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STUDIES ON THE BULGARIAN VASCULAR FLORA DURING THE PERIOD 2017–2023

Ana Petrova

Institute of Biodiversity and Ecosystem Research, Department of Plant and Fungal Resources,
Bulgarian Academy of Sciences, Acad. Georgi Bonchev Str., bl. 23, 1113 Sofia, Bulgaria

e-mail: ana_petrova@abv.bg

This overview of taxonomic and floristic studies on Bulgarian vascular plants summarizes information on new species identified within its territory during the period 2017–2023, as published by Bulgarian and foreign authors. As a result, a total of 169 new taxa, belonging to 40 families, were recorded for the Bulgarian flora during this period. The distribution of two new alien genera (*Lagarosiphon* and *Rotala*) was also established. Fifty-nine taxa new to science were described, 48 of which belong to the genus *Taraxacum*. Forty-six species (approximately 27 %) of the newly identified species are alien, having entered and spread within the country. Thirty-seven species were erroneously reported, unconfirmed, or distributed outside the country's borders.

Key words: Bulgaria; flora; new taxa; alien species

INTRODUCTION

This overview of the Bulgarian flora covers the period from 2017 to 2023, continuing from previous contributions that addressed the periods 1994–2004 [1] and 2005–2016 [2]. Numerous articles were published during this period, including the results of taxonomic and floristic studies. These studies provide new data on species distribution across different floristic regions, which complement the information on their distribution in the country. However, this overview focuses only on publications that report, confirm, restore, or correct the distribution of taxa previously unknown to the Bulgarian flora. As in previous years, particular attention during the period under review was given to alien species, their entry into the country, and their distribution in natural habitats, often after escaping from gardens where they had long been cultivated as ornamentals. The distribution of more

than 100 alien species, reported for the first time between 2000 and 2023, has been summarized [3].

The newly established taxa from this period are presented in tables, with their distribution aligned with the floristic regions recognized in Bulgarian taxonomic and floristic literature. The authors' names of the plants are provided only in the tables.

RESULTS AND DISCUSSION

When summarizing the information from publications during the period under consideration, the distribution of 169 new taxa was established: 151 species (Table 1), four subspecies (Table 2), and six hybrids (Table 3). Additionally, five species were confirmed for the flora of the country, previously known from single localities and not reported for many years, along with three restored species (Table 4). All of these taxa belong to 40 different families.

Table 1. New taxa reported for Bulgaria (**in bold** – new to science; *alien species)

