

<https://helda.helsinki.fi>

Euro plus Med-Checklist Notulae, 11

Von Raab-Straube, Eckhard

2019-12

Von Raab-Straube , E , Raus , T , Bazos , I , Cornec , J P , De Belair , G , Dimitrakopoulos , P G , El Mokni , R , Fateryga , A V , Fateryga , V V , Fridlender , A , Gil , J , Grigorenko , V N , Hand , R , Kovalchuk , A , Mastrogianni , A , Otto , R , Raetzl , S , Raus , T , Ristow , M , Salas Pascual , M , Strid , A , Svirin , S A , Tsiripidis , I , Uhlich , H , Vela , E , Verloove , F , Vidakis , K , Yena , A V , Yevseyenkov , P E & Zeddarn , A 2019 , ' Euro plus Med-Checklist Notulae, 11 ' , Willdenowia : Annals of the Botanic Garden and Botanical Museum Berlin , vol. 49 , no. 3 , pp. 421-445 . <https://doi.org/10.3372/wi.49.49312>

<http://hdl.handle.net/10138/322427>

<https://doi.org/10.3372/wi.49.49312>

unspecified
publishedVersion

Downloaded from Helda, University of Helsinki institutional repository.

This is an electronic reprint of the original article.

This reprint may differ from the original in pagination and typographic detail.

Please cite the original version.

Euro+Med-Checklist Notulae, 11

Source: Willdenowia, 49(3) : 421-445

Published By: Botanic Garden and Botanical Museum Berlin (BGBM)

URL: <https://doi.org/10.3372/wi.49.49312>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

ECKHARD VON RAAB-STRAUBE^{1*} & THOMAS RAUS¹ (ed.)

Euro+Med-Checklist Notulae, 11

Version of record first published online on 6 December 2019 ahead of inclusion in December 2019 issue.

Abstract: This is the eleventh of a series of miscellaneous contributions, by various authors, where hitherto unpublished data relevant to both the Med-Checklist and the Euro+Med (or Sisyphus) projects are presented. This instalment deals with the families *Anacardiaceae*, *Asparagaceae* (incl. *Hyacinthaceae*), *Bignoniaceae*, *Cactaceae*, *Compositae*, *Cruciferae*, *Cyperaceae*, *Ericaceae*, *Gramineae*, *Labiatae*, *Leguminosae*, *Orobanchaceae*, *Polygonaceae*, *Rosaceae*, *Solanaceae* and *Staphyleaceae*. It includes new country and area records and taxonomic and distributional considerations for taxa in *Bidens*, *Campsis*, *Centaurea*, *Cyperus*, *Drymocallis*, *Erigeron*, *Hoffmannseggia*, *Hypopitys*, *Lavandula*, *Lithraea*, *Melilotus*, *Nicotiana*, *Olimarabidopsis*, *Opuntia*, *Orobanche*, *Phelipanche*, *Phragmites*, *Rumex*, *Salvia*, *Schinus*, *Staphylea*, and a new combination in *Drimia*.

Key words: distribution, Euro+Med PlantBase, Europe, Med-Checklist, Mediterranean, new combination, new record, taxonomy, vascular plants

Article history: Contributions received 18 April 2019 to 21 October 2019; peer-review completed 1 November 2019; received in revised form 4 November 2019; accepted for publication 5 November 2019.

Citation

For the whole article:

Raab-Straube E. von & Raus Th. (ed.) 2019: Euro+Med-Checklist Notulae, 11 [Notulae ad floram euro-mediterraneam pertinentes No. 40]. – Willdenowia 49: 421–445. doi: <https://doi.org/10.3372/wi.49.49312>

For a single contribution (example):

Strid A. 2019: *Bidens alba* (L.) DC. – Pp. 424–426 in: Raab-Straube E. von & Raus Th. (ed.), Euro+Med-Checklist Notulae, 11 [Notulae ad floram euro-mediterraneam pertinentes No. 40]. – Willdenowia 49: 421–445. doi: <https://doi.org/10.3372/wi.49.49312>

Notice

A succinct description of the Euro+Med project, with a list of recognized territories and their abbreviations, and the conventions used to indicate the status and presence of taxa, can be found in the introduction to the first instalment of the Euro+Med Notulae (Greuter & Raab-Straube 2005: 223–226) and on the Euro+Med PlantBase website (Euro+Med 2006+). For the previous instalment of the Euro+Med-Checklist Notulae, see Raab-Straube & Raus (2019).

Country and mapping area abbreviations in the Euro+Med PlantBase originally followed those defined and accepted in *Flora europaea* (Tutin & al. 1964–1980). Later, due changes were introduced to cope with new countries emerging from former Czechoslovakia, Yugoslavia and the USSR. The Euro+Med PlantBase Secretariat suggests to use from now on the abbreviations **Ko** (Republic of Kosovo) and **Se** (Republic of Serbia) instead of **Sr** (Serbia with Kosovo), as is already current practice in *Atlas florae europaeae* (Kurtto & al. 2013, 2018).

¹ Botanischer Garten und Botanisches Museum Berlin, Freie Universität Berlin, Königin-Luise-Str. 6–8, 14195 Berlin, Germany; *e-mail: e.raab-straube@bgbm.org (author for correspondence); t.raus@bgbm.org

Contributors

- I. Bazos, National and Kapodistrian University of Athens, Department of Biology, Section of Ecology and Systematics, Panepistimiopolis, 15784 Athens, Greece; e-mail: ibazos@biol.uoa.gr
- J. P. Cornec, Université AMU, UMR RECOVER, 3 place Victor Hugo; 13 003 Marseille, France; e-mail: jpierre.cornec@gmail.com
- G. De Bélair, Université Badji Mokhtar, BP 512, 23000 Annaba, Algérie; e-mail: debelaig@yahoo.com
- P. G. Dimitrakopoulos, Department of Environment, University of the Aegean, 81100 Mytilene, Greece, e-mail: pdimi@env.aegean.gr
- R. El Mokni, Department of Pharmaceutical Sciences "A", Laboratory of Botany, Cryptogamy and Plant Physiology, Faculty of Pharmacy of Monastir, BP. No. 207, Avenue Avicenna, Monastir 5000, Tunisia; e-mail: riridah@hotmail.com
- A. V. Fateryga, T. I. Vyazemsky Karadag Scientific Station, Nature Reserve of the Russian Academy of Sciences, Branch of A. O. Kovalevsky Institute of Biology of the Southern Seas, Nauki Str. 24, Kurortnoye, Feodosiya 298188, Crimea; e-mail: fater_84@list.ru
- V. V. Fateryga, T. I. Vyazemsky Karadag Scientific Station, Nature Reserve of the Russian Academy of Sciences, Branch of A. O. Kovalevsky Institute of Biology of the Southern Seas, Nauki Str. 24, Kurortnoye, Feodosiya 298188, Crimea; e-mail: valentina_vt@mail.ru
- A. Fridlender, Faculté des Sciences, Département Pluri-disciplinaire, Université AMU; 3 place Victor Hugo; 13 003 Marseille, France; e-mail: alain.fridlender@univ-amu.fr
- J. Gil, Centro de Agrodiversidad de La Palma, Finca Miraflores, 38700 Santa Cruz de La Palma, Islas Canarias, Spain; e-mail: jgil@gmx.fr
- V. N. Grigorenko, Vorovskogo Str. 60, kv. 308, Simferopol 295017, Crimea; e-mail: tinodes@yandex.ru
- R. Hand, Winterfeldtstr. 25, 10781 Berlin, Germany; e-mail: ralfhand@gmx.de
- A. Kovalchuk, Department of Forest Sciences, P. O. box 27, Latokartanonkaari 7, University of Helsinki, 00014 Helsinki, Finland; e-mail: andriy.kovalchuk@helsinki.fi
- A. Mastrogianni, Department of Botany, School of Biology, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece; e-mail: amastroi@bio.auth.gr
- R. Otto, Lindenstraße, 2, 96163 Gundelsheim, Germany; e-mail: rainer.herta.otto@t-online.de
- S. Rätzel, Georg-Friedrich-Händel-Straße 13, D-15234 Frankfurt an der Oder, Germany; e-mail: stefan.raetzel@googlemail.com
- Th. Raus, Botanischer Garten und Botanisches Museum Berlin, Freie Universität Berlin, Königin-Luise-Str. 6–8, 14195 Berlin, Germany; e-mail: t.raus@bgbm.org
- M. Ristow, University of Potsdam, Plant Ecology and Nature Conservation, Am Mühlenberg 3, 14476 Potsdam, Germany; e-mail: ristow@uni-potsdam.de
- M. Salas Pascual, Instituto de Estudios Ambientales y Recursos Naturales (i-UNAT), Campus Universitario de Tafira, Universidad de las Palmas de Gran Canaria, 35017 Las Palmas de Gran Canaria, Gran Canaria, Canary Islands, Spain; e-mail: marcosalaspascual@gmail.com
- A. Strid, Bakkevej 6, 5853 Ørbæk, Denmark; e-mail: arne.strid@youmail.dk
- S. A. Svirin, Sevastopol Branch of the Russian Botanical Society, Gromova Str. 64, kv. 199, Sevastopol 299002, Crimea; e-mail: sapsan7@mail.ru
- I. Tsiripidis, Department of Botany, School of Biology, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece; e-mail: tsiripid@bio.auth.gr
- H. Uhlich, Gartenstraße 19, 56357 Welterod, Germany; e-mail: uhlich.holger@googlemail.com
- E. Véla, AMAP, Université de Montpellier / CIRAD / CNRS / INRA / IRD, Montpellier, France; e-mail: errol.vela@cirad.fr
- F. Verloove, Botanic Garden Meise, Nieuwelaan 38, 1860 Meise, Belgium; e-mail: filip.verloove@botanicgardenmeise.be
- K. Vidakis, Department of Forestry and Natural Environment, International Hellenic University, 66100 Drama, Greece; e-mail: k.vidakis@for.ihu.gr
- A. V. Yena, Academy of Bioresources and Life Management of V. I. Vernadsky Crimean Federal University, Agraroye, Simferopol 295492, Crimea; e-mail: an.yena@gmail.com
- P. E. Yevseyenkov, Sevastopol Branch of the Russian Botanical Society, Oktyabrskoy Revolyutsii Av. 32, kv. 496, Sevastopol 299038, Crimea; e-mail: fhunt@flora.crimea.ru
- A. Zeddami, 17 rue Aïssa Akif, Hussein-Dey, Algiers, Algeria; e-mail: abida_z@yahoo.fr; belkis.sol.2016@gmail.com

Anacardiaceae

Lithraea molleoides (Vell.) Engl. (≡ *Schinus molleoides* Vell.)

A Tn: Tunisia: Monastir, Monastir city, 35°46'25"N, 10°49'06"E, 21 m, within an old building, 21 May 2018, *El Mokni* (Herb. Univ. Monastir). – *Lithraea molleoides* is a tree up to 8 m tall native to South America, ranging from Argentina, Uruguay and Bolivia to the Cerrado vegetation of Brazil (see, e.g., Lorenzi 2000; Zuloaga & al. 2008; López Patiño & al. 2012; Jørgensen & al. 2013). According to the Euro+Med Plant-Base (Henning & Raab-Straube 2016+), the taxon does not appear to have been reported in the Mediterranean region as yet. The African Plant Database (APD 2019) reported the occur-

rence of the taxon as “naturalized-introduced” only in tropical Africa. Therefore, the citation here as a casual alien constitutes the first report of this taxon for the Tunisian and N African flora. A single non-flowering individual was found within the cited area. R. El Mokni

Schinus molle L.

N Tn: Tunisia: Monastir, Jemmal toward Touza, 35°37'43"N, 10°45'59"E, 76 m, roadside, 4 Jun 2012, *El Mokni* (Herb. Univ. Monastir); Monastir, Aqba toward Monastir city, 35°44'59"N, 10°49'27"E, 3 m, roadside, 21 Sep 2013, *El Mokni* (Herb. Univ. Monastir). – *Schinus molle*, a 10–15 m tall tree with a spreading crown and drooping, pendulous twigs and foliage is native to the South American Andes of Peru and adjoining regions of C South America. It is widely introduced in tropical, subtropical and Mediterranean regions around the world (Ravindran 2017). The taxon is reported in Europe and the Mediterranean region as an alien with naturalized status only in Corse (Euro+Med PlantBase, Henning & Raab-Straube 2016+) and in Italy (Galasso & al. 2018). For N Africa the taxon is cited as alien with unknown status for Algeria, Libya and Tunisia. The African Plant Database (APD 2019) lists the occurrence of the taxon in N Africa as present with cultivated status for Algeria, the Canary Islands, Morocco and Tunisia. The actual status of *S. molle* in Tunisia is defined here. Some sporadic subpopulations of few individuals have been observed growing and spreading mainly in the Monastir region since 2012; therefore, the species can be considered as naturalized in Tunisia. R. El Mokni

Schinus terebinthifolius Raddi

N Tn: Tunisia: Monastir, Jemmal toward Touza, 35°37'43"N, 10°45'59"E, 76 m, roadside, 4 Jun 2012, *El Mokni* (Herb. Univ. Monastir); Monastir, Aqba toward Monastir city, 35°44'59"N, 10°49'27"E, 3 m, roadside, 21 Sep 2013, *El Mokni* (Herb. Univ. Monastir); Mahdia, Sidi Messaoud, 35°31'17"N, 11°01'36"E, 7 m, railway tracks, 7 Feb 2019, *El Mokni* (Herb. Univ. Monastir). – An evergreen shrub or small tree, 3–10(–15) m tall, native to C and E South America including Argentina, Brazil, Paraguay and Uruguay (USDA-ARS 2019). The plant has been widely introduced to many parts of North America, Africa, Australasia, Europe, the West Indies and Oceania and there are records of the species having naturalized and becoming invasive in each of these regions. In the Mediterranean area it is recorded from Spain and Por-

tugal and it may be more widespread in Mediterranean and subtropical regions of the world than indicated in the distribution list (see CABI 2019). In N Africa and according to Euro+Med PlantBase (Henning & Raab-Straube 2016+) the taxon is cited as alien with “unknown status” for Algeria, Libya, Morocco and Tunisia. In the African Plant Database (APD 2019), the species is cited as “Cult./Adv./Introd.”. The actual status of *S. terebinthifolius* in Tunisia is defined here. Many sporadic subpopulations of numerous individuals have been observed growing and spreading mainly in the Monastir region since 2012; therefore, the species can be considered as naturalized in Tunisia.

