ANNALS OF THE UNIVERSITY OF CRAIOVA

Series: ✓*Biology*
✓*Horticulture*
✓*Food products processing technology*
✓*Environmental engineering*

Vol. XXXI (LXVII) – 2026

FROM CULTIVATION TO SPONTANEOUS FLORA: HORTICULTURAL USE AND NATURALIZATION OF ALIEN SOLANACEAE SPECIES IN ROMANIA

Nagodă Eugenia[1]*, Urziceanu Mihaela[2], Anastasiu Paulina[2]
[1]Botanical Garden "D. Brandza" University of Bucharest, Romania
[2]Faculty of Biology, University of Bucharest, Romania
**Correspondence author. E-mail:* eugenia.nagoda@bio.unibuc.ro

Keywords*: allochthonous plants, Datura, invasive species, Lycium, Solanum*

ABSTRACT

This study examines how introduction purposes and pathways relate to the occurrence outside cultivation and naturalization of alien Solanaceae in Romania. Thirty taxa from 11 genera were assessed using published literature and the national POIM database covering the period 2020–2022. Information on uses, introduction pathways, establishment status, occurrence records and habitats was compiled. The taxa range from casual escapes to naturalized and invasive plants. Eighteen taxa were classified as casual, five as naturalized, five as lacking recent records and two as invasive: Datura stramonium and Lycium barbarum. Recently recorded Solanum elaeagnifolium also warrants attention because of its invasive potential. The synthesis highlights contrasting establishment outcomes among cultivated taxa and provides a basis for monitoring their persistence and spread in the Romanian flora.

INTRODUCTION

Solanaceae Juss. is a large family of eudicots containing 103 accepted genera (POWO 2026) and approximately 2,700 species including economically important crops such as potatoes, tomatoes, peppers, and eggplants (Olmstead et al. 2008, Poczai at al. 2022), widely distributed in tropical and temperate regions of the world, but mostly native to Central and South America (Olmstead et al. 2008).

Solanaceae have been used as food and medicinal plants for thousands of years and are also widely cultivated as ornamentals (Gebhardt 2016). The family includes numerous cultivated species with diverse agricultural uses (Heywood 1985, Carreño et al. 2007) and ranks among the most important plant families for human nutrition (Long Towell 2001, Trigo Pérez 2010).

Solanaceae is an important family for possessing countless ornamental, medicinal and nutritious species (Heywood 1993, Sauer 1994, Stinca 2020). Many solanaceous plants are vital sources of medicinal drugs, folk remedies, and hallucinogens, while wild and cultivated species, such as tobacco, are commonly used as stimulants. Several groups, such as petunia seasides, angel's trumpets, butterfly flowers, and Jerusalem cherry have been grown as ornamentals for centuries due to the aesthetic appeal of their flowers and berries (Poczai at al. 2022).

The family Solanaceae lists many species worldwide, of which 143 are considered weeds (Sheppard et al. 2006). *Solanum* L., with approximately 1,245 species widely distributed across the world, is the largest and most morphologically diverse genus of the Solanaceae (Olmstead et al. 1999, Hilgenhof et al. 2023). Besides economically important and globally cultivated crops, e.g., *S. lycopersicum* L., *S. melongena* L., and *S. tuberosum* L., some American species are noxious invasive weeds in the tropics and sub tropics of the Old World, e.g., *S. elaeagnifolium* Cav. (Sheppard et al. 2006), *S. rostratum* Dunal (Datiles 2014, Ozuzu et al. 2024). At the European level, *Solanum* is among the genera with the highest number of alien plant species, ranking seventh with 56 recorded species, including *Solanum elaeagnifolium* (Kalusová et al. 2024).

As well as unintentionally introduced species, active introduction has often occurred, usually associated with the design of gardens, urban green spaces, and peri-urban landscapes (Jones at al. 2024). Anthropic action is a factor that influences the biological invasion process, especially of ornamental species, because it acts as a facilitator for the spread of species beyond their native areas (Pyšek & Richardson 2006). Plant characteristics that make a plant interesting for gardeners, such as climatic suitability or quick propagation, may also promote a successful invasion. As a result, the rate of naturalization is higher in deliberately introduced plants as compared to accidental introductions (Kowarik 2003). For example, petunias are one of the most popular annual bedding plants in Europe and the United States. The great diversity seen today in flower colour, size and pattern as well as plant growth habit is the result of 170 years of breeding and selection, which adapted and continues to adapt this ornamental plant to the fancies of humans who love to decorate their windows, balconies and gardens with colorful flowering plants (Gebhardt 2016).

The Solanaceae family represents a relevant model for the analysis of the relationship between horticulture and the introduction of alien plants, as it includes numerous species cultivated for food, ornamental or medicinal purposes, but also taxa that have escaped from cultivation or have been accidentally introduced and established in the spontaneous flora. The study aims to determine to what extent the purpose and manner of introduction of the alien Solanaceae species are associated with the escape from cultivation and with their degree of naturalization in Romania.

