Correspondence

Fl. Medit. 32: 73-78
https://doi.org/10.7320/FlMedit32.073
Version of Record published online on 30 June 2022

S. Cambria, G. Giusso del Galdo, P. Minissale, S. Sciandrello & G. Tavilla

Lablab purpureus (*Fabaceae*), a new alien species for Sicily

Abstract

Cambria, S., Giusso del Galdo, G., Minissale, P., Sciandrello, S. & Tavilla, G.: *Lablab purpureus* (*Fabaceae*), a new alien species for Sicily. — Fl. Medit. 32: 73-78. 2022. — ISSN: 1120-4052 printed, 2240-4538 online.

Lablab purpureus (*Fabaceae*) is a species native to tropical Africa, but widely cultivated and naturalized in many tropical and sub-tropical countries. We report the occurrence of this species for the first time in Sicily, close to the town of Palermo. The population seems to be well established and takes part to a sub-nitrophilous vegetation dominated by *Oloptum miliaceum*, representing the first case of naturalization of this species in Italy.

Key words: biological invasion, naturalization, invasive species, Italy, vascular flora, xenophytes.

Introduction

Lablab Adans. is a monotypic genus that includes only one species, i.e., *Lablab purpureus* (L.) Sweet (Moteetee & Van Wyk 2012). Previously, it was included within the genus *Dolichos* L., but morphological, nomenclatural, and molecular surveys showed that the two genera should be separated (Verdcourt 1968, 1970; Wojciechowski & al. 2004). Actually, *Lablab* can be distinguished from *Dolichos* and related genera by several characters including a blade-like style, a non-penicillate stigma and verrucose pod margins (Verdcourt 1978). Some authors (Verdcourt 1970; Maass & al. 2005) and databases (POWO 2021; PROTA 2022) recognized the occurrence of three different subspecies within this taxon, although Amkul & al. (2021) deny their existence on the basis of genetic investigations.

During floristic investigation focused on the alien flora in Sicily, we unexpectedly found a huge population of *L. purpureus*. This species is probably indigenous to tropical Africa, but is widely cultivated in tropical and subtropical regions of the world (CABI 2021; POWO 2021). It is a crop whose use as food has been reported in India prior to 1,500 BC and in Egyptian Nubia from the 4th century AD (Maass & al. 2010). In fact, it is well known the food use of its unripe beans and seeds, which have also an important medicinal value for dissolving kidney stones (Bobos 2016; Bobos & Ivanitskaya 2018). Besides, *L. purpureus* is characterized by several qualities that make it an excellent forage also for dry areas. It is drought resistant and adaptable to different environmental conditions, staying green during the dry season (Murphy & Colucci 1999). According to the literature, the

species has been introduced and is often a weed in many areas, such as India, China, Central and South America, Australia, Indonesia, Thailand, Pacific Islands, Cape Verde, etc. (Sánchez-Pinto & al. 2005; Celesti-Grawpow & al. 2009; POWO 2021). In some areas it is of considerable economic interest, representing for instance the third most significant vegetable in central and south-western regions of Bangladesh (Rashid & al. 2007).

As concerns the European countries, this species is generally cultivated only as an ornamental plant and was reported as naturalized in the Canary Islands and Madeira (Borges 2008; Verloove 2013). In the Italian territory, *L. purpureus* is hitherto recorded only in Lombardy (N Italy) as casual alien (Banfi & Galasso 2010; Galasso & al. 2018), while previously Fiori (1925) reported it only as a cultivated plant. Therefore, our finding is the first record for Sicily and the earliest naturalized population in Italy.

Material and Methods

We carried out the study of the new wild population on living material. The specimens are stored in the Herbarium of the University of Catania (CAT, herbarium acronyms follow Thiers 2021). The taxonomical identification was made following several papers and floras regarding this taxon (Verdcourt 1970, 1978; Laguna-Lumbreras 2001; Wu & Thulin 2010; Hyde & al. 2021). We mapped the distribution range of the species and its area of occupancy (AOO) in Sicily by using QGIS tools (QGIS.org 2021). According to the phytosociological method (Braun-Blanquet 1964), the vegetation in which the species occurs was investigated. Furthermore, the risk assessment protocol for invasive alien species was used to identify the risk class (Weber & Gut 2004).