R. El Mokni

Asparagaceae (incl. *Hyacinthaceae*)

Drimia anthericoides (Poir.) Véla & Bélair, **comb. nov.** ≡ *Scilla anthericoides* Poir., Voy. Barbarie 2: 149. 1789 ≡ *Ornithogalum anthericoides* (Poir.) Link ex Steud., Nomencl. Bot. 1: 573. 1821 ≡ *Urginea anthericoides* (Poir.) Steinh. in Ann. Sci. Nat., Bot., sér. 2, 1: 328. 1834 ≡ *Squilla anthericoides* (Poir.) Jord. & Fourr., Icon. Fl. Eur. 2: 2. 1868 ≡ *Urginea maritima* var. *anthericoides* (Poir.) Maire & Weiller, Fl. Afrique N. 5: 163. 1958 ≡ *Charybdis anthericoides* (Poir.) Véla & Bélair in Phytotaxa 288: 155. 2016. – For this NE Algerian endemic and threatened squill recently highlighted and resurrected under *Charybdis* Speta (Véla & al. 2016; Véla & De Bélair 2017), a name in *Drimia* Jacq. is still lacking. In our 2016 paper, reviewers encouraged us to consider it under *Charybdis*, because this genus had a better consensus among Mediterranean taxonomists. Nevertheless, the main regional or global databases (Euro+Med 2006+; Dobignard & Chatelain 2010; Govaerts & al. 2019) still do not consider the small genus *Charybdis* and prefer to include it, also with *Urginea* s.s., within *Drimia* in a broad sense. The resurrection of the species then became troublesome owing to lack of harmonization:

- Euro+Med, based on the treatment of the World Checklist of Selected Plant families (WCSP 2010), still does not recognize the species, still has not incorporated the new name and keeps its basionym *Scilla anthericoides* as a synonym of *Drimia maritima*;
- The current WCSP treatment (Govaerts & al. 2019, accessed 21 Oct 2019) took note of the new name but considered it as unplaced;
- The African Plant Database (APD, version 3.4.0), regularly updating the initial work by Dobignard & Chatelain (2010+), added the new name and considered it accepted as it was, while all the other species of the group are still considered under the genus *Drimia*.

For these reasons, and because we have personally no definitive opinion about the genus delimitation of *Drimia*

s.l., we propose here to create the new combination in order to end this uncomfortable situation.

E. Véla & G. De Bélair

Bignoniaceae

Campsis radicans (L.) Seem. ex Bureau

N Ag: Algeria: Wilaya of Algiers, Daïra of Hussein-Dey, Commune of Hussein-Dey, by the court, vigorous, spontaneously established stem climbing on electric pole and regenerating strongly in sterile state after regular cutting since 2014, 23 Oct 2019, *Zeddám* (photo); *ibid.*, Commune of Kouba, at foot of walls of an old abandoned church facing the Mairie building, population of spontaneously germinated plants partly creeping on the ground with sterile shoots, partly climbing with woody, flowering shoots on vertical brick walls, 30 Nov 2018, *Zeddám* (photo); *ibid.*, Vieux Kouba, in ruderal area (waste land), vigorous population of flowering shoots developed on neighbouring shrubs and trees available as supporting structures, observed since 31 Dec 2010, 15 Feb 2019, *Zeddám* (B, photo). – A high-climbing, aggressively colonizing woody vine, native to E North America (see, e.g., Wannerberg 2004) and widely cultivated for ornament due to its showy, reddish orange, broadly trumpet shaped flowers. Previously not given for any of the N African countries outside cultivation (Euro+Med 2006+, Dobignard & Chatelain 2011). In urban areas of Algiers locally naturalized. The population in Vieux Kouba is monitored for nine years by now, established and dwelling without any human intervention.

A. Zeddám & Th. Raus

Cactaceae

Opuntia microdasys (Lehm.) Pfeiff. – Fig. 1.

N Gr: Greece, Sterea Ellas, Periferia Attikis, Salamina island, close to the Euripides cave, 37°52'55.81"N, 23°27'9.28"E, c. 100 m, 29 Jul 2019, *Salas Pascual* (photo). – *Opuntia microdasys* has a wide natural distribution range in the Chihuahuan Desert of Mexico. It is commonly grown as an ornamental shrub in arid climate types across the world, including the Mediterranean area. Its stem segments break off easily which enables the species to escape wherever planted. In the past years it has been known as a naturalized escape from the Canary Islands (Fuerteventura, Lanzarote, La Palma, Tenerife) and Italy (Korotkova & von Raab-Straube 2017). In addition, it is also known from France, Portugal and Spain, as well as from Gran Canaria in the Canary

Islands (Verloove & al. 2017). To our knowledge, there were no records from Greece so far. *O. microdasys* grows on a cliff on the island of Salamina, close to the Cave of Euripides. It grows on a well-preserved and difficult-to-access mountain slope where it is accompanied by native species of this kind of habitat. It clearly reproduces and looks completely naturalized.

Opuntia microdasys is an increasing weed problem in almost all areas where it was once introduced, for instance in Australia and South Africa (Smith & al. 2011; Novoa & al. 2015).

M. Salas Pascual & F. Verloove

Opuntia robusta H. L. Wendl. ex Pfeiff. – Fig. 2.

N Gr: Greece, Sterea Ellas, Periferia Attikis, Sounio, below the temple of Poseidon, 37°39'0.05"N, 24°1'34.70"E, c. 35 m, 31 Jul 2019, *Salas Pascual* (photo). – *Opuntia robusta* is a Mexican species that is frequently grown as an ornamental shrub in arid regions, also in the Mediterranean region. Its stem segments easily detach which enables the species to escape from ornamental plantations. In the Euro+Med area it has been recorded as such from the Canary Islands (Gran Canaria, La Palma, Tenerife), Italy and France, as well as from the islands of Corse and Sicily (Korotkova & von Raab-Straube 2017). To our knowledge, there were no records from Greece so far. A small colony of *O. robusta* with at least a dozen of individuals grows on a slope below the Temple of Poseidon. The plants seem to have escaped from a nearby garden and have expanded throughout the promontory located just in front of the temple.

Opuntia robusta is an increasing weed problem in almost all areas where it was once introduced, for instance in Australia and South Africa (Walters & al. 2011; Novoa & al. 2015).

M. Salas Pascual & F. Verloove

Compositae (Asteraceae)

Bidens alba (L.) DC. – Fig. 3.

P AE(G), Cr: Greece, Nomos of Dodekanisos, island of Karpathos, the town of Pigadia, 35°29'N, 27°13'E, ruderal habitat, 5 m, 23 Sep 2019, *Strid 60375* (UPA, herb. Strid). – This species is native in tropical and subtropical regions of the Americas from the S United States to Peru, and naturalized in Africa and Asia. It is not mentioned by Strid (2016) and not incorporated in Greuter (2006+) as yet. The first report from the Mediterranean area appears to be by Kleinsteuber & al. (2016: 154) who had observed it in a few localities on the island of



Fig. 1. *Opuntia microdasys* – A: general view of plants in habitat; B: flowering shoots. – Greece: Salamina, close to Euripides cave, 29 Jul 2019, photographs by M. Salas Pascual.



Fig. 2. *Opuntia robusta*, general view of plants in habitat. – Greece: Sounio, below temple of Poseidon, 31 Jul 2019, photograph by M. Salas Pascual.



Fig. 3. *Bidens alba*, upper part of plant with capitula in flower. – Greece: Karpathos, town of Pigadia, 23 Sep 2019, photograph by A. Strid.

Rodos in the period 2013–2015 and assigned it to the status of “offensichtlich zumindest temporär eingebürgert” [apparently at least temporarily naturalized]. Since it has now been found also on the island of Karpathos in the Cretan area, it appears to be on the verge of becoming established in the Aegean area.

A. Strid

***Centaurea carduiiformis* DC.** – Fig. 4.

+ **Rf(CS)**: Russia: Dagestan, Makhachkala urban okrug, vicinity of Talgi, 42°52'36"N, 47°26'42"E, c. 280 m, dry calcareous slope, 12 Jun 2019, *Fateryga & Fateryga* (MW, PHEO). – *Centaurea carduiiformis* was described from Western Armenia (now Turkey) and is also known from Georgia, Armenia, Azerbaijan, Syria and Iran (Tzvelev 1963; Wagenitz 1975; Greuter 2006+). This species is rather polymorphic in phyllary appendages and corolla colour (Gabrielyan 1995). According to Mikheev (2000), *C. carduiiformis* has hybrid origin and it is not necessary to distinguish any infraspecific taxa within this species. Although *C. carduiiformis* has never been reported from

Russia, there is a report of the hybrid of *C. reflexa* Lam. and *C. scabiosa* subsp. *adpressa* (Ledeb.) Gugler (sub *C. adpressa* Ledeb.) from Dagestan (Tzvelev 1963). The latter report could probably refer to *C. carduiiformis*. However, the plants from the vicinity of Talgi were not accompanied by any of the supposed “parent” species.

A. V. Fateryga, V. V. Fateryga &
V. N. Grigorenko

***Centaurea phrygia* subsp. *pseudophrygia* (C. A. Mey.) Gugler** (≡ *Centaurea pseudophrygia* C. A. Mey.) – Fig. 5.

+ **Gr**: W Makedonia, Nomos of Pella, Eparchia of Almopia: Above Loutra Loutrakiou along road to Kali Pediada, 40°58.75'N, 21°54.59'E, 640 m, grassy roadside in open deciduous woodland, schistose substrate, 30 Jul 2019, *Strid 60365* (B, UPA, herb. Strid). – This taxon is variously regarded as an independent species, *Centaurea pseudophrygia*, or a subspecies of *C. phrygia* L. It occurs in C and W Europe, extending to W Denmark and SW Norway in the north. In the south-east it has been recorded as far as Bosnia

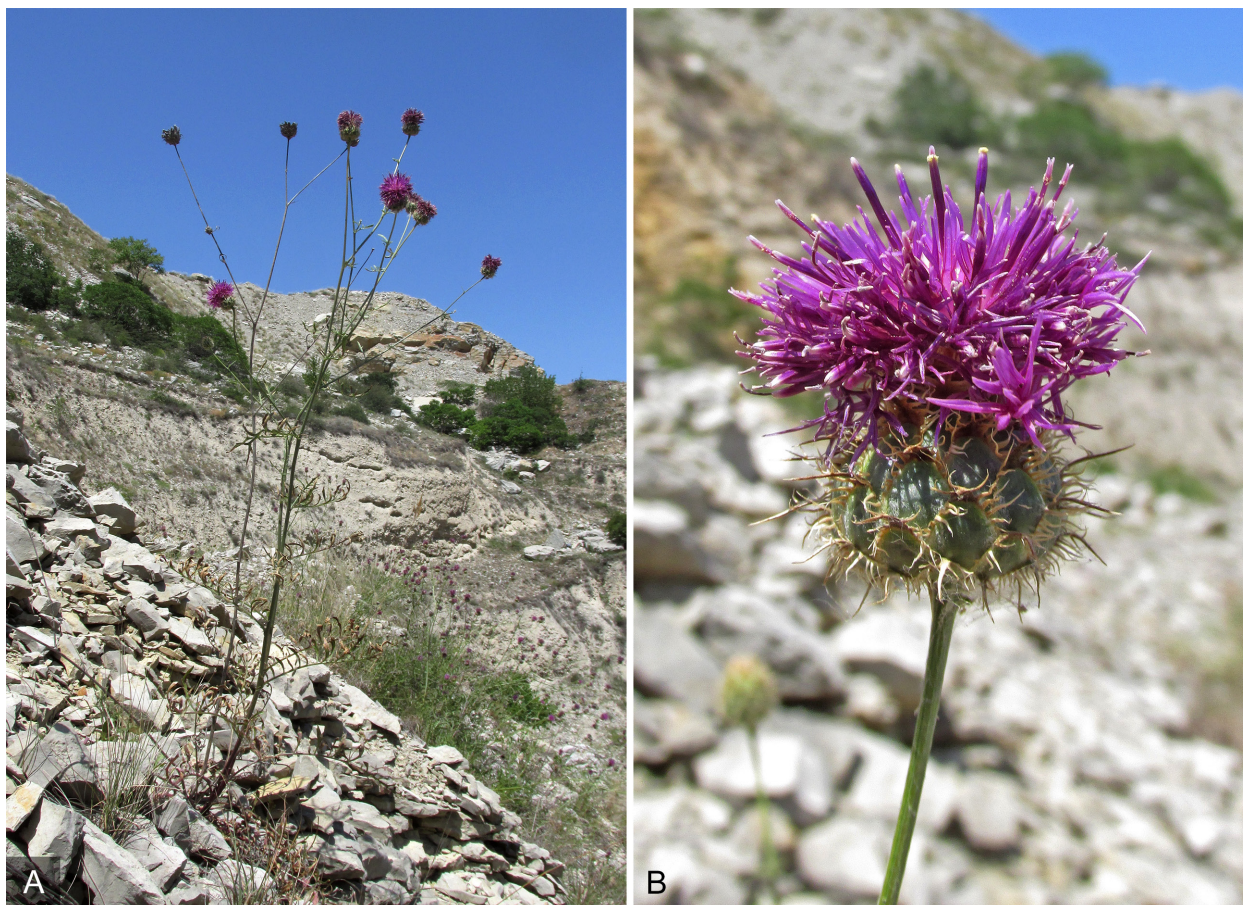


Fig. 4. *Centaurea cardiiformis* – A: general view of plant in habitat; B: capitulum in flower. – Russia: Dagestan, Makhachkala urban okrug, vicinity of Talgi, 12 Jun 2019, photographs by A. V. Fateryga.