In Romania, historical floras, national botanical syntheses and recent surveys provide information on alien Solanaceae occurrences (Ghișa 1960, Ciocârlan 2009, Sârbu et al. 2013, Anastasiu et al. 2024). Additional records continue to update this evidence, including the first Romanian records of *S. elaeagnifolium* in 2024 (Urziceanu et al. 2025). Bringing these sources together allows introduction histories and cultivation uses to be considered alongside establishment status, rather than treating occurrence records individually.

This study aims to synthesize and descriptively compare introduction pathways, reported cultivation purposes and naturalization status of alien Solanaceae taxa in Romania, with particular attention to their occurrence outside cultivation. Specifically, we compile a taxonomically explicit inventory, compare establishment categories between introduction and use groups, and identify uncertainties relevant to monitoring and interpretation.

MATERIALS AND METHODS

The study includes 30 non-native Solanaceae taxa reported in Romania, introduced intentionally for ornamental, food or medicinal uses, or accidentally. The inventory was compiled from historical Romanian floristic literature, publications on alien plants and recent reports of taxa occurring outside cultivation. It also incorporates data from the POIM/178/4/1/120008 project, "Adequate management of invasive species in Romania, in accordance with EU Regulation 1143/2014 regarding the prevention and management of the introduction and spread of invasive alien species", conducted in 2020–2022 (Anastasiu et al. 2023a, b, c, Anastasiu et al. 2024). Taxonomic names were checked against POWO (2026) and Euro+Med PlantBase (2006+). Establishment terminology follows Richardson et al. (2000) and Pyšek et al. (2004). For each taxon, we compiled its name, number of POIM records (Anastasiu et al. 2024), introduction mode and pathway, reported uses, establishment status, earliest reported occurrence in Romania and supporting reference. Casual, naturalized and invasive taxa were distinguished according to evidence of reproduction, persistence and spread outside cultivation. Taxa not reported for more than 50 years were treated separately as lacking recent confirmation. Known uses were distinguished from documented introduction purposes; possible pathways were treated as hypotheses where direct evidence was unavailable.

RESULTS AND DISCUSSIONS

The inventory comprises 30 taxa in 11 genera: *Brugmansia*, *Calibrachoa*, *Capsicum*, *Datura* (three taxa), *Hyoscyamus*, *Lycium* (two), *Nicandra*, *Nicotiana* (four), *Petunia* (three), *Physalis* (two) and *Solanum* (11). For *Solanum triflorum*, taxonomic treatments differ among POWO (2026), Romanian floras (Ciocârlan 2009, Sârbu et al. 2013) and Euro+Med (2026). Romanian floras and Euro+Med distinguish *Solanum triflorum* subsp. *triflorum* and *S. triflorum* subsp. *ponticum*, whereas POWO (2026) includes the latter within *S. triflorum*. We retain both as separate inventory entries because Romanian records distinguish their leaf morphology: pinnatisect or pinnatifid leaves in subsp. *triflorum* and sinuate-dentate leaves in subsp. *ponticum*. Consequently, totals refer to taxa rather than independently accepted species. The presence of *S. retroflexum* in Romania remains uncertain, as its description in Ghișa (1960) corresponds to *S. triflorum* subsp. *ponticum*.

Table 1.

Alien Solanaceae taxa reported in Romania, introduction pathways, reported uses, establishment status and occurrence records from the 2020–2022 national survey (Anastasiu et al. 2024)

Taxon	Introduction pathway	Reported uses[1]	Status	POIM records
Brugmansia arborea (L.) Sweet	Deliberate	orn	Casual	0
Calibrachoa parviflora (Juss.) D'Arcy	Accidental	orn	Naturalized	8
Capsicum annuum L.	Deliberate	alim	Casual	1
Datura innoxia Mill.	Deliberate	orn	Naturalized	71
Datura stramonium L.	Deliberate	med	Invasive	1298