species	Family	Floristic regions/References
<i>Acalypha australis</i> L.*	Euphorbiaceae	Sofia Region [4]
<i>Allium goumenissanum</i> Ioannidis & Tzanoud.	Amaryllidaceae	Valley of River Struma (<i>Southern</i>) [5]
<i>Allium melanogyne</i> Greuter	Amaryllidaceae	Slavyanka Mt, Rhodopi Mts (<i>Eastern</i>) [6]
<i>Amaranthus viridis</i> L.*	Amaranthaceae	Black Sea Coast (<i>Northern</i>) [7]
<i>Ammannia coccinea</i> Rottb.*	Lythraceae	Thracian Lowland [8]
<i>Anogramma leptophylla</i> (L.) Link	Pteridaceae	Valley of River Struma (<i>Southern</i>) [9]
<i>Ballota hispanica</i> (L.) Benth.	Lamiaceae	Danubian Plain [10]
<i>Bidens subalternans</i> DC.*	Asteraceae	Black Sea Coast (<i>Southern</i>) [11]
<i>Bromopsis balcanica</i> Dimitrov & Vutov	Poaceae	Balkan Range (<i>Central</i>) [12]
<i>Bromopsis kresnaensis</i> Dimitrov	Poaceae	Valley of River Struma (<i>Southern</i>) [13]
<i>Bromus diandrus</i> Roth*	Poaceae	Black Sea Coast (<i>Southern</i>) [14]
<i>Bupleurum boissieri</i> Post	Apiaceae	Black Sea Coast (<i>Northern</i>), Northeast Bulgaria [15]
<i>Bupleurum pauciradiatum</i> Boiss.	Apiaceae	Black Sea Coast (<i>Northern</i>) [16]
<i>Calendula officinalis</i> L.*	Asteraceae	Pirin Mts (<i>Northern</i>) [17]
<i>Campanula lactiflora</i> M. Bieb.*	Campanulaceae	Rila Mts [18]
<i>Centaurea angelescui</i> Grinț.	Asteraceae	Northeast Bulgaria [19]
<i>Cirsium eriophorum</i> (L.) Scop.	Asteraceae	Rhodopi Mts (<i>Eastern</i>) [20]
<i>Cirsium palustre</i> (L.) Scop.	Asteraceae	Znepole Region [21]
<i>Colchicum arenarium</i> Waldst. & Kit.	Colchicaceae	Danubian Plain [22]
<i>Cosmos bipinnatus</i> Cav.*	Asteraceae	Pirin Mts (<i>Southern</i>), Tundzha Hilly Country [23]
<i>Crocus adamioides</i> Kernd. & Pasche	Iridaceae	Thracian Lowland [24]
<i>Crocus danubensis</i> Kernd., Pasche, Randjel. & V. Randjel.	Iridaceae	Northeast Bulgaria [25]
<i>Crocus heuffelianus</i> Herb.	Iridaceae	Pirin Mts (<i>Northern</i>) [26]