and Herzegovina and Serbia; *C. phrygia* s.str. is found in EC and NE Europe (Euro+Med 2006+). Only a small population was found above Loutra Loutrakiou, growing in a fairly trivial habitat, with species such as *Agrimonia eupatoria* L. and *Melilotus albus* Medik. Greek specimens are indistinguishable from plants growing near the author's home on the island of Fyn, Denmark. Distinguishing features are: Perennial with a few erect stems 70–100 cm tall, leafy up to the capitula, slightly arachnoid-tomentose above. Middle and upper cauline leaves sessile to subsessile, narrowly ovate to elliptical, green, sparsely scabridulous. Capitula several, solitary or often in clusters of 2–3, forming a corymbose synflorescence. Involucre 15–20 mm, broadly ovoid. Appendage of middle phyllaries narrowly triangular, blackish-brown, gradually attenuate into a filiform, recurved, fimbriate, brown acumen. Florets pinkish-mauve, the outer radiate. The only other Greek representative of the *C. phrygia* complex is *C. phrygia* subsp. *stenolepis* (A. Kern.) Gugler (\equiv *C. stenolepis* A. Kern.) which occurs particularly in the Rodopi area,

with scattered localities also in NC Greece (Dimopoulos & al. 2013: 56). It is a smaller plant, generally 30–70 cm tall, with crowded capitula and much narrower, oblong to narrowly ellipsoid involucre.

A. Strid

Erigeron annuus subsp. *strigosus* (Muhl. ex Willd.) Wagenitz – Fig. 6.

N Ge: Germany, Bavaria, city of Bamberg, Armeestraße along edge of Hauptsmoor forest c. 100 m N of U.S. army shooting range, 49°53'40.0"N, 10°55'47.6"E, 255 m, c. 200 individuals at roadside and in sandy ditch, 20 Jul 2013, *Otto 20504* (B, BR, herb. Otto); *ibid.*, sandy ditch and embankment opposite junction of Moosstraße and Armeestraße, numerous individuals, 9 Jun 2014, *Otto 21094* (B, BR, herb. Otto); *ibid.*, sandy road ditch and embankment 0.5 km N of U.S. army shooting range, numerous individuals, 13 Jun 2014, *Otto 21103* (B, BR, herb. Otto); *ibid.*, sandy riparian embankment of an artificial streambed for drainage alongside forest edge, numerous individuals, 19 May 2017, *Otto 22761* (B, herb. Otto). – *Erigeron annuus* subsp. *strigosus* is a member of the *E. annuus*



Fig. 5. *Centaurea phrygia* subsp. *pseudophrygia* – A: upper part of plant; B: capitulum in flower. – Greece: W Makedonia, above Loutra Loutrakiou, 30 Jul 2019, photograph by A. Strid.

(L.) Desf. species complex (formerly sometimes accommodated in a segregate genus, *Phalacrolooma* Cass.). It is native to large parts of North America (United States and adjacent parts of Canada). *Erigeron annuus* s.l. is widely naturalized in many European countries. It is quite variable and some populations have been ascribed to related similar taxa, e.g. subsp. *strigosus* (see Halliday 1976). However, cytological and morphological studies have shown that only one species is involved, *E. annuus* s.str. (Frey & al. 2003), and this is reflected in the Euro+Med PlantBase account for the complex: claims of *E. strigosus* Muhl. ex Willd. (incl. many synonyms) are considered erroneous and referred to *E. annuus* [subsp. *septentrionalis* (Fernald & Wiegand) Wagenitz] (Greuter 2006+).

Near a former U.S. army base in Bamberg (Bavaria, Germany) a species of *Erigeron* is established that strikingly differs from morphotypes of *E. annuus* that are usually observed in Europe and traditionally named *E. annuus* subsp. *annuus* or subsp. *septentrionalis*. Sennikov & Kurtto (2019) pointed out that the lec-

totype of *E. annuus* subsp. *annuus* in fact refers to subsp. *septentrionalis* and proposed the new name *E. annuus* subsp. *lilacinus* Sennikov & Kurtto for the lilac- to bluish-flowered morphotypes with coarsely toothed leaves and long, erect hairs formerly named subsp. *annuus*.

The deviant plants occur in clearly distinguishable, pure populations. Stems are strigose to strigillose in the lower half with hairs mostly ascending and only 0.3–0.5 mm long (vs spreading or erect and up to 1.5 mm long); rosette leaves tend to persist to flowering (vs withered) and the middle and upper cauline leaves are narrowly lanceolate to nearly linear and have margins that are nearly entire (vs lanceolate or rhombic-lanceolate and with minutely to coarsely serrate margins) (Nesom 2006; Sennikov & Kurtto 2019). We have noticed further striking differences to subsp. *annuus* and subsp. *lilacinus*: the aberrant plants appear much more delicate, with thinner and shorter stems, only 50–80 cm tall (vs 60–150 cm). They start flowering 2(–3) weeks earlier and the flower heads do not nod before flowering (vs typically nod-



Fig. 6. Comparison of *Erigeron annuus* subsp. *strigosus* (1) and *E. annuus* subsp. *lilacinus* (2). – A: lower part of plants at beginning of flowering; B: upper part of plants and inflorescences at beginning of flowering; C: basal portion of stems showing hairiness; D: involucres, lateral view showing hairiness; E: capitula, apical view showing ray florets. – Scale bars = 2 mm. – Photographs by R. Otto, A, B and E from 9 Jun 2014, C and D from 14 Jul 2017.

ding). Toward the end of the flowering season the peduncles elongate considerably, rendering a very typical appearance to the plant and allowing its separation from the other subspecies from a distance. Because of its appressed hairs (not only on stems, but also on phyllaries, peduncles, leaves, etc.), it appears as an almost subglabrous plant to the naked eye, and the fresh leaves and stems feel smooth when touched (vs rough). Its stems are nearly always reddish, at least in the basal part. All these features point at *E. strigosus*, and this identity was subsequently confirmed by Guy Nesom (pers. comm., Sep 2017). We follow Sennikov & Kurtto (2019) and include this taxon in *E. annuus* s.l. and treat it on the same taxonomic level as subsp. *annuus* and subsp. *lilacinus*.

Sennikov & Kurtto (2019) distinguish two morphotypes of subsp. *strigosus*, which differ in

the pubescence on involucres and stems as well as in the form of the stem leaves. Our plants have very short and dense hairs 0.3–0.5 mm long and narrow cauline leaves and correspond to plants once called *E. strigosus* var. *beyrichii* (Fisch. & C. A. Mey.) A. Gray. According to Allison & Stevens (2001), the diffuse and “subnaked” inflorescence and flexuous peduncles are typical, as also seen in our plants.

Erigeron annuus subsp. *strigosus* is naturalized in the locality mentioned above in a 15 m wide strip between the road and a pine forest, where an artificial creek bed about 2–3 m deep was dug into the sandy soil. A narrow strip of bushes separates the creek bed and the roadside. The subspecies is found there on the roadside, in the road ditch, between the bushes and on flats of the open, loose sandy creek embankment. Sometimes the plants also grow directly on the

shoreline of the small creek. The light, sun-exposed places have a sketchy, sparse plant cover that is sometimes even completely missing. The species spectrum consists mainly of species of oligotrophic grassland communities and forest margins, some ruderal companion species and seedlings of nearby trees and bushes. The population is intermixed with subsp. *annuus* and subsp. *lilacinus*. Distinctive accompanying species are, e.g., *Agrostis capillaris* L., *Calamagrostis epigejos* (L.) Roth, *Centaurea jacea* L., *Echium vulgare* L., *Epilobium angustifolium* L., *Hypericum perforatum* L., *Hypochaeris radicata* L., *Juncus tenuis* Willd., *Thymus pulegioides* L., *Oenothera biennis* L., *O. fallax* Renner, *Pilosella officinarum* F. W. Schultz & Sch.-Bip., *Rumex thyrsoiflorus* Fingerh., *Silene vulgaris* (Moench) Garcke and *Solidago canadensis* L. The number of individuals was estimated to be at least 1000 (in 2017) and the population has been known to persist since at least 2010.

Although obviously much less frequent than the other two subspecies, the genuine presence of subsp. *strigosus* in Germany is here confirmed. It can be assumed that such plants are overlooked elsewhere in Germany and Europe. Plants depicted by Šída (2004) indeed represent subsp. *strigosus*, which again confirms its presence in the Czech Republic (although probably also confined to a restricted number of localities). It was already mentioned for Czechoslovakia by Domin (1935–1936) as *Stenactis ramosa* (Walter) Domin. Also from Austria it has been reliably recorded (Wagenitz 1965: “die subsp. *strigosus* [ist] in Niederösterreich (längs der March), im Burgenland, in Steiermark und Kärnten nicht selten; sie blüht früher als die anderen Unterarten, und die Köpfchen nicken vor dem Aufblühen nicht”). Finally, Sennikov & Kurtto (2019) further refer to “some unambiguous herbarium material from Austria, Finland, Italy, the Netherlands, Poland and Russia”.

R. Otto & F. Verloove

Cruciferae (Brassicaceae)

Olimarabidopsis pumila (Stephan) Al-Shehbaz & al. (≡ *Arabidopsis pumila* (Stephan) N. Busch) – Fig. 7.

+ **Cm**: Crimea: Sovetskiy district, 8 km N of Dmitrovka, coast of Sivash gulf at the border of “Prisivashskiy” preserve, 45°33'53"N, 35°03'47"E, 0 m, saline land, 21 Apr 2019, *Fateryga, Fateryga, Svirin, Yena & Yevseyenkov* (CSAU, LE, MW, PHEO, YALT). – *Olimarabidopsis pumila* is widely distributed from the E Mediterranean to C Asia. Within the territory covered by the Euro+Med PlantBase, this species was previ-



Fig. 7. *Olimarabidopsis pumila*, plant in flower and young fruit. – Crimea: Sovetskiy district, 8 km N of Dmitrovka, coast of Sivash gulf at border of “Prisivashskiy” preserve, 21 Apr 2019, photograph by P. E. Yevseyenkov.

ously known from Egypt, Israel, Armenia, N Caucasus and S European Russia (Busch 1939; Grossheim 1950; Marhold 2011+). The new locality discovered in the Crimea represents the westernmost point of the species distribution in Europe. Since *O. pumila* was already known from the Don region (Busch 1939), its record in the neighbouring Crimea is not surprising.

A. V. Fateryga, V. V. Fateryga, S. A. Svirin,
A. V. Yena & P. E. Yevseyenkov

Cyperaceae

Cyperus alternifolius subsp. *flabelliformis* Kük. (≡ *Cyperus flabelliformis* Rottb. ≡ *C. involucratus* Rottb.)

A Tn: Tunisia: Bizerta, Bhira, 37°17'14"N, 09°51'50"E, 16 m, abandoned area (a good tuft of flowering individuals), 22 May 2019, *El Mokni* (Herb. Univ. Monastir). – A xenophyte native to E Africa, cultivated as an ornamental in warm-temperate and tropical regions of the world (Dai & al. 2010) and naturalized in North

America, Asia, Australia and Europe (see Verloove 2014). In Europe and the Mediterranean region the taxon is reported as alien with unknown status from Madeira, the Iberian Peninsula, the Balears, Corse, Cyprus and Poland (Euro+Med 2006+). It also occurs in Italy (Domina & al. 2018; Galasso & al. 2018). In N Africa, the taxon is reported from the Canary Islands, Morocco, Algeria and Egypt, also as alien with unknown status, and as cultivated on a large scale from Libya, but without any citation from Tunisia (Jiménez-Mejías & Luceño 2011+). Also the African Plant Database (APD 2019) does not report the occurrence of the taxon in Tunisia. Therefore, the citation here as a casual alien constitutes the first report of this taxon for the Tunisian flora, as an escape from former cultivation in an ornamental plantation.

R. El Mokni & F. Verloove

Ericaceae

Hypopitys monotropa Crantz (\equiv *Monotropa hypopitys* L.) – Fig. 8.

+ **Le:** Lebanon: Ehden forest, 34°18'50"N, 35°59'E, c. 1500 m, a few dried stems (fruits with some seeds), under dark forest canopy of *Abies cilicica* (Antoine & Kotschy) Carrière and *Cedrus libani* A. Rich. mixed with trees such as *Acer tauricola* Boiss. & Balansa, *Quercus coccifera* L. and *Q. infectoria* G. Olivier, in places rich in humus, Oct 2018, Fridlender (CLF121191). – This record is based on observation of six dried and damaged infructescences, so that one cannot discuss more about (sub)species identification. Many seeds were still present in the fruits and their morphology (Fig. 8) is consistent with previous descriptions of *Hypopitys* seeds (Randall Olson 1993).

