

Alien Plants of Malta and Sicily



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Alien Plants
of Malta and Sicily



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Authors

Stephen Mifsud
Pietro Minissale
Sonia D'Agostino
Saverio Sciandrello

Arthur Lamoliere
Sandra Biondolillo
Rosaria Chiara D'Urso
Giulia Bacilliere

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Anna Anichkova

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Introduction

Sicily and Malta are known for their unique biodiversity and stunning natural landscapes. However, alongside their rich native flora, both territories have been impacted by many invasive alien plant species. Alien plants are non-natives, introduced to an area outside their natural distribution range through various means, but typically aided by international trade and tourism. Human activities, such as trade, travel, and horticulture, have led to these plants' unintentional or intentional introduction to new environments, albeit occasionally, birds or animals are the vectors of introduction. Initially, most alien plant species were agricultural crops, fruit trees and some medicinal plants, but later, especially since the 19th century, many introduced plants were decorative plants or ornamental trees. While some alien plants coexist harmoniously with native species, others become invasive, spreading aggressively and displacing native flora. Their presence has significant ecological and economic consequences, especially when dealing with invasive alien plant species.

Invasive plants often outcompete native species for resources such as water, light, nutrients, or space, leading to a decline in the native plant populations, sometimes leading to the local extinction of native species. The loss of native flora can disrupt the intricate balance of the ecosystem, affecting other organisms associated or dependent on them, such as insects and their larvae, birds, and mammals that live or rely on native plants for food and habitat. Invasive species may also alter the physical characteristics of habitats, leading to changes in soil composition, water availability, and fire regimes. These alterations can have cascading effects on the overall ecological functioning of the affected areas.

As a result, the removal of invasive species has become an obligation (sometimes at the European level), and such measures are often expensive and difficult to reach a desirable success - either because of their cumbersome size (e.g. *Acacia* spp., *Agave* spp. and *Opuntia* spp.) or their persistence and fast spreading habit (e.g. *Cardiospermum* spp., *Carpobrotus* spp. and *Pennisetum* spp.). The best example we can give for an invasive species is the Cape wood-sorrel (*Oxalis pes-caprae*), which became the most abundant plant in the Maltese archipelago, in only 150 years since its first introduction at the beginning of the 19th century. In addition to ecological impacts, invasive plants can also affect the agricultural sector, as they compete with crops for resources and reduce crop yields, thereby impacting the economy.

By understanding the causes and impacts of invasive plants and implementing effective management strategies, both Sicily and Malta can work towards mitigating the negative effects and preserving their unique natural heritage. Continued research, collaboration, and public engagement are essential in maintaining the ecological balance and protecting the native plant species for future generations to enjoy. This booklet provides ground knowledge on several alien species occurring in Malta and some selected species found in Sicily.

Acacia cyclops

A. Cunn. ex G. Don



(Spermatophyta >> Magnoliopsida (Rosids) >> Fabales
>> Fabaceae >> Caesalpinioideae)
Phylum >> Class >> Order >> Family >> Subfamily

Main synonyms

Acacia cyclopis Loudon; *Acacia eglandulosa* D. C.; *Acacia mirbelii* Dehnh.; *Racosperma eglandulosum* (D. C.) Pedley.

Common English names

Coastal Wattle; One-eyed Wattle; Cyclops Wattle; Red-eyed Wattle; Red-wreath acacia; Western coastal wattle; Rooikrans.

Common Maltese names

Gažżija tal-għajn; Akaċja tac-Ċiklopi; Gažżija tac-Ċiklopi.

Common Italian names

Acacia dei ciclopi.

Short description

Deciduous or evergreen unarmed shrub about 2m high, rarely growing as a small tree if in sheltered locations, reaching a height of up to 4 m. Bark mahogany-brown, initially smooth then becomes roughly fissured and greyish brown with age. Twigs numerous, pendent forming a dome-shaped canopy, bearing modified enlarged petioles acting as leaves known as phyllodes (the real leaflets drop down prematurely). Phyllodes 3 – 8 × 0.5 – 1.6 cm, narrowly oblong to linear oblanceolate with an obtuse and mucronate tip, glabrous, dark-green with 3-6 longitudinal veins. Inflorescence a shortly-pedunculate raceme of two to three (sometimes solitary) globular flower heads about 5 mm in diameter composed of tiny, yolk-yellow florets. Legume 40–120 × 9–13 mm, flattened, coiled or spirally twisted, not or marginally constricted between the seeds, reddish-brown. Seeds 5–7 × 3–4 mm in size, brownish-black with a conspicuous and characteristic red or amber funicle (aril) encircling the seed in a double-fold border making it look like an eye.

Place of origin and global distribution

Native to Western Australia but naturalised in subtropic and temperate regions worldwide, especially in coastal areas.

Distribution in Malta

Cultivated and naturalised throughout mainland Malta, especially in the south and central parts. Examples include Siġġiewi, Haż-Żebbuġ, Hał-Saptan, Hał-Far (Żurrieq), Għajn Tuffieħa, Marfa (close to the red tower) and I-Aħrax tal-Mellieħa. Not reported in Gozo but a few specimens might exist too.

Distribution in Sicily

Contrada Sanguedolce and Contrada Taccio Vecchio (Lampedusa Island), Monte Bandiera (Linosa Island).

Life-form

Phanerophyte.

Introduction source

Cultivated for afforestation and embellishment near the coast.



Habitat or preferred invading habitat

Valley sides, fields or abandoned agricultural areas, or sides of roads and paths in semi-urban and rural areas.

Frequency in Malta

Rather scarce, but increasing gradually.

Frequency in Sicily

Rare/uncommon.

Mode of dispersion

Seeds that are primarily dispersed by water streams after heavy rain or by strong wind, which may be carried away into crevices in rocky ground, paths or roads.

First record in Malta

Introduced sometime in the eighties since it is not reported in Haslam et al. (1977), probably after the popular introduction of *Acacia saligna*. First published record is likely the ecological report by Fava et al. (1997) at Għajn Tuffieħa.

First record in Sicily

The first *A. cyclops* was observed growing wild in the 70s near a private orchard at Contrada Sanguedolce, Lampedusa Island (Pasta et al. 2012).

Ecology

Trees form many seed pods at the beginning of summer which give rise to a large number of seeds. The germination rate is higher in damp or wet locations. Seedlings form mature trees in a short period of time.

Possible control methods

Manual cutting of aerial parts with standard gardening or agricultural equipment, during winter-spring when the trees are devoid of ripe fruit.

Invasive category/local potential threat

Medium-Low.

Remarks

Not as invasive as the other *Acacia* / *Vachellia* species recorded in the Maltese Islands.

Referenced bibliography

- Fava G., Micallef S., Lanfranco S. & Schembri, P. J., 1997. An ecological survey of the Ghajn Tuffieha area prepared for the Gaia Foundation as part of the management plan for the area. Malta University Services Ltd., Msida, Malta, 51 pp.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Pasta S., Badalamenti E. & La Mantia T., 2012. *Acacia cyclops* A. Cunn. ex G. Don (Leguminosae) in Italy: first cases of naturalisation. *Anales del Jardín Botánico de Madrid*, 69 (2): 193-200.

Acacia saligna (Labill.) H. L. Wendl.



(Spermatophyta >> Magnoliopsida (Rosids) >> Fabales
>> Fabaceae >> Caesalpinioideae)
Phylum >> Class >> Order >> Family >> Subfamily

Main synonyms

Acacia bracteata Maiden & Blakeley; *Acacia cyanophylla* Lindl.

Common English names

Blue-leaved Acacia; Blue-leaved Wattle Blue; Wattle, Silver Wattle; Jackson Willow; Port Jackson Wattle; Weeping Wattle; Western Australian golden wattle; Coojong.

Common Maltese names

Gažżija Kommuni; Akaċja.

Common Italian names

Acacia, Mimosa, Gaggia.

Short description

Fast-growing, evergreen, thornless shrub or small tree, reaching a height of 2 – 9 m, with smooth grey bark, later greyish-brown and minutely fissured. Twigs glaucous, pendent forming numerous modified, enlarged petioles acting as leaves known as phyllodes. Phyllodes 10 – 32 × 0.6 – 2.8 cm, narrowly lanceolate, somewhat asymmetrical and falcate, more or less glaucous, 1-veined; but abnormally larger (up to 8 cm wide) and ovate on sucker shoots. The inflorescence a raceme of two to six globular compound flower heads about 10–16 mm in diameter with golden yellow florets. Legume 60-130 × 4-9 mm, flattened, distinctly constricted between the seeds, glaucous when young, later brownish. Seeds dark brown and almost black with a white or pale grey funicle at one end, shiny, flattened and aligned serially (end-to-end) inside the pod.

Place of origin and global distribution

Native to the Western part of South Africa. Naturalised in several tropical, subtropical and warm temperate regions, including Europe.

Distribution in Malta

Throughout the Maltese Islands, except Cominotto and the islets. Particularly abundant such as along Wied il-Qlejgħa, Ghajn Mula and Ghajn Rihana valley system, I-Aħrax tal-Mellieha, opposite Ta' Pinu Church (Gozo) and several other places especially agricultural land.

Distribution in Sicily

Coastal areas of Sicily (Bazan & Speciale 2005), Isola Bella (Minissale et al. 2005); Pantalica (Minissale et al. 2007); Torre Manfreda, Gela (Guarino et al. 2008); Vendicari (Minissale & Sciandrello 2010); Capo Murro di Porco, Siracusa (Minissale et al. 2011), Taormina (Sciandrello et al. 2014); Macconi di Gela (Sciandrello et al. 2015), Nature Reserve “Pantani della Sicilia sud-orientale” (pers. obs.), Coastal area of Simeto (pers. obs.), Nature Reserve “Saline di Priolo” (pers. obs.).

Life-form

Phanerophyte.

Introduction source

Escape from ornamental cultivation and deliberate plantations for hunting purposes.

Habitat or preferred invading habitat

Wetlands and semi-wetland habitats, clayey fields either abandoned or still owned and taken care of by farmers or hunters, coastal dunes and coastal shrubs (2210 *Crucianellion maritimae* fixed beach dunes, 2250*Coastal dunes with *Juniperus* spp.; 5330 Thermo-Mediterranean and pre-desert scrub).

Frequency in Malta

Locally frequent forming established populations in a short period of time.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Seeds that are primarily carried away by water streams after rain in rural areas or dragged in crevices by wind in urban areas.



First record in Malta

Haslam et al. (1977).

First record in Sicily

Villa Trabia (Palermo) late 19th and early 20th century (Ostinelli 1910).

Ecology

Trees form seed pods almost regularly throughout the year, except in winter and early spring. Fruit production is at its peak at the beginning of summer. Seeds germinate readily and forms mature trees in a short period of time, sometimes even after one year if found in optimal growing conditions (abundant water, nutrients and sun).

Possible control methods

Manual cutting of aerial parts with standard gardening or agricultural equipment during winter-spring when the trees are devoid of ripe fruit.

Invasive category/local potential threat

Medium-high.

Remarks

Introduced and cultivated at a large scale between the 1960s and mid-1980s as a fast-growing tree from afforested areas in a short period of time and later for hunting purposes. Gradually, it was replaced by other trees as it was thought that its copious pollen is responsible to cause allergic rhinitis and recently because its cultivation is prohibited by law.

Referenced bibliography

Bazan G. & Speciale M., 2005. Processi di spontaneizzazione in Sicilia di *Acacia saligna* (Mimosaceae, Magnioliophyta). *Quaderni di Botanica ambientale applicata*, 12 (2001): 99-100.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20: 5-582.

- Guarino R., Minissale P. & Sciandrello S., 2008. Analisi della biodiversità vegetale e relativa cartografia del pSIC “Torre Manfria” (Sicilia meridionale). *Quaderni di Botanica ambientale applicata*, 19: 37-66.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Minissale P. & Sciandrello S., 2010. Flora e vegetazione terrestre della Riserva Naturale di Vendicari (Sicilia sud-orientale). *Ente Fauna Siciliana*, 12: 145-208.
- Minissale P., Santo A. & Sciandrello S., 2011. Analisi geobotanica del SIC “Capo Murro di Porco, Penisola della Maddalena e Grotta Pellegrino” (Siracusa, Sicilia). *Fitosociologia*, 48 (2): 77-98.
- Minissale P., Sciandrello S. & Spampinato G. 2005. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata Isola Bella e del territorio circostante (Taormina – ME – Sicilia). *Quaderni di Botanica ambientale applicata*, 16: 175-208.
- Minissale P., Sciandrello S. & Spampinato G. 2007. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata “Pantalica, Valle dell’Anapo e Torrente Cava Grande” (Sicilia sud-orientale). *Quaderni di Botanica ambientale applicata*, 18: 241-303.
- Ostinelli V., 1910. Villa Trabia. Tipografia Priulla, Palermo.
- Sciandrello S., D’Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains-NE Sicily). *Webbia: Journal of Plant Taxonomy and Geography*, 69 (2): 301–324.
- Sciandrello S., Tomaselli G. & Minissale P., 2015. The role of natural vegetation in the analysis of the spatio-temporal changes of coastal dune system: a case study in Sicily. *Journal of Coastal Conservation*, 19: 199–212.

Aeonium arboreum (L.) Webb & Berth.



(Spermatophyta >>
Magnoliopsida >>
Saxifragales >> Crassulaceae)
Phylum >> Class >> Order
>> Family

Main synonyms

Aeonium doremae Webb ex Christ; *Aeonium manriqueorum* Bolle.

Common English names

Tree aeonium; Tree houseleek; Irish rose.

Common Maltese names

Widnet il-Kalli; Siġret il-Kalli.

Common Italian names

Semprevivo arborescente; Aeonium arborescente.

Short description

Perennial shrubs, with erect, somewhat woody stems 40–80 cm tall, stout, with suberect branches, marked by conspicuous leaf-scars. Leaves alternate, crowded into terminal rosettes, 3–6 × 2–3 cm or smaller, glossy bright green but some varieties have copper brown or glaucous colours, succulent, oblanceolate to cuneate, margin slightly denticulate or/and ciliate. Flowers 10-merous, in a compound conical panicle up to 25 cm long subtended on a stout peduncle up to 50 cm. Petals are 5, free, 6–7 mm long, bright yellow, cuneate with a pointed apex. Stamens twice as many as the petals around a central pistil. Seeds minute, in an inoperculate dehiscent capsule.

Place of origin and global distribution

Native to Mexico but naturalised in some African countries such as Tanzania and Kenya, Australia and the Mediterranean region.

Distribution in Malta

MALTA: Rabat (Wied l-Isaqof), Siġġiewi (Wied Xkora), Birkirkara, Mġarr, Qormi (farms near Wied il-Kbir). GOZO: iż-Żebbuġ (cliffs facing Għasri), Mġarr ix-Xini (close to the bay), Xagħra (escarpments facing Wied tal-Egħzien), Qala (near tal-Wardiġa Promenade), and Għajnsielem (facing Xatt l-Aħmar).

Distribution in Sicily

M. Catalfano (Tineo) (Gussone 1843, Lojacono 1891, Mazzola 1983), Isola Bella (Minissale et al. 2005), Cliffs of Taormina (Sciandrello et al. 2014).

Life-form

Chamaephyte. Succulent.

Introduction source

Introduced for horticulture use and escaped through dumped plants and possibly deliberate planting in fields and farmhouses.

Habitat or preferred invading habitat

Rocks, rubble walls, boulders and boulder scree, disturbed stony ground.

Frequency in Malta

Frequent in many sites, but usually as individuals or a restricted population.

Frequency in Sicily

Not Common (Giardina et al. 2007).

Mode of dispersion

Propagation mainly through dumped plants and relic cultivation given that seeds do not seem to germinate or able to produce mature plants.

First record in Malta

Zerapha (1831).

First record in Sicily

M. Catalfano (Tineo) (Gussone 1843).

Ecology

Plants flower in January-February and are visited by some pollinators. Fruits are formed a month later. Plants remain evergreen all year round.

Possible control methods

Uprooting and gathering of broken stems since they may root during the wet seasons.

Invasive category/local potential threat

Low.

Remarks

Despite numerous seeds are produced, plants rarely form a population. It might be some hybridogenous horticultural variety.

Referenced bibliography

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Gussone J., 1843. *Florae Siculae Synopsis* 1. Neapoli.

Lojacono Pojero M., 1891. *Flora Sicula*, 1 (2). Palermo.

Mazzola P., 1983. Osservazioni su alcune esotiche spontaneizzate in Sicilia. *Nuovo Giornale Botanico Italiano*, n. ser., 115 (6) (1981): 407.

Minissale P., Sciandrello S. & Spampinato G., 2005. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata Isola Bella e del territorio circostante (Taormina – ME – Sicilia). *Quaderni di Botanica ambientale applicata*, 16: 175-208.

Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains-NE Sicily). *Webbia: Journal of Plant Taxonomy and Geography*, 69 (2): 301–324.

Zerapha S., 1831. *Flora Melitensis Thesaurus*, fasc. alter: 69. Valletta.



Agave americana L.



(Spermatophyta >> Liliopsida >>
Asparagales >> Asparagaceae)
Phylum >> Class >> Order
>> Family

Main synonyms

Agave altissima Zumaglini; *Agave expansa* Jacobi; *Agave europaea* Visiani; *Agave ramosa* Moench; *Agave spectabilis* Salisbury; *Agave picta* Salm-Dyck; *Agave ingens* A. Berger var. *picta* (Salm-Dyck) A. Berger; *Agave theometel* Zuccagni.

Common English names

Century Plant; American Aloe; Maguey.

Common Maltese names

Sabbara tal-Amerika; Agave komuni.

Common Italian names

Agave Americana.

Short description

Very robust, rhizomatous and stoloniferous perennial plant with a life span of up to about 30 years. Stem scarcely developed and may be present in old specimens, but surrounded and hidden by a rosette of huge leaves. Leaves ensiform, very fleshy and with strong fibres, 100–200 cm × 15–25 cm, constricted close to the base, glaucous (variegated in yellow or grey in var. *marginata* Trel.), remotely spinose-dentate, with a stout, hardened, blackish terminal spine 1–3 cm long. Flowering stalk 4–10 m long, terete, forming a panicle of flowers, produced once, then the plant dies away after seed dispersal (monocarpic species). Panicle pyramidal, huge sometimes up to 7 m high in large specimens; flowers aggregated in dense clusters at the ends of horizontal branches. Flowers tubular, 70–90 mm long including the inferior ovary; perianth-segments linear-oblong, obtuse, erect, greenish-yellow. Stamens and style strongly exerted; filaments tapering gradually from base to apex; 70–80 mm long, inserted on the hypanthial tube; anthers introrse, 30–35 mm. Capsule oblong 4–8 cm, trigonous with a pointed tip. Seeds flat and winged, 6–8 mm long, shiny blackish-brown, dispersing by wind. Apart from flowers, the flowering branches produce viviparous young plantlets, usually more numerous than the flowers.

Place of origin and global distribution

Southern region of North America (e. g. Arizona and Texas) and Mexico.

Distribution in Malta

Widely distributed in rocky areas, especially near the coast. Largest population occurring at Baħar iċ-Ċagħaq near Magħtab and Għallis.

Distribution in Sicily

From Capo Lilibeo to Ronciglio, Marsala (Aleo et al. 2004); Isola Bella (Minissale et al. 2005); Marettimo Island (Gianguzzi et al. 2006);

Levanzo Island (Romano et al. 2006); Ragusa (Licitra & Napoli, 2011); Tindari (Licandro et al. 2011), Pizzo di Cane, Comune di Ventimiglia di Sicilia (Caldarella et al. 2013); Taormina (Sciandrello et al. 2014); Archaeological Park of Selinunte (Scafidi & Raimondo 2019); Palermo (Domina et al. 2019); Mouth of Irminio (pers. obs.), Regional Natural Reserve “Pantani della Sicilia sud-orientale” (pers. obs.), Coastal area of Simeto river (pers. obs.).

Life-form

Nanophanerophyte, succulent plant.

Introduction source

Cultivated as an exotic and low-maintenance plant in large gardens, parks embellishments.

Habitat or preferred invading habitat

Arid rocky ground close to the coast, but often seen in garigue, steppe, maquis and abandoned fields. Uncultivated land, hedges, road edges, olive groves, both cultivated and spontaneous.

Frequency in Malta

Common, becoming very common and dominating in some invaded sites.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Propagation by seeds and more successfully by viviparous plantlets.

First record in Malta

Mentioned first by Sommier & Caruana Gatto (1915) as a cultivated plant (they didn't refer to being naturalised) while Borg (1927) gives a number of naturalised sites namely Buskett, Addolorata Cemetery, Blata l-Bajda, Mellieħa, Mdina in mainland Malta and Xlendi and Mġarr in Gozo (also in Comino).

First record in Sicily

Species introduced in Italy in the 16th century (Padova 1561, Pisa 1583, Firenze 1586). For Sicily, Lojacono (1908) indicates it has been present since ancient times probably after the dates indicated for Italy.

Ecology

Plant remains vegetative throughout their entire life until they form a single inflorescence before they die. Their large inflorescence produces hundreds to a few thousands of flowers and viviparous plantlets. Born on high flowering stalks plantlets travel to a few meters away by wind when they drop down or when the stalk falls horizontally to the ground. Moreover, fruit capsules, release numerous wind-dispersed seeds that in strong wind, they can travel a few kilometres away. Although there are no specific local studies, it appears that seeds are viable from the distribution pattern of some populations.



Possible control methods

Mechanical removal is obligatory due to the huge and bulky size of the plants. Removal of four large plants by hand using chainsaws and employing four men took 8 hours of work.

Invasive category/local potential threat

Very high.

Remarks

It is not clear if during the observations of Sommier & Caruana Gatto (1915), the species was not already naturalised, since they do not mention any specific naturalised sites. If this is the case, then the species have rapidly naturalised during the following ten years or so because Borg (1927) records several naturalised populations. On the other hand, it may have already escaped but Sommier & Caruana Gatto (op. cit.) neglected to specify about being naturalised. Apart from the three or four recorded species in the wild, there are other *Agave* species occurring in the Maltese Islands and currently lumped or overlooked as *Agave americana* (pers. observation, Stephen Mifsud). However, their management and eradication protocols are the same for all *Agave* spp.

Referenced bibliography

- Aleo M., Bazan G. & Cordi R., 2004. Le piante vascolari del litorale trapanese: da Capo Lilibeo a Ronciglio. *Quaderni di Botanica ambientale applicata*, 15: 83-98.
- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Caldarella O., Gianguzzi L., Romano S. & Fici S., 2013. The vascular flora of Nature Reserve "Pizzo Cane, Pizzo Trigna and Grotta Mazzamuto" (NW Sicily). *Webbia*, 64: 101-151.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.

- Gianguzzi L., Scuderi L. & Pasta S., 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia*, 61 (2): 359-402.
- Licandro G., Marino P. & Raimondo F. M., 2011. Flora e vegetazione della Riserva Naturale Orientata "Laghetti di Marinello" (Sicilia nord-orientale). *Informatore Botanico Italiano*, 43 (2): 333-351.
- Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.
- Lojacono Pojero M., 1908. Flora Sicula III volume. Palermo.
- Minissale P., Sciandrello S. & Spampinato G. 2005. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata Isola Bella e del territorio circostante (Taormina – ME – Sicilia). *Quaderni di Botanica ambientale applicata*, 16: 175-208.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Scafidi F. & Raimondo F. M., 2019. Contribution to the vascular flora of the archaeological park of Selinunte and Cave of Cusa (South-Western Sicily, Italy): preliminary results. *Boccone*, 28: 371-390.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains-NE Sicily). *Webbia: Journal of Plant Taxonomy and Geography*, 69 (2): 301-324.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.

Agave attenuata Salm-Dyck



(Spermatophyta >> Liliopsida >> Asparagales >>
Asparagaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Agave cernua A. Berger; *Agave debaryana* Jacobi; *Agave glaucescens* Hook.; *Agave kellocki* Jacobi; *Agave pruinosa* Lem. ex Jacobi.

Common English names

Foxtail Agave; Lion's Tail Agave; Swan's Neck Agave.

Common Maltese names

Agave milwija.

Common Italian names

Agave attenuate.

Short description

Robust, rhizomatous perennial plant with a life span of about 10–12 years. Stem usually developed, 50–120 cm high, woody, visible in mature plants, although sometimes hidden by the rosette of leaves in young plants. Offsets develop and root at the base of the stem or rosette, which over time they expand and form a cluster of rosettes. Leaves broadly ovate then acuminate towards the tip, very fleshy, 40–70 m × 12–20 cm, glaucous and light green, margin and tip smooth and spineless, although some old leaves may have a hardened tip. Flowering stalk 2–5 m long, terete, erect then recurved and drooping, giving rise to a dense raceme of light-yellow flowers. Inflorescence produced once, then the plant dies away after seed dispersal (monocarpic). Flowers tubular, 20–40 mm long including the inferior ovary, born on short, thick pedicels perianth-segments linear-oblong, pale green to yellowish-green. Stamens strongly exerted; filaments filiform, rigid, 50–65 mm long, distinctly longer from the perianth, inserted at the lower part of the perianth tube; anthers yellow, introrse. Blooming starts at the bottom of the raceme and gradually moves upwards towards the tip, taking about four weeks for complete blooming. Capsule elongated elliptic, 15–22 mm long, rounded at the apex, bright green. Seeds scale-like, winged by a thin membrane, dispersed by wind. Viviparous plantlets not produced, at least in cultivation.

Place of origin and global distribution

Mexico.

Distribution in Malta

Seen here and there in cultivation but rarely in the wild. Some plants are present at San Martin area and at I-Añrax tal-Mellieña, probably deliberately planted in the wild.

Distribution in Sicily

Species cultivated in coastal areas in some of which its diffusion as a casual species is documented: Isola Bella, Taormina (Minissale et al. 2005); Taormina (pers. obs.), Linosa Island (Pasta et al. 2017).

Life-form

Nanophanerophyte, succulent plant.

Introduction source

Cultivated as an exotic and low-maintenance plant in large gardens, parks and less often as street embellishment.

Habitat or preferred invading habitat

Arid rocky ground.

Frequency in Malta

Rare in natural ecosystems, more common in cultivation.

Frequency in Sicily

Not Common.

Mode of dispersion

Only by offshoots from the mother plants or by cuttings propagated by man.

First record in Malta

Not recorded in historical literature, including the flora by Haslam et al. (1977); hence its introduction in Malta is relatively recent compared to other species of *Agave* occurring locally. The first official mention of this species in literature is possibly by Weber (2008), but it may have been mentioned vaguely in some local horticultural books.

First record in Sicily

It has been used for a long time as an ornamental species but there is no information on its introduction. Currently, as indicated by Galasso et al. (2018) it is to be considered a casual species for Sicily.

Ecology

Monocarpic species, where the plant remains vegetative throughout their entire life until they form a single inflorescence before they die. However, during its lifespan, an individual forms several younger offsets that expand radially and hence the plant remains alive and vigorous indefinitely through its clones. Despite hundreds of flowers and fruit capsules are produced, this *Agave* does not form viable seeds in Malta. Naturalised populations are not yet reported or documented.



Possible control methods

Mechanical removal is obligatory due to the huge and bulky size of the plants.

Invasive category/local potential threat

Low.

Remarks

This species is not invasive as *A. sisalana* and *A. americana*, likely because, unlike these species, *A. attenuata* does not produce viviparous propagules (plantlets). Moreover, viable seeds have not been detected when fruiting specimens have been examined (pers. obs. S. Mifsud) and hence propagation is restricted to vegetative budding from the underground rhizomes.

Referenced bibliography

- Galasso G., Conti F., Peruzzi L., et al., 2018. An updated checklist of the vascular flora alien to Italy. *Plant Biosystems*, 152 (3): 556–592.
- Minissale P., Sciandrello S. & Spampinato G., 2005. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata Isola Bella e del territorio circostante (Taormina – ME – Sicilia). *Quaderni di Botanica Ambientale Applicata*, 16: 175-208.
- Pasta S., Ardenghi N. M. G., Badalamenti E., La Mantia T., Livreri Console S. & Parolo G., 2017. The alien vascular flora of Linosa (Pelagie Islands, Strait of Sicily): update and management proposals. *Willdenowia*, 47 (2): 135–144. <https://doi.org/10.3372/wi.47.47205>.
- Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.

Agave sisalana Perrine



(Spermatophyta >> Liliopsida >>
Asparagales >> Asparagaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Agave anacantha A. Terracciano.

Common English names

Sisal, Sisal Hemp.

Common Maltese names

Agave tas-Sisal.

Common Italian names

Agave sisalana.

Short description

Very robust, rhizomatous perennial plant, with a life span up to 25 years. When developed, stem short and surrounded by a rosette of huge leaves. Leaves ensiform, very fleshy, 60–150 cm × 10–15 cm, dull to greyish green with a waxy cuticle, spineless at the margin, sometimes small spines are present in young leaves which disappear as they mature, but possess a rigid, dark brown terminal spine, 2–3 cm long. Flowering stalk 3–6 m long, terete, forming a panicle of flowers, produced once, then the plant dies away after seed dispersal (monocarpic). Panicle pyramidal, huge sometimes up to 3 m high in large specimens; flowers aggregated in dense clusters at the ends of horizontal branches. Flowers tubular, 50–65 mm long including the inferior ovary; perianth-segments linear-oblong, obtuse, erect, greenish-yellow. Stamens and style strongly exerted; filaments tapering gradually from base to apex; 50–65 mm long, inserted mid-way the perianth tube; anthers yellow, introrse. Capsule rare, 5–6 cm long, oblong-oval with a pointed tip. Seeds are seldom produced. Flowering branches produce viviparous young plantlets, sometimes more numerous than the flowers. It seems that the species has reverted to this mode of reproduction since if produced, seeds are not very viable.

Place of origin and global distribution

Mexico.

Distribution in Malta

Scarce-frequent distribution, not frequently naturalised as *A. americana* L. but often found admixed with it. The largest population occurs at Pembroke and Baħar iċ-Ċagħaq near Magħtab and Għallis.

Distribution in Sicily

Sicilia (Mazzola 1983); M. Pellegrino (Raimondo 1992); Marettimo Island (Gianguzzi et al. 2006); Levanzo Island (Romano et al. 2006); Tindari, Patti (Licandro et al. 2011).

Life-form

Nanophanerophyte, succulent plant.

Introduction source

Cultivated as exotic and low-maintenance plants in large gardens, parks and embellishments, escaping and naturalising in rocky areas.

Habitat or preferred invading habitat

Arid rocky ground close to the coast, but often seen in garigue, steppe, maquis and abandoned fields. Uncultivated land, hedges, and road edges.

Frequency in Malta

Infrequent in natural ecosystems, probably still more frequent in cultivation.

Frequency in Sicily

Rare (Giardina et al. 2007).

Mode of dispersion

Propagation by viviparous plantlets produce on the inflorescence branches.



First record in Malta

First mentioned by Borg (1927) from Buskett and Blata l-Bajda as naturalised populations and also states that it was used as an ornamental plant since 1900.

First record in Sicily

It has been used for a long time as an ornamental species but there is no information about its introduction in Sicily.

Ecology

Plant remains vegetative throughout their entire life until they form a single inflorescence before they die. When it flowers, hundreds or even a few thousands of flowers and viviparous plantlets are produced. Being borne on high flowering stalks, plantlets travel to a few meters away by wind when they are blown away or when the stalk falls horizontally to the ground. Seeds are not produced and perhaps explains in part why it is not invasive and widespread as *A. Americana*.

Possible control methods

Mechanical removal is obligatory due to the huge and bulky size of the plants. Removal of four large plants by hand using chainsaws and employing four men took 8 hours of work.

Invasive category/local potential threat

Moderate-high.

Remarks

Apart from the three or four recorded *Agave* species in the wild, other *Agave* species occur in the Maltese Islands but are currently lumped or overlooked as *Agave americana* or *A. sisalana* (pers. obs. Stephen Mifsud). However, their management and eradication protocols are the same as the other known naturalised *Agave* spp.

Referenced bibliography

- Borg J., 1927. Descriptive Flora of the Maltese Islands. Malta, Government Stationery Office, 846 pp.
- Gianguzzi L., Scuderi L. & Pasta S., 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia*, 61 (2): 359-402.
- Licandro G., Marino P. & Raimondo F. M., 2011. Flora e vegetazione della Riserva Naturale Orientata "Laghetti di Marinello" (Sicilia nord-orientale). *Informatore Botanico Italiano*, 43 (2): 333-351.
- Mazzola P., 1983. Osservazioni su alcune esotiche spontaneizzate in Sicilia. *Nuovo Giornale Botanico Italiano*, n. ser., 115 (6) (1981): 407.
- Raimondo M. F., 1992. Studio e catalogazione della flora, della vegetazione e delle emergenze botaniche ed ambientali del Monte Pellegrino (Palermo). Palermo.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.

Ailanthus altissima (Mill.) Swingle



(Spermatophyta >> Magnoliopsida (Rosids) >> Sapindales
>> Simaroubaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Ailanthus erythrocarpa Carrière; *Ailanthus giraldii* Dode; *Ailanthus glandulosa* Desf.; *Ailanthus vilmoriniana* Dode; *Toxicodendron altissimum* Mill.

Common English names

Tree of Heaven, Varnish tree.

Common Maltese names

Xumakk falz.

Common Italian names

Ailanto; Albero del paradiso.

Short description

Deciduous tree growing up to 25 m high or even more in its native habitat; trunk smooth with light greyish bark, branches reddish and with a yellowish-brown pubescence when young then becoming pale and smooth. Leaves compound, imparipinnate, large, up to 60 cm long composed of 15–25 nearly opposite, lanceolate leaflets, sometimes the proximal ones slightly lobed, 6–12 × 3–4 cm with their base asymmetric, subtruncate to shallowly cordate and the tip acute-acuminate; dark green above, lighter below, with prominent, whitish veins emitting a foetid, rubber-like scent when crushed. Inflorescences a large panicle 12–30 cm long. Flowers 5-merous, rather small, 5–7 mm across; sepals overlapping, tiny; petals 2–3 mm long with hispid base; stamens 10, densely hispid at the lower half, longer than the corolla in male flowers, shorter in females; ovary with 5 carpels and 5-lobed stigma. Fruit a samara, oblong-lanceolate, slightly twisted, 3–5 cm long and about 1 cm wide, cream, pink or pale green (or mixed colours) with seed located in the middle.

Place of origin and global distribution

China, Taiwan and North Korea, but became widely distributed and naturalised in most warm parts of the world in all habitable continents.

Distribution in Malta

Found in many places throughout mainland Malta (e. g. Buskett, Wied tal-Qlejgha, Attard), Comino (e. g. near Santa Marija Bay and chapel) and less frequent in Gozo (e. g. Mgarr valley and Għajnielem).

Distribution in Sicily

The species is abundantly present throughout the Sicilian territory, including all the archipelagos with the exception of Marettimo.

Life-form

Phanerophyte.

Introduction source

Introduced both in Malta and Sicily as an ornamental tree for

embellishing roads and city squares sometime in the second half of the 19th century. Like in neighbouring countries, it may have the fame for breeding silk moths namely *Bombyx cynthia*.

Habitat or preferred invading habitat

Prefers water courses, damp disturbed ground (but seldom found on clay slopes), roadsides, occasionally near old farms. Invasive in abandoned fields, roadsides, ruins; also cultivated as ornamental.

Frequency in Malta

Locally frequent, and invasive but do not spread long distances from the original plantation or occurrence.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Samaras are dispersed by seeds but probably most populations have been introduced by man and expanded vegetatively by suckers and maybe seeds that fall close by.

First record in Malta

Gulia (1855-56).

First record in Sicily

Ailanthus altissima has been present in Sicily for over two centuries. It figures for the first time in the floristic list drawn up by Giuseppe Tineo, the first director of the Botanical Garden of Palermo. An important role in the diffusion of the species was played by the Baron Francesco Anca, who founded the Acclimation and Agriculture Society in Palermo in 1861 with the aim of using the species in agriculture, but also for ornamental purposes in urban areas (Badalamenti et al. 2012).

Ecology

Trees are dormant throughout most winter and produce leaves end of spring and shortly after the inflorescences. Winged seeds are set in June-July and possibly germinate from first rains at the end of summer. However, since these wind-dispersed fruits are set during the early summer month that wind is not prevalent, dispersion to long distances by wind is not successful in Malta. In Sicily the species

is now naturalised, and spreads creating monospecific populations of modest size. Confirming its high ecological plasticity, *Ailanthus* grows at very different altitudes (from 0 m above sea level to 1300). *Ailanthus* grows well both in areas characterized by hot and arid climates, and in cool and humid areas, with high rainfall rates.

Possible control methods

Uprooting trees and destroying the thick roots below ground. Could be very challenging and expensive due to the large size of mature trees.

Invasive category/local potential threat

Natural expansion of populations is very low but local invasiveness is high, where copses of *Eucalyptus* decrease remarkably the vegetation growing under and close to them.



Remarks

Highly invasive in many parts where it was introduced through dispersion of samaras primarily by wind but also by water streams (Kowarik & Säumel 2008). However, since its wind-dispersed fruit are set during the early summer months where strong wind is not prevalent and water streams are rare, long-distance dispersion of seeds is not successful in Malta. Although populations do expand rapidly (e. g. at Comino) they remain isolated and it is likely that a large part of the local distribution has been introduced by man, either as an ornament or likely to be used for breeding silk moth which was a rather popular habit in the past for obtaining silk.

Referenced bibliography

- Badalamenti, E., Barone, E., Pasta, S., Sala, G., & La Mantia, T., 2012. *Ailanthus altissima* (Mill.) Swingle (Simaroubaceae) in Sicilia e cenni storici sulla sua introduzione in Italia. // *Naturalista siciliano*, 34 (1): 117-164.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20: 5-582.
- Gulia G., 1855-56. Repertorio Botanico Maltese. Malta, 68 pp.
- Kowarik I. & Säumel I., 2008. Water dispersal is an additional pathway to invasions by the primarily wind-dispersed tree *Ailanthus altissima*. *Plant Ecology*, 198: 241-252. DOI: 10.1007/s11258-008-9398-x.

Amaranthus blitoides S. Watson



(Spermatophyta >> Liliopsida >> Asparagales >>
Asparagaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Amaranthus reverchonii (Uline & W.L. Bray) Kov.; *Amaranthus aragonensis* Sennen; *Amaranthus blitoides* S. Watson var. *flexuosus* Sennen.

Common English names

Mat amaranth; Prostrate pigweed.

Common Maltese names

Għobbejra tal-art.

Common Italian names

Amaranto blitoide.

Short description

Herbaceous, annual plant, prostrate and not higher from 10–15 cm from the ground, with trailing and divaricately branching stems reaching up to 70 cm in length. Leaves alternate, petiolate (ca. 8 mm long); abundant; lamina obovate or oblong, 0.5–3.0 × 4–10 mm, with a cuneate base, an obtuse apex often ending in a short bristle and an entire margin usually paler and whitish. Flowers small in dense clusters at the axils of leaves or branches, reddish-amaranth. Bracts and bracteoles about 3 mm long, lanceolate, slightly longer from the perianth segments. Perianth segments 4–5, ovate-lanceolate or almost oblong 1.0–2.5 mm long with an acuminate pointed apex. Utricles green, subequal to the perianth, broadly globose-prolate (slightly compressed dorsally), about 2.0 mm wide, smooth to slightly verrucose, circumscissile dehiscence. Seeds black, broadly lenticular, 1.2–1.7 mm in diameter, smooth and slightly glossy.

Place of origin and global distribution

Likely originating from the central and eastern regions of North America. Widely naturalised in subtropical and temperate regions worldwide, such as the Mediterranean area.

Distribution in Malta

Widespread throughout the main islands.

Distribution in Sicily

Sampieri (Brullo & Furnari 1970); Lago Ancipa, Lago Disueri (Brullo & Marcenò 1974); Scoglitti, Pozzallo, Modica, Gela, Mazara del Vallo e Lago Ancipa (Bartolo et al. 1976); Marina di Ragusa, Donnalucata, Avola (Brullo & Marcenò 1979); Scicli, between Modica and Sampieri (Brullo & Marcenò 1985); Piana degli Albanesi (Spadaro & Raimondo 2002), Piano Stella, Gela (Minissale & Sciandrello 2005).

Life-form

Therophyte.

Introduction source

Unknown, but possibly as a contaminant from imported agricultural products.

Habitat or preferred invading habitat

Fields or field margins, farms, banks of shallow valleys rich in soil close to agricultural land. A weed in not irrigated crops.

Frequency in Malta

Frequent-common in its preferred habitat.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

By seeds carried around by ants and wind but also through the displacement of contaminated soil in agricultural areas.



First record in Malta

Weber & Kendzior (2006), although it has been present and unrecorded much before, possibly in the late seventies or early eighties after the flora of Haslam et al. (1977) who do not record this species.

First record in Sicily

Sampieri (Brullo & Furnari 1970).

Ecology

Plants germinate late in winter and grow slowly during the cold months, where they flourish in from April when the weather becomes warm. They persist in summer and their presence become more evident since most competing annual vegetation dies off.

Possible control methods

Manual uprooting and monitoring for several years.

Invasive category/local potential threat

Moderate, but can become locally invasive in fallow or abandoned fields and possibly disturbed valley sides, for example, after dredging.

Remarks

Species can form large mats over fields and agricultural areas typically in late spring and may persist throughout summer in irrigated fields. Currently, it has a low to moderate level of threat to natural ecosystems, but however, it may be a problem in shallow valleys close to agricultural areas because it spreads rapidly. *Amaranthus blitoides* become locally frequent in a relatively short period from its recent introduction presumably in the late seventies. Each plant produces thousands of seeds with a high germination rate in exposed areas that are not heavily vegetated.

Referenced bibliography

- Bartolo G., Brullo S. & Marceno C., 1976. Contributo alla flora sicula. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 4, 12 (9-10): 72-78.
- Brullo S. & Furnari F., 1970. Contributo alla flora del territorio ibleo (Sicilia sud-orientale). *Pubblicazioni dell'Istituto Botanico dell'Università di Catania*: 1-20.
- Brullo S. & Marcenò C., 1974. La vegetazione estiva dei bacini artificiali siciliani. *Lavori dell'Istituto Botanico e Giardino Coloniale di Palermo*, 25: 184-194.
- Brullo S. & Marcenò C., 1979. Il *Diplotaxion eruroides* in Sicilia, con considerazioni sulla sintassonomia e distribuzione. *Notulae Fitosociologiche*, 15: 27-44.
- Brullo S. & Marcenò C., 1985. Contributo alla conoscenza della vegetazione nitrofila della Sicilia. *Coll. Phytosoc.*, 12 (1983): 23-148.
- Giardina G., Raimondo F. M., & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Minissale P. & Sciandrello S., 2005. La vegetazione di Piano Stella presso Gela (Sicilia meridionale) un biotopo meritevole di conservazione. *Quaderni di Botanica Ambientale Applicata*, 16: 129-142.
- Spadaro V. & Raimondo F. M., 2002. *Amaranthus blitoides* (Amaranthaceae, Magnoliophyta) avventizia in Sicilia. *Quaderni di Botanica Ambientale Applicata*, 13: 11-12.
- Weber H. C. & Kendzior B., 2006. Flora of the Maltese Islands. A field Guide. Margraf Publishers, Weikersheim, 383 pp.

Amaranthus cruentus L.



(Spermatophyta >> Superasterids >>
Caryophyllales >> Amaranthaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Amaranthus anacardana Hook.f.; *Amaranthus arardhanus* Sweet;
Amaranthus carneus Moq.; *Amaranthus esculentus* Besser ex Moq.;
Amaranthus incarnatus Moq.; *Amaranthus montevidensis* Moq.;
Amaranthus paniculatus L.; *Amaranthus sanguineus* L.; *Amaranthus sanguinolentus* Schrad. ex Moq.; *Amaranthus speciosus* Sims;
Amaranthus spicatus Wirzén; *Amaranthus strictus* Willd.

Common English names

Blood amaranth; red amaranth; purple amaranth; prince's feather.

Common Maltese names

Ġhobbejra Ħamra; Denb id-Dib aħmar.

Common Italian names

Amaranto cruento.

Short description

Herbaceous, dioecious, annual plant, 50–200 cm high. Stem, glabrous or nearly so, erect, green or reddish-purple (amaranth), branched only above near or at the inflorescence. Leaves alternate, petiole about half or subequal to the lamina's length; lamina broadly ovate, rhombic-ovate or sometimes broadly lanceolate, 5–16 × 2–12 cm, with a broadly cuneate base, blunt to acute tip (sometimes shallowly notched) and an entire margin. Inflorescence deep reddish-purple, very conspicuous, arranged in long terminal or axillary spikes (the terminal longer from the axillary) up to 50 cm in length, erect or more often nodding, below branched into small ascending spikes. Male flowers arranged at the upper part of the inflorescences and are less numerous than the female flowers. Bracts and bracteoles 2–3 mm long, narrowly spatulate with a spinose apex, subequal or longer than the tepals. Perianth segments 5, subequal, oblong-lanceolate, widest at the centre or lower half, 1.5–3.0 mm long with an acute apex. Utricles about same length or longer than the perianth segments, obovoid, about 2.0 mm wide, smooth to finely rugose above, dehiscence regularly circumscissile. Seeds variable, pearl-white with pinkish tint to reddish-brown, broadly lenticular, 1.5 mm across, minutely to distinctly punctulate (rarely smooth).

Place of origin and global distribution

Tropical area of North and South America. Widely naturalised in the tropical and subtropical regions as well in temperate areas such as the Mediterranean Region.

Distribution in Malta

Fragmented distribution in many localities such as Qrendi, Rabat, Birzebbugia, San Martin in Malta, Nuffara, Wied M'Forn, Ghasri, and

the vicinity of San Rafflu in Gozo. Population very sporadic and often short term.

Distribution in Sicily

Naturalised everywhere in the region (Giardina et al. 2007) Palermo, Militello di Valdemone, Etna close to Milo, Siracusa, Avola, Lentini (Gussone 1845); Catania (Tornabene); Palermo and surroundings (Raimondo et al. 1979), Selinunte (Scafidi & Raimondo 2019) Egadi Islands (Gianguzzi et al. 2006) Pantelleria Island (Gianguzzi 2003) Castelbuono, Castronovo, Militello (Lojacono 1904), Ragusa (Licitra & Napoli 2011).

Life-form

Therophyte.

Introduction source

Probably as a seed contaminant from imported agricultural products and later introduced from horticultural plants.

Habitat or preferred invading habitat

Fallow or abandoned fields or field margins, farms, occasionally valley sides close to fields and disturbed areas (e. g. soil heaps).

Frequency in Malta

Scarce, possibly decreasing.

Frequency in Sicily

Widespread in the island but rare with little populations.

Mode of dispersion

By seeds carried by ants, wind and less frequently by water streams.

First record in Malta

Lanfranco (1972) as *A. patulus* originally found by Silverwood from San Martin area.

First record in Sicily

Gussone (1845) records this species in several localities of Sicily.

Ecology

Plants germinate sometime in early winter and set flowers after a short time, usually in spring and remain till summer shedding thousands of seeds.

Possible control methods

Manual uprooting and monitoring for some years.

Invasive category/local potential threat

Moderate-Low.

Remarks

Local population is decreasing due to modern farming (herbicides, fewer fields left fallow), development and possibly decreased precipitation in late winter. There are few other *Amaranthus* with large red inflorescences such as *A. hypochondriacus* L., *A. caudatus* L. and *A. gangeticus* L.



Referenced bibliography

- Gianguzzi L., 2003. Il paesaggio vegetale dell'isola di Pantelleria Sicilia Foreste, 6. Azienda Foreste Demaniali, Palermo.
- Gianguzzi L., Scuderi L. & Pasta S. 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia* 61 (2): 359-402.
- Gussone J., 1845. *Florae Siculae Synopsis* 2 (2). Neapoli.
- Lanfranco E., 1972. Additions and corrections to the Maltese flora. *Maltese Naturalist*, 1 (3): 17–20.
- Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.
- Lojacono Pojero M., 1904. *Flora Sicula*, 2 (2). Palermo.
- Raimondo F. M., Ottonello D. & Castiglia C., 1979. Aspetti stagionali e caratteri biocorologici della vegetazione infestante gli agrumeti del palermitano. *Notulae Fitosociologiche*, 15: 159-170.
- Scafidi F. & Raimondo F. M., 2019. Contribution to the vascular flora of the archaeological park of Selinunte and Cave of Cusa (South-Western Sicily, Italy): preliminary results. *Boccone*, 28: 371-390.

Amaranthus retroflexus L.



(Spermatophyta >> Superasterids >>
Caryophyllales >> Amaranthaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Amaranthus bulgaricus Kov.; *Amaranthus bullatus* Besser ex Spreng.; *Amaranthus curvifolius* Spreng.; *Amaranthus delilei* Richt. & Loret; *Amaranthus johnstonii* Kov.; *Amaranthus recurvatus* Desf.; *Amaranthus rigidus* Schult. ex Steud.; *Amaranthus spicatus* Lam.; *Amaranthus strictus* Ten.; *Galliaris scabra* Bubani.

Common English names

Red-rooted pigweed, Pigweed Amaranth, Redroot amaranth.

Common Maltese names

Għobbejra, Denb id-Dib.

Common Italian names

Amaranto comune, Amaranto riflesso.

Short description

Herbaceous, dioecious, annual plant, 30–150 cm high. Stem pubescent, green but reddish near the base, branched only above. Leaves alternate, long-petiolate (almost same length of blade), rather numerous; lamina rhombic-ovate to elliptic, 3–12 × 2–7 cm, with a cuneate or rounded base, acute to obtuse tip (sometimes slightly notched or emarginate) and an entire, slightly sinusoidal margin. Inflorescence in small terminal or axillary leafless short spike-like racemes, green but usually with an amaranth-red tint. Male flowers few, present at the tip of the inflorescences. Bracts 3–5 mm long, narrowly lanceolate with a stiff acuminate hyaline apex, exceeding the perianth segments (=tepals). Perianth segments 5, spatulate and widest at the upper third, 2.5–4.0 mm long with an emarginate apex. Utricles green, broadly obovoid (slightly compressed dorsally), shorter than the perianth, about 1.5–2.5 mm long, smooth to finely rugose at the base, dehiscence circumscissile. Seeds dark reddish-brown, broadly lenticular to subglobose, 1.2 mm across, polished.

Place of origin and global distribution

Tropical parts of north and south Americas. Introduced and widespread worldwide including the Mediterranean Region.

Distribution in Malta

Malta: Wied Liemu, Wied Gerzuma, Wied tal-Baħrija, Wied tal-Girgenti, Buskett, Wied is-Sewda, Msida dam, Burmarrad, Wied Speranza, Wied Santa Katerina; Gozo: Wied seqer, Wied tal-Ort, Wied tax-Xlendi, Wied Hanzira (largest population) before Wied Mgarr ix-Xini, Wied tar-Ramla.

Distribution in Sicily

The species is quite common in Sicily (Giardina et al. 2007); certain records are reported for Palermo (Domina et al. 2019), Cefalù (Cambria

& Tavilla 2020) Marsala (Catanzaro 1991), Isole Egadi (Gianguzzi et al. 2006), Ragusa (Licitra & Napoli 2011).

Life-form

Therophyte.

Introduction source

Probably as a seed contaminant from imported agricultural products.

Habitat or preferred invading habitat

Irrigated arable land, farms, valley sides and valley beds especially when contaminated with nitrogen leach, dry water catchment areas, sometimes in field margins.



Frequency in Malta

Locally-frequent, absent in some parts.

Frequency in Sicily

Everywhere in the region, but localised (Giardina et al. 2007).

Mode of dispersion

By seeds carried by ants, wind and water streams, but also through the displacement of contaminated soil in agricultural areas.

First record in Malta

Zerapha (1831).

First record in Sicily

Unknown, however the species was already reported for Sicily and the Aeolian Islands by Gussone (1843).

Ecology

Plants germinate around winter and they are in flower from end of March where they produce numerous flowers and seeds for about two months when they dry in early summer. Large quantity of seeds is produced, giving rise to a large population in a short time.

Possible control methods

Manual uprooting and monitoring for some years, although difficult to uproot without damaging surrounding flora due to its extensive and deep roots.

Invasive category/local potential threat

Moderate.

Remarks

Usually found as scattered individuals or pockets of plants, possibly due to competition of established vegetation when this plant germinates and starts growing in spring. However, extensive populations have occasionally been seen in valleys that are heavily leached with nitrates intoxicating vegetation during winter and hence leaving space for this

species to proliferate. Closely related is the species *Amaranthus hybridus* L. which differ in small details in the shape of the perianth segments and bracts and can be easily interchanged with each other.

Referenced bibliography

- Cambria S., Tavilla G., 2020. Check-list of the vascular flora of the “Bosco di Gibilmanna”, a Special Area of Conservation (S.A.C.) in northern Sicily (Italy) *Biodiversity Journal*, 11 (2): 369-382.
- Catanzaro F., 1991. Contributo alla flora dell'isola di S. Pantaleo (Mozia) nelle Egadi (Sicilia occidentale). *Atti della Società Toscana di Scienze Naturali*, Serie B, 98.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G., Gargano M.L., 2019. The urban vascular flora of Palermo (Sicily, Italy) *Plant Biosystems*, 154(5):627-634. Doi: 0.1080/11263504.2019.1651787.
- Gianguzzi L., Scuderi L., Pasta S., 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia*, 61(2): 359-402.
- Giardina G. Raimondo F. M., Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea* 1-582.
- Gussone J. (1843) *Florae Siculae Synopsis* vol. 2 Napoli.
- Licitra G., Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44(373): 227 - 278.
- Minissale P., Scindarello S., Spampinato G., 2007. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata “Pantalica, Valle dell'Anapo e Torrente Cava Grande” (Sicilia sudorientale). *Quaderni di Botanica Ambientale e Applicata.*, 18 (2007): 145-207.
- Zerapha S., 1831. *Flora Melitensis Thesaurus*, fasc. 2. Valletta, 41 pp.

Amaranthus viridis L.



(Spermatophyta >> Superasterids >>
Caryophyllales >> Amaranthaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Amaranthus acutifolius Uline & W. L. Bray; *Amaranthus fasciatus* Roxb.; *Amaranthus gracilis* Desf.; *Chenopodium caudatum* Jacq.; *Galliardia adscendens* Bubani.

Common English names

Green amaranth, Slender amaranth.

Common Maltese names

Għobbejra, Denb id-Dib.

Common Italian names

Amaranto verde.

Short description

Herbaceous, dioecious, annual plant, erect, 40–100 cm high, glabrous, green, occasionally with purple (amaranth) streaks on the stem axils, branches and leaf petioles. Stem rectangular or angular, longitudinally striated and loosely branched. Leaves alternate, long-petiolate (4–6 cm long) not numerous and lax along the stem; lamina ovate, rhombic or elliptic, 3–8 × 2–5 cm, with a cuneate to sub-truncate base, rounded or blunt tip (sometimes shallowly notched) and an entire to sinusoidal margin. Inconspicuous, green flowers arranged in branched, thyrsoid cymes, forming elongated slender spikes, 6–15 cm long, the terminal larger from the axillary (lateral) ones. Male flowers arranged at the upper part of the inflorescences and much less numerous than the female flowers. Bracts and bracteoles < 1 mm, ovate-lanceolate, about two-thirds or half the length of the perianth segments (=tepals). Perianth segments 3, broadly obovate or almost oblong, widest at the upper half, 1.2–1.7 mm long with a subacute apex. Utricles green, longer than the perianth, globose-prolate (slightly compressed dorsally), about 1.5–2.0 mm wide and subequal or slightly longer than the tepals, finely rugose, indehiscent. Seeds blackish, broadly lenticular, 1 mm across, minutely punctulate.

Place of origin and global distribution

Southern America. Widely naturalised in the tropical and subtropical regions as well in temperate areas such as the Mediterranean Region.

Distribution in Malta

Widespread throughout the main islands.

Distribution in Sicily

Pantaleo/Mozia Islands, Marsala (Catanzaro 1991); Catania and Palermo (Giardina et al. 2007); Ragusa (Licitra & Napoli 2011); Gibilmanna, Cefalù (Cambria & Tavilla 2020).