Taxon	Introduction pathway	Reported uses[1]	Status	POIM records
Datura wrightii Regel	Deliberate	orn	Naturalized	157
Hyoscyamus albus L.	Accidental	med	Casual	0
Lycium barbarum L.	Deliberate	med, orn, ecol	Invasive	1894
Lycium chinense Mill.	Deliberate	med, alim, orn	Casual	0
Nicandra physalodes (L.) Gaertn.	Deliberate	orn, med	Casual	1
Nicotiana alata Link & Otto	Deliberate	orn	Casual	60
Nicotiana rustica L.	Deliberate	orn, med	No recent confirmation	0
Nicotiana sylvestris Speg.	Deliberate	orn	No recent confirmation	0
Nicotiana tabacum L.	Deliberate	orn, med	Casual	1
Petunia × *atkinsiana* (Sweet) D.Don ex W.H.Baxter	Deliberate	orn	Casual	54
Petunia axillaris (Lam.) Britton, Sterns & Poggenb.	Deliberate	orn	Casual	8
Petunia integrifolia (Hook.) Schinz & Thell.	Deliberate	orn	Casual	0
Physalis ixocarpa Brot. ex Hornem.	Deliberate	alim, orn	Casual	0
Physalis pubescens L.	Deliberate	alim	No recent confirmation	0
Solanum aethiopicum L.	Deliberate	alim, orn, med	No recent confirmation	0
Solanum americanum Mill.	Deliberate	med, alim	No recent confirmation	0
Solanum carolinense L.	Accidental	med, repellent	Casual	0
Solanum citrullifolium A.Braun	Deliberate	orn	Casual	0
Solanum elaeagnifolium Cav.	Accidental	med, alim	Naturalized	0
Solanum lycopersicum L.	Deliberate	alim	Casual	90
Solanum retroflexum Dunal	Accidental	alim	Casual	0
Solanum rostratum Dunal	Deliberate	med	Casual	4
Solanum triflorum Nutt. subsp. *ponticum* (Prodan) Negrean & Dihoru	Accidental	alim, med	Naturalized	3
Solanum triflorum Nutt. subsp. *triflorum*	Accidental	med, alim local	Casual	0
Solanum tuberosum L.	Deliberate	med, alim local	Casual	6

[1]Reported uses: orn - ornamental; alim - food; med - medicinal; ecol - ecological. Question marks indicate uncertain uses. “No recent confirmation” refers to historical records whose current occurrence requires verification. Introduction pathways and establishment assignments are discussed below.

Seven taxa were classified as accidentally introduced: *Calibrachoa parviflora*, *Hyoscyamus albus*, *Solanum carolinense*, *S. elaeagnifolium*, *S. retroflexum*, *S. triflorum* subsp. *ponticum* and *S. triflorum* subsp. *triflorum*. The remaining 23 were classified as deliberate introductions.

Table 2.
Establishment categories of alien Solanaceae taxa by introduction mode

Introduction way	Casual	Naturalized	Invasive	No recent confirmation	Total
Deliberate	14	2	2	5	23
Accidental	4	3	0	0	7

Among taxa classified as deliberately introduced, 14 were casual, two naturalized and two invasive, while five lacked recent confirmation. Among accidentally introduced taxa, four were casual and three naturalized (Table 2). Both introduction pathways were therefore represented among taxa established outside cultivation. These proportions describe the compiled inventory rather than the probability of naturalization among all plants introduced to Romania.

Calibrachoa parviflora was first recorded at Sulina in 1876 (Kanitz 1879–1881), possibly following maritime transport. Subsequent records confirm its presence in the Danube Delta (Anastasiu et al. 2014), where it grows in sandy, disturbed and partly trampled habitats; the POIM database contains eight records (Anastasiu et al. 2024). *Hyoscyamus albus* has few Romanian records, mainly from disturbed habitats. Its origin status requires clarification: POWO (2026) and Euro+Med (2026) treat it as native to Romania, while DAISIE (2009) includes it among alien plants in Europe. In Romanian Flora is indicated as a Mediterranean plant with only few occurrences in ruderal places (Sârbu et al. 2013). *Solanum carolinense* was recorded from Constanța harbour in small numbers and attributed to accidental introduction with imported seeds from North America (Costea 1996). It occurs in sunny habitats with sandy soils in its native range. *Solanum elaeagnifolium* was first recorded in Romania in autumn 2024 at two geographically separated sites in Constanța and Olt counties (Urziceanu et al. 2025). Both are disturbed sites, near a railway and a reservoir, respectively, but the introduction pathway remains uncertain. *Solanum retroflexum* has been reported from disturbed sands in the Danube Delta, at Sfântu Gheorghe, Letea, C. A. Rosetti, Caraorman and Sulina (Doroftei & Covaliov 2013); it was not recorded in the POIM survey. The two *S. triflorum* subspecies have been associated with commercial transport. *Solanum triflorum* subsp. *triflorum* was collected by Petrescu at Fulgerești railway station, Galați County, in 1922 and published by Borza (1942). Historical records also concern Galați, Brăila and Iași counties, but no POIM records were available. *Solanum triflorum* subsp. *ponticum* occurs on disturbed sands in Dobrogea and has three POIM records.

For these accidentally introduced taxa, food or medicinal uses reported elsewhere should not be interpreted as purposes of introduction in Romania. Their occurrence in the Romanian flora is considered here in relation to transport and establishment, independently of any known uses.