Hypopitys is generally considered as a circumboreal element. Locally abundant in European forests, it is clearly rare in N Mediterranean mountains and considered native in a few N African forests (Algeria; Greuter & al. 1989). In Sicily, *Hypopitys* was recently found in a *Fagus* (*Quercus-Fagetia*) relict forest (Poli Marchese & Puzzolo 1999; Bonari & al. 2015). But even in France, where it grows mostly in moist oak-pine-spruce mountain forests, *Hypopitys* is very sensitive to drought episodes (Chassagne 1957). In the E Mediterranean, *H. monotropa* grows in NW Turkey but is rare elsewhere in some *Pinus-Abies-Quercus* forests between 540 and 1800 m (Steven 1978). It is also present in Cyprus (Hand & al. 2011+).

Hence this is the first record of a member of *Ericaceae* subfam. *Monotropoideae* for

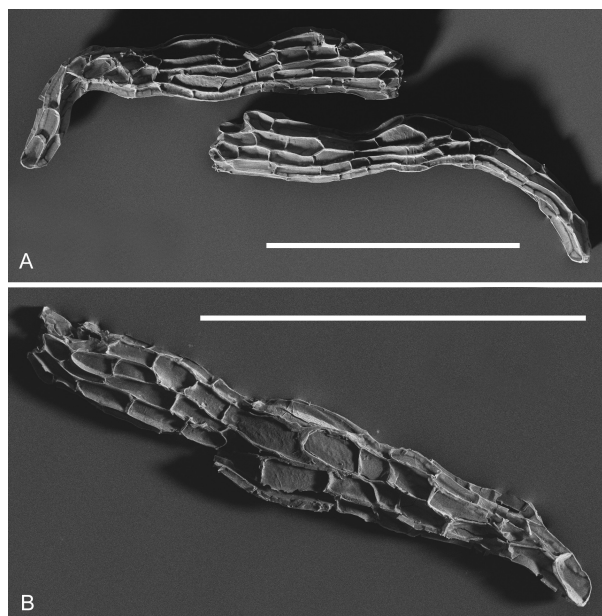


Fig. 8. *Hypopitys monotropa* – A, B: SEM micrographs of seeds collected from dried fruits. – Scale bars = 0.5 mm. – Source: Lebanon, Ehden forest, Oct 2018, Fridlender (CLF121191).

Lebanon and the Middle East, because there is just an old unconfirmed mention of *Hypopitys monotropa* from SE Turkey (Mt Amanus, Mouterde 1978). This achlorophyllous species is very sensitive to environmental changes, and so represents a typical relict species of high biogeographic value, clearly connected to the *Abies cilicica-Cedrus libani* forest endemic to the area. Mycoheterotrophic plants are “excellent indicators of undisturbed forests and forests with old-growth characteristics” (Bidartondo 2005). Therefore, *H. monotropa* represents one of the most important indicators of the great value of the Ehden Forest as a Middle East relict “old” forest. Although the summer drought was still strongly felt in the season of observation and collection (October), many ectomycorrhiza mushroom species were in full growth (e.g. an abundance of *Boletus satanas* Lenz). Natural forest dynamics remain well preserved in Ehden, as exemplified by the association of the rare hemiparasitic *Arceuthobium oxycedri* (DC.) M. Bieb. with *Juniperus-Abies* stands. Unfortunately, recent *Sus scrofa* (wild boar) introduction in Ehden forest may have great consequences on those fragile equilibria. A. Fridlender

Gramineae (Poaceae)

Phragmites frutescens H. Scholz – Fig. 9.

+ **Le:** Lebanon: Akkar, Halba, 34°33'N, 36°04'E, 82 m, agricultural plain in process of urbanization, compact hedge of reeds of about 25 metres

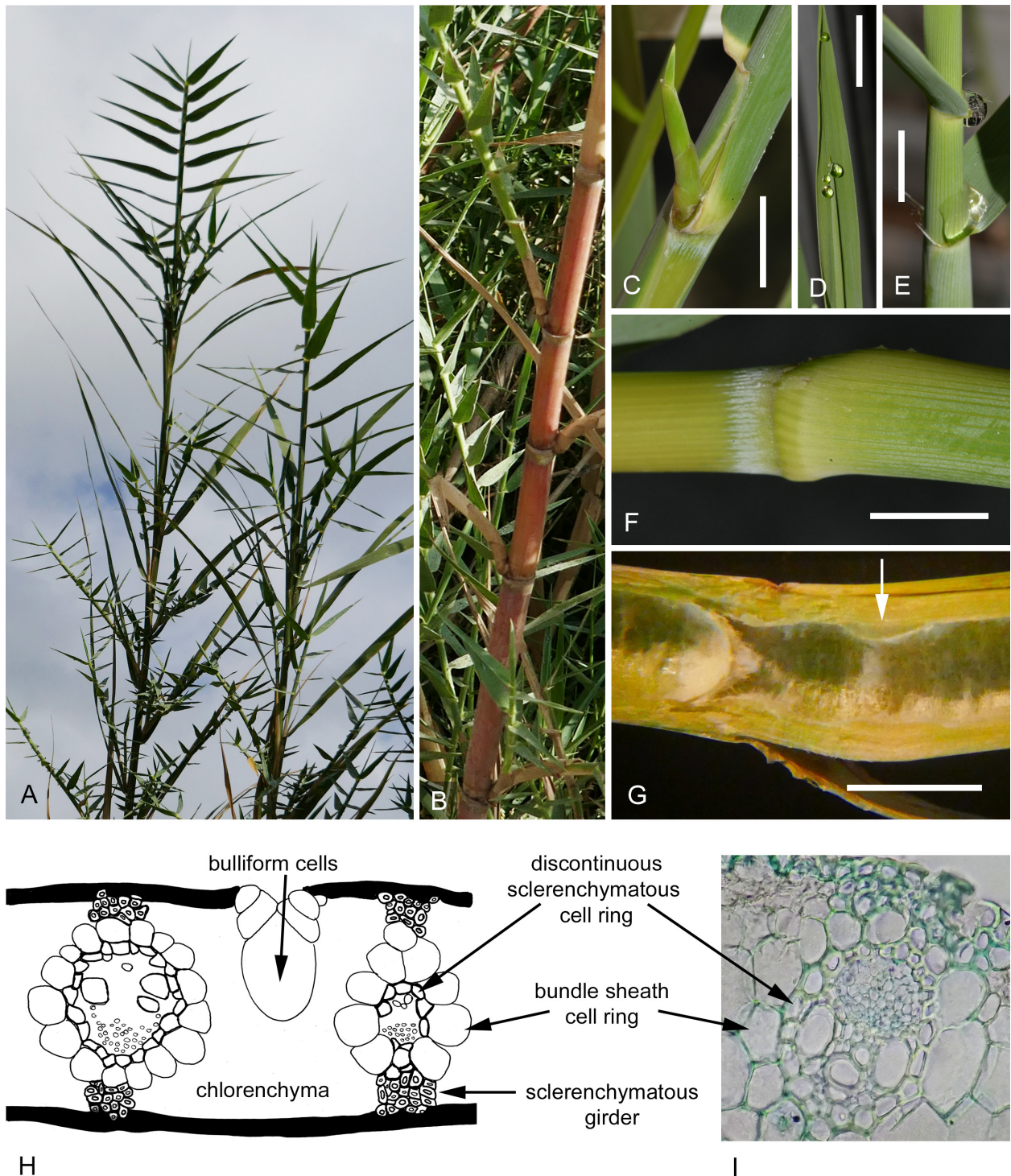


Fig. 9. *Phragmites frutescens* — A: dense ramification with spiny leaves; B: culm sometimes reddish; C: extravaginal shoot initiation; sylleptic tiller on a 3-week culm rupturing base of overlying leaf sheath; D: guttation; small droplets appear at night at margin of leaf blade apex; E: droplets slide toward ligule, where they gather; F, G: internodes and axial pulvinus on young shoot in cultivation (Marseille); F: general aspect; G: longitudinal section of showing axial pulvinus (arrow) and hollow internodes; H, I: leaf blade cross-sections 15 μ m thick; I: stained with iodine green and carmine alum. — Scale bars: C–E = 1 cm; F, G = 5 mm. — Photographs A–E: Lebanon, Halba, May 2019, by A. Fridlender.

bordering an abandoned field, 18 May 2019, Fridlender (CLF121190). — The phoenicoid habit of vigorous young shoots 3–4.5 m tall, presence of sylleptic and abundant proleptic

branching on the culm (mesotonic and acrotonic), dense foliage, and spiny leaves make identification of this recently described species (Greuter & Scholz 1996; Scholz & Böh-

ling 2000) quite easy (Fig. 9A). In *Poaceae*, extravaginal bud tillering (Fig. 9C) normally produces stolons or rhizomes (Bell & Bryan 2008) but in *Phragmites frutescens* (and also in bamboos) it forms orthotropic tillers (Fig. 9C). In Marseille, cultivated plants from Lebanon and Crete have the same growing compartment and peculiar nodal organization with well-developed axial pulvinus and hollow internodes (Fig. 9F, G). Surprisingly, cultivated in small water tanks, *P. frutescens* evaporates much more water than other reeds growing in the same conditions and, at night, guttation is abundant in young leaves (Fig. 9D, E). Some culms are reddish for the basal 1–1.5 m (Fig. 9B), as we also observed in some Cretan populations. The cauline anthocyanins probably have a protective effect against high irradiation.

Moreover, leaf anatomy revealed that bundle sheath cells are well developed like in C_4 plants (Fig. 9H, I). They are often lined inside by sclerenchymatous cell rings (generally discontinuous). An iodine coloration test does not show starch accumulation in bundle sheath cells (cf. Kranz cells), but the chlorenchyma gives a positive reaction to staining for starch (when cultivated in water tanks). The photosynthetic complex pathway remains unclear in *Phragmites frutescens* and is probably not reduced to a simple C_3/C_4 opposition as in different ecotypes of *P. communis* Trin. (Chen & al. 2003; Gong & al. 2011; Srivastava & al. 2014). In any case, physiology of this fast-growing plant could be different from other reeds.

In Lebanon, the ecology of the plant is identical to that of the Greek populations: the reeds grow in the plain, where “resurgences” of underground water descend from the mountains. This orographic configuration is common in W Lebanon: *Phragmites frutescens* could potentially be present on a large part of the coastline. Runners are vigorous and explain the vegetative persistence of this species. However, after millennia of agricultural over-exploitation, most of those sites are now almost completely urbanized.

Near Beirut, the three reed species that we have observed, generally located at the edge of water, are not spinescent: *Arundo donax* L., *A. micrantha* Lam. (= *A. mediterranea* Danin) and *Phragmites* sp., probably *P. chrysanthus* Mab. (= *P. isiacus* auct.). We have never found *P. communis* in Lebanon: reeds present in the Mediterranean part, from sea level (along “nahr”) to 1500 m and

in the Bekaa Asii river (Oronte), are all high plants without purplish inflorescences as in *P. communis*. Obviously, it is the same taxon as the one in Israel, which is named *P. australis* subsp. *altissimus* (Benth.) Clayton (Feinbrun-Dothan & Danin 1998). Then, plants with “spiny leaves and growing in relatively dry soils” observed by Mouterde (1966) and named *P. communis* f. *pungens* L. Chevall. (= *P. communis* var. *stenophyllus* Boiss.) in Nahr Gadhira (Mount Lebanon) might be small *P. frutescens*. Unfortunately, this locality disappeared after the construction of Rafik Hariri International Airport.

Although it is likely that other *Phragmites frutescens* populations will survive here and there at the edge of fields, drains or ditches, it must be considered that this species, which is disappearing with its habitats, should be conserved. However, *P. frutescens*, a reed of tropical origin, new to the Lebanon flora, is still present in a vast eastern part of the Mediterranean, from mainland Greece and Crete to Cyprus (Danin & Hadjikiakou 2004) and Israel (the Philistean Plain, Danin 2008).

A. Fridlender & J. P. Cornec

Labiatae (Lamiaceae)

Lavandula angustifolia Mill.

A Tn: Tunisia: Bizerta, toward Nadhour, 37°17'59"N, 09°52'06"E, 3 m, on sidewalks (2 flowering individuals), 11 Jul 2019, *El Mokni* (Herb. Univ. Monastir); Monastir, Monastir city, 35°45'45"N, 10°49'56"E, 10 m, roadside (5 flowering individuals), 21 Mar 2019, *El Mokni* (Herb. Univ. Monastir). – *Lavandula angustifolia*, a highly aromatic evergreen shrub is endemic to France, Italy and Spain, often found on calcareous soils (Pignatti 1982; Castroviejo & al. 2010; Girerd & Roux 2011; RBG Kew 2012). It has been widely introduced outside this area and is frequently found in cultivation all over Europe, where it has escaped and become naturalized in many areas (see Khela 2013; WCSP 2010). Within N Africa, the African Plant Database (APD 2019) lists the occurrence of this taxon as cultivated only in Algeria and Morocco. Therefore, the citation here as a casual alien constitutes the first report of the taxon for the Tunisian flora as few sporadic flowering escapes germinated from seeds of cultivated specimens. R. El Mokni

Lavandula dentata L.