Life-form

Therophyte.

Introduction source

Unknown, but possible as a contaminant from imported agricultural products.

Habitat or preferred invading habitat

Fields or field margins, farms, valley sides rich in soil and mostly in urban areas such as traffic islands, large planters, pavement sides, ruins, railways tracks.

Frequency in Malta

Frequent-common in its preferred habitat.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

By seeds carried by ants, wind and water streams, but also through the displacement of contaminated soil in agricultural areas.

First record in Malta

Lanfranco (1972).

First record in Sicily

First reported by Fiori (1923), and later confirmed by Chiovenda (1927).

Ecology

Plants germinate after the first rains and set flowers and fruit after a short time, usually as early as late autumn. They keep alive and repeatedly seeding for a long time as far as they have water, but normally, they succumb in early summer.

Possible control methods

Manual uprooting and monitoring for some years.

Invasive category/local potential threat

Moderate.

Remarks

Like other *Amaranthus* species, *A. viridis* can form large populations from the large number of seeds they produce, but established populations have mostly been observed in artificial habitats, namely irrigated fields (fallow or abandoned), old farms or farmhouses or stagnant dams. Currently, *A. viridis* has a low to moderate level of threat to natural ecosystems, but it may become a problem in shallow valleys close to agricultural areas. Also important is to consider that its occurrence became frequent in the Maltese Islands in only about 30 years. The species is quite distinct for being taller and forming larger leaves compared to other green-flowering *Amaranthus* species (e. g. *A. greacizans* L.). Other large species of *Amaranthus* (e. g. *A. cruentus* L.) produce larger leaves and colourful (amaranth-red) showy inflorescences.



Referenced bibliography

- Cambria S. & Tavilla G., 2020. Check-list of the vascular flora of the “Bosco di Gibilmanna”, a Special Area of Conservation (S.A.C.) in northern Sicily (Italy). *Biodiversity Journal*, 11 (2): 369-382.
- Catanzaro F., 1991. Contributo alla flora dell'isola di S. Pantaleo (Mozia) nelle Egadi (Sicilia occidentale). *Atti Società Toscana di Scienze Naturali, Memorie, Serie B*, 98.
- Chiovenda E., 1927. Nota su alcune piante della Sicilia. *Annali Botanici*, 17 (3): 81-87.
- Fiori A., 1923. Nuova Flora Analitica d'Italia, 1 (1-2-3). Firenze.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Lanfranco E., 1972. Additions and corrections to the Maltese flora. *Maltese Naturalist*, 1 (3): 17-20.
- Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.

Ambrosia artemisiifolia L.

Spermatophyta >> Magnoliopsida >> Asterales >>
Asteraceae
Phylum >> Class >> Order >> Family

Main synonyms

Ambrosia elatior L.

Common English names

Common ragweed.

Common Maltese names

None.

Common Italian names

Ambrosia con foglie di artemisia.

Short description

Annuals, 20-150 cm. Stems erect. Leaves opposite and alternate; petiole 2.5-3.5(-6) cm; blade deltate to lanceolate or elliptic, 2.5-5.5(-9) × 2-3(-5) cm, pinnately 1- or 2-lobed, abaxially sparsely pilose to strigilose, adaxially strigilose, both surfaces gland-dotted, base cuneate, ultimate margin entire or toothed. Female capitula clustered, proximal to male; floret 1. Male capitula: peduncles 0.5-1.5 mm; involucre shallowly cup-shaped (usually without black veins), 2-3 mm in diam., glabrous or hispid to pilose; florets 12-20. Burs ± globose to pyriform, 2-3 mm, ± pilose, spines or tubercles 3-5, near middle or apex, conical to acerose, 0.1-0.5 mm, tips straight.

Place of origin and global distribution

Native to Subarctic America and USA.

Distribution in Malta

Not recorded.

Distribution in Sicily

The species until now is very rare but in north and central Italy is considered invasive, therefore it is important to monitor the species

to avoid its naturalisation in Sicily considering it is known to colonize natural habitats and spreading rapidly in Italy.

Life-form

Therophyte.

Introduction source

Introduced in Europe by escape from botanic gardens since the 18th century and later as a contaminant of agricultural products.

Habitat or preferred invading habitat

Grows mostly in anthropogenic habitats and tolerates different soil and climate conditions. It is widely distributed in disturbed areas such as wastelands, road sides, railways and river corridors.

Frequency in Malta

Not recorded.

Frequency in Sicily

Very rare.

Mode of dispersion

The species only reproduces by seed which usually fall and only disperse within 1 m from the mother plant. The long-distance seed dispersal is primarily through human activities; either directly by the transport of contaminated litter or soil, or indirectly as a contaminant of agricultural products (e. g. crops and bird feed) or agricultural and construction machinery that is then inadvertently distributed along transport corridors (Bullock et al. 2012). Moreover, *Ambrosia artemisiifolia* forms a persistent seed bank in the soil and could generate new plants years after their introduction in soil.

First record in Malta

Not recorded.

First record in Sicily

The specie was observed for the first time in 2020 at Castelluzzo close to the village of San Vito lo Capo (Cambria 2023).

Ecology

A rapidly growing herb that completes its growth cycle within 115 to 183 days. This plant produces a substantial amount of small and lightweight viable seeds per individual, as well as utilizes wind pollination. The pollen of *A. artemisiifolia* is small, approximately 20-30 μm in size, with a tricolporate, spherical structure adorned with short and sparse spines and cavae.

Possible control methods

Any control strategy must aim to prevent pollen production and fertile seeds. *Ambrosia* sp. can only be eradicated, with reasonable means, from sites where it has not yet infested the soil seed bank. Different habitats give different methods for control. Herbicide is recommended to control the species in agricultural fields, roadsides and other urban areas. In natural habitats, disturbed soil should immediately be covered by a dense population of native plants in case of an advanced infestation. Single plant stands in areas where infestation is in its initial state should be uprooted and destroyed manually. If this *Ambrosia* is growing in competition with other plants, mowing can be tried as a control method.

Invasive category/local potential threat

High in Italy and in many European countries.

Remarks

Ambrosia artemisiifolia is one of the most noxious invasive species in Europe with a great impact on human health. It causes up to 80% loss in the yield of certain crops and it represents one of the main causes of seasonal respiratory allergy in many European countries and in some areas of northern Italy (Skálová et al. 2017, Albertini et al. 2017).

Referenced bibliography

- Albertini R., Ugolotti M., Ghillani L., Adorni M., Vitali P., Signorelli C. & Pasquarella C., 2017. Aerobiological monitoring and mapping of *Ambrosia* plants in the province of Parma (northern Italy, southern Po valley), a useful tool for targeted preventive measures. *Annali di Igiene – Medicina Preventiva e di Comunità*, 29: 515-528.
- Cambria S., Azzaro D., Caldarella O., Aleo M., Bazan G., Guarino R., Torre G., Cristaudo A. E., Ilardi V., La Rosa A., Laface V. L.A., Luchino F., Mascia F., Minissale P., Sciandrello S., Tosetto L. & Tavilla G., 2023. New Data on Native and Alien Vascular Flora of Sicily (Italy): New Findings and Updates. *Plants*, 12: 1743.
- Skálová H., Guo W.-Y., Wild J. & Pyšek P., 2017. *Ambrosia artemisiifolia* in the Czech Republic: history of invasion, current distribution and prediction of future spread. *Preslia*, 89: 1–16, <https://doi.org/10.23855/preslia.2017.001>.

Anredera cordifolia (Ten.) Steenis



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Basellaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Boussingaultia cordata Spreng.; *Boussingaultia baselloides* Kunth.

Common English names

Madeira-vine; Mignonette vine.

Common Maltese names

Fatata.

Common Italian names

Anredera, Liana di Madeira.

Short description

Evergreen twining vine with individual branches reaching up to 10 m long growing from a hardy rhizome. Tough knobby tubercles are produced abundantly on the branches. Leaves 3–5 × 1–5 cm in size, subcordate, thick and somewhat succulent, bright green, sometimes with wavy margins. Flowers in pendulous, slender raceme up to 20 cm long. Flowers with a short (3 mm) pedicel, followed by tiny, semi-membranous triangular bracts and whitish-green, orbicular bracteoles, both subtending the corolla above. Corolla pentamerous, about 6 mm across, fragrant, formed by white to greenish-white, ovate petals about 2.5 mm long. Stamens and pistil also white. Style with three stigmatic branches, each ending with a club-shaped white stigma. Fruit and seeds are not produced.

Place of origin and global distribution

South America (Bolivia, Brazil, Paraguay, Uruguay and Argentina); naturalised and often invasive in tropic, subtropical areas and other warm countries like the Mediterranean region.

Distribution in Malta

Widespread throughout Malta and Gozo, also present in Comino.

Distribution in Sicily

Reported along the coastal stretch between Milazzo and S. Agata di Militello by Rossitto & Ilardi (2000); Marinella di Selinunte, Ustica, urban e peri urban area of Palermo (Pasta et al. 2016); Linosa Island (Pasta et al. 2017).

Life-form

Phanerophyte.

Introduction source

Introduced as an ornamental garden plant and widely cultivated.

Habitat or preferred invading habitat

Cultivated in several gardens, field sides, farms, farmhouses, etc., usually in abandoned places, but recently it escaped in valleys, which has become locally invasive.

Frequency in Malta

Frequent-common, increasing due to its spread in natural habitats.

Frequency in Sicily

In the last decades it has been reported in many places in Sicily, even if its diffusion is not yet generalised. Recently reported as invasive in the river vegetation of Naso stream by Piccione and Malacrino (2022).

Mode of dispersion

By tubercules located on aerial branches and dumped plants in rural areas. In the past, it was dispersed by deliberate cultivation.

First record in Malta

Very old cultivated plant mentioned since Zerapha (1827).

First record in Sicily

First reported as cultivated in Palermo at Villa Trabia by Ostinelli (1910) and then as casual in Palermo by Di Martino & Perrone (1962).



Ecology

Plant form flowers in late winter (typically February), but it does not form fertile fruit. However, it produces numerous adventitious bulbil-like propagules on aerial parts, which drop and can give rise to new plants (vegetative apomixis). Dumped plants easily propagate thanks to these bulbils.

Possible control methods

It is very difficult to eradicate because of its tenacious growth, underground rhizomes and dormant tubercles in the soil bank, which may regenerate new plants after control of mother plants.

Invasive category/local potential threat

High.

Remarks

Past records of *Anredera vesiculosa* (Zerapha 1827) and *Anredera scandens* (Borg 1927) most likely refer to *A. cordifolia*. Despite being an old introduction, the plants have escaped into valley systems only recently, where they prefer to grow and climb on strands of *Arundo donax* (Pasta et al. 2016) but also on riparial arboreal vegetation such as Naso Stream in north Sicily (Piccione & Malacrinò 2022). It is assumed that the dumping of pruned branches into valleys has been the prime course of escape. However, a warmer climate change and polluted freshwater by fertilisers may have also contributed to this species to multiply so rapidly in the last twenty years or so.

Referenced bibliography

- Borg J., 1927. Descriptive Flora of the Maltese Islands. Malta Government Printing Office, 846 pp.
- Di Martino A. & Perrone C., 1962. Nuovo contributo alla flora arboricola di Palermo. *Lavori dell'Istituto Botanico e Giardino Coloniale di Palermo*, 18: 112-202.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.

- Pasta S., Ardenghi N. M. G., Badalamenti E., La Mantia T., Livreri Console S. & Parolo G., 2017. The alien vascular flora of Linosa (Pelagie Islands, Strait of Sicily): update and management proposals. *Willdenowia*, 47 (2): 135–144. <https://doi.org/10.3372/wi.47.47205>.
- Pasta S., La Rosa A., La Mantia T. & Badalamenti E., 2016. *Anredera cordifolia* (Ten.) Steenis (Basellaceae): status in Italia e sua espansione in Sicilia occidentale. *Il Naturalista Siciliano*, 40 (1): 145-149.
- Piccione V. & Malacrino V., 2017. *Anredera cordifolia* (Basellaceae) invasive in the river vegetation of north-eastern Sicily. *Flora Mediterranea*, 31: 501–507. <https://doi.org/10.7320/FIMedit31SI.50>.
- Rossitto M. & Ilardi V., 2000. Note tassonomiche e distributive su *Buossingaultia cordifolia* (Basellaceae, Magnoliophyta). *Quaderni di Botanica Ambientale Applicata*, 9 (1998): 207-209.
- Zerapha S., 1827. *Flora Melitensis Thesaurus*, fasc. 1. Valletta, iv + 36 pp.

Artemisia arborescens (Vaill.) L.



(Spermatophyta >> Asterids
(Campanulids) >> Asterales >>
Asteraceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Artemisia argentea Willk. & Lange; *Artemisia elegans* Salisb.

Common English names

Wormwood.

Common Maltese names

Erbabjanka.

Common Italian names

Assenzio aromatic.

Short description

Aromatic, evergreen, perennial shrub, up to 1.2 m tall, profusely branched and woody below. Leaves double pinnatisect (younger ones less divided), covered in dense tomentose hair making leaves look silvery white, lobes 5–22 × 1–2 mm in size, slightly fleshy. Flower heads, abundant, simple, rayless, longitudinally compressed and discoid, 6–8 mm across, bright yellow turning tan with age, held by a flimsy pedicel hence becoming slightly drooping down or erectopatent. Involucral bracts in 2 rows, 3–4 mm long, narrowly ovate, tomentose, with a wide glabrous margin. Receptacle hairy. Achenes without a distinct pappus, covered with yellowish glands.

Place of origin and global distribution

Mediterranean region, but species is believed to be introduced in Malta.

Distribution in Malta

Examples, mostly as singular individuals, are found in several localities such as in mainland Malta at Floriana (Braxia), Qormi (Wied il-Kbir), Buskett-Verdala, Mellieħa (Selmun), Naxxar and in Gozo at Xagħra (Qortin area) and Qala (Hondoq ir-Rummien).

Distribution in Sicily

The species is considered very common throughout Sicily (Giardina et al. 2007) including most of the circum-Sicilian islands. In particular, in Lampedusa it was collected and surveyed by Calcara (1847). Here it could have been introduced by the Sicilian farmers who populated the island, however, in the rest of Sicily, the species is native.

Life-form

Nanophanerophyte.

Introduction source

Imported a long time ago as a medicinal herb and the remaining examples are relicts of cultivation.

Habitat or preferred invading habitat

Agricultural areas, fallow or disused fields, field margins.

Frequency in Malta

Rare.

Frequency in Sicily

Very common.

Mode of dispersion

Seeds dispersed by wind and possibly ants.

First record in Malta

Zerapha (1827) as “Erbabyanca” but under the species name *Artemisia pontica*.

First record in Sicily

The species is native.

Ecology

Plants flower for a short period of time in June and seed shortly after in July. Seeds do not seem to germinate, even if many plants are found in fertile soil in agricultural areas. Easily cultivated by cuttings, and perhaps farmers shared and propagated this medicinal plant vegetatively.

Possible control methods

Uprooting when the plants are not in seed, although it is not an invasive alien in Malta.

Invasive category/local potential threat

Low.

Remarks

Artemisia arborescens is a native plant to the Mediterranean region, yet it is considered as an introduced alien species for the Maltese Islands. Singular plants or small groups occurring mostly in agricultural areas, old gardens or cemeteries, indicate that they are introductions, possibly for the medicinal virtues of the species. The largest population at Xagħra comprises some 10 individuals, some being very large, old, and present in what looks to be a degraded garigue. Unless it is a remnant native population, it corresponds to the only example of a

fully naturalised population. In fact, Borg (1927) mentions that it was a shrub regularly cultivated in farms and gardens, although it does not self-propagate through seeds. The species is native to Tunisia, Libya, Sicily, Sardinia and Greece amongst other Mediterranean stations, hence in Malta, it could also be a case of a species extinct in the wild because of over-collection in the past. Sommier & Caruana Gatto (1915) do not include this species in their flora except for an example at Ta' Braxia on which they recorded *Puccinia absinthii* D. C. and state that they have not encountered any example in rural and suburban environments.



Referenced bibliography

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Calcara P., 1847. Descrizione dell'isola di Lampedusa. Palermo.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Sommier, S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Stab. Pellas, Firenze, 502 pp.

Zerapha S., 1827. Flora Melitensis Thesaurus, fasc. 1. Malta, 36 pp.

Artemisia verlotiorum Lamotte



(Spermatophyta >> Magnoliopsida >> Asterales >>
Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Artemisia verlotiorum Lamotte, *Artemisia vulgaris* L. subsp. *verlotiorum* (Lamotte) Bonnier, *Artemisia selengensis* auct., non Turcz. ex Besser, *Artemisia umbrosa* auct., non (Turcz. ex Besser) Turcz. ex Verl., *Artemisia vestita* Wall., *Artemisia vulgaris* L. var. *umbrosa* auct., non Turcz. ex Besser.

Common English names

Chinese mugwort, Chinese wormwood, mugwort, Verlot's mugwort.

Common Maltese names

None.

Common Italian names

Assenzio dei fratelli Verlot, Artemisa dei fratelli Verlot.

Short description

Perennial plant, tall from 40 up to 150 cm and with erect stem, very branched and streaked with red. The leaves are 1 – 2 pinnate seven, of an intense green colour and glabrescent in the upper page, tomentose and glandular in the lower one; the upper ones are divided into lanceolate lacinia, elongated and whole \pm equal to each other and with an entire margin, of 5-10 (-13) x 3-8 cm; the lower leaves have a short, semi-embracing petiole with 3 – 5 pairs of lanceolate or lanceolate-linear lacinia. The inflorescence is formed by pyramidal panicles, dense with flower heads, called calatids (simulate a single flower), tomentose, tendentially arranged unilaterally, in groups of 1 – 2-3, \pm spherical or ovoid, subsessile \emptyset \pm of 3 mm, with ramifications and presence of axillary leaflets. The individual flowers are tubular, with a long and filamentous corolla of 2 – 3 mm and reddish in color. The sparsely hairy envelope and with bracts of 2 orders, both elongated ovals, glabrescent and with scarce margin. The fruits are oblong-obovate achenes without pappus, brown in colour, 0.5 – 0.8 mm.

Place of origin and global distribution

The native range of this species is Himalaya to China, Taiwan. Introduced into: Albania, Algeria, Austria, Balears, Baltic States, Belgium, Brazil North, Brazil Northeast, Brazil South, Brazil Southeast, Brazil West-Central, Colombia, Corse, Cyprus, Czechoslovakia, France, Germany, Great Britain, Greece, Italy, Krym, Lebanon-Syria, Madeira, Mauritius, Morocco, New South Wales, New Zealand North, Palestine, Paraguay, Poland, Portugal, Queensland, Rodrigues, Réunion, Sardinia, Sicily, Spain, Switzerland, Turkey, Turkmenistan, Ukraine, Uruguay, Victoria, Yugoslavia.

Distribution in Malta

Not recorded.

Distribution in Sicily

Nebrodi Mounts at “Case Zerbetto”; Madonie close to Vallone Mandarinì, Madonie monts: Portella Mandarinì, Petralia Sottana, Pantelleria, Pantalica (Siracusa).

Life-form

Geophyte.

Introduction source

This species has long been cultivated for its medicinal properties, but has escaped cultivation and become naturalised mainly in moist sites (e. g. on riverbanks, in riparian vegetation and in swampy or marshy areas) or disturbed areas. It spreads vegetatively via creeping underground stems (i. e. rhizomes) to form large and dense colonies, while long range dispersal occurs via wind and water transport.

Habitat or preferred invading habitat

Muds, glads of woods riparii, river-beds, popler woods.

Frequency in Malta

Not recorded.

Frequency in Sicily

Infrequent.

Mode of dispersion

Seeds have a hairy pappus and dispersed far away by wind.

First record in Malta

Not recorded.



First record in Sicily

Pantelleria (Di Martino 1962).

Ecology

This species grows on fresh soils rich in nitrogen compounds in disturbed sites such as road margins, landfills, abandoned fields, but also riparian woods, riverbeds and streams, etc., from 0 to 600 m above sea level. It flowers between September and November.

Possible control methods

Manual uprooting when not in fruit.

Invasive category/local potential threat

High.

Remarks

The creeping underground rhizomes can dominate the upper soil layers, allowing this species to out-compete other plants for available soil moisture. The density of *Artemisia verlotiorum* stands can also smother other groundcover plants and prevent the regeneration of native trees and shrubs. In addition, the sand stabilising nature of its growth habit can influence the structure and behaviour of rivers through the accretion of soil and formation of islands.

Referenced bibliography

Di Martino A., 1962. Piante inedite di Pantelleria. *Lavori dell'Istituto Botanico e del Giardino Coloniale di Palermo*, 18: 72-79.

Arundo donax L.



(Spermatophyta >> Liliopsida (Commelinids) >> Poales
>> Poaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Arundo aegyptia Delile; *Arundo aegyptiaca* E. Vilm.; *Arundo bambusifolia* Hook.f.; *Arundo bengalensis* Retz.; *Arundo bifaria* Retz.; *Arundo coleotricha* (Hack.) Honda; *Arundo glauca* Buban; *Arundo latifolia* Salisb.; *Arundo longifolia* Salisb. ex Hook. f.; *Arundo sativa* Lam.; *Arundo scriptoria* L.; *Arundo triflora* Roxb.; *Donax sativus* C. Presl.; *Donax arundinaceus* P. Beauv.

Common English names

Giant reed; Giant cane; Elephant grass; Arundo.

Common Maltese names

Qasba; Qasab komuni.

Common Italian names

Canna domestica; Canna comune.

Short description

Robust, evergreen, perennial grass forming stands of reeds from thick, resilient, segmented rhizomes creeping a few centimetres below ground but forming deep roots that provide strong anchorage. Culms formed as robust but moderately pliable, erect canes pale yellow and polished, 2–8 m long and up to 3 cm in diameter, unbranched or thinly branched on the upper third, sometimes bearing viviparous branchlets. Leaf-sheaths long, glabrous except at the basal rim (opening), which is pilose or ciliate. Lamina ensiform 30–70 × 2–6 cm, margin entire, minutely scabrous (harsh when rubbed). Ligule is very short, about 1 mm long lined with long, pilose indumentum on the margin. Inflorescence an oval or lanceolate panicle, 40–50 cm long, purplish when young, turning beige when mature. Spikelets 10–15 mm long with 2–4 florets each. Glumes narrowly lanceolate, 7–11 mm long with acute to acuminate tips. Lemma linear, about 10 mm long with a bifid apex, characterised with a brush of whitish-cream hairs, 6 mm long arising from the dorsal (external) side. Achenes not produced or sterile.

Place of origin and global distribution

Middle East and Western Asia.

Distribution in Malta

Widely distributed in most freshwater wetland areas, namely valleys and along clay slopes that feature underground seeping water or springs originating from perched aquifers.

Distribution in Sicily

Quite widespread. Biviere di Gela, Fiume Ippari, Irminio, Pantani della Sicilia sud-orientale, Saline di Priolo, Saline Siracusa, Saline di Augusta, Simeto, La Gurna Fondachello, Fiumefreddo, Alcantara, Torrente Santa Venera (pers. obs.).

Life-form

Geophyte (rhizomatous).

Introduction source

Archaeophyte, introduced before 1492 possibly by the Arabs or even before the Romans for its numerous uses to construct amenities, especially in agriculture.

Habitat or preferred invading habitat

Watercourses, springs, dams and sheltered, damp places. Practically everywhere wherever water is present. Cultivated for hedges, or for agricultural use, grown spontaneously.

Frequency in Malta

Very common and invasive in its preferred habitat.

Frequency in Sicily

Very Common (Giardina et al. 2007).

Mode of dispersion

Populations only expand vegetatively by fast-growing rhizomes.



First record in Malta

Zerapha (1827) from valleys.

First record in Sicily

As an archaeophyte, it is not possible to establish the time of its introduction in Sicily which probably took place as in the rest of the Mediterranean from the Middle East a few thousand years ago (Hardion et al. 2014). However, it is included in the early flora and catalogues of plants growing in Sicily such as Cupani (1696) and Gussone (1828) In particular, the latter author specifies that the species in Sicily is not only cultivated but also naturalised.

Ecology

Culms are produced all year long, particularly growing rapidly in the warmer period of late spring when water is still available. Inflorescences are produced in October-November, but they are sterile.

Possible control methods

Digging rhizomes and roots from the ground, possibly requiring excavation with means of machinery.

Invasive category/local potential threat

High.

Remarks

Recent phylogenetic studies suggest that *Arundo donax* originated from the Middle East and Western Asia and was introduced progressively in western Europe through the Mediterranean basin. It was a commodity plant for manufacturing all sorts of utilities both in the house and especially in agriculture, such as curtains, light furniture, baskets, hedges, supporting structures, wind-breakers and hedges. Other uses include manufacturing floating rafts (for hunting fish), musical instruments, and several hand-held tools.

According to Maltese historical literature, authors of the early 20th century (e. g., Sommier and & Caruana Gatto 1915; Borg 1927) give only a handful of localities where the giant reed occurs, giving the impression it was neither so common nor invasive at that time. This leaves a dilemma about the real introduction of *Arundo donax* in Malta. Being known for its numerous uses and benefits, an assumedly

early introduction in the Maltese Islands would have resulted in numerous occurrences after one or two thousand years. It is possible that early colonisers already well knew its dangerous invasiveness, and its expansion was well managed and restricted in a few valleys. It is noteworthy to mention that the giant reed is a sterile plant here in Malta and cannot propagate by seeds (Hardion et al. 2014).

Nevertheless, the species have now escaped in most valleys and numerous clay slopes where its damage to the native ecosystems is immeasurable. Valleys densely populated with *Arundo donax* have an understory with poor vegetation, usually being restricted to the same few species, namely: *Parietaria* spp.; *Arum italicum* Mill., *Acanthus mollis* L. and *Oxalis pes-caprae* L. (at the border).

Referenced bibliography

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Cupani F., 1696. Hortus Catholicus. Napoli, 23 pp.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20: 5-582.

Gussone J., 1828. Florae Siculae Prodromus. Napoli, 1, 134 pp.

Hardion L., Verlaque R., Saltonstall K., Leriche A. & Vila B., 2014. Origin of the invasive *Arundo donax* (Poaceae): a trans-Asian expedition in herbaria. *Annals of Botany*, 114 (3): 455-462. <https://doi.org/10.1093/aob/mcu143>.

Haslam S. M., Sell P. D. & Wolseley P.A.W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.

Lojacono-Pojero M., 1878. Le Isole Eolie e la loro vegetazione. Lorusnaider, Palermo.

Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.

Zerapha S., 1827. Flora Melitensis Thesaurus, fasc. 1., Malta, 36 pp.

Austrocylindropuntia subulata (Muehlenpf.) Backeb.



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Cactaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Opuntia exaltata A. Berger; *Opuntia ellemeetiana* Miq.; *Opuntia segethii* Phil.; *Pereskia affinis* Meinsh.

Common English names

Eve's Pin Cactus; Eve's Needle Cactus; Cholla.

Common Maltese names

None.

Common Italian names

Opunzia subulata; Fico d'India subulato.

Short description

Perennial shrub about 1-2 m high but can reach up to 5 m in ideal conditions. Stems seldom woody (only in old and large specimens), much-branched and spreading around central trunk. Cladodes (or joints) cylindrical to slightly curved, 20–50 cm long, distinctly tuberculate with elongated bulging bumps, glaucous green to bright green. Leaves present at the upper parts of young cladodes, 3–6 (-10) cm long, terete, linear-cylindrical, bright green, persisting for a while then caducous. Areoles present at the tip of each tubercule (bump), white and with a lanose pubescence, protruding as a cushion and giving rise to 1 or 3 straight, light brown spines, about 3–8 cm long. Flowers 6–7 cm long, most of it being a green flower tube (hypanthium) with a tuberculate wall and often with few bract scales resembling small leaves at the upper half. Petals 3 cm long, light orange, scarlet or pinkish, imbricated forming a cup-shaped corolla. Fruit 5–8 cm long, barrel-shaped with a prominent depressed pale brown apex, green poorly spinose.

Place of origin and global distribution

Peruvian Andes.

Distribution in Malta

MALTA: San Martin, Buskett, Wied iż-Żurrieq, Hal-Far (close to the cliffs), Għargħur (Vicinity of Wied id-Dis), Mellieħa (Marfa peninsula). GOZO: Mġarr ix-Xini, Xlendi (close to Wied tal-Kantra), Xagħra (near Pergla). Always seen as single individuals.

Distribution in Sicily

Palermo (Domina et al. 2019); Saline di Trapani, Vendicari, Oasi del Simeto, Taormina (pers. obs.) and some circumsicilian islands such as Lampedusa and Pantelleria (Minissale et al. 2023).

Life-form

Nanophanerophyte to phanerophyte. Succulent.

Introduction source

Introduced for horticulture use and either escaped through dumped plants or as a relic of cultivation in fields and open ground near farm and rural dwellings.

Habitat or preferred invading habitat

Arid rocky ground and steppe. Can tolerate sea spray. Dry localities, roadsides, edges.

Frequency in Malta

Infrequent-scarce.

Frequency in Sicily

Rare (Giardina et al. 2007).

Mode of dispersion

Propagation mainly by man through cultivation. Fruiting examples have been occasionally seen, and so it may propagate naturally by seeds. However, not seeing established populations, propagation by seed is likely unsuccessful in Malta.

First record in Malta

Although some large specimens indicate that they have several decades of age, the species was not mentioned by Haslam et al. (1977) and the first record is formally bound to Mifsud (2006) and Weber (2008). It was seen in the wild by one of the authors in 2003 at Buskett where it was deliberately planted and today it is over 3 m high (pers. comm. Stephen Mifsud).

First record in Sicily

Palermo (Mazzola et al. 1988).

Ecology

Plants flower in early summer and fruit later in autumn where birds eat and disperse their seeds. Reproduction by seeds is however quite unsuccessful for this cactus.

Possible control methods

Uprooting and gathering of all cladodes from site.

Invasive category/local potential threat

Low. Despite several casual occurrences, the trees fail to produce an expanding population. Examples are seen in the wild as single or few individuals, even if some of them are large and mature, they have not naturalised to form thickets.

Remarks

In Malta it is frequently cultivated as an ornamental cactus both in public gardens and private houses or farm yards. Since it does not fruit very often and the pulp is not very sweet, it has not become popular as the prickly pear tree (*Opuntia ficus-indica*). A similar species is *Austrocylindropuntia cylindrica* (Lamarck) Backeberg which is also cultivated for horticulture purposes and it differs from *A. subulata* by having smaller leaves and the flowers are lighter in colour, ranging from light apricot orange to salmon.



Referenced bibliography

- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20: 5-582.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Mazzola P., Romano S. & Fici S., 1988. Contributo alla conoscenza del genere *Opuntia* Miller. 1. Dati cariologici e distribuzione delle specie spontaneizzate e coltivate in Sicilia. *Il Naturalista siciliano*, ser. 4, 12 (3-4): 159-168.
- Minissale P., Cambria S., Montoleone E., Tavilla G., Giusso del Galdo G., Sciandrello S., Badalamenti E. & La Mantia T., 2023. The alien vascular flora of the Pantelleria National Park (Sicily Channel, Italy): new insights into the distribution of some potentially invasive species. *Bioinvasions Records*, in press.
- Mifsud S., 2006. *Austrocyllindropuntia subulata* profile created on Dec-2006. Retrieved from MaltaWildPlants.com on 12-Nov-2021. Url: www.maltawildplants.com/CACT/Austrocyllindropuntia_subulata.php.
- Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.

Bidens frondosa L.



(Spermatophyta >> Magnoliopsida >> Asterales >>
Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Bidens melanocarpus Wiegand, *Bidens melanocarpa* Wiegand.

Common English names

Devil's Beggarticks, Devil's-Pitchfork, Devil's Bootjack, Sticktight, Bur Marigold, Pitchfork Weed, Tickseed Sunflower, Leafy Beggarticks, Common Beggar-Ticks.

Common Maltese names

None.

Common Italian names

Forbicina pedunculata, Bidente foglioso.

Short description

Annual, 10–180 cm high. Leaves: petioles 10–60 mm long; blades deltate to lance-ovate overall, 30–80(–150+) × 20–60(–100+) mm long, 3(–5)-foliolate, leaflets petiolulate, lanceolate to lance-ovate, (15–)35–60(–120) long × (5–)10–20(–30) mm across, bases cuneate, margins dentate to serrate, sometimes ciliate, apices acuminate to attenuate, faces glabrous or hirtellous. Heads usually borne singly, sometimes in 2s or 3s or in open, corymbiform arrays. Peduncles 10–40(–80+) mm long. Calyculi (subsidiary circle of small bracts outside the involucrel phyllaries) of (5–)8(–10) ascending to spreading, spatulate or oblanceolate to linear, sometimes ± foliaceous bractlets or bracts 5–20(–60) mm, margins usually ciliate, abaxial faces glabrous or hirtellous. Involucres campanulate to hemispheric or broader, 6–9 × 7–12 mm. Phyllaries (bracts surrounding the capitulum) 6–12, oblong or ovate to lance-ovate, 5–9 mm. Ray florets 0 or 1–3+; laminae golden yellow, 2–3.5 mm. Disc florets 20–60(–120+) mm long; corollas ± orange, 2.5–3+ mm. Cypselae (fruits) blackish to brown or stramineous, ± obcompressed, obovate to cuneate, outer 5–7 mm, inner 7–10 mm, margins antrorsely or retrorsely barbed, apices ± truncate to concave, faces usually 1-nerved, sometimes tuberculate, glabrous or sparsely hirtellous; pappi of 2 ± erect to spreading, antrorsely or retrorsely barbed awns 2–5 mm.

Place of origin and global distribution

It is native to North America (parts of Canada and all USA states except for Montana). This species has been introduced worldwide including many European countries, China, French Guiana, Japan, Lebanon, Morocco, New Zealand, South Korea and Tajikistan.

Distribution in Malta

Not recorded.

Distribution in Sicily

Oreto, Vittoria Valley of Ippari river, Palermo.

Life-form

Therophyte.

Introduction source

Unknown, but possibly through the agricultural industry. Animals and human activity may accidentally assist its spread into urban and semi-rural systems.

Habitat or preferred invading habitat

It can be found in moist woods, meadows, thickets, fields, roadsides, railroads, borders of streams, ponds, sloughs, swamps, ditches. Wherever it occurs, *B. frondosa* tends to be associated with damp habitats.

Frequency in Malta

Not recorded.

Frequency in Sicily

Infrequent.

Mode of dispersion

The seeds of *B. frondosa* can be dispersed by water as the plants are often found growing close to waterways. The central achenes of *B. frondosa* are adapted for dispersal by animals due to their larger size, longer teeth and more pronounced protrusions from the seed head. The seeds can also become entangled in wool and other animal fibres, including clothing and harvested vegetation such as hay.

First record in Malta

Not recorded.

First record in Sicily

B. frondosa was introduced to Italy as an ornamental plant in the second half of the 18th century, later becoming naturalised first in Tuscany in 1849 and then in Sicily (Palermo), before its appearance in the Po Valley in the 1960s (Fiori in Fiori & Paoletti 1904).

Ecology

B. frondosa is an annual herb that flowers in August and September. It grows best where there is ample soil moisture and sun, especially in disturbed areas leaving bare ground (i. e. a pioneer species). It can survive in water saturated soils, frequently found growing at the water's edge, in drainage ditches or on flood plains.

Possible control methods

Manual uprooting when not in fruit. The plants could be pulled before seeds are set and the vegetative material composted.

Invasive category/local potential threat

Medium.

Remarks

The achenes (seeds) are in two forms, the central ones being brown and elongated, the peripheral ones black and thicker. The longer central achenes are better adapted to wind dispersal, since they have longer teeth and stand exposed in the seed head (capitulum). The peripheral achenes are shorter, have shorter teeth and stand close to the involucre bracts, which are of similar length to the outer achenes (Brändel 2004). It has been suggested that the central achenes are adapted for long-distance dispersal by animals, while the fast-germinating peripheral achenes have a lower dispersal capability. These morphological differences are related to differences in dormancy.

Referenced bibliography

Brändel M., 2004. Dormancy and germination of heteromorphic achenes of *Bidens frondosa*. *Flora*, 1993: 228-233.

Fiori A. & Paoletti G., 1904. *Flora Analitica d'Italia*. Padova.

Boerhavia coccinea Mill.



(Spermatophyta >> Magnoliopsida (Rosids) >>
Caryophyllales >> Nyctaginaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Boerhavia repens subsp. *viscosa* (Choisy), Maire; *Boerhavia repens* var. *viscosa* Choisy.

Common English names

Scarlet spiderling.

Common Maltese names

None.

Common Italian names

Boeravia scarlatta.

Short description

Stems creeping, pubescent glandular, branchy often lignified at the base. Opposite leaves, the largest with 5-20 mm petioles and ovate-elliptical lamina (17-25 x 20-27 mm), irregularly crenate or toothed on the edge, rounded and often mucronate at the apex, obtuse or truncated at the base. Flowers in multiflorous umbelliform glomeruli at the axilla of the upper leaves, carried by a common 1-2 cm peduncle; flower peduncles of 1 mm or less; 1 mm bracelets; pink or purple perianth, glandular pubescent (3 mm).

Place of origin and global distribution

B. coccinea is considered to be native to the neotropics, although it is naturalised throughout the tropics and widely regarded as a cosmopolitan species. It is distributed throughout Central America, South America, Mexico, West Indies, Eurasia, Africa and Australia (Struwig & Siebert 2013). By other authors (Pignatti 2017) it is considered a species of paleotropical origin. It is present on many Pacific islands, including the Hawaiian Islands, where it is an invasive species and a noxious weed. In Europe it is only in Italy and recorded only for Sicily, Calabria and Campania (Musarella et al. 2019; Celesti-Grapow et al. 2009).

Distribution in Malta

Not Present.

Distribution in Sicily

Very common in the Palermo area, South East Sicily, and in the Tyrrhenian coast between Catania and Messina. Observed also in little islands around Sicily such as Linosa (Pasta et al. 2017) and Pantelleria (Montoleone 2010).

Life-form

Chamaephyte.

Introduction source

Probably accidentally introduced.

Habitat or preferred invading habitat

Frequent along roadsides, ruderal areas, abandoned cultivated areas with a more or less arid thermo-Mediterranean climate.

Frequency in Malta

Not Present.

Frequency in Sicily

Very Common (Giardina et al. 2007).

Mode of dispersion

B. coccinea has adhesive seeds that stick to clothing and fur, thus aiding dispersal (Jurado et al. 1991).

First record in Malta

Not recorded to date.

First record in Sicily

The species was reported for the first time in Sicily in Palermo (De Leo 1967) sub *Boerhavia repens* L. subsp. *viscosa* (Choisy) Maire.

Ecology

B. coccinea associates with other weedy plants commonly found in disturbed areas. It is preferring well-drained, stony or sandy soil. It is found in a wide range of habitats, from riverbanks, hills, and mountains, to disturbed sites (often along roadsides), waste places, upper beaches and gravelly outwash fans. The plant tolerates arid environments with an annual rainfall between 100 and 500 mm. In summer the plant tolerates temperatures from 12 to 40°C. Flowering and fruiting in *B. coccinea* occur during the spring, summer and early autumn (Struwig & Siebert 2013).

Possible control methods

Manual uprooting and monitoring for several years.

Invasive category/local potential threat

High.

Remarks

The species has not yet been registered in the Maltese Islands; however, any entry must be carefully monitored considering the invasive characteristics that Sicilians have shown where in about 50 years it has spread to many coastal sites and islands of the Sicily channel. such as Linosa and Pantelleria or recently the Capo Passero

area where it was observed in 2020 with large populations. The leaves and roots of *B. coccinea* are used medicinally in countries including Cameroon, Ethiopia, Namibia, Nigeria, Tanzania, Mexico, Brazil, Argentina, and Paraguay. It is also eaten by humans and used as animal feed. A flour can be made from its seeds. *B. coccinea* is an invasive species threatening native plant species and a noxious weed, rapidly spreading and now common in coastal or slightly inland disturbed places such as roadside.

Referenced bibliography

- Celesti-Grapow L., Alessandrini A., Arrigoni P. V., Banfi E., Bernardo L., Bovio M., Brundu G., Cagiotti M. R., Camarda I., Carli E., Conti F., Fascetti S., Galasso G., Gubellini L., La Valva V., Lucchese F., Marchiori S., Mazzola P., Peccenini S., Poldini L., Pretto F., Prosser F., Siniscalco C., Villani M. C., Viegi L., Wilhelm T. & Blasi C., 2009. Inventory of the non-native flora of Italy. *Plant Biosystems*, 143 (2): 386-430. DOI: 10.1080/11263500902722824
- De Leo A., 1967. Una nuova avventizia nel Palermitano: *Boerhaavia repens* Lin. ssp. *viscosa* (Choisy) Maire. *Lavori dell'Istituto Botanico e del Giardino Coloniale di Palermo*, 22: 72-76.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Jurado E., Westoby M. & Nelson D., 1991. Diaspore weight, dispersal, growth form and perenniality of central Australian plants. *Journal of Ecology*, 79 (3): 811-828.
- Musarella C. M., Laface V. L. A., Morabito A., Cano-Ortiz A., Cannavò S. & Spampinato G., 2019. Aggiornamenti sulla flora alloctona calabrese: novità e conferme. *Notiziario della Società Botanica Italiana*, 3 (1): 11-48.
- Pasta S., Ardenghi N. M. G., Badalamenti E., La Mantia T., Livreri Console S. & Parolo G., 2017. The alien vascular flora of Linosa (Pelagie Islands, Strait of Sicily): update and management proposals. *Willdenowia*, 47 (2): 135-144.
- Pignatti S., 2017. Flora d'Italia 2. Ed. Edagricole, Bologna.

Struwig M. & Siebert S. J., 2013. A taxonomic revision of *Boerhavia* (Nyctaginaceae) in southern Africa. *South African Journal of Botany*, 86: 116-134.

Cardamine flexuosa With.



(Spermatophyta >> Rosids (Malvids)
>> Brassicales >> Brassicaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Cardamine arisanensis Hayata; *Cardamine debilis* D. Don; *Cardamine occulta* Hornem.; *Cardamine muscosa* Vahl ex D. C.; *Nasturtium obliquum* Zoll; *Pteroneurum decurrens* Blume.

Common English names

Wavy Bitter-Cress.

Common Maltese names

Kardamin tal-ġonna.

Common Italian names

Billeri flessuoso, Cardamine flessuosa.

Short description

Annual herbs, 10–30 cm tall, glabrous or partly hirsute at the lower parts of the plant. Stems ascending or erect, sometimes decumbent, simple in smaller plants, branched in larger ones, straight or flexuous (curved) developed from 6–9 basal prostrate leaves. Leaves petiolate, 4–10 cm long, lyrate with 2–6 pairs of oblong-ovate lateral lobes and a much larger terminal lobe, reniform to circular in shape (lobed in larger plants). Cauline leaves are somewhat different, with the terminal lobe divided into 3–5 broad lobes and not much larger (sometimes subequal) to the lateral lobes. Inflorescence an elongating raceme. Corolla white, minute, petals 2–3 mm long, longer than the sepals (ca. 2 mm long). Pedicels curved in fruiting. Stamens 6. Siliqua linear, about 3 × 1 mm in size, glabrous, constricted between the seeds. Seeds oblong-oval, 1.2 × 0.8 mm, copper-brown.

Place of origin and global distribution

North and Central Europe extending to western parts of the Mediterranean region.

Distribution in Malta

Mostly urban areas, but have been seen in orchards and groves such as at Buskett (close to Wied il-Luq), Siġġiewi (Girgenti area), Mellieħa (Ġnien Ingraw) and in Gozo at Nadur (San Blas area).

Distribution in Sicily

Records for Palermo and Etna by Domina et al. (2019).

Life-form

Therophyte.

Introduction source

Escapee from introduced plants and trees.

Habitat or preferred invading habitat

Planters, parks, traffic islands, gardens, citrus groves, fields cultivated with fruiting trees, occasionally in damp paths or shallow valleys close to agricultural areas.

Frequency in Malta

Scarce, but tends to form established populations if not controlled. Has increased significantly over the past 3 decades.

Frequency in Sicily

Common only in mountain woods (Giardina et al. 2007).

Mode of dispersion

Ants and through the movement of contaminated soil. They are ejected from the siliqua to some distance.

First record in Malta

Duthie (1872).

First record in Sicily

This species is native to Sicily (Fiori 1923, Pignatti 2017).

Ecology

Annual plants which germinate readily in contact with water and set seed in a short period, especially during warm periods of the year. It can also be seen in summer in shaded and irrigated sites.

Possible control methods

Uprooting or rotovating the soil when the plants are not in seed.

Invasive category/local potential threat

Moderate-Low.



Remarks

In old literature it seems to have been confused with *Cardamine hirsuta* L., which is closely related and also present in Malta. Confusion probably arises due to the epithet '*hirsuta*' meaning hairy, where *C. flexuosa* has hairy flowering stems (at the basal part) whereas it is glabrous in *C. hirsuta*, and hence, this may lead to exchange the species identification. *C. flexuosa* can be distinguished in having 6 stamens (4-5 in *C. hirsuta*) and 5–10 leaves along the flowering stems (none or up to 4 in *C. hirsuta*). The distribution of *C. hirsuta* is more widespread, extending to the Mediterranean Region and hence is likely native to Malta. Being a small and fragile plant *C. flexuosa* is not very competitive with other native plants, and it usually thrives only in artificial habitats.

Referenced bibliography

- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Duthie J. F., 1872. Notes on the Flora of Malta and Gozo. *The Journal of Botany British and Foreign*: 206-210.
- Fiori A., 1923. Nuova Flora Analitica d'Italia, 1 (1-2-3). Firenze.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Pignatti S., 2017. Flora d'Italia 2. Ed. Edagricole, Bologna.

Cardiospermum grandiflorum Sw.



(Spermatophyta >> Magnoliopsida
(Rosids) >> Sapindales >> Sapindaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Cardiospermum barbicaule Baker; *Cardiospermum coluteoides* Kunth;
Cardiospermum duarteanum Cambess; *Cardiospermum elegans* Kunth;
Cardiospermum hirsutum Willd.; *Cardiospermum hispidum* Kunth;
Cardiospermum macrophyllum Kunth; *Cardiospermum pilosum* Vell.;
Cardiospermum velutinum Hook. & Arn.; *Cardiospermum vesicarum*
Humb.

Common English Names

Showy balloon vine, Heart seed vine.

Common Maltese Names

Sfineġ sufi, Tursien ir-riħ sufi, Tuffieh ir-riħ.

Common Italian Names

Cardiospermo a fiori grandi.

Short description

Herbaceous, evergreen, perennial vine, often with woody basal stems; forming extremely long rampant stems, hirsute with patent rigid brown hairs, sometimes glabrous. Leaves petiolated, biternate, 3–8 × 2–4 cm; leaflets ovate, rhombic or obovate, ending with acuminate tips and attenuate bases, each 12–30 × 15–35 mm with the terminal leaflet being the largest, bright and rather light green, subglabrous to pubescent (young leaves are often hispid on the veins), margin serrated. Flower clusters produced on tendrils stalks formed at the end of the branches, staminate and bisexual forms. Sepals 4, green with a white margin, in two different pairs, petals 5, white or cream with yellow band-shaped markings, 7– 12 mm across, fragrant. Stamens united in a tube and 7 mm long in staminate flowers, free and up to 4 mm long in bisexual flowers. Fruits elliptic-ovate capsules with three distinct angles, inflated, 4–6 cm long, membranous and becoming straw-yellow when mature, seeds 6– 7 mm across, dark grey to black with a small white rounded hilum sitting on internal membranous flaps inside the fruit capsule.

Place of origin and global distribution

Brazil and eastern parts of Argentina. Introduced and became naturalised in most parts of the world where it quickly became invasive in regions with favourable climatic and geographic conditions (e. g. temperate and subtropical regions).

Distribution in Malta

Widespread in many valleys, such as at Mellieħa, Wied Babu, Wied Inċita, Wied Għollieqa (controlled), Wied I-Isperanza, Wied il-Għasel, Wied Għomor, Msida. Possibly not yet introduced in Gozo.

Distribution in Sicily

Palermo (Di Martino & Perrone 1962), Etna at Canalicchio close to Catania and Santa Maria la Scala (Minissale pers. observ. in 2021).

Life-form

Phanerophyte.

Introduction source

Escapee from horticulture.

Habitat or preferred invading habitat

Valley beds, sometimes in disturbed ground near farms.

Frequency in Malta

Locally frequent.

Frequency in Sicily

Rare (Giardina et al. 2007).

Mode of dispersion

By vegetative means through anthropogenic vectors, and naturally by seeds that are primarily dispersed by water streams and wind where the light inflated capsule is blown away by strong winds.

First record in Malta

First publication in literature of *Cardiospermum* is that by Lanfranco (1992) as *C. villosum* mentioned as an ornamental tree in gardens. It is not certain if this record alludes to *C. grandiflorum*. However, the first mention of *C. grandiflorum* from natural habitats is by Weber & Kendzior (2006).

First record in Sicily

Di Martino & Perrone (1962).

Ecology

Plants form numerous flowers during the warmer months of the year, each giving rise to 3 seeds. Seeds are highly viable and germinate readily even in vegetated locations where there flexible creeping stems can grow through existing vegetation and cling over them forming large vines that are detrimental to the underlying plants.

Possible control methods

Manual uprooting.

Invasive category/local potential threat

High in suitable habitats.

Remarks

Highly invasive in Malta sometime seen covering large carob trees, extensive patches on tall stands of *Arundo donax* L., or intertwining with bramble making it very difficult to eradicate. Not recorded in old floras including Haslam et al. (1977), indicating that is a rather recent introduction, possibly sometime in the last quarter of the 20th century. Closely related is the annual and smaller species, *C. halicacabum* L., which forms similar leaves and flowers, but is glabrous throughout, has shorter tendrils, and its seeds have a large, boomerang-shaped white hilum covering about one third of the seed surface. It is much less frequent than *C. grandiflorum* and often found along rubble walls or field margins.



Referenced bibliography

- Di Martino A. & Perrone C., 1962. Nuovo contributo alla flora arboricola di Palermo. *Lavori dell'Istituto Botanico e Giardino Coloniale di Palermo*, 18: 112-202.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Lanfranco G., 1992. *Ħxejjex mediċinali u Oħrajn fil-Gżejjer Maltin*. Media Centre Print, Malta, 132 pp.+ 22 illus.
- Weber H. C. & Kendzior B., 2006. Flora of the Maltese Islands. A field Guide. Margraf Publishers, Weikersheim, 383 pp.

Carpobrotus acinaciformis s. l. (L.) L. Bolus



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Aizoaceae)
Phylum >> Class >> Order >> Family

Main synonym

None.

Common English names

Elands Sourfig; Sally-my-handsome; Pigface.

Common Maltese names

Swaba tal-Madonna vjola; Xuxet San Ġwann vjola.

Common Italian names

Fico degli Ottentotti comune, Carpobroto comune.

Short description

Evergreen, fast-growing, succulent, perennial, prostrate, profusely branched and mat-forming plant, about 25 cm in height. Roots thin, numerous and branching, also formed at internodes when the stem is in contact with humid ground. Stems rounded, becoming lignified at the base in mature plants, otherwise green and coriaceous, growing up to 200 cm long before branching, raised up towards the ends. Leaves opposite, partly connate at the base, sabre-shaped, up to 100 mm in length, cross-section an isosceles triangle about 13–15 mm wide. Foliage often becoming dark green verging into reddish-maroon in some cases. Flowers with numerous radiating linear petals, bright magenta with a reddish halo at the base, hybrids with a white or cream halo, 80-150 mm across, borne singly at the end of short, robust, flowering stalks. Stamens numerous, white sometimes fading to pink (or cream in hybrids) arranged as a ring below the petals and encircling a central pistil composed of a multi-radiating stigma. Ovary inferior with 10-14 locules. Fruit fleshy and green until seed dispersal where it becomes leathery or cork-like, semi-globose and constricted at the base (= chalice like). Seeds numerous, small (± 0.5 mm), black, irregular pip-shaped, rugulose, embedded in a sticky, mucoid matrix.

Place of origin and global distribution

South Africa. Widely naturalised worldwide, especially in tropical regions and the Mediterranean region.

Distribution in Malta

Cultivated and became naturalised throughout the Maltese Islands, especially near the coast and on cliffs.

Distribution in Sicily

Everywhere in the region (Giardina et al. 2007); from Capo Lilibeo to Ronciglio, Saline di Teodoro, Marsala (Aleo et al. 2004); Pantelleria Island (Gianguzzi 2003); Levanzo Island (Romano et al. 2006); Palermo (Domina et al. 2019).

Life-form

Chamaephyte, trailing habit, succulent.

Introduction source

Repeated introductions as an ornamental plant and later for embellishment, where it escaped forming dense and invasive populations.

Habitat or preferred invading habitat

Arid rocky ground close to the coast, but it can naturalise throughout the entire Maltese Islands. Naturalised on the beaches.

Frequency in Malta

Common.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Mostly spreading vegetatively and extending from its source of plantation, while long-distance dispersal is mainly from cuttings propagated by man. Seeds are viable but are not the preferred way of natural dispersal in Malta.



First record in Malta

Both Gulia (1855-56) and Cleghorn (1869) mention vaguely plants that may refer to *Carpobrotus* spp. namely *Mesembryanthemum tenuifolium* (Xuxet il-Madalena) and *Mesembryanthemum deltoideum* respectively. To what plants these authors refer remains uncertain, but the first reliable record of a *Carpobrotus* is that of *C. acinaciformis* by Sommier & Caruana Gatto (1915) and later by Borg (1927).

First record in Sicily

The first news of naturalisation for Europe of *Carpobrotus* sp. date back to the late nineteenth century, early twentieth century (Campoy et al. 2018). Lojacono (1891) reports *Carpobrotus acicaciformis* as already common on the island.

Ecology

Plants mainly reproduce vegetatively by rapid extension of their branches which also root and form stronger anchorage and more efficient uptake of water and nutrients, finally forming a clonal population. Seed dispersal has not been shown to occur in situ, but plants had been successfully propagated from seeds under strict observation in a closed environment showing that they are viable (pers. obs. S. Mifsud). Perhaps seeds do play a role in the propagation of the species in suitable habitats and ground that is not highly vegetated such as sand dunes or exposed rock.

Possible control methods

Manual removal with careful pickup and disposal of all stems and leaves which can act as viable propagules leading to further new populations.

Invasive category/local potential threat

High.

Remarks

Morphologically it is closely related to *Carpobrotus edulis* which has been confused with for some 50 years and was assumed that populations occurring in Malta corresponded to *C. edulis*, until taxonomic clarification was brought forward by Mifsud (2021). In this study, many plants corresponded to a cultivar hybrid complex referred to as *C. affinity acinaciformis*, although pure plants of *C. edulis* and

C. acinaciformis have been found in Malta. From the sample of 25 studied populations, *C. edulis* developed yellow flowers whereas all *C. acinaciformis* formed purple flowers hence until further investigations the colour of the flowers are sufficient to discriminate between *C. edulis* and *C. acinaciformis* s.l. although the purple-flowering variety of *C. edulis* (var. *rubescens* Druce) should not be ignored and may be also present within the numerous introductions occurring in the Maltese Islands.

Referenced bibliography

- Aleo M., Bazan G. & Cordi R., 2004. Le piante vascolari del litorale trapanese: da Capo Lilibeo a Ronciglio. *Quaderni di Botanica ambientale applicata*, 15: 83-98.
- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Campoy J. G., Acosta A. T. R., Affre L., Barreiro R., Brundu G., Buisson E., Gonzalez L., Lema M., Novoa A., Retuerto R., Roiloa S. R. & Fagúndez J., 2018. Monographs of invasive plants in Europe: *Carpobrotus*. *Botany Letters*, 165: 440-475.
- Cleghorn H., 1969. Notes on the Botany and Agriculture of Malta and Sicily. Proceedings for March 1969: 106-139.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Gianguzzi L., 2003. Il paesaggio vegetale dell'isola di Pantelleria. Sicilia Foreste, 6. Azienda Foreste Demaniali, Palermo.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20: 5-582.
- Gulia G., 1855-56. Repertorio Botanico Maltese. Tipografia Laferla, Malta, 68 pp.
- Lojacono Pojero M., 1891. Flora sicula 1 (2). Palermo.