<i>Crocus randjeloviciorum</i> Kernd., Pasche, Harpke & Raca	Iridaceae	Balkan Range (<i>Western</i>) [27]
<i>Crocus speciosus</i> M. Bieb.	Iridaceae	Black Sea Coast (<i>Southern</i>), Mt. Strandzha [28]
<i>Cucurbita foetidissima</i> Kunth*	Cucurbitaceae	Thracian Lowland [29]
<i>Cupressus sempervirens</i> L.*	Cupressaceae	Black Sea Coast (<i>Northern</i>) [30]
<i>Cyanus austrobalcanicus</i> Skokanová	Asteraceae	Mt Slavyanka, Pirin Mts (<i>Southern</i>) [31]
<i>Cyanus vichrenensis</i> Skokanová	Asteraceae	Pirin Mts (<i>Northern</i>) [31]
<i>Cyperus eragrostis</i> Lam.*	Cyperaceae	Black Sea Coast (<i>Southern</i>), Sofia Region (Mt Lyulin), Mt Strandzha [32]
<i>Cytisus scoparius</i> (L.) Link*	Fabaceae	Thracian Lowland [33]
<i>Dorycnium haussknechtii</i> Boiss.	Fabaceae	Thracian Lowland [34]
<i>Erodium botrys</i> (Cav.) Bertol.	Geraniaceae	Rhodopi Mts (<i>Eastern</i>) [35]
<i>Euphorbia serpens</i> Kunth*	Euphorbiaceae	Black Sea Coast (<i>Northern</i>) [7]
<i>Fumana aciphylla</i> Boiss.	Cistaceae	Rhodopi Mts (<i>Eastern</i>) [36]
<i>Fumana bonapartei</i> Maire & Petitm.	Cistaceae	Rhodopi Mts (<i>Eastern</i>) [36]
<i>Galatella sedifolia</i> (L.) Greuter	Asteraceae	Danubian Plain [37]
<i>Geranium sibiricum</i> L.*	Geraniaceae	Sofia Region [38]
<i>Gymnadenia rubra</i> Wettst.	Orchidaceae	Rila Mts. [39]
<i>Hemerocallis fulva</i> (L.) L.*	Liliaceae	Northeast Bulgaria, Forebalkan (<i>Eastern</i>), Sofia Region, Znepole Region, Mt Vitosha Region, Valley of River Mesta, Rhodopi Mts (<i>Western</i> & <i>Central</i>), Thracian Lowland [40]
<i>Heracleum mantegazzianum</i> Sommier & Levier*	Apiaceae	Sofia Region, Rhodopi Mts (<i>Western</i>) [41, 42]
<i>Heracleum sosnowskyi</i> Manden*	Apiaceae	Rhodopi Mts (<i>Western</i> & <i>Central</i>) [42]
<i>Heteranthera reniformis</i> Ruiz & Pav.*	Pontederiaceae	Thracian Lowland [43]
<i>Hieracium amphigenum</i> Briq.	Asteraceae	Rila Mts [44]
<i>Hieracium gusseVII</i> Szélag	Asteraceae	Mt Vitosha Region [45]