Results and Discussion

Lablab purpureus (L.) Sweet in Hort. Brit., ed 1, pt. 2: 481, (1826).

Synonyms: *Dolichos lablab* L., Sp. Pl.: 725 (1753); *Dolichos purpureus* L., Sp. Pl., ed. 2, 2: 1021 (1763); *Lablab niger* Medik. in Vorles. Churpf. Phys. Ges. 2: 354 (1787); *Lablab vulgaris* Savi in Nuov. Giorn. Lett. (Pisa) 8: 116, fig. 8/a-c (1824); *Vigna aristata* Piper, Contr. U.S. Natl. Herb. 22: 665 (1926).

Lablab purpureus is an annual or short-living perennial plant, with leaves alternate, trifoliate, flowers in axillary inflorescences, whitish-purple to purple, style not winged along the margins and legumes oblong-falcate, usually verrucose along the margins, seeds 3–5, oblong, with hilum linear (Verdcout 1970; Wu and Thulin 2010). The occurrence of *L. purpureus* in Italy is known only for a locality in Lombardy region. In particular, just a single plant was observed in Milan city along the roadsides, probably arising from seeds accidentally dropped by a plant cultivated in the nearby ornamental gardens (Banfi & Galasso 2010). During fieldwork in north-western Sicily, we found a consistent population of *L. purpureus* constituted by almost one hundred plants, growing along a roadside near Altavilla Milicia (Palermo, 38° 2’36.41”N 13°33’25.51”E; see Figs. 1, 2).

Fig. 1. Distribution map of *L. purpureus* in Sicily.

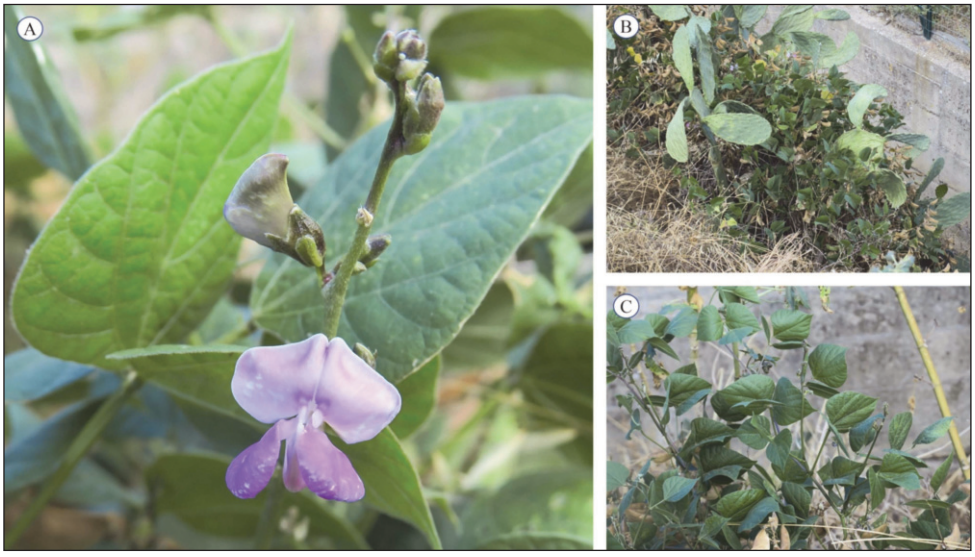

Fig. 2. *Lablab purpureus* from Sicily: **A)** details of flower; **B)** habitus; **C)** leaves.