- Mifsud S., 2021. Morphology of the invasive *Carpobrotus* (Aizoaceae) in Europe: Malta as a case study. *Mediterranean Botany*, 42: e 71195. <https://doi.org/10.5209/mbot.71195>.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.

Carpobrotus edulis (L.) N.E. Br



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Aizoaceae)
Phylum >> Class >> Order >> Family

Main synonyms

None.

Common English names

Hottentot Fig; Highway Ice plant.

Common Maltese names

Swaba tal-Madonna safra; Xuxet San Ġwann safra.

Common Italian names

Fico degli Ottentotti edule; Carpobroto edule.

Short description

Evergreen, fast-growing, succulent, perennial, prostrate, profusely branched and mat-forming plant, about 25 cm in height. Roots thin, numerous and branching, also formed at internodes when the stem is in contact with humid ground. Stems rounded, becoming lignified at the base in mature plants, otherwise green and coriaceous, growing up to 220 cm long before branching, raised up towards the ends. Leaves opposite, partly connate at the base, straight to slightly curved, up to 100 mm in length, cross-section an equilateral triangle about 10–14 mm wide. Foliage bright green, sometimes turning orange-red. Flowers with numerous radiating linear petals, light yellow with a paler base, 70–110 mm across, borne singly at the end of short, robust, flowering stalks. Stamens numerous, white sometimes or cream arranged as a ring below the petals and encircling a central pistil composed of a multi-radiating stigma. Ovary inferior with 9–11 locules. Fruit fleshy and green until seed dispersal where it becomes leathery or cork-like, semi-globose and constricted at the base (= chalice like). Seeds numerous, small (± 0.5 mm), black, irregular pip-shaped, rugulose, embedded in a sticky, mucoid matrix.

Place of origin and global distribution

South Africa. Widely naturalised worldwide, especially in tropical regions and the Mediterranean region.

Distribution in Malta

Cultivated but not yet reported to have naturalised in the wild. Examples of cultivated plants in rural areas include Ghasri, opposite ta' Pinu church, Selmun and Hagar Qim.

Distribution in Sicily

Everywhere in the region (Giardina et al. 2007); from Capo Lilibeo to Ronciglio, Saline di Teodoro, Marsala (Aleo et al. 2004); Marettimo Island (Gianguzzi et al. 2006); Macconi di Gela (Sciandrello et al. 2015); Torre Faro, Messina (Minissale & Sciandrello 2015); Archaeological Park of Selinunte (Scafidi & Raimondo 2019); Palermo (Domina et al. 2019); Oasi del Simeto and Mouth of Irminio river (pers. obs.).

Life-form

Chamaephyte, trailing habit, succulent.

Introduction source

Ornamental plant.

Habitat or preferred invading habitat

Arid rocky ground close to the coast.

Frequency in Malta

Rare.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Mostly spreading vegetatively and extending from its source of plantation, while long-distance dispersal is mainly from cuttings propagated by man. Seeds are viable but are not the preferred way of natural dispersal in Malta.



First record in Malta

Both Gulia (1855-56) and Cleghorn (1869) mention vaguely plants that may refer to *Carpobrotus* spp. namely *Mesembryanthemum tenuifolium* (Xuxet il-Madalena) and *Mesembryanthemum deltoideum* respectively. To what plants these authors refer remains uncertain. In addition, *C. edulis* has been confused with *C. acinaciformis* and records of both species are interchangeable and cannot be assigned to the actual species, yet Borg (1927) and Haslam et al. (1977) mentions both *C. edulis* and *C. acinaciformis* from Malta and hence this distinction into two species attributes the first records of *C. edulis* for the Maltese Islands.

First record in Sicily

The first news of naturalisation for Europe of *Carpobrotus* sp. date back to the late nineteenth century, early twentieth century (Campoy et al. 2018). Lojacono (1891) reports *Carpobrotus acicaciformis* as already common on the island but does not mention *C. edulis*.

Ecology

Plants mainly reproduce vegetatively by rapid extension of their branches which also root and form stronger anchorage and more efficient uptake of water and nutrients, finally forming a clonal population. Seed dispersal has not been shown to occur in situ, but plants had been successfully propagated from seeds under strict observation in a closed environment showing that they are viable (pers. obs. S. Mifsud). Perhaps seeds do play a role in the propagation of the species in suitable habitats and ground that is not highly vegetated such as sand dunes or exposed rock.

Possible control methods

Manual removal with careful pickup and disposal of all stems and leaves which can act as a viable propagule leading to further new populations.

Invasive category/local potential threat

High.

Remarks

Morphologically it is closely related to *Carpobrotus edulis* which has been confused with for some 50 years and was assumed that

populations occurring in Malta corresponded to *C. edulis* s. l., until taxonomic clarification was brought forward by Mifsud (2021). In this study, many plants corresponded to a cultivar hybrid complex referred to as *C. affine acinaciformis*, although pure plants of *C. edulis* and *C. acinaciformis* have been found in Malta. From the sample of 25 studied populations, *C. edulis* developed yellow flowers whereas all *C. acinaciformis* formed purple flowers hence until further investigations the colour of the flowers are sufficient to discriminate between *C. edulis* and *C. acinaciformis* s.l. although the purple-flowering variety of *C. edulis* (var. *rubescens* Druce) should not be ignored and may be also present within the numerous introductions occurring in the Maltese Islands.

Referenced bibliography

- Aleo M., Bazan G. & Cordì R., 2004. Le piante vascolari del litorale trapanese: da Capo Lilibeo a Ronciglio, *Quaderni di Botanica ambientale applicata*, 15: 83-98.
- Borg J., 1927. Descriptive Flora of the Maltese Islands. Malta Government Printing Office, 846 pp.
- Campoy J. G., Acosta A. T. R., Affre L., Barreiro R., Brundu G., Buisson E., Gonzalez L., Lema M., Novoa A., Retuerto R., Roiloa S. R. & Fagúndez J., 2018. Monographs of invasive plants in Europe: *Carpobrotus*. *Botany Letters*, 165: 440-475.
- Cleghorn H., 1969. Notes on the Botany and Agriculture of Malta and Sicily. Proceedings for March 1969: 106-139.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Gianguzzi L., 2003. Il paesaggio vegetale dell'isola di Pantelleria. Sicilia Foreste, 6. Azienda Foreste Demaniali, Palermo.
- Gianguzzi L., Scuderi L. & Pasta S., 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia*, 61 (2): 359-402.

- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20: 5-582.
- Gulia G., 1855-56. Repertorio Botanico Maltese. Tipografia Laferla, Malta, 68 pp.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Lojacono Pojero M., 1891. Flora sicula 1 (2). Palermo.
- Mifsud S., 2021. Morphology of the invasive *Carpobrotus* (Aizoaceae) in Europe: Malta as a case study. *Mediterranean Botany*, 42: e 71195. <https://doi.org/10.5209/mbot.71195>.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Minissale P. & Sciandrello S., 2015. The sabulicolous therophytic associations in Sicily: new insights through the statistical approach, stressing the continuum vs discrete model of plant communities. *Acta Botanica Gallica*, 162 (1): 55-78.
- Scafidi F. & Raimondo F. M., 2019. Contribution to the vascular flora of the archaeological park of Selinunte and Cave of Cusa (South-Western Sicily, Italy): preliminary results. *Boccone*, 28: 371-390.
- Sciandrello S., Tomaselli G. & Minissale P., 2015. The role of natural vegetation in the analysis of the spatio-temporal changes of coastal dune system: a case study in Sicily. *Journal of Coastal Conservation*, 19:199-212.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.

Casuarina equisetifolia L.



(Spermatophyta >> Magnoliopsida (Rosids) >> Fagales >>
Casuarinaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Casuarina africana Lour.; *Casuarina brunoniana* Miq.; *Casuarina excelsa* Dehnh. ex Miq.; *Casuarina indica* Pers.; *Casuarina lateriflora* Poir.; *Casuarina littorea* Oken; *Casuarina mertensiana* Rupr. ex Miq.; *Casuarina repens* Hoffmanns.; *Casuarina sparsa* Tausch; *Casuarina truncata* Willd.

Common English names

Australian pine tree; whistling pine tree; She-oak tree; Beach she-oak tree; Horsetail tree.

Common Maltese names

Kazwarina komuni.

Common Italian names

Casuarina equisetifolia.

Short description

Monoecious tree, up to 30 m tall, not forming suckers even when mature. Trunk with scaly bark, chestnut to dull brown becoming reddish brown in old trees. Crown conical, profusely branched with the proximal (lowermost) branches slightly pendulous in mature trees. Twigs linear, jointed at regular intervals, profusely branched, about 1 mm in diameter and 10–20 cm long, greyish-green and photosynthetic. Twig nodes 7 mm long with 6–8 ridges. True leaves scale-like in whorls of 6 to 8 at the base of twigs and usually appressed to them, linear-lanceolate and less than 5 mm long, pale green to yellowish, not highly photosynthetic. Male inflorescences linear-oblong, 2–5 cm long with florets having cream-yellow stamens about 3 mm long. Female flowers brush of thread-like scarlet-purple stigma, then forming lignified cones. Cones subspherical to ellipsoid with truncate base and apex, 1.5 – 3.0 cm long, greyish-green then becoming brown when fully mature, having 8 or 9 whorls of fruiting units each enclosed with two protruding, triangular valves. When seeds are mature, valves open to release the seeds and remains open. Seeds a winged samara 5–8 mm long, tan coloured.

Place of origin and global distribution

Australia.

Distribution in Malta

MALTA: Wied il-Qlejgħa, Wied Għajn Żejtuna, Buskett Woodland.
GOZO: Wied ta' Marsalforn, Xlendi, Xewkija Industrial Estate.

Distribution in Sicily

Isola Lachea (Sciandrello et al. 2017), Palermo (Domina et al. 2019).

Life-form

Phanerophyte.

Introduction source

Introduced for the embellishment of roads, parks and public gardens.

Habitat or preferred invading habitat

Embellishment and ornamental trees but have seen naturalised in a few valleys both in Gozo and Malta.

Frequency in Malta

Rare in the wild but increasing as casual and individual occurrences in some valleys.

Frequency in Sicily

Rare.

Mode of dispersion

By seed which is primarily dispersed by wind, but also by ants and water streams.

First record in Malta

Borg (1925) as an ornamental tree.

First record in Sicily:

Not reported. May be Isola Lachea (Sciandrello et al. 2017).

Ecology

Male and female organs are present on separated flowers. Large amounts of pollen are liberated and dispersed by wind fertilising the long stigma of female flowers. Seeds are formed in woody cones and liberated in November where they have a wing and dispersed by wind. *Casuarina* species do not propagate vegetatively by suckers.

Possible control methods

Uprooting or logging from the base.

Invasive category/local potential threat

Moderate (see remarks).

Remarks

At least three *Casuarina* trees are present in the Maltese islands but they are closely related and needs careful inspection of the reproductive parts to ascertain identity. *Casuarina verticillata*

Lam. (= *Allocasuarina verticillata* (Lam.) L. A. S. Johnson) is probably as common as *C. equisetifolia* and was also mentioned by Borg (1925) under the synonymous taxon *C. stricta* Aiton. Similarly, *Casuarina cunninghamiana* Miq. was also recorded by Borg (1925) as an ornamental tree and is less known from the other two species and less frequent. All three species have the same ecology and habitat.

Naturalisation of *Casuarina* trees was not documented and probably did not occur, until the last ten years or so when individual trees started to appear in a few valley beds such as Wied ta' Marsalforn and Wied tal-Qlejgha. Climate change may be playing a role in the new naturalisation events of this tree.

Referenced bibliography

Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.

Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.

Sciandrello S., Minissale P. & Sturiale G., 2017. Plant communities supported by the geological setting: the case history of the Isole dei Ciclopi (Etna, S.E. Sicily). *Lazaroa*, 38 (1): 27-51.

Pennisetum villosum R.Br. ex Fresen.



(Spermatophyta >> Liliopsida
(Commelinids) >> Poales >> Poaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Pennisetum angustifolium E. Vilm.; *Cenchrus longisetus* M.C. Johnst.

Common English names

Feathertop grass.

Common Maltese names

Pennisetum żgħira; Pjuma żgħira.

Common Italian names

Penniseto lanceolato; *Penniseto villosa*.

Short description

Rhizomatous perennial grass forming medium-sized dense tufts between 40–100 cm wide and about 80 cm high. Flowering stems bent at the base the arising straight. Leaves narrowly lanceolate to linear, arcuate, 10–18 cm long and about 3 mm wide, greyish-green, rigid, margins slightly or not inrolled, smooth. Ligule 1.5 mm rounded, smooth but ciliate above. Inflorescences spike-like, soft and plumose at the lower part, 50 – 100 mm long, ovoid, white or sometimes cream. Flowers singular or in pairs from each involucre node attached to the rachis by a short a short stalk surmounted with a brush of 25-30 mm long cream-coloured bristles (about four times the length of the spikelets). Spikelet 10–12 mm long, lower glume circular very small and indistinct (1 mm long); upper glume about one third to two thirds of the spikelet length (3–4 mm long), broadly lanceolate-triangular with an acute to acuminate tip. Lemma acuminate and almost the same length of the spikelet, membranous with green coarse veins. Anthers about 3.5 mm long, subtended on long, wiry thin filaments.

Place of origin and global distribution

Native to Ethiopia, Somalia and possibly neighbouring Arabian regions. Cultivated as an ornament in many warm countries including the Mediterranean region, where it got widely naturalised.

Distribution in Malta

Scattered as small groups of plants or individuals in mainland Malta. Probably not introduced in Gozo or if introduced, lived for a short term. Cultivation have been observed at San Anton Gardens, University grounds, Argotti gardens, traffic islands at Marsascala and Siggiewi, and also escaping in the wild such as at Xemxija Heritage Trail and Wied iż-Żurrieq promenade.

Distribution in Sicily

Lercara Friddi (Schicchi & Trapani 1998); Vicari (Raimondo & al. 2004) Recently recorded by Banfi (2011) at Scoglitti (Ragusa) and by Aleo (2021) in Palermo.

Life-form

Hemicryptophyte.

Introduction source

Introduced in Malta as an ornamental mostly cultivated in traffic islands, central strip and public gardens.

Habitat or preferred invading habitat

Arid and bare rocky ground, possibly preferring areas close to the sea. Uncultivated land, road edges.

Frequency in Malta

Scarce and decreasing.

Frequency in Sicily

Rare (Giardina et al 2007).

Mode of dispersion

Escaping by seed through wind dispersal. Other modes of dispersal namely water streams or insects could be considered but does not seem to take place, since sporadic escapees do not form larger populations.

First record in Malta

Sommier & Caruana Gatto (1915) citing a collection by John Borg from Wied is-Sewda and referred to it as *P. compressum*. Populations in natural ecosystems were reported by Casha (2009) from Xemxija in 2008.

First record in Sicily

First collected near Lercara Friddi (Schicchi & Trapani 1998).

Ecology

Inflorescences are produced almost all year round, with a decreased output in the coldest months. Thousands of seeds are shed but they do not germinate readily probably because environment conditions are not suitable.

Possible control methods

Uprooting completely plants without spreading seeds, and if possible, destroy roots present deep in crevices.

Invasive category/local potential threat

Low, because reported escapees are few and they do not further form

large populations. Yet climate or environment changes might trigger higher rates of germination making it problematic as *P. setaceum*. Hence as a precaution, using this species as an ornament is not advised.

Remarks

The species is easily differentiated from the highly invasive *P. setaceum* from its shorter and ovoid inflorescences (up to 10 cm) – long and cylindrical and measuring more than 15 cm in *P. setaceum*. Moreover, the inflorescences are almost white or greenish in *P. villosum* and light brown or purplish in *P. setaceum*. The plant recorded by Casha (2009) has not become invasive, and when examined in 2014 (about six years later its first record), three plants were present and all close to the mother plant, probably reproduced vegetatively by rhizomes. Borg (1927) also mentioned a short-live population naturalised at the Floriana glacia. It remains a bit enigmatic why the *P. setaceum* is highly invasive and *P. villosum* can bare naturalise in the Maltese Islands, considered that they are related species, originating from the same zone and sharing same natural habitats in their native range.

Referenced bibliography

Aleo M., 2021. ActaPlantarum.

<https://www.actaplantarum.org/forum/viewtopic.php?&t=124083>.

Banfi E., 2011. Acta Plantarum.

<https://www.actaplantarum.org/forum/viewtopic.php?&t=41510>.

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Casha A., 2009. A Contribution to the Maltese Flora. *The Central Mediterranean Naturalist*, 5 (1): 35-43.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Raimondo F. M., Mazzola P. & Domina G., 2004. Check-list of the vascular plants collected during Iter Mediterraneum III. *Boccone*, 17: 65- 231.

Schicchi R. & Trapani S., 1998. *Pennisetum villosum* R. Br. ex Fresen., nuova esotica spontaneizzata in Sicilia. Quad. Bot. Amb. Appl. 6(1995): 79-80.

Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.



Pennisetum setaceum (Forssk.) Chiov.



(Spermatophyta >> Liliopsida (Commelinids) >> Poales >>
Poaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Pennisetum erythraeum Chiov.; *Pennisetum macrostachyum* Fresen;
Pennisetum numidicum Paris; *Cenchrus setaceus* (Forssk.) Morrone.

Common English names

African Fountain grass; Crimson Fountain grass.

Common Maltese names

Pennisetum, Pjuma.

Common Italian names

Penniseto setaceo, Penniseto allungato.

Short description

Perennial grass forming large dense tufts up to 150 cm wide and about 100 cm high. Leaves linear, arcuate, 20–50 cm long and only 2 mm wide, glaucous greyish-green, rigid, surface slightly harsh and with a thickened midrib, margins inrolled rather smooth. Ligule ciliate, short. Inflorescences spike-like, soft, 100 – 280 mm long, cylindrical, slightly arched and with a purplish-brown rachis. Flowers in groups of three spikelets, one sessile and two with a short pedicel, arising on a common short stalk surmounted with a brush of 20-40 mm long purplish or straw-coloured bristles (about four times the length of the spikelets). Spikelet 4–6 mm long, lower glume ovate to circular and about one third the length of spikelet; upper glume longer and about half the spikelet length, lanceolate with an acute to acuminate tip. Lemma almost same shape of glumes but about the same length of the spikelet. Male and female florets separated within each spikelet. Anthers subtended on long wiry thin filaments.

Place of origin and global distribution

Native to arid regions in the Middle East, North Africa and some central African countries like Kenya, Somalia, Sudan and Tanzania. Introduced as an ornamental plant in many warm countries including the Mediterranean region since the mid 20th century.

Distribution in Malta

Widespread throughout mainland Malta and the eastern half of Gozo, mostly in urban areas, but escaped in natural ecosystems mostly fields close to roads, steppe and valleys (e. g. Ħarq Ħammim and Wied il-Miżieb in Malta, and Wied tal-Marġa and Wied tar-Ramla in Gozo), where they are able to dominate and invade in a very short time.

Distribution in Sicily

Currently the species is very widespread. It is reported for the territory of Palermo (DI Martino & Trapani 1964; Trapani 1965; Raimondo 1975; Dia & Romano 1982; Raimondo & Mazzola 1983; Ottonello & Marcenò 1991; Gianguzzi et al. 1996; Dia 1999; Sortino et al. 2004),

Messina (Rossitto 1986; Sciandrello et al. 2014), Catania (pers. obs., Sciandrello 2021-2022); Trapani, Agrigento and Caltanissetta (Sortino et al. 2004). From these locations began the unstoppable spread of the species in Sicily.

Life-form

Hemicryptophyte.

Introduction source: Introduced in Malta as an ornamental mostly cultivated in traffic islands, central strip and later public gardens. In Sicily, apart from the first documented introduction in the Botanical Garden of Palermo from which its naturalisation very likely started, from the 2000s and until a few years ago it was widely used as an ornamental plant for private gardens, public green traffic islands etc.

Habitat or preferred invading habitat

Roads and pathways, rubble walls, steppe, rocky valley sides, disturbed ground, abandoned plots.

Frequency in Malta

Very common in mainland Malta, rare in Gozo and currently not reported from Comino and other islands of the Maltese archipelago.

Frequency in Sicily

Very common in the urban outskirts of Catania and Palermo, along the Palermo highway Trapani and on the mountains around Palermo in the steppe grasslands where it tends to replace local species with similar ecology such as *Hyparrhenia hirta* and *Ampleosedmos mauritanicus*. Rare in inland areas of Sicily, some reports only for areas with a hot and arid climate.

Mode of dispersion

Three modes of natural dispersal has been observed: by water currents, by wind and by ants. Moreover, it has been widely cultivated by man.

First record in Malta

Mentioned in literature by Weber (2008) but was known to exist and escaping in roads and pathways with rubble walls few years earlier, probably in 2005-2005. Populations in natural ecosystems were observed in 2009 on rocky ground close to the cliffs at Hal Far in a

Natura 2000 site. (pers. obs. Stephen Mifsud 2009) and later in several other sites for example at Baħar iċ-Ċagħaq, Mellieha and Burmarrad (Sciberras & Sciberras, 2010) and dominating in tributary of Wied tal-Miżieb.

First Record in Sicily

The species was introduced in Sicily in 1939 through the Botanical Garden of Palermo (Bruno 1939) with seeds coming from East Africa. It was cultivated in the garden for experimental purposes, first as a forage herb and later as an ornamental species. Cultivation continued in the following decades (Pasta et al. 2010). The first report of the species as naturalised in Sicily is by Pignatti & Wikus (1959) who report it on Mount Pellegrino in Palermo and the following year it is also reported in Catania (with an incorrect *P. villosum* R. Br. name) by (Borruso & Furnari 1960).

Ecology

Inflorescences are produced almost all year round, with a decreased output in the coldest months. Thousands of seeds are shed and can potentially give rise to a plant. Seeds can remain viable for at least three years.

Possible control methods

Uprooting completely plants without spreading seeds, and if possible, destroy roots present deep in crevices.

Invasive category/local potential threat

High, had become common and invaded several areas in just a span of 15 years.

Remarks

A very invasive plant listed as an alien species of EU concern via Regulation 1143/2014 and specifically 1263/2017 (listed as *Pennisetum setaceum*). Eradication from the island of Gozo has been successful and under control (Mifsud 2021) since action has started at an early phase, but in mainland Malta, the species had overrun without control. At least three other species of *Cenchrus* have been cultivated but they did not show an invasive character as *C. setaceum* which become widespread and forming stubborn populations in a

very short period of time of more or less in 15-17 years. Its introduction and cultivation was contested by many ecologists (e.g. Baldacchino 2012, 2014) but legislation to control its spread and abolish its trade came into force late.

Referenced bibliography

Baldacchino A., 2012. EU stand on invasive species. The Times of Malta (29-Oct-2012). Retrieved from <https://timesofmalta.com/articles/view/EU-stand-on-invasive-species.443077>.

Baldacchino A., 2014. L-Ispeċi Invażivi... u l-Mepa. Alfred Baldacchino Blog. Retrieved from <https://alfredbaldacchino.wordpress.com/category/pennisetum-setaceum/>

Borruso S. & Furnari F., 1960. Due nuove avventizie in Sicilia: *Pennisetum villosum* R. Br. e *Xanthium italicum* Moretti. *Bollettino Istituto di Botanica dell'Università di Catania*, 3: 76-78.

Bruno F., 1939. Una graminacea ornamentale: *Pennisetum ruppellii* Steud. *Bollettino Istituto di Botanica dell'Università di Messina*, 1: 175-176.

Dia M. G., 1999. Note sull'espansione di alcune neofite in Sicilia. *Quaderni di Botanica Ambientale Applicata*, 10: 35-36.

Dia M. G. & Romano S., 1982. Note sulla diffusione di alcune piante nella Sicilia settentrionale e occidentale. *Atti Accademia Scienze, Lettere e Arti di Palermo*, IV, 39 (1): 325-338.

Di Martino A. & Trapani S., 1964. Flora e vegetazione dell'Isola delle Femmine. *Lavori dell'Istituto di Botanica e Giardino Coloniale di Palermo*, 20: 121-159.

Gianguzzi L., Ilardi V. & Raimondo F. M., 1996. La vegetazione del promontorio di Monte Pellegrino (Palermo). *Quaderni di Botanica ambientale applicata*, 4: 79-137.

Mifsud S., 2021. Eradicating invasive alien species: the battle against African fountain grass. The Times of Malta (30-Oct-2021). Retrieved from <https://timesofmalta.com/articles/view/eradicating-invasive-alien-species-the-battle.910414>.

- Ottonello D. & Marcenò C., 1991. *Pennisetum setaceum* (Forssk.) Chiov.: biologia, distribuzione e utilizzazione nel restauro ambientale in provincia di Palermo. *Giornale Botanico italiano*, 125: 323.
- Pasta, S., Badalamenti, E., & La Mantia, T. 2010. Tempi e modi di un'invasione incontrastata: *Pennisetum setaceum* (Forssk.) Chiov. (Poaceae) in Sicilia. *Il Naturalista Siciliano*, 34 (3-4): 487-525.
- Pignatti S. & Wikus E., 1963. Contribuzione alla flora siciliana. *Pubblicazioni dell'Istituto Botanico dell'Università di Trieste*, 14 (5): 13-14.
- Raimondo F. M., 1975. Nota su alcune neofite della flora siciliana. *Archivi di Botanica e Biogeografia Italiana*, 51: 134-140.
- Raimondo F. M. & Mazzola P., 1983. Aggiunte alla flora delle Madonie (Sicilia). *Atti dell'Accademia di Scienze, Lettere e Arti, Palermo*, s. 4, 40 (1): 1-11.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains-NE Sicily). *Webbia: Journal of Plant Taxonomy and Geography*, 69 (2): 301-324.
- Sciberras J. & Sciberras A., 2010. A Contribution to the Knowledge of Alien Flora in the Maltese Islands. *The Central Mediterranean Naturalist*, 5 (2): 44-48.
- Sortino S., La Mantia A., Orlando L. & Sortino M., 2004. Autoecological observations on *Pennisetum setaceum* (Försskal) Chiovenda in Sicily. *Proceedings of XI OPTIMA Meeting*, Belgrado, 5-11 settembre 2004: 133.
- Trapani S., 1965. *Pennisetum ruppellii* Steud. avventizia nel Palermitano. *Lavori dell'Istituto di Botanica e Giardino Coloniale di Palermo*, 21: 68-73.
- Weber H.C., 2008. *Ornamental Plants of Malta*. Margraf Publishers, Weikersheim, 356 pp.

Centaurea diluta Aiton



(Spermatophyta >> Asterids (Campanulids) >>
Asterales >> Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Calcitrapa subspinosa Moench.; *Centaurea elongata* Schousb.;
Centaurea subspinosa Steud.

Common English names

North African knapweed; Lesser star-thistle.

Common Maltese names

Ġentawreja tal-Afrika.

Common Italian names

Fiordaliso del nord Africa, Centaurea del nord Africa.

Short description

Annual or less often a short-lived perennial reaching up to 220 cm in fertile ground, fairly branched below and profusely branched above at the inflorescences, covered throughout with very short hairs, sometimes sparsely so. Basal leaves form a rosette when young, petiolate and up to 18 cm long, then gradually becoming reduced (2–7 cm long) and sessile up the stem with a distinct winged or decurrent flap at the stem's attachment. Basal leaves with deeply pinnately-lobed lamina; cauline leaves gradually less lobed with the uppermost leaves oblong-lanceolate and almost entire or irregularly shallowly-lobed. Inflorescence a widely-open and profusely branched cyme with subtending small leaves (1–2 cm long) at regular intervals along the flowering branches. Flowerheads with ovoid involucre approx. 10–15 mm in diameter covered by ovate involucral phyllaries, having a green body with the upper part broadly margined with a copper-brown and scarious appendage outlined by shortly-spinose, blackish-brown teeth (ca. 0.8 mm long). Ray florets magenta or bright purple of two types: the outer (and sterile) 24–30 mm long, with a long narrow tube opening to a fan-like 5-lobed appendage; the inner more numerous, much shorter, not more than 18 mm long, tubular turning white at the lower half. Achenes (sometimes referred to as a cypsela) 3–4 mm long, tan to clay-brown, topped with white, simple, straight bristles of unequal length, 2–5 mm long.

Place of origin and global distribution

Southwest Europe and the northern part of Africa.

Distribution in Malta

Known from several localities close to agricultural land or abandoned fields. Quite widespread in the western part of mainland Malta and throughout Gozo.

Distribution in Sicily

This species was collected in several location of Easter and central Sicily, including Catania, Belpasso, Paternò, Lentini, Castel di Judica, Agira (Giardina & Lucchese 2002), Vittoria, Termini Imerese, and Milena.

Life-form

Therophyte.

Introduction source

Probably from birdseed used in cages for bird trapping in abandoned fields or steppe.

Habitat or preferred invading habitat

Agricultural areas, fallow or disused fields, field margins, steppe with considerable soil depth.

Frequency in Malta

Scarce but rather frequent in Gozo.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Seeds dispersed by wind.

First record in Malta

Lanfranco (1972).

First record in Sicily

Recent introduction according to Giardina & Lucchese (2002), clarifying an incorrect identification of a sample preserved in the Herbarium Mediterraneum Panormitanu at the end of the 19th century.

Ecology

Most plants in Malta exhibit an annual life cycle since they do not withstand the hot, arid weather in summer. The plants germinate in October-November after the first rains, reach maturity in April, flower in May and set seeds in June, often distributed so considerable distances with the aid of the wind.

Possible control methods

Uprooting when the plants are not in seed.

Invasive category/local potential threat

Moderate.

Remarks

The population seems to fluctuate where it was rather frequent in the 1970s, declined drastically in the 1990s, and increased again in the early 2000s. It has been confused with *C. pulluta* L. and *C. scabiosa* L in the past.



Referenced bibliography

Giardina G. & Lucchese, F. 2002: The native-alien status of *Centaurea diluta* Aiton in Italy. Additional points and clarification. *Archivio Geobotanico*, 6(2): 183-188.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Lanfranco, E., 1972. Additions and corrections to the Maltese flora. *Maltese Naturalist*, 1 (3): 17–20.

Chasmanthe floribunda (Salisb.) N. E. Br.



(Spermatophyta >> Liliopsida >>
Aspargales >> Iridaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Antholyza praealta Delile.

Common English names

African flag.

Common Maltese names

Vipra komuni, Bifra komuni.

Common Italian names

Casmante floribunda, Gladiolo africano.

Short description

Herbaceous plants from underground globose corms (5-7 cm across), withering and aerial parts absent between end of spring till mid-autumn, flowering stem erect and reaching up to 120 cm. Leaves, mostly basal, simple, linear-ensiform, 20–35 mm wide, bright green, glabrous with an entire margin, acute tip and ribbed longitudinal parallel veins; cauline leaves shorter, few. Inflorescence a spike of 20–40 sessile flowers arranged distichously (2 opposite ranks). Tepals fused to form a tube, curved and slightly twisted, about 40 mm long, with a pouch-like nectary pocket at the base, then free into six unequal limbs, some small and lobe-like (ca. 8 mm long), the upper distinctly long (ca. 30 mm long), hooded and shielding the stamens and pistil, the lateral about 12 mm long, bright reddish-orange, slightly fragrant. Capsules 10–14 mm, globular, wrinkled with three longitudinal keels. Seeds rounded, shiny, bright orange to amber, up to six per capsule (usually 3–4).

Place of origin and global distribution

Endemic to Cape Town in South Africa, but introduced worldwide in temperate and sub-tropical climates including the Mediterranean region.

Distribution in Malta

Distributed throughout the Maltese Islands, including Gozo and Comino.

Distribution in Sicily

The species was observed close Palermo at Monte Pellegrino and Balestrate (Grandis, 2016).

Life-form

Geophyte.

Introduction source

Escape from cultivation as an ornament.

Habitat or preferred invading habitat

Exposed arid rocky ground (natural stations) and pavement cracks, roadsides and abandoned gardens (urban stations)

Frequency in Malta

Frequent in the maquis, sheltered garigue, path sides, valleys sides, farms, field margins, disturbed agricultural areas, etc.

Frequency in Sicily

The species is cultivated as ornamental plant but it is very rare as naturalised.

Mode of dispersion

New populations are introduced by seeds dispersed by soil movements and water currents. However, many stations might have originated by man, either deliberately by planting into new sites or accidentally through dumping of unwanted plants.

First record in Malta

Mifsud (2017).

First record in Sicily

Grandis (2016).



Ecology

Plants survive summer through deep underground corms, which produce leaves soon after the first rains (typically October). Flowers are seen around February, and seeds are ripe in May. Some 100 seeds per plant are produced. New corms are formed every year and give rise to large populations after a short time.

Possible control methods

Uprooting plants and removing underground corms, which however, may be problematic because leaves are easily detached from the corms when pulled up since corms are usually deep down below ground level, sometimes anchored under stones or compact soil.

Invasive category/local potential threat

Moderate.

Remarks

Based on old records dating back to the beginning of the 20th century till recent publications, *C. floribunda* was probably confused as *C. aethiopica* (Borg 1927; Haslam et al. 1977; Weber & Kendzior 2006; Casha 2013, 2017) until a taxonomic correction was published by Mifsud (2017). Furthermore, some past records of the closely related *C. bicolor* might also refer to *C. floribunda*, however, *C. bicolor* is recorded from the Maltese Islands but is relatively rarer. It produces smaller and more slender flowers with red and yellow-green colours (hence the epithet *bicolor*), whereas flowers of *C. floribunda* are uniformly reddish-orange. Other ornamental species of *Chasmanthe* are expected to be found naturalised from consequent escape in rural areas, same as the other species mentioned above. *C. floribunda* can be a slow but persistent plant invader, where old and established populations extend to tens of metres in size and form dense stands.

Referenced bibliography

- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Casha A., 2013. Flora of the Maltese Islands Vol. 1-3 (1st ed.). LuLu Press, Malta.
- Casha A., 2017. Flora of the Maltese Islands (2nd ed.). Self-published, Malta.
- Grandis M. 2016. Sulla presenza di *Chasmanthe floribunda* e *Chasmanthe aethiopica* in Italia. *Acta Plantarum Notes*, 4: 137-139.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Mifsud S., 2017. Contribution to the alien flora of the Maltese Islands: New records, observations on invasive species and taxonomic updates. Conference: 4th International Congress on Biodiversity “Man, Natural Habitats and Euro-Mediterranean Biodiversity”, 17-19th November 2017, Malta.
- Weber H. C. & Kendzior B., 2006. Flora of the Maltese Islands. A field Guide. Margraf Publishers, Weikersheim, 383 pp.

Chenopodium album L.



(Spermatophyta >> Superasterids >> Caryophyllales >>
Amaranthaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Botrys alba (L.) Nieuwl.; *Chenopodium borbasii* F. Murr; *Chenopodium lanceolatum* R. Br.; *Chenopodium probstii* Aellen; *Chenopodium viride* L.; *Chenopodium viridescens* (St.-Amans) Dalla Torre & Sarnth.; *Chenopodium vulgare* Gueldenst. ex Ledeb.; *Chenopodium vulpinum* Buch.-Ham.; *Chenopodium zobelii* Murr ex Asch. & Graebn.

Common English names

Fat hen; White goosefoot; Lamb's quarters.

Common Maltese names

Għobbejra Bajdanija, Għobbejra Hādra.

Common Italian names

Farinello murale.

Short description

Herbaceous, annual plant, 30–180 cm high, glabrous and profusely branched. Stem erect, ribbed, green with pearl-white or purple-red striations forming spreading branches. Leaves alternate, petiole as long as the lamina; lamina very variable, ovate-rhombic to broadly lanceolate, 3–7 × 2.5–4.5 cm, with a broadly cuneate base, blunt to acute apex and laxly and irregularly dentate margin, glabrous above but farinose on the lower surface. Inflorescences in dense clusters (glomerules) forming panicles usually elongated (10–18 cm long) but sometimes small and few-flowered. Flowers 3 mm across 5-merous, perianth segments, tiny, about 1 mm long, ovate-lanceolate and strongly keeled, not caducous, and cover the fruit till maturity of the seed, farinose when young, less so in fruiting. UrICLES ovoid and longitudinally compressed. Achenes lenticular and with a circular margin, 1.0–1.5 mm across, black, smooth to minutely rugulose.

Place of origin and global distribution

Not known with certainty but assumed to be native to Europe (except the southmost parts) and Asia. It has been widely naturalised throughout most of the world and has a widespread global distribution.

Distribution in Malta

Widespread throughout mainland Malta and less frequently so in Gozo.

Distribution in Sicily

The species is considered very common throughout Sicily (Giardina et al. 2007). In Sicily the species is native.

Life-form

Therophyte.

Introduction source

Probably as a seed contaminant from imported agricultural products, although it may have reached the island through natural means, namely migratory birds.

Habitat or preferred invading habitat

Fallow or abandoned fields, waste ground (in agricultural areas) field paths, valley sides close to fields, usually preferring disturbed areas.

Frequency in Malta

Scarce and possibly decreasing.

Frequency in Sicily

Very common.

Mode of dispersion

The small disseminules are dispersed by ants, water and soil movements.

First record in Malta

Zerapha (1927) under the misapplied name of *Chenopodium viride*.

First record in Sicily

This species is native to Sicily.

Ecology

Plants germinate sometime in early winter and set flowers after a short time, usually in spring and remain till summer, shedding thousands of seeds. According to some studies on pest control, large plants can produce up to 75,000 seeds before they die.

Possible control methods

Manual uprooting and monitoring for some years.

Invasive category/local potential threat

Moderate-Low.



Remarks

Although its native range is not well known due to multiple past introductions, the species is believed to be native to central and northern parts of Europe (possibly including parts of Asia), and it is hence presumably to be introduced in the Maltese Islands, probably as a contaminant with the import of agricultural products.

The records in Malta are confusing, with some pioneer authors saying or indicating it is common (Grech Delicata 1853; Gulia 1874), whereas others do not report it and claim that they have not seen it at all in the Maltese Islands (Sommier & Caruana Gatto 1915). This brings about some confusion about what species the historic records of "*Chenopodium viride*" refer to and, therefore, its actual date of introduction. Nevertheless, *Chenopodium album* was mentioned as a frequent species in the seventies by Haslam et al. (1977) and has been part of the Maltese flora since then. While plants can form sizeable populations, they have not been observed to be of any serious threat to native species. Their numbers fluctuate from year to year, possibly depending on precipitation during late winter when seeds seem to germinate. Also, the species' preferred habitat is usually agricultural and disturbed areas.

Referenced bibliography

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Grech Delicata G. C., 1853. *Flora Melitensis*. Malta, 49 pp.

Gulia, G. (1874) – Maltese Botany – Chenopodiaceae. *Il Barth*, 3(23): 462.

Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. *A Flora of the Maltese Islands*. Malta University Press, Malta, 560 pp.

Sommier S. & Caruana Gatto A., 1915. *Flora Melitensis Nova*. Firenze: Stabilimento Pellas, viii + 502 pp.

Zerapha S., 1827. *Flora Melitensis Thesaurus*, fasc. 1. Valletta, iv+36 pp.

Cortaderia selloana (Schult. & Schult.f.) Asch. & Graebn.

Spermatophyta >> Magnoliopsida >> Poales >>
Poaceae)
Phylum >> Class >> Order >> Family

Main synonyms

None.

Common Maltese names

Qasba ta' Pampas; Rixa ta' Pampas.

Common English names

Pampas Grass; Silver Pampas Grass; Uruguayan Pampas Grass.

Common Italian names

Erba delle Pampas.

Short description

Erect perennial, tussock-forming grass, up to 2-4 m tall and 1-2 m wide. The leaves are 1-3 m long and 3-8 cm wide, glaucous-green, with serrulate margins and a V-shaped cross-section. The leaves are contained in groups in an auricle-like sheath often glabrous at the base. Inflorescences consist of several large plumose light-violet to silver-white (30-130 cm) long, stiff panicles. It is a gynodioecious species (i. e. it has hermaphrodite plants and female plants). It forms numerous 1.5 cm spikelets, containing six florets in female plants and three in hermaphrodite plants. Florets are less than 1 cm long, glumes are white or membranous, the lemma is long and hairy, awns are less than half a centimeter long and the stigmas are exerted. Seeds are not easily separated from the racilla.

Place of origin and global distribution

Native of temperate South America (Argentina, Chile, Brazil and Uruguay). However, in its introduced range, at least in Europe, it is mainly found at low altitudes (Ireland, UK, France, Italy, Spain and

Portugal). It also occurs in many Micronesian islands, South Africa, Australia, New Zealand, Hawaiian Islands and the Pacific coast of the USA.

Distribution in Malta

Scattered distribution of singular plants, at Malta: Qormi, Santa Venera, Mosta (Wied il-Għasel), Dingli (I/o Wied ir-Rum) and Taż-Żuta area; Gozo: Qala (Wied tal-Blata), Xagħra (limits of Calypso Cave), Comino.

Distribution in Sicily

Species recorded as casual alien on the edge of the highway between Cefalù and Buonfornello, recorded also in the natural reserve “Macchia foresta Fiume Irminio” in SE Sicily.

Life-form

Hemicryptophyte.

Introduction source

Introduction as an ornamental during the last century and via landscaping in Ireland, Portugal, Spain, France, Italy and Malta. Most of the Maltese plants are of cultivated origin, but some plants observed in construction sites, open water reservoirs, or quarries are most likely from dispersed seeds.

Habitat or preferred invading habitat

In its native range, pampas grass is common in moist soils in grassland plains, dunes, sparse shrublands and riverine habitats. In its introduced range, the main invaded habitats are generally damp places and road edges. It also occurs in sandy habitats, grassland recently-felled woodland, early-stage woodland and coppice, transport and pipeline networks and other constructed hard-surface areas and such anthropogenically disturbed areas. In addition, in Malta it shows phenomenal occurrences in abandoned construction sites and quarries same as *Nicotiana glauca*.

Frequency in Malta

Scarce-rare (most occurrences are of cultivated origin).

Frequency in Sicily

Rare.

Mode of dispersion

Seeds are very light and can be dispersed by wind to long distances.

First record in Malta

Not officially recorded but published by Mifsud (2018).

First record in Sicily

At the edge of the motorway between Cefalù and Buonfornello (Dia & Romano 1981).

Ecology

It flowers in late summer, and hermaphrodite panicles appear 1 or 2 weeks before female panicles. Seed dispersal occurs in the autumn and seeds germinate in the early spring. In Mediterranean areas where this species has been introduced, summer drought and mammal herbivory are the major causes of seedling mortality. Seedlings seem to be more resistant to water stress than similar coexisting perennial grasses because as water become scarce, *C. selloana* maximizes water uptake by increasing the R/S ratio and minimizes water loss by reducing specific leaf area.

Possible control methods

Pampas grass can be controlled through herbicide treatment. Another control method is to cut and bag inflorescences to prevent seeds from spreading or pulling seedlings.

Invasive category/local potential threat

Low.

Remarks

In cultural landscapes its spread is very much related to time because of pasture or agricultural field abandonment and distance to urban areas where it is planted as an ornamental (Domènech et al. 2005). In Malta it was introduced sometime in the 80s or 90s since it was not reported in previous floristic work such as by Haslam et al. (1977). It is not mentioned in recent floristic works and books and is a quite neglected species. However, several plants are present in urban and rural areas (pers. obs. Stephen Mifsud, including Mifsud 2018).

Referenced bibliography

- Dia M. & Romano S., 1981. Note sulla diffusione spontanea di alcune piante esotiche nella Sicilia Settentrionale e Occidentale. *Atti Accademia di Scienze di Palermo*, ser. 4, 39 (1) (1979-80): 3-15.
- Domènech R., Vila M., Pino J. & Gesti J., 2005. Historical land-use legacy and *Cortaderia selloana* invasion in the Mediterranean region. *Global Change Biology*, 11: 1054-1064.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Mifsud S., 2018. *Cortaderia selloana*. Plant datasheet from MaltaWildPlants.com (http://www.maltawildplants.com/POAC/Cortaderia_selloana.php).

Crepis micrantha Czerep.



(Spermatophyta >> Asterids (Campanulids) >> Asterales
>> Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Barkhausia muricata Spreng.; *Crepis breviflora* Delile ex Steud.;
Crepis muricata Sm.; *Crepis parviflora* Pers.

Common English names

Small-flowered smooth hawksbeard.

Common Maltese names

Krepis irqiqa, Sargħat żgħir.

Common Italian names

None.

Short description

Annual, herbaceous, soft-bristly plant, 20–60 cm tall. Stems with shallow taproots, erect, unbranched or with few lateral, procumbent, slender branches. Basal leaves a rosette, petiolate, lanceolate, 5–18 × 1–3 cm with an acute to acuminate apex dentate or acutely lobed margins, sometimes subentire; cauline leaves gradually smaller up the stem and with base sagittate and clasping the stem, usually covered with whitish, long soft bristles. Inflorescence a loose corymb, buds upright. Flower involucre cylindrical made of 7–14, narrow-lanceolate phyllaries, about 5 mm long, green with a hyaline margin, beige tip and on the outside covered by long bristles and stipitate glands. Ray florets golden yellow (amber below) with a reddish-brown tip (sometimes observed as a central brown disk in young flowers), about 10 mm long. Achenes copper-brown, elliptic-cylindrical, 2 mm long, with 8-10 longitudinal ribs and a narrowed apex giving rise to a brush of white feathery pappi 3–4 mm long. Very variable in its indumentum and leaf shape.

Place of origin and global distribution

East Europe and parts of the Middle East and gradually naturalising towards the west.

Distribution in Malta

Mosta, Lija, Burmarrad.

Distribution in Sicily

Not recorded.

Life-form

Therophyte.

Introduction source

Unknown.

Habitat or preferred invading habitat

Semiurban areas, damp areas behind walls, footpaths.

Frequency in Malta

Scarce.

Frequency in Sicily

Not recorded.

Mode of dispersion

Seeds dispersed by wind.

First record in Malta

This publication.

First record in Sicily

Not recorded.

Ecology

Plants germinate in autumn after the first rainfall, grow vegetatively during the cold months of winter and flower in spring. They produce seeds for about two months until they dry and die in early summer.

Possible control methods

Uprooting when the plants are not in seed.

Invasive category/local potential threat

Moderate-Low.

Remarks

Five *Crepis* spp. has been recorded from the Maltese Islands, of which the most closely related to *C. micrantha* are *C. capillaris* (L.) Wallr., and *C. neglecta* L. These two species are sometimes considered conspecific. *C. neglecta* primarily differs in having flower buds held upside down, and the leaves are more deeply lobed and lyrate-shaped. *C. capillaris* is described to possess glandular hair (namely at the involucre), which *C. micrantha* does not possess, and all hairs are eglandular and bristly. Finally, *C. micrantha* has smaller flowers, and its hairs are softer and whitish or pale. The presence in Malta is interesting as it extends the distribution of the species further west. It is uncertain if this has been present and unrecorded (=native) or an introduction.

Referenced bibliography

This datasheet represent the first record for this species in Malta, and, as such, no literature is available on the topic.

Cyperus involucratus Rottb.



(Spermatophyta >> Liliopsida (Commelinids) >> Poales
>> Cyperaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Cyperus alternifolius subsp. *flabelliformis* Kük.; *Cyperus flabelliformis* Rottb.; *Cyperus flagellatus* Hochst.; *Cyperus gradatus* Forssk.; *Cyperus petersianus* Boeckeler; *Cyperus proximus* Steud.

Common English names

Umbrella papyrus, Umbrella sedge.

Common Maltese names

Bordi l-kbira, Bordi tal-ġonna.

Common Italian names

Zigolo a ventaglio, Zigolo involucrato, Papiro dei fioristi.

Short description

Caespitose, robust, perennial herb growing from short thick rhizomes. Culms strongly trigonous, 50–150 cm tall, sheathed below. Leaves reduced to sheaths, lamina inconspicuous or usually absent. Inflorescence large, composed of numerous (15–22) tall bracts (acting as leaves), up to 30 cm long, approx. twice as much as the subtending inflorescence above, drooping, linear-ensiform with a scabrid margin, sitting one over each other around the culm. Inflorescence composed of a dense, glomerate cluster of 10–20 spikelets born on slender terete rays 3–12 cm long, somewhat flexuous and a group of short to sessile rays (raylets) at the centre. Spikelets narrowly lanceolate-ovate, compressed, 10–20 × 2 mm, light greenish-yellow when young, reddish-brown when mature, each bearing 10–30 florets. Glumes imbricate, 2 mm long, ovate, membranous and with an acute apex. Achene brown, broadly ellipsoid, trigonous, about 0.5 mm long with finely punctate surface.

Place of origin and global distribution

West Africa, Madagascar and the Arabian Peninsula, but became widely distributed throughout the warm parts of world, including the Mediterranean Region.

Distribution in Malta

Spreading in several valleys, usually as individuals or small groups, but sometimes established into sizable populations, such as at watercourses in Pembroke, Għar Lapsi, Marsa, Imsida, Wied il-Fawwara, Wied il-Għasel, Wied il-Kbir, Wied is-Sewda, Wied Għajn Żejtuna, Wied tal-Grazzja (Gozo), Wied Cianti/Wied Marsalforn (Gozo) and Wied ta' Żejta (Gozo).

Distribution in Sicily

Reported in several localities of Sicily, but spontaneous only in citrus orchards close to Cefalù (Dia & Romano, 1981), in Messina area, Alcantara Valley (Giardina et al. 2007), Palermo (Domina et al. 2019).

Life-form

Geophyte (rhizomatous).

Introduction source

Escape from cultivation as an ornamental.

Habitat or preferred invading habitat

Watercourses, springs, dams and damp places.

Frequency in Malta

Scarce, but increasing rapidly in the last two decades.

Frequency in Sicily

Often cultivated, but rare as spontaneous.

Mode of dispersion

By water streams, and possibly by ants and wind but more importantly by human-mediated dispersion such as dumping of unwanted plants in valleys.

First record in Malta

Borg (1927) under the taxon *Cyperus alternifolius*.



First record in Sicily

Dia & Romano (1981).

Ecology

New inflorescences are produced during the warm period of the year (typically April-November) during which a large number of seeds is produced. The plants live all year round and may spread vegetatively through the expansion of underground rhizomes.

Possible control methods

Digging rhizomes and roots from the ground, possible requiring the aid of tools since roots and rhizomes might be anchored strongly with the underground substrate.

Invasive category/local potential threat

Moderate.

Remarks

According to Borg (1927), this sedge was frequently cultivated in gardens and produced large amounts of viable seeds. Despite being introduced about 100 years, plants were seldom seen in natural ecosystems since the early years of 2000 when plants started to appear in some valleys, where they naturalise and sometimes form sizable populations. The species is not particularly invasive, possibly because germinated tiny plantlets would find strong competition from the surrounding high vegetation. The most successful period would be from early rains in autumn when many wetland areas are devoid of annual vegetation. High disturbance of wetland areas (e. g. heaving cleaning of valley beds by machinery) is likely to contribute to new introductions, if seeds are present in the soil.

Referenced bibliography

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Dia M. G., Romano, S. 1981: Note sulla diffusione spontanea di alcune piante esotiche nella Sicilia Settentrionale e Occidentale. – *Atti Accad. Sci. Palermo*, ser. 4, 39(1) (1979-80): 3-15.

Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.

Datura innoxia Mill.



(Spermatophyta >> Magnoliopsida >> Solanales >>
Solanaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Datura metel L.; *Datura meteloides* D. C. ex Dunal.

Common English names

Prickly Burr; Recurved Thorn-Apple; Downy Thorn-Apple; Indian-Apple; Lovache; Moonflower.

Common Maltese names

Sigra tar-Rizzi; Stramonju.

Common Italian names

Datura metella, Imbutone metello, Noce metella, Stramonio metello.

Short description

Annual to perennial herb to up to 1 m high, with a spreading crown about 2 m in diameter. Roots may be tuberous. Stems and leaves tomentose, covered with short and soft greyish hairs that give the whole plant a greyish appearance. Mature leaves broadly ovate, the lamina up to 20 cm long, almost entire, slightly sinuate, or irregularly lobed towards base, with conspicuous pinnate venation alternately arranged along the stem. *D. innoxia* bears white tubular (trumpet) flowers that have green veins, 12-19 cm long, with stigmas well above the anthers. Some people find the flowers fragrant at night, when the plant is blooming. Calyx 5-11 cm long, 3-6-lobed; lobes 13-20 mm long, sometimes incompletely separated. Corolla 12-19 cm long, white with green veins; limb undulate, appearing 10-lobed, alternate lobes broadly triangular or ending in a slender point 5-10 mm long. Stamens not exerted; anthers 8-10 mm long. Style 10-14 cm long; stigma well below anthers. The fruit is a globose or ovoid spiny capsule with numerous slender spines, about 3-5 cm in diameter, deflexed, spiny; spines numerous, slender, sharp, all about equal in length, to 10 mm long; persistent base of calyx to 20 mm long, very prominent. Capsule split when ripe, releasing brown seeds, 4-5 mm long.

Place of origin and global distribution

D. innoxia is native to the tropical and subtropical Americas, from southwestern USA and Mexico, through Central America to northern and western South America, to Peru, and east to Bolivia and Paraguay. *D. innoxia* has been widely introduced and is found throughout the tropics. It is invasive in temperate areas, where it was introduced as an ornamental shrub but has since naturalised.

Distribution in Malta

Found throughout Malta and Gozo mostly in cultivation as an ornamental tree, (often still found for sale in nurseries) and as non-persisting escapees close to cultivation. This species seems to increase during the past three decades, possibly due to more cultivated plants as ornamentals in urban and rural environments.

Distribution in Sicily

Castelvetrano, Bruca Volpe; Messina province; common along the road between Messina and Santo Stefano, Palermo in Bagheria and Ficarazzi; throughout the region; S. Pantaleo Island, Mozia Island; Monte S. Giuliano, Erice, Castelbuono, Madonie; Pantelleria, from Capo Lilibeo to Ronciglio, Palermo.

Life-form

Therophyte.

Introduction source

Introduced as an ornamental. Several species of *Datura* have been introduced worldwide as contaminants of agricultural or horticultural products. *Datura* species are intentionally introduced as popular ornamental plants worldwide, especially in Europe, North America and China.

Habitat or preferred invading habitat

D. innoxia grows naturally in disturbed areas such as eroded areas, uncultivated fields, vacant lots, overgrazed pastures and rangeland, roadsides, abandoned roadbeds, and fencerows.

Frequency in Malta

Frequent-Scarce.

Frequency in Sicily

Common.

Mode of dispersion

The spiny capsule can become attached to the fur of animals, which is carried away entirely and then split open and disperse the seed while the animal is wandering. Seeds are further dispersed by ants.

First record in Malta

There is a remarkable confusion in records with different authors mentioning different *Datura* species, and which probably all are referring to *D. innoxia*. However, the first mention is most probably ascribed to Gulia (1855-56) under the taxon *Datura stramonium* (referring to *D. innoxia*).

First record in Sicily

In sandy cultivations between Messina and S. Stefano di Camastra, along the street close to the sea (Gussone 1827).

Ecology

D. innoxia grows in a wide variety of tropic and temperate climates. It is found on a wide variety of soils but prefers well-drained soils, on both igneous and sedimentary parent materials. As many other *Datura* species, *D. innoxia* is pollinated by moths and flowers blossom overnight. In the tropics, *D. innoxia* is a perennial species, but it grows as an annual in temperate regions due to the arid summer period. *D. innoxia* can flower and fruit throughout the year in some environments but only from July to September.



Possible control methods

Isolated plants should be hand-pulled before they set seed, whereas larger areas of infestation are controlled by cultivation when weeds are in the seedling stage. Eradication becomes less effective as plants mature and hence forming woodier and robust stems and more extensive root system. Seedlings emerge over a long period of time so repeated cultivations may be necessary to reduce the level of infestation. However, tillage may promote seed survival as seeds decay more rapidly on the soil surface than when buried, and there is greater loss of seed to predators under no-till than conventional tillage systems.