Table 1 Continues

<i>Hieracium petraeum</i> Bluff & Fingerh.*	Asteraceae	Rila Mts [46]
<i>Hieracium vladimirovii</i> Szelag	Asteraceae	Balkan Range (Central) [45]
<i>Himantoglossum robertianum</i> (Loisel.) P. Delforge	Orchidaceae	Valley of River Struma (Southern) [39]
<i>Humulus japonicus</i> Siebold & Zucc.*	Cannabaceae	Northeast Bulgaria [47]
<i>Hylotelephium ruprechtii</i> (Jalas) Tzvelev	Crassulaceae	Black Sea Coast (Northern) [48]
<i>Ipomoea purpurea</i> (L.) Roth*	Convolvulaceae	Black Sea Coast (Southern) [49]
<i>Isoetes gymnocarpa</i> (Gennari) A. Braun	Isoetaceae	Rhodopi Mts (Eastern) [50]
<i>Isoetes pirinica</i> D. F. Brunt. & D. Ivanova	Isoetaceae	Pirin Mts (Northern & Southern) [51]
<i>Lagarosiphon major</i> (Ridl.) Moss*	Hydrocharitaceae	Rhodopi Mts (Western) [10]
<i>Larix decidua</i> Mill.*	Pinaceae	Rhodopi Mts (Central) [52]
<i>Legousia hybrida</i> (L.) Delarbre	Campanulaceae	Black Sea Coast (Northern) [53]
<i>Lilium candidum</i> L.*	Liliaceae	Thracian Lowland [17]
<i>Lupinus gredensis</i> Gand.*	Fabaceae	Rhodopi Mts (Eastern) [54]
<i>Malus florentina</i> (Zuccagni) C. K. Schneid.	Rosaceae	West Frontier Mts, Valley of River Struma (Northern) [55]
<i>Minuartia globulosa</i> (Labill.) Schinz & Thell.	Caryophyllaceae	Rhodopi Mts (Eastern) [56]
<i>Mollugo verticillata</i> L.*	Molluginaceae	Valley of River Struma (Southern) [57]
<i>Oenothera laciniata</i> Hill*	Onagraceae	Black Sea Coast (Northern) [58]
<i>Oenothera speciosa</i> Nutt.*	Onagraceae	Sofia Region, Pirin Mts (Southern) [23]
<i>Onosma kittaniae</i> Stefanović, Kit Tan & Iatroú	Boraginaceae	Rhodopi Mts (Eastern) [59]
<i>Ophrys aesculapii</i> Renz	Orchidaceae	Black Sea Coast (Southern) [39]
<i>Ophrys epirotica</i> (Renz) Devillers-Tersch. & Devillers	Orchidaceae	West Frontier Mts, Valley of River Struma (Southern) [39]
<i>Ophrys grammica</i> (B. Willing & E. Willing) Devillers-Tersch & Dellivers	Orchidaceae	Valley of River Struma (Southern), Mt Slavyanka, Rhodopi Mts (Western & Eastern) [39]
<i>Ophrys hebes</i> (Kalop.) E. Willing & B. Willing	Orchidaceae	Rhodopi Mts (Eastern) [39]
<i>Opuntia engelmannii</i> Engelm.*	Cactaceae	Mt Sredna Gora (Western) [60]
<i>Opuntia fragilis</i> (Nutt.) Haw.*	Cactaceae	Mt Sredna Gora (Western) [60]
<i>Opuntia macrorhiza</i> Engelm.*	Cactaceae	Black Sea Coast (Southern) [61]
<i>Orobanche centaurina</i> Bertol.	Orobanchaceae	Black Sea Coast (Northern), Balkan Range (Central & Eastern), Znepole Region, Rhodopi Mts (Western) [62]
<i>Oxalis articulata</i> Savigny*	Oxalidaceae	Black Sea Coast (Northern), Sofia Region, Valley of River Struma (Southern) [40]
<i>Papaver nigrotinctum</i> Fedde	Papaveraceae	Valley of River Struma (Northern & Southern) [63]
<i>Physalis peruviana</i> L.*	Solanaceae	Valley of River Struma (Southern) [6]
<i>Physalis philadelphica</i> Lam.*	Solanaceae	Black Sea Coast (Southern) [64]
<i>Pilosella bulgarica</i> Szelag & Vladimirov	Asteraceae	Balkan Range (Central) [65]
<i>Pilosella lactucella</i> (Wallr.) P.D. Sell & C. West	Asteraceae	Rila Mts [66]
<i>Pinus pinaster</i> Aiton*	Pinaceae	Black Sea Coast (Northern & Southern) [67]
<i>Potentilla hirta</i> L.	Rosaceae	Mt Strandzha [68]
<i>Ranunculus paludosus</i> Poir.	Ranunculaceae	Rhodopi Mts (Eastern) [35]
<i>Rhus typhina</i> L.*	Anacardiaceae	Black Sea Coast (Southern) [69]
<i>Rosa rugosa</i> Thunb.*	Asteraceae	Black Sea Coast (Northern), Balkan Range (Western), Rhodopi Mts (Central) [70]
<i>Rotala ramosior</i> (L.) Koehne*	Lythraceae	Thracian Lowland [43]
<i>Salvia hispanica</i> L.*	Lamiaceae	Valley of River Struma (Southern) [6]
<i>Saxifraga scardica</i> Griseb.	Saxifragaceae	Znepole Region [71]
<i>Sedum sarmentosum</i> Bunge*	Crassulaceae	Forebalkan (Eastern), Sofia Region, Pirin Mts (Southern) [23]
<i>Serapias bergonii</i> E.G. Camus	Orchidaceae	Rhodopi Mts (Eastern) [39]