A Tn: Tunisia: Bizerta, toward Nadhour, 37°17'59"N, 09°52'06"E, 3 m, on sidewalks (2–3 non-

flowering individuals), 11 Jul 2019, *El Mokni* (Herb. Univ. Monastir); Monastir, Monastir city, 35°45'45"N, 10°49'56"E, 10 m, roadside (7 small individuals), 21 Mar 2019, *El Mokni* (Herb. Univ. Monastir). – *Lavandula dentata*, a low, lignified and very ramified bush growing to 1 m in height with typical elongated leaves, characterized by small rounded lobes on their margin. It is native to Algeria, the Balears, Morocco, Spain and the Arabian peninsula and has been reported as a casual alien with unknown status in Madeira, the Canary Islands, Italy, Sicily, Malta and Bulgaria (Euro+Med 2006+; WCSP 2010). The African Plant Database (APD 2019) does not report the occurrence of the taxon in Tunisia yet. Therefore, the citation here as a casual alien constitutes the first report of this taxon for the Tunisian flora as few sporadic flowering escapes germinated from seeds of cultivated plants grown as ornamentals. R. El Mokni

Salvia microphylla Kunth

A Tn: Tunisia: Beja, toward Bousalem main road, 36°43'06"N, 09°10'45"E, 286 m, c. 10 flowering individuals on sidewalks and roadsides near some ornamental plantations, 13 Jun 2019, *El Mokni* (Herb. Univ. Monastir); Beja city, 36°43'18"N, 09°11'03"E, 253 m, on sidewalks and at walls (c. 8 flowering individuals), 13 Jun 2019, *El Mokni* (Herb. Univ. Monastir). – *Salvia microphylla*, an evergreen shrub that grows to 130 cm in height, is found in the wild in SE Arizona and the mountains of E, W and S Mexico to Guatemala (see Paton & al. 2009; Garcia-Mendoza & Meave 2012; Vladimirov & al. 2015; O'Leary & Moroni 2016). In the Mediterranean region the taxon is reported only from Morocco either as alien with unknown status (Euro+Med 2006+; WCSP 2010) or as cultivated (APD 2019). Therefore, the citation here as a casual alien constitutes the first report of this taxon for the Tunisian flora as few sporadic escapes grew in the Beja district from fragmented pieces of rhizomes of plants cultivated as ornamentals. R. El Mokni

Leguminosae (Fabaceae)

Hoffmannseggia glauca (Ortega) Eifert – Fig. 10.

A Ca(F): Canary Islands, Fuerteventura: Tuineje, Barranco de Gran Tarajal, c. 10 m, 28°13'46.78"N, 14°00'53.97"W, 14 Apr 2019, *Gil, Torres & Gil 7791* (TFMC-PV). – *Hoffmannseggia glauca* occurs in weedy and ruderal communities across the United States (from Kansas and

Colorado south to SW Texas and west to California), Mexico (Baja California and NC Mexico south to Puebla) and South America (from S Peru across Bolivia into N Chile and in Argentina as far south as Patagonia) (Simpson & Ulibarri 2006). The species is not included in the Euro+Med PlantBase (Euro+Med 2006+). However, in the past years it has been reported on several occasions. It is known from Alicante in Spain since the 1990s (Camuñas & Crespo 1999) from where it was subsequently confirmed in the same area by one of us in 2005 (*Verloove 6108* in BR, LG; see also Mateo & al. 2015). In 2006 it was also recorded in Santa Cruz de Tenerife in Tenerife (Canary Islands). In this locality, given its reputation as a noxious weed, it was immediately eradicated (Verloove & Reyes-Betancort 2011). Soon afterward, small but well-established populations were also observed in two localities in Vélez-Málaga, again in Spain (Cabezudo & al. 2009).

In April 2019 one of us (JG) discovered a small population, consisting of eight individuals, in the dried-out riverbed of Barranco de Gran Tarajal in Tuineje. After heavy rains local farmers divert the water from the ravine to their agricultural lands which could enhance the dispersal of the species in the area. In order to prevent this, the species was removed at this early stage of invasion.

Hoffmannseggia glauca is a weedy and aggressive species. Its tuberous roots allow it to form large colonies. The provenance of the plants recently discovered in Fuerteventura remains obscure. Although the species certainly has ornamental value, it apparently is not widely available throughout the horticultural trade (it is not mentioned, for instance, by Sánchez de Lorenzo Cáceres 2005). Its presence in Málaga, however, was associated with a local garden centre (Cabezudo & al. 2009).

J. Gil & F. Verloove

Melilotus officinalis (L.) Pall.

A Tn: Tunisia: Jendouba, Fernana, 36°39'12"N, 08°41'58"E, 273 m, roadsides near cultivated fields, 23 Apr 2010, *El Mokni* (Herb. Univ. Bizerta); Beja, Nefza-Bellif, 37°02'24"N, 09°04'26"E, 56 m, roadsides within *Quercus suber* L. forests close to cultivated areas, 17 Jun 2019, *El Mokni* (Herb. Univ. Monastir). – *Melilotus officinalis* is an erect annual or biennial herb growing from strong taproots. It is native to Eurasia and introduced in North America, Africa and Australia and has escaped from cultivation and become an invasive



Fig. 10. *Hoffmannseggia glauca*, inflorescence and portions of leaves. – Spain: Canary Islands, Fuerteventura, Tuineje, Barranco de Gran Tarajal, 14 Apr 2019, photograph by J. Gil.

weed in many temperate and tropical regions (see, e.g., Randall 2017; Roskov & al. 2018; USDA-ARS 2019; CABI 2019). In N Africa, the taxon is reported as an adventitious plant only in Algeria, Libya and Morocco (APD 2019). Therefore, the citation here as a casual alien, probably introduced with seeds intended for cultivation purposes, constitutes the first report of this taxon for the Tunisian flora.

R. El Mokni

Orobanchaceae

Orobanche ballotae A. Pujadas – Fig. 11.

+ **Gr:** Greece: Peloponnisos, SE of Evrostina, Mt Mavro Oros, Achladokambos, 38°03'00"N,

22°24'08"E (WGS 84), 1100 m, N-exposed phrygana over conglomerate, small population on *Lamium garganicum* L. (verified, matrix nova!), 9 Jun 2011, Rätzel 2601, 2602 & Ristow (herb. Rätzel); *ibid.*, 12 May 2010 (sprouting), next to *Lamium garganicum*, Raabe & Rätzel (obs.). – New to Greece; mentioned neither in the current checklist (Dimopoulos & al. 2013, 2016) nor in the *Atlas of the Aegean flora* (Strid 2016). This species, described from Córdoba (Spain) (Pujadas Salvà 1997: 30 f.; holotype: COA 17617; isotypes: G, MA, MGC), belongs to *Orobanche* sect. *Orobanche* subsect. *Speciosae* (Lojac.) Novopokr. [incl. subsect. *Minores* (Beck) Teryokhin]. It has been relatively rarely recorded up to now, especially



Fig. 11. *Orobanche ballotae* – A: habit; B: detail of inflorescence. – Greece: Peloponnisos, SE of Evrostina, Mt Mavro Oros, Achladokambos, 9 Jun 2011, photographs by S. Rätzl.

from the southern regions along the Mediterranean coast of Spain, and only *Ballota hirsuta* Benth. was known as a verified host (Pujadas 1997; Sánchez Pedraja & al. 2016+). Another record outside Spain seems feasible, but requires confirmation: “Moroccan High Atlas, Oukaïmeden, parasitic on *Mantisalca?*”, *Jury* 8867 (RNG) (Jury & al. 2008; see also note in Pujadas 1997: 32).

The plants from Peloponnisos match the original description (Pujadas 1997) as well as other images and collections (e.g. Sánchez Pedraja & al. 2016+; “Nanosanchez” on https://de.wikipedia.org/wiki/Datei:Orobanche_ballotae140004.jpg; J. Quiles on http://www.flora-silvestre.es/mediterranea/Orobanchaceae/Orobanche_ballotae.htm; M. Isabel Ferrero on [<http://www.almerinatura.com/parasitas/orobanche-ballotae.html>; J. R. González López on <https://www.asturnatura.com/fotografia/flora/orobanche-ballotae-2/33008.html>; all accessed 17 Aug 2019\) very well in several characters, i.e. conspicuously lax spike, very long bracts normally much exceeding the corolla, corolla form and size, corolla white with pale pink venation, and stigma white or faintly pink.](https://floresysetasdeespana.wordpress.com/2018/06/03/orobanche-ballotae-orobanchi</p>
</div>
<div data-bbox=)

In the course of a detailed examination of an isotype in G (G00383291), we could ensure that our specimen agrees with *Orobanche ballotae* also in micromorphological characters (hairs at inner side of corolla). This applies also to the rich and long, glandular hairs on the stem and bracts (to 2.5 mm) and filaments (to 0.7 mm).

S. Rätzl, M. Ristow & H. Uhlich

Phelipanche hedyroidis Rätzl & al. (\equiv *Orobanche hedyroidis* (Rätzl & al.) Hand)

+ **Sn:** Egypt, Sinai: “Arabia petraea, Mart. 1846”, Boissier (Herb. Fl. Orientalis G-BOIS G00768873 [sub *Phelipaea ramosa* var. “ β ”; collection with parts of *Hedypnois rhagadioloides* subsp. *tubaeformis*!]). – New for Sinai. *Phelipanche hedyroidis*, recently described from Rodos, Greece (Rätzl & al. 2017: 651 f.; holotype B 10 0699408), is a widely distributed, overlooked species of Mediterranean coastal areas (rarely up to 800 m). The species is known from Spain (El Hierro, Canary Islands; Mallorca, Balearic Islands), Morocco, Greece (Chalkidiki, Limnos, Lesvos, Peloponnisos, Kriti, Rodos), Turkey and Lebanon (Rätzl & al. 2017 and unpublished data). It was recently also recorded for Cyprus (Hand 2019).

The geographical assignment is based on the explanations by Boissier himself. He stayed on the Sinai Peninsula in March 1846: “Pendant l’hiver et le printemps de 1846, j’ai remonté la vallée du Nil jusqu’à Assouan; puis, de retour au Caire, j’ai été, en Mars, par Suez, au mont Sinäi; j’ai ensuite traversé toute l’Arabie Pétrée jusqu’à Gaza. La saison était trop peu avancée pour les parties élevées de la chaîne Sinaïtique, mais la végétation du désert, entrainé dans son meilleur moment. Au Caire, M. le Dr. Husson a enrichi ma collection de plantes intéressantes qu’il avait recueillies dans le désert entre l’Egypte et la mer Rouge.” (Boissier 1867: xxii), see also Mermoud (1980) and Charpin (2011) for further details of the journey of Boissier to Egypt, Palestine, Lebanon and Syria in 1845–1846 (with maps of the

itinerary). Due to the knowledge of the ecology of *Phelipanche hedyroidis*, we presume the location of the collection to be along Boissier’s coastal route between Suez and Mokatteb (Sinai).

The species is morphologically well characterized by the mostly irregular (4 or)5–6(–8) calyx teeth, the usually relatively compact habit (in comparison to *P. mutelii* (F. W. Schultz) Pomel, *P. ramosa* (L.) Pomel and other relevant species) and by the yellowish, distally (toward the seam) pale or dull violet corollas.

H. Uhlich & S. Rätzl

Phelipanche nowackiana (Markgr.) Soják (\equiv *Orobanche nowackiana* Markgr.). – Fig. 12, 13.

+ **AE(G):** Greece, East Aegean Islands, Nomos of Lesvos, Island of Lesvos, Mt Olimbos, 39°04'27.19"N, 26°20'19.71"E, 753 m, opening in *Pinus brutia* Ten. forest dominated by the endemic *Odontarrhena lesbiaca* P. Candargy (\equiv *Alyssum lesbiacum* (P. Candargy) Rech. f.), on serpentine, 27 Apr 2018, Dimitrakopoulos (photos). – This species was previously known as *Orobanche rechingeri* Gilli, described from a locality in S Pindos where it was apparently parasitic on a species of *Odontarrhena* C. A. Mey. ex Ledeb. (\equiv *Alyssum* sect. *Odontarrhena* (C. A. Mey. ex Ledeb.) K. Koch). It was subsequently found in several localities in the serpentine areas of NW Greece (Fig. 13). The same species has also been collected in a large serpentine mountain in SW Anatolia (Sandras Dağ, Hartvig & al. 23294, 6 Jul 1984; B, C, E, EGE, G). Foley (2000) demonstrated that *Orobanche rechingeri* is conspecific with *O.*



Fig. 12. *Phelipanche nowackiana*. – A: habitat with host plant, *Odontarrhena lesbiaca*; B: flowering plants. – Greece: Lesvos, 27 Apr 2018, photographs by P. G. Dimitrakopoulos.