In particular, the species colonizes a clayey slope at an altitude of 18 m a.s.l., covering a surface of about 250 m^2. It is linked to a plant community characterized by other allochthonous taxa, such as *Ricinus communis* L., *Boerhavia coccinea* Mill., and *Opuntia ficus-indica* (L.) Mill. (Table 1). It is a typical alien-dominated phytocoenosis (Viciani & al. 2020) with a mainly summer-autumn blooming behavior, linked to really disturbed stands with soils particularly rich in nitrates. This community can be ascribed to *Boerhavio-Oryzopsietum miliaceae* Brullo 1984, included in the *Bromo-Oryzopsion miliaceae* O. Bolòs 1970 alliance (Brullo 1984). This association was recorded almost 40 years ago in the Palermo area and today, as we observed, it is widely spread in many sites all around Sicily, especially along coastal roadsides. *L. purpureus* increases the alien biodiversity of this plant community. In our research, we applied one weed risk assessment approach. Based on the methodology described by (Weber & Gut 2004), sum of points for the *L. purpureus* in Italy amounted 22/39, and the species can be categorized as intermediate risk, therefore, it requires further observation. According to the classification by Pyšek & al. (2004), the population of *L. purpureus* in Sicily should be considered as naturalized. The data in our possession suggest that the species has been present for at least three years in this locality, probably escaped from some nearby gardens where it could have been used as an ornamental. The species bears fruit regularly and can be assumed that its local spread is linked mainly to seeds dispersion. In conclusion, the occurrence and the spread of *L. purpureus* in Sicily need to be adequately monitored, since it may represent a future risk to natural and semi-natural ecosystems, and it could invade the nearby areas.

Table 1. Phytosociological relevés of plant community with *L. purpureus* in Sicily.

Relevés	1	2
Area (mq)	50	50
Altitude (m a.s.l.m)	18	18
Slope (%)	40	40
Lablab purpureus (L.) Sweet	2	2
Oloptum miliaceum (L.) Röser & H.R. Hamasha	2	1
Opuntia ficus-indica (L.) Mill.	.	3
Boerhavia coccinea Mill.	1	1
Ricinus communis L.	1	.
Erigeron bonariensis L.	.	+

Specimina visa

ITALY: Sicily, Altavilla Milicia (Palermo), roadsides near the tollbooth of the motorway, 38° 2'36.41"N 13°33'25.51"E, 18 m a.s.l., 14 July 2021, *S. Cambria s. n.* (CAT).

Acknowledgements

A special thanks to Dr. Gabriele Galasso, who provided information on the distribution of the species in Lombardia region. This research was carried out within the project INTERREG V-A ITALIA-MALTA 2014-2020 Axis III – Objective 3.1 FAST - Fight Alien Species Transborder CUP: E99C20000160005

References

Amkul, K, Sookbang J. M. & Somta P. 2001: Genetic diversity and structure of landrace of lablab (*Lablab purpureus* (L.) Sweet) cultivars in Thailand revealed by SSR markers. – Breed Sci. **71(2):** 176-183. 10.1270/jsbbs.20074.

Banfi, E., Galasso, G. 2010: La flora esotica lombarda. – Milano.

Bobos, I.M., Ivanitsky, A. R. 2018: Qualitative estimation of beans and seeds of Dolichos. – Modern Sci. Res. Agric. (Yolnat PE, Minsk) **4:** 38-40. https://doi.org/10.2478/v10032-010-0016-9

Braun-Blanquet, J. 1964: Pflanzensoziologie. Grundzüge der Vegetationskunde [Plant Sociology. Basic Course of Vegetation Science]. – Wien & New York.

Borges, P. A. 2008: Listagem dos fungos, flora e fauna terrestres dos arquipélagos da Madeira e Selvagens. – Lisbona.

Brullo, S. 1984: L'alleanza *Bromo-Oryzopsion miliaceae* in Sicilia. – Boll. Acc. Gioenia Sci. Nat. Catania **17(323):** 239-258.

CABI, 2021: *Lablab purpureus* (hyacinth bean). In: Invasive Species Compendium. – Wallingford, UK.