The 23 taxa classified as deliberately introduced include plants cultivated for ornamental, food, medicinal or combined purposes. Common food crops include *Capsicum annuum*, *Solanum lycopersicum* and *S. tuberosum*, represented by numerous cultivated varieties. Seeds and seedlings are increasingly accessible through shops, online trade and Romanian horticultural research institutions. These crops are generally grown during the warm season. Outside cultivation, they are mostly reported from disturbed sites, including waste dumps receiving garden

residues, ditches and roadsides. The POIM database contains 90 records of *S. lycopersicum*, six of *S. tuberosum* and one of *C. annuum* (Anastasiu et al. 2024). These counts describe recorded occurrences outside cultivation and do not measure cultivation intensity.

Ornamental introductions include taxa from *Brugmansia*, *Datura*, *Nicotiana*, *Petunia* and *Solanum*, cultivated for their flowers or decorative fruits. Identification problems have been reported among *Datura wrightii*, *D. innoxia* and *Brugmansia arborea*. *Datura* and *Brugmansia* can be distinguished by flower orientation: *Datura* generally has erect flowers, whereas *Brugmansia* has pendulous flowers (Dhanya & Devipriya 2016). *Brugmansia also* typically has a larger, woody habit, while many *Datura species* are herbaceous (Assidqi et al. 2025). Cultivated as ornamentals worldwide, *Brugmansia taxa* have established outside cultivation in several warmer regions (Knapp 2013). *Brugmansia arborea* has ovate leaves and pendulous, white, trumpet-shaped flowers borne in the leaf axils (Koza et al. 2025). In Romania, winter frost limits its outdoor persistence.

Datura innoxia and *D. wrightii* are morphologically similar, which may have affected historical identifications. *Datura wrightii* generally has larger flowers and is valued as an ornamental (Verloove 2008). Its stem hairs are mainly short, appressed or retrorse and eglandular, whereas *D. innoxia* has longer, erect, multicellular glandular hairs. Additional differences concern stigma position, marginal seed furrows and corolla length: 12–26 cm in *D. wrightii* and 12–16 cm in *D. innoxia* (Verloove 2008). The POIM database contains 71 records of *D. innoxia* and 157 of *D. wrightii*. These records indicate occurrence outside cultivation but cannot, by themselves, demonstrate greater horticultural popularity.

Petunias are widely cultivated bedding plants in Europe and the United States (Gebhardt 2016), originating from temperate and subtropical South America (Stehmann et al. 2009). *Petunia axillaris* has white flowers with a corolla 3–7 cm long (Stehmann et al. 2009). Its morphological and climatic variation corresponds partly to traditional subspecies boundaries (Turchetto et al. 2014), while recent phylogenetic work identified three evolutionary lineages (Backes et al. 2024). Crosses involving *P. axillaris* and *P. integrifolia* produced the ornamental hybrid *P.* × *atkinsiana* (Soares et al. 2025), an important commercial plant and experimental model (Vandenbussche et al. 2016, Bombarely et al. 2016). *Petunia integrifolia* has pilose stems and leaves and is associated with rocky habitats in its native range (Soares et al. 2025). In Romania, petunias occur outside cultivation on roadsides, near fences and cemeteries, in pavement cracks and on waste deposits, where they may flower and fruit during the warm season. They are treated here as casual taxa. This status concerns the absence of demonstrated autonomous population persistence, rather than winter mortality of adult plants alone. The POIM database contains 54 records of *P.* × *atkinsiana* and eight of *P. axillaris*.

Of the four *Nicotiana taxa*, *N. rustica* and *N. sylvestris* have not been confirmed outside cultivation for approximately 50 years. *Nicotiana tabacum* is still cultivated locally, particularly in southern Romania. *Nicotiana alata* is an ornamental with varied flower colours and a long flowering season (Khan et al. 2020, Zheng et al. 2021). In Romania, it is treated as casual and occurs in ditches, along roads, near cemeteries, on waste deposits and on disturbed land near houses, often where garden residues are discarded. The POIM database contains 60 records.

Lycium barbarum and *L. chinense* have been cultivated for food, medicinal, ornamental and ecological purposes. Both have a long history of use in Asian cuisine

and traditional medicine; their fruits, root bark and leaves are used in different preparations (Potterat 2010, Lei et al. 2022). Their phytochemical composition and reported biological activities have also attracted research interest (Kulczynski & Gramza-Michałowska 2016, Zhao et al. 2020). *Lycium barbarum* has been reported in Romania since the nineteenth century (Guebhard 1842–1848, cited by Brândză 1879–1883). It occurs on grassy banks, fences, road and railway embankments, orchard and vineyard margins and riverbanks. Its extensive root system and vegetative propagation, together with tolerance of frost, drought and pollution, favour persistence and spread (Dumitriu-Tătăranu 1960, Möllerová 2005). It is classified as invasive in Romania; the POIM database contains 1,894 records.