Table 1 Continues

<i>Sideritis elica</i> Aneva, Zhelev & Bonchev	Lamiaceae	Rhodopi Mts (<i>Central</i>) [72]
<i>Silene pendula</i> L.*	Caryophyllaceae	Thracian Lowland [73]
<i>Silene tenuiflora</i> Guss.	Caryophyllaceae	Rhodopi Mts (<i>Eastern</i>) [74]
<i>Sisyrinchium rosulatum</i> E.P. Bicknell*	Iridaceae	Valley of River Struma (<i>Southern</i>) [75]
<i>Stachys byzantina</i> K. Koch*	Lamiaceae	Rila Mts [76]
<i>Tagetes patula</i> L.*	Asteraceae	Pirin Mts (<i>Northern</i>), Thracian Lowland [23]
<i>Taraxacum abnorme</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [77]
<i>Taraxacum abruptilobum</i> Štěpánek & Kirschner	Asteraceae	Thracian Lowland [78]
<i>Taraxacum amborum</i> G.E. Haglund	Asteraceae	Balkan Range (<i>Central</i>) [79]
<i>Taraxacum amoenum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Southern</i>) [77]
<i>Taraxacum aquilinum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Southern</i>) [80]
<i>Taraxacum atomatum</i> Štěpánek & Kirschner	Asteraceae	Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum auricula</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum basilicum</i> Štěpánek & Kirschner	Asteraceae	Sofia Region, Mt Vitosha Region, Znepole Region, Mt Sredna Gora (<i>Western</i>) [78]
<i>Taraxacum benevolens</i> Štěpánek & Kirschner	Asteraceae	Mt Vitosha Region [77]
<i>Taraxacum blandum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum chionogeiton</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [77]
<i>Taraxacum chrysocephalum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum circense</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum dorchocarpum</i> Soest	Asteraceae	Balkan Range, Mt Vitosha Region, Pirin Mts (<i>Northern</i>), Rila Mts, Rhodopi Mts [80]
<i>Taraxacum erzincanense</i> Döll	Asteraceae	Balkan Range (<i>Central</i>), Rila Mts, Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum favorable</i> Štěpánek & Kirschner	Asteraceae	Mt Vitosha Region [81]
<i>Taraxacum ferum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum fornicatum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts, Rila Mts, Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum fragile</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum honestum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Southern</i>) [82]
<i>Taraxacum humifusum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum incantatum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum kuzmanovii</i> Štěpánek & Kirschner	Asteraceae	Valley of River Struma (<i>Southern</i>) [82]
<i>Taraxacum leopardinum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum melanospilum</i> Štěpánek & Kirschner	Asteraceae	Balkan Range (<i>Central</i>) [77]
<i>Taraxacum musalae</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [77]
<i>Taraxacum musteum</i> Štěpánek & Kirschner	Asteraceae	Mt Vitosha Region [77]
<i>Taraxacum oreades</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [77]
<i>Taraxacum pandum</i> Štěpánek & Kirschner	Asteraceae	Mt Vitosha Region [77]
<i>Taraxacum pictum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>), Rila Mts [77]
<i>Taraxacum pindicola</i> (Baldacci) Hand.-Mazz.	Asteraceae	Pirin Mts (<i>Northern & Southern</i>) [80]
<i>Taraxacum pirinicum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum pseudoalpestre</i> Štěpánek & Kirschner	Asteraceae	Balkan Range (<i>Central</i>) [77]
<i>Taraxacum pseudobulgaricum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]

Table 1 Continues

<i>Taraxacum pseudorecognitum</i> Štěpánek & Kirschner	Asteraceae	Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum pseudosplendens</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum radmilae</i> Štěpánek & Kirschner	Asteraceae	Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum recognitum</i> Štěpánek & Kirschner	Asteraceae	Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum rhodopaeum</i> Štěpánek & Kirschner	Asteraceae	Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum rumelicum</i> Štěpánek & Kirschner	Asteraceae	Rhodopi Mts (<i>Central</i>) [78]
<i>Taraxacum saevum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum saluator</i> Štěpánek & Kirschner	Asteraceae	Balkan Range (<i>Central</i>) [77]
<i>Taraxacum serenum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Taraxacum siticulosum</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [81]
<i>Taraxacum splendens</i> Štěpánek & Kirschner	Asteraceae	Mt Vitosha Region [77]
<i>Taraxacum striatifolium</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [80]
<i>Taraxacum tephroleucum</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [77]
<i>Taraxacum terrestre</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [77]
<i>Taraxacum tetricum</i> Štěpánek & Kirschner	Asteraceae	Rhodopi Mts (<i>Central</i>) [77]
<i>Taraxacum vile</i> Štěpánek & Kirschner	Asteraceae	Rila Mts [77]
<i>Taraxacum vitellicolor</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]
<i>Thymus aznavourii</i> Velen.	Lamiaceae	Thracian Lowland [83]
<i>Thymus jaliasianus</i> Stoyanov & Marinov	Lamiaceae	Rhodopi Mts (<i>Eastern</i>) [84]
<i>Tragopogon coelesyriacus</i> Boiss.	Asteraceae	Rhodopi Mts (<i>Eastern</i>) [85]
<i>Trinia multicaulis</i> (Poir.) Schischk.	Apiaceae	Northeast Bulgaria, Danubian Plain [86]
<i>Tripleurospermum rosellum</i> (Boiss. & Orph.) Hayek	Asteraceae	Rhodopi Mts (<i>Eastern</i>) [87]
<i>Tulipa agenensis</i> DC.*	Liliaceae	Black Sea Coast (<i>Southern</i>) [88]

The majority of new species were reported from the genus *Taraxacum* (51 species and one subspecies) by Štěpánek & Kirschner [77–82], who studied the genus for Flora of Bulgaria, vol. 12. Fifty-nine taxa were described as new to sci-

ence, 48 of which are from the genus *Taraxacum*. Another 11 taxa (ten species and one hybrid) are from different genera and families and are currently known only from Bulgaria (Tables 1–3, in bold).