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. – Pl. Biosyst. **143(2):** 386-430. https://doi.org/10.1080/11263500902722824

Fiori, A. 1925: Nuova Flora Analitica d'Italia, **1.** – Firenze.

Galasso, G., Conti, F., Peruzzi, L., Ardenghi, N. M. G., Banfi, E., Celesti-Grapow, L., Albano, A., Alessandrini, A., Bacchetta, G., Ballelli, S., Bandini Mazzanti, M., Barberis, G., Bernardo, L., Blasi, C., Bouvet, D., Bovio, M., Cecchi, L., Del Guacchio, E., Domina, G., Fascetti, S., Gallo, L., Gubellini, L., Guiggi, A., Iamonico, D., Iberite, M., Jiménes Mejías, P., Lattanzi, E., Marchetti, D., Martinetto, E., Masin, R. R., Medagli, P., Passalacqua, N. G., Peccenini, S., Pennesi, R., Pierini, B., Podda, L., Poldini, L., Prosser, F., Raimondo, F. M., Roma Marzio, F., Rosati, L., Santangelo, A., Scoppola, A., Scortegagna, S., Selvaggi, A., Selvi, F., Soldano, A., Stinca, A., Wagensommer, R.P., Wilhalm, T. & Bartolucci, F. 2018: An updated checklist of the vascular flora alien to Italy. – Pl. Biosyst. **152(3):** 556-592. https://doi.org/10.1080/11263504.2018.1441197

Hyde, M.A., Wursten, B.T., Ballings, P. & Coates Palgrave, M. 2021: Flora of Zimbabwe: Species information: *Lablab purpureus* subsp. *uncinatus* var. *uncinatus*. – https://www.zimbabweflora.co.zw/speciesdata/species.php?species_id=132450 [Last accessed 26 October 2021]

Laguna-Lumbreras, E. 2001: Sobre el frijol flamenco o careto, *Lablab purpureus* (L.) Sweet, en tierras valencianas. – Fl. Montiberica **17:** 12-20.

Maass, B. L., Jamnadass, R. H., Hanson, J. & Pengelly, B.C. 2005: Determining sources of diversity in cultivated and wild *Lablab purpureus* related to provenance of germplasm by using amplified fragment length polymorphism (AFLP). – Genet. Resour. Crop Evol. **52**: 683-695.

—, Knox, M. R., Venkatesha, S. C., Tolera Angessa, T., Ramme, S., & Pengelly, B. C. 2010: *Lablab purpureus*—A Crop Lost for Africa? – Trop. Pl. Biol. **3:** 123-135. https://doi.org/10.1007/s12042-010-9046-1

Moteetee, A. N. & Van Wyk, B. E. 2012: A revision of the genus *Dolichos* (*Fabaceae*, *Papilionoideae*, *Phaseoleae*), including Lesotho and Swazilan. – S. Afr. J. Bot. **78:** 178-194. https://doi.org/10.1016/j.sajb.2011.06.012

Murphy, A. M., Colucci, P. E. 1999: A tropical forage solution to poor quality ruminant diets: A review of *Lablab purpureus*. Livestock. – Res. Rural Developm. **11:** 96-113.

POWO 2021: Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. – http://www.plantsoftheworldonline.org/ [Last accessed 21 October 2021].

PROTA 2022: Plant Resources of Tropical Africa. – https://www.prota4u.org/database/ [Last accessed 07 June 2022].

Pyšek, P., Richardson, D. M., Rejmánek, M., Webster, G. L., Williamson, M., & Kirschner, J. 2004: Alien plants in checklists and floras: towards better communication between taxonomists and ecologists. – Taxon **53(1):** 131-143. https://doi.org/10.2307/4135498

QGIS.org, 2021. QGIS Geographic Information System. – http://qgis.org

Rashid, M. A., Tauhidur Rahman, M., Shahadad Hussain, M. & Motiur Rahaman, M. 2007: Indigenous vegetables in Bangladesh. – ISHS Acta Hort **752:** 397-400.