Lycium barbarum and *L. chinense* are morphologically similar shrubs with purple flowers and orange-red fruits (eFloras 2018). In *L. barbarum*, the calyx is usually two-lobed and the corolla tube is longer than the lobes; in *L. chinense*, the tube is shorter than or approximately equal to the lobes (eFloras, 2018). Seed size may also help distinguish them, with smaller seeds in *L. barbarum* (Wetters et al. 2018). *Lycium chinense* was reported for Romania (Tutin et al. 1972). Confusion between the two species may obscure its distribution; our observation of *Lycium chinense* as escaped from cultivation is limited to the “D. Brandza” Botanical Garden in Bucharest (Nagodă et al. 2014).

Reported uses overlapped across establishment categories (Table 3). Ornamental uses were assigned to 16 deliberately introduced taxa, food uses to eight and medicinal uses to ten. Common food crops were classified as casual, whereas taxa with ornamental or medicinal uses included casual, naturalized and invasive plants. This contrast indicates varied establishment outcomes within use groups, without identifying cultivation purpose as a cause of naturalization.

Table 3.

Reported uses and establishment categories of taxa classified as deliberately introduced

Reported use	Casual	Naturalized	Invasive	No recent confirmation	Total
Ornamental	10	2	1	3	16
Food	5	0	0	3	8
Medicinal	5	0	2	3	10

Eighteen taxa (60 %) were classified as casual, five (16.7 %) as naturalized, five (16.7 %) as lacking recent confirmation and two (6.7 %) as invasive. The naturalized group comprises *Calibrachoa parviflora*, *Datura innoxia*, *D. wrightii*, *Solanum elaeagnifolium* and *S. triflorum* subsp. *ponticum*. The taxa lacking recent confirmation are *Nicotiana rustica*, *N. sylvestris*, *Physalis pubescens*, *Solanum aethiopicum* and *S. americanum*. *Datura stramonium* and *Lycium barbarum* form the invasive group. *Datura stramonium* was cultivated in Italy for ornamental and medicinal purposes before spreading through Europe, including Romania (Tutin et al. 1972). Its reproductive biology includes substantial seed production and predominantly self-fertilizing reproduction (Anghel et al. 1972, Motten & Antonovics 1992, Motten & Stone 2000). In Romania, it occurs in ruderal habitats, waste deposits, near houses and fences, along roads and in cultivated fields. The POIM database contains 1,298 records.

The earliest report of a Solanaceae in Romania is *Datura stramonium* in Transylvania in 1778 (Benkö 1778, cited by Pop 1930). The most recent first record in the inventory is *Solanum elaeagnifolium*, detected in 2024 in Constanța and Olt counties (Urziceanu et al. 2025). Taken together, these records illustrate different introduction histories and establishment outcomes. Food crops such as *Capsicum annuum*, *S. lycopersicum* and *S. tuberosum* remain casual in this inventory, whereas taxa associated with ornamental or medicinal uses include casual, naturalized and invasive plants. Cultivation purpose therefore needs to be considered alongside the history of introduction and evidence of autonomous persistence and spread.

CONCLUSIONS

Alien Solanaceae reported in Romania show contrasting establishment outcomes, from casual occurrences to naturalized and invasive populations. Common food crops such as *Capsicum annuum*, *Solanum lycopersicum* and *S. tuberosum* are treated as casual, while ornamental and medicinal taxa include both casual and established plants. *Datura stramonium* and *Lycium barbarum* are classified as invasive, and recently recorded taxa such as *S. elaeagnifolium* warrant continued monitoring. Distinguishing occasional escapes from populations sustained by autonomous reproduction is essential for interpreting their occurrence outside cultivation. By integrating historical literature and recent records, this study provides an updated synthesis of Romanian alien Solanaceae and supports monitoring of their persistence and spread.

REFERENCES

Anastasiu P., Gavrilidis A., Miu I.V. & Niculae I.M. 2023a. Raport iniţial privind distribuția speciilor de plante alogene rezultată din activitatea de inventariere cu efort redus (an 1 cartare). Zenodo. https://doi.org/10.5281/zenodo.10396155.

Anastasiu P., Gavrilidis A., Miu I.V., Niculae I.M. 2023b. Raport intermediar privind distribuția speciilor de plante alogene rezultată din activitatea de inventariere cu efort redus (an 2 cartare). Zenodo. https://doi.org/10.5281/zenodo.10396292.

Anastasiu P., Gavrilidis A., Miu I.V., Niculae I.M. 2023c. Raport final privind distribuția speciilor de plante alogene rezultată din activitatea de inventariere cu efort redus (an 3 cartare). Zenodo. https://doi.org/10.5281/zenodo.10396105.