Invasive category/local potential threat

Medium.

Remarks

Datura species are thought to spread solely by seed which it produces in large numbers. Both seed capsules and seeds float on water, providing an effective means of dispersal. However, spread by broken stem fragments may also be a minor means of dispersal. Gulia (1872) reports the toxification of four boys from Malta who ate *Datura* fruit.

Referenced bibliography

Gulia G., 1855-56. Repertorio Botanico Maltese. Malta, 79 pp.

Gulia, G., 1872. Sopra un caso di avvelenamento per la *Datura* Metel. *Il Barth*, 1: 85.

Gussone G., 1827. Florae Siculae Prodromus sive plantarum in Sicilia ulteriori nascentium enumeratio secundum systema linneanum disposita 1. Neapoli.

Datura stramonium L.



(Spermatophyta >> Magnoliopsida (Asterids) >>
Solanales >> Solanaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Datura inermis Jacq.; *Datura tatula* L.; *Datura wallichii* Dunal;
Stramonium vulgare Hill.

Common English names

Thorn Apple, Devil's trumpet.

Common Maltese names

Stramonju, Sigret ir-Rizzi.

Common Italian names

Stramonio comune, Indormia, Noce spinosa, Stramonioone.

Short description

Annual shrub up to about 1.2 m tall, dichotomously branched and

foliose, pubescent throughout, stems and branches green or purplish. Leaves quite variable, broadly ovate or rhombic with sinuated and dented margin, 8–18 × 4–15 cm in size, shortly pubescent, base cuneate, truncate or broadly cordate, petiolate (2–6 cm long). Flowers pedicellate. Calyx tubular, 3–6 cm long, light green, with slender, acuminate calyx teeth, about 6 mm long, apiculate, reflexed in fruit. Corolla white, sometimes tinged or washed in purple, tubiform, 7–10 cm long opening into a broad limb with an irregular and 5-lobed or dentate outline, up to 7 cm across, limb teeth often swirled and conspicuously large. Anthers ca. 5 mm long, white. Fruit capsule, broadly ovoid, 3.0–4.5 cm long, spiny (spines recurved and 4 mm long) and densely pubescent, held erect by a stiffened petiole, when mature, splitting into four valves. Seeds black, reniform, wrinkled, 3 mm long.

Place of origin and global distribution

Central America was then introduced and naturalised in many warm regions worldwide.

Distribution in Malta

Sporadic occurrences with populations not often long-lived. E. g. Rabat, Siggiewi, Mellieħa (Malta) and Nuffara (Xagħra, Gozo).

Distribution in Sicily

The species is quite common in Sicily; certain records are reported for Palermo (Domina et al. 2019) Laghetti di Marinello (Messina) (Licandro et al. 2011), Ragusa (Licitra & Napoli 2011), Acireale (pers. observation Minissale 2023), Egadi Islands (Gianguzzi et al. 2006) and in Pantelleria Island (Gianguzzi 2003).

Life-form

Therophyte.

Introduction source

Escapee from ornamental plants, sometimes cultivated in farmhouses

Habitat or preferred invading habitat

Fallow fields, field margins, valley sides (lined by agricultural fields)

Frequency in Malta

Scattered sporadically, rather uncommon in the wild, seldom naturalise to form an established population.

Frequency in Sicily

Everywhere in the region, especially on ruins, debris, below walls (Giardina et al. 2007).

Mode of dispersion

By seeds from plants in cultivation, possibly dispersed by ants.

First record in Malta

Gulia (1855-56), although Sommier & Caruana Gatto (1915) remarked that Gulia record belongs to *D. innoxia* Mill.

First record in Sicily

The date of the first introduction in Sicily is not known however the species was already reported by Gussone (1843) for Sicily, and later on close to Avola having Bianca (1939-1957).

Ecology

Plants germinate after winter, grow into a bush during spring and flower in May, where mature fruit dehisce later in July and releases a few hundred seeds per capsule. Plants do not survive in summer.



Possible control methods

Manual uprooting before the fruiting period.

Invasive category/local potential threat

Low.

Remarks

Lanfranco (1972) assumes that Gulia's (1856) record belongs to *D. stramonium*, as has been assumed by Sommier & Caruana Gatto (1915). Hence, the first authentic record of this specie is that found by Eugenio Azzopardi in a quarry near Żebbuġ (Lanfranco, 1972). There is also the variety *tatula* (L.) Torrey with purplish flowers, but it does not have any taxonomic importance and recent taxonomist consider it as a synonym. The populations met in the wild were always the white-flowering form.

Referenced bibliography

- Bianca, G. 1839-1857: Flora dei dintorni di Avola. – Atti della Accademia Gioenia di Scienze Naturali in Catania, ser. 1 Mem. 1-10.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Gianguzzi L., 2003. Il paesaggio vegetale dell'isola di Pantelleria. Sicilia Foreste, 6. Azienda Foreste Demaniali, Palermo.
- Gianguzzi L., Scuderi L., Pasta S., 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia*, 61(2): 359-402.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Gulia G., 1855-56. Repertorio Botanico Maltese. Malta, 79 pp.
- Gussone J. (1843) *Florae Siculae Synopsis* vol. 2 Napoli.
- Lanfranco E., 1972. Additions and corrections to the Maltese flora. *Maltese Naturalist*, 1 (3): 17–20.

- Licandro G., Marino P. & Raimondo F. M., 2011. Flora e vegetazione della Riserva Naturale Orientata “Laghetti di Marinello” (Sicilia nord-orientale). *Informatore Botanico Italiano*, 43 (2): 333-351.
- Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.

Datura wrightii Regel



(Spermatophyta >>
Magnoliopsida >> Solanales>>
Solanaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Datura metel auct. p.p., non L., *Datura inoxia* auct. p.p., non Mill.,
Datura meteloides auct. p.p., non D. C. ex Dunal.

Common English names

Sacred Datura.

Common Maltese names

Stramonjum abjad.

Common Italian names

Stramionio di Wright.

Short description

It is a vigorous herbaceous perennial that grows 30 cm to 1.5 m tall and wide. The leaves are broad and rounded at the base, tapering to a point, often with wavy margins. The flowers are the most striking feature, being sweetly fragrant white trumpets up to 20 cm (7.9 in) long, sometimes tinted purple, especially at the margin. Five narrow points are spaced symmetrically around the rim. The plants often can be seen as a ground vine in habit, growing close to the ground and spreading in a very exposed environment with full direct sunlight (cleared roadside). *D. wrightii*, blooms from April through October. In clear weather, flowers open in the morning and evening and close during the heat of the day (depending on water availability); in cloudy weather, they may open earlier and last longer. The seeds are borne in a spiny, globular capsule 3 to 4 cm in diameter, which opens when fully ripe.

Place of origin and global distribution

The native range of this species is SW. & S. Central U.S.A. to N. Mexico (Arizona, California, Mexico Northeast, Mexico Northwest, Nevada, New Mexico, Texas, Utah). Introduced into: Alabama, Colorado, Corse, France, Greece, Illinois, Italy, Maryland, New South Wales, Northern Territory, Oregon, Romania, Sardinia, Sicily, South Australia, Spain, Tunisia, Ukraine, Victoria, Western Australia, Yugoslavia.

Distribution in Malta

Valletta main ditch, San Anton Gardens, Floriana, amongst other examples of gardens and locations in cultivation.

Distribution in Sicily

Pantelleria; along the Tangenziale road leading to Catania Airport Fontanarossa.

Life-form

Therophyte.

Introduction source

introduced as an ornamental both in Malta and Sicily.

Habitat or preferred invading habitat

It is growing naturally in disturbed areas such as eroded areas, uncultivated fields, vacant lots, overgrazed pastures and rangeland, roadsides, abandoned roadbeds.

Frequency in Malta

Very rare and casual.

Frequency in Sicily

Rare.

Mode of dispersion

The spiny capsule can become attached to the fur of animals, which is carried away entirely and then split open and disperse the seed while the animal is wandering. Seeds are further dispersed by ants.

First record in Malta

Sommier & Caruana Gatto (1915). This record might also refer to other *Daturium* species namely *D. innoxia* which was already mentioned in literature.

First record in Sicily

Piana di Catania (Chiovenda 1927: sub *D. meteloides*), Ficarazzi, Palermo (from herbarium specimens).

Ecology

D. wrightii grows in a wide variety of soils but prefers well-drained soils, on both igneous and sedimentary, up to 200 meters elevation. It can flower and fruit throughout the year in some environments but only from July to September.

Possible control methods

Isolated plants should be hand-pulled before they set seed, whereas larger areas of infestation are controlled by cultivation when weeds are in the seedling stage.

Invasive category/local potential threat

Low.

Remarks

Considered not distinct from *D. innoxia* by several authors. Gulia (1872) reports the intoxication of four boys from Malta who ate its fruit.

Referenced bibliography

Chioyenda E., 1927. Nota su alcune piante della Sicilia. *Annali Botanici*, 17 (3): 81-87.

Gulia G., 1872. Sopra un caso di avvelenamento per la *Datura Metel*. *Il Barth*, 1: 85.

Sommier S. & Caruana Gatto A., 1915. *Flora Melitensis Nova*. Firenze: Stabilimento Pellas, viii + 502 pp.



Diospyros lotus L.



(Spermatophyta >> Magnoliopsida >> Ericales >>
Ebenaceae)
Phylum >> Class >> Order >> Family

Main synonyms

None.

Common English names

Ate-plum; Caucasian persimmon; Lilac persimmon.

Common Maltese names

None.

Common Italian names

Albero di Sant' Andrea; Legno Santo; Loto falso; Guaiaco falso.

Short description

Tree up to 14 m, with furrowed bark. Young twigs pubescent. Leaves 6-12 x 2.5-5 cm, elliptical to oblong, rounded to broadly cuneate at base, acuminate, entire, pubescent when young but usually glabrescent above, shortly petiolate. Male flowers 2- 3 together, c. 5 mm; female flowers solitary, 8-10 mm. Calyx with 4 short, acute, ciliate lobes, villous within. Corolla reddish- or greenish-white, with recurved, rounded, ciliate lobes c. 1/2 as long as the tube. Fruit c. 15 mm in diameter, globose, yellow or blue-black.

Place of origin and global distribution

Native to subtropical southwest Asia. Naturalised in the Balkan peninsula and occasionally elsewhere in southeast Europe. Introduced in Albania, the Balaeric Islands, Bulgaria, Doubtful in France, Greece, Switzerland, Spain, Italy (excl. Sardinia), ex-Yugoslavia.

Distribution in Malta

Not recorded.

Distribution in Sicily

Observed in small populations in the suburbs of Catania (Monte Po) and neighboring towns San Giovanni La Punta, Acireale.

Life-form

Phanaerophyte.

Introduction source

Cultivated locally for its edible fruits but generally used as rootstock of *Diospyrus kaki*.

Habitat or preferred invading habitat

Present in areas for a long time in cultivation abandonment where the plant propagates above all by vegetative way from root suckers, sometimes forming thickets. the species invades areas characterized by more or less nitrophilous herbaceous species.

Frequency in Malta

Not recorded.

Frequency in Sicily

Rare but it is to be kept in mind to avoid complete naturalisation as happened in other regions of Italy, especially northern Italy.

Mode of dispersion

Propagations seems only to occur vegetatively from root suckers but reproduction through the seeds cannot be completely excluded.

First record in Malta

Not recorded.

First record in Sicily

The first three Italian herbaria containing samples of *D. lotus*, dating to the 1551 -1570 period, are the Erbario B of the Biblioteca Angelica of Rome, the Erbario Aldrovandi (Bologna) and the Erbario Cesalpino (Florence). It is difficult to establish the moment of introduction in Sicily, it is connected to the use of the species as rootstock of the fruiting tree *Diospyrys kaki*.

Ecology

It is in flower in July, and the fruit ripens from October to November. The species is dioecious.

Possible control methods

For small populations, the best strategy seems to be to carry out the uprooting with mechanical means to avoid regrowth by suckers.

Invasive category/local potential threat

Low.

Remarks

Introduced plants were cultivated for agricultural or horticultural purposes but occasionally found as an escapee close to the site of their original cultivation. Sometimes used as a rootstock for *D. kaki*. The wood is durable, pliable, and resists rot and thus was used to construct furniture and wooden tools.

Referenced bibliography

Bosi G., Herchenbach M., Buldrini F., Rinaldi R. & Bandini Mazzanti M., 2017. On the Trail of Date-Plum (*Diospyros lotus* L.) in Italy and Its First Archaeobotanical Evidence. *Economic Botany*, 71 (2): 133-146

Galasso G., Conti F., Peruzzi L., et al., 2018. An updated checklist of the vascular flora alien to Italy. *Plant Biosystems*, 152 (3): 556–592.

Dodonaea viscosa (L.) Jacq.



(Spermatophyta >> Magnoliopsida (Rosids) >> Sapindales
>> Sapindaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Dodonaea arabica Hochst. & Steud.; *Dodonaea arborea* Herter;
Dodonaea bialata Kunth; *Dodonaea candolleana* Blum ; *Dodonaea cuneata* Rudge; *Dodonaea dioica* Roxb. ex DC.; *Dodonaea ehrenbergii* Schltld.; *Dodonaea eriocarpa* Sm.; *Dodonaea fauriei* H.Lév.; *Dodonaea forsteri* Montrouz.; *Dodonaea illita* F.Muell. ex Regel; *Dodonaea jamaicensis* D. C ; *Dodonaea kohautiana* Schltld.; *Dodonaea latifolia* Salisb.; *Dodonaea linearifolia* Turcz; *Dodonaea lucida* Moench; *Dodonaea microcarya* Small; *Dodonaea neriifolia* A.Cunn. ex A.Gray; *Dodonaea ovata* Dum.Cours.; *Dodonaea pallida* Miq.; *Dodonaea pauca* Herrera; *Dodonaea paulinia* Herrera; *Dodonaea pentandra*

Griff.; *Dodonaea repanda* Thonn.; *Dodonaea sandwicensis* Sherff; *Dodonaea scabra* Lodd. ex Loudon; *Dodonaea spatulata* Sm.; *Dodonaea stenoptera* Hillebr.; *Dodonaea thunbergiana* Radlk.

Common English names

Hopbush.

Common Maltese names

Dodoneja.

Common Italian names

None.

Short description

Evergreen, perennial shrubs or small trees 1.5–3.0 m tall, branches narrowly winged and covered with sticky wax-like substance. Leaves simple, shortly petiolate or sessile, variable shape, from linear to narrow spathulate or oblong-lanceolate, 5–12 × 0.5–3.5 cm in size, with prominent central midvein, glabrous, shiny, viscous, apex rounded to obtuse, margin entire sometimes shallowly undulate. Inflorescences terminal or axillary, densely flowered, shorter than the leaves. Flowers apetalous, inconspicuous, hanging on slender, wiry pedicels (2–7 mm long), sepals narrowly elliptic, 3 mm long. Stamens 7–8, with very short filaments and incurved anthers (2 mm long). Ovary ellipsoid, viscous, with a 5–6 mm long style. Fruit capsules showy, obcordiform, with two or three papery rounded wings, 1.5–2.5 mm long, yellowish then reddish-brown when fully mature, in dense elongated clusters. Seeds black, lenticular, ca. 2 mm across.

Place of origin and global distribution

Cosmopolitan distribution in warm regions, typically in tropical, subtropical and warm temperate areas such as Australasia, Southeast Asia, the Americas, Africa.

Distribution in Malta

Pembroke, Ġebel Sornu (Mosta), Burmarrad close to Kennedy Grove, Buskett.

Distribution in Sicily

Not recorded.

Life-form

Phanerophyte (or nanophanerophyte).

Introduction source

Unknown, assumably introduced for ornament (for its numerous reddish fruit) or for resilient hedges (tolerate well drought and warm conditions) and later escaped in rural areas.

Habitat or preferred invading habitat

Garigue, steppe.

Frequency in Malta

Scattered, rather rare but can reproduce quickly.

Frequency in Sicily

Not recorded.

Mode of dispersion

Through seeds, where the winged capsules can be dispersed by wind over a few kilometres away from their mother plant.

First record in Malta

Weber (2008).

First record in Sicily

Not recorded.

Ecology

Plants form numerous flowers during the warmer months of the year, and germinate in autumn during the wet season.

Possible control methods

Manual uprooting of shrubs and monitoring of the area for at least 3 years to ensure that if new plants are present, they are removed immediately.

Invasive category/local potential threat

Moderate.

Remarks

Not reported in old flora (e. g. Borg 1927, Haslam et al. 1977) and hence assumed to be a recent introduction. It is well adapted to grow in arid rocky ground (degraded garigue and steppe) because it can tolerate arid and warm conditions and consequently found naturalised in sizable populations in Pembroke and Mosta (Mifsud 2017). Can be a serious invader if not controlled in its early stages.

Referenced bibliography

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.

Mifsud S., 2017. Contribution to the alien flora of the Maltese Islands: New records, observations on invasive species and taxonomic updates. *4th International Congress on Biodiversity "Man, Natural Habitats and Euro-Mediterranean Biodiversity", 17-19th November 2017, Malta.*

Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.



Dysphania ambrosioides (L.) Mosyakin & Clemants



(Spermatophyta >> Magnoliopsida >>
Caryophyllales >> Chenopodiaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Chenopodium integrifolium Voroc.; *Chenopodium suffruticosum* Willd.

Common English names

American Wormseed; Bluebush; Indian Goosefoot; Jerusalem-Tea; Mexican Tea; Spanish-Tea; Wormseed.

Common Maltese names

Għobbejra tfuħ; Għobbejra ta' Te Falz.

Common Italian names

Farinello aromatico; Chenopodio romatico; Farinello integrifoglio; Farinello suffruticoso.

Short description

Erect subshrub to 1 m tall, with strong, fetid smell, many-branched from a woody base; stem ribbed to cylindrical, more or less pubescent. Leaf blades 2-9 × 0.6-3.8 cm, chartaceous, lanceolate or oblanceolate, glabrous or nearly so, lower surface with abundant yellowish gland dots, the apex obtuse or acute, the base tapering into a more or less elongate (to 2 cm), winged petiole, the margins deeply lobed or serrate to entire on upper leaves. Flowers minute, greenish, in axillary glomerules or in spikes of glomerules, the spikes 1-2 cm long. Calyx greenish, ca. 1 mm long, the sepals oblong; stamens ca. 1 mm long; styles 3, whitish. Utricle whitish, ca. 1 mm long, covered with persistent sepals. Seeds 1 mm long, nearly lenticular, reddish brown.

Place of origin and global distribution

Native to Mexico, and Central and South America. Naturalised in Europe, the United States, the West Indies, Africa, Australia, Pacific Islands and Asia.

Distribution in Malta

Widespread in several valleys in Malta and less commonly in Gozo.

Distribution in Sicily

Common throughout the Sicilian peninsula.

Life-form

Therophyte.

Introduction source

Introduced and cultivated for culinary and medical use, as an aromatic herb, tea-making and food commodity, later escaping in rural areas, especially in damp areas such as valleys and pastures. It has been accidentally introduced as a seed contaminant in hay and agricultural products.

Habitat or preferred invading habitat

D. ambrosioides can grow in various habitats and climates, including tropical, subtropical, and temperate regions, from sea level to 2000 m altitude. This species is described as a “cosmopolitan weed” common in disturbed areas, waste places, roadsides, forest edges, abandoned gardens, pastures, and agricultural fields. *D. ambrosioides* is very successful colonizing new habitats, principally areas with high sunlight exposure and moist conditions.

Frequency in Malta

Locally frequent specifically in temporary-flooded valleys, especially disturbed rocky valleys.

Frequency in Sicily

Common.

Mode of dispersion

D. ambrosioides spreads by seeds. Mature plants produce several thousands of seeds which can be dispersed by wind, water or as a contaminant in hay, crop seeds, mud, and agricultural equipment. Being small, dispersal can also be assisted by ants.

First record in Malta

Zerapha (1827).

First record in Sicily

Ustica (Gussone 1843).

Ecology

Flowers in *D. ambrosioides* are bisexual (have both male and female organs) or gynomonocious (bisexual and female flowers) and are pollinated primarily by wind. This species reproduces over a lengthy period, flowering from July to October, and the seeds ripen from August to October. Plants of *D. ambrosioides* are mostly annuals or short-lived perennials. It grows in a wide variety of soils including sandy, loamy and clay soils. It can grow in acid, neutral and basic (alkaline) soils, from 0 to 1500 m above sea level.

Possible control methods

Manual uprooting when not in fruit.

Invasive category/local potential threat

Medium-High.

Remarks

D. ambrosioides has been intentionally introduced in many tropical and subtropical regions to be used as a culinary and aromatic herb, tea, food commodity, to extract essential oils and as a medicinal plant. It has escaped from cultivation and spreads rapidly into disturbed areas, secondary forests, and agricultural lands where it behaves as a weed. Considering that this species can produce thousands of seeds easily dispersed by biotic and abiotic seed dispersal vectors, the probability of invasion remains high, principally in areas near its cultivation.

Referenced bibliography

Gussone G., 1943. *Florae Siculae Synopsis* 1. Neapoli.

Zerapha S., 1827. *Flora Melitensis Thesaurus*, fasc. 1. Valletta, iv+36 pp.

Echinochloa colona (L.) Link



(Spermatophyta >> Liliopsida
(Commelinids) >> Poales >>
Poaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Pennisetum crus-galli (L.) Baumg.; *Echinochloa verticillata* Berhaut;
Panicum zonale Guss.

Common English names

Deccan grass; Awnless barnyard grass; Jungle rice.

Common Maltese names

Ekinoklowa lixxa.

Common Italian names

Giavone meridionale.

Short description

Annual laxly tufted grass, forming ascending culms up to 70 cm high. Leave blades linear with acute tips, 5–20 × 0.4–0.8 cm, glabrous with roughened margins. Ligule absent. Inflorescences up to 12 cm long, erect, generally cylindrical- (column-) shaped for its evenly sized and erecto-patent racemes, not more from 10 cm wide, bearing about 10–12, distantly spaced racemes more or less evenly distributed along the culm, although the shape of the inflorescence is usually variable. Racemes 1–3 cm long, simple and never branched at the base. Raceme producing 4 neat rows of spikelets, evenly arranged along the rachis. Spikelets 2.0–3.5 mm long, ovate in outline, glabrescent to finely hirsute, green to brownish-green. Lower and upper glume almost identical, about one half the spikelet length, with a sharply acute-cuspidate (rarely mucronate) tip. Upper glume finely pubescent (hairs < 0.5 mm long). Lower lemma sterile, herbaceous, tip acuminate, not extended into an awn; upper lemma fertile, 2–3 mm long, ovate-elliptic with a blunt, unawned tip. Anthers pale yellow, 0.8 mm long.

Place of origin and global distribution

Specific origin not known, but native in tropical and subtropical regions throughout the world. It was introduced and quickly naturalised in warm parts of America, Australia and the Mediterranean region.

Distribution in Malta

Imtaħleb, Ġnejna, Ġnien il-Kbir, San Martin, Selmun, Baħrija, Buskett, Mellieħa, Ġnien Ingraw, Mistra, Għajn il-Kbira.

Distribution in Sicily

Palermo; Trabia; Bagheria; Ficarazzi; Marsala; Mazara; Melazzo (Gussone 1827); Lago di Lentini; Gorghì Tondi (Lopriore 1900); Milazzo and elsewhere in Messinese (Nicotra & Campagna 1908); Misilmeri al Fiume; Caltagirone; Capaci a Foresta; Palermo; Bagheria; Trabia; Ficarazzi; Marsala; Mazzara; Milazzo; Avola (Lojacono 1909); Siracusa sul Colle Temenite (Zodda 1928); Piana di Catania (Tomaselli 1962); Palermitano: S. Maria di Gesù; Ciaculli (Raimondo & al.

1979); Sampieri; Donnalucata; Scicli; Fiume Irminio (Ragusa); between Modica and Sampieri; Marina di Ragusa (Brullo & Marcenò 1985); Ustica (Carratello & al. 1991); Misterbianco (Catania) in citrus groves (Giardina et al. 2007).

Life-form

Therophyte.

Introduction source

Presumably via commercial bird-seed mixtures which are widely used in trapping sites that are scattered throughout the Maltese Islands.

Habitat or preferred invading habitat

Water courses, stagnant water bodies behind dams that dry in summer. Ditches, muddy ground, irrigated fields.

Frequency in Malta

Frequent in valley beds and water catchment areas, but apparently becoming gradually replaced by *E. crus-gallii*.

Frequency in Sicily

Not common (Giardina et al. 2007).

Mode of dispersion

Being an annual, the species can only propagate by seeds, dispersed primarily by water currents in valley systems and further by granivorous birds and by man through the use of bird seed in bird trapping practices.

First record in Malta

Sommier & Caruana Gatto (1915).

First record in Sicily

Gussone (1827).

Ecology

The plant germinates around the end of spring to early summer where it grows rapidly and flowers in August-October. Each plant can disseminate about 1000 seeds before it dies on the onset of cold days in mid-autumn.

Possible control methods

Manual uprooting of young plants repeatedly for several years, ideally in early summer before setting seed.

Invasive category/local potential threat

moderate-high, can invade rapidly new areas and able to disperse very easily, where in 40 years from its first record, it became a dominant component of valley systems.

Remarks

Variable plant and easily confused with the rather similar *E. crus-galli* (L.) Beauv., which is a more robust and taller plant with culms usually over 100 cm tall, produces more racemes that are furnished with longer awns (short or absent in *E. colona*). Moreover, the spikelets in *E. colona* are neatly arranged in (2-) 4 rows, while in *E. crus-galli* they are arranged unevenly in 2 rows. Interestingly, when the botanist Link transferred the species from *Panicum* to *Echinochloa* he erroneously left the gender of the epithet in the masculine form and for many decades the species was referred to as *E. colonum* instead of *E. colona*.



Referenced bibliography

- Brullo S. & Marcenò C., 1985. Contributo alla conoscenza della vegetazione nitrofila della Sicilia. *Coll. Phytosoc.*, 12 (1983): 23-148.
- Carratello A., Gambino, A. & Raimondo F. M., 1991: Aggiunte alla flora dell'Isola di Ustica. *Il Naturalista siciliano*, ser. 4, 15 (1-2): 69-75.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Gussone J., 1827. *Florae Siculae Prodromus sive plantarum in Sicilia ulteriori nascentium enumeratio secundum systema linneanum disposita 1*. Neapoli.
- Lopriore, C. 1900: Studi comparativi sulla flora lacustre della Sicilia. Catania
- Nicotra L. & Campagna C., 1908. Addenda ad floram siculam nonnulla. *Malpighia*, 22: 3-14; 537-548.
- Lojacono Pojero M., 1909. *Flora Sicula*, 3. Palermo.
- Raimondo F. M., Ottonello D. & Castiglia C., 1979: Aspetti stagionali e caratteri biocorologici della vegetazione infestante gli agrumeti del palermitano. *Notulae Fitosociologiche*, 15: 159-170.
- Sommier S. & Caruana Gatto A., 1915. *Flora Melitensis Nova*. Firenze: Stabilimento Pellas, viii + 502 pp.
- Tomaselli R., 1962. Notizie sulla flora infestante le colture nella piana di Catania. *Atti Istituto Botanico Reale e Laboratorio delle Crittogame dell'Università di Pavia*, ser. 5, 19 (1961): 63-71.
- Zodda G., 1928. Notizie sulla flora di Siracusa. *Annuario del R. Liceo Scientifico "O. M. Corbino"*, vol. 2 (Anni scolastici 1925-26 e 1926-27): 71-113.

Echinochloa crus-gallii (L.) P.Beauv



(Spermatophyta >> Liliopsida (Commelinids)
>> Poales >> Poaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Echinochloa caudata Roshev.; *Echinochloa commutata* Schult.;
Echinochloa frumentacea (Roxburgh) Link.

Common English names

Cockspur grass; Barnyard millet; Japanese Millet.

Common Maltese names

Ekinoklowa.

Common Italian names

Giavone comune, Panico piede di gallo, Echinocloa, Pabbio, Pabbione.

Short description

Annual grass, forming erect or ascending leafy, coarse culms up to 150 cm high. Leave blades linear with pointed tips, 6–35 × 0.4–1.8 cm, glabrous but usually with scabrous (rough) margins. Ligule absent. Inflorescences up to 25 cm long, erect, giving rise to 10–20, sometimes more racemes, widely spaced at the bottom the more crowded at the summit of the culm. Racemes 3–10 cm long, erecto-patent to ascending (running parallel to the culm) usually simple, but sometimes lowermost racemes branched. Rachis with 2 to 4 rows of spikelets, sometimes arranged irregularly along the rachis. Spikelets 3–4 mm, ovate-elliptic in outline, with hispid veins, green or maroon (usually when found in exposed, sunny locations). Lower and upper glume almost identical, about one third the spikelet length, with an acute tip, hispid. Lower lemma sterile, herbaceous, tip acuminate or extended into a short awn up to 3 cm long with the terminal spikelets usually having the longest awns; upper lemma fertile, scarious, brown, stout, with an acute but unawned tip. Anthers pale yellow, 1 mm long.

Place of origin and global distribution

Many countries of tropical Asia and Africa. It was introduced and quickly naturalised in most tropical and subtropical regions of the world including the Americas and most of Europe including the Mediterranean region.

Distribution in Malta

Widespread in several valleys both in Malta and in Gozo, such as in Wied il-Fiddien, Wied tal-Qlejgħa, Wied Santa Katerina, Wied il-Għasel, Wied Għajn Riħana, Wied Ħarq Ħamiem, Wied Ħesri (Malta); Wied id-Seqer, Wied il-Ort, Wied tal-Grazzja, Wied ta' Marsalforn and Wied l-Infern in Gozo. Not recorded in Comino.

Distribution in Sicily

Everywhere in the region (Giardina et al. 2007); Biviere di Gela (Brullo & Sciandrello 2006); Pantalica (Minissale et al. 2007); Taormina (Sciandrello et al. 2014); Siracusa (Minissale & Sciandrello 2017), Giardini Naxos e Fiumefreddo (pers. obs., Sciandrello).

Life-form

Therophyte.

Introduction source

Presumably via commercial bird-seed mixtures, widely used in trapping sites that are scattered throughout the Maltese Islands.

Habitat or preferred invading habitat

Water courses, stagnant water bodies behind dams that dry in summer. A weed in cultivated ground, embankments, wet ruins, river-beds.

Frequency in Malta

Frequent in valley beds and water catchment areas.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Being an annual, the species can only propagate by seeds, dispersed primarily by water currents in valley systems and further by granivorous birds and by man through the use of bird seed in bird trapping practices.



First record in Malta

Lanfranco (1979) reports the first populations found by Michael Briffa in 1978 at Qaliet area of Saint Julians and Exiles area in Sliema under the taxon *Echinochloa frumentacea*.

First record in Sicily

Not reported.

Ecology

The plant germinates sometime around the end of spring to early summer where it grows rapidly and flowers in August-October. Each plant can disseminate about 1000 seeds before it dies on the onset of cold days in mid-autumn.

Possible control methods

Manual uprooting of young plants repeatedly for several years, ideally in early summer before setting seed.

Invasive category/local potential threat: moderate-high, can invade rapidly new areas and able to disperse very easily, where in 40 years from its first record, it became a dominant component of valley systems.

Remarks

A very variable and polymorphic species with endless synonymous taxa described all over the world and some 40 infraspecific of different rankings (esp. forma). It is closely related and easily confused with *E. colona*, which has racemes with spikelets arranged evenly in 4 rows (irregular and 2-rowed in *E. crus-gallii*), as well with *E. crus-pavonis* (Kunth) Schult., which has a larger inflorescence, longer and densely awned and racemes with many short secondary branchlets at the base. This grass was domesticated by man over 4500 years, possibly for fodder rather human consumption (Purugganan & Fuller 2009), hence its worldwide distribution from old cultivation and uncertain specific origin. In Malta it is rather dominant in accumulated mud behind dams in water catchment areas along valley beds.

Referenced bibliography

- Brullo S. & Sciandrello S., 2006. La vegetazione lacustre del Biviere di Gela (Sicilia meridionale). *Fitosociologia*, 43 (2): 21-40.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.
- Lanfranco E., 1979. Two new casual grasses from Malta. *Central Mediterranean Naturalist*, 1 (2): 47-48.
- Minissale P. & Sciandrello S., 2017. The wild vascular flora of the archaeological park of Neapolis of Syracuse and surrounding areas (Sicily, Italy). *Biodiversity Journal*, 8 (1): 87-104.
- Minissale P., Sciandrello S. & Spampinato G., 2007. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata "Pantolica, Valle dell'Anapo e Torrente Cava Grande" (Sicilia sud-orientale). *Quaderni di Botanica Ambientale Applicata*, 18: 241-303.
- Purugganan M. D. & Fuller D. Q., 2009. The nature of selection during plant domestication. *Nature*, 457(7231): 843-848. DOI: 10.1038/nature07895.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains-NE Sicily). *Webbia: Journal of Plant Taxonomy and Geography*, 69 (2): 301-324.

Eclipta prostrata (L.) L.



(Spermatophyta >> Magnoliopsida >> Asterales >>
Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Verbesina alba L.; *Eclipta alba* (L.) Hassk. var. *neapolitana* N. Terracc.

Common English names

False Daisy.

Common Maltese names

Eklipta, Margerita Falza.

Common Italian names

Eclipta Prostrata, Falsa Margherita.

Short description

Terrestrial, annual herb, branching, decumbent to erect or prostrate of 75 cm covered with short appressed hairs, node-rooting; leaves lanceolate, elliptic, or oblong, acute-acuminate. Flowers bisexual, grouped in a terminal or axillary head with tubular and ligulate, sessile without a stalk, e. g. leaves without petioles, stigmas without a style, or flowers without pedicel. Flowers, white or yellow and achenes angled, strongly tuberculate, scattered hairs at apex, pappus absent.

Place of origin and global distribution

Native of Asia (China, including Taiwan, Japan, and Korea). Widely distributed worldwide in subtropical, tropical, and warm temperate regions.

Distribution in Sicily

Lago Arancio; Palermo Botanical Garden, Palermo, Selinunte Archaeological Park, Ragusa, Bosco di Gibilmanna, Cefalù, Torrente Sirina (Taormina), Mouth at the Plaia beach (Catania).

Distribution in Malta

Restricted to gardens, cultivated pots and planters, occasionally seen in disturbed, arid urban areas.

Life-form

Therophyte.

Introduction source

It is spread as a contaminant in rice seed in the Philippines and is thought to have been introduced into France in contaminated seed. Seeds are carried from field to field by running water especially during the flooding period.

Habitat or preferred invading habitat

E. prostrata occurs under both upland and lowland conditions. It is widespread in damp places (heavy soils with a constant and abundant water supply are preferred, in ditches, and near rivers and swamps.

Frequency in Malta

Rare-Scarce.

Frequency in Sicily

Rare.

Mode of dispersion

It spreads by small seeds which are further dispersed by ants.

First record in Malta

Not formerly recorded but observed by E. Lanfranco in 2004 from Sliema in planters and embellishments.

First record in Sicily

Foce del Simeto (Giardina 1992).

Ecology

E. prostrata is an annual species which propagates by seed. Adaptable to changing environmental conditions, usually on poorly drained, wet areas along streams and ditches in marshes, on sunny places. Can be found up to 400 m above sea level. It is usually seen at end of spring and in flower in May-June.

Possible control methods

It is easily controlled by hand pulling the plants.

Invasive category/local potential threat

Medium-Low.

Remarks

Eclipta prostrata (L.) L. is an important medicinal plant in the tropical and subtropical regions. It is a common weed of rainfed lowland rice in the Philippines, Indonesia, and India, and other crops, including sugarcane, flax, taro, papaya, banana, soybean, vegetables, and cotton. In Malta, it is often seen in planters, pots, and garden margins, indicating that it is introduced from imported horticultural material (mostly from Sicilian nurseries) and may escape for a few years without naturalising. Probably their successful germination occurring in the warmer days of early spring is made challenging from competitive vegetation already covering natural floors.

Referenced bibliography

Giardina G., 1992. Segnalazioni Floristiche Italiane: 692. *Informatore Botanico Italiano*, 24 (3): 200-201.

Eichhornia (= *Pontederia*) *crassipes* Mart.



(Spermatophyta >> Liliopsida (Commelinids)
>> Commelinales >> Pontederiaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Eichhornia cordifolia Gand.; *Eichhornia crassipes* (Mart.) Solms;
Eichhornia crassicaulis Schltr.; *Eichhornia speciosa* Kunth; *Heteranthera*
formosa Miq.; *Piaropus mesomelas* Raf.; *Pontederia crassicaulis* Schltr.;
Pontederia elongata Balf.

Common English names

Common Water Hyacinth.

Common Maltese names

Ġjaċinta tal-ilma.

Common Italian names

Giacinto d'acqua.

Short description

Perennial, free-floating, water plants, 30-180 cm including roots, but aerial parts 20-35 cm tall. Roots numerous and feathery, very long, tough and fibrous. Main stems compact, but stoloniferous branches producing vegetatively new individuals may be long. Leaves petiolate, light green, glossy, leathery, glabrous, spongy, orbicular to broadly ovate in shape, 4–12 cm across, with a cordate base and smooth margin. Petiole variable in length (up to 30 cm), swollen, filled with air chambers and providing buoyancy to the plant. Flowering stems not immersed in water, erect during flowering then bending down in fruit to facilitate release of seeds in the water. Flowers opening a few hours after sunrise, wilting after sunset. Perianth with six mauve-purple petals, each 15–20 mm long, the outer whorl of tepals slightly narrower from the inner ones, with upper petal of the inner whorl somewhat larger and modified in having distinctly darker veins and a bright yellow blob at the centre, surrounded by a broad violet border. Stamens 6, grouped in two sets of unequal length, the shortest about 10 mm long; the longest about 30 mm. Fruit capsule ovoid, 15 mm across, bearing many black seeds, ca. 1.5 mm long, lined with 11–14 minute longitudinal ribs.

Place of origin and global distribution

South America and naturalised throughout warm regions of the world, especially in tropical and subtropical regions.

Distribution in Malta

Wied il-Lunzjata (pers. comm. Mario Gauci); Wied Incita (Attard). Plants were removed from both stations, and possibly the species does not further occur in natural ecosystems.

Distribution in Sicily

Along the channel between Pantano Gariffi and the sea (Bartolo & al. 1976), but recently no longer found. Reported a few years ago at the Rosamarina lake near Caccamo.

Life-form

Hydrophyte.

Introduction source

Sold as an ornamental for garden ponds and consequently escaped in natural wetlands through dumping of unwanted plants.

Habitat or preferred invading habitat

Still or slow-flowing water, for example, water catchment areas, valleys with dams, open water reservoirs and large ponds.

Frequency in Malta

Rare or possibly extinct in the wild.

Frequency in Sicily

Rare (Giardina et al. 2007).

Mode of dispersion

Water streams.

First record in Malta

Mifsud (2012).

First record in Sicily

Between Pantano Gariffi and the sea (Bartolo et al. 1976).

Ecology

Plants reproduce incredibly fast, primarily by vegetative stolons throughout the year, especially at optimum warm temperatures of about 28–30°C. Furthermore, individual plants produce thousands of seeds per year which are viable for up to 25 years. Individual plants can grow 1–3 m per day in optimal conditions, hence large populations are established in a very short time. Flowers open a few hours after sunrise, and wilt soon after sunset. Seeds not always produced and reported to have a poor germination.

Possible control methods

Picking floating plants from water bodies and monitoring sites for at least ten years.

Invasive category/local potential threat

Moderate due to limited suitable natural habitats (typically growing in lakes and stagnant water bodies) but invasive in artificial ponds, reservoirs, and water catchment areas.

Remarks

The European Union black-listed *Eichhornia crassipes* on the list of Invasive Alien Species of Union Concern in 2016, thus forbidding any sales, import, cultivation or release in the environment in all member countries of the European Union.

Referenced bibliography

Mifsud S., 2012. *Eichhornia crassipes*. Profile created on Feb-12 and last updated 2021. Retrieved from MaltaWildPlants.com on 25-May-2022.

Bartolo G., Brullo S. & Marceno C., 1976. Contributo alla flora sicula. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 4, 12 (9-10): 72-78.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.



Eucalyptus camaldulensis Dehnh.



(Spermatophyta >> Magnoliopsida
(Rosids) >> Myrtales >>
Myrtaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Eucalyptus acuminata Hook.; *Eucalyptus longirostris* F. Muell. ex Miq.;
Eucalyptus mcintyrensis Maiden; *Eucalyptus rostrata* Schldl.

Common English names

River Red gum; Murray red gum.

Common Maltese names

Sigra tal-gammiem lixxa; Ewkaliptus lixxa.

Common Italian names

Eucalipto di Camaldoli; Eucalipto rosso; Eucalipto rostrato.

Short description

Fast growing tree reaching up to 30 m in its native habitat; canopies evergreen, cylindrical to conical; trunk up to 75 cm wide covered with smooth, greyish-beige bark which exfoliate as thin sheets leaving attractive patches on the trunk. Branches of large trees slightly pendulous. Leaves opposite and broadly lanceolate when young then characteristically falcate or broadly lanceolate-falcate when mature, thin but tough and leathery, greyish-green, 60–250 × 12–22 mm, subtended by a 2 cm long flattened petiole, lamina with few black glands, margin smooth, regular, entire. Veins approximately at an angle of 45 ° from the central pale green midvein. Inflorescences a short umbel of 5–11 flowers hanging on a woody peduncle, sessile or on short pedicels. Calyx tube campanulate, 8 mm long, with a wider and swollen operculum (cap). Flowers scented, petals absent, stamens cream-colored arranged in a thick annular brush about 6mm long sitting on the border of the hypanthium around a central green pistil. Fruit capsule sub-globose, 18 mm long, 8 mm across hardened and woody, cap swollen having a characteristic central cross-shaped opening formed by 4 triangular valves through which small reddish-brown seeds are liberated by swaying of branches in wind.

Place of origin and global distribution

Native to the south western coast of Australia in water courses, floodplains and similar wetland areas, somewhat preferring calcareous, clayey soils. Widely cultivated worldwide in warm regions including the Mediterranean region, often for rapid afforestation.

Distribution in Malta

Found in many places throughout mainland Malta and Gozo, such as at Wied Ghomor (Rabat), Wied tal-Imsida, Wied tal-Mistra, Marsalforn (Gozo).

Distribution in Sicily

Widely planted in Sicily both on coasts and hilly areas of the inland (Badalamenti et al. 2018). Monte Gibliscemi, Mazzarino (Bazan et al. 2006); Pantalica valle dell'Anapo, Sortino (Minissale et al. 2007); Rocca D'entella, Contessa Entellina (Gianguzzi et al. 2011); Pizzo di Cane, Ventimiglia di Sicilia (Caldarella et al. 2013); Monte Matassaro, Monte Gradara e Monte Signora", Costa Lunga, Monreale (Giordano et al. 2021).

Life-form

Phanerophyte.

Introduction source

Introduced in Malta as an ornamental tree then for afforestation.

Habitat or preferred invading habitat

Water courses, fields with moist clayey soils, valleys, urban areas as ornamental tree. Reafforested areas in Sicily.

Frequency in Malta

Frequent in Malta and less in Gozo.

Frequency in Sicily

Common. Considered rare until a few years ago as a spontaneous species in Sicily (Giardina et al. 2007) *E. camaldulensis* has recently been highlighted as having a greater capacity for naturalisation in natural and semi-natural environments (Badalamenti et al. 2018). Its spread mainly affects the natural floodplains of watercourses with an irregular or seasonal flow, which are prevalent in the Mediterranean and Sicily. Here, *E. camaldulensis* seems to find ideal conditions for its establishment and spreads especially along river shores and banks, according to its ecological requirements. Some examples are Imera settentrionale River, Alcantara River (Badalamenti et al. 2018) and Nature reserve Oasi del Simeto (pers. obs.).

Mode of dispersion

Natural dispersion is not known, but most, if not all, trees have been planted, mostly in the 1970s and 1980s by hunters and trappers.

First record in Malta

First mention possibly by Haslam (1988).

First record in Sicily

Early 1900 (Agostini 1953).

Ecology

Trees fruit abundantly in summer and beginning of autumn, although saplings have never been seen, and natural propagation by seed has not been documented.

Possible control methods

Uprooting trees and destroying the thick roots below ground. Could be very challenging and expensive due to the large size of mature trees.



Invasive category/local potential threat

Natural expansion of populations is very low but local invasiveness is high, where copses of *Eucalyptus* decrease remarkably the vegetation growing under and close to them.

Remarks

The majority of trees in Malta have been planted by hunters and trappers from the 1970s till present date since many *Eucalyptus* trees grow fast and produces an afforested area in about 4 to 5 years. This species can be easily distinguished from the closely related *E. gomphocephala* (also present in Malta) from its smooth, exfoliating bark leaving attractive patterns of ash-gray, beige and brown. The species can adapt in clayey soils very well and it is more prone to drought than *E. gomphocephala*. It is found in more moist places such as valley sides and flooded areas. Selling and planting *E. camaldulensis* and *E. gomphocephala* trees is illegal in Malta. As several *Eucalyptus* species, *E. camaldulensis* is able to absorb rapidly water from the soil reducing the understory biodiversity drastically.

Referenced bibliography

- Agostini R., 1953. Cenni storici sulla introduzione degli eucalitti in Italia. *L'Italia Forestale e Montana*, 8: 117-122.
- Badalamenti E., Cusimano D., La Mantia T., Pasta S., Romano S., Troia A. & Ilardi V., 2018. The ongoing naturalisation of *Eucalyptus* spp. in the Mediterranean Basin: new threats to native species and habitats. *Australian Forestry*, 81 (4): 239-249.
- Bazan G., Ilardi V., Minissale P. & Sciandrello S., 2006. La biodiversità vegetale di Monte Gibliscemi (Mazzarino - CL - Sicilia). *Quaderni di Botanica Ambientale Applicata*, 17 (2): 119-138.
- Caldarella O., Gianguzzi L., Romano S. & Fici S., 2013. The vascular flora of Nature Reserve "Pizzo Cane, Pizzo Trigna and Grotta Mazzamuto" (NW Sicily). *Webbia*, 64: 101-151.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

- Gianguzzi L., D'Amico A., Caldarella O. & Romano S., 2011. La flora vascolare delle Rocche di Entella (entroterra dalla Sicilia occidentale). *Il Naturalista siciliano*, s. 4, 35 (3-4): 363-405.
- Giordano M., Troia A. & Ilardi V., 2021. Floristic survey of the former royal hunting reserve of Renda, near Palermo (Sicily, Italy). *Biodiversity Journal*, 12 (2): 403-433.
- Haslam S. M. & Borg J., 1998. The River Valleys of the Maltese Islands Environment and Human Impact. Institute for Islands and Small States within the Foundation for International Studies, Malta and CIHEAM, Bari, 330 pp.
- Minissale P., Scindarello S. & Spampinato G., 2007. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata "Pantalica, Valle dell'Anapo e Torrente Cava Grande" (Sicilia sudorientale). *Quaderni di Botanica Ambientale Applicata*, 18: 145-207.

Eucalyptus gomphocephala D. C.



(Spermatophyta >> Magnoliopsida (Rosids) >> Myrtales >>
Myrtaceae)
Phylum >> Class >> Order >> Family

Main synonym

Eucalyptus gomphocephala var. *rhodoxylon* Blakely & H. Steedman.

Common English names

Tuart; Gum tree.

Common Maltese names

Siġra tal-Gammjem; Ewkaliptus komuni.

Common Italian names

Eucalipto con testa di chiodo.

Short description

Fast growing tree reaching up to 40 m in its native habitat but usually does not grow more than 15 m; canopies evergreen, cylindrical to conical; trunk up to 60 cm wide covered with greyish-medium brown bark that is shallowly fissured, fibrous and flaky. Leaves ovate when young then characteristically falcate or lanceolate-falcate when mature, tough and leathery but thin, glaucous light green, sometimes discoloured, 100–150 × 15–25 mm, subtended by a 2 cm long petiole, sometimes flattened. Inflorescences a short umbel of 7 flowers hanging on a flattened peduncle, sessile or on short pedicels. Calyx tube campanulate, 8mm long, ribbed with a wider and swollen operculum (cap). Flowers scented, without petals, consisting of a brush ring of cream-coloured stamens and a central pistil. Fruit pyriform, 2 cm long, hardened and woody, cap swollen and with broad rim and a characteristic central cross-shaped opening from where seeds are liberated by swaying in wind. Seeds very small, < 2 mm long, reddish brown.

Place of origin and global distribution

Native to the western coast of Australia in sandy and calcareous soils. Introduced in warm regions worldwide including the Mediterranean region, often for rapid afforestation.

Distribution in Malta

Found everywhere throughout the Maltese Islands, including Comino.

Distribution in Sicily

Widely planted in Sicily both on coasts and hilly areas of the inland.

Life-form

Phanerophyte.

Introduction source

Introduced in Malta as an ornamental tree then for afforestation.

Habitat or preferred invading habitat

Fields with clayey soils, valley sides and beds, moist sheltered areas, urban areas as ornamental trees. Reafforested areas in Sicily.

Frequency in Malta

Common especially in fields situated at hill sides, below escarpments and lining valley banks. It is also found in urban areas as cultivated trees

Frequency in Sicily

Common (Giardina et al. 2007). Rarely spontaneous.

Mode of dispersion

Natural dispersion is not known, but most if not, all trees situated in Malta have been planted, mostly in the 1970s and 1980s by hunters and trappers.

First record in Malta

First mention by Borg (1925) as one of the examples of Eucalyptus trees planted in Malta under the taxon *E. globulus*. He gives the indication that they were introduced as ornamental or exotic trees, and were present as casual occurrences.

First record in Sicily

Early 1900 (Agostini 1953).

Ecology

Trees fruit abundantly in summer and beginning of autumn, although saplings have never been seen, and natural propagation by seed has not been documented.

Possible control methods

Uprooting trees and destroying the thick roots below ground. Could be very challenging and expensive due to the large size of mature trees.

Invasive category/local potential threat

Natural expansion of populations is very low but local invasiveness is high, where copses of Eucalyptus decrease remarkably the vegetation growing under and close to them.

Remarks

The majority of trees in Malta have been planted by hunters and trappers from the 1970s till present date - despite legal notices abolishing planting of Eucalyptus trees. It became popular with hunters

because it grows into a 10–12 m evergreen tree in just about 5 years. It possibly represents the most common tree in Gozo. Trees produces numerous viable seeds but almost none manage to form saplings or mature trees, although germinated seeds with cotyledons and few pairs of leaves have been occasionally seen under trees. Sometimes, the taxon *E. globulus* Labill. was used for this Eucalyptus (Borg 1925; Mazzocchi 1969), but that is a different species which has not been recorded from the Maltese Islands. Another misidentification (or misapplication) is that by Haslam et al. (1977) who reports this Eucalyptus as *Eucalyptus amygdalina* Labill. Closely related and occurring in Malta is *E. camaldulensis* Dehnh. and *E. leucoxylon* F. Muell. which is very rare and cultivated sporadically as a nectar source for bee-keeping.



Referenced bibliography

- Agostini R., 1953. Cenni storici sulla introduzione degli eucalitti in Italia. *L'Italia Forestale e Montana*, 8: 117-122.
- Badalamenti E., Cusimano D., La Mantia T., Pasta S., Romano S., Troia A. & Ilardi V., 2018. The ongoing naturalisation of *Eucalyptus* spp. in the Mediterranean Basin: new threats to native species and habitats. *Australian Forestry*, 81 (4): 239-249.
- Borg J., 1925. *Gardening in Malta*. Self-published, Malta, 183 pp.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. *A Flora of the Maltese Islands*. Malta University Press, Malta, 560 pp.
- Mazzocchi G. B., 1969. *Trees and shrubs in the Maltese Islands*. Food and Agriculture Organisation of the United Nations, Rome. 57 pp.

Euphorbia hypericifolia L.



(Spermatophyta >> Magnoliopsida
(Rosids) >> Malpigiales >>
Euphorbiaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Euphorbia glomerifera (Millsp.) L. C. Wheeler; *Euphorbia papilligera* Boiss.

Common English names

Graceful spurge and Golden spurge.

Common Maltese names

Tenghud tal-gonna wieqfa.

Common Italian names

Euforbia con foglie d'iperico.

Short description

Annual, dioecious, glabrous, herbaceous plant up to 50 cm long. Stems erect, slender (ca. 2 mm), loosely branched above with milky sap. Leaves shortly petiolated, oblong or oblanceolate, 15–35 × 8–12 mm with an oblique, asymmetric base, serrulate margin and acute apex. Stipules connate, triangular, smooth or dentate at the tip, approximately 2 mm long. Inflorescences densely flowered cymose heads, about 1–2 cm across, produced at leaf axils or terminally. Flowers (cyathia) with 5 ovate-triangular marginal lobes; 4 nectary glands with white or lilac appendages; a turbinate involucre about 1 mm subtended by a 4 mm long peduncle. Male flower numerous overtopping and surrounding female flower, with a green, glabrous ovary and a 2-lobed stigma. Fruit capsule about 2 mm in diameter, smooth, 3-angular. Seeds irregularly ovoid 4-angled in cross-section, 0.8–1.2 mm long with a finely striated-rugose testa.

Place of origin and global distribution

Native to tropical Americas, including the southern part of the USA, Central America and northern parts of South America.

Distribution in Malta

Scattered in urban areas throughout the Maltese Islands, less frequent in Gozo, also introduced in Comino.

Distribution in Sicily

Palermo (Spadaro & Raimondo, 2017); Taormina (Sciandrello et al., 2016).

Life-form

Therophyte.

Introduction source

Contaminant in imported horticultural plants.

Habitat or preferred invading habitat

At present, the species is restricted to artificial habitats such as planters, traffic islands, afforested areas, gardens, parks, and occasionally agricultural areas.

Frequency in Malta

Scarce (rare in the wild).

Frequency in Sicily

Locally common and expanding.

Mode of dispersion

Seeds that are primarily carried away by ants, but also by water streams and strong wind.

First record in Malta

Mifsud (2018).

First record in Sicily

Reported for the first time by Sciandrello et al. (2016) close to the Nature Reserve “Isola Bella”, Taormina.

Ecology

Plants are annual and germinate in late autumn after the first rains or other periods of the year when growing in suitable places with artificial irrigation in a semi-shaded and sheltered location, although they rarely occur in summer. Seeds are formed in large quantities after a relatively short period, usually during late winter and spring and less often at the beginning of summer.

Possible control methods

Manual uprooting when not in fruit.

Invasive category/local potential threat

Moderate. At present, plants are confined in artificial habitats.

Remarks

A recent introduction to the Maltese Islands and for some time was being confused with *Euphorbia nutans* Lagasca, which is a similar plant and differs from *E. hypericifolia* by small morphological characters, namely in having seeds longer by 0.5 mm, stipules rudimentary or absent and hairier (Mifsud 2018).

Referenced bibliography

Mifsud S., 2018. Contribution to the flora of the Maltese Islands: *Euphorbia* subg. *Chamaesyce* and *Euphorbia exigua* s. l. (Euphorbiaceae). *Phytotaxa*, 372 (2): 153-166. <https://doi.org/10.11646/phytotaxa.372.2.2>.

Sciandrello S., Giusso del Galdo G., Minissale P., 2016. *Euphorbia hypericifolia* L. (Euphorbiaceae), a new Alien Species for Italy. *Webbia*, 71: 163–168.

Spadaro, V. & Raimondo, F. M., 2018. Stazioni nuove di *Euphorbia hypericifolia* (Euphorbiaceae) e di *Phyllanthus tenellus* (Phyllanthaceae) in Sicilia. *Quaderni di Botanica Ambientale e Applicata*, 26(2015): 39-42.



Ficus elastica Roxb. ex Hornem.



(Spermatophyta >> Magnoliopsida (Rosids) >> Rosales
>> Moraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Ficus clusiifolia Summerh.; *Ficus cordata* Kunth & C. D. Bouché.