Sánchez-Pinto, L., Leticia Rodríguez, M., Rodríguez, S., Martín, K., Cabrera, A. & Cármen Marrero, M. 2005. Pteridophyta, Spermatophyta. – Pp. 38-57 in: Arechavaleta, M., Zurita, N., Marrero, M. C. & Martín, J. L. (eds), Lista preliminar de especies silvestres de Cabo Verde (hongos, plantas y animales terrestres). – Santa Cruz de Tenerife.

Verdcourt, B. 1968: The identities of *Dolichos trilobus* L. and *Dolichos* L. by *Dolichos trilobus* L. pro parte. – Taxon **19(2):** 297-298. https://doi.org/10.2307/1216508

— 1970: Studies in the Leguminosae-Papilionoïdeae for the 'Flora of Tropical East Africa': III. – Kew Bull. **24(3):** 379-447. https://doi.org/10.2307/4103150

— 1978: The classifications of *Dolichos* L. emend. Verdc., *Lablab* Adans., *Phaseolus* L., *Vigna* Savi and their Allies. – Pp. 45-48 in: Summerfield, R. J. & Bunting, A. H. (eds), Advances in Legume Science. – Kew,.

Verloove, F. 2013: New xenophytes from Gran Canaria (Canary Islands, Spain), with emphasis on naturalized and (potentially) invasive species. – Coll. Bot. **32:** 59-82. https://doi.org/10.3989/collectbot.2013.v32.006

Thiers, B. 2021: Index Herbariorum: A global directory of public herbaria and associated staff. - http://sweetgum.nybg.org/ih/ [Last accessed 26/10/2021].

Viciani, D., Vidali, M., Gigante, D., Bolpagni, R., Villani, M., Acosta, A. T. R., Adorni, M., Aleffi, M., Allegrezza, M., Angiolini, C., Assini, S., Bagella, S., Bonari, G., Bovio, M., Bracco, F., Brundu, G., Buffa, G., Caccianiga, M., Carnevali, L., Ceschin, S., Ciaschetti, G., Cogoni, A., Di Cecco, V. D., Foggi, B., Frattaroli, A.R., Genovesi, P., Gentili, R., Lazzaro, L., Lonati, M., Lucchese, F., Mainetti, A., Mariotti, M., Minissale, P., Paura, B., Pellizzari, M., Perrino, E. V., Pirone, G., Poggio, L., Poldini, L., Poponessi, S., Prisco, I., Prosser, F., Puglisi, M., Rosati, L., Selvaggi, A., Sottovia, L., Spampinato, G., Stanisci, A., Stinca, A., Venanzoni, R. & Lastrucci, L. 2020. A first checklist of the alien-dominated vegetation in Italy. – Pl. Sociol. **57:** 29-54. https://doi.org/10.3897/pls2020571/04

Weber, E. & Gut, D. 2004: Assessing the risk of potentially invasive plant species in central Europe. – J. Nat. Cons. **12:** 171-179. https://doi.org/10.1016/j.jnc.2004.04.002

Wojciechowski, M.F., Lavin, M. & Sanderson, M.J. 2004: A phylogeny of Legumes (*Leguminosae*) based on analysis of the plastid matK gene resolves many well-supported subclades within the family. – Amer. J. Bot. **91(11):** 1846-1862. https://doi.org/10.3732/ajb.91.11.1846

Wu, D. & Thulin, M. 2010: *Lablab* Adanson. – Pp. 253 in: Wu, Z.Y., Raven, P. H. & Hong, D. Y. (eds), Flora of China, **10.** – Beijing, St. Louis.

Address of the authors:
Salvatore Cambria*, Gianpietro Giusso del Galdo, Pietro Minissale, Saverio Sciandrello & Gianmarco Tavilla,
Department of Biological, Geological and Environmental Sciences, University of Catania, Via A. Longo 19, 95125 - Catania, Italy.
* Corresponding author, E-mail: cambria_salvatore@yahoo.it