Anastasiu P., Miu I.V., Gavrilidis A., Preda C., Rozylowicz L., Sirbu C., Oprea A., Urziceanu M., Camen-Comanescu P., Nagoda E., Memedemin D., Barbos M., Boruz V., Cislariu A., Don I., Fagaras M., Frink J., Georgescu I., Haruta O., Hurdu B.-I., Matis A., Milanovici S., Muncaciu S., Neacsu A., Neblea M., Nicolin A., Niculescu M., Oroian S., Pop O., Radutoiu D., Samarghitan M., Simion I., Soare L., Steiu C., Stoianov E., Strat D., Szabo A., Szatmari P., Tanase C., Mirea M., Manta N., Sirbu I. 2024. Alien plant species distribution in Romania: a nationwide survey following the implementation of the EU Regulation on Invasive Alien Species. Biodiversity Data Journal, 12, e119539. https://doi.org/10.3897/BDJ.12.e119539.

Anastasiu P., Negrean G., Smarandache D., Liţescu S., Basnou C. 2014. Neophytes in Protected Areas. Case Study: The Danube Delta Biosphere Reserve. Acta Horti Botanici Bucurestiensis, 41, 41-69. DOI: 10.2478/ahbb-2014-0003.

Anghel G., Chirilă C., Ciocârlan V., Ulinici A. 1972. Buruienile din culturile agricole și combaterea lor. București, Editura Ceres, pp. 355.

Assidqi K., Sianipar N.F., Mangindaan D., Enyi C.U. 2025. Genus Datura: An Exploration of Genetic Alterations, Bioactive Compounds, and Pharmacological Activity. Plants, *14*(14), 2244. https://doi.org/ 10.3390/plants14142244.

Backes A., Turchetto C., Mäder G., Segatto A.L.A., Bonatto S.L., Freitas L.B. 2024. Shades of white: The Petunia long corolla tube clade evolutionary history. Genetics and Molecular Biology, 47(1), e20230279.

Bombarely A., Moser M., Amrad A., Bao M., Bapaume L., Barry C.S., ... & Kuhlemeier C. 2016. Insight into the evolution of the Solanaceae from the parental genomes of Petunia hybrida. Nature plants, *2*(6), 16074.

Borza A. 1942. *Solanum triflorum* Nutt. în România. Bul. Grăd. Bot. Muz. Bot. Cluj, 22(1-4): 17-20.

Brândză D. 1879-1883. Prodromul Florei Române. Bucureşti, Tipogr. Acad. Române, pp. 568.

Carreño N., Vargas Á., Bernal A.J., Restrepo S. 2007. Problemas fitopatológicos en especies de la familia Solanaceae causados por los géneros Phytophthora, Alternaria y Ralstonia en Colombia. Una revisión. Agronomía Colombiana, 25(2), 320-329.

Ciocârlan V. 2009. Flora ilustrată a României (Pteridophyta et Spermatophyta). București, Editura Ceres, pp. 1141.

Costea M. 1996.The recording of some new adventive taxa for Romania in the harbor of Constanţa. Rev. Roum. Biol., ser. Biol. végét., 41(2): 91-96.

DAISIE 2009. Handbook of Alien Species in Europe. Dordrecht, Springer, pp. 399.

Datiles M. J. 2014. *Solanum rostratum* (prickly nightshade). *CABI Compendium: Wallingford, UK*. https://doi.org/10.1079/cabicompendium.50544.

Dhanya C., Devipriya V. 2016. Pollen morphological studies on two solanaceous genera *Brugmansia* Pers. and *Datura* L. International Journal of Advanced Research, 4, 1879–1887. https://doi.org/10.21474/IJAR01/1669.

Doroftei M., Covaliov S. 2013. „Manual de... Delta Dunării", Ghid pentru personalul de teren al Administraţiei Rezervaţiei Biosferei Delta Dunării şi gărzii de mediu, Tulcea, Edit. Centrul de Informare Tehnologică Delta Dunării, pp. 482.

Dumitriu-Tătăranu I. 1960. Arbori şi arbuşti forestieri şi ornamentali cultivaţi în R. P. R., Bucureşti, Edit. Agro-Silvică, pp. 810.

Efloras 2018. Available at: http://www.efloras.org/florataxon.aspx?flora_id=2& taxon_id=119146 [accessed on 22 September 2026].

Euro+Med 2006+ [continuously updated]: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. Published at http://www.europlusmed.org [accessed on 22 September 2026].

Gebhardt C. 2016. The historical role of species from the Solanaceae plant family in genetic research. Theoretical and Applied Genetics, 129(12), 2281-2294.

Ghișa E**.** 1960. Solanaceae. In: Săvulescu, T.n **(**red.). *Flora Republicii Populare Române*. Vol. VII. București, Editura Academiei R.P.R., pp. 400-450.