Common English names

India rubber tree; Rubber fig; Rubber tree.

Common Maltese names

Fikus tal-India; Fikus tal-gomma.

Common Italian names

Fico del caucciù.

Short description

Large, multi-branched evergreen tree, reaching about 25 m in length, trunk can widen to a very large perimeter in old trees. Lower branches can form aerial roots that hang down and reach the ground where they become lignified, providing further support. Latex milky, abundant. Stipules 4–10 cm long, bright red, horn-shaped, sheathing the leaf. Leaves with a 1–3 cm petiole, oval-ellipsoid, smooth, glossy dark green above and light green below, with a pale thickened midrib, leathery in texture, 10–30 × 7–12 cm, margin smooth, apex subacute to shortly acuminate. Flowering structures in pairs on leafless, short, auxiliary branches, green, yellow then reddish-brown when fully mature, ovoid-ellipsoid, glabrous, about 10 × 7 mm in size. Male and female florets minute, subsessile or shortly pedicellate, with 4 calyx lobes, intermixed and unexposed inside the overturned hypanthium forming the fig flower/fruit (referred to as syconium). Ripe figs form numerous tiny (ca. 1 mm) ovoid seeds with a tuberculate coat.

Place of origin and global distribution

North of India and south of China as well countries within the area including Indonesia, Nepal and Malaysia. The tree has been introduced in most warm regions of the world as an ornament, low maintenance, fast-growing tree, including the Mediterranean region.

Distribution in Malta

Quite frequent in cultivation in parks and gardens in the seventies and eighties but several individuals have been later chopped down due to the ground damage caused by the strong expanding roots. Occasionally found planted in natural ecosystems such as Wied ta Ħal-Lija, or relic cultivations such as in fields close to Ħaġar Qim (Qrendi), and Wied Ħesri, Siggiewi.

Distribution in Sicily

Common in gardens and parks along the coast (Giardina et al. 2007).

Life-form

Phanerophyte.

Introduction source

Introduced for embellishment of roads and parks for its low maintenance, glossy green leaves and fast-growing trees.

Habitat or preferred invading habitat

Fields, valleys abandoned farms or old gardens. Cultivated as ornamental.

Frequency in Malta

Frequent-scarce in urban areas as embellishment, scarce-rare in rural areas and natural ecosystems.

Frequency in Sicily

Rarely spontaneous.

Mode of dispersion

Propagated vegetatively and introduced and spread by cultivation.

First record in Malta

Sommier & Caruana Gatto (1915) reported the fungus *Uredo fici* Cast. on fallen leaves of *Ficus elastica*, but they do not include the plant in their flora section, clearly suggesting they considered it a purely



horticultural ornamental tree. Borg (1925) also records this species (*F. elastica* var. *macrophylla*) as a much-used ornamental tree, but interestingly for indoor use. He does not mention it in his subsequent published flora (Borg 1927).

First record in Sicily

Probably introduced in the second half of the 19th century (Mazzola et al. 2011).

Ecology

The trees in Malta have not been seen to produce fruit; hence all individuals have either been imported or propagated by cuttings. As a result, the invasive potential of this tree is low.

Possible control methods

Uprooting trees and destroying the thick roots below ground.

Invasive category/local potential threat

Low.

Remarks

This species was probably a popular ornamental initially for indoor use and later becoming cultivated outdoors in gardens, parks, squares and streets. Eventually it was also cultivated by farmers in their fields possibly for providing shade near their dwellings. Its popularity decreased when some mature trees, especially those built near buildings and streets, uplifted ground and caused structural damages. Nowadays, they are mostly seen in old gardens and open spaces.

Referenced bibliography

Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Mazzola P. & Raimondo F. M., 2011. Schede per la flora ornamentale siciliana. 61-67. *Quaderni di Botanica Ambientale Applicata*, 22: 151-159.

Sommier S. & Caruana Gatto A., 1915. *Flora Melitensis Nova*. Firenze: Stabilimento Pellas, viii + 502 pp.

Ficus microcarpa L. fil.



(Spermatophyta >>
Magnoliopsida (Rosids) >>
Rosales >> Moraceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Ficus dilatata Miq.; *Ficus littoralis* Blume; *Ficus regnans* Diels; *Ficus nitida* Thunb.; *Ficus rubra* Roth; *Urostigma microcarpum* (L. Fil.) Miq.

Common English names

Chinese Banyan; Indian Laurel; Malayan Banyan; Curtain Fig.

Common Maltese names

Fikus tat-Toroq.

Common Italian names

Ficus a frutti piccolo.

Short description

Large, multi-branched evergreen tree, reaching 25–30 m in length, forming wide, large, densely-foliose rounded canopies and broad trunk that can measure up to 50 cm across. Secondary smaller trunks are often seen accompanying and merge with the main trunk in large, old specimens. Bark light gray, smooth when young then finely fissured or minutely cracked. Lower branches can form aerial roots that can hang down but do not often reach the ground to form supporting pillars. Branchlets medium reddish brown, more or less smooth. Latex milky, not particularly abundant. Stipules small, 1 cm long, not brightly coloured, sheathing the leaf. Leaves with a 5–15 mm long petiole; leaf blade oval-ellipsoid to obovate, smooth, leathery, glossy green, 5–12 × 2–5 cm, margin smooth, apex subacute, base cuneate or attenuate; 1-2 pairs of primary basal veins and some 5–12 secondary nerves that are rather inconspicuous. Flowering structures 1 or two pairs shortly pedicillate syconia, abundant, 4–5 mm in diameter, initially green then yellow and blackish-brown when fully mature, subglobose to pyriform glabrous, sometimes falling prematurely. Male and female florets unexposed inside the syconium (overturned hypanthium), minute, subsessile or sessile, with 3 bracts and calyx lobes. Ripe figs pyriform to subglobose growing up to 10 mm in diameter, glossy purple-black when fully mature, with numerous tiny seeds.

Place of origin and global distribution

Native to tropical Asia including Taiwan, southern China, and most Western Pacific Islands, further extending to parts of Australia. This *Ficus* has been introduced in most warm regions of the world, including the Mediterranean as an embellishment tree and large ornament tree with impressive trunks in parks. Well known for its low maintenance and fast-growing characters.

Distribution in Malta

Found in several old towns and gardens such as Msida, Saint Julian, Sliema, Valletta, Cottonera, Mosta, B'kara, Attard, Mdina, Rabat,

Żurrieq, as well in Victoria, Gozo. Also spotted in the natural ecosystems such as Wied tal-Baħrija but its introduction is not known if natural (e.g. by birds) or deliberately cultivated by man.

Distribution in Sicily

Naturalised in Northern and Western Sicily (Schicchi 1999).

Life-form

Phanerophyte.

Introduction source

Introduced for embellishment of roads and parks for its low maintenance, glossy green leaves and fast-growing trees.

Habitat or preferred invading habitat

Valleys and moist areas. Urban areas.

Frequency in Malta

Frequent in urban areas as road embellishment, or shade tree in traffic islands or parks, but rather rare in rural areas and natural ecosystems.

Frequency in Sicily

Rarely spontaneous (Giardina et al. 2007).

Mode of dispersion

Mainly by birds which consume the fruit, but figs may also be carried by water streams after heavy rain. Propagation and introduction by man is also considered plausible.

First record in Malta

First recorded by Borg (1925) as *Ficus elastica* var. *macrophylla* with some ten other ornamental *Ficus* trees that are cultivated for ornamental use. Probably *F. macrophylla* and some other species have been introduced to embellish streets much earlier, likely during the first decades of the British rule (19th century).

First record in Sicily

Probably introduced in the second half of the 19th century (Schicchi 1999).

Ecology

Trees fruit abundantly all year round with seedlings sometimes seen sprouting under trees and surrounding soil, although they are likely short-lived.

Possible control methods

Uprooting trees and destroying the thick roots below ground. Could be very challenging and expensive due to the large size of mature trees.

Invasive category/local potential threat

Medium-Low.

Remarks

The taxonomy of this tree is confusing with an array of synonymous taxa of which in Malta, *F. nitida* auct. non Thumb., *F. retusa* auct. non L. and *F. benjamina* auct non L. have been intermixed widely in past publications. For example, Mazzocchi's (1969) "*F. benjamina*" refers to *F. macrocarpa*.



Referenced bibliography

Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Mazzocchi G. B., 1969. Trees and shrubs in the Maltese Islands. Food and Agricultural Organisation of the United Nations, Rome, 57 pp.

Schicchi R., 1999. Spontaneizzazione di *Ficus microcarpa* L. (Moraceae) e *Cardiospermum grandiflorum* Sw. (Sapindanaceae) in Sicilia. *Il Naturalista siciliano*, ser. 4, 23 (1-2): 315-317.

Ficus rubiginosa Desf.



(Spermatophyta >> Magnoliopsida (Rosids) >> Rosales
>> Moraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Ficus australis Willd.; *Ficus ferruginea* Desf.; *Ficus fulva* Kunth & C. D. Bouché; *Ficus macrophylla* var. *pubescens* F. M. Bailey; *Ficus muelleri* Miq.; *Ficus platypoda* var. *mollis* Benth.; *Ficus shirleyana* Domin; *Urostigma leichhardtii* Miq.

Common English names

Rusty Fig, Port Jackson Fig.

Common Maltese names

Fikus tal-werqa sufija.

Common Italian names

Fico ruggine, Fico di Port Jackson.

Short description

Large, branched evergreen tree, reaching a maximum of 25–30 m in length, although usually it only reaches 15 m. Canopies wide, densely foliose, spreading and subtended by a broad trunk measuring up to 45 cm across. Trunk with light greyish-beige bark, smooth to finely cracked; when old it becomes gnarled, uneven and with several deep cavities in the lower part. A few hanging roots are sometimes formed from the lower branches that seldomly reach the ground to form supporting pillars. Young shoots pubescent, rust-brown. Leaves with a 8–25 mm long petiole; leaf blade ellipsoid to oblong, leathery, glossy green above, pubescent below (or glabrous in var. *glabrescens*), 5–10 × 4–8 cm, margin smooth, apex acute to acuminate, base cuneate or shortly truncate; 1–2 pairs of primary basal veins and 10–20 secondary nerves. Stipules sheathing leaves, greenish-yellow, about 7 cm long. Flowering structures in a few axillary pairs borne on thick peduncles, quite abundant, globose, 8–10 mm in diameter, initially green then yellowish brown and finally reddish-brown when fully mature, glabrescent, often covered by short rust-brown hairs. Male and female florets unexposed inside the syconium (overturned hypanthium), minute, sessile, with 3 bracts and calyx lobes. Ripe figs globular, growing up to 18 mm in diameter, pubescent (rusty brown), warted or pitted in light colour, packed with numerous tiny seeds.

Place of origin and global distribution

Native to the eastern coast of Australia often in rainforest habitats. It has been introduced in most warm regions of the world, including the Mediterranean region as a shade tree in streets, avenues, squares, parking lots and parks.

Distribution in Malta

Found in some old towns and mostly in gardens such as Argotti (Floriana), Barraka Gardens (Valletta); Romeo Romano (Santa Venera), Howard Garden (Mdina), Villa Rundle (Victoria, Gozo) and also in some street or parking lots such as Wied il-Għasri and Xlendi in Gozo.

Distribution in Sicily

Cultivated as ornamental to Palermo (Riccobono 1910).

Life-form

Phanerophyte.

Introduction source

Introduced in Malta as an ornamental tree.

Habitat or preferred invading habitat

Valleys and moist areas.

Frequency in Malta

Frequent in urban areas, rare in the wild such as at Wied Għajn Żejtuna (Mellieħa) and Wied il-Għasri (Gozo) as escapee.

Frequency in Sicily

Very rare.



Mode of dispersion

Mainly by birds which consume the fruit, but figs may also be carried by water streams after heavy rain. Propagation and introduction by man is also considered plausible.

First record in Malta

First recorded by Borg (1925) but likely introduced earlier by the British (19th century).

First record in Sicily

Probably introduced as an ornamental tree in the early nineteenth century (Riccobono 1910).

Ecology

Trees fruit abundantly all year round although saplings have never been seen.

Possible control methods

Uprooting trees and destroying the thick roots below ground. Could be very challenging and expensive due to the large size of mature trees.

Invasive category/local potential threat

Low.

Remarks

Two varieties have been described based on the pubescence on the abaxial surface of the leaves, with *var. rubiginosa* having rusty-brown short hairs and *var. glabrescens* F.M. Bailey having leaves with glabrous surfaces. The latter was often referred under the synonymous taxon *Ficus australis* (e. g. Weber, 2008).

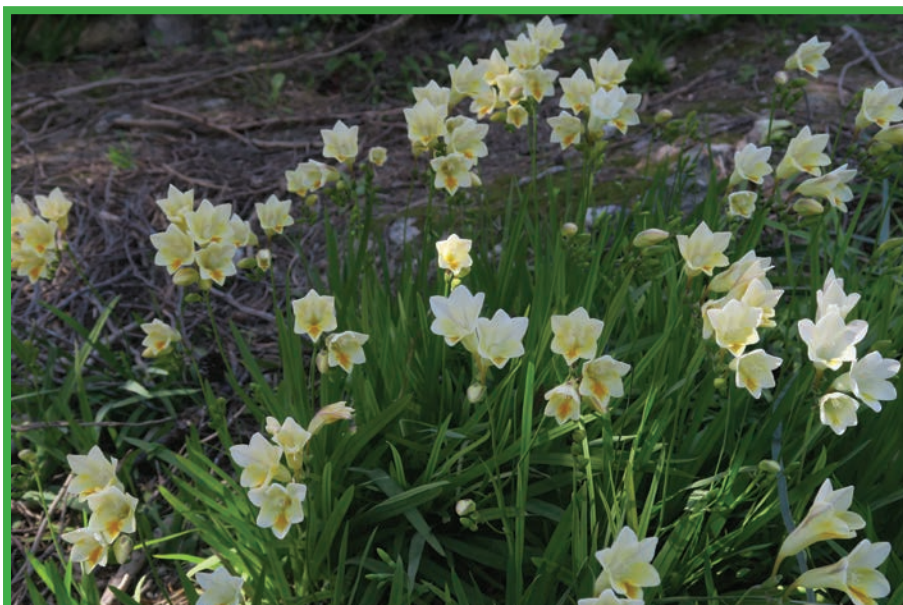
Referenced bibliography

Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.

Riccobono V., 1910. Le specie di *Ficus* Coltivate in piena terra a Palermo. *Bullettino della Regia Società Toscana di Orticultura*, serie 3, 15 (2) (1910): 39-45.

Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.

Freesia leichtlinii s. l. Klatt



(Spermatophyta >> Liliopsida >> Aspargales >> Iridaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Freesia gentilis N. E. Br.; *Freesia middlemostii* W. F. Barker; *Freesia muirii* N. E. Br.; *Sparaxis thoubertii* Klatt.

Common English names

Leichtlin's Freesia.

Common Maltese names

Freżja bajda.

Common Italian names

Fresia di Leichtlin.

Short description

Herbaceous cormous plants, found in leaves and flowers during autumn and spring, then wither during summer. Flowering stem erect, slender, flexuous, unbranched (or rarely with 1–2 lower branches), reaching up to 40 cm in length. Leaves, basal, simple, ensiform, 8–25 cm long, and 6–15 mm wide, bright green, glabrous with an entire margin, acute tip and slightly bulging longitudinal parallel veins. Inflorescence a spike of (3–)5–10 sessile flowers, arranged loosely on the upper half, abruptly bent at about 60–90 degrees. Corolla tubular-campanulate attenuated to a narrow and bent tube at the base, and opening with six subequal, broad, lobe-like, perianth segments at its mouth; adaxial (inner) surface white, cream or pale yellow except the basal perianth segment which has a distinct lemon-yellow patch of variable size and intensity; abaxial (outer) surface with some lilac to pale violet hues especially in mature flowers, occasionally absent. Fruit capsules greenish-grey, 10–15 mm long, broadly ovate, 3-lobed longitudinally, with constrictions between seeds. Seeds dark brown, about 5–5 mm long, pip-shaped, wrinkled or almost smooth.

Place of origin and global distribution

Endemic to Cape Town in South Africa but introduced worldwide in temperate and sub-tropical climates, including the Mediterranean region.

Distribution in Malta

Distributed throughout mainland Malta such as at Pembroke, Verdala and upper reaches of Buskett (largest population), Siggiewi (Salib tal-għolja area), Dingli Cliffs, Naxxar (Wied id-Dis and Wied-Anġlu area), Marfa Peninsula, etc., but much more scarce in Gozo (e. g. at Ta' Ċenċ).

Distribution in Sicily

Observed by Giardina et al. (2007) in dry grazing lands near urban centres and scattered in the coastland. Recently observed in south East sicily in the nature reserve “Bosco di Santo Pietro” (personal observation, Minissale 2023)

Life-form

Geophyte.

Introduction source

Escaped a long time ago from cultivation used as an ornament and probably deliberately planted in the wild in the past (e. g. by the British).

Habitat or preferred invading habitat

Maquis, garigue, wooded areas, rocky valley sides.

Frequency in Malta

Locally frequent where present.

Frequency in Sicily

Rare.

Mode of dispersion

New populations are introduced by seeds dispersed by soil movements and water currents. Small cormlets can also be spread likewise. However, many stations might have originated by man, either deliberately by planting into new sites or accidentally through dumping of unwanted plants.

First record in Malta

Mifsud 2019.

First record in Sicily

The precise date of the naturalisation of this species in Sicily is not known, presumably occurring in the last century.

Ecology

Plants survive summer through deep underground corms, which produce leaves soon after the first rains – typically in October. Flowers are seen as early as December, and seeds are ripe in March. New corms and cormlets are formed every year and give rise to large populations after a short time.

Possible control methods

Uprooting plants and removing underground corms, which, however, may be problematic because leaves are easily detached from the corms

when pulled up, leaving corms down below ground level, sometimes anchored under stones or compact soil.

Invasive category/local potential threat

Moderate.

Remarks

Previous records of *Freesia refracta* (Jacq.) Klatt from Malta are referable to *Freesia leichtlinii* s. l (Mifsud, 2019). The same was stated in Italy (Galasso et. al., 2018), previous records of *Freesia refracta* are all referable to *F. leichtlinii*. Most probably, *Freesia refracta* does not occur in Malta, and some colourful species occasionally met in gardens are instead *F. x kewensis*. The Maltese populations of wild Freesia might even constitute of a mixture of two species: *F. leichtlinii* subsp. *leichtlinii* and *F. leichtlinii* subsp. *alba*, including hybridogenous complexes between the two and several back-crosses. This presumed hybrid swarm is indicated by the wide variability seen in wild populations of Freesia occurring in the Maltese Islands. Nevertheless, individuals corresponding to the description of *F. leichtlinii* s. str. (Manning & Goldblatt 2010) have been observed. Further investigations are required to understand these wild populations of horticulture origin.



Referenced bibliography

- Galasso G., Conti F., Peruzzi L., et al., 2018. An updated checklist of the vascular flora alien to Italy. *Plant Biosystems*, 152 (3): 556–592.
- Giardina G, Raimondo FM, Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5–582.
- Manning J. C. & Goldblatt P., 2010. Botany and horticulture of the genus *Freesia* (Iridaceae). *Stelitzia*, 27: 1-114.
- Mifsud S., 2019. New records, taxonomic updates, and new locations for some alien species occurring in the Maltese Islands Poster *presentation for Optima Meeting XVI. Conference: 2-5th November 2019, Athens.*

Ipomoea indica (Burm.) Merr.



(Spermatophyta >> Magnoliopsida >> Solanales >>
Convolvulaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Ipomoea acuminata (Vahl) Roem. & Schult.; *Pharbitis learii* (Knight ex Paxton) Lindl.

Common English names

Ocean Blue Morning-Glory.

Common Maltese names

None.

Common Italian names

Campanella Perenne; Ipomea Indiana.

Short description

Herbs twining or sometimes prostrate, with \pm densely retrorse pilose axial parts. Stems 3-6 m, sometimes rooting at nodes. Petiole 2-18 cm; leaf blade ovate or circular, 5-15 X 3.5-14 cm, abaxially densely short, soft, pubescent, adaxially \pm sparsely pubescent, base cordate, margin entire or \pm 3-lobed, apex acuminate or abruptly acuminate. Inflorescences dense umbellate cymes, several flowered; peduncle 4-20 cm; bracts linear, sometimes lanceolate. Pedicel 2-5(-8) mm. Sepals subequal, 1.4-2.2 cm, gradually linear-acuminate apically, glabrous to appressed pilose; outer 3 lanceolate to broadly lanceolate; inner 2 narrowly lanceolate. Corolla bright blue or bluish purple, aging reddish purple or red, with a paler centre, funnellform, 5-8 cm, glabrous. Stamens included. Pistil included; ovary glabrous. Stigma 3-lobed. Capsule \pm globose, 1-1.3 cm in diameter containing four to six dark brown or black coloured seeds, 5 mm (Flora of China Editorial Committee 2017).

Place of origin and global distribution

The native distribution range is unclear, as it appears to be Pan-tropical. It has been listed as probably native to the tropics of Central and South America, and possibly also native to southeastern Asia and some islands in the Pacific region. It can be found growing in cultivation and also “naturalised” in Europe, Asia, southern Africa, United States, New Zealand, Australia, and on several Pacific islands (Wagner et al. 1999; PIER 2017; Queensland Government 2017; Randall 2017; Staples 2017; USDA-ARS 2017).

Distribution in Malta

Several localities in mainland Malta and Gozo.

Distribution in Sicily

Along the coastland of Sicily (Giardina et al. 2007, Barone et al. 2021) but also in the mainland in hilly or urban environment (Licitra & Napoli 2011, Cambria & Tavilla 2020).

Life-form

Geophyte.

Introduction source

Cultivated for ornament and naturalised.

Habitat or preferred invading habitat

Open and disturbed habitats near gardens, coastal areas, forest edges, and along roadsides and waterways. (Rojas-Sandoval 2022). In Malta in maquis, valley sides, old farmhouses and abandoned gardens, rubble walls at field margins (often climbing hedges of prickly pear trees).

Frequency in Malta

Frequent and increasing.

Frequency in Sicily

Very common (Giardina et al. 2007).

Mode of dispersion

I. indica in introduction areas reproduces primarily from broken fragments of stems that produce new roots at the nodes. Hence, the most common mode of dispersal is believed to be as a consequence of gardeners dumping unwanted vegetative material. Stem fragments are also dispersed by water, animals, and vehicles (Weber 2003; Smith 2010; Csurches 2016, Queensland Government 2017).



First record in Malta

Borg (1925) mentions some *Ipomea* species as garden climbers but not specifically *I. indica* (or its synonyms). It is first mentioned in literature by Haslam et al. (1977) under the taxon *Ipomea acuminata*.

First record in Sicily

The date of introduction and naturalisation are not known; but it should be noted that it is reported (as *I. acuminata*) in Pignatti (1982) as a cultivated and sometimes casual species in Sicily while Celesti-Crapow et al. 2009 indicate it as an invasive species.

Ecology

I. indica prefers to grow on moist, well-drained, light or sandy loam soils with pH in the range 6.1-7.5. It grows best in areas with full sunlight and mean annual rainfall in the range 1000-3500 mm and annual temperatures ranging from 18°C to 30°C. It does not tolerate temperatures below 7°C (Dave's Garden, 2017; Kew, 2017; USDA-NRCS, 2017). Plants are perennial and flower throughout the year, mostly in the warm period of the year. In Malta and Sicily plants show moderate fertility, probably not pollinated successfully, but fruit capsules have sometimes been observed on naturalised examples.

Possible control methods

Difficult to control, as like for other lianas, they are entangled upon trees or native vegetation and difficult to trace the main stem but small infestations can be manually removed. Plants should be hand pulled and the roots dug out. All roots and all stems touching the ground must be removed. Follow-up treatments are necessary to ensure the control of this species (BioNET-EAFRINET, 2017; Queensland Government, 2017). Chemical control should be done by cutting vines at breast height, laying the lower portions on the ground and spraying them with herbicides such as MCPA 500, dicamba, 2,4-D amine and glyphosate (Weber 2003; Queensland Government 2017; Weeds of New Zealand 2017).

Invasive category/local potential threat

Moderate-low but locally could be high.

Remarks

In areas where it has been introduced, this species rarely produces fruits and viable seed (Csurches, 2016) and this is true also for Sicily. Seeds are fertile and do grow when cultivated in an artificial environment; hence they have the potential to naturalise and form new populations. Other similar *Ipomea* species occur in Malta, namely *I. cairica* (L.) Sweet, *I. nil* (L.) Roth (unpublished) and *I. purpurea*; the last two species being very closely related to *I. indica* but less common and not often found naturalised in natural ecosystems.

Referenced bibliography

- Barone G., Domina G. & Di Gristina E., 2021. Comparison of different methods to assess the distribution of alien plants along the road network and use of Google Street View panoramas interpretation in Sicily (Italy) as a case study *Biodiversity Data Journal*, 9: e66013 <https://doi.org/10.3897/BDJ.9.e66013>
- BioNET-EAFRINET, 2017. East African Network for Taxonomy. Online Key and Fact Sheets for Invasive plants.
- Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.
- Cambria S. & Tavilla G., 2020. Check-list of the vascular flora of the “Bosco di Gibilmanna”, a Special Area of Conservation (S.A.C.) in northern Sicily (Italy). *Biodiversity Journal*, 11 (2): 369-382.
- Celesti-Grapow L., Alessandrini A., Arrigoni P. V., Banfi E., Bernardo L., Bovio M., Brundu G., Cagiotti M. R., Camarda I., Carli E., Conti F., Fascetti S., Galasso G., Gubellini L., La Valva V., Lucchese F., Marchiori S., Mazzola P., Peccenini S., Poldini L., Pretto F., Prosser F., Siniscalco C., Villani M. C., Viegi L., Wilhelm T. & Blasi C., 2009. Inventory of the non-native flora of Italy. *Plant Biosystems*, 143 (2): 386-430. DOI: 10.1080/11263500902722824
- Csurches S., 2016. Invasive plant risk assessment: blue morning glory *Ipomoea indica*. Queensland Government, Department of Agriculture and Fisheries, Australia.

- Dave's Garden, 2017. *Ipomoea* Species, Morning Glory, Blue Dawnflower, Oceanblue, Island Morning Glory.
- Flora of China Editorial Committee, 2017. Flora of China. In: Flora of China, St. Louis, Missouri and Cambridge, Massachusetts, USA: Missouri Botanical Garden and Harvard University Herbaria.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Kew, 2017. The Royal Botanical Garden. Data and Resource.
- Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.
- PIER, 2017. Pacific Islands Ecosystems at Risk. In: Pacific Islands Ecosystems at Risk. Honolulu, Hawaii, USA: HEAR, University of Hawaii.
- Pignatti S. 1982. Flora d'Italia. Edagricole. Bologna.
- Queensland Government, 2017. Weeds of Australia, Biosecurity Queensland Edition. In: Weeds of Australia, Biosecurity Queensland Edition. Queensland Government, Australia.
- Randall R. P., 2017. A global compendium of weeds, Ed.3 [ed. by Randall, R. P.]. Perth, Australia: iii + 3653 pp.
- Rojas-Sandoval J., 2022. *Ipomoea indica* (ocean blue morning-glory). CABI Compendium, CABI International. doi:10.1079/cabicompendium.107833.
- Smith R. L., 2010. Invasive Alien Plant Species of the Bahamas and Biodiversity Management. Thesis. Institute of Environmental Sciences, Miami University, Oxford, Ohio, USA.
- Staples G., 2017. World Checklist of Convolvulaceae. Facilitated by the Royal Botanic Gardens, Kew.
- USDA-ARS, 2017. Germplasm Resources Information Network (GRIN). Online Database. In: Germplasm Resources Information Network (GRIN). Online Database. Beltsville, Maryland, USA: National Germplasm Resources Laboratory.

USDA-NRCS, 2017. The PLANTS Database. In: The PLANTS Database. Greensboro, North Carolina, USA: National Plant Data Team.

Wagner W. L., Herbst D. R. & Sohmer S. H., 1999. Manual of the flowering plants of Hawai'i, Vols. 1 & 2, Revised edition Honolulu, USA: University of Hawai'i Press/Bishop Museum Press.

Weber E., 2003. Invasive plants of the world. Wallingford, UK: CABI Publishing, 548 pp.

Weeds of New Zealand, 2017. Weed busters.

Ipomoea purpurea (L.) Roth



(Spermatophyta >> Magnoliopsida >>
Solanales >> Convolvulaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Ipomoea purpurea (L.) Roth var. *diversifolia* (Lindl.) O'Donell; *Pharbitis nil* (L.) Choisy var. *diversifolia* (Lindl.) Choisy.

Common English names

Tall morning glory.

Common Maltese names

Kampanella roża.

Common Italian names

Campanella turchina.

Short description

Herbaceous vine, twining, 2-3 m in length. Stems cylindrical, slender, pilose or hirsute. Leaves alternate; blades simple, 2-10 × 2-10 cm, cordiform or deeply trilobed, the lobes ovate or lanceolate, chartaceous, strigulose on both surfaces, the apex acuminate, the base cordiform, the margins entire or slightly sinuate, ciliate; upper and lower surface with the veins slightly prominent; petioles 2.5-6 cm long, slender, strigulose, sulcate. Flowers solitary or in simple dichasia, axillary; peduncles longer than the petioles; bracts subulate, approximately 3 mm long, not forming an involucre. Calyx green, of 5 subequal sepals, 8-16 mm long, chartaceous, oblong lanceolate, the outer ones slightly broader than the inner ones, acute at the apex, hirsute outside on the basal portion; corolla blue, purple, pink, or with lines (forming a star) of these colours on a white background, 4-4.5 cm long, the throat white, limb with shallow, rounded lobes; stamens and stigmas pink, not exerted. Capsule, 9-10 mm in diameter, glabrous, the pericarp thin, with the chartaceous sepals persistent at the base; seeds 4 per fruit, pyriform, 3-4 mm long, black, glabrous.

Place of origin and global distribution

The exact native range of *I. purpurea* is obscure; however, it is thought to have originated in tropical America. It now also occurs in Asia, Africa, Europe and Australia.

Distribution in Malta

Ghajn Fekruna (Lanfranco 1979), Mistra, Dingli (l/o Wied ir-Rum), Armier, Qrendi, Siggiewi (Girgenti area). Seems not to be popular in Gozo, where it was only seen at Qala (towards Hondoq).

Distribution in Sicily

Near urban centres and in many hills throughout Sicily. Also recorded in Taormina, Selinunte and Palermo.

Life-form

Therophyte.

Introduction source

introduced worldwide to be used as an ornamental flowering vine.

Habitat or preferred invading habitat

I. purpurea can be found growing in agricultural, horticultural and nursery crops, and in uncultivated fields. It also grows along roadsides, in waste places, and in thickets in secondary forests. In Malta it is usually found escaping from old farms, abandoned fields, typically on rubble walls, gardens and sometimes they reach more natural areas namely valley sides and disturbed maquis, possibly from dumped plants.

Frequency in Malta

Scarce, sometimes forming large but localised populations from old introductions.

Frequency in Sicily

Not common.

Mode of dispersion

I. purpurea is a copious seed producer. Reproductive individuals can produce up to 26,000 seeds/plant. Seeds can be dispersed by wind, rain, and gravity. Seeds can also be secondarily dispersed by birds and by human activities via ornamental plants or dumped plants in natural sites.

First record in Malta

First recorded by Lanfranco (1979) from Xemxija area.

First record in Sicily

The date of introduction and naturalisation are not known but it is first reported in Pignatti (1982) as a cultivated and sometimes casual species in Sicily. Celesti-Crapow et al. (2009) indicate it as a naturalised species for Italy.

Ecology

The species relies primarily on insect pollination, but it is self-compatible and thus also capable of self-pollination. It flowers and seeds copiously throughout spring and summer, with germination taking place in autumn. Since the plant produces thousands of seeds, formation of successful adult plants is feasible.

Possible control methods

small infestations can be cut near the base of the plant; the roots require digging out by hand. For larger infestations with many stems, cutting and subsequent applications of herbicides are required when not present in natural or protected sites.

Invasive category/local potential threat

Moderate - Low.

Remarks

None.

Referenced bibliography

Celesti-Grapow L., Alessandrini A., Arrigoni P. V., Banfi E., Bernardo L., Bovio M., Brundu G., Cagiotti M. R., Camarda I., Carli E., Conti F., Fascetti S., Galasso G., Gubellini L., La Valva V., Lucchese F., Marchiori S., Mazzola P., Peccenini S., Poldini L., Pretto F., Prosser F., Siniscalco C., Villani M. C., Viegi L., Wilhalm T. & Blasi C., 2009. Inventory of the non-native flora of Italy. *Plant Biosystems*, 143 (2): 386-430. DOI: 10.1080/11263500902722824.

Lanfranco E., 1979. Additions to the Maltese Flora. *The Central Mediterranean Naturalist*, 1 (1): 13-17.

Pignatti S. 1982. Flora d'Italia. Edagricole. Bologna.



Iris albicans Lange



(Spermatophyta >> Liliopsida >> Aspargales >> Iridaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Iris alba Savi.

Common English names

White Flag Iris, White Cemetery Iris.

Common Maltese names

Fjurdulis Abjad.

Common Italian names

Giaggiolo biancastro, Iris biancastra.

Short description

An iris with typical sword-shaped leaves forming a tall peduncle up to

50–60cm long bearing (1–)2–3 mildly fragrant, large flowers about 7cm wide. Both the standard and fall tepals are white without any blue hue and are unornamented or without colourful veins or pattern, except for pale yellow markings at the base. The fall petals have a light-yellow beard becoming white distally. The style crests are also pure white hence forming an entirely white corolla. It is a hybridogenous sterile species that do not develop fruiting capsules or seeds.

Place of origin and global distribution

Native to Saudi Arabian Peninsula and Yemen. Naturalised in south Europe.

Distribution in Malta

Malta: San Pawl tat-Tarġa (Mosta); Buskett, Verdala (Dingli), Wied l-Isqof (Rabat), Ras il-Pellegrin (Rabat), Wied tal-Baħrija (Rabat); Xemxija (San Pawl il-Baħar); Bengħisa (Birżebbugia), Dwejra Lines (Mosta/Mġarr); Wied Anġlu (Għargħur). Gozo: not recorded.

Distribution in Sicily

Throughout the region, scattered (Giardina et al. 2007). Isola di Ustica (Ronsisvalle, 1972); Monte Kalfa, Peloritani (pers. obs. Sciandrello 2022).

Life-form

Geophyte (rhizome).

Introduction source

Escape from ornamental cultivation, possibly used to be common in cemeteries during the English rule (19th Century).

Habitat or preferred invading habitat

Garigue, dry rocky ground near or at urban areas, valley sides, abandoned fields or farms. Dry slopes.

Frequency in Malta

Rare to scarce occurrence but can form extensive populations (e.g. at Bengħisa).

Frequency in Sicily

not common (Giardina et al. 2007).

Mode of dispersion

Plant do not form seeds because it is a sterile hybrid, hence distribution is strictly by distribution of rhizomes by man.

First record in Malta

Gulia (1855-56), as a cultivated Iris.

First record in Sicily

Not reported.

Ecology

Plant in leaf all year round but reduced during summer. Flowers produced in Feb-Apr. Fruit not developed, hence growth entirely by vegetative reproduction.

Possible control methods

Manual removal of rhizomes.

Invasive category/local potential threat

Low.

Remarks

Previously recorded erroneously as *Iris xflorentina* L. which is closely related, but flowers have a pale blue tonality whereas *I. albicans* is pure white (Mifsud 2017). However whether these two *Iris* taxa are conspecific or not is still under debate and further investigations are being carried out for a decisive taxonomic treatment.

Referenced bibliography

- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Gulia G., 1855-56. Repertorio Botanico Maltese. Tipografia Laferla, Malta, 68 pp.
- Mifsud S., 2017. Contribution to the alien flora of the Maltese Islands: New records, observations on invasive species and taxonomic updates. Conference: *4th International Congress on Biodiversity "Man, Natural Habitats and Euro-Mediterranean Biodiversity", 17-19th November 2017*, Malta.
- Ronsisvalle G. A., 1972. Flora e vegetazione dell'isola di Ustica. *Lavori della società Italiana di Biogeografia*, n. s., 3 (estratto): 1-63.



Kalanchoe × *houghtonii* D.B. Ward



(Spermatophyta >> Liliopsida
(Commelinids) >> Poales >>
Cyperaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Kalanchoe daigremontiana × *tubiflora* (alternative hybrid formula).

Common English names

Houghton's Mother of thousands; Houghton's devil's backbone;
Houghton's alligator plant.

Common Maltese names

Kalankowa selvaġġa.

Common Italian names

Orecchia di elefante ibrida.

Short description

Evergreen, succulent erect herb reaching up to 120 cm, but usually not more than 60 cm. Leaves, opposite, petiolate, fleshy, simple, triangular to lanceolate with subtruncate to obtusely cuneate base, serrated margin (teeth forward-directing and with folded margins) and mottled at the abaxial side, with dark olive green-brown patches. Inflorescences corymbose, with hanging, tubular, scarlet to red (sometimes with orange and amber hues) flowers, with small, rounded to spade-shaped lobes at the rim, pentamerous or less often tetramerous. Calyx campanulate-tubular with 4–5 pointed lobes. Stamens included or slightly excluded, filaments red, anthers yellow. Seeds seldom seen, but viviparous bulbils are produced on the margin of the leaves.

Place of origin and global distribution

Hybrid artificially produced in California, America, and became naturalised (and sometimes invasive) in several countries, including Australasia, Southeast Asia, India, South America, Africa and the Mediterranean region (the most densely occurring area according to Herrando-Moraira 2020).

Distribution in Malta

Found here and there in urban areas but naturalised at a few localities, including Pembroke, Naxxar, Zebbug (Gozo) and Xlendi (Gozo), the latter being the largest population known.

Distribution in Sicily

Reported for Palermo (Domina et al. 2019), Siracusa, Levanzo (Egadi Islands) Pantelleria island (Di Gregorio 2017).

Life-form

Chamaephyte.

Introduction source

Escape from cultivation as an ornament.

Habitat or preferred invading habitat

Exposed arid, rocky ground (natural stations) and pavement cracks, roadsides and abandoned gardens (urban stations).

Frequency in Malta

Scarce, increasing in natural habitats.

Frequency in Sicily

Rare.

Mode of dispersion

Populations only expand vegetatively by fast-growing rhizomes

First record in Malta

Mifsud 2019.

First record in Sicily

Previously probably confused with *K. daigremontana* also growing in Sicily, it was first reported by Di Gregorio et al. (2017).

Ecology

Culms are produced all year long, particularly growing rapidly in the warmer period of late spring when water is still available. Inflorescences are produced in October-November, but they are sterile.

Possible control methods

Uprooting plants while avoiding dislodging the highly fertile bulbils at margin of leaves into the surroundings.

Invasive category/local potential threat

Low-moderate.

Remarks

This hybrid (triploid) was produced artificially by the American horticulturalists A. D. Houghton in the 1930s by crossing *K. daigremontiana* Raym.-Hamet & H. Perrier (diploid) and *K. tubiflora* (Harv.) Raym.-Hamet (tetraploid). The two species co-occur in their native range in Madagascar, as well in several naturalised regions, but

the hybrid was never documented to occur naturally (Herrando-Moraira et al., 2020). This plant was introduced as an ornament around several warm regions of the world, where it has become naturalised worldwide and is reported as a serious invader in many territories (Herrando-Moraira et al., 2020). It is often confused with any of the two parents. Despite its recent introduction, *K. × houghtonii* is showing a tremendous invasive capability due to some of the traits common to the genus, such as their drought-tolerance and easy vegetative propagation by thousands of asexual, bulb-like propagules per plant, which germinate easily in damp soil.



Referenced bibliography

- Di Gregorio B. (ed.), 2017. Rassegna di segnalazioni notevoli riguardanti la Sicilia comparse nel forum Acta Plantarum. *Acta Plantarum Notes*, 5: 70-74.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Herrando-Moraira S., Vitales D., Nualart N., Gómez Bellver C., Ibáñez N., Massó S., Cachón-Ferrero P., González Gutiérrez P., Guillot D., Herrera I., Shaw D., Stinca A., Wang Z. & López-Pujol J., 2020. Global distribution patterns and niche modelling of the invasive *Kalanchoe × houghtonii* (Crassulaceae). *Scientific Reports*, 10 (1). DOI: 10.1038/s41598-020-60079-2.
- Mifsud S., 2019. *Kalanchoe × houghtonii* in MaltaWildPlants.com – An online flora of the Maltese Islands retrieved from http://www.maltawildplants.com/CRSS/Kalanchoe_xhoughtonii.php on May 2022.

Lantana camara L.



(Spermatophyta >> Asterids (Lamiids) >> Lamiales >>
Verbenaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Lantana annua C. B. Clarke; *Lantana glandulosissima* Hayek; *Lantana antillana* Raf.; *Lantana mexicana* Turner; *Lantana mixta* Medik.; *Lantana moritziana* Otto & A. Dietr.; *Lantana sanguinea* Medik.; *Lantana spinosa* L. ex Le Cointe; *Lantana suaveolens* Desf.; *Lantana undulata* Raf.; *Lantana urticifolia* Mill.; *Lantana viburnoides* Blanco.

Common English names

Common Lantana; Shrubby Verbena.

Common Maltese names

Lantana ħamra.

Common Italian names

Camara; Lantana camara.

Short description

Woody shrubs to small trees, up to 2 m high, profusely branched deciduous in cold climates, otherwise evergreen in regions with mild winters. Herbaceous parts pubescent and aromatic. Leaves petiolate, with an ovate leaf blade, 3–8 × 2–5 cm, bristly and harsh and rather dry or papery, distinctly wrinkled, with a serrate margin, subcordate base and an acute tip. Flowers in capitulate clusters borne on axillary peduncles, more or less the same length of the subtending leaves. Flowerheads hemispheric, 2–3 cm in diameter, composed of radiating florets and narrowly lanceolate bracts about 6 mm broad. Florets with narrow sepals, about 3 mm long, composed of a narrow tube about 8–11 mm long, opening into 4 rounded somewhat unequal limbs fused at the lower half and about 3 mm long. Florets deep red in bud, orange when mature and dark red when old, again forming a display of red and orange colours. Fruit spherical drupe about 4 mm across, glossy purple-black containing 2 small seeds.

Place of origin and global distribution

Southern and central parts and South America, widely introduced as an ornament worldwide and naturalised in several countries with a warm climate.

Distribution in Malta

Most plants are seen as casual escapees or deliberately planted and persisting in abandoned farms or old gardens. However, a small naturalised population has been observed at Xlendi on south-facing escarpments growing in arid, rocky ground (pers. obs. Stephen Mifsud and Alex Casha).

Distribution in Sicily

Throughout the region (Domina & Mazzola 2002). Isola Bella e Taormina (Minissale et al. 2005); Ragusa (Licitra & Napoli 2011); Parco archeologico di Selinunte, Castelvetro (Scafidi & Raimondo 2019); Tindari, Patti (Licandro et al. 2011); Palermo (Domina et al. 2019), Siracusa in the Archaeological park (Minissale et al. 2016).

Life-form

Nanophanerophyte.

Introduction source

Horticulture, widely used to form hedges.

Habitat or preferred invading habitat

The single known naturalised population was found growing on arid, rocky ground.

Frequency in Malta

Rare in the wild, but a warming climate change may favour its naturalisation.

Frequency in Sicily

Common (Giardina et al. 2007) especially close to coastal areas sometimes with high capacity of naturalisation.

Mode of dispersion

From plants dumped into natural ecosystems or less frequently naturally dispersed from birds who consume the drupes.



First record in Malta

No naturalised occurrences are recorded in literature from Malta, and the unpublished record from Xlendi observed by Stephen Mifsud and Alex Casha in 2009 corresponds to the first record in the wild. The species have been mentioned in horticultural books, the first probably being by Borg (1925).

First record in Sicily

Introduced as an ornamental plant by Giuseppe Tineo in the Botanical Garden of Palermo (Ucria, 1789).

Ecology

Plants usually form flowers throughout many months of the year and sometimes all year round, but flowering peaks in the warmer months of April to October. Plants flower profusely and attract several insects especially *Lepidoptera* species.

Possible control methods

Manual uprooting and monitoring for some years for resprouting.

Invasive category/local potential threat: Low in Malta, medium in Sicily.

Remarks

The species occur in a few colour forms, with the red one being the most common in horticulture. However, the small population found naturalised in Xlendi and casually in a few other places was purple-yellow. Also present in Malta is the similar species *Lantana montevidensis* (Spreng.) Briq. which forms violet-lilac or white flowers with a white and yellow centre. It is a trailing-ascending shrub rarely reaching more than 50 cm in height and hence does not form defined bushes as *L. camara*. Both species are invasive in several warm countries such as South Asia, Southern Africa, India and Australia (Major 2021; Cabi 2022). In Malta, *Lanata camara* cannot be declared as an invasive species; however, precaution must be taken because a global climate change towards a warmer environment would favour the naturalisation and proliferation of *Lantana* spp. in the Maltese Islands. The species in Sicily advances rapidly both in anthropized environments (farms and abandoned places) and in natural environments such as cliffs, scrub,

grasslands (Minissale et al. 2005). Therefore, it must be considered as potentially dangerous (Domina & Mazzola 2002).

Referenced bibliography

- Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.
- CABI, 2022. Invasive Species Compendium *Lantana camara (lantana)* datasheet. CAB International. Retrieved from <https://www.cabi.org/isc/datasheet/29771>.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Domina G., & Mazzola P., 2002. Note su alcune xenofite nuove o in espansione in Sicilia. *Il Naturalista siciliano*, ser. 4, 26 (3-4): 165-174.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.
- Licandro G., Marino P. & Raimondo F. M., 2011. Flora e vegetazione della Riserva Naturale Orientata "Laghetti di Marinello" (Sicilia nord-orientale). *Informatore Botanico Italiano*, 43 (2): 333-351.
- Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.
- Major T., 2021. Aspiring Indigenous rangers fight weeds threatening Australia's endangered 'dry rainforest. ABC.net.au retrieved from <https://www.abc.net.au/news/2021-04-11/aspiring-indigenous-rangers-fight-weeds-in-endangered-rainforest/100058888>.
- Minissale P., Sciandrello S. & Spampinato G., 2005. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata Isola Bella e del territorio circostante (Taormina – ME – Sicilia). *Quaderni di Botanica Ambientale applicata*, 16: 175-208.
- Ucria B., 1798. Hortus regius panormitanus. Palermo.

Minissale P., Trigilia A., Brogna F. & Sciandrello S., 2016. Plants and vegetation in the archaeological park of Neapolis of Syracuse (Sicily-Italy). A management effort but also an opportunity for a better enjoyment of the site. *Conservation and Management of Archaeological Sites*, 17: 340–369.

Scafidi F. & Raimondo F. M., 2019. Contribution to the vascular flora of the archaeological park of Selinunte and Cave of Cusa (South-Western Sicily, Italy): preliminary results. *Boccone*, 28: 371-390.

Lantana montevidensis (Spreng.) Briq.



(Spermatophyta >> Asterids (Lamiids) >> Lamiales >>
Verbenaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Lantana sellowiana Link & Otto; *Lantana decumbens* Sellow ex A. DC.; *Lantana delicatissima* Poit.; *Lantana selloi* Steud.

Common English names

Trailing Lantana; Creeping Lantana; Weeping Lantana.

Common Maltese names

Lantana vjola.

Common Italian names

Lantana di Montevideo.

Short description

Woody trailing low-growing shrub, rarely more than 50 cm high, moderately branched, evergreen, rarely deciduous. Herbaceous parts pubescent and aromatic. Leaves shortly petiolate, with ovate, bright green leaf blades, 2–5 × 1–2 cm, rough to touch, distinctly wrinkled, with a crenate margin, cuneate base and acute tip. Flowers in capitate clusters subtended from axillary peduncles that are distinctly longer than the subtending leaves. Flowerheads hemispheric, 1.5–3 cm in diameter composed of radiating florets and narrowly lanceolate bracts about 3.5 mm wide. Florets with linear-lanceolate sepals, about 2 mm long, and a trumpet-shaped corolla, composed of a narrow tube about 10 mm long and 4 rounded and slightly unequal limbs fused at the lower half somewhat zygomorphic. Florets white, lilac or light violet with a white and yellow centre, rather concolourous through development (getting slightly darker when old). Fruit a spherical drupe about 4 mm across, glossy green than bluish-purplish, containing 2 small seeds.

Place of origin and global distribution

Tropical region of South America (Bolivia, Uruguay, Paraguay, Argentina and Brazil).

Distribution in Malta

Casual occurrences at Floriana, Mellieħa (Santa Marija Estate and Għajn Żejtuna) and Buskett (Malta) and Ta' Cenc near the hotel (Gozo).

Distribution in Sicily

Not Present.

Life-form

Nanophanerophyte.

Introduction source

Casual escapee from horticulture.

Habitat or preferred invading habitat

Disturbed rocky ground in a warm sunny location.

Frequency in Malta

Casual occurrences in urban areas, but a warming climate change may favour naturalisation.

Frequency in Sicily

Not present.

Mode of dispersion

Horticulture escapees usually from dumped plants.

First record in Malta

No naturalised occurrences are recorded in literature from Malta. The species have been mentioned in horticultural books such as by Weber (2008).

First record in Sicily

Not reported.

Ecology

Plants flower throughout the warmer months of the year (April-October) and sometimes longer periods in years with mild winters. They flower profusely and attract several insects especially *Lepidoptera* species.

Possible control methods

Manual uprooting.



Invasive category/local potential threat

Low.

Remarks

Lantana species form various flower colours, but this species typically produces white, lilac or light violet flowers with a white (or yellow and white) centre. *Lantana camara* is usually deep red, but some forms also have purple-violet flowers and hence looking alike to and can be confused with *L. montevidensis*. However, flowers of *L. camara* have a darker centre than the rest of the corolla, while in *L. montevidensis* the centre is white or yellow-white. Moreover, the flower heads of *Lantana camara* are typically formed of two different colours, whereas they are uniform in *L. montevidensis*.

In addition, the hybrid between the two species - *Lantana × flava* Medik. (= *L. × hybrida*) is also present in the Maltese Islands, and usually produces pure yellow flowers. Hitherto, the Lantana plants in the Maltese islands are of the following flower colour types: red and yellow or purple and yellow (*L. camara*); white, lilac or light violet (*L. montevidensis*) and yellow (*L. camara × montevidensis*), also known as the 'New Gold Lantana'. These species are invasive in several warm countries such as South Asia, Southern Africa, India and Australia (Major 2021, Cabi 2022) and may become naturalised and invasive in Malta too.

Referenced bibliography

CABI, 2022. Invasive Species Compendium *Lantana camara* (lantana) datasheet. CAB International. Retrieved from <https://www.cabi.org/isc/datasheet/29771>.

Major T., 2021. Aspiring Indigenous rangers fight weeds threatening Australia's endangered 'dry rainforest. ABC.net.au. Retrieved from <https://www.abc.net.au/news/2021-04-11/aspiring-indigenous-rangers-fight-weeds-in-endangered-rainforest/100058888>.

Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.

Lemna minor L.



(Spermatophyta >> Liliopsida >> Arales >> Araceae)
Phylum >> Class >> Order >> Family

Main synonyms

Lemna cyclostasa Elliott ex Chev.; *Lemna minima* Thuill. ex P.Beauv.;
Lenticularia vulgaris Lam.

Common English names

Common duckweed; Lesser duckweed.

Common Maltese names

Għadż ta' l-Ilma komuni ; Lemna komuni.

Common Italian names

Lenticchia d'acqua comune.

Short description

Very small aquatic species comprising of one small leaf-like organ referred to as a frond. Fronds floating, singular or in groups of 2–4

ovate, flat and slightly gibbous, about 2–5 × 1–3 mm in size with an entire margin with 1–3 veins, the central most evident and slightly raised. Surface glabrous but finely papillate when observed under a magnifying lens. Fronds bright green, rarely with maroon hues at the abaxial surface. Root solitary, never in clusters, up to 4 cm long (usually shorter in situ). Flowers and fruit tiny and indistinct, laterally produced on each frond, not more than 1 mm in size. Seeds with 10–15 ribs, remaining connected with the fruit wall after becoming ripe.

Place of origin and global distribution

Globally distributed and considered to be a subcosmopolitan species native to Africa, Europe, America, and Asia, but is also introduced in South America and Australasia

Distribution in Malta

Widespread throughout Malta and Gozo.

Distribution in Sicily

Peloritani Mounts: Pizzo Bottino, Piano S. Calogero Piana di Milazzo (Zodda 1908); Ciane river (Barbagallo et al. 1979); Gurna di Mascali (Minissale & Spampinato 1990); natural wetlands of Nebrodi Mountains (Brullo & al. 1994); Stagni Madonie, Castelbuono, Mezzojuso, (Raimondo et al. 1994).

Life-form

Hydrophyte

Introduction source

Mostly by man and possibly by birds where fronds adhere with their feet or feathers and get transported to new wetlands.

Habitat or preferred invading habitat

Shallow valleys, especially those with water catchment areas, open water reservoirs, ponds, and wetlands with still freshwater.

Frequency in Malta

Locally frequent in wetland areas.

Frequency in Sicily

Locally frequent in wetland areas.

Mode of dispersion

By translocation of fronds, mediated by humans, dogs accompanying bird hunters or birds.

First record in Malta

Zerapha (1827).

First record in Sicily

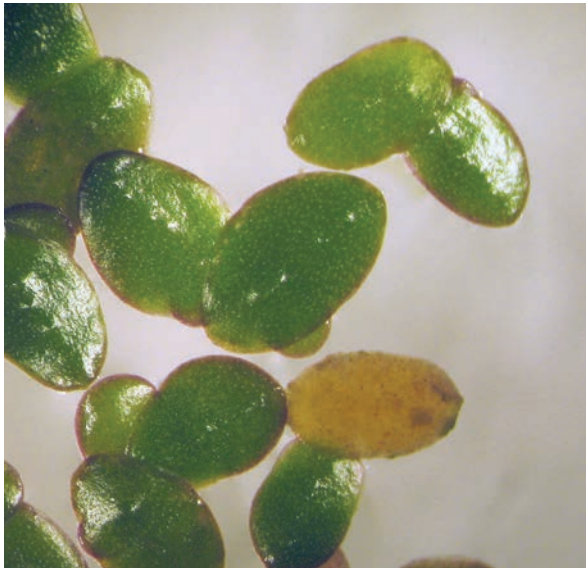
This species is considered native to Sicily (Fiori 1923, Pignatti 2017).

Ecology

Fronds initially germinate from seeds when water is present again after the first rainwater precipitation. Fronds propagate and multiply rapidly vegetatively (frond budding), while in the warmer period, they produce seeds which drop to the floor. Fronds die when water evaporates in spring and summer.

Possible control methods

Very difficult to eradicate since many tiny seeds reside on the floor of valleys, water catchment areas etc., which is impossible to gather or remove. Continuous removal of fronds during their first appearance might control the population growth.



Invasive category/local potential threat

Moderate-High

Remarks

Apparently it was not very common in the past, as, for example, Sommier & Caruana Gatto (1915) have not seen the species previously recorded from Marsa. However, it has increased drastically nowadays and can be found in almost every valley system that holds water in spring. Closely related species like *Spirodela oligorrhiza* (Mifsud, 2008) and *Lemna minuta* (Mifsud, 2010) are also recorded from the Maltese Islands.