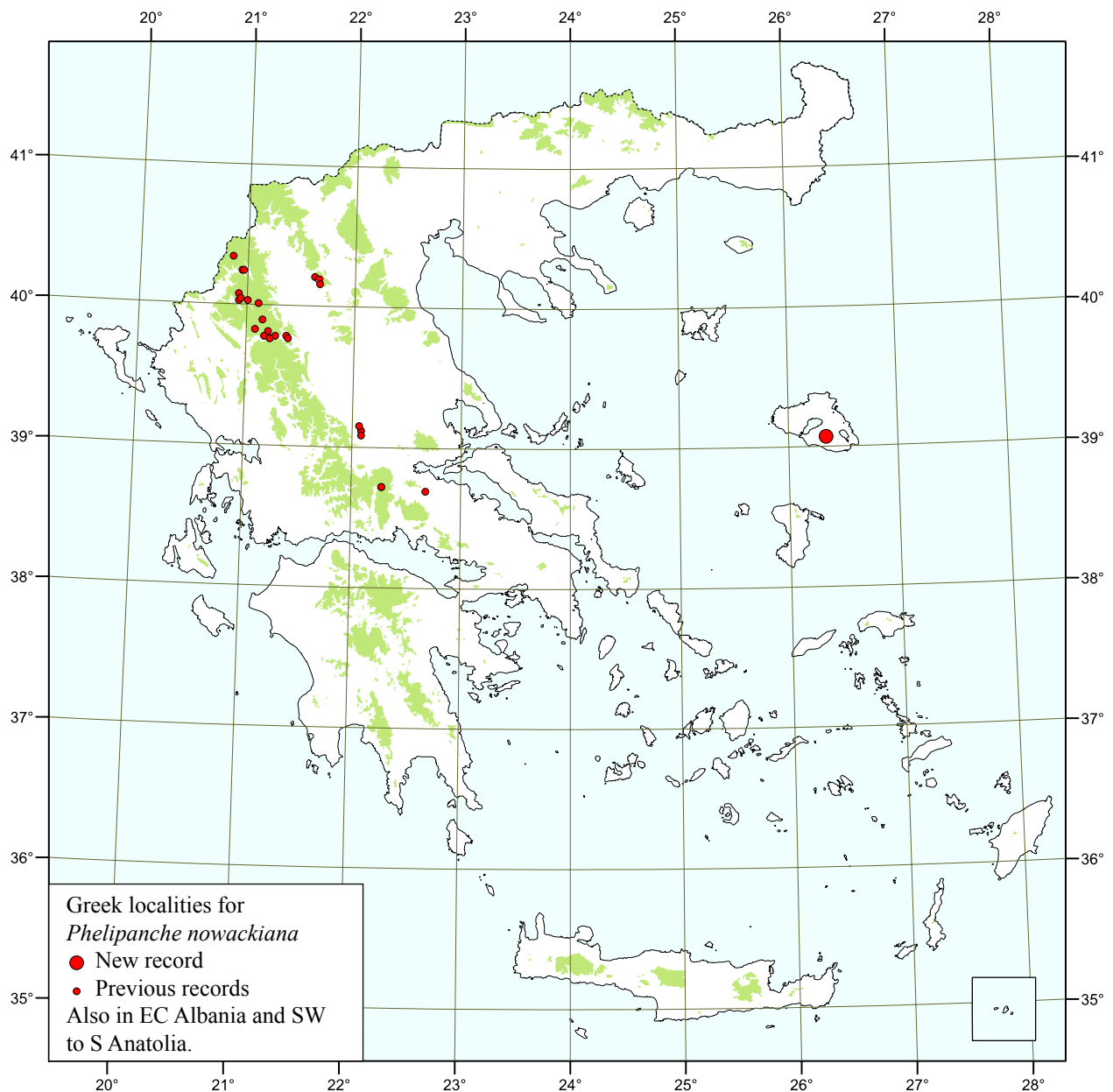


Fig. 13. Distribution map for *Phelipanche nowackiana* according to records in the Flora Hellenica Database.

nowackiana, described from C Albania. In the same publication (Foley 2000: 274) it was also reported from the island of Lesvos, based on observations by R. Reeves in 1998; however, this report was overlooked both in Euro+Med (2006+) and in the Greek checklist (Dimopoulos & al. 2013). *Orobanchae nowackiana* and a group of related species are now mostly placed in the genus *Phelipanche*. The separation of the two genera was accepted by Dimopoulos & al. (2013: 118). We can now confirm the occurrence of *P. nowackiana* on Mt Olimbos in Lesvos, where it is parasitic on the endemic *Odontarrhena lesbiaca*.

P. G. Dimitrakopoulos,
I. Bazos & A. Strid

Phelipanche portoilicitanus (A. Pujadas & M. B. Crespo) Carlón & al. (≡ *Orobanchae portoilicitanus* A. Pujadas & M. B. Crespo)

+ **Ga(F)**: France: Dép. Var, Châteaudouble, below the village along the road to Draguignan, 43°35'40"N, 06°26'55"E, rocky road bank, 29 May 2016, *Hand* 7479 (B [sub *Orobanchae* sp. with note: "flowers pale yellow, base more intensive, in very rich vegetation, host unclear", det./rev. Rätzel & Uhlich 15 Jul 2019, photos of specimen conf. Sánchez-Pedraja 14 Aug 2019]). – The taxon was not known to occur in France until now (Tison & Foucault 2014: 867 f.; see also online database at http://siflore.fcfn.fr/?cd_ref=&r=metro). The species, described from Spain (Alicante, Pujadas & Crespo 2004;

holotype: COA 31083), has a widespread distribution in the Mediterranean. It has also been recorded from Morocco, Algeria, Tunisia, Libya and Egypt (except Sinai, Pujadas & Crespo 2004; Carlón & al. 2005, 2008; Domina & Raab-Straube 2010+; Sánchez Pedraja & al. 2016+;). Recently, the species was mentioned for Armenia as well (Piwowarczyk & al. 2019: 38 f.).

Phelipanche portoilicitana shows a characteristic habit with always very compact, cylindric inflorescences and, compared to the stem, relatively small flowers with strong bracts. The stems are very thick and densely covered with scales. There is only a weak tendency to branched stems; most individuals are unbranched as in the French specimen. Stems, bracts and calyces are typically pale whitish-yellowish, giving the plant a brightly coloured overall appearance. All previously described host plants belong to *Asteraceae* (*Centaurea* s.l.).

S. Rätzl, R. Hand & H. Uhlich

Polygonaceae

Rumex obtusifolius L.

+ **Tn:** Tunisia: Jendouba, Ain Draham, road toward Babouch village, 36°46'58"N, 08°41'11"E, 724 m, in a small roadside stream, 17 Mar 2019, *El Mokni* (Herb. Univ. Monastir). – *Rumex obtusifolius* is an erect perennial herb, 40–150 cm tall, with a stout, branched taproot; basal and lower leaves are petiolate, ovate-oblong, with a cordate base and a rounded apex, and have a large and paper-like ochrea. It is native to Eurasia (Hultén 1950; Uotila 2017+) but has been introduced to other continents. In N Africa the taxon is native only to Algeria, considered as casual alien in Morocco and alien with unknown status in the Canary Islands but is not reported for Tunisia (Uotila 2017+; APD 2019). Therefore, the citation here constitutes the first record of this species for the Tunisian flora, probably as an overlooked or previously misidentified taxon.

R. El Mokni & F. Verloove

Rosaceae

Drymocallis rupestris (L.) Soják

+ **Uk(U):** Ukraine, Zakarpatska obl. (Transcarpathian region), Vynohradiv, Chorna hora, 48°08'N, 23°04'E, grassy SW slope, c. 150 m, 3 May 2008, *Kovalchuk* (photo; Kovalchuk 2011: <https://www.plantarium.ru/page/image/id/85459.html>). – *Drymocallis rupestris* (listed

in older sources as *Potentilla rupestris* L.) is distributed in Europe from Spain and the British Isles to S Sweden and Belarus (Kurtto & al. 2004: 159, Map 3391); it is also reported from NW Africa (Morocco, Kurtto 2009). Crimean and Caucasian populations are sometimes regarded as separate species, *Potentilla jailae* Juz. (\equiv *Drymocallis jailae* (Juz.) Soják) and *P. foliosa* Sommier & Levier, respectively. There is also an isolated occurrence of the species in the Altai region of Russia (Soják 2010: 326). The eastern limit of its continuous distribution in C Europe goes via Belarus, Poland, Slovak Republic, Hungary and Romania (Kurtto & al. 2004: 159, Map 3391).

The occurrence of *D. rupestris* in Ukraine in contemporary floristic compilations was regarded as doubtful and questionable (Kotov 1964: 112; Mosyakin & Fedoronchuk 1999: 291; Kamelin 2001: 409; Fedoronchuk 2017: 6) due to the lack of recent collections. It was explicitly mentioned as absent from Uk(U) by Kurtto & al. (2004: 160), and Ukraine is not included in its distribution area in Euro+Med PlantBase (Kurtto 2009). However, the species was observed in the Transcarpathian region in the first half of the 20th century by A. Margittai. He mentioned its occurrence near the town of Seljush (now Vynohradiv) (Margittai 1923: 72). The author of this report observed the species in the same location in 2008.

Chorna hora is a hill of volcanic origin situated in the Tisa river valley, well known for its floristic richness. *D. rupestris* grows there within thermophilic herbaceous plant communities (*Geranion sanguinei*) on the SW slope. Currently, this is the only known occurrence of *D. rupestris* (excl. *D. jailae*) in Ukraine.

A. Kovalchuk

Solanaceae

Nicotiana alata Link & Otto

A Tn: Tunisia: Sousse, Sousse City, 35°49'59"N, 10°38'25"E, 7 m, on sidewalks and under *Phoenix canariensis* plantations in the Boujaâfar area, c. 20 white-flowering individuals, 6 Jul 2019, *El Mokni* (Herb. Univ. Monastir). – *Nicotiana alata* is an herbaceous annual to perennial herb up to 40–70(–150) cm tall, with lanceolate leaves and 5–8 cm long trumpet-shaped flowers with white interiors and yellowish exteriors (see Graft 1980; Kohlein & Menzel 1994). Its native range is from SE & S Brazil to NE Argentina (Griffiths 1994). Cultivated as an ornamental, the species is

reported as casual alien in Belgium, France and Spain and as alien with unknown status in Germany, Romania and Austria (Valdés 2012+). For N African countries, however, it is reported only from the Canary Islands as an alien with unknown status (Valdés 2012+) and from Morocco as “Cult./Adv./Introd.” (APD 2019). The present report is therefore the first for the Tunisian flora, as a casual escape from horticultural introductions to some nearby hotels or residences.

R. El Mokni

Staphyleaceae

Staphylea pinnata L.

+ **Gr:** Greece, Thrace, Nomos of Xanthi: Stena Nestou (gorge of Nestos river), 2.5 km W of Ano Livera, 41°09'07"N, 24°40'45"E, 70 m, 27 Jul 2014, *Vidakis & Tsiripidis* (obs.); *ibid.*, 41°09'05"N, 24°40'52"E, 77 m, 27 Jul 2014, *Vidakis & Tsiripidis* (obs.); *ibid.*, 41°09'06"N, 24°40'27"E, 114 m, 1 Aug 2016, *Mastrogianni & Tsiripidis* (obs.); *ibid.*, 41°09'08"N, 24°40'40"E, 63 m, 2 Aug 2016, *Mastrogianni & Tsiripidis* (TAUF); *id.*, Nomos of Drama: 3 km S of Kato Vrontou, 41°14'53"N, 23°45'40"E, 723 m, 27 Aug 2014, *Vidakis & Tsiripidis obs.* – Not given for Greece in *Flora europaea* (Ball 1968), later reported to be extinct in Greece (Euro+Med 2006+, Dimopoulos & al. 2013: 28, 143) by construction and flooding of the Thisavros dam in the upper reach of the Nestos river in 1996 (for details, see Raus 2006), but certified here with the correct status of an extant native member of the Greek flora with at least two populations in NE Greece representing the southernmost occurrences of the species in Europe. In the first locality, several small subpopulations were found mainly in small stands of alluvial *Tilio-Acerion* forests and at the ecotone between this type of vegetation and riverine *Populus alba* L. stands on the eastern banks of river Nestos where *Tilia platyphyllos* Scop., *T. tomentosa* Moench, *Ostrya carpinifolia* Scop. and *Carpinus orientalis* Mill. are the predominant tree species, with *Asplenium scolopendrium* L., *Ruscus aculeatus* L. and the vine *Smilax aspera* L. as other significant accompanying species. Several individuals of *Staphylea pinnata* were observed in fruit, forming an understorey shrub layer with an average cover of 12% and a height of 2–3 m. Furthermore, juveniles were recorded in the herb layer indicating ability of regeneration. In the second locality, N of Kato Vrontou, few young individuals (to c. 0.5 m tall) were

found in the understorey layer of a thermophilous-mesophilous *Fagus sylvatica* L. forest, accompanied by few juveniles of *Tilia platyphyllos* and *Ulmus glabra* Huds.

A. Mastrogianni, K. Vidakis,
Th. Raus & I. Tsiripidis

Acknowledgements

A. Fridlender wishes to thank Bouchra Douaihy and Jean Stephan for their useful help during field exploration in Lebanon, and Fabrice Paraque for the English correction. R. Hand, S. Rätzel and H. Uhlich thank Ò. Sánchez-Pedraja (Editor-in-chief of the Grupo botánico cantábrico (GBC), Liérganes, Spain) for confirmation of the determination of *Phelipanche portulicitanica* and helpful hints. The latter two authors also thank N. Fumeaux (Genève/G) for support, J. Krause (Berlin) and M. Ristow (Potsdam and Berlin) for providing unpublished data, and U. Raabe (Marl) for joint field trips (with S. Rätzel). Finally, two anonymous reviewers are thanked for their comments on earlier versions of these Notulæ.