Heywood V.H. 1993. *Flowering plants of the world.* Oxford University Press, New York.

Heywood V.H. 1985. Las plantas con flores. Editorial Reverté, S.A. Barcelona. pp. 34.

Hilgenhof R., Gagnon E., Knapp S., Aubriot X., Tepe E.J., Bohs L., Giacomin L.L., Gouvêa Y.F., Martine C.T., Orejuela A., Orozco C.I., Peralta I.E., Särkinen T. 2023. Morphological trait evolution in *Solanum* (Solanaceae): Evolutionary lability of

key taxonomic characters. *Taxon,* 72(4): 811–847. https://doi.org/10.1002/tax.12990.

Jones T.S., Culham A., Pickles B.J., David J. 2024. How do gardeners define 'invasive'? Implications for invasion science and environmental policy instruments on invasive species. Environmental Science & Policy, 151, 103614.

Kalusová V., Čeplová N., Danihelka J., Večeřa M., Pyšek P., Albert A., Anastasiu P., Biurrun I., Boch S., Cottaz C., Essl F., Kuzemko A., Maslo S., Mifsud S., Protopopova V.V., Shevera M., Sîrbu C., Svenning J.-C., Welk E., Axmanová I. 2024. Alien plants of Europe: an overview of national and regional inventories. Preslia, 96: 149–182, https://doi.org/10.23855/preslia.2024.149.

Kanitz A. 1879-1881. Plantas Romaniae hucusque cognitas. Claudiopoli, Apud E. Demjén, pp. 268.

Khan A.H.A., Nawaz I., Qu Z., Butt T.A., Yousaf S., & Iqbal M. 2020. Reduced growth response of ornamental plant *Nicotiana alata* L. upon selected heavy metals uptake, with co-application of ethylenediaminetetraacetic acid. Chemosphere, 241, 125006.

Knapp S. 2013. Huanduj: *Brugmansia*. Botanical Journal of the Linnean Society, 171(4), 777. https://doi.org/10.1111/boj.12026.

Kowarik I. 2003. Human agency in biological invasions: secondary releases foster naturalisation and population expansion of alien plant species. Biological Invasions 5, 293-312.

Koza V.O., Pegu J., Yimchunger A.L., Phom K.O., Yam G. 2025. New Distributional Record of *Brugmansia arborea* (L.) Sweet (Solanaceae) from Nagaland, Northeast India. Asian Journal of Biology, 21(7), 80-86. https://doi.org/10.9734/ajob/2025/v21i7530.

Kulczynski B., Gramza-Michałowska A. 2016. Goji berry (*Lycium barbarum*): composition and health effects–a review. Polish Journal of Food and Nutrition Sciences, 66, 67–76.

Lei Z., Chen X., Cao F., Guo Q., Wang J. 2022. Phytochemicals and bioactivities of Goji (Lycium barbarum L. and Lycium chinense Mill.) leaves and their potential applications in the food industry: A review. International Journal of Food Science and Technology, 57(3), 1451-1461.

Long Towell J. 2001. Una semblanza de las Solanaceae. Etnobiología, 1:18-24.

Möllerová J. 2005. Notes on invasive and expansive trees and shrubs. J. Forest Sci., 51 (Special Issue): 19-23.

Motten A.F., Antonovics J. 1992. Determinants of outcrossing rate in a predominantly self-fertilizing weed, *Datura stramonium* (Solanaceae). American Journal of Botany, 79(4), 419-427.

Motten A.F., Stone J.L. 2000. Heritability of stigma position and the effect of stigma-anther separation on outcrossing in a predominantly self-fertilizing weed, *Datura stramonium* (Solanaceae). American Journal of Botany, 87(3), 339-347.

Nagodă E., Comănescu P., Anastasiu P. 2014. „Dimitrie Brandza" Botanic Garden, Potential Centre for the Dispersal of Invasive Plants? Acta Horti Botanici Bucurestiensis, 41, 13-40.

Olmstead R.G., Bohs L., Abdel Migid H., Santiago-Valentin E., Garcia V.F., Collier S.M. 2008. A molecular phylogeny of the Solanaceae. Taxon 57: 1159–1181, https://doi.org/10.1002/tax.574010.

Olmstead R.G., Sweere J.A., Spangler R.E., Bohs L., Palmer J.D. 1999. Phylogeny and provisional classification of the Solanaceae based on chloroplast DNA. Solanaceae IV, 1(1), 1-137.

Ozuzu S.A., Hussain R.S.A., Kuchkarova N., Fidelis G.D., Zhou S., Habumugisha T., Shao H. 2024. Buffalo-bur (*Solanum rostratum* Dunal) invasiveness, bioactivities, and utilization: A review. PeerJ 12: e17112. https://doi.org/10.7717/peerj.17112.