Referenced bibliography

- Barbagallo, C., Brullo, S., & Furnari, F., 1979. Osservazioni fitosociologiche sulla vegetazione del fiume Ciane (Sicilia orientale). *Istituto di Botanica dell'Università di Catania*. Pp. 12.
- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Brullo S., Minissale P., & Spampinato G., 1994. Studio fitosociologico della vegetazione lacustre dei Monti Nebrodi (Sicilia settentrionale). *Fitosociologia*: 27, 5-50.
- Fiori A., 1923. Nuova Flora Analitica d'Italia, 1 (1-2-3). Firenze.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Mifsud S., 2008. Four new records for the flora of the Maltese Islands - *Dactyloctenium aegyptium* (L.) P. Beauv. (Fam: Poaceae), *Amaranthus muricatus* (Gillies ex Moq.) Hieron. (Fam: Amaranthaceae), *Fumaria reuteri* Boiss. (Fam: Fumariaceae) and *Spirodela oligorrhiza* (Kurtz) Hegelm. (Fam. Lemnaceae). *The Central Mediterranean Naturalist*, 4 (4): 263-273.
- Mifsud S., 2010. First occurrences of *Lemna minuta* in the Maltese islands. *The Central Mediterranean Naturalist*, 5(2): 1-4.

- Minissale P. & Spampinato G., 1990. Osservazioni fitosociologiche sul "Pantano Gurna" presso Mascali (Sicilia orientale). *Bollettino delle Sedute della Accademia Gioenia di Scienze Naturali in Catania*, 23(336): 317-336.
- Pignatti S., 2017. *Flora d'Italia* 2. Ed. Edagricole, Bologna.
- Raimondo F. M., Gianguzzi L. & Ilardi, V., 1994. Inventario delle specie "a rischio" nella flora vascolare nativa della Sicilia. *Quaderni di Botanica Ambientale e Applicata*, 3: 65-132.
- Zerapha S., 1827. *Flora Melitensis Thesaurus*. fasc.1. Valletta, iv + 36 pp.
- Zodda G., 1908. Entità nuove o importanti della flora siciliana. *Rendiconti e memorie della Reale Accademia di Scienze, Lettere ed Arti degli Zelanti*, 5: 99-162.

Leucaena leucocephala (Lam.) de Wit



(Spermatophyta >> Magnoliopsida (Rosids) >> Fabales >>
Fabaceae >> Caesalpinioideae)
Phylum >> Class >> Order >> Family >> Subfamily

Main synonyms

Acacia glauca (L.) Willd.; *Leucaena glabra* Benth.; *Leucaena glauca* Benth.

Common English names

White Leadtree; White Popinac; Jumbay; River Tamarind; Wild Tamarind; Ipil-Ipil.

Common Maltese names

Gazzija Bajda; Albizzja Bajda.

Common Italian names

Leucaena a fiore bianco.

Short description

Fast growing, evergreen, tree, reaching a height of 3 – 10 m, exceptionally up to 20 m in its native range. It has a deep, draught-resistant taproot suitable for arid conditions forming thornless, highly-branched tree with smooth, grey-brown bark tinged in salmon pink when young, then darker grey-brown with orange-brown vertical fissures on older branches. Leaves compound, bipinnate, bright green, bearing 6–9 leaflets (primary pinnae) 7 – 12 cm long each with 12–20 pairs of leaflets (secondary pinnae) 2–5mm long, elliptic or narrowly oblong, with an acute tip, glabrous with finely ciliated margin. Leaves and leaflets fold up with heat or lack of water. The inflorescence is a small cluster of globular compound flower heads about 15–20 mm across, each composed of 100–160(–180) white or whitish-cream florets. Legumes flat, reddish-brown pods, 100 to 180 mm × 15–20 mm in size, with up to 18 seeds, more or less narrowly oblong in shape with a rounded tip. Seeds dark brown, shiny, very hard, 7–10 × 4–6 mm, flattened and aligned in the pod side-to-side.

Place of origin and global distribution

Tropical region of south America (Costa Rica, Colombia, Guatemala, Honduras, etc.), and naturalised elsewhere in similar habitats such as in Mexico and south parts of USA.

Distribution in Malta

Naturalised throughout the Maltese Islands.

Distribution in Sicily

Naturalised near Agrigento and Campofelice di Roccella (Palermo) (Raimondo & Domina 2007). Agrigento (AG), Campofelice di Roccella (PA), Cefalù (PA), Ribera (AG), at the crossroads for “Piana Grande”, Trappeto (PA), Service area of the Highway SS 115 (Ribera, AG), Isola delle Femmine (PA), Lampedusa (Porto Vecchio) (AG), Ribera (Secca Grande) (AG), Villagrazia di Palermo (PA), Cefalù (PA), Balestrate (PA), Favignana (TP), Linosa (AG), Pantelleria (TP) (Badalamenti et al. 2020).

Life-form

Phanerophyte.

Introduction source

Escape from ornamental cultivation, including street embellishments in the past.

Habitat or preferred invading habitat

Wetlands and semi-wetland habitats, especially in disturbed areas, but also in abandoned fields and farms, urban areas, and waste ground. Disturbed ground, roadsides.

Frequency in Malta

Locally frequent forming established populations in a short period of time.

Frequency in Sicily

Rare (Giardina et al. 2007).

Mode of dispersion

Seeds that are primarily carried away by water streams after rain in rural areas or dragged in crevices by wind in urban areas.

First record in Malta

First publication is rather recent, where it was recorded as *Albizzia lebbek* (Lanfranco 2000), although it may have been known to exist for a few decades earlier.

First record in Sicily

Introduced as ornamental plant in 1793, in the Botanical Garden of Palermo, (Raimondo & Domina 2007).

Ecology

Trees form seed pods almost regularly throughout the year, except in winter and early spring. Fruit production is at its peak at the beginning of summer. Seeds germinate readily and forms mature trees in a short period of time, sometimes even after one year if found in optimal growing conditions (abundant water, nutrients and sun).

Possible control methods

Manual uprooting when not in fruit, although the taproot is very resilient and may give rise to new growth even if the entire aerial parts are removed.

Invasive category/local potential threat

Medium-high.

Remarks

Probably a recent introduction both in Malta and in Europe since it is neither mentioned in local historic literature, nor included in the Flora Europaea (Tutin et al. 1968). In Sicily grows *Leucaena leucocephala* (Lam.) de Wit subsp. *glabrata* (Rose) Zárate.



Referenced bibliography

- Badalamenti E., Pasta S., Sala G., Catania V., Quatrini P. & La Mantia T., 2020. The paradox of the alien plant *Leucaena leucocephala* subsp. *glabrata* (Rose) S. Zárate in Sicily: another threat for the native flora or a valuable resource? *International Journal of Plant Biology*, 11: 8637.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Lanfranco E., 2000. Is-siġar f' Malta: l-użu, l-impatt u l-pajsaġġ. In: Baldacchino A. E & Stevens D.T. (eds.): Is-Siġar Maltin – l-użu u l-importanza: 41-51. Dipartiment għall-Ħarsien ta' l-Ambjent. Malta.
- Raimondo F. M. & Domina G., 2007. Two new Mimosaceae naturalised in Italy. *Flora Mediterranea*, 17: 209-216.
- Tutin T. G., Heywood V. H., Burges N. A., Valentine D. H., Walters S. M. & Webb D. A., 1968. *Flora Europea Volume 2 - Rosaceae to Umbelliferae*. Cambridge University Press, Cambridge, UK, 486 pp.

Lycium ferocissimum Miers



(Spermatophyta >> Magnoliopsida (Asterids) >>
Solanales >> Solanaceae)
Phylum >> Class >> Order >> Family

Main synonyms

None.

Common English names

African boxthorn.

Common Maltese names

Għawseġġ tal-Afrika.

Common Italian names

Spina santa Africana.

Short description

Large perennial shrub, reaching up to 4 m armed with strong woody thorns. Stem spreading, profusely branched, glabrous, light grey with pinkish-tan hue. Leaves in small clusters, sessile (or a very short petiole), narrowly elliptic, fleshy, 10–30 × 4–8 mm in size, bright green and polished. Flowers solitary, possessing a tubular calyx approx. 6 mm long, terminating with five broadly triangular lobes shorter from the tube. Corolla shortly tubular approx. 7 mm long then opening to five small rounded corolla lobes, 3–4 mm long; tube white-lilac sometime pale violet in colour with some violet venation and a distinct violet spot or macula at the base of each lobe. Stamens and pistil yellowish with white anthers and style, both excreted out from the throat of the corolla, with a pilose ring at the fusion of the filaments with the inner corolla wall. Fruit a bright red, subspherical berry about 9 mm across.

Place of origin and global distribution

Native to South Africa and became naturalised in temperate regions such as the Mediterranean basin and temperate parts of Australasia and USA.

Distribution in Malta

Known from some localities in the north of Malta, namely in the vicinity of Wied il-Mizieb, Għadira nature reserve, Simar nature reserve and l-Għadira ż-żgħira, all situated in the locality of Mellieħa.

Distribution in Sicily

Not present.

Life-form

Phanerophyte.

Introduction source

Cultivated for hedging purposes and as a curious exotic plant.

Habitat or preferred invading habitat

Arid areas with well-drained soil.

Frequency in Malta

Scarce, locally invasive.

Frequency in Sicily

Not present.

Mode of dispersion

Seeds (possibly dispersed by birds) and vegetatively by suckers.

First record in Malta

Weber & Kendzior (2006).

First record in Sicily

Up to now the species has not been recorded as naturalised in Sicily. For Italy there is only one report concerning Sardinia (Lazzeri et al. 2013) where the species is considered naturalised.

Ecology

Plants are perennial and produce flowers throughout spring and early summer. Fruit is formed and matures about 6 weeks later from the flowering period and produces a few dozens of tiny, disk-shaped seeds. Seeds do not seem to be so fertile and do not germinate readily. Moreover, the shrub forms numerous suckers, which quickly enlarges existing populations.

Possible control methods

Uprooting plants, including underground sucking when specimens are not in fruit, hence in winter.



Invasive category/local potential threat

Low-Moderate.

Remarks

Lycium ferocissimum was introduced at the Simar and Ghadira nature reserves in Mellieħa apparently to form a natural hedge around the premises. However, plants became locally invasive, with some sporadic escapees away from their cultivated confinement. Some examples have been found naturalised elsewhere too.

This species should not be underestimated in its invasive potential as in other territories such as Australia and New Zealand where it was introduced in the 19th century it represents today a serious problem as it is strongly invasive (Noble et al. 2021). For this reason, its cultivation should be discouraged in the Mediterranean area.

Referenced bibliography

- Lazzeri V. (ed.), 2013. Novità floristiche per le regioni Sardegna e Toscana. *Acta Plantarum Notes*, 2: 42-59.
- Noble M., Adair R. & Ireland K., 2021. Biology of Invasive Plants 2. *Lycium ferocissimum* Miers. *Invasive Plant Science and Management*, 14 (2): 41-56. doi:10.1017/inp.2021.13
- Weber H. C. & Kendzior B., 2006. Flora of the Maltese Islands. A field Guide. Margraf Publishers, Weikersheim, 383 pp.

Mesembryanthemum cordifolium L. fil.



(Spermatophyta >>
Magnoliopsida >>
Caryophyllales >> Aizoaceae)
Phylum >> Class >> Order
>> Family

Main synonyms

None.

Common English names

Baby sun rose; Heart-leaf sun rose; Purple aptenia.

Common Maltese names

Widnet il-Ħanżir; Widnet il-Ġurdien.

Common Italian names

Erba cristallina cordifolia.

Short description

Evergreen, fast-growing, short-lived perennial, succulent, profusely branched, prostrate and reaching only 20–25 cm in height. Roots thick with long horizontal rootlets. Stems four-angled or rounded, up to 65 cm long, woody at the base, otherwise green and fleshy. Bladder cells (water cells) are closely arranged on the surfaces of the stems and leaves, shiny in the sunlight. Leaves bright green, sometimes slightly yellowish in hue, flat but distinctly succulent, up to 60 x 25 mm in size, distinctly heart-shaped, hence base of mature leaves cordate (younger leaves might be truncate to slightly cuneate). Flowers borne singly or in clusters on short flower stalks, magenta-purple, 15-17 mm across, centre white or pale, petals slender, linear, shiny. Flowers open during the bright hours of the day, usually around midday to late afternoon when the sun is setting. Fruit a green capsule with four lidless locules, each containing one seed. Seeds large, black-brown, with a rugose surface.

Place of origin and global distribution

South Africa. Naturalised worldwide in suitable warm climates from cultivation.

Distribution in Malta

Cultivated and naturalised throughout the Maltese islands, especially in urban areas, farms and agricultural dwellings.

Distribution in Sicily

Widespread in particular close to tourist residences (Giardina et al. 2007). Taormina (Sciandrello et al. 2014); Palermo (Domina et al. 2019); Levanzo Island (Romano et al. 2006).

Life-form

Chamaephyte, suffruticose, succulent.

Introduction source

Cultivated as house or garden plant, usually for carpeting ground or walls, or as a hanging plant.

Habitat or preferred invading habitat

Often present on rubble walls at or close to agricultural areas, or abandoned fields or old buildings in rural areas. Seldom found in more natural areas such as steppe or rocky banks close to the coast or cliffs. Walls, sands, abandoned beds.

Frequency in Malta

Frequent. Was a popular plant, especially in the mid-20th century, but now its popularity decreased for other succulents such as *Carpobrotus* spp., *Lampranthus* spp., and other ice plants, including the closely related *Mesembryanthemum lancifolium*.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Propagation by seeds dispersed by water or ants and also from cuttings by man.



First record in Malta

First recorded by Gulia (1855-56) as a cultivated plant, and was introduced in Malta well before the other closely related species *M. lancifolium* L. Bolus.

First record in Sicily

Not Reported.

Ecology

Plants produce thousands of tiny seeds that are released at the end of summer and autumn, although the success rate of germination is thought to be low. Plants may keep flowering throughout most of the year if the annual climate is warm in winter.

Possible control methods

Manual removal.

Invasive category/local potential threat

Moderate, but climate change might favour invasiveness.

Remarks

Morphologically, this sun rose is closely related to *Mesembryanthemum lancifolium*, the latter differing in having leaves with a cuneate base, hence more lance-shaped rather than oval or heart-shaped; and flowers tend to have a more purplish tinge. Moreover, a hybrid plant (referred to as red apple baby rose) may also be present in Malta and makes identification further difficult. Yet all plants previously under the genus *Aptenia* are invasive in certain preferred habitats, and they are treated the same way with regards to their control and management.

Referenced bibliography

Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

- Gulia G., 1855-56. Repertorio Botanico Maltese. Tipografia Laferla, Malta, 68 pp.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains – northeast Sicily). *Webbia*, 69 (2): 301-324.

Mesembryanthemum lancifolium (L. Bolus) Klak



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Aizoaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Litocarpus cordifolius (L.f.) L. Bolus.

Common English names

Baby sun rose; Lance-leaf sun rose; Red Aptenia.

Common Maltese names

Qrun il-baqra.

Common Italian names

Erba cristallina a foglie lanceolate.

Short description

Evergreen, fast-growing, short-lived perennial, succulent, profusely branched, prostrate and reaching only 18 cm in height. Roots thick with long horizontal rootlets. Stems rounded, up to 75 cm long, woody at the base otherwise green and fleshy. Bladder cells (water cells) closely arranged on the surfaces of the stems and leaves, shiny in sunlight. Leaves medium green sometimes dark, flat but distinctly succulent, oval or lance-shaped, base of mature leaves cuneate or rounded, up to 70 x 20 mm in size. Flowers borne singly or in clusters on short flower stalks, purple sometimes with rose hue, 16-19 mm across, centre white or pale pink, petals slender, linear, shiny. Flowers open during the bright hours of the day, usually around midday to early afternoon when sun is setting. Fruit a green capsule with four lidless locules, each containing one large black-brown seed with a rugose surface.

Place of origin and global distribution

South Africa. Naturalised worldwide in suitable warm climates from cultivation.

Distribution in Malta

Cultivated and naturalised throughout the Maltese islands, especially in urban areas, farms and agricultural dwellings.

Distribution in Sicily

To be confirmed. Reported by Siracusa (Raimondo & al. 2005).

Life-form

Chamaephyte, suffruticose, succulent.

Introduction source

Cultivated as house or garden plant, usually for carpeting ground or walls, or as a hanging plant.

Habitat or preferred invading habitat

Often present on rubble walls at or close to agricultural areas, or abandoned fields or old buildings in rural areas. Seldom found in more natural areas such as steppe or rocky banks close to the coast or cliffs. Synantropic on disturbed ground.

Frequency in Malta

Scarce. Recently introduced and has not yet widespread throughout the islands.

Frequency in Sicily

Rare (Giardina et al. 2007).

Mode of dispersion

Propagation by seeds dispersed by water or ants and also from cuttings by man.

First record in Malta

Not recorded by Haslam et al. (1977), who mentions only *Aptenia* (= *Mesembryanthemum*) *cordifolia*, or any historic literature. The first published record is therefore attributed to that by Weber & Kendzior (2006). It may have been vaguely mentioned in previous books about local gardening and horticulture, although it might also have been confused with *M. cordifolium* which, according to literature, it has been cultivated in Malta for over 100 years.

First record in Sicily

Not Reported.

Ecology

Plants produce thousands of tiny seeds that are released at the end of summer and autumn, although the success rate of germination is thought to be low. Plants may keep flowering throughout most of the year if the annual climate is warm in winter.

Possible control methods

Manual removal.

Invasive category/local potential threat

Moderate, but climate change might favour invasiveness.

Remarks

Morphologically, *Mesembryanthemum lancifolium* is closely related to *M. cordifolium*, this differing in having mature leaves with a subcordate or truncate base, hence attaining a heart-like or broadly oval shape rather lance-shaped and the flowers tend to have a more purplish tinge.

Moreover, a hybrid plant (referred to as red apple baby rose) may also be present in Malta and makes identification further difficult. Yet all plants previously under the genus *Aptenia* are invasive in certain preferred habitats, and they are treated the same way with regards to their control and management.

Referenced bibliography

- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Weber H. C. & Kendzior B., 2006. Flora of the Maltese Islands. A field Guide. Margraf Publishers, Weikersheim, 383 pp.

Mirabilis jalapa L.



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Nyctaginaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Jalapa officinalis Garsault; *Mirabilis lindheimeri* (Standl.) Shinnery;
Nyctago hortensis Dum. Cours.; *Nyctago versicolor* Salisb.

Common English names

Marvel of Peru; Four o'clock flower.

Common Maltese names

Hummejr.

Common Italian names

Bella di Notte.

Short description

Annual or short-lived perennial, tuberous, herbaceous bushy plants up to about 1 m tall. Stem profusely branched and foliose, glabrous, green, with slightly inflated nodes. Leaves with 2–4 cm long petiole, broadly ovate or rhombic, dark green, 5–12 × 3–9 cm with an entire margin, subcordate to truncate base and acuminate apex. Flowers in small groups at branch apices, fragrant, shortly pedicellate. Involucre calyx-like, green, tubular-campanulate with 5 short dentate lobes, ca. 1 cm long. Perianth salverform, varying in many colours (purple, magenta, red, yellow, white) and sometimes mixed in two or even three colours, tube 2–5 cm long, limb 2–3 cm across, usually opening late in the afternoon till next morning. Stamens, longly exerted from the corolla mouth, vividly coloured (usually purple) with thread-like, arched, filaments and spherical yellow anthers. Fruit black, fleshy, globose, 6–7 mm in diameter, ribbed, sulcate or wrinkled.

Place of origin and global distribution

Mexico and possibly Guatemala, introduced and naturalised in many warm tropical, subtropical and temperate regions worldwide, including the Mediterranean Region.

Distribution in Malta

Widely distributed throughout Malta and Gozo, sometimes forming established populations such as at Wied Għajn Żejtuna, Harq Ħammim and Xlendi valleys.

Distribution in Sicily

Reported as naturalised in many places in Sicily (Barone et al. 2021) such as Siracusa (Minissale et al. 2011), Trapani (Aleo et al. 2018) Egadi Islands (Gianguzzi et al. 2006, Romano et al. 2006), Palermo and surroundings (Caldarella et al. 2013, Cambria & Tavilla 2020, Domina et al. 2019) but it never forms consistent populations.

Life-form

Geophyte.

Introduction source

Escapee from ornamental plants. Was a very popular ornamental plant in the early and mid- 20th century where it was cultivated in many gardens and fields.

Habitat or preferred invading habitat

Valleys (especially damp valley beds), irrigated fields or field margins, roadsides, farms, occasionally maquis.

Frequency in Malta

Scattered as small groups in many locations sometimes forming invasive populations in moist, sheltered areas (e. g. valleys).

Frequency in Sicily

Scattered as small groups in many locations never forming invasive populations

Mode of dispersion

By seeds carried and dispersed by water currents.

First record in Malta

Zerapha (1831).

First record in Sicily

Albo (1919) for SE Sicily.

Ecology

In Malta, most plants are perennial and flower all year round, perhaps peaking in the warmer months, producing vast amounts of seeds yearly. They germinate readily in contact with moist soil, hence the invasive potential in favourable habitats of this species in valleys and semidry wetlands. They do not seem to prefer clayey soil and clay slopes.

Possible control methods

Manual uprooting and digging out carefully the tuberous part. Site has to be monitored for several consecutive years for newly germinated plants.

Invasive category/local potential threat

Moderate-high.

Remarks

Very popular ornamental plant in Malta for its varied colourful and fragrant flowers present almost all year round, easy to propagate, low maintenance and well suited to the Maltese climate. Sometimes *Mirabilis odorata* L. was considered a different plant, differing in being

smaller, and producing smaller but more fragrant flowers. *M. odorata* now it is treated as a synonym or sometimes a variety of *M. jalapa*. Most part of the plants are known for its hallucinogenic properties, although the seeds are usually avoided since they have neurotoxic effects (Weber 2008).



Referenced bibliography

- Albo G., 1919. La vita delle piante Vascolari nella Sicilia meridionale ed orientale Parte II: Flora Ragusa. Tip. Piccitto, pp. 308.
- Aleo M., Bazan G. & Cordi R., 2004. Le piante vascolari del litorale trapanese: da Capo Lilibeo a Ronciglio, Quaderni di Botanica ambientale applicata, 15: 83-98.
- Barone G., Domina G. & Di Gristina E., 2021. Comparison of different methods to assess the distribution of alien plants along the road network and use of Google Street View panoramas interpretation in Sicily (Italy) as a case study. *Biodiversity Data Journal*, 9: e66013 <https://doi.org/10.3897/BDJ.9.e66013>.
- Caldarella O., Gianguzzi L., Romano S. & Fici S., 2013. The vascular flora of Nature Reserve "Pizzo Cane, Pizzo Trigna and Grotta Mazzamuto" (NW Sicily). *Webbia*, 64: 101-151.
- Cambria S. & Tavilla G., 2020. Check-list of the vascular flora of the "Bosco di Gibilmanna", a Special Area of Conservation (S.A.C.) in northern Sicily (Italy). *Biodiversity Journal*, 11 (2): 369-382.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Gianguzzi L., Scuderi L. & Pasta S., 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia*, 61 (2): 359-402.
- Minissale P., Santo A. & Sciandrello S., 2011. Analisi geobotanica del SIC "Capo Murro di Porco, Penisola della Maddalena e Grotta Pellegrino" (Siracusa, Sicilia). *Fitosociologia*, 48 (2): 77-98.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.
- Zerapha S., 1831. Flora Melitensis Thesaurus, fasc. Alter: 69. Valletta.

Nicotiana glauca Graham



(Spermatophyta >> Magnoliopsida (Asterids) >>
Solanales >> Solanaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Acnistus virgatus Griseb.; *Siphaulax glabra* Raf.

Common English names

Tobacco tree; Mustard tree.

Common Maltese names

Tabakk tas-Swar; Sigra tat-Tabakk.

Common Italian names

Tabacco glauco.

Short description

Small tree or shrub, glabrous 2–9 m tall, poisonous. Stems smooth,

becoming blackish when mature. Leaves glaucous-green, glabrous and slightly shiny, petiolate, 5–25 × 2–10 cm in size, elliptical-lanceolate or ovate, margins sometimes undulated, petiole simple, unwinged. Flowers numerous in a lax drooping panicle. Calyx 9–14 mm long, green, tubular with triangular, acute, equal teeth. Corolla yellow, tubular and subsalviform, 30–40 mm long and about 5 mm in diameter, mouth dilated and broadened by 2–4 mm in five shallow subfused lobes, slightly constricted below the mouth. Stamens subequal, inserted in the basal $\frac{1}{4}$ of corolla-tube, not protruding out from the corolla mouth. Fruit an elongated ovoid capsule subtended by swollen calyces below and opening at the apex by five small triangular flaps. Seeds minute, 0.5 mm, brown.

Place of origin and global distribution

South America specifically from Bolivia and northern Argentina. Naturalised in other warm temperate to sub-tropical areas including the Mediterranean region.

Distribution in Malta

Common and widespread throughout the Maltese Islands including Comino.

Distribution in Sicily

Throughout the region and in the surrounding islands (Giardini et al. 2007). Messina in various places including Gravitelli (Nicotra 1904); Messina (Musmarra 1935); from Capo Lilibeo to Ronciglio, at Saline S. Teodoro, Marsala (Aleo et al. 2004); Levanzo Island (Romano et al. 2006); Penisola della Maddalena, Archaeological Park of Neapolis, Siracusa (Minissale et al. 2011, 2016); Archaeological Park of Selinunte, Castelvetro (Scafidi & Raimondo, 2019); Valle del Sirina-Castelmola, Oasi del Simeto (pers. obs. Sciandrello 2022). On the island of Linosa it has been reported (Pasta et al. 2017) and despite the eradication attempts made in recent years with the LIFE project (LIFE+ Nat/It 00093 Pelagic Birds) it is still present, albeit with few specimens, observed in 2022 (Minissale pers. obs.).

Life-form

Phanerophyte to Nanophanerophyte.

Introduction source

It was probably introduced for embellishment of roads and parks for its low maintenance and elegant flowers.

Habitat or preferred invading habitat

Mostly found in abandoned quarries, construction sites, and disturbed ground with rubble stones and stoney debris. Sometimes seen in upper parts of escarpments, fortification walls and construction waste dumps. Dunes.

Frequency in Malta

Common in its preferred habitat, but rare in other habitats. Seldom found in garigue, steppe or maquis.

Frequency in Sicily

Very common (Giardina et al. 2007).

Mode of dispersion

By seed which is primarily dispersed by wind and possibly by ants and water currents.



First record in Malta

Gulia (1855-56).

First record in Sicily

Messina (Nicotra 1878).

Ecology

Mature trees produces numerous tiny seeds in summer which germinate readily after the first rains of autumn in exposed ground giving rise to matures offspring in a very short time of two years.

Possible control methods

Uprooting when trees are not in fruit.

Invasive category/local potential threat

Moderate.

Remarks

This species has strong preference to disturbed ground and it is seldom a threat to the natural ecosystems of the Maltese Islands. It has been the Maltese Islands for more than 100 years (Gulia, 1855-56) but during this time no invasive population has been reported in natural ecosystems. Its presence in Natura 2000 sites is very sporadic and restricted to disturbance. Apparently, the tiny seeds germinate and develop into mature trees in barren ground which is not already vegetated. They may become outcompeted by surrounding vegetation and hence the species succeeds best in exposed ground which is deep enough to sustain the trees when mature. The only natural habitat where a few trees has been observed was eroded cliff sides and escarpments.

Referenced bibliography

- Aleo M., Bazan G. & Cordì R., 2004. Le piante vascolari del litorale trapanese: da Capo Lilibeo a Ronciglio, Quaderni di Botanica ambientale applicata, 15: 83-98.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.
- Gulia G., 1855-56. Repertorio Botanico Maltese. Tipografia Laferla, Malta, 68pp.
- Minissale P., Santo A. & Sciandrello S., 2011. Analisi geobotanica del SIC "Capo Murro di Porco, Penisola della Maddalena e Grotta Pellegrino" (Siracusa, Sicilia). *Fitosociologia*, 48 (2): 77-98.
- Musmarra A., 1935. Nuove aggiunte alla Flora Sicula. *Malpighia*, 34: 11-12.
- Nicotra L., 1878. *Prodromus florum messanenesis plantas exhibens phanerogamas sponte virentes juxta methodum naturalem digesta. Messanae.*
- Nicotra L., 1904. Variazioni recenti nella flora messinese. *Nuovo Giornale Botanico Italiano*, n.s., 11: 34-47.
- Pasta S., Ardenghi N. M. G., Badalamenti E., La Mantia T., Livreri Console S. & Parolo G., 2017. The alien vascular flora of Linosa (Pelagic Islands, Strait of Sicily): update and management proposals. *Willdenowia*, 47 (2): 135–144. <https://doi.org/10.3372/wi.47.47205>.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Scafidi F. & Raimondo F. M., 2019. Contribution to the vascular flora of the archaeological park of Selinunte and Cave of Cusa (South-Western Sicily, Italy): preliminary results. *Bocconea*, 28: 371-390.

Nothoscordum × *borbonicum* Kunth



(Spermatophyta >> Liliopsida >> Asparagales >>
Amaryllidaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Allium × *fragrans* Bojer; *Nothoscordum fragrans* (Ventenat) Kunth;
Milla × *borbonica* (Kunth) Baker; *Nothoscordum indorum* auct. non
(Aiton) Asch. & Graebn (=misapplied name).

Common English names

Honeybells, Fragrant false garlic, Onion Weed, Grace garlic.

Common Maltese names

Tewm tal-Qsari.

Common Italian names

Falso aglio gracile.

Short description

Bulb ovoid, more or less 2 cm diameter, surrounded by numerous smaller bulblets. Flowering stem terete, 30–60 cm high. Leaves 4–9, light green, flat and slightly channelled, soft and somewhat flaccid, with a membranous sheath at the base, 15–50 cm long, 5–12 mm wide. Umbel loose, 8–16-flowered; spathe-bracts 2, membranous and usually pigmented maroon, ovate, flowers on hanging to sub-erect pedicels 1.5–4.0 cm long; flowers about 12 mm long 8 mm across, scented, perianth segments fused basally for about 4 mm then free, pointed, mostly white, with a pinkish or green mid-vein and green at the base; stamens attached with the corolla tube, filaments white, 7–10mm, slightly shorter than perianth segments, anthers brown; capsule spherical, 6 mm long; seeds black, angled (pip-shaped), 2 mm long, with finely wrinkled testa.

Place of origin and global distribution

Tropical and warm regions of South America, such as Argentina and Brasil.

Distribution in Malta

Cultivated and escaped in some valleys such as Wied Blandun and Wied Zejtuna, apart from many urban areas where it escaped from parks or private gardens. In literature, it is recorded from Fort Chambray and Mgarr (Gozo), Lia, Balzan, Attard, Birkirkara, and Mosta.

Distribution in Sicily

Very common in the coastland of Sicily (Giardina et al. 2007) but generally close to urbanized areas with gardens.

Life-form

Geophyte, bulbous.

Introduction source

Ornamental plant.

Habitat or preferred invading habitat

Old or abandoned gardens, roadsides, footpaths, keystones and pavement in urban areas, valley sides, grassy areas in steppe and abandoned agricultural areas in rural zones.

Frequency in Malta

Locally frequent and increasing.

Frequency in Sicily

Locally frequent.

Mode of dispersion

By the numerous seeds that get dispersed by water currents from rain or artificial irrigation, and vegetatively by the bulblets, including soil movement or dumping of unwanted plants in the wild.

First record in Malta

First recorded as *Allium odorum* by Caruana Gatto (1890), who already remarked that it escaped from cultivation and naturalised. Many other authors subsequently recorded it under different names, such as *Nothoscordium fragrans* by Sommier & Caruana Gatto (1915) and *Nothoscordon inodorum* by Borg (1927).

First record in Sicily

Ross (1899) in Palermo.



Ecology

Spreads through the underground bulbils and seeds that have a high germination success. The bulb is usually deep underground and protected from mechanical and physical damage and is difficult to raise without digging out the soil.

Possible control methods

Manual removal of the bulbs and bulbils tends to be difficult since bulbs are usually deep down and leaves come loose when pulled, leaving the bulb intact.

Invasive category/local potential threat

High.

Remarks

The populations occurring in the Maltese Islands are likely represented by more than one species because some plants are not strongly scented and therefore represented by another non-fragrant species (Mifsud 2021). However, being of hybrid origin, the plants may also vary in their scent amongst other characters. The hybrid is between *N. entrerianum* Ravenna and *N. gracile* (Aiton) Stearn.

Referenced bibliography

- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Caruana Gatto A., 1890. Liliacee Maltesi – loro enumerazione. – osservazioni e aggiunte. *Il Naturalists Maltese*, 1(2): 16-18.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.
- Mifsud, S. (2-Jan-2020). *Nothoscordum borbonicum*. Retrieved from MaltaWildPlants.com on 21-Aug-2021

Ross H., 1899. Beiträge zur Flora von Sicilien. 1 Teil. Erläuterungen und kritische Bemerkungen zum Herbarium siculum. Centuria I. *Bulletin de l'Herbier Boissier*, 7 (4): 262-299.

Opuntia ficus-indica (L.) Mill.



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Cactaceae)

Phylum >> Class >> Order >> Family

Main synonyms

Cactus opuntia L.; *Opuntia ficus-barbarica* A. Berger; *Opuntia megacantha* Salm-Dyck.

Common English names

Indian Fig; Prickly pear; Tuna cactus; Fig opuntia.

Common Maltese names

Bajtar tax-Xewk; Bajtar tal-Indja.

Common Italian names

Fico d'India; Opunzia fico d'India.

Short description

Long-living perennial, about 2–3 m high but can reach up to 6 m in

height, woody stems short, thick, robust, usually completely covered by the cladodes all around. Branches patent and mostly low-lying. Cladodes (leaf pads) 15–60 × 10–25 cm, obovate to spatulate shape with obtuse to rounded ends, about 3 cm thick, bright green. Leaves inconspicuous, 3–5 mm, yellow, caducous. Areoles white or ash-grey, small. Spines usually not present, or sometimes up to 2 per areoles, pale yellow, 0.5 – 2 cm long, rarely longer. Glochids (bristly spines) numerous, light yellow or straw-coloured, caducous, 2–3 mm long. Flowers about 8 cm in diameter, bright yellow, (sometimes pale) to orange or occasionally mixed with orange restricted as basal patches, multi-petalled forming a cup. Anthers numerous in a broad ring, filaments pale yellow. Fruit 4–10 cm, ovoid to barrel-shaped with a prominent depressed pale brown apex, yellow, orange or green or mixed colours. Upper part of fruit highly spinescent. Pericarp (pulp) sweet and edible embedded with many brown small seeds ca. 5 mm long.

Place of origin and global distribution

Central Mexico, where it is the national tree. Naturalised in many warm parts of the world, especially in the Mediterranean region.

Distribution in Malta

Naturalised throughout the Maltese islands, mostly in agricultural areas and derelict fields.

Distribution in Sicily

Throughout the region (Giardini et al. 2007). Ustica Island (Ronsisvalle 1972); Marettimo Island (Gianguzzi & Scuderi 2006); Taormina (Sciandrello et al. 2014); Mastrissa-Castelmola, Capo Milazzo, Tindari near Santuario, Oasi del Simeto (pers. obs. Sciandrello 2022).

Life-form

Nanophanerophyte to phanerophyte. Succulent.

Introduction source

Cultivation for agriculture purposes (namely hedging) and for its delicious fruit.

Habitat or preferred invading habitat

Field borders, abandoned fields and farms, maquis and rocky areas below escarpments, sometimes encountered in garigue, valley sides and cliff sides.

Frequency in Malta

Common, especially in agricultural areas.

Frequency in Sicily

Very common (Giardina et al. 2007).

Mode of dispersion

Propagation mainly by man through cultivation. It also propagates naturally by seeds (dispersion aided by birds) and fallen cladodes, which are very successful in damp ground such as in valleys and flooded clayey fields

First record in Malta

Zerapha (1927) as *Cactus opuntia*.



First record in Sicily

The first references to the diffusion of prickly-pear species in Sicily can be found in a manuscript of the 17th century by Bonanno (Biuso Varvaro 1895; Barbera et al. 1992).

Ecology

This cactus flowers profusely in early summer and fruits later in early autumn where birds eat and disperse their seeds. A small proportion of fruit mature and set seeds in winter.

Possible control methods

Uprooting and gathering of all cladodes from site.

Invasive category/local potential threat

Moderate-high. It is a slow invader but then difficult to remove and invades completely the area where it is present.

Remarks

Introduced in Malta a long time ago and has been reported to have naturalised along some cliffs, namely at Għar Hasan, Siġġiewi and Casal Dingli, in early 20th century (Sommier & Caruana Gatto 1915). Despite being an alien, it was depicted in the coat of arms of Malta between 1975 and 1988.

Referenced bibliography

- Barbera G., Carimi F. & Inglese P., 1992. Past and Present Role of the Indian-Fig Prickly-Pear (*Opuntia ficus-indica* (L.) Miller, (Cactaceae) in the Agriculture of Sicily. *Economic Botany*, 46 (1): 10-20.
- Biuso Varvaro F., 1895. Il fico d'India in Sicilia. Tip. Marsala, Palermo.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Gianguzzi L., Scuderi L. & Pasta S., 2006. La flora vascolare dell'Isola di Marettimo (Arcipelago delle Egadi, Sicilia occidentale): analisi fitogeografica ed aggiornamento. *Webbia*, 61 (2): 359-402.

- Ronsisvalle G. A., 1972. Flora e vegetazione dell'isola di Ustica. *Lavori della società Italiana di Biogeografia*, Forlì, n. s., 3 (estratto): 1-63.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains – northeast Sicily). *Webbia*, 69 (2): 301-324.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.
- Zerapha S., 1827. Florae Melitensis Thesaurus: sive plantarum enumeratio, quae in Melitae gausosque insulis aut vulgatissimae. Fasciculus 1. Ex Regia Typographia, Malta.

Opuntia microdasys (Lehm.) Pfeiff.



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Cactaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Opuntia macrocalyx Griffiths.

Common English names

Bunny Ears, Bunny Cactus, Angel's wing cactus.

Common Maltese names

None.

Common Italian names

Fico d'India microvillosa, Opunzia microvillosa.

Short description

Small compact shrub when fully mature, up to 80 cm in height with spreading, non-woody stems. Cladodes (or pads) orbicular-ovate, 8–12 × 4–8 cm in size, apex rounded, bright green, shallowly tuberculate (covered with shallow humps), seldom falling down. Leaves rarely formed. Areoles numerous, evenly spaced, 2–5 mm across, white to ash-gray, circular. Spines absent. Glochoids numerous, 3–5 mm long, covering most of the areole forming a cushion, golden yellow, somewhat mustard-colour at the base - some varieties have whitish and reddish colours. Flowers approximately 3 cm in diameter, bright yellow aging to faded orange or peach. Filaments white and surmounting the green style at the centre. Fruit 2–3 cm long, red or deep orange-red, barrel-shaped or subglobular, unarmed from spines but with many white, glochoid-bearing aerolas, especially on the rim of the fruit. Seeds pale brown, almost spherical in shape, about 1 mm long.

Place of origin and global distribution

Native to Mexico but naturalised in some African countries such as Tanzania and Kenya, Australia and the Mediterranean region.

Distribution in Malta

MALTA: Rabat (Wied l-Isaqof), Siġġiewi (Wied Xkora), Birkirkara, Mġarr, Qormi (farms near Wied il-Kbir). GOZO: iż-Żebbuġ (cliffs facing Għasri), Mġarr ix-Xini (close to the bay), Xagħra (escarpments facing Wied tal-Egħżien), Qala (near tal-Wardiġa Promenade), and Għajnsielem (facing Xatt l-Aħmar).

Distribution in Sicily

Pantelleria (Di Gregorio et al. 2017).

Life-form

Chamaeophyte. Succulent.

Introduction source

Introduced for horticulture use and escaped through dumped plants and possibly deliberately planted.

Habitat or preferred invading habitat

Arid rocky ground, barren escarpments and higher parts of rocky valley sides. Specialist of a very arid environment.

Frequency in Malta

Rare-Scarce.

Frequency in Sicily

Very rare.

Mode of dispersion

Propagation mainly through dumped plants or fallen cladodes from houses or gardens near rocky ground. Deliberate cultivation of unwanted plants is also possible. Plants seldom form fruits.

First record in Malta

Lalov & Lanfranco (2007). Zahra (2012) mention it only as a cultivated plant.

First record in Sicily

Pantelleria (Di Gregorio et al. 2017).

Ecology

Plants rarely flower, hence many plants have a vegetative reproduction through fallen cladodes. Few examples have been seen in fruit in July and February hence flowering is sporadic.

Possible control methods

Uprooting and gathering of all cladodes from site.

Invasive category/local potential threat

Moderate-Low. Despite the several occurrences, very few populations have naturalised and became invasive, although some populations were reported to have plantlets from fallen cladodes (Lalov & Lanfranco 2007).

Remarks

The popularity of this cactus as an ornament has been reported by Weber (2008). It managed to escape in the wild from cultivated plants probably within the end of the 20th century sometimes forming established but relatively small populations such as at Wied Xkora (Lalov & Lanfranco 2007). The plant is reported invasive in warmer countries with a sub-desert climate namely in Africa, South America and Australia and had naturalised in the Balearic Islands and south of

Spain. It seems the plant remains vegetative in colder regions and do not produce flowers, although since 2017, several examples were seen in fruit indicating that the species is slowly naturalising to the Maltese climate (pers. obs. Stephen Mifsud) and its invasive potential should not be neglected, favoured by a climate change resulting in warmer climate and milder winters.

Referenced bibliography

Di Gregorio B. (ed.) & al. (2017) Rassegna di segnalazioni notevoli riguardanti la Sicilia comparse nel forum *Acta Plantarum*. *Acta Plantarum Notes*, 5: 70-74.

Lalov S. V. & Lanfranco E., 2007. New Records on the Maltese Flora: *Opuntia microdasys* (Lehm.) Pfeiffer (Family: Cactaceae). *The Central Mediterranean Naturalist*, 4 (3): 203-204.

Weber H.C., 2008. *Ornamental Plants of Malta*. Margraf Publishers, Weikersheim, 356 pp.

Zahra R., 2012. *Kaktus u Sukkulenti Ohra*. PIN Publications, Malta.



Opuntia stricta (Haw.) Haw.



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Cactaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Opuntia dillenii Ker Gawl.; *Opuntia inermis* D. C.; *Consolea bahamana* (Britton & Rose) A. Berger; *Opuntia nejapensis* Bravo.

Common English names

Erect prickly pear.

Common Maltese names

Bajtar tal-inka.

Common Italian names

Fico d'India compatto, Opunzia stretta.

Short description

Perennial shrub reach up to 2.5 m in height. Stems seldom form a woody trunk, much-branched and spreading low and patent around main stem. Cladodes (or pads) obovate to elliptic-orbicular 10–35 × 7.5–20 cm long, green. Leaves 5–6 mm, deciduous, indistinct. Areoles small, 3–8 mm, straw-coloured, circular giving rise to 1–12 spines, radiating away from the areole, golden yellow and sometimes mottled, 1–5 cm long. Glochoids numerous, golden yellow, 2–6mm long. Flowers 6–12 cm in diameter with bright yellow to golden yellow petals 2–3 cm long. Filaments numerous, pale yellow, 12 mm long. Fruit 5–7 cm long, barrel-shaped to obovoid with a prominent depressed apex and usually unarmed from spines but possess several glochoids, skin smooth and thin, deep purple when fully mature. Pericarp deep purple, not particularly sweet or palatable, releasing a stain-like reddish-purple fluid. Seeds light brown, about 5 mm long.

Place of origin and global distribution

Southern states of America and Mexico.

Distribution in Malta

Scattered in numerous sites including Comino and Selmunett, somewhat more frequent in Gozo. It seldom forms large and dense populations as *Opuntia ficus-indica*, although an extensive population is, for example, found at Ta' Ċenc, Gozo.

Distribution in Sicily

Serra, Misilmeri (Barone et al. 2021); Palermo (Domina et al. 2019); i Levanzo Island (Romano et al. 2006).

Life-form

Nanophanerophyte to chamaephyte. Succulent.

Introduction source

Introduced for horticulture use and either escaped through dumped plants or as a relict of cultivation in fields and open ground near farm and rural dwellings.

Habitat or preferred invading habitat

Arid rocky ground, steppe, abandoned fields. Can tolerate sea spray and very arid environment.

Frequency in Malta

Frequent.

Frequency in Sicily

Rare (Giardina et al. 2007).

Mode of dispersion

Propagation mainly through cultivation, but may propagate naturally by seeds (dispersion aided by birds) and fallen cladodes.

First record in Malta

Sommier & Caruana Gatto (1915) vaguely records *O. dillenii* as an observation without enumerating it as part of the Maltese flora, stating that they observed: “un altra specie di Opuntia che ci è sembrata *O. Dillenii* Haw.”

First record in Sicily

Levanzo island (Romano et al. 2006).

Ecology

Plants flower in early summer and fruit later in autumn where birds eat and disperse their seeds. Reproduction by seeds is not so successful for this species.



Possible control methods

Uprooting and gathering of all cladodes from site.

Invasive category/local potential threat

Moderate. Despite numerous occurrences, very few populations had considerable formed invasive thickets.

Remarks

This species has been recorded in Malta under at least three taxa, that is *O. vulgaris* Mill., *O. maxima* Mill. and *O. dillenii* (Ker Gawl.) Haw. The first two are now synonyms of *O. ficus-indica* (L.) Mill. by several authorities. *O. dillenii* and *O. stricta* have a history of conflicting taxonomy with some considering them synonymous and others as distinct. At present, the treatment of Weber (2008) is preferred, also for the fact that the distinction between *O. dillenii* and *O. stricta* is not particularly evident, often based on the number of spines per areole: 0-2 for *O. stricta* and 0-7 for *O. dillenii*. If the two species are treated distinct, both *Opuntias* are then found in Malta. To complicate further matters, two other taxon – *O. monacantha* (Willd.) Haw. and *O. tuna* (L.) Mill. may also occur in the Maltese Islands and can have been confused as *O. stricta/O. dillenni* in literature. *Opuntia* species with deep violet fruit occurring on the Maltese Islands, require further taxonomic investigation.

Referenced bibliography

Barone G., Domina G. & Di Gristina E., 2021. Comparison of different methods to assess the distribution of alien plants along the road network and use of Google Street View panoramas interpretation in Sicily (Italy) as a case study. *Biodiversity Data Journal*, 9: e66013 <https://doi.org/10.3897/BDJ.9.e66013>.

Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.

- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.

Oxalis corniculata L.



(Spermatophyta >> Magnoliopsida (Rosids) >> Oxalidales
>> Oxalidaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Oxalis albicans Kunth; *Oxalis foliosa* Blatt.; *Oxalis minima* Steud.;
Oxalis procumbens Steud. ex A. Rich; *Oxalis repens* Thunb; *Oxalis tropaeoloides* Schlachter ex Planch.

Common English names

Creeping woodsorrel; Procumbent Yellow Sorrel; Sleeping Beauty.

Common Maltese names

Ingliża tal-Ġonna; Inqliża tal-Toroq.

Common Italian names

Acetosella dei campi; Acetosella cornicolata.

Short description

Creeping short-lived perennial, sparsely to moderately pubescent plant, forming leaves most of the year if water is available, but usually aestivates in the hottest months, or dies and hence living as an annual. Rootstock a woody taproot which extends in deep cracks or crevices. Bulbs and stolons absent. Stem up to 30 cm long but usually shorter, rooting at nodes, in contact with damp soil. Leaves alternate, petiolated, 2–10 cm long, with three obcordate leaflets at the top, each 3–15 × 4–22 mm, dark green mottled or subfused with purple hues, finely pubescent-pilose and with a ciliate margin; folding down during night. Inflorescence umbellate, bearing 2–7 flowers borne on long peduncles about same length or slightly longer from petioles, pubescent, terete with a sour sap. Pedicels arching down, 5–20 mm long, giving rise to a single flower. Corolla 0.8–1.0 cm wide, 5-merous. Sepals oblong-lanceolate, green, 3–5 × 1–2 mm, margin ciliate especially at the apex. Petals bright yellow, oblong-obovate 4–8 mm long, free or fused at the base sometimes ornamented with a red spot at the base. Stamens 10, arranged in two layers, filaments glabrous. Fruit subcylindrical-elliptic, slender, capsule, 1–3 cm long, shortly-pubescent, exploding to emit its seeds. Seeds transversely ridged, 1.5 mm long, brown.

Place of origin and global distribution

Possibly southern east Asia and introduced in Europe before 1500. Linnaeus description were based on specimens from Italy. It has wide distribution as a cosmopolitan weed such as in Europe (including the Mediterranean) and the Americas.

Distribution in Malta

Scattered and sporadic, mostly in old towns and gardens like in Mdina, Rabat, Sliema, Valletta, Floriana, Ħamrun, and Victoria including Citadella (Gozo) where it is mostly encountered along street curbs.

Distribution in Sicily

Throughout the region (Giardina et al.2006). Taormina (Sciandrello et al. 2014); Pantalica Valle dell'Anapo e Torrente Cava (Minissale et al. 2007); Ragusa (Licitra et al. 2011); Pizzo di Cane, Palermo (Caldarella et al. 2013); Ustica Island (Ronsisvalle 1972).

Life-form

Hemicryptophyte.

Introduction source

Likely as a contaminant in soil of larger potted plants and trees.

Habitat or preferred invading habitat

Cosmopolitan often seen in gardens, pot planters, parks but particularly common in street curbs, flagstones and street crevices. Not reported in natural habitats.

Frequency in Malta

Locally frequent in some places, completely absent in others.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Primarily dispersion by seeds via the exploding fruit capsules and further spread by water currents, wind and ants.

First record in Malta

Forsskål (1775).



First record in Sicily

Not reported.

Ecology

Flowers are rapidly formed after plant germinate and keeps flowering till the life span of the plant, somewhat more profusely in the warmer months. Plants in shaded places usually survive summer especially if they are occasionally watered from residents washing outdoors or water released from air conditioner units.

Possible control methods

Uprooting of plants.

Invasive category/local potential threat

Low.

Remarks

An old introduction with the possibility of being an archaeophyte given that it was already known to exist in the Mediterranean before year 1500. Indeed, it was reported in Malta by Forsskål in (1775), and later by Zerapha (1831) and Sommier & Caruana Gatto (1853) who indicate that it is a rather common plant in cultivated ground, that is, fields and gardens. It seems that this wood sorrel has decreased due to habitat loss from modern urbanisation of towns and villages, for example by renovation of gardens and resurfacing of streets, however some plants find refuge in old gardens, alleys and ancient village streets.

Referenced bibliography

Caldarella O., Gianguzzi L., Romano S. & Fici S., 2013. The vascular flora of Nature Reserve "Pizzo Cane, Pizzo Trigna and Grotta Mazzamuto" (NW Sicily). *Webbia*, 64: 101-151. <https://doi.org/10.1080/00837792.2009.10670854>.

Forsskål P., 1775. Flora Melitensis. In: *Flora Aegyptiaco-Arabica*: xiii – xiv.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.

- Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.
- Minissale P., Scindarello S. & Spampinato G., 2007. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata "Pantalica, Valle dell'Anapo e Torrente Cava Grande" (Sicilia sudorientale). *Quaderni di Botanica Ambientale Applicata*, 18: 145-207.
- Ronsisvalle G. A., 1972. Flora e vegetazione dell'isola di Ustica. *Lavori società italiana di Biogeografia*, Forlì, n. s., 3 (estratto): 1-63.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains – northeast Sicily). *Webbia*, 69 (2): 301-324. <http://dx.doi.org/10.1080/00837792.2014.966487>.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.
- Zerapha S., 1831. Flora Melitensis Thesaurus, fasc.: alter. Valletta, 45 pp.

Oxalis debilis Kunth.



(Spermatophyta >> Magnoliopsida (Rosids) >> Oxalidales
>> Oxalidaceae)

Phylum >> Class >> Order >> Family

Main synonyms

Oxalis corymbosa D. C.; *Ionoxalis canaminensis* Rusby; *Oxalis bipunctata* Graham; *Oxalis multibulbosa* Turcz.; *Oxalis purpurea* auct non L. [misapplied name].

Common English names

Large-flowered pink-sorrel; Pink woodsorrel.

Common Maltese names

Ingliża Roża.

Common Italian names

Acetosella debole.

Short description

Creeping or suberect perennial, without aerial stems but leaves and inflorescences emerge from underground bulbs and bulbils, then disappearing in the hottest months. Leaves petiolated, 10–28 cm long, with three orbicular to sub-obcordate leaflets at the top, each 12–30 × 15–35 mm, light green, lobed 1/5 their length with their adaxial surface hirsute, adaxial glabrous and a densely ciliated margin. Leaflets fold down during night. Inflorescence composed of cymes of 5–12 flowers borne on long scapes, 10–20 cm long, terete, moderately shortly villous to glabrescent, sap sour. Pedicels patent or slightly reflexed, 15–25 mm long, giving rise to a single flower each. Corolla 1.2–2.5 cm wide, 5-merous. Sepals linear-elliptical, dark green, 4–8 × 2–3 mm, margin ciliate especially at the apex. Petals magenta or pink, obovate 10–15 mm long, free. Stamens 10, arranged in two layers, 4–6 mm long with glabrous filaments. Fruit cylindrical-elliptic, not observed.

Place of origin and global distribution

Tropical parts of South America (e. g. Brazil); cultivated and sometimes naturalised in other countries with similar climate including the Mediterranean region.

Distribution in Malta

Sporadic occurrences, mostly in old gardens such as Attard (San Anton Gardens), Naxxar (Villa Parisio), Sliema promenade, Birkirkara (Stazzjon), Valletta (Lower Barracks).

Distribution in Sicily

Catania (Gil 2013).

Life-form

Hermaphrodite.

Introduction source

Escapee from horticulture, plant quite attractive and sometimes sold in nurseries in the past.

Habitat or preferred invading habitat

Cosmopolitan often seen in old gardens, pot planters and sometimes in private gardens of old houses.

Frequency in Malta

Rare and occasional.

Frequency in Sicily

Uncommon.

Mode of dispersion

By vegetative means through displacement of bulblets that are dispersed by rain, water streams and soil disturbance. Seed capsules are not produced in Malta.

First record in Malta

Borg (1927) as *Oxalis purpurea* but formerly published in its proper name by Lanfranco (1995).

First record in Sicily

Catania (2013).

Ecology

Plant is found in vigour during the wet season and then aestivates rather early, unless irrigated and keeps alive for a longer period. Flowers do not set seed since but it produces several small bulblets that eventually give rise to a new plant.

Possible control methods

Uprooting of plants.

Invasive category/local potential threat

Low.

Remarks

A garden favourite by old locals for its low maintenance, easy to propagate and beautiful magenta flowers that when properly kept, pots can form large foliose plants with large amounts of flowers. In Europe, plants are sterile and propagation is only by bulbs.

Referenced bibliography

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Gil T., 2013. Catania. ActaPlantarum. Notes: Noterella 0134

Lanfranco E., 1995. Questions and Answers. *Il-Balluta*, Arbor; Malta, 29: 4.



Oxalis pes-caprae L.



(Spermatophyta >> Magnoliopsida (Rosids) >> Oxalidales
>> Oxalidaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Oxalis burmannii Jacq.; *Oxalis cernua* Thunb.; *Oxalis ehrenbergii* Schlttdl.; *Oxalis lybica* Viv.

Common English names

African wood-sorrel; Bermuda buttercup; Bermuda sorrel; Cape Sorrel; Soursob.

Common Maltese names

Ħaxixa Ingliża; Qares; Qarsu.

Common Italian names

Acetosella gialla.

Short description

Perennial, gracious, glabrous or sparsely pubescent plant in leaves between October and April then aestivates through small, underground copper-brown bulbs (and sometimes bulbils) about 10-15 mm long. Bulb give rise to a green vertical stem which upon reaching soil surface (or light if in a crevice) it forms an umbel of leaves with long, fragile, green petioles, between 3–18 cm long, giving rise at its acute tip three obcordate leaflets. Leaflets 6–25 × 12–35 mm, varying from bright green to dull green, most often mottled with maroon or purplish blobs or streaks, glabrous but ciliate on the margin, folding down during night. Inflorescence made up of umbellate cymes with 3–12 flowers subtended on long peduncles, up to 30 cm in length, glabrous, terete with a sour sap. Pedicels flaccid, giving rise to a single flower. Corolla 2–3 cm wide, 5-merous. Sepals green, 3–5 × 1 mm. Petals bright yellow, obovate 15–20 mm long, fused at the base. Stamens 10, central in two layers, filaments glabrous. Fruit a loculicidal narrow, terete, pod-shaped capsule that is formed very rarely.