References

- Allison J. R. & Stevens T. E. 2001: Vascular flora of Ketchikan dolomite outcrops in Bibb County, Alabama. – *Castanea* **66**: 154–205.
- APD 2019: African Plant Database (version 3.4.0). *Cyperus alternifolius* subsp. *flabelliformis* Kük., *Lavandula angustifolia* Mill., *Lavandula dentata* L., *Melilotus officinalis* (L.) Pall., *Nicotiana glauca* Link & Otto, *Rumex obtusifolius* L. subsp. *obtusifolius*, *Salvia microphylla* Kunth, *Schinus molle* L. – Genève: Conservatoire et Jardin botaniques; Pretoria: South African National Biodiversity Institute. – Published at <http://www.ville-ge.ch/musinfo/bd/cjb/africa/index.php> [accessed 1 Aug 2019].
- Ball P. W. 1968: *Staphylea* L. – P. 242 in: Tutin T. G., Heywood V. H., Burges N. A., Moore D. M., Valentine D. H., Walters S. M. & Webb D. A. (ed.), *Flora europaea 2. Rosaceae to Umbelliferae*. – Cambridge: Cambridge University Press.
- Beck von Mannagetta G. 1930: *Orobanchaceae*. – In: Engler A. (ed.), *Das Pflanzenreich. Regni vegetabilis conspectus* **IV. 261** (Heft **96**). – Leipzig: Wilhelm Engelmann.
- Bell A. D. & Bryan A. 2008. *Plant form. An illustrated guide to flowering plant morphology*. – Portland, etc.: Timber Press.
- Bidartondo M. I. 2005: The evolutionary ecology of myco-heterotrophy. – *New Phytol.* **165**: 335–352.
- Boissier P. E. 1867: *Flora orientalis sive enumeratio plantarum in Oriente a Graecia et Aegypto ad Indiae*

- fines hucusque observatarum **1**. *Thalamiflorae*. – Genevae et Basileae: H. Georg.
- Boissier P. E. 1879: Flora orientalis sive enumeratio plantarum in Oriente a Graecia et Aegypto ad Indiae fines hucusque observatarum **4**. *Corolliflorae* et *Monochlamydeae*. – Genevae et Basileae: H. Georg.
- Bonari G., Cambria S., Rosati L., Domina G. 2016: Contributo alla conoscenza della distribuzione di *Monotropa hypophegea* Wallr. (*Ericaceae*) in Italia. – Atti Soc. Tosc. Sci. Nat. Mem. Ser. B, **122**: 11–16.
- Busch N. A. 1939: *Cruciferae* B. Juss. [pro parte majore]. – Pp. 14–606 in: Komarov V. L. (ed.), Flora SSSR **8**. – Moscow & Leningrad: Academy of Sciences of USSR.
- Cabezudo B., Casimiro-Soriguer Solanas F., Pérez Latorre A. V., Dana Sánchez E. D. & Ramírez López J. 2009: *Hoffmannseggia glauca* (Ortega) Einfen (*Fabaceae*, *Caesalpinioideae*) nuevo metáfito en el sur de la Península Ibérica (Málaga, España). – Acta Bot. Malac. **34**: 261–263.
- CABI 2019: Invasive species compendium. – Wallingford: CAB International. – Published at <https://www.cabi.org/isc> [accessed 1 Aug 2019].
- Camuñas E. & Crespo M. B. 1999: The genus *Hoffmannseggia* Cav. (*Fabaceae*, *Caesalpinioideae*), new for the Mediterranean flora. – Israel J. Pl. Sci. **47**: 283–286.
- Carlón L., Gómez Casares G., Laínz M., Moreno Moral G., Sánchez Pedraja Ó. & Schneeweiss G. M. 2005: Más, a propósito de algunas *Orobanchae* L. y *Phelipanche* Pomel (*Orobanchaceae*) del oeste del Paleártico. – Doc. Jard. Bot. Atlántico **3**: 1–71.
- Carlón L., Gómez Casares G., Laínz M., Moreno Moral G., Sánchez Pedraja Ó. & Schneeweiss G. M. 2008: Más, a propósito de algunas *Phelipanche* Pomel, *Boulardia* F. W. Schultz y *Orobanchae* L. (*Orobanchaceae*) del oeste del Paleártico. – Doc. Jard. Bot. Atlántico **6**: 1–128.
- Castroviejo S., Aedo C., Lainz M., Morales R. Muñoz Garmendia F., Nieto Feliner G. & Paiva J. (ed). 2010: Flora iberica **12**. – Madrid: Real Jardín Botánico, C.S.I.C.
- Charpin A. 2011: Les voyages d'Edmond Boissier en Grèce et au Moyen-Orient. – Arch. Sci. **64**: 25–42.
- Chassagne M. 1957: Inventaire analytique de la flore d'Auvergne **2**. – Paris: Lechevalier.
- Chen K.-M., Gong H.-J., Chen G.-C., Wang S.-M. & Zhang C.-L. 2003: Up-regulation of glutathione metabolism and changes in redox status involved in adaptation of reed (*Phragmites communis*) ecotypes to drought-prone and saline habitats. – J. Pl. Physiol. **160**: 293–301.
- Dai L. K., Tucker G. C. & Simpson D. A. 2010: *Cyperus*. – Pp. 219–241 in: Wu C. Y., Raven P. H. & Hong D. Y. (ed.), Flora of China **23**. *Acoraceae* through *Cyperaceae*. – Beijing: Science Press; St. Louis: Missouri Botanical Garden Press.
- Danin A. & Hadjikyriakou G. 2004: *Phragmites frutescens* H. Scholz. – P. 79 in: Greuter W. & Raus T. (ed), Med-Checklist Notulae, 22. – Willdenowia **34**: 71–80.
- Danin A. & Naenny W. 2008: Contribution to recognition of reeds by their rhizome anatomy. – Fl. Medit. **18**: 385–392.
- Dimopoulos P., Raus T., Bergmeier E., Constantinidis T., Iatrou G., Kokkini S., Strid A. & Tzanoudakis D. 2013: Vascular Plants of Greece: an annotated checklist. – Berlin: Botanic Garden and Botanical Museum Berlin-Dahlem; Athens: Hellenic Botanical Society. – Englera **31**.
- Dimopoulos P., Raus T., Bergmeier E., Constantinidis T., Iatrou G., Kokkini S., Strid A. & Tzanoudakis D. 2016: Vascular Plants of Greece. An annotated checklist. Supplement. – Willdenowia **46**: 301–347.
- Dobignard A. & Chatelain C. 2010: Index synonymique de la flore d'Afrique du Nord **1**. *Pteridophyta*, *Gymnospermae*, *Monocotyledonae*. – Genève: Conservatoire et Jardin botaniques de la Ville de Genève, publication hors-série **11**.
- Dobignard A. & Chatelain C. 2011: Index synonymique de la flore d'Afrique du Nord **3**. *Dicotyledoneae: Balsaminaceae à Euphorbiaceae*. – Genève: Conservatoire et Jardin botaniques de la Ville de Genève, publication hors-série **11b**.
- Domin K. 1935–1936: Plantarum czechoslovakiae enumerato, species vasculares indigenas et introductas exhibens. – Preslia **13–15**: 1–306.
- Domina G., Galasso G., Bartolucci F. & Guarino R. 2018: Ellenberg indicator values for the vascular flora alien to Italy. – Fl. Medit. **28**: 53–61.
- Domina G. & Raab-Straube E. von 2010+ [continuously updated]: *Phelipanche* Pomel. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=69555&PTRefFk=7500000> [accessed 12 Aug 2019].
- Euro+Med 2006+ [continuously updated]: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed> [accessed 17 Oct 2019].
- Fedoronchuk M. M. 2017: Taksoni *Rosaceae* flori Ukraïni: poloshennja v novij sistemi rodini, pobudovanij za danimi molekulyarno-filogenetichnogo analizu. Taxa of *Rosaceae* of the Ukrainian flora: position in a new system of the family according to molecular phylogenetic data [in Ukrainian]. – Ukrain. Bot. J. **74**: 3–15.
- Feinbrun-Dothan N. & Danin A. 1998: Analytical flora of Eretz-Israel, ed. 2. – Jerusalem: CANA Publishing House.
- Foley M. J. Y. 2000: The taxonomic position of *Orobancha rechingeri* Gilli (*Orobanchaceae*) in relation to *Orobancha nowackiana* Markgr. – Candollea **55**: 269–276.

- Frey D., Baltisberger M. & Edwards P. J. 2003: Cytology of *Erigeron annuus* s.l. and its consequences in Europe. – *Bot. Helv.* **113**: 1–14.
- Gabrielyan E. Ts. 1995: *Centaurea* L. [pro parte majore]. – Pp. 368–433 in: Takhtajan A. L. (ed.), *Flora Armenii* **9**. – Havlickuv Brod: Koeltz.
- 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., Iamónico D., Iberite M., Jiménez-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., Wilhelm T. & Bartolucci F. 2018: An updated checklist of the vascular flora alien to Italy. – *Pl. Biosystems* **152**: 556–592.
- García-Mendoza A. J. & Meave J. A. (ed.) 2012: Diversidad florística de Oaxaca: de musgos a angiospermas (colecciones y listas de especies), ed. 2. – México: Instituto de Biología, Universidad Nacional Autónoma de México.
- Girerd B. & Roux J. P. 2011: Flore du Vaucluse. – Mèze: Biotope.
- Gong C. M., Bai J., Deng J. M., Wang G. X. & Liu X. P. 2011: Leaf anatomy and photosynthetic carbon metabolic characteristics in *Phragmites communis* in different soil water availability. – *Pl. Ecol.* **212**: 675–687.
- Govaerts R., Zonneveld B. J. M. & Zona S. A. 2019: World checklist of *Asparagaceae*. Facilitated by the Royal Botanic Gardens, Kew. – Published at <http://wcp.science.kew.org/> [accessed 19 Sep & 21 Oct 2019].
- Graft A. B. 1980: *Tropica*. Color encyclopedia of exotic plants and trees, ed. 10. – East Rutherford: Roehrs.
- Greuter W. 2006+ [continuously updated]: *Compositae* Giseke [pro parte majore]. – In: Greuter W. & Raab-Straube E. von (ed.), *Compositae*. Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=14103&PTReffk=7000000> [accessed 15 Aug 2019].
- Greuter W., Burdet H. M. & Long G. 1989: Med-Checklist. A critical inventory of vascular plants of the circum-mediterranean countries **4**. – Genève: Conservatoire et Jardin botaniques de la Ville de Genève; Berlin: Secrétariat Med-Checklist, Botanischer Garten und Botanisches Museum Berlin-Dahlem.
- Greuter W. & Raab-Straube E. von (ed.) 2005: Euro+Med Notulae, 1 [Notulae ad floram euro-mediterranean pertinentes 16]. – *Willdenowia* **35**: 223–239.
- Greuter W. & Scholz H. 1996: *Phragmites* in Crete, *Cenchrus frutescens* and the nomenclature of the common reed (*Gramineae*). – *Taxon* **45**: 521–523.
- Griffiths M. 1994: Index of garden plants. – Portland, etc.: Timber Press.
- Grossheim A. A. 1950: Flora Kavkaza, ed. 2, **4**. – Moscow & Leningrad: Academy of Sciences of USSR.
- Halliday G. 1976: *Erigeron* L. – Pp. 116–120 in: Tutin T. G., Heywood V. H., Burges N. A., Moore D. M., Valentine D. H., Walters S. M. & Webb D. A. (ed.), *Flora europaea* **4**. – Cambridge: Cambridge University Press.
- Hand R. 2019: *Orobanche hedypnoidis* comb. nov. in Cyprus, new but not unexpected. – *Cypricola* **14**. – Published at <http://flora-of-cyprus.eu/cypricola> [accessed 1 Sep 2019].
- Hand R., Hadjikyriakou G. N. & Christodoulou C. S. (ed.) 2011+ [continuously updated]: Flora of Cyprus – a dynamic checklist. – Published at <http://www.flora-of-cyprus.eu/> [accessed 31 Jul 2019].
- Henning T. & Raab-Straube E. von 2016+ [continuously updated]: *Schinus* L. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=956&PTReffk=7100000> [accessed 31 Jul 2019].
- Hultén E. 1950: Atlas of the distribution of vascular plants in north-west Europe. – Stockholm: Esselte AB.
- Jiménez-Mejías P. & Luceño M. 2011+ [continuously updated]: *Cyperus involucratus* Rottb. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=37612&PTReffk=7400000> [accessed 1 Aug 2019].
- Jørgensen P. M., Nee M. H. & Beck S. G. (ed.) 2013: Catálogo de las plantas vasculares de Bolivia – Monogr. Syst. Bot. Missouri Bot. Gard. **127**.
- Jury S. L., Rutherford R. W., Rejdali M., Rankou H. & El Atechi T. 2008: The vascular flora of Oukaïmeden, in the Moroccan High Atlas. Second edition 2008. – Published at https://www.researchgate.net/publication/237672452_The_vascular_flora_of_Oukaïmeden_in_the_Moroccan_High_Atlas [accessed 1 Aug 2019].
- Kamelin R. V. 2001: Lapchatka – *Potentilla* L. [Cinquefoil – *Potentilla* L. in Russian] – Pp. 394–452 in: Tzvelev N. N. (ed.), *Flora Europae orientalis* **10**. – Sankt-Peterburg: Mir i Semia & Academia Chemicopharmaceutica Petropolitana.
- Khela S. 2013: *Lavandula angustifolia*. – The IUCN Red List of threatened species 2013: e.T203244A2762550. – Published at <https://doi.org/10.2305/IUCN.UK.2013-2.RLTS.T203244A2762550.en> [accessed 31 Jul 2019].
- Kleinsteuber A., Ristow M. & Hassler M. (ed.) 2016: Flora von Rhodos und Chalki **1**. Allgemeiner Teil. Spezieller Teil: *Polypodiopsida*, *Equisetopsida* und *Lycopodiopsida*. *Pinopsida* und *Gnetopsida*. *Magnoliopsida* (Familien A–F). – Karlsruhe: Naturwissenschaftlicher Verlag A. Kleinsteuber.