Poczai P., D'Agostino N., Deanna R., Portis E. 2022. Solanaceae VII: biology, genetics, and evolution. Frontiers in genetics, 13, 932421. doi: 10.3389/fgene.2022.932421.

Pop E. 1930. Cei dintâi culegători ai numelor româneşti de plante. II. Ţara Bârsei, 2(3): 234 - 244.

Potterat O. 2010. Goji (*Lycium barbarum* and *L. chinense*): Phytochemistry, pharmacology and safety in the perspective of traditional uses and recent popularity. Planta medica, *76*(01), 7-19.

POWO 2026. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew, https://powo.science.kew.org/ [accessed on 23 September 2026].

Pyšek P., Richardson D.M. 2006. The biogeography of naturalization in alien plants. Journal of Biogeography 33(12): 2040-2050. https://doi.org/10.1111/j.1365-2699.2006.01578.

Pyšek P., Richardson D.M., Rejmanek M., Webster G.L., Williamson M., Kirschner J. 2004. Alien plants in checklists and floras: towards better communication between taxonomists and ecologists, Taxon, 51(1): 131-143. DOI: 10.2307/4135498.

Richardson D.M., Pyšek P., Rejmánek M., Barbour M.G., Panetta F.D., West C.J. 2000. Naturalization and invasion of alien plants: concepts and definitions, Diversity and distributions, 6(2): 93-107. DOI: 10.1046/j.1472-4642.2000.00083.x.

Sârbu I., Ștefan N., Oprea A. 2013. *Plante vasculare din România: determinator ilustrat de teren.* Editura Victor B Victor, București, pp. 1320.

Sauer J. D. 1994. Historical geography of crop plants. Roca Raton, Flórida.

Sheppard A.W., Shaw R.H., Sforza R. 2006. Top 20 environmental weeds for classical biological control in Europe: a review of opportunities, regulations and other barriers to adoption. Weed research, 46(2), 93-117.

Soares L.S., Stehmann J.R., Freitas L.B. 2025. The genus *Petunia* (Solanaceae): Evolutionary synthesis and taxonomic review. Plants, 14(10), 1478.

Stehmann J.R., Lorenz-Lemke A.P., Freitas L.B., Semir J. 2009. The genus *Petunia*. In: Gerats, T., Strommer, J. (Eds.), Petunia Evolutionary, Developmental and Physiological Genetics. Springer, New York, pp. 1–28.

Stinca A. 2020. *Brugmansia suaveolens* (Humb. & Bonpl. ex Willd.) Sweet (Solanaceae): an alien species new to continental Europe. BioInvasions Records, 9(4), 660.

Trigo Pérez M.d.M. 2010. Solanaceae In: Sánchez de Lorenzo Cáceres, J. M. (coord.). Flora Ornamental Española. Las plantas cultivadas en la España peninsular e insular. Araliaceae • Boraginaceae, 6: 307-379. Junta de Andalucía & Ediciones Mundi-Prensa.

Turchetto C., Segatto A.L., Telles M.P., Diniz-Filho J.A., Freitas L.B. 2014. Infraspecific classification reflects genetic differentiation in the widespread Petunia axillaris complex: a comparison among morphological, ecological, and genetic

patterns of geographic variation. Perspectives in Plant Ecology, Evolution and Systematics, 16(2), 75-82.

Tutin T.G., Heywood V.H., Burges N.A., Moore D.M., Valentine D.H., Walters S.M., Webb D.A. (Eds.). 1972. *Flora Europaea: Volume 3. Diapensiaceae to Myoporaceae*. Cambridge, Cambridge University Press, pp. 370.

Urziceanu M., Nagodă E., Dumitrașcu M., Nicoară A., Nicoară R. 2025. First records of the alien species *Solanum elaeagnifolium* Cav. Romania with updated insights into European distribution. BioInvasions Records, 14(4), 789-806.

Vandenbussche M., Chambrier P., Rodrigues Bento S., Morel P. 2016. Petunia, your next supermodel?. Frontiers in plant science, 7, 72.

Verloove F. 2008. *Datura wrightii* (Solanaceae), a neglected xenophyte, new to Spain. Bouteloua, (4), 37-40.

Wetters S., Horn T., Nick P. 2018. Goji who? Morphological and DNA based authentication of a “superfood”. fpls, 9, 1859.

Zhao J.C., Jin Y., Yan Y. M., Qin K., Qian D., Zhang W., ... & Chen Z. 2020. Herbal textual research on “Lycii Fructus” and “Lycii Cortex” in Chinese classical prescriptions. Mod Chin Med, 22(8), 1269-1286.

Zheng Y., Chen Y., Liu Z., Wu H., Jiao F., Xin H., ... & Yang L. 2021. Important roles of key genes and transcription factors in flower color differences of *Nicotiana alata*. Genes, 12(12), 1976.