Place of origin and global distribution

South Africa. Widely naturalised in the Mediterranean region and north up to the British Isles.

Distribution in Malta

Very common throughout the Maltese Islands (including all main islands and some islets) especially in derelict rural land and disturbed areas.

Distribution in Sicily

Throughout the region (Giardina et al. 2007). Taormina (Sciandrello et al. 2014); Laghetti di Marinello (Licandro et al. 2011); Marzamemi (Barone et al. 2021); Caltagirone (Barone et al. 2021); Agrigento (Barone et al. 2021); Palermo (Domina et al. 2019); Mozia (Catanzaro 1991); Levanzo Island (Romano et al. 2006). Although very common in Sicily, it is confined to the lower altitudes, generally it does not exceed 600-700 m of altitude and is less invasive on more drained soils.

Life-form

Geophyte, bulbous.

Introduction source

Escaped from cultivation, where it was used as a popular ornamental plant shortly after its introduction in Malta.

Habitat or preferred invading habitat

Abandoned fields, field margins, clay slopes, rubble walls, fortifications, disturbed ground, afforested areas, valley sides, and literally able to inhabit all natural habitats of the Maltese Islands.

Frequency in Malta

Very common (most common plant in Malta).

Frequency in Sicily

Very common (Giardina et al 2007).

Mode of dispersion

Dispersion of bulbs or bulbils by water currents, strong winds, soil movements and anthropogenic activity, possibly also accidentally by birds.

First record in Malta

Zerapha (1831), but mentioned by Hyacinthus in 1806 in a list of plants growing at Argotti botanic gardens cited in Sommier & Caruana Gatto (1915).

First record in Sicily

Cultivated in Sicily since 1796 (Pignatti 1982).

Ecology

Leaves emerge from the soil after the first heavy rains, usually in October and form the first flowers a few months later, typically December-January. When climatic temperature increase and precipitation stops, the plant start to wither and disappear in May. Flowers do not form the fruiting pod as it does in its native range, and propagation occurs vegetatively by its bulbs.

Possible control methods

Continuous uprooting of plants in autumn for several years for a small-scale area. Eradication from Malta is impossible until a herbicide specific to Oxalidaceae is produced.

Invasive category/local potential threat

Very high.

Remarks

Despite being the most common plant in the Maltese Islands, it was introduced only in the beginning of the 19th century where some plants collected from Cape of Good Hope in South Africa were donated to Carlo Giacinto (Hyacinthus) curator of the Argotti Gardens (Henslow, 1891). In a short time, hence by 1811, the species became naturalised and then considered as a common weed in various localities already by the mid-19th century (Grech Delicata, 1853). It eventually escaped from Malta to other Mediterranean countries, but



this plant was already in cultivation in Palermo and Naples (Sommier & Caruana Gatto 1915) and hence these are additional stations from where the species might have escaped into Europe, apart from other gardens that it might have been present and not documented. A variety with double-form flowers is also present in the Maltese Islands and referred to as *Oxalis pes-caprae* var. *pleniflora* Ceasati. It is less common but frequently found scattered within (or isolated) from the commoner form. Its introduction in Malta is not reported in literature. Apart from the larger number of petals, the abaxial side of var. *pleniforma* and tip of sepals are bronze-reddish brown, and the leaves are dark green and hairier. An Intermediate form between these two varieties was once encountered.

Referenced bibliography

- Catanzaro F., 1991. Contributo alla flora dell'isola di S. Pantaleo (Mozia) nelle Egadi (Sicilia occidentale). *Atti Società Toscana di Scienze Naturali, Memorie, Serie B*, 98.
- Barone G., Domina G & Di Gristina E., 2021. Comparison of different methods to assess the distribution of alien plants along the road network and use of Google Street View panoramas interpretation in Sicily (Italy) as a case study. *Biodiversity Data Journal*, 9: e66013 <https://doi.org/10.3897/BDJ.9.e66013>
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, DOI: 10.1080/11263504.2019.1651787.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.
- Gulia G., 1855-56. Repertorio Botanico Maltese. Tipografia Laferla, Malta. 68 pp.
- Grech Delicata G. C., 1853. Flora Melitensis. Malta, 49 pp.

- Henslow G., 1891. On the northern distribution of *Oxalis cernua* Thunb. *Proceedings of the Linnean Soc. of London, Session 1890-91*: 31-36.
- Licandro G., Marino P. & Raimondo F. M., 2011. Flora e vegetazione della Riserva Naturale Orientata "Laghetti di Marinello" (Sicilia nord-orientale). *Informatore Botanico Italiano*, 43 (2): 333-351.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Pignatti S. 1982. Flora D'italia vol.2. Edagricole, Bologna.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains – northeast Sicily). *Webbia*, 69 (2): 301-324. <http://dx.doi.org/10.1080/00837792.2014.966487>
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.
- Zerapha S., 1831. Flora Melitensis Thesaurus, fasc. alter. Valletta, 45 pp.

Oxalis stricta L.



(Spermatophyta >> Magnoliopsida
(Rosids) >> Oxalidales >> Oxalidaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Acetosella chinensis (Haw. ex G. Don) Kuntze; *Ceratoxalis cymosa* Lunell;
Oxalis europaea Jord.; *Oxalis fontana* Bunge; *Xanthoxalis interior* Small;
Xanthoxalis stricta (L.) Small.

Common English names

Common yellow woodsorrel; Common yellow oxalis; Upright yellow-sorrel; Lemon clover.

Common Maltese names

Ingliża rqiqqa, Inqliża wieqfa.

Common Italian names

Acetosella minore, Acetosella delle fonti.

Short description

Annual or short-living perennial, with aerial stems and underground rhizomes, but without bulbs or stolons or rooting nodes. Stems erect or decumbent, 20–70 cm high, shortly and finely villous. Leaves petiolated, almost opposite or whorled, 2–6 cm long, with three obcordate leaflets at the top, each 10–22 × 12–25 mm, light green, lobed 1/3 to 1/4 their length, both surfaces glabrous (abaxial surface sometime with short sparse hairs), margin smooth. Inflorescence composed of cymes of 2–6 (–12) flowers borne on scapes, 3–10 cm long, terete, pubescent with simple and at least some septate trichomes at base, sap without oxalate deposits (hence not sour). Pedicels patent or suberect, then erect in fruit, 5–10 mm long, pubescent. Corolla small, 8–15 mm across, 5-merous. Sepals linear-elliptical, dark green, 4–6 × 1–2 mm, margin ciliate. Petals light yellow, oblong-obovate 4–8 mm long, free. Stamens 10, arranged in two layers, 3 mm long with glabrous filaments. Fruit cylindrical-elliptic capsules, 5-sided, nearly terete, 8–14 mm long, villous but sometimes scant and glabrescent. Seeds reddish-brown 1.0–1.5 mm long, with white transverse ridges.

Place of origin and global distribution

North America, Canada and parts of Eurasia, introduced in Europe and naturalised in many countries including the Mediterranean region.

Distribution in Malta

Sliema, Msida, Ta' Xbiex, Wied Rihan (Gozo).

Distribution in Sicily

Monte Aperto, Agrigento (Domina 2020).

Life-form

Hermaphrodite but probably therophyte in Malta.

Introduction source

Not known, but possibly an escapee from greenhouse-cultivated potted plants grown in nurseries where this species is a soil contaminant.

Habitat or preferred invading habitat

Cosmopolitan, seen in pot planters, crevices or gaps in street verges and flagstones. Once found in humid soil close to a water course in a valley.

Frequency in Malta

Rare and occasional.

Frequency in Sicily

Rare.

Mode of dispersion

By seeds dispersed by explosive mechanism of the fruit capsule and then further dispersed by wind, ants and water streams.

First record in Malta

Mifsud (2007) as *Oxalis fontana* Bunge.

First record in Sicily

The species until now was collected only close to Agrigento.

Ecology

After fertilisation, the insect-pollinated flowers produce seeds in fruit capsules which open with an explosive mechanism. Plants probably die in summer as the temperature is too hot, but individuals found in a sheltered and moist area where water is being occasionally available (e.g. from washing of terraces or balconies), may survive summers and live vegetatively for few years.

Possible control methods

Uprooting of plants.

Invasive category/local potential threat

Low-Medium.

Remarks

O. stricta is a neglected weed found in gardens and pots and planters with ornamental plants (Fretz, 1972). Records from Malta are escapes associated with this habitat. However, a small but established population of some 30 plants was found naturalised in moist soil close to a valley bed in Gozo, located near a cultivated field. Hence this

species is able to naturalise moist habitats if it manages to find its way. Closely related is the species *O. dillenii* Jacq. but its habit is not erect and stem hairs are appressed to the stem and do not have septae (Lovett Doust et al. 1985).

Referenced bibliography

Fretz T. A., 1972. Weed competition in container grown Japanese holly. *HortScience*, 7: 485-486.

Lovett Doust L., MacKinnon A. & Lovett Doust J., 1985. Biology of Canadian Weeds. *Oxalis stricta* L., *O. corniculata* L., *O. dillenii* Jacq. ssp. *dillenii* and *O. dillenii* Jacq. ssp. *filipes* (Small) Eiten. *Canadian Journal Plant Science*, 65: 691-709.

Mifsud S., 2007. Updates in the flora of the Maltese Islands (Central Mediterranean). *The Central Mediterranean Naturalist*, 4 (3): 171-179.



Paspalum distichum L.



(Spermatophyta >> Liliopsida (Commelinids) >> Poales >>
Poaceae)

Phylum >> Class >> Order >> Family

Main synonyms

Digitaria paspalodes Michx.; *Panicum paspaliforme* J. Presl; *Paspalum polyrrhizum* J. Presl.

Common English names

Knotgrass; Water finger-grass; Couch paspalum.

Common Maltese names

Nigem tal-Ilma.

Common Italian names

Panico acquatico, Paspalo distico.

Short description

Creeping perennial stoloniferous grass forming extensive carpets, up to 30 cm high, although the ascending culms can occasionally be longer. Leaves narrow-ensiform, 2–7 × 0.5 cm, dark green, rigid, glabrous but ciliate at the lower part. Ligule ciliate, short. Inflorescences composed of two racemes, one sessile, the other on a short peduncle. Racemes straight or slightly incurved 25–55 mm long, flattened. Spikelets solitary in 2 rows on a flattened rachis, about 3 mm long, planoconvex (lens-shaped), ovate in outline, stout, light green. Lower glume inconspicuous as a tiny scar, upper glume 5-veined, finely pubescent, coriaceous. Lower (and sterile) lemma resembles upper glume but glabrous and shiny. Upper lemma pallid, softer, smooth. Anthers distinctly blackish-maroon, 1.5 mm long, pendulous on a long, wiry filament.

Place of origin and global distribution

Not known with certainty because considered native in many continents but as an old introduction and probably originating from tropical areas of south America; naturalised in most tropical, subtropical and several temperate regions of the world including the Mediterranean area.

Distribution in Malta

Located in many wetland areas especially in Gozo: Wied il-Fiddien; Wied il-Qleigħa, Wied is-Sewda, Marsa water course in Malta and Wied Mgarr ix-Xini, Wied ta' Xħajma, Nuffara area, Wied tar-Ramla in Gozo.

Distribution in Sicily

Coastal wetlands (Giardini et al. 2007). Taormina (Sciandrello 2014), Tindari (Licandro et al. 2011), Gibilmanna (Cambria & Tavilla 2020), Isola di Levanzo (Romano et al. 2006), Pizzo di Cane (Caldarella et al. 2013).

Life-form

Hemicryptophyte, creeper.

Introduction source

Not being an attractive plant, its introduction cannot be attributed to horticulture import or garden escapee, hence it has been likely introduced accidentally as a seed contaminant through imported agricultural goods.

Habitat or preferred invading habitat

Water courses, stagnant water such as water catchment areas behind dams.

Frequency in Malta

Locally frequent in water courses where it is found, often competing and dominating with *Cynodon dactylon*.

Frequency in Sicily

Very common (Giardina et al. 2007).

Mode of dispersion

Populations expand rapidly by vegetative growth and dispersed long distances by seed with the aid of water streams. It is probably dispersed into different valleys by granivorous birds and indirectly by man where seed is stuck in mud and unintentionally carried with footwear, vehicles or tools.

First record in Malta

Lanfranco (1972) from populations observed by Guido Lanfranco in the early 1950s identified originally identified by the later as *Digitaria sanguinalis* L. (Scop.)

First record in Sicily

Recorded in Catania by Roccella (1927).

Ecology

Inflorescences are produced almost all year round, but somewhat peaking in spring and autumn, releasing thousands of viable seeds that are carried away by water streams. It usually invades sizeable patches in valley systems it occurs in

Possible control methods

Uprooting completely plants repeatedly for several years, although this is very difficult to achieve without effecting neighbouring native plants and the removal by hand is very elaborate.

Invasive category/local potential threat

Moderate-high, can invade rapidly new areas after dredging valley beds and water catchment areas.

Remarks

For long, the species was attributed under the taxon *Paspalum paspalodes* (sometimes misspelt as paspaloides) until the description by Linnaeus as *P. distichum* was validated again. The type of Linnaeus contained two grasses labelled as two different species – *P. distichum* and *P. virginiatum*. According to nomenclature regulations, plant names with sheets having two different species as type specimens



are not valid. However, later it was found that the *Paspalum* labelled as *virginiatum* was indeed *P. distichum* too, yet many taxonomists argued that this situation is confusing and *P. distichum* was rejected as *nomen confusum* and used *P. paspalodes* (Michx.) Scribner as its valid name. Recently, taxonomists defended Linnaeus' taxon as not confusing if both type specimens are of the same species, and hence *P. distichum* is now used by many authors and classifications. *Paspalum vaginatum* resembles *P. distichum* at a glance but differs in having narrower leaves (2 mm), flattened spikelets (convex in *P. distichum*) and upper glumes are glabrous. Since its first record in Malta in the early 1950s (Lanfranco 1972), the species has spread remarkably in several valleys in Malta and Gozo, indicating its invasive potential. *Paspalum dilatatum* Poir. was also recorded by Haslam et al. (1977) at the Marsa water course as frequent but it has now been replaced by *Paspalum distichum*, and the current occurrence of *Paspalum dilatatum* in Malta is at present doubtful.

Referenced bibliography

- Cambria S. & Tavilla G., 2020. Check-list of the vascular flora of the “Bosco di Gibilmanna”, a Special Area of Conservation (S.A.C.) in northern Sicily (Italy). *Biodiversity Journal*, 11 (2): 369-382.
- Caldarella O., Gianguzzi L., Romano S. & Fici S., 2013. The vascular flora of Nature Reserve “Pizzo Cane, Pizzo Trigna and Grotta Mazzamuto” (NW Sicily). *Webbia*, 64: 101-151. <https://doi.org/10.1080/00837792.2009.10670854>
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.
- Lanfranco E., 1972. Additions and corrections to the Maltese flora. *Maltese Naturalist*, 1 (3): 17-20.
- Licandro G., Marino P. & Raimondo F. M., 2011. Flora e vegetazione della Riserva Naturale Orientata “Laghetti di Marinello” (Sicilia nord-orientale). *Informatore Botanico Italiano*, 43 (2): 333-351.

- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Roccella G., 1927. Tre piante dubbie od escluse dalla flora sicula state raccolte nel territorio di Catania. *Malpighia*, 30: 484.
- Romano S., Tobia G. & Gianguzzi L., 2006. Rassegna della flora vascolare dell'Isola di Levanzo (Arcipelago delle Egadi, Canale di Sicilia). *Informatore Botanico Italiano*, 38 (2): 481-502.
- Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains–northeast Sicily). *Webbia*, 69 (2): 301-324. <http://dx.doi.org/10.1080/00837792.2014.966487>.

Persicaria senegalensis (Meisn.) Soják



(Spermatophyta >>
Magnoliopsida >> Caryophyllales
>> Polygonaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Polygonum sambesicum Schust.

Common English names

Senegalese Knotgrass.

Common Maltese names

Persikarja ta' Senegal.

Common Italian names

Poligono del Senegal.

Short description

Erect, robust, perennial, hydrophyte herb with stems up to 2.8 m tall, distinctly rooting at the lower swollen nodes when in touch with water. Leaf lamina 8–25 × 3–7 cm, oblong-lanceolate with a cuneate base narrowing into the petiole, acuminate apex and smooth or nearly so margin, indumentum variable from glabrescent to tomentose but always hairy on the midrib and main veins, and usually on the lower surface; petioles 1–5 cm long often covered with small yellowish glands, often also present on the proximal part of the lower surface. Ochrea smooth and without cilia or with sparse cilia up to 3 mm long. Inflorescence a spiciform raceme forming numerous flowers, usually white or pale green colour, but sometimes rosy-pink. Peduncles (4–7 cm long), pedicels (2–3 mm long), and sometimes the petals are dotted with distinct amber-yellow glands and appressed white hairs. Corolla cup-shaped, 4–6 mm across with 4 or 5 petal lobes. Nut about 3 mm long, lenticular with dimpled faces, shiny brown, shortly beaked.

Place of origin and global distribution

Tropical and subtropical Africa, including South Africa and Madagascar.

Distribution in Malta

Frequent in several valleys such as Wied tal-Ħżejjen, Wied tal-Girgenti, Wied Speranza, Wied ta' Brija, Wied il-Għasel; Wied Sara (Gozo), Wied tal-Grazzja (Gozo); Wied ta' Cianti (Gozo), Wied ta' Marsalforn (Gozo) and recently observed in several other stations indicating that it is spreading successfully in wetland areas.

Distribution in Sicily

Up to now the only report concerns the island of Pantelleria for a single location "Arenella" where there is stagnant water in an old tank.

Life-form

Hemicryptophyte.

Introduction source

Not certain, but since not being an ornamental species, the most credible source is from migratory birds coming from Africa.

Habitat or preferred invading habitat

Watercourses, mostly in ponds and water catchment areas.

Frequency in Malta

Locally frequent in several valleys, sometimes forming dense populations.

Frequency in Sicily

very rare only one locality known where the species persists over time.

Mode of dispersion

Seeds that are produced in large numbers.

First record in Malta

Tabone (2008).

First record in Sicily

Galasso et al. (2014) for the island of Pantelleria where the authors observed this species since 2000.

Ecology

Plants are perennial but flower during the warmer months, typically April to October, but sometimes they are in flower for a longer period. Thousands of semi-buoyant seeds are shed every year and are easily carried by water streams during the rainy season. Established populations are usually resilient.

Possible control methods

Manual uprooting during the dry season for several years until the seed bank in the valley floor is exhausted.

Invasive category/local potential threat

Moderate.

Remarks

Persicaria senegalensis has a variable indumentum, from glabrous to tomentose forms, resulting in several subspecies and varieties. This

variation is sometimes observed in the same population or even on the same plant; hence this character is not diagnostically and taxonomically reliable (Mifsud, 2011). More distinct is the presence of orange-amber dots, found in the pedicels and less often at the base of the lower side of the leaves. *Persicaria senegalensis* resembles *Persicaria glabra* (Willd.) M.Gómez, and which has been recorded from mainland Malta. *P. glabra* is usually a smaller plant, with narrower leaves, smaller inflorescence and perianths which lack the yellow dots. Moreover, *P. glabra* has nuts with a triangular cross-section, while they are always lenticular in *P. senegalensis*. Plants previously ascribed to *P. glabra* in Malta were identified as *P. senegalensis* when examined by Mifsud (2011), although the presence of this species in the Maltese Islands should not be excluded.



Referenced bibliography

- Galasso G., Monteleone E. & Federico C., 2014. *Persicaria senegalensis* (Polygonaceae), entità nuova per la flora italiana, e chiave di identificazione delle specie del genere *Persicaria* in Italia. *Atti Società Italiana di Scienze Naturali e Museo Civico di Storia Naturale*, Natural History Sciences, 1 (1): 13-18.
- Mifsud S., 2011. A study of the genus *Persicaria* Miller (Polygonaceae) in the Maltese Islands. *The Central Mediterranean Naturalist*, 5 (3-4): 26-51.
- Tabone T. J., 2008. A list of records of some rare vascular plants occurring in the Maltese Islands (Central Mediterranean) Part II. *The Central Mediterranean Naturalist*, 4 (4): 311–337.

Pistacia atlantica Desf.



(Spermatophyta >> Magnoliopsida (Rosids) >>
Sapindales >> Anacardiaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Pistacia mutica Fisch. & C. A. Mey.

Common English names

Atlas pistachio; Atlantic pistacia; Atlantic terebinth; Persian turpentine tree.

Common Maltese names

Deru tal-Atlantiku; Deru tal-Lvant; Butum.

Common Italian names

Albero di Trementina di Cipro, Albero di Trementina Persiana.

Short description

Rapid-growing, evergreen, dioecious tree reaching an average height of 4–6 m, sometimes taller if in a shaded location. Trunk thickens rapidly forming course, greyish-brown bark. Leaves 5–15 cm long, bright green with a reddish-brown tinge when young, alternate, compound, imparipinnate with 3–5(–7) pairs of tough, glabrous leaflets. Leaflets 2–6 × 0.5–1.5 cm, narrow-elliptic or lanceolate with a blunt apex and a raised midvein, with the terminal leaflet usually the smallest. The base of the leaf rachis is visibly but distinctly winged. Inflorescences paniculate up to 10 cm long. Male and female flowers, without petalous, very small, numerous in compact clusters, the male with distinct reddish anthers; the female greenish-tan, initially indistinct but soon develops into deep red, glossy, globular (laterally compressed), hard fruit about 4 mm long with a disagreeable, aromatic-sour taste.

Place of origin and global distribution

Eurasia and North Africa. Naturalised worldwide in suitable warm climates, mostly in the southern parts of Europe and West Africa.

Distribution in Malta

Cultivated in several gardens, parks, bastions and streets (Floriana, Valletta, Mdina, Sliema, Rabat, Buskett woodland, Cospicua), less so in Gozo, however, found naturalised in the wild by Stephen Mifsud in at Gebel Sornu (Mosta) and ta' Kuljat Hill, Żebbuġ, Gozo. The latter is an interesting station because it is located far away from urban areas, hence its origin should be investigated further.

Distribution in Sicily

Restricted to field, no record in the wild.

First record in Sicily

No record in the wild.

Life-form

Phanerophyte

Introduction source

Introduced as embellishment trees in gardens, streets and parks.

Habitat or preferred invading habitat

Rocky ground and maquis.

Frequency in Malta

Frequent as an ornamental tree or cultivation (e. g. Buskett) but very rare in the wild.

Frequency in Sicily

Sometimes cultivated as an ornamental tree it is not growing in the wild.

Mode of dispersion

By seeds after ingested by birds, although this does not seem to occur significantly in Malta, possibly drupes are not consumed by birds that occur in Malta during the fruiting period.

First record in Malta

Several trees were introduced in the early 1970s (Schembri & Lanfranco 1996).



First record in Sicily

So far there is no evidence of naturalisation of the species in the wild.

Ecology

Trees flower in mid-spring, and fruit mature in May-June (sometimes persisting till mid-summer), where germination does not seem to occur readily from seeds that drop on the ground.

Possible control methods

Manual cutting of aerial parts with standard gardening or agricultural equipment, probably easier before spring when trees are without leaves.

Invasive category/local potential threat

Low.

Remarks

Trees were introduced in the early seventies for grafting upon the edible *Pistacia vera* L. (Pistachio nuts), of which many were cultivated at Buskett. Others were cultivated as an ornament for their hardiness and not requiring much attention in summer. The leaflets often form semi-circular beaded red galls galled by *Forda riccobonii* (De Stefani Perez 1899) (Mifsud et al. 2009).

Referenced bibliography

Mifsud D., Perez Hidalgo N. & Barbagallo S., 2009. Aphids (Hemiptera: Aphidoidea) associated with native trees in Malta (Central Mediterranean). *Bulletin of the Entomological Society of Malta*, 2: 81–93.

Schembri P. J. & Lanfranco E., 1996. Introduced species in the Maltese Islands. In: Baldacchino A. E. & Pizzuto A. (eds.), Introduction of Alien Species of Flora & Fauna. *Proceedings of a Seminar held at Qawra, Malta*, 5th March 1996: 29-54. Malta, Environment Protection Department

Pittosporum tobira (Thunb.) Aiton fil.



(Spermatophyta >> Magnoliopsida (Asterids) >> Apiales
>> Pittosporaceae)
Phylum >> Class >> Order >> Family

Main synonyms

None.

Common English names

Australian laurel, Japanese cheesewood, Japanese pittosporum, Shrubby Putterick.

Common Maltese names

Pittosporum.

Common Italian names

Pittosporo, Fitosforo.

Short description

Shrubs to small trees up to 5 m high, profusely branched and usually the woody trunk is covered by the low-lying branches. Leaves compact at the apex of the branches, petiolated, dark glossy green, robust and leathery, obovate with a cuneate base, margin entire and revolute, 5–10 cm × 2–4 cm. Inflorescences small umbels at the tip of the branchlets, numerous composed of about 10–20 fragrant flowers with five white free petals which becomes pale yellow with age, about 1 cm long. Stamens two types, outer whorl sterile and small, inner whorl fertile and about 6mm long. Fruit a globular, light green to pale yellow, dehiscent capsule about 12–15 mm in diameter, opening by three valves exposing reddish-orange seeds in a gelatinous-viscous matrix, 4 mm long with a conspicuous funicle.

Place of origin and global distribution

Native to Japan and eastern China but introduced and naturalised in various parts of the world including Europe and the Mediterranean.

Distribution in Malta

Much used shrub for hedges in parks, playing fields, school yards, streets and traffic islands as well as stand-alone ornament trees, but only occasionally found naturalised. MALTA: Marfa Peninsula (Paradise Bay), Wied Ghomor, Għajn Żejtuna, Ħarq Ħammiem, Wied Ħal-Saptan, and GOZO: Xlendi (Wied tal-Kantra), Wied Mgarr ix-Xini, Wied tal-Marġa.

Distribution in Sicily

Growing along motorways, not naturalised (Giardina et al 2007).

Life-form

Nanophanerophyte.

Introduction source

Escape from cultivation either by seed dispersion or dumping of plants or pots.

Habitat or preferred invading habitat

Rocky valley sides, sheltered coastal areas.

Frequency in Malta

Common in cultivation; scarce in the wild, but its sightings are increasing.

Frequency in Sicily

Common only in cultivation.

Mode of dispersion

Seeds that are dispersed by birds. Some populations are likely introduced by man through dumping of plants or deliberately planting them.

First record in Malta

As an ornament, it was first mentioned in Malta by Borg (1925) whereas the species was first observed in the wild in early seventies from St. Julians by Edwin Lanfranco (Stevens & Baldacchino 1999).

First record in Sicily

The date of introduction as an ornamental species in Sicily is not known.



Ecology

Plant in leaf all year round but reduced during the coldest period, where some individuals may die, especially if in an unsheltered location. However, due to climate change, specimens are becoming more resistant and live for several years. Flowers are produced in Apr–May where their fruit mature and seeds in early summer.

Possible control methods

Manual uprooting when not in fruit.

Invasive category/local potential threat

Moderate.

Remarks

Pittosporum tobira is categorised as invasive alien in many territories, and in Mata it did escape to a few sites. However, despite occurring on the Maltese Islands for over 100 years, it has not been seen to invade large areas or form sizeable populations. One of the largest populations, is found at the boulder scree of Paradise Bay, where the canopy of trees (unless it is one large individual), is about 20 x 20 m.

Referenced bibliography

Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.

Stevens D. T. & Baldacchino A. E., 1998. Siġar Maltin, siġar barranin, il-ħarsien tagħhom u l-obbligi nazzjonali u internazzjonali. Is-siġar Maltin: l-użu u l-importanza: seminar nazzjonali ta' ġurnata mlaqqa' l-Furjana, Malta: 45-52.

Ricinus communis L.



(Spermatophyta >> Magnoliopsida (Rosids) >>
Malpigiales >> Euphorbiaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Cataputia major Ludw.; *Ricinus africanus* Mill.; *Ricinus badius* Rchb.; *Ricinus europaeus* T. Nees; *Ricinus glaucus* Hoffmanns.; *Ricinus inermis* Mill.; *Ricinus lividus* Jacq.; *Ricinus minor* Mill.; *Ricinus rugosus* Mill.; *Ricinus scaber* Bertol. ex Moris; *Ricinus speciosus* Burm. f.; *Ricinus spectabilis* Blume; *Ricinus viridis* Willd.

Common English names

Castor oil plant; Castor bean; Palm of Christ Tree.

Common Maltese names

Sigra tar-Riġnu; ir-Riġnu.

Common Italian names

Ricino; Palma di Cristo.

Short description

Monoecious, annual herb or short-lived tree up to 5 m. Leaves up to 55 cm across, peltate and palmate with five to ten lobes, each ovate-lanceolate ending to a narrow acute tip and with an irregularly coarsely-dentate margin. Young leaves are reddish-bronze then turning dark green, sometimes glossy above when mature, although in some varieties, they remain reddish or with a reddish tinge throughout their life. Inflorescence an erect panicle with male flowers below the female along a common flowering stem. Flowers without petals; male numerous, forming a brush of pale yellow stamens, female with diverging red stigmas. Fruit oval, 10–24 mm long, with elongated, smooth conical projections, rarely short. Seeds 9–17 mm long, smooth, shiny, variously patterned in shades of white, grey, light brown, brown, or/and black, forming rather attractive seed coats.

Place of origin and global distribution

Native to tropical Africa, but extensively naturalised worldwide in the tropics, subtropics and warm temperate regions.

Distribution in Malta

Throughout the Maltese Islands.

Distribution in Sicily

Quite widespread.

Life-form

Nanophanerophyte.

Introduction source

Escape from ornamental cultivation and possibly accidental through imported agricultural goods.

Habitat or preferred invading habitat

Wetland and semi-wetland habitats, namely valleys and water catchment areas where *Arundo donax* is not abundant, damp disturbed ground, sometimes in abandoned agricultural. Abandoned land subject to earthworks especially in urban and suburban areas.

Frequency in Malta

Common in its preferred habitat, such as Wied il-Għasel, Wied tal-Qlejgħa, Wied Hēsri, and Wied ta' Xħajma (Gozo).

Frequency in Sicily

Very common (Giardina et al 2007) especially in urban e suburban areas.

Mode of dispersion

Seeds that are primarily carried away by water streams, but possibly long-distance dispersal by animal vectors.

First record in Malta

Gulia (1855-56), without giving information whether it was found in the wild or cultivated, although most of Gulia records are from the wild.



First record in Sicily

Terranova=Gela, Noto, Milazzo, Messina, Brolo, S. Alessio, Buonfornello, Roccella, Cefalù, Lipari (Gussone 1845). Cefalù (Tornabene 1887). Terranova=Gela, Noto, Partanna, Lipari, Pantelleria (Lojacono Pojero 1904).

Ecology

Plant in leaf all year round but reduced during the coldest period, where some individuals may die, especially if in an unsheltered location. However, due to climate change, specimens are becoming more resistant and live for several years. Flowers are produced in Apr–May where their fruit mature and seeds in early summer.

Possible control methods

Manual uprooting when not in fruit.

Invasive category/local potential threat

High.

Remarks

A few varieties are identified in Malta, indicating multiple introductions, possibly since the 19th Century. At present, all previous taxa (more than 50) described for this species are not recognised and lumped as a single species, although the taxonomy of *R. communis* is a debatable subject.

Referenced bibliography

Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.

Gulia G., 1855-56. Repertorio Botanico Maltese. Tipografia Laferla, Malta, 68 pp.

Gussone J., 1845. *Florae Siculae Synopsis* 2 (2). Neapoli.

Lojacono Pojero M., 1904. *Flora Sicula*, 2 (2). Palermo.

Tornabene F., 1887. *Flora sicula viva et exsiccata*. Catania.

Robinia pseudoacacia L.



(Spermatophyta >> Magnoliopsida
>> Fabales >> Fabaceae)
Phylum >> Class >> Order >>
Family

Main synonym

Robinia pringlei Rose.

Common Maltese names

Robinja.

Common English names

Black locust.

Common Italian names

Robinia, Acacia, Acacia falsa, Gaggia, Cascia.

Short description

R. pseudoacacia is a medium-sized tree, generally 12-18 m tall and 30-76 cm in stem diameter, with an open, irregular crown. *R. pseudoacacia* usually produces a shallow and wide-spreading root system that is excellent for soil binding but is also capable of producing deep roots (5-7 m deep). The smooth bark becomes reddish-brown and deeply furrowed with age, becoming 4 cm thick. It has sharp spines or thorns at the nodes of young branches. The leaves are alternate, deciduous, compound and imparipinnate, 20-45 cm long and consist of 7-19 small, oval, alternate leaflets, 3.8-5 cm long, 1.2-1.8 cm wide, broadest near the middle to uniformly wide, dull dark green in colour. The fragrant, whitish flowers, less than 20 mm long, are borne in lax to pendent inflorescences (racemes), with perfect flowers originating in the axils of current year leaves. The fruit is a small, flattened, oblong pod with a narrow wing along the ventral margin, containing 4-8 hard-coated seeds.

Place of origin and global distribution

R. pseudoacacia is native to eastern North America. *R. pseudoacacia* has been widely introduced to other parts of North America, possibly in pre-history, thus blurring the actual limits to its native range. It was introduced in Europe in the early 1600s and has since become widely naturalised in many countries. *R. pseudoacacia* has also been introduced extensively to countries in Africa, Australasia and Asia.

Distribution in Malta

Cultivated in public gardens and street embellishments, occasionally escaping in fertile ground. Buskett, Argotti Gardens, San Anton Gardens (Borg, 1927), Rabat, Mosta (l/o Wied il-Ghasel).

Distribution in Sicily

Ravines, slopes, uncultivated land, hedges. Only locally spontaneous, particularly in Peloritani and Nebrodi Mountains. Very common and invasive on Etna in the ZSC Bosco di Milo, abundant also in Nature reserve Timpa di Acireale. Common especially in Nebrodi and Peloritani Mountains.

Life-form

Phanerophyte.

Introduction source

Introduced for control of soil erosion, revegetation of denuded hills, land reclamation, rehabilitation of eroded tracts in temperate and subtropical regions, windbreaks, nurse crops, honey production and as an ornamental street or garden tree.

Habitat or preferred invading habitat

The native range of *R. pseudoacacia* includes cool temperate moist forest, warm temperate montane moist forest, warm temperate montane wet forest, and warm temperate moist forest life zones. *R. pseudoacacia* invades disturbed woodlands and urban and rural landscapes throughout North America, riparian areas and canyons in California, also disturbed or cleared sites, and frequently becomes established on burned-over land. It also aggressively invades dry prairies, sand prairies and savannas. In South Africa, *R. pseudoacacia* invades riverbanks and roadsides. In Malta and Sicily, it is commonly seen as a roadside tree, sometimes forming thorny stands from root suckers along roads, rivers and field margins.

Frequency in Malta

Scarce with most examples being cultivated and localised.

Frequency in Sicily

Very common.



Mode of dispersion

Seeds have no special mechanism for dispersal away from the mother plant out of its native range. Germination is very successful in Sicily, making the species becoming invasive, but in Malta, it seems not able to spread successfully, possibly due to a more arid environment where saplings fail to reach maturity.

First record in Malta

Recorded by Borg (1927) as an ornamental tree from San Anton and Argotti.

First record in Sicily

The species was introduced in Italy in 1662 in the botanical garden of Padua (Pignatti 1982). The exact date of introduction in Sicily is not known. Its diffusion and naturalisation probably occurred in the second half of the twentieth century due to the reforestation activities carried out throughout Sicily using this species.

Ecology

In its native range, *Robinia pseudoacacia* grows best in humid conditions. It is found on a variety of soils with pH ranging from 4.6 to 8.2, but grows best on moist, rich, loamy, calcareous soils,

Possible control methods

No present techniques provide effective control of *R. pseudoacacia*, mostly due to its resprouting ability. Most management has focused on the use of chemical control with variable success. Uprooting trees is the best method of control, but it is time-consuming and expensive due to the need of heavy machinery and transportation of uprooted material for proper disposal.

Invasive category/local potential threat

High in Italy, medium in Sicily, least concern in Malta.

Remarks

None.

Referenced bibliography

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Pignatti S., 1982. Flora d'Italia. Edagricole, Bologna.

Saccharum biflorum Forssk.

(Spermatophyta >> Magnoliopsida >> Poales >> Poaceae)
Phylum >> Class >> Order >> Family

Main synonym

Saccharum spontaneum subsp. *aegyptiacum* (Willd.) Hack.

Common English names

Wild Sugarcane, Egyptian Sugar Cane.

Common Maltese names

None.

Common Italian name

Canna d'Egitto.

Short description

Rhizomatous perennial up to 5 m high; leaves 5–15(–40) mm wide, the lamina extending to the base; ligule crescent-shaped. Panicle 25–40(–60) cm long, the axis and especially the top of the peduncle hairy; racemes 3–15 cm long, usually much longer than the supporting branches. Spikelets 2.5–5(–7) mm long, the callus bearded with silky white hairs 2–3 times as long as the spikelet; glumes subcoriaceous in the lower third, glabrous on the back; upper lemma very shortly awned, the awn not visible beyond the tips of the glumes.

Place of origin and global distribution

Native to Algeria, Burkina, Cameroon, Central African Republic, Chad, Egypt, Eritrea, Ethiopia, Ghana, Kenya, Lebanon-Syria, Libya, Malawi, Morocco, Niger, Nigeria, Palestine, Seychelles, Sinai, Somalia, Sudan, Tanzania, Togo, Tunisia, Uganda, Introduced into Italy, Mauritius, Réunion, Sardegna.

Distribution in Malta

Not recorded but seen once as a small (possibly experimental) cultivation at Xaghra, Gozo.

Distribution in Sicily

Comune di Augusta (SR), comune di Gela (CL), comune di Pachino (SR), comune di Porto Empedocle (AG), comune di Campobello di Mazara (TP), Tindari: Olivieri, comune di Patti (ME) Aeolian Islands and particularly in Stromboli where this species used in the past to build border hedges has now invaded large, uncovered areas previously cultivated or made up of unfixed sand. Present with particular abundance along the entire southern coast from Gela to Capo Passero where, in addition to the cultivated fields, it settles in aspects of coastal subigrophilous vegetation characterized by the native species *Imperata cylindrica* and *Juncus acutus*.

Life-form

Hemicryptophyte.

Introduction source

In Sicily, it has been introduced outside of its range for cultivating sugarcane and hence sugar-producing programmes. In addition, Sicilians used it as an alternative to giant cane (*Arundo donax*) in sandy soils such as to make support canes for vegetables and to delimit cultivated plots (Lojacono Pojero 1908).

Habitat or preferred invading habitat

Uncultivated wet ground forming hedges. In Sicily, this species threatens habitats of Community interest (Habitat Directive 93/42 EEC) such as Mediterranean salt meadows (*Juncetalia maritimi*) and Coastal dunes with *Juniperus* spp., whereas in in Stromboli it also colonizes Thermo-Mediterranean and pre-desert scrub competing vigorously with *Cytisus aeolicus* - a strict and endangered endemic species.

Frequency in Malta

Very rare and casual (one sighting).

Frequency in Sicily

Very common.

Mode of dispersion

This species can grow up to 5 m in height and reproduces both vegetatively, from a large network of rhizomes and by producing thousands of wind-dispersed seeds.

First record in Malta

Not recorded.

First record in Sicily

Lojacono-Pojero (1878a, 1878b) records this species in the Aeolian Islands, but the introduction in Sicily is probably earlier and of unknown origin and date.

Ecology

It grows near flowing water or on sandy soils above high groundwater levels, mainly along the Coastal Plain, where it spreads vegetatively by spreading rhizomes in wet or moist soil.

Possible control methods

Deep ploughing is effective for controlling this species, although herbicides have successfully controlled this plant in different cropping and agricultural systems.

Invasive category/local potential threat

Natural expansion of populations is low, but local invasiveness is high, especially on sandy soils.

Remarks

In Malta, it was observed only once as a small patch in a field at Xaghra, Gozo, probably as an experimental crop. (pers. obs. Stephen Mifsud). Nevertheless, it was widely cultivated to extract sugar centuries ago when it was not commercially available.

Referenced bibliography

Lojacono-Pojero M., 1878a. Le Isole Eolie e la loro vegetazione con enumerazione delle piante spontanee vascolari. Tip. G. Lorusnaider, Palermo.

Lojacono-Pojero M., 1878b. Flora sicula vol. 3. Palermo, 448 pp.

Schinus molle L.



(Spermatophyta >> Magnoliopsida (Rosids) >> Sapindales
>> Anacardiaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Schinus areira L.

Common English names

Peruvian pepper tree; Peruvian mastic; California pepper tree.

Common Maltese names

Bżar falz tal-weqa twila.

Common Italian names

Pepe falso.

Short description

Evergreen, aromatic, dioecious tree reaching an average height of 8–10 m, with greyish-brown, roughly fissured bark and characteristic long, slender, flexuous, drooping branches. Leaves 10–25 cm long, 4–10 cm wide, alternate, compound, imparipinnate with 12–40 pairs of glabrous, leaflets, each 2–6 × 0.5–1.0 cm, linear-lanceolate with an acute apex, bright glossy green with a finely serrated margin. The base of the leaf rachis is unwinged. Inflorescences multi-branched, laxly paniculate raceme, growing from axils of leaves. Male and female flowers in numerous clusters, pentamerous, tiny (c. 2mm long), whitish green, born on 2–3 mm long pedicels. Male flowers with ten stamens; female flowers with a globose ovary about 1 mm diameter and a single compound style ending with three stigmas about 0.5 mm long. Fruit a pinkish, globose drupe, 5–7 mm in diameter having a sweetish peppery taste.

Place of origin and global distribution

Andean desert of Peru and other arid mountainous regions in neighbouring countries of Chile, south Mexico and north Argentina. Widely naturalised around the world after being cultivated either for its wood or as an ornamental tree.

Distribution in Malta

Cultivated in several locations (e.g., Valletta, San Anton, Romeo Romano, Mdina, Buskett) but rarely becomes naturalised.

Distribution in Sicily

Evergreen tree widely spread and used for ornamental purposes, with scarce tendency to become naturalised (Giardina et al 2007).

Life-form

Phanerophyte.

Introduction source

Cultivated as embellishment trees along streets and in public gardens and parks.

Habitat or preferred invading habitat

Maquis, valley sides, fields and rural areas.

Frequency in Malta

Scarce, present as an ornamental tree, but rarely seen naturalised in the wild. Local environment and climatic conditions do not meet the optimal conditions for the prolific germination of the seeds.

Frequency in Sicily

Common (Giardina et al 2007).

Mode of dispersion

Seeds dispersed after fruit is ingested by birds. They may also be carried away by water streams in valleys or after heavy rain.

First record in Malta

Introduced by the British as a street ornamental tree where its first record goes back to that by Zerapha (1831).

First record in Sicily

Ornamental plant present in Sicily for more than three hundred years (Cupani, 1696). First evidences of naturalisation of *Schinus molle* in Sicily, near Carini and Partinico (Palermo) (Badalamenti et al. 2012).

Ecology

Trees form thousands of seeds but are not viable and prolific as *S. terebinthifolia*. Flowers are formed in early autumn and fruit ripe by the end of the year. Seeds are shed in winter and germination follows shortly after in spring when the climate starts to get warm.

Possible control methods

Manual cutting of aerial parts with standard gardening or agricultural equipment, during late spring and summer when the trees are devoid of ripe fruit.

Invasive category/local potential threat

Low.

Remarks

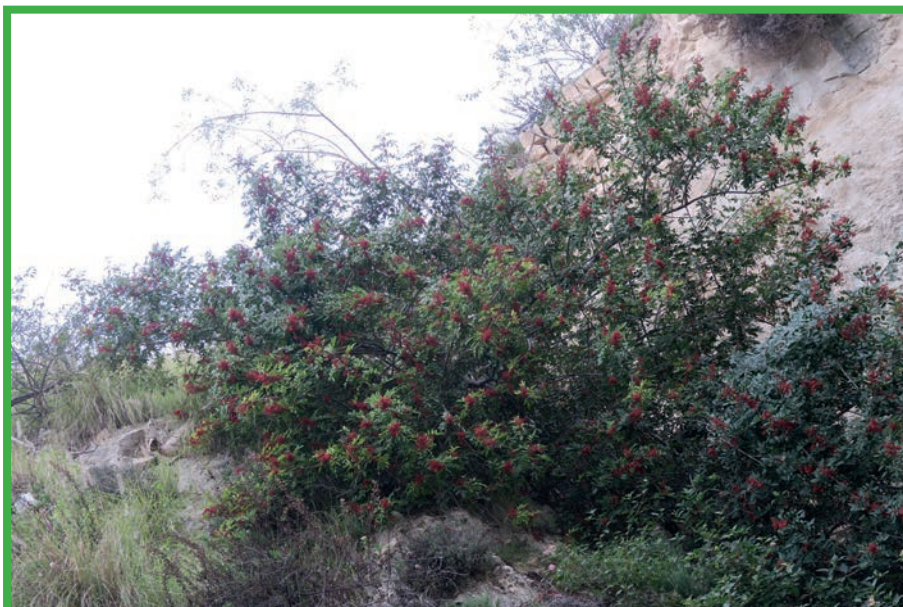
Schinus terebinthifolia and *S. molle* have been amongst the preferred ornamental trees along streets and squares of several localities (Borg, 1925). It is the largest of all *Schinus* species and possibly the longest lived (Goldstein & Coleman 2004).

Referenced bibliography

- Badalamenti E., Pasta S. & La Mantia T., 2012. Primi segnali di spontaneizzazione di *Schinus molle* L. (Anacardiaceae) in Sicilia. // *Naturalista siciliano*, ser. 4, 36 (1): 165-167.
- Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.
- Cupani F., 1696. Hortus Catholicus seu Illustrissimi et Excellentissimi Principis Catholicae, Ducis Misilmeris. Apud Franciscum Benzi, Neapoli, 262 pp.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Goldstein D. J. & Coleman R. C., 2004. *Schinus molle* L. (Anacardiaceae) Chicha production in the Central Andes. *Economic Botany*, 58 (4): 523–529.
- Zerapha S., 1831. Florae Melitensis Thesaurus, sive planatarum enumeratio quae in Melite Gaulosque insulis aut indigenae aut vulgatissimae. Malta, 86 pp.



Schinus terebinthifolia Raddi



(Spermatophyta >> Magnoliopsida (Rosids) >> Sapindales
>> Anacardiaceae)
Phylum >> Class >> Order >> Family

Main synonyms

None.

Common English names

Brazilian pepper tree; Rose pepper; Broadleaf pepper tree; Christmas berry tree.

Common Maltese names

Bżar falz; Skinus.

Common Italian names

Falso pepe con foglie da terebinto; Pepe rosa; Pepe brasiliano.

Short description

Evergreen, aromatic, dioecious tree reaching an average height of 5–8 m, sometimes reduced to a large shrub in rocky ground with a shallow root network. Bark light greyish-brown, deeply fissured and textured when mature. Leaves 5–15 cm long, alternate, compound, imparipinnate with 2–6(–10) pairs of tough, glabrous, leaflets, each 3–7 × 1–3 cm, obovate or elliptic with an obtuse or rounded apex, dark glossy green with visible light-coloured veins and entire or finely dentate margin. The base of the leaf rachis is slightly winged. Inflorescences paniculate to racemose, emerging from axils of leaves up to 11 cm long. Male and female flowers in numerous clusters, pentamerous, tiny (c. 2mm long), whitish born on 1–3 mm long pedicels. Male flowers with ten stamens; female flowers with a subglobose ovary about 1mm diameter and a single compound style with three flattened clavate stigma about 0.3mm long. Fruit a reddish drupe, 4–6 mm in diameter having a sweetish peppery taste.

Place of origin and global distribution

Subtropical and tropical regions of South America namely Brazil, Argentina and Paraguay. Naturalised worldwide in suitable warm climates.

Distribution in Malta

Cultivated and naturalised throughout the Maltese islands.

Distribution in Sicily

Species used only for ornamental purposes.

Life-form

Phanerophyte.

Introduction source

Cultivated as embellishment trees along streets and parks.

Habitat or preferred invading habitat

Woodlands especially maquis, valley sides, high garigue, field margins and along roads and paths in semi-urban and rural areas.

Frequency in Malta

Frequent, present in numerous places and increasing rapidly.

Frequency in Sicily

Species with scarce tendency to become naturalised.

Mode of dispersion

Seeds dispersed after fruit is ingestion by birds. They may also be carried away by water streams in valleys or after heavy rain.

First record in Malta

Introduced by the British as a street ornamental tree where it is recorded in historic literature, with the first record going back to that by Zerapha (1831) as *Schinus nigricans*, although his note that it flowers in April leaves some doubt if he was referring to this species. Nevertheless, it is mentioned by Sommier & Caruana Gatto (1915) and Borg (1925, 1927) as an ornamental tree in avenues, hence giving credit that Zerapha's record was actually referring to the same species.

First record in Sicily

Not reported.

Ecology

Trees form thousands of seeds that are highly viable and give rise to new trees in a very short period of time. Germination does not require special conditions and sprout with high success. They are shed in autumn and germinate shortly after in late winter or spring when the climate starts to get warmer.

Possible control methods

Manual cutting of aerial parts with standard gardening or agricultural equipment, during late spring and summer when the trees are devoid of ripe fruit.

Invasive category/local potential threat

High.

Remarks

Schinus terebinthifolia and *S. molle* have been amongst the preferred trees cultivated and planted by the British along streets and squares of several localities, where nowadays stand some mature trees with large trunks, such in some gardens and streets at Valletta and Mdina.

Referenced bibliography

- Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.
- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.
- Zerapha S., 1831. Florae Melitensis Thesaurus, sive planatarum enumeratio quae in Melite Gaulosque insulis aut indigenae aut vulgatissimae. Malta, 86 pp.



Selenicereus undatus (Haw.) D.R.Hunt



(Spermatophyta >> Magnoliopsida >> Caryophyllales >>
Cactaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Cereus tricostatus Goss.; *Cactus triangularis-aphyllus* Jacquin.

Common English names

Dragon fruit; White-fleshed Pitahaya.

Common Maltese names

None.

Common Italian names

Cacto Grandifloro, Regina della Notte.

Short description

Perennial plants able to clamber and climb vertical objects such as walls, rocky sides and especially tree trunks climbing up to 15 m high. Stems moderately branched and spreading upwards rarely become woody and never form a distinct trunk. Cladodes (or joints) cylindrical but with 3 (-4) distinct angles or wings that are undulate, 20–60 × 4–10 cm in size, dark green. Leaves normally absent. Areoles mostly in rows along the wings, 4–5 cm apart 2–5 mm across, white or ash-grey giving rise to 1–3(-5) spines, spreading from areole in various directions, pale brown or grey, subulate, 2–8 mm long. Glochoids absent. Flowers deeply fragrant, blossoming at night, 20–30 cm in diameter composed of 12-18 sepaloids (sepal-like structures) each linear-lanceolate with a smooth, entire margin and an acuminate apex, slightly curved down, 10–15 cm long, white with a green midrib; and 15–20 cream or white petals, imbricated to form a cup-shaped corolla about 8 cm deep. Filaments pale yellow, 6–8 cm long, arranged as a crown around the pistil. Style eccentric, greenish or cream, 10–20cm long, protruding out of the corolla, eccentric, ending with 18–24 linear and radiating stigma segments, each about 3cm long. Fruit globose or barrel-shaped, 8–12 cm long with numerous small triangular scales on its wall, deep red with a green base. Pulp white, sweet and palatable, embedded with scattered black seeds about 1.5 × 2 mm.

Place of origin and global distribution

Southern states of America and central America although precise origin is unknown.

Distribution in Malta

Scattered in numerous localities where it was originally cultivated and abandoned as a relic for example at walls of Msida Valley (Malta) and *Eucalyptus* trees at Żewwieqa (Gozo).

Distribution in Sicily

Species used only for ornamental purposes.

Life-form

Phanerophyte. Succulent, climber.

Introduction source

Introduced for horticulture use and sometimes cultivated in rural dwellings and farms where they persist as a relict after dwellings become abandoned. Escape through dumped plants is less likely since the species prefers a support to climb against, but could naturalise if dumped over escarpments or boulder scree.

Habitat or preferred invading habitat

Gardens, farms, plantations of high trees (e. g. *Eucalyptus*), old houses.

Frequency in Malta

Rare-Scarce.

Frequency in Sicily

Species with scarce tendency to become naturalised.

Mode of dispersion

Propagation mainly through cultivation. Dispersal by seed is not yet reported or encountered and plants are always found as individuals

First record in Malta

Not recorded in historic flora, with previous authors treating this cactus as a simple garden ornament. First recorded from the wild by Mifsud (2006). Weber (2008) also mentions the plant from Malta but not from the wild.

First record in Sicily

Not reported.

Ecology

Plants flowers profusely at night but seldom produce fruit, probably due to the absence of a proper pollinator (species of bats). When fruits are produced, the seeds are not viable to form more plants near the mother plant. Plants hence undergo a vegetative growth with no sexual reproduction. Vegetative reproduction through damages or fallen cladodes is possible.

Possible control methods

Uprooting and gathering of all cladodes from site.

Invasive category/local potential threat

Low. Despite reasonable occurrences of plants from several sites in the Maltese Islands, they do not self-propagate to form an established and sizeable population.

Remarks

Species very easy to identify from its conspicuous large flowers which during the day are usually found withered or fallen off because they bloom during the night. For long the species was known as *Hylocereus undatus* (Haw.) Britton & Rose but following DNA sequencing, it was transferred to the genus *Selenicereus*.

Referenced bibliography

Korotkova N., Borsch T. & Arias S., 2017. A phylogenetic framework for the Hylocereeae (Cactaceae) and implications for the circumscription of the genera. *Phytotaxa* 327 (1): 1-46. DOI: 10.11646/phytotaxa.327.1.1.

Mifsud S., 2006. *Hylocereus undatus* profile created on Dec-2006. Retrieved from MaltaWildPlants.com on 12-Nov-2021. url: http://www.maltawildplants.com/CACT/Hylocereus_undatus.php

Weber H.C., 2008. Ornamental Plants of Malta. Margraf Publishers, Weikersheim, 356 pp.



Senecio angulatus L. fil.



(Spermatophyta >> Asterids
(Campanulids) >> Asterales >>
Asteraceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Senecio macropodus D. C.

Common English names

Creeping groundsel; Cape Ivy.

Common Maltese names

Liedna s-Safra; Kubrita xeblieka.

Common Italian names

Senecione angolato.

Short description

Perennial, scrambling shrub growing up to 2m tall but its branches can extend up to 6 m if they find support. Stems angular, loosely branched, light green, then turning purple-brown and woody below. Leaves produced in few clusters per node along branches, semi-succulent, petiolate, rhombic or broadly ovate 3–5 × 2–5 cm long; with a shallowly cordate or truncate base, rounded apex and a subentire margin sometimes with small wide lobes or teeth; glossy surface above, shortly and densely pubescent below. Inflorescences profusely branched panicles, flat-topped, up to 3–10 cm across. Involucre light green, glabrous or puberulous, composed of two series of linear-lanceolate phyllaries, the upper twice as long as the lower and about 6 mm long. Flower head about 20 mm across, composed of 4–6 bright-yellow ray florets and a golden disk of tubular florets at the centre. Achenes 3–4 mm long, ribbed, covered with very short hairs mostly in the grooves, cylindrical, tapering above, giving rise to a pappus of 6 mm long, tan-brown, unbranched bristles.

Place of origin and global distribution

Cape province in South Africa, naturalised in other northern African countries and introduced in Australasia, the Mediterranean region, south Europe and Macaronesia, where it is declared invasive in some areas such as New Zealand and parts of Australia.

Distribution in Malta

Scattered as single individuals in several localities such as Siggiewi, Rabat, Qrendi, Bingemma (Victoria Lines), Mellieħa (Malta) and Mġarr (Gozo).