- Kohlein F. & Menzel P. 1994: Color encyclopedia of garden plants and habitats. – Portland, etc.: Timber Press.
- Korotkova N. & Raab-Straube E. von 2017: *Cactaceae* Juss. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=94373&PTRefFk=7500000> [accessed 8 Aug 2019].
- Kotov M. I. 1964: Perstach – *Potentilla* L. [Cinquefoil – *Potentilla* L. in Ukrainian] – Pp. 106–144 in: Zevrov D. K. (ed.), Flora URSR **6**. – Kyiv: Vydavnytstvo Akademii nauk Ukraïnskoï RSR.
- Kovalchuk A. 2011: *Potentilla rupestris* L. – Plantarium: open on-line atlas and key to plants and lichens of Russia and neighbouring countries. 2007–2019. – Published at <https://www.plantarium.ru/page/image/id/85459.html> [accessed 17 Apr 2019].
- Kurtto A. 2009: *Rosaceae* [pro parte majore]. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=31288&PTRefFk=7300000> [accessed 1 Aug 2019].
- Kurtto A., Lampinen R. & Junikka L. (ed.) 2004: Atlas florae europaeae. Distribution of vascular plants in Europe. **13**. *Rosaceae* (*Spiraea* to *Fragaria*, excl. *Rubus*). – Helsinki: The Committee for Mapping the Flora of Europe & Societas Biologica Fennica Vanamo.
- Kurtto A., Sennikov A. N. & Lampinen R. (ed.) 2013: Atlas florae europaeae. Distribution of vascular plants in Europe. **16**. *Rosaceae* (*Cydonia* to *Prunus*, excl. *Sorbus*). – Helsinki: The Committee for Mapping the Flora of Europe & Societas Biologica Fennica Vanamo.
- Kurtto A., Sennikov A. N. & Lampinen R. (ed.) 2018: Atlas florae europaeae. Distribution of vascular plants in Europe. **17**. *Rosaceae* (*Sorbus* s. lato). – Helsinki: The Committee for Mapping the Flora of Europe & Societas Biologica Fennica Vanamo.
- López Patiño E. J., Szeszko D. R., Rascala Pérez J. & Beltrán Retis A. S. 2012: The flora of the Tenacingo-Malinalco-Zumpahuacán protected natural area, state of Mexico, Mexico. – Harvard Pap. Bot. **17**: 65–167.
- Lorenzi H. 2000: Árvores Brasileiras: manual de identificação e cultivo de plantas arbóreas nativas do Brasil, ed. 3. – Nova Odessa: Plantarum.
- Margittai A. 1923: Vznosy k flore Podkarpatskoj Rusi. – Kvartalnik IV Sekts. Nauchn. Zhurn. Estestv. (Mukachevo) **1**: 8–79.
- Marhold K. 2011+ [continuously updated]: *Brassicaceae* Burnett. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=14691&PTRefFk=7200000> [accessed 15 Aug 2019].
- Mateo G., Crespo M. B. & Laguna E. 2015: Flora valentina. Flora vascular de la Comunitat Valenciana **3**. (*Angiospermae*, III). – Valencia: Fundación de la Comunidad Valenciana para el Medio Ambiente.
- Mermoud M. 1980: Voyages d'Edmond Boissier en Orient en 1842 et 1846. – Candollea **35**: 71–85.
- Mikheev A. D. 2000: Obzor vidov roda *Centaurea* (*Asteraceae*) flory Kavkaza. 2. Podrody *Lopholoma* – *Tetramorphaea*. – Bot. Zhurn. **85**(3): 116–124.
- Mosyakin S. L. & Fedoronchuk M. M. 1999: Vascular plant of Ukraine: A nomenclatural checklist. – Kiev: National Academy of Sciences of Ukraine & M. G. Kholodny Institute of Botany.
- Mouterde P. 1966: Nouvelle flore du Liban et de la Syrie **1**. – Beyrouth: Dar El-Machreq (Imprimerie Catholique).
- Mouterde P. [Charpin A. & Greuter W. (ed.)] 1978: Nouvelle flore du Liban et de la Syrie **3**(1). – Beyrouth: Dar El-Machreq (Imprimerie Catholique).
- Nesom G. L. 2006: *Erigeron* L. – Pp. 256–348 in: Flora of North America Editorial Committee (ed.), Flora of North America **20**. – New York & Oxford: Oxford University Press.
- Novoa A., Le Roux J. J., Robertson M. P., Wilson J. R. U. & Richardson D. M. 2015: Introduced and invasive cactus species: a global review. – AoB PLANTS **7**: plu078.
- O'Leary N. & Moroni P. 2016: Las especies de *Salvia* (*Lamiaceae*) para Argentina. – Darwiniana, ser. 2, **4**: 91–131.
- Paton A. J., Bramley G., Ryding O., Polhill R., Harvey Y., Iwarsson M., Willis F., Phillipson P., Balkwill K., Lukhoba C., Otiend D. & Harley R. M. 2009: Flora of Tropical East Africa. *Lamiaceae* (*Labiatae*). – Kew: Royal Botanic Gardens, Kew.
- Pignatti S. 1982: Flora d'Italia. – Bologna: Edagricole.
- Piwowarczyk R., Sánchez Pedraja Ó., Moreno Moral G., Fayvush G., Zakaryan N., Kartashyan N. & Aleksanyan A. 2019: Holoparasitic *Orobanchaceae* (*Cistanche*, *Diphelypaea*, *Orobanche*, *Phelipanche*) in Armenia: distribution, habitats, host range and taxonomic problems. – Phytotaxa **386**: 1–106.
- Poli Marchese E. & Puzzolo V. 1999: Floristic composition, physiognomic and structural aspects of the *Fagus sylvatica* L. forests of the Mt. Etna Natural Park (southern Italy). Ann. Bot. (Rome) **57**: 105–119.
- Pujadas A. & Crespo M. B. 2004: A new species of *Orobanche* (*Orobanchaceae*) from south-eastern Spain. – Bot. J. Linn. Soc. **146**: 97–102.
- Pujadas Salvà A. J. 1997: *Orobanche ballotae* A. Pujadas (*Orobanchaceae*), especie nueva. – Acta Bot. Malac. **22**: 29–34.
- Raab-Straube E. von & Raus Th. (ed.) 2019: Euro+Med-Checklist Notulae, 10 [Notulae ad floram euro-mediterraneam pertinentes No. 39]. – Willdenowia **49**: 95–114.

- Rätzel S., Ristow M. & Uhlich H. 2017: Bemerkungen zu ausgewählten Vertretern der Gattung *Phelipanche* Pomet im östlichen Mittelmeergebiet mit der Beschreibung von *Phelipanche hedypnoidis* Rätzel, Ristow & Uhlich, sp. nov. – *Carinthia II* **127**: 643–684.
- Randall Olson A. 1993: Patterns of embryo and endosperm formation in *Monotropa hypopitys* (*Monotropaceae*) from North America and western Sweden. – *Amer. J. Bot.* **80**: 839–846.
- Randall R. P. 2017: A global compendium of weeds, ed. 3. – Perth: R. P. Randall.
- Raus Th. 2006: Found and lost – *Staphyleaceae* in Greece. – *Willdenowia* **36**: 311–315.
- Ravindran P. N. 2017: The encyclopedia of herbs & spices **1 & 2**. – Wallingford: CAB International.
- Roskov Y. R., Bisby F. A., Zarucchi J. L., Schrire B. D. & White R. J. (ed.) 2018: *Melilotus officinalis*. – In: ILDIS World Database of Legumes. – Published at <https://ildis.org/cgi-bin/Araneus.pl?version~10.01&LegumeWeb&tno~6197&genus~Melilotus&species~officinalis> [accessed 1 Aug 2019].
- Sánchez de Lorenzo Cáceres J. M. 2005: Flora ornamental Española **4**. *Papilionaceae–Proteaceae*. – Madrid, Barcelona & México: Mundi-Prensa.
- Sánchez Pedraja Ó., Moreno Moral G., Carlón L., Piwowarczyk R., Laínz M. & Schneeweiss G. M. 2016+ [continuously updated]: Index of *Orobanchaceae*. – Published at <http://www.farmalierganes.com/Otropsdf/publica/Orobanchaceae%20Index.htm> [accessed 10 Aug 2019].
- Scholtz H. & Böhlting N. 2000: *Phragmites frutescens* (*Gramineae*) re-visited. The discovery of an overlooked, woody grass in Greece, especially Crete. – *Willdenowia* **30**: 251–261.
- Sennikov A. N. & Kurtto A. 2019: The taxonomy and invasion status assessment of *Erigeron annuus* s.l. (*Asteraceae*) in east Fennoscandia. – *Memoranda Soc. Fauna Fl. Fenn.* **95**: 40–59.
- Šída O. 2004: *Erigeron* L. – Pp. 140–153 in: Slavík B. & Štěpánková J. (ed.), *Květena České Republiky* **7**. – Praha: Academia.
- Simpson B. B. & Ulibarri E. A. 2006: A synopsis of the genus *Hoffmannseggia* (*Leguminosae*). – *Lundellia* **9**: 7–33.
- Smith G. F., Figueiredo E., Boatwright J. S. & Crouch N. R. 2011: South Africa's ongoing *Opuntia* Mill. (*Cactaceae*) problem: the case of *O. microdasys* (Lehm.) Pfeiff. – *Bradleya* **29**: 73–78.
- Soják J. 2010: Synopsis of *Drymocallis* Fourr. ex Rydb. (*Rosaceae–Potentilleae*) in the Old World. – *Ann. Naturhist. Mus. Wien, B*, **112**: 319–328.
- Srivastava J., Kalra S. J. S. & Naraian R. 2014: Environmental perspectives of *Phragmites australis* (Cav.) Trin. ex. Steudel. – *Appl. Water Sci.* **4**: 193–202.
- Steven P. F. 1978: *Monotropa* L. – P. 107 in: Davis P. H. (ed.), *Flora of Turkey and the East Aegean Islands* **6**. – Edinburgh: Edinburgh University Press.
- Strid A. 2016: Atlas of the Aegean flora. Part 1: text & plates. – Berlin: Botanic Garden and Botanical Museum Berlin, Freie Universität Berlin. – *Englera* **33(1)**.
- Tison J.-M. & Foucault B. de 2014: Flora gallica. Flore de France. – Mèze: Biotope.
- Tutin T. G., Heywood V. H., Burges N. A., Moore D. M., Valentine D. H., Walters S. M. & Webb D. A. (ed.) 1964–1980: *Flora europaea* **1** (1964), **2** (1968), **3** (1972), **4** (1976), **5** (1980). – Cambridge: Cambridge University Press.
- Tzvelev N. N. 1963: *Lopholoma* (Cass.) Dobrocz. – Pp. 493–512 in: Bobrov E. G. & Czerepanov S. K. (ed.), *Flora SSSR* **28**. – Moscow & Leningrad: Academy of Sciences of USSR.
- Uotila P. 2017+ [continuously updated]: *Rumex obtusifolius* L. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=27542&PTrRefFk=7300000> [accessed 1 Aug 2019].
- USDA-ARS 2019: Germplasm Resources Information Network (GRIN). – Beltsville: United States Department of Agriculture, Agricultural Research Service. – Published at <https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch.aspx> [accessed 1 Aug 2019].
- Valdes B. 2012+ [continuously updated]: *Solanaceae*. – In: Euro+Med PlantBase – the information resource for Euro-Mediterranean plant diversity. – Published at <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=100493&PTrRefFk=7100000> [accessed 31 Jul 2019].
- Véla E. & De Bélair G. 2017: *Charybdis anthericoides*. – The IUCN Red List of threatened species 2017: e.T111272454A111273406. – Published at <https://doi.org/10.2305/IUCN.UK.2017-3.RLTS.T111272454A111273406.en> [accessed 4 Nov 2019].
- Véla E., De Bélair G., Rosato M. & Rossello J. 2016: Taxonomic remarks on *Scilla anthericoides* Poir. (*Asparagaceae, Scilloideae*), a neglected species from Algeria. – *Phytotaxa* **288**: 154–160.
- Verloove F. 2014: A conspectus of *Cyperus* s.l. (*Cyperaceae*) in Europe (incl. Azores, Madeira and Canary Islands), with emphasis on non-native naturalized species. – *Webbia* **69**: 179–223.
- Verloove F., Marrero Rodríguez Á., Salas-Pascual M. & Guiggi A. 2017: New records of *Cactaceae* from Gran Canaria (Canary Islands, Spain). – *Haseltonia* **23**: 79–91.
- Verloove F. & Reyes-Betancort J. A. 2011: Additions to the flora of Tenerife (Canary Islands, Spain). – *Collect. Bot. (Barcelona)* **30**: 63–78.
- Vladimirov V., Dane F. & Tan K. 2015: New floristic records in the Balkans: 26. – *Phytol. Balcan.* **21**: 53–91.
- Wagenitz G. 1965: *Erigeron annuus* (L.) Pers. – Pp. 94–98 in: Hegi G. [Conert H. J., Hamann U., Schulze-Motel W. & Wagenitz G. (ed.)] 1964–1979: *Illust-*

- rierte Flora von Mitteleuropa, ed. 2, **6(3)**. – München: Hanser; Berlin & Hamburg: Parey.
- Wagenitz G. 1975: *Centaurea* L. – Pp. 465–585 in: Davis P. H. (ed.), Flora of Turkey and the East Aegean Islands **5**. – Edinburgh: Edinburgh University Press.
- Walters M., Figueiredo E., Crouch N. R., Winter P. J. D., Smith G. F., Zimmermann H. G. & Mashope B. K. 2011: Naturalised and invasive succulents of southern Africa. – *ABC Taxa* **11**.
- WCSP 2010: World checklist of selected plant families (WCSP). Facilitated by the Royal Botanic Gardens, Kew. – Published at <http://wcsp.science.kew.org/> [accessed 1 Aug 2019].
- Wennerberg S. 2004: Trumpet creeper *Campsis radicans* (L.) Seem. ex Bureau. – USDA NRCS plant guide. – Published at https://plants.usda.gov/plantguide/pdf/pg_cara2.pdf [accessed 22 Oct 2019].
- Zuloaga F. O., Morrone O., Belgrano M. J., Marticorena C. & Marchesi E. (ed.) 2008: Catálogo de las plantas vasculares del Cono Sur. – *Monogr. Syst. Bot. Missouri Bot. Gard.* **107**.

Willdenowia

Open-access online edition bioone.org/journals/willdenowia



Online ISSN 1868-6397 · Print ISSN 0511-9618 · Impact factor 1.156

Published by the Botanic Garden and Botanical Museum Berlin, Freie Universität Berlin

© 2019 The Authors · This open-access article is distributed under the CC BY 4.0 licence