Distribution in Sicily

Palermo (Domina et al., 2019); Termini Imerese (Di Martino et al., 1994); Patti (Barone et al., 2021); Avola (Barone et al., 2021).

Life-form

Nanophanerophyte.

Introduction source

Escape from plants cultivated as an ornament.

Habitat or preferred invading habitat

Maquis, disturbed ground, or suitable sheltered areas behind gardens or villas, cultivated relicts in farmhouses, field sides, walls, valleys and watercourse with *Arundo donax* L.

Frequency in Malta

Scarce, rare in the wild.

Frequency in Sicily

Scarce, rare in the wild.

Mode of dispersion

Seeds dispersed by wind, but also from dumped plant material in moist places

First record in Malta

Mifsud (2007) unless mention in some horticultural booklet or journal.

First record in Sicily

In the herbarium of Palermo there is a sample collected on the island of Mozia (Trapani) in 1956 (PAL9497, Legit unknown collector, 1956) which could be the first record in Sicily of *Senecio angulatus* although it is not certain that it was collected from a naturalised specimen.

Ecology

Perennial plants flower almost all year round, but mostly in the warmer months of the year. Seeds are produced a few weeks after the flowering and dispersed by wind. Large amounts of seed are produced per year from an adult plant.

Possible control methods

Uprooting main stem and digging around to kill the underground roots which may propagate back the plant.

Invasive category/local potential threat

Moderate-Low.

Remarks

Not recorded and possibly a recent introduction, although some specimens in abandoned old farmhouses suggest that it may have been present in Malta for a reasonable long period of time. Some plants were found in the ditch of the Victoria Lines in Bingemma. If these have not been dumped or deliberately planted by someone, then seeds of this species can travel long distances and are viable to create new populations away from urban areas.



Referenced bibliography

- Barone G., Domina G & Di Gristina E., 2021. Comparison of different methods to assess the distribution of alien plants along the road network and use of Google Street View panoramas interpretation in Sicily (Italy) as a case study. *Biodiversity Data Journal*, 9: e66013 <https://doi.org/10.3897/BDJ.9.e66013>
- Di Martino C., 1994. La florula rudérale del Castello di Caccamo (Palermo, Sicilia). *Quaderni di Botanica ambientale e applicata*, 5: 11-16.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, DOI: 10.1080/11263504.2019.1651787.
- Mifsud S., 2007, 2021. *Senecio angulatus* profile created on MaltaWildplants.com on Dec-07. Retrieved from MaltaWildPlants.com on 30-Apr-2022.

Solanum linnaeanum Hepper & P.-M.L.Jaeger



(Spermatophyta >> Magnoliopsida >> Solanales>>
Solanaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Solanum sodomaeum L.; *Solanum hermannii* Dunal.

Common English names

Brown Nightshade; Afghan Thistle; Apple of Sodom; Apple-of-Sodom; Bitter Apple; Black-Spined Nightshade; Dead Sea Apple; Devil's Apple; Poison Apple; Poison Bush; Poison Weed; Sodom's Apple; Sodom-Apple.

Common Maltese names

Tuffieħ ta' Sodoma.

Common Italian names

Morella di Sodoma, Morella Linneana.

Short description

Shrubby perennial; stem 50-300 cm or more, stout, erect, much-branched, sparsely stellate-pubescent, with many straight, wide-based pale yellow prickles up to 1.5 cm. Leaves 5-13(-18) x 4-9(-15) cm, more or less ovate, pinnatisect almost to midrib, with many prickles sparsely stellate-hairy above, more densely so beneath; lobes rounded, sinuate; petioles 1-3(-5) cm. Cymes few-flowered, solitary, extra-axillary, sessile; pedicels c. 10 mm, elongating and recurving in fruit; upper flowers smaller, male. Calyx 5-7 mm, accrescent and with dense prickles in hermaphrodite flowers; lobes lanceolate. Corolla 25-30 mm in diameter, orbicular-pentagonal, pale violet. Anthers 5-6 mm, equal. Berry 20-30 mm in diameter, globose, yellow to brown, shining.

Place of origin and global distribution

Native to southern Africa (i. e. Mozambique, Zimbabwe and South Africa). It is found occasionally in many Mediterranean countries and is considered a seriously invasive alien in parts of Australia and New Zealand.

Distribution in Malta

Recorded from San Pawl tat-Targa (Mosta) over a hundred years ago. New records from Malta are lacking.

Distribution in Sicily

Lampedusa, Cala Madonna (Gussone) Ustica Pantelleria, Marsala, Ragusa, Pantalica, Sortino, Selinunte Archaeological Park, Palermo, RN "Pizzo Cane, Pizzo Trigna and Grotta Mazzamuto", along the sandy coast of Gela, Valle del Sirina, Castelmola.

Life-form

Nano phanerophyte.

Introduction source

Cultivated as a medicinal and ornamental plant and possibly further dispersed by birds and other animal vectors.

Habitat or preferred invading habitat

A weed of warmer temperate, sub-tropical and semi-arid regions that invades pastures, open woodlands, grasslands, roadsides, waste areas, disturbed sites, coastal environs and creek lines. Often also found in abandoned or fallow fields, possibly survivors of past cultivations.

Frequency in Malta

Very rare and possibly extinct.

Frequency in Sicily

Scarce.

Mode of dispersion

This species reproduces only by seed which are usually not spread very far from the parent plants, but they are sought by birds which may actively disperse them. Moreover, the fruit may be dragged significant distances when their prickly walls become attached to animals, clothes or machinery.

First record in Malta

San Pawl tat-Targa limits of Mosta by Borg in 1913 (reported by Sommier & Caruana Gatto 1915).



First record in Sicily

Reported by Gussone (1827) from Palermo to Messina, and from Messina to Terranova (=Gela).

Ecology

This perennial species prefers sandy porous soil near the coast but can grow inland such as in fallow land, meadows and ruins (e. g. abandoned farms) at hills up to 1000 m elevation. Flowering and fruiting throughout the year, but especially in late spring.

Possible control methods

Manual uprooting when not in fruit.

Invasive category/local potential threat

Low.

Remarks

Fruits can be poisonous to sheep and children; green fruits are more toxic than ripe ones.

Referenced bibliography

Gussone G., 1827. *Florae Siculae Prodromus sive plantarum in Sicilia ulteriori nascentium enumeratio secundum systema linneanum disposita* 1. Neapoli.

Sommier S. & Caruana Gatto A., 1915. *Flora Melitensis Nova*. Firenze: Stabilimento Pellas, viii + 502 pp.

Solanum lycopersicum L.



(Spermatophyta >>
Magnoliopsida (Asterids) >>
Solanales >> Solanaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Lycopersicon cerasiforme Dunal; *Lycopersicon esculentum* Mill.;
Solanum pomiferum Cav.; *Solanum pseudolycopersicum* Jacq.;
Solanum racemigerum Vilm. ex T. Moore; *Solanum spurium* J. F. Gmel.

Common English names

Tomato, Love Apple.

Common Maltese names

Tadam, Tuffieħ t'Adam.

Common Italian names

Pomodoro, Tomatica.

Short description

Erect to decumbent herbaceous annual plant, mostly glandular-pubescent and aromatic. Leaves alternate, petiolate, compound, imparipinnate, 18–30 × 6–12 cm; primary leaflets 3–4 pairs, 3–6 cm long, ovate-elliptic with shallowly dentate margins, shortly petiolated; secondary leaflets (lobes) present on basal primary leaflets only, 0.3–0.8 cm long, ovate, with crenated margins, subsessile. Inflorescence axillary cymes with 3–12 (–20) flowers on short, simple or two-branched pubescent peduncles. Sepals 5, dark green, lanceolate, acute, fused at the base. Corolla 2–3 cm across, yellow. Anthers located close together in a single unit but not fused, well exerted from the corolla and ending with a pointed beak at the apex. Fruit a rounded berry of various sizes, shapes and colours depending the cultivars, but typically globose or elongated ovate-elliptic, 5–8 cm long, with a thin, smooth, skin-like epicarp, deep or light red, (or yellow) with somewhat slightly lighter coloured pulp. Seeds lenticular, 2 mm wide, held by axile placentation in five or more locules filled with jelly or slime-like substance.

Place of origin and global distribution

Western South America.

Distribution in Malta

Spotted here and there sporadically such as at Wied tal-Baħrija, Wied tal-Qlejgħa, Wied is-Sewda, Wied il-Kbir (Malta) and Wied il-Lunzjata, Wied tax-Xlendi and Wied tar-Ramla (Gozo). Also observed in disturbed ground, for example in Xagħra (Gozo). In many cases, populations do not persist more than one or two years.

Distribution in Sicily

Cultivated as vegetable.

Life-form

Therophyte.

Introduction source

Escapee from agriculture.

Habitat or preferred invading habitat

Valley sides of shallow or small valleys close to fields usually in partial shade. Less often in disturbed ground and waste places.

Frequency in Malta

Scattered sporadically, but not abundant, form large populations or in any way invasive

Frequency in Sicily

Rare in the spontaneous state.

Mode of dispersion

By seeds mostly from trashed fruit, usually because of low yield or not sellable.

First record in Malta

Have been introduced in Malta in the 16th century for edible uses but reported as naturalised in the wild by Haslam et al. (1977).

First record in Sicily

Not reported.



Ecology

Plants are grown in open fields during winter and spring (extended periods in green houses) where last fruit-sets are set in May-June. In the wild they are usually in flower in April and fruit persists till June depending if they are in an exposed arid location or in a damp shaded valley.

Possible control methods

Manual uprooting before fruiting period.

Invasive category/local potential threat

Low.

Remarks

Encountered populations are always in low numbers and do not usually persist, hence they cannot be categorised as invasive. Moreover, many populations are sporadic and have a short life of one or two years, with a few exceptions as for example Wied tax-Xlendi which was seen growing during repeated random visits during the last ten years. Interestingly, the population reported as 'naturalised' by Haslam et al. (1977) was also from Wied tax-Xlendi. This population is found in a shaded part of the valley, enjoys a constant supply of water and consists of less than twenty plants. Moreover, remarkable was a population of some 15 plants in a partially excavated plot with debris of globigerina limestone situated at Triq Marsalforn, Xagħra. Plants fruited in June despite the poor soil conditions and an arid and windy location they were growing in (pers. obs. Stephen Mifsud).

Referenced bibliography

Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.

Solidago gigantea Aiton

(Spermatophyta >> Magnoliopsida >> Asterales >>
Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Solidago serotina Retz.

Common English names

Tall Goldenrod; Giant Goldenrod; Smooth Goldenrod.

Common Maltese names

None.

Common Italian names

Verga D'oro Del Canada.

Short description

Plants 50–200 cm (solitary or clustered); rhizomes short- to long-creeping. Stems 1–20+ or clustered, erect, glabrous or sparsely strigose in arrays, sometimes glaucous. Leaves: basal 0; proximal cauline usually withering by flowering time, sessile, lanceolate, 91–97 × 10–14 mm, margins sharply serrate, 3-nerved, apices acuminate, abaxial faces pilose on nerves or glabrous; mid to distal cauline similar, 57–76 × 0.7–1.2 cm, largest toward mid stem, decreasing distally. Heads 40–600, secund, in broadly secund, pyramidal paniculiform arrays, rarely rhombic or club-shaped, proximal branches divergent, recurved, glabrous-glabrate or strigose, sometimes glaucous. Peduncles 1.5–3 mm, sparsely to densely strigillose; bracteoles 0–2, linear-lanceolate. Involucres campanulate, (2–)2.5–4(–5) mm. Phyllaries in 3–4 series, unequal, acute; outer lanceolate, inner linear-lanceolate (hexa-ploids from far west can have minute stipitate glands, especially near base of outer phyllaries and peduncle bracts). Ray florets (7–)9–15(–24) (conspicuous); laminae 1–3 × (0.1–)0.2–0.4 mm. Disc florets (4–)7–12(–17); corollas (2.5–)3–3.5(–4.5) mm, lobes 0.6–1(–1.4) mm. Cypselae 1.3–1.5 mm, sparsely strigose; pappi 2–2.5 mm.

Place of origin and global distribution

Native to North America.

Distribution in Malta

Not recorded.

Distribution in Sicily

The species until now is very rare but in north Italy is considered invasive, therefore it should be useful the monitoring of the species in order to avoid its naturalisation in Sicily, considering its capacity to colonize natural habitats.

Life-form

Hemicryptophyte.

Introduction source

Ornamental introduction.

Habitat or preferred invading habitat

Generally reported to occur in forest glades, bank bushes, and grassy damp wasteland. In Sicily, it was observed in seasonal humid environments with vegetation referable to *Scrophulario-Helichrysetea italici* near Pace del Mela (Messina), colonizing the edges of ditches and canals. This species was also observed within the habitat known asconstantly flowing Mediterranean rivers with *Glaucium flavum* type of vegetation.

Frequency in Malta

Not recorded.

Frequency in Sicily

Very rare.

Mode of dispersion

Wind dispersal.

First record in Malta

Not recorded.

First record in Sicily

The specie was observed for the first time in 2022 at Pace del Mela (Cambria 2023).

Ecology

Plants flower during most time of the year, producing thousands of wind-dispersed seeds, which at present do not germinate to form adult plants, but current trends of climate change ay start favouring successful propagation and may become a potentially invasive species.

Possible control methods

Long-term management techniques out of its native range include grazing, mowing and periodic flooding on the invader's plant community.

Invasive category/local potential threat

low, but it could become a serious invasive species in the next decades as has already happened in several other European countries.

Remarks

None.

Referenced bibliography

Cambria S., Azzaro D., Caldarella O., Aleo M., Bazan G., Guarino R., Torre G., Cristaudo A. E., Ilardi V., La Rosa A., Laface V. L.A., Luchino F., Mascia F., Minissale P., Sciandrello S., Tosetto L. & Tavilla G., 2023. New Data on Native and Alien Vascular Flora of Sicily (Italy): New Findings and Updates. *Plants*, 12: 1743.

Sorghum halepense (L.) Pers.



(Spermatophyta >> Liliopsida
(Commelinids) >> Poales >>
Poaceae)
Phylum >> Class >> Order >>
Family

Main synonyms

Sorghum decolor Beauv.; *Trachypogon avenaceus* Nees; *Sorghum saccharatum* (L.) Moench var. *halepense* (L.) Kuntze.

Common English names

Aleppo Millet-grass; Egyptian Millet; Johnson Grass.

Common Maltese names

Qaraboċċ Salvagg.

Common Italian names

Sorgo selvatico; Sorgo d'Aleppo; Sorghetto; Melgastro, Canestrello; Melghetta; Sagginella.

Short description

Rhizomatous perennial grass forming moderately dense spreading stands or clusters, but usually contained small populations. Culms erect, 0.5–1.8 m tall with short hairy nodes. Leaves linear-ensiform, 20–70 × 1–4 cm, glabrous, somewhat dark green with a wide, white midrib; margin smooth; sheath glabrous. Ligule about 2–4 mm long, hyaline, sparsely ciliate at the margin. Inflorescences a lax, pyramidal panicle, 20–50 cm long with white hairs in the basal axil; lower branches compound, without spikelets (bare) at the base then bearing racemes of 1–6 pairs of spikelets on the secondary branches; upper branches shorter and with racemes most of their length, the uppermost branches being simple and bearing singular racemes. Spikelets sessile, in pairs, elliptic-lanceolate outline, 4–5 mm long, with a bearded obtuse callus, more or less hairy (rarely subglabrous), light green, copper brown or maroon or sometimes blackish brown in colour. Lower glumes 7- to 11-veined, finely pubescent, appressed, somewhat coriaceous, apex with three small teeth. Upper glume similar but smaller and with 5- to 7- nerves. Lemma 3–4 mm long, cuspidate-mucronate or bifid with a geniculate awn 10–16 mm long. Anthers 2.0–2.5 mm, golden yellow.

Place of origin and global distribution

Northern and eastern parts of Africa and west Asia, probably extending to the southeast Mediterranean region. Naturalised worldwide in warm countries (tropical and temperate zones) including the Mediterranean.

Distribution in Malta

Located sporadically in small clumps in several places in both rural and suburban locations. Examples include Imtaħleb, Ġnejna, San Martin, Pwales, Buskett, Miellieħa, St. Paul's Bay, Marsa, Pembroke, Mtarfa, Santa Katerina (Rabat), Dingli, Fomm ir-Riħ (Malta) and Xewkija, Qala, Wied Marsalforn and Victoria (Gozo).

Distribution in Sicily

Throughout the region.

Life-form

Hemicryptophyte.

Introduction source

Possible multiple sources, where the old mention by Boccone in 1697 indicates that it was cultivated, possibly to feed poultry, but it may have been further re-introduced in the last 4–6 decades with bird seed, because some populations recorded in recent years are found in street margins or disturbed ground in old towns and rural villages.

Habitat or preferred invading habitat

Water courses, valley sides, field margins, abandoned fields, pathways and side of streets.

Frequency in Malta

Scarce, met here and there as opportunistic species, rarely forming large populations.

Frequency in Sicily

Very common (Giardina et al 2007).

Mode of dispersion

Seeds are dispersed to short distances by wind, ants and water streams, but are likely dispersed to long distance by birds consuming grains, human activity and water courses in large valleys.

First record in Malta

First mentioned from Malta by Don Paulo Boccone in 1697 under the name "*Millium peregrinum nodosa radice*" cultivated by a medic called Fra Giuseppe Zammit (Sommier & Caruana Gatto 1915).

First record in Sicily

Not reported.

Ecology

Inflorescences are produced throughout most of the year peaking between October and May. Flowers are wind pollinated and set seeds throughout most of the year which germinate readily if they land on moist exposed ground. Many plants die in summer due lack of water (especially in urban populations), but naturalise for long periods of time in wetlands and shaded areas.

Possible control methods

Manual uprooting of plants, ideally when not in fruit.

Invasive category/local potential threat

Moderate, can be problematic in wetlands.

Remarks

Being mentioned back to the 17th century, *Sorghum halepense* might have been introduced in Malta several centuries before, and hence its status could be that of an archaeophyte. Its use as fodder for domesticated birds amongst other uses in north and east Africa is documented to have taken place for a long period of time and in fact Sorghum crops were amongst the plants that were carried and repeatedly cultivated by African native migrants and nomads, even since prehistoric times (Srinivasa Rao et al. 2014). It is plausible that Arabs had introduced it when they colonised Malta between the 9th and the 11th century, although there is no literature to back this as evidence. The numerous populations recorded in Malta, even if some of them are short lived, indicates that the species is being re-introduced in recent times, and one source is likely to be bird-seed mixtures, which is often used by bird trappers in who have trapping sites scattered throughout Malta and Gozo.

Referenced bibliography

- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Srinivasa Rao P., Reddy B. V. S., Nagaraj N. & Upadhyaya H. D., 2014. *Sorghum* Production for Diversified Uses. In: Genetics, Genomics and Breeding of Sorghum. Series on Genetics, Genomics and Breeding of Crop Plants. CRC Press (Taylor & Francis), Boca Raton, 01-27. ISBN 9781482210088.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.

Symphotrichum squamatum (Spreng.) G. L. Nesom



(Spermatophyta >> Magnoliopsida (Asterids) >>
Asterales >> Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

None.

Common English names

Narrow-leaved Aster; Annual Saltmarsh Aster; Bushy starwort; Swamp Aster.

Common Maltese names

Settembrina Salvagġa; Żagħżiġha.

Common Italian names

Astro annuale, Astro scaglioso, Astro autunnale.

Short description

Annual or biennial 30-200 cm high, stem erect and profusely branched above, glabrous, dark green. Leaves alternate, linear to narrowly lanceolate with a smooth margin and pointed, tip. Inflorescence a symmetrical panicle with hundreds of small flower-heads. Involucral bracts in 3 rows, 4-6 mm long, oblanceolate, slender, tapering to an acute or mucronate, purple-red apex usually with a minutely serrate margin. Ray-florets white to pale violet-blue, linear, about 2mm long, sometimes shorter and inconspicuous. Tubular florets few, yellow. Achenes beige, linear 2 mm long, minutely ribbed with a simple bristly whitish-cream pappus.

Place of origin and global distribution

Central and South America. Naturalised worldwide in tropical and subtropical regions including the Mediterranean region.

Distribution in Malta

Naturalised throughout the Maltese islands, in disturbed ground in urban areas, as well in disturbed shallow valleys especially those close to agricultural areas. Can form large populations near dams and water catchment areas.

Distribution in Sicily

Throughout the region (Giardina et al 2007).

Life-form

Therophyte or Hemicryptophyte if water is available most of the year.

Introduction source

Probably as contaminant of imported seed.

Habitat or preferred invading habitat

Disturbed wetland areas with soil sediment such as in shallow valleys close to agricultural areas and in accumulated silt in water catchment areas. Also common in disturbed ground in abandoned fields, roadsides, neglected embellishment areas and saline marshes.

Frequency in Malta

Common, often forming patchy dense population in wetland areas.

Frequency in Sicily

Very common (Giardina et al 2007).

Mode of dispersion

Propagation mainly by seeds dispersed by wind.

First record in Malta

First recorded by Lanfranco (1969) under the closely related species *Aster subulatus* and subsequently corrected by Lanfranco (1975).

First record in Sicily

Reported for the first time by Molinier for Marsala in 1956 (Pignatti & Wikus 1963).

Ecology

Plants grow in early summer and flower in September. Each plant can produce thousands of tiny seeds that are released and dispersed by wind in autumn. Plants die in winter but sometimes they can persist vegetatively in mild winters, with exceptional cases where flowers are produced in spring.

Possible control methods

Manual removal before setting seeds.

Invasive category/local potential threat

Moderate-high especially in wetland ecosystems.

Remarks

Sommier & Caruana Gatto (1915) and Borg (1927, 1935) do not record this species and hence it is assumed that it had been introduced some time around the early forties. It is hence one of the alien species that spread most rapidly, where after about 50 years from its introduction, it became common and considered invasive. The reason for introduction is not well known, but not being an attractive flowering plant, it is understood that it had been introduced accidentally through horticulture or agriculture imports from regions where the species was already established.

Referenced bibliography

- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Borg J., 1935. A Third Supplement to the Descriptive Flora of the Maltese Islands. *Archivium Melitense*, 9 (4): 239-245.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Lanfranco G., 1969. Field Guide to the Wild Flowers of Malta. Progress Press, Malta, 146 pp.
- Lanfranco E., 1975. Some additions to the Maltese flora. *Maltese Naturalist*, 2 (2): 47-48.
- Pignatti S. & Wikus E., 1963. Contribuzione alla Flora siciliana. *Pubblicazioni dell'Istituto Botanico dell'Università di Trieste*, 14: 1-15.
- Sommier S. & Caruana Gatto A., 1915. Flora Melitensis Nova. Firenze: Stabilimento Pellas, viii + 502 pp.



Tropaeolum majus L.



(Spermatophyta >> Magnoliopsida (Rosids) >>
Brassicales >> Tropaeolaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Nasturtium indicum Garsault; *Tropaeolum pinnatum* Andrews;
Tropaeolum quinquelobum Bergius.

Common English names

Garden Nasturtium; Indian Cress; Monks cress.

Common Maltese names

Kapuċċinella.

Common Italian names

Nasturzio commune.

Short description

Trailing and often twining annual herb, glabrous and foliose. Leaves alternate, long-petiolate, peltate; lamina orbicular or slightly reniform with margin variously obtusely angled, smooth, entire, 3–12 cm in diameter with 9 main veins radiating from the attachment of petiole. Flowers solitary from leaf axils on a long, intertwining or curved, glabrous pedicel, 5–12 cm long. Corolla 5-petalled, bilaterally symmetric, spurred; petals very bright yellow, orange or orange-red, often found with various shades and markings of these colours, and with darker and contrasting streaks or blobs at the base. Apical pair of petals elliptic, 3–5 × 1–2 cm, almost entire; basal 3 petals orbicular (2 × 2 cm) and with a deeply fringed margin on the claw. Spur curved up, about 2 cm long. Stamens 8, unequal, yellow. Ovary with 3 locules, short single style opening in three-lobed linear stigma. Fruit capsule oblate (globular and longitudinally compressed like pumpkin) often showing three shallow corners, 1.5–2.0 mm across. Seeds 6–7 mm, sub-globular, rugose.

Place of origin and global distribution

Andes region of South America.

Distribution in Malta

Several localities in mainland Malta and Gozo, such as Wied Inċita, Wied Blandun, Wied tal-Qlejgħa, and Wied is-Sewda in Malta; and Ħondoq ir-Rummien, Wied il-Għasri, Wied tal-Kapuċċini, Wied il-Lunzjata and Wied l-Infern in Gozo.

Distribution in Sicily

Species used only for ornamental purposes.

Life-form

Therophyte.

Introduction source

Escapee from horticulture.

Habitat or preferred invading habitat

Valley sides and exposed valley beds.

Frequency in Malta

Frequent and increasing. Locally invasive in valleys and damp areas.

Frequency in Sicily

Species with scarce tendency to become naturalised.

Mode of dispersion

By seeds carried away by water streams and possible by ants. Several populations had however originated from trashed plant material into valleys.

First record in Malta

Haslam et al. (1977) as naturalised in valley beds.

First record in Sicily

First reported by di Martino & Perrone (1962) for the city of Palermo. Reported also as naturalised by Minissale et al (2005) for Isola Bella (Taormina) and surroundings of Taormina (Sciandrello et al. 2014).

Ecology

Plants usually form flower throughout most of the year, peaking in the warmer and wet months of February to June. They flower profusely and release large number of seeds that resist arid environments and germinate rapidly in contact with water.



Possible control methods

Repeated manual uprooting, and perseverant monitoring.

Invasive category/local potential threat

High.

Remarks

Tropaeolum majus is a recent introduction in the Maltese Islands where it is not mentioned in old floristic literature. It has spread in several localities in Malta and Gozo, often forming extensive carpeting over native vegetation and depriving them of sunlight and nutrients. It is hence a serious invasive species, as already noted by Mifsud (2007). The leaves are consumed by larvae of some species of the white cabbage butterflies, but they seem to avoid wild populations, preferring horticulture stock instead. In central parts of Europe, this plant is widely consumed as a salad and is rich in Vitamin C and mineral salts, but it has not entered in the local diet or foraging.

Referenced bibliography

- Di Martino A. & Perrone C., 1962. Nuovo contributo alla flora arboricola di Palermo. *Lavori dell'Istituto Botanico e Giardino Coloniale di Palermo*, 18: 112-202.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Mifsud S., 2007. The 21st Century *Oxalis pes-caprae* in MaltaWildPlants.com forum. <http://www.maltawildplants.com/forum/viewtopic.php?f=2&t=951>.
- Minissale P., Sciandrello S. & Spampinato G., 2005. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata Isola Bella e del territorio circostante (Taormina – ME – Sicilia). *Quaderni di Botanica Ambientale Applicata*, 16: 175-208.

Sciandrello S., D'Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains-NE Sicily). *Webbia, Journal of Plant Taxonomy and Geography*, 69 (2): 301-324.

Vachellia karroo (Hayne) Banfi & Galasso



(Spermatophyta>>
Magnoliopsida (Rosids)>>
Fabales >> Fabaceae >>
Caesalpinioideae)
Phylum >> Class >> Order >>
Family >> Subfamily

Main synonyms

Acacia horrida (L. Willd.); *Acacia minutifolia* Ragup.; *Acacia pseudowightii* Thoth.; *Acacia eburnean* (L. fil.) Willd; *Acacia capensis* E. Mey.

Common English names

Karoo thorn; Sweet thorn; Cassie piquants blancs; Cape gum; Cape thorn tree.

Common Maltese names

Gazzija tax-xewk kbir; Akaċja tax-xewk; Xewk ta' Kristu.

Common Italian names

Acacia orrida; Mimosa orrida; Gaggia orrida.

Short description

Deciduous shrub or small tree, sometimes partly evergreen in mild winters, reaching a height of 4 m, although it can grow about 12m in optimum conditions, conspicuously armed with stipular thorns. Bark reddish-brown, initially smooth, then becomes rough and dull brown with age, secreting a bright red gum when injured. Leaves dark green, compound, bipinnate with 2–6 pairs of primary pinnae up to 8 cm long, each bearing 5–15 pairs of oblong leaflets, 6 – 12 × 2 – 4 mm with an obtuse tip, stipules modified to a pair of ivory-white, hard thorns up to 10 (–17) cm long and 8 (–10) mm wide. Base of pinnae with one conspicuous gland. Inflorescence a short raceme of three to six globular, compound flower heads about 10 mm in diameter with mildly fragrant, golden yellow florets born on glabrous peduncles up to 25 mm long. Legume 80-150 × 6-8 mm, linear-falcate or strongly curved, slightly constricted between the seeds, glabrous, greyish-brown when mature. Seeds olive-green to brown, shiny, 5–8 mm long with an areole about 5 × 3 mm.

Place of origin and global distribution

Native to the Western part of South Africa. Naturalised in several tropical, subtropical and warm temperate regions, including south Europe.

Distribution in Malta

Cultivated and escaping in the southeast and central parts of Malta, such as at Wied Blandun, Dewjra Hill (along the Victoria lines), Wied Ħsri, Wied is-Sewda, Marfa ridge, while so far, in Gozo it is only present in few gardens or parks namely Ulysses Garden and Villa Rundle, but has not been seen naturalised in the wild.

Distribution in Sicily

Coastal areas of Sicily and smaller islands (Giardina et al. 2007), Isola Bella (Minissale et al. 2005); Vendicari (Minissale & Sciandrello 2010),

Taormina (Sciandrello et al. 2014) Siracusa in the Archaeological park (Minissale et al. 2016) and also in the Nature Reserve “Fiume Ciane e Saline di Siracusa”.

Life-form

Phanerophyte.

Introduction source

Escape from ornamental cultivation often used as a barrier hedge.

Habitat or preferred invading habitat

Valley sides, disturbed ground near embellishment, fields or abandoned agricultural areas. Coastal dunes and coastal shrubs (2210 Crucianellion maritimae fixed beach dunes, 2250*Coastal dunes with Juniperus spp; 5330 Thermo-Mediterranean and pre-desert scrub).

Frequency in Malta

Rather scarce, but increasing gradually.

Frequency in Sicily

Common (Giardina et al. 2007).

Mode of dispersion

Seeds that are primarily dispersed by water streams after heavy rain or by strong wind, which may be carried away into crevices in rocky ground, paths or roads.

First record in Malta

Probably introduced sometime in the eighties, since it is not reported in Haslam et al. (1977) or any other earlier floras. First published record from Malta is probably by Weber & Kendzior (2006).

First record in Sicily

Gussone 1821 (cultivation); Romeo 1957 (naturalisation).

Ecology

Trees form many seed pods at the beginning of summer which release large number of seeds. Seeds germinate readily if they are in a location with sufficient water, hence they are of a more serious threat in valley sides and close to water catchment areas. Seedlings forms mature trees in a short period of time.

Possible control methods

Manual cutting of aerial parts with standard gardening or agricultural equipment, using adequate safety precautions from the thorns, during winter-spring when the trees are devoid of ripe fruit.

Invasive category/local potential threat

Medium.

Remarks

Closely related and much less frequent is the species *Vacchelia farnesiana* with smaller thorns.



Referenced bibliography

- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Gussone J., 1821. *Catalogus Plantarum quae observantur in Regio Horto ser. Fr. Borbonii Principis Juventutis in Boccadifalco prope Panormum. Neapoli.*
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. *A Flora of the Maltese Islands.* Malta University Press, Malta, 560 pp.
- Minissale P., Sciandrello S. & Spampinato G. 2005. Analisi della biodiversità vegetale e relativa cartografia della Riserva Naturale Orientata Isola Bella e del territorio circostante (Taormina – ME – Sicilia). *Quaderni di Botanica Ambientale Applicata*, 16: 175-208.
- Minissale P. & Sciandrello S., 2010. Flora e vegetazione terrestre della Riserva Naturale di Vendicari (Sicilia sud-orientale). *Ente Fauna Siciliana*, 12: 145-208.
- Minissale P., Trigilia A., Brogna F. & Sciandrello S., 2016. Plants and vegetation in the archaeological park of Neapolis of Syracuse (Sicily-Italy). A management effort but also an opportunity for a better enjoyment of the site. *Conservation and Management of Archaeological Sites*, 17: 340–369.
- Romeo V., 1957. Le piante epifite dell’Orto Botanico di Messina. *Nuovo Giornale Botanico Italiano*, n. s., 64: 266-271.
- Sciandrello S., D’Agostino S. & Minissale P., 2014. The vascular flora of the Taormina Region (Peloritani Mountains-NE Sicily). *Webbia: Journal of Plant Taxonomy and Geography*, 69 (2): 301-324.
- Weber H. C. & Kendzior B., 2006. *Flora of the Maltese Islands. A field Guide.* Margraf Publishers, Weikersheim, 383 pp.

Vitis rupestris L.



(Spermatophyta >> Magnoliopsida (Rosids) >>
Rhamnales >> Vitaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Cissus vinifera (L.) Kuntze; *Vitis sylvestris* C. C. Gmel.

Common English names

Coon grapevine, Sand grapevine, Currant grapevine, Rock grapevine, Mountain grape vine.

Common Maltese names

Dielja tal-Għeneb salvaġġa, Insolja.

Common Italian names

Vite rupestre.

Short description

Sprawling and climbing shrub, few-branched, deciduous in winter. Stem woody, deeply fissured, rough and cracked, stout - reported reaching 1.5 m in girth. Branches very long and tough, woody, unarmed, climbing high over rocks, walls or nearby trees, giving rise to leaf branchlets at the lower part, simple leaves, tendrils and flowers racemes at the distal end. Leaves long-petiolate (same length of blade), leaf blade orbicular with a deep cordate base, unlobed or shallowly lobed above near the petiole attachment, sometimes 5-lobed, 10—20 cm across with a serrate margin and an acute apex, half-way pleated from the midrib during warm days, glabrous or finely and scantily pubescent. Tendrils ending in two long branches located opposite the leaf. Flowers in long branched racemes, 8—22 cm long. Corolla greenish, with tiny petals narrowly lanceolate petals, 1.5mm long. Stamens numerous, radiating and spreading out, 1 mm long, with yellowish anthers. Fruit a greenish or reddish or blackish-violet berry, subglobular to ellipsoid, 8—25 mm long, (1–)2–4 seeded. Seeds hard, pyriform, 4–6 mm long.

Place of origin and global distribution

Southern states of the US, namely Missouri, Oklahoma, Arkansas, and further west to Texas and east to Pennsylvania. Introduced in many temperate countries for its fruit.

Distribution in Malta

Widespread in several localities, possibly throughout all the rural and agricultural areas of Malta, Gozo and Comino.

Distribution in Sicily

Recorded from the provinces of Agrigento, Catania, Messina, Palermo, Ragusa, and Siracusa (Ardenghi and Cauzzi, 2015).

Life-form

Nanophanerophyte or Phanerophyte.

Introduction source

Agricultural introduction and escape in surrounding walls, scree and rocky escarpments.

Habitat or preferred invading habitat

Rubble walls, boulder scree, escarpments, rocky valley sides, maquis.

Frequency in Malta

Frequent also in the wild.

Frequency in Sicily

Rather widespread (Ardenghi & Cauzzi, 2015).

Mode of dispersion

Dispersion of seeds during or after consumption of the juicy berries by man, birds or rats

First record in Malta

Borg (1927).

First record in Sicily

Vitis rupestris has been one of the first rootstocks to be employed at the beginning of the phylloxera crisis, occurred in Sicily in 1880. However probably due to a lack of insights into the species of the *Vitis* genus of American origin in Sicily, the presence of this species has only recently been highlighted (Ardenghi et al. 2014).



Ecology

Plants hibernates in winter. It first produces leaves in April and flowering branches later in mid-May. Fruit is developed gradually and are ripe in end of August to beginning of September. Leaves are shed in the cold months of December-January.

Invasive category/local potential threat

Moderate. While they escape readily, their presence is usually restricted to rubble walls and artificial environs, and only a small proportion actually naturalise in natural habitats.

Possible control methods

Pruning branches out then chopping away the main stem. It is very difficult to uproot individuals because their roots are deep inside crevices and fissures of rock or between stones of rubble walls.

Remarks

Other grapevine species such as *V. vinifera* L. and *V. vulpina* L. are also present in the Maltese Islands, but *V. rupestris* is the most successful to naturalise in natural habitats. *V. rupestris* can be locally invasive where its long branches and numerous wide leaves forms a curtain that impede other vegetation to receive sunlight and grow properly. A number of varieties are said to be found only in Malta (Borg 1927), but many have been lost. Two important local varieties which are still very popular are called *Girgentina* and *Gellewza*.

Referenced bibliography

- Ardenghi N.M.G., Banfi E. & Galasso G., 2015. A taxonomic survey of the genus *Vitis* L. (Vitaceae) in Italy, part II: the 'Euro-American' hybrids. *Phytotaxa*, 224 (3): 232-246.
- Ardenghi N.M.G., Galasso G., Banfi E., Zoccola A., Foggi B. & Lastrucci L., 2014. A taxonomic survey of the genus *Vitis* L. (Vitaceae) in Italy, with special reference to Elba Island (Tuscan Archipelago). *Phytotaxa*, 166 (3):163-198.

Ardenghi, N. M., & Cauzzi, P., 2015. Alien grapes (*Vitis*, Vitaceae) in Sicily (Italy): novelties for the Sicilian and Mediterranean flora. *Natural History Sciences*, 2(2), 137-148.

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Washingtonia filifera (Gloner ex Kerch., Burv., Pynaert, Rodigas & Hull) de Bary



(Spermatophyta >> Liliopsida
(Commelinids) >> Arecales >> Arecaceae)
Phylum >> Class >> Order >> Family >>
Subfamily

Main synonyms

Brahea dulcis J. G.Cooper; *Brahea filamentosa* Kuntze.

Common English names

Northern Washingtonia, California Fan palm, Desert fan palm.

Common Maltese names

Palma tal-Imrewħa Americana.

Common Italian names

Palma californiana, Palma filifera.

Short description

Monoecious tree, up to 20 m tall, typically palm-shaped with a wide canopy. Trunk uniform in diameter, slightly widening at the base, 50–120 cm wide, excluding the petioles of pruned leaves or entire dead leaves, which naturally persist and droop down in the upper third portion of the tree. Crown open but dense, roughly forming a spherical outline (unless pruned). Leaves fan-shaped, glabrous, green with a slight greyish tone, formed by 60-75 linear and pleated segments fused about half or two-thirds of their length, then free as slender and acuminate lobes, usually drooping or pendulous, and with long, curly, pale-yellow threads hanging down from the margins of the free ends and the sinus between the leaf segments. Leaf petiole plano-convex, robust and fibrous-woody, polished, lined with incurved, hard, yellowish to amber-brown, spinous teeth and terminating into a triangular-rhombic hastula, usually glabrous in pure breeds. Inflorescence drooping spiciform or narrow paniculate racemes, much longer from the leaves. Flowers white, shortly petiolate and sessile, trimerous, composed of a 3-lobed campanulate calyx and a papery corolla with three petals fused at the base, 6–8 mm long. Stamens 6, protruding away from the perianth with versatile, pinkish-cream anthers, 2 mm long. Fruit blackish-brown, spherical, laterally compressed, approximately 8 × 6 mm in size, hard.

Place of origin and global distribution

Northern Mexico and states of California and Arizona (southwest states of USA).

Distribution in Malta

Widespread ornamental tree, mostly cultivated in touristic sites, hotels and coastal areas.

Distribution in Sicily

Widespread ornamental tree, mostly cultivated in touristic sites and gardens in coastal areas and naturalised in several places such as Palermo (Domina et al., 2019) and Siracusa (Minissale et al 2015).

Life-form

Phanerophyte.

Introduction source

Introduced as an ornamental tree.

Habitat or preferred invading habitat

Have been observed in different habitats, including garigue, rocky valley sides, abandoned gardens and farmhouses, but seems to prefer most exposed valley beds free from *Arundo donax*.

Frequency in Malta

Scarce in the wild but increasing significantly in several habitats, especially in valley beds.

Frequency in Sicily

Common as cultivated plant (Giardina et al. 2007) but rare as naturalised.

Mode of dispersion

By seed dispersed by wind, water streams and possibly by birds.

First record in Malta

Historic literature (e. g. Borg 1925; Haslam et al. 1977) only mentions the closely related *Washingtonia robusta* as an ornamental tree, and it is uncertain if at those times, authorities confused the two species as both being *W. robusta* or if *W. filifera* was otherwise a recent introduction in Malta. Not given much emphasis in old literature, *Washingtonia* trees were probably not popular trees in the past. One of the first publications mentioning this species is that by Mifsud (1995), stating that these palms are gaining popularity, indicating that *W. filifera* may have been introduced some years earlier.

First record in Sicily

In the herbarium of Palermo there is a sample collected in Giardino Garibaldi in 1892 which could be the first record, although it was likely a cultivated specimen.

Ecology

Trees are perennial but produce flowers once per year, more or less in May-June, and they form the fruit later in early summer.

Possible control methods

Uprooting or logging from the base.

Invasive category/local potential threat

Moderate. (See remarks)

Remarks

Up to the early years of the 2000, the seeds of this species have been known to germinate, but then the plantlets do not survive the winter. Seeds germinate in early autumn after the first rains and again in early spring, which climatically is similarly warm. The spring germinated plants do not survive the arid and hot summer, while the autumn germinated plantlets die probably because of the long



periods of coldness, where temperatures below 10° C used to persist in January and February and early March. In fact, there were no records of spontaneous occurrences of *Washingtonia* spp. in Malta until the last 8–10 years, when naturalised specimens started to be spotted in several rural sites and by now have matured to established flowering trees. Spontaneous occurrences have also been seen at the sides of trees and even water gullies and culverts. This recent naturalisation is probably attributed to mild winters that occurred since about 2010 when the cold frame was not long or harsh enough to kill the autumn-germinated plants. The lack of substantial rain in January and February during this period of years might have also contributed since flooding and cold soil act against the survival of germinated plantlets. When they survive the first year, the trees become hardy and establish into mature trees a few years later.

Referenced bibliography

- Borg J., 1925. Gardening in Malta. Self-published, Malta, 183 pp.
- Domina G., Di Gristina E., Scafidi F., Calvo R., Venturella G. & Gargano M. L., 2019. The urban vascular flora of Palermo (Sicily, Italy). *Plant Biosystems*, 154 (5): 627-634. DOI: 10.1080/11263504.2019.1651787.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Bocconea*, 20:5-582.
- Haslam S. M., Sell P. D. & Wolseley P. A. W., 1977. A Flora of the Maltese Islands. Malta University Press, Malta, 560 pp.
- Mifsud S., 1995. Palms of the Maltese Islands. *Principles*, 39 (4): 190-196.
- Minissale P., Trigilia A., Brogna F., Sciandrello S. (2015) Plants and Vegetation in the Archaeological Park of Neapolis of Syracuse (Sicily, Italy): A Management Effort and also an Opportunity for Better Enjoyment of the Site. *Conservation and Management of Archaeological Sites*, 17 (4): 340-369.

Xanthium strumarium L.



(Spermatophyta >> Asterids (Campanulids)
>> Asterales >> Asteraceae)
Phylum >> Class >> Order >> Family

Main synonyms

Xanthium strumarium L. subsp. *italicum* (Moretti) D. Löve; *Xanthium orientale* L. subsp. *italicum* (Moretti) Greute *Xanthium americanum* Walt.; *Xanthium commune* Britton; *Xanthium echinatum* Murray; *Xanthium indicum* D. C.; and some 100 other synonymous taxa all under the genus of *Xanthium*.

Common English names

Common cocklebur, Large cocklebur, Rough cocklebur.

Common Maltese names

Ħobbejża falza.

Common Italian names

Vite rupestre.

Short description

Annual, dioecious herbs, 30-160 cm tall, mostly covered with scabrid or short appressed, tough hair giving the plant a slightly greyish colour. Leaves with long petioles, 5–10 cm long; lamina ovate-deltate, 10–22 cm long with a shallowly cordate or broadly cuneate base, acute apex and irregularly lobed, denticulate margin. Male flowers arranged in apical clusters, very small, tubular, and clustered as spherical heads covered with white, brown anthers; involucre phyllaries in 1 series, narrowly lanceolate, about 2 mm long. Female flowers at leaf axils, with similarly-shaped phyllaries, but 3 mm long, also clustered as a spherical head, greenish-beige and not showy. Fruit a floatable bur, oblong-elliptic, 12–20 mm long, 5–12 mm wide, covered with tough spine-like bristles ending with a tiny hook and with 2 horn-shaped beaks at the apex.

Place of origin and global distribution

Worldwide distribution where its origin is not certain but believed to be Central America.

Distribution in Malta

Wied il-Fiddien, Wied il-Qlejgħa, Wied l-Isperanza, Wied il-Għasel. Currently absent in Gozo.

Distribution in Sicily

Common in many fluvial and coastal sandy areas.

Life-form

Therophyte.

Introduction source

Not known, assumably from agricultural products in the mid-20th century.

Habitat or preferred invading habitat

Valley floors, especially near dams where stagnant water is still present in late spring. Uncultivated land, ruins and sandy areas near the sea.

Frequency in Malta: Locally frequent in some valley systems (absent in other habitats).

Frequency in Sicily

Very common (Giardina et al. 2007).

Mode of dispersion

Seeds dispersed by water streams and possibly with furry animals.

First record in Malta

Lanfranco (1969).

First record in Sicily

Zodda (1928).

Ecology

Plants germinate and grow at the end of spring and are in flower in early summer. Plenty of seeds is released where they initially are not dispersed. With the first heavy rains in autumn, the gush of water carries the buoyant fruit down the valley. The fruit also has tiny, strong hooks at the tips of the bristle and can adhere to clothes or furry animals, hence another possible means of dispersion. In autumn, plants die off when fruiting is over, and valley beds are flooded again.

Possible control methods

Uprooting when the plants are young. It may take many years of persistent removal until the seed bank is exhausted.

Invasive category/local potential threat

Moderate.

Remarks

Not recorded in historic literature, hence it is assumed that it was introduced sometime in the mid-20th century, later recorded by Lanfranco (1969) from Chadwick Lakes. The population has then spread in adjacent valleys and has become invasive in certain parts with dams or ponds of stagnant water. However, being a summer plant, the damage to native flora that is mostly not in leaf in summer is minimal. Its presence in a controlled manner may have a beneficial value to some fauna. Seeds germinate in successive years. The

closely related *Xanthium spinosum* L. is distinct for its long spines is also recorded from the Maltese Islands and is a much rarer species and was not seen for many decades until a few plants were recently recorded in Gozo (Mifsud 2009).

Referenced bibliography

Lanfranco G., 1969. Field Guide to the Wild Flowers of Malta. Progress Press, Malta, 146 pp.

Mifsud S., 2009. Update on Maltese flora (Central Mediterranean) including very rare species or species thought to be extinct from mainland Malta or its islands. *The Central Mediterranean Naturalist*, 5 (1): 7-16.

Zodda G., 1928. Notizie sulla flora di Siracusa. *Annuario del R. Liceo Scientifico "OM Corbino", Siracusa (Anni scolastici 1925-26 e 1926-27)*, 2: 71-113.



Yucca gloriosa L.



(Spermatophyta >> Liliopsida >> Aspargales >>
Asparagaceae)
Phylum >> Class >> Order >> Family

Main synonyms

Yucca acuminata Sweet; *Yucca acutifolia* Truff.; *Yucca ellacombei* Baker; *Yucca ensifolia* Groenl.; *Yucca integerrima* Stokes; *Yucca obliqua* Haw.; *Yucca patens* André; *Yucca plicata* (Carrière) K.Koch; *Yucca plicatilis* K.Koch; *Yucca pruinosa* Baker; *Yucca superba* Haw.; *Yucca tortulata* Baker.

Common English names

Spanish dagger; Mound Lily.

Common Maltese names

Jukka.

Common Italian names

Jucca; Giucca.

Short description

Evergreen, tree-like shrub giving rise to erect, woody branches that

may reach up to 3 m in height. Stem restricted at the base, distinctly thickened in mature examples giving rise to 2–8 erect branches. Bark thin, light greyish-brown, rough, longitudinally fissured. Leaves numerous and clustered at the upper part of the branches, caducous, ensiform and usually slightly canaliculate with a broadened spatulate base, 25–65 × 3–4 cm, stiff, dark green, glabrous, armed with a scabrous to denticulate margin made up of stiff teeth and a tough spine at the tapering tip. Inflorescence a terminal erect panicle about 1–2 m long, forming several pendulous, white, bell-shaped flowers about 2 cm long and 1.5 cm in diameter. Fruit is a tough ellipsoid berry but is seldom formed in Malta.

Place of origin and global distribution

Warm temperate to subtropical parts of southeastern North America. Widely cultivated in warm regions throughout the world, including the Mediterranean basin.

Distribution in Malta

Found in many places throughout mainland Malta and Gozo, practically in every locality. Few specimens are also found cultivated in Comino.

Distribution in Sicily

Cultivated in gardens, naturalised in gardens and roadsides (Giardina et al 2007).

Life-form

Nanophanerophyte (sometimes phanerophyte).

Introduction source

Introduced in Malta as a low-maintenance ornamental tree.

Habitat or preferred invading habitat

Species seems to grow anywhere so far there is enough soil depth. It is mostly found close to anthropogenic activity, namely in fields (including derelict fields and field margins), farms and farmhouses, disturbed ground, valley sides close to roads, and occasionally in hunting areas or near bird trapping sites.

Frequency in Malta

Frequent and becoming common.

Frequency in Sicily

Uncommon (Giardina et al 2007).

Mode of dispersion

Mature plants have not been seen to form fruit. Propagation is only by vegetative means through cultivation or trashed plants in natural ecosystems.

First record in Malta

Borg (1922) mentions it as a cultivated plant and later occurring growing on its own in abandoned gardens (Borg 1927).

First record in Sicily

Naturalised in Sicily (Viegi & Cella Renzoni 1981).

Ecology

Mature individuals flower once every summer, but do not develop any fruit. They reach maturity in a short period of time and can reach full height in ten years if located in a sunny location with good edaphic conditions.



Possible control methods

Uprooting trees and destroying the thick roots below ground. Could be very challenging and expensive due to the large size of mature trees and proliferating roots.

Invasive category/local potential threat

Low-Moderate.

Remarks

This tree gained popularity after the seventies when it was originally used as an indoor or garden plant in houses. It seems that later, its cultivation progressed outdoors into fields, farm houses and rural areas, and recently, *Yucca* spp. started to be used as a hedging plant at margins of fields and groves (e. g. at Wied Qirda, and Ghajn Hadid). *Yucca* is met frequently in many sites and occurrences are increasing rapidly in the Maltese Islands; however, the species does not propagate on its own, and all examples are derived through man-mediated activities; either through direct cultivation or from dumped plants in natural habitats. The stems are very resilient, and chopped sections of the stem can readily regenerate to an individual if it is in contact with damp soil. Moreover, trees are incredibly difficult to get rid of once they get hold to the ground and are fully developed.

Another *Yucca* species that is frequently cultivated in Malta and also found here and there spontaneously in rural areas is *Yucca aloifolia* L. Compared to *Y. gloriosa*, *Y. aloifolia* can grow up to 6 m high, has narrower and brighter green leaves with margins that are more sharply denticulate and a longer and more dangerous apical spine, usually brown and lignified. Flowers of *Y. aloifolia* are tinged in purple while they are mostly white in *Y. gloriosa*. *Yucca filamentosa* L. and *Yucca elephantipes* Regel are other species found in cultivation but not frequent. Other *Yucca* species may have been recently imported and may soon become established in local ecosystems in the same route as *Y. gloriosa* and *Y. aloifolia*.

Referenced bibliography

- Borg J., 1922. Cultivation and diseases of fruit trees in the Maltese Islands. Government Printing Office, Malta, 622 pp.
- Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.
- Giardina G., Raimondo F. M. & Spadaro V., 2007. A catalogue of plants growing in Sicily. *Boccone*, 20:5-582.
- Viegi L., Cela-Renzoni G. & Garbari F. 1974. Flora esotica d'Italia. *Lavori società italiana di Biogeografia*, n.ser., 4: 125-220.

Zantedeschia aethiopica (L.) Sprengel



(Spermatophyta >> Liliopsida >> Arales >> Araceae)
Phylum >> Class >> Order >> Family >> Subfamily

Main synonyms

Calla ambigua Salisb.; *Calla moschata* Moench; *Colocasia aethiopica* (L.) Link; *Pseudohomalomena pastoensis* A.D. Hawkes; *Richardia africana* Kunth.

Common English names

Calla Lily; Arum Lily; Trumpet Lily.

Common Maltese names

Buqari; Zantedeskja.

Common Italian names

Calla; Calla colorata; Falsa calla; Giglio del Nilo; Giglio-calla.

Short description

Rhizomatous, perennial, aquatic plants, completely glabrous, up to 80 cm tall (can get taller in shaded areas). Leaves with a long, robust, green petiole giving rise to a single large leaf, 10–30 cm long and 8–20 cm broad, completely dark green (without colouration or patterns), glossy, broadly ovate-deltate with a hastate to cordate base and acute to blunt tip. Flowering peduncle 30–60 cm long, triangular cross-section, glabrous. Spathe about 18 × 14 cm white sometimes with a hint of cream hue light green at the base, folded below the insertion of the spadix, acuminate at the tip. Spadix sessile, the male part about 8 cm long, the female part below, about 2 cm long. Male flowers with golden yellow anthers (but pollen is whitish). Female flowers yellowish-green, with globose ovaries. Fruit globular, 1.0–1.4 cm across, green then orange-straw colour, each giving rise to about 10 bright yellow, pip-shaped seeds.

Place of origin and global distribution

Native to southern countries of Africa, namely Mozambique, Lesotho, South Africa, and Eswatini. It has become naturalised in neighbouring countries in Africa and Australasia (considered a toxic alien weed), and the Mediterranean region.

Distribution in Malta

Known from a few localities such as Wied il-Baħrija; Wied Għollieqa (removed during valley restoration project); Wied tal-Ġnejna; Wied Ta' Cianti (Gozo), Wied ta' Marsalforn, and also at Comino, close to the disused pumping station.

Distribution in Sicily

reported from few localities such as Nature Reserve Pizzo Cane close to Palermo (Caldarella et al. 2013), city of Ragusa (Licitra & Napoli 2011).

Life-form

Geophyte.

Introduction source

Cultivated ornamental plants.

Habitat or preferred invading habitat

Shallow valleys with long-lasting watercourses, damp sites in agricultural areas, abandoned gardens or old farmhouses.

Frequency in Malta

Rare-scarce but increasing constantly.

Frequency in Sicily

Rare as naturalised plant.

Mode of dispersion

Dumped plants or deliberately planted for the harvest of their flowers.

First record in Malta

Borg (1927) under the name *Richardia aethiopica*, which was reported as self-sowing and naturalised.

First record in Sicily

Not reported.

Ecology

Plants are perennial and produce flowers throughout winter and spring. Seeds are fertile and can give rise to new plants. However, highly vegetated valley beds offer a strong competition for seeds to germinate, and as a result, populations are not so extensive in the wild. They are more successful in fields and open ground, although they need shade and a moist environment to thrive.

Possible control methods

Uprooting plants with rhizomes.

Invasive category/local potential threat

Moderate.

Remarks

Popular for its flowers used in decorating churches for Good Friday and flower arrangements for funeral ceremonies, hence explaining the deliberate cultivations here and there. Naturalised populations in some shallow valleys could be a result of dumped plants but deliberate cultivation for obtaining and use flowers cannot be excluded.

Referenced bibliography

Borg J., 1927. Descriptive Flora of the Maltese Islands. Government Stationery Office, Malta, 846 pp.

Caldarella O., Gianguzzi L., Romano S. & Fici S., 2013. The vascular flora of Nature Reserve "Pizzo Cane, Pizzo Trigna and Grotta Mazzamuto" (NW Sicily). *Webbia*, 64: 101-151.

Licitra G. & Napoli M., 2011. Flora spontanea della città di Ragusa. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 44 (373): 227-278.



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