Table 2. New subspecies reported for the county (**in bold** – new to science; *alien species)

Name	Family	Floristic regions/References
<i>Buglossoides incrassata</i> subsp. <i>splitgerberi</i> (Guss.) E. Zippel & Selvi	Boraginaceae	Black Sea Coast (<i>Southern</i>), Znepole Region, Mt Slavyanka [89]
<i>Ophrys sphegodes</i> subsp. <i>helenae</i> (Renz) Soó & D.M. Moore	Orchidaceae	Northeast Bulgaria [90]
<i>Paspalum distichum</i> subsp. <i>paucispicatum</i> (Vasey) Verloove & Reynders.*	Poaceae	Danubian Plain [91]
<i>Taraxacum pyrenaicum</i> subsp. <i>balcanicum</i> Štěpánek & Kirschner	Asteraceae	Pirin Mts (<i>Northern</i>) [77]

Table 3. New hybrids reported for the country (**in bold** – new to science)

Hybrids	Family	Floristic regions/References
<i>Anacamptis coriophora</i> (L.) R. M. Bateman, Pridgeon & M. W. Chase × <i>A. morio</i> (L.) R. M. Bateman, Pridgeon & M.W. Chase	Orchidaceae	Rhodopi Mts (Western) [92]
<i>Digitalis</i> × <i>macedonica</i> Heywood	Scrophulariaceae	Rhodopi Mts (Western) [93]
<i>Gymnadenia conopsea</i> s.l. × <i>G. rhellicani</i> (Teppner & E. Klein) Teppner & E. Klein	Orchidaceae	Mt Slavyanka [92]
<i>Neotinea</i> × <i>dietrichiana</i> (Bogenh.) H. Kretzschmar, Eccarius & H. Dietr.	Orchidaceae	Mt Vitosha Region [94]
<i>Senecio</i> × <i>riloensis</i> Szélag & Vladimirov	Asteraceae	Rila Mts [95]
<i>Verbascum blattaria</i> L. × <i>V. speciosum</i> Schrad.	Scrophulariaceae	Znepole Region [96]

Table 4. Confirmed, new names, new combination, new taxonomic status, or restored taxa for the country

Taxa/status	Floristic regions	Synonyms/References
<i>Buglossoides rochelii</i> (Friv.) Stoyanov, Mátiš & Sennikov, comb. nov.	Black Sea Coast (Northern), Danubian Plain, Thracian Lowland	<i>Lithospermum rochelii</i> Friv.; <i>L. glandulosum</i> Velen.; <i>Buglossoides glandulosa</i> (Velen.) R. Fern. [97]
<i>Campanula neiceffii</i> (Hayek) Marinov & Stoyanov, stat. nov.	Balkan Range (Central)	<i>C. rotundifolia</i> var. <i>bulgarica</i> Neiceff, confirmed [98]
<i>Carex lazarei</i> Jac. Koopman, Niketić, Wiesław & Govaerts, nom. nov.	Pirin Mts, Rila Mts	<i>Carex bulgarica</i> (Domin) Lazare, nom illeg. [99]
<i>Cyanus adamovicii</i> (Velen.) Skokanová, comb. nov.	Balkan Range (Central), Rila Mts	<i>Centaurea adamovicii</i> Velen., restored [31]]
<i>Galatella cana</i> (Waldst. & Kit.) Nees	Thracian Lowland	confirmed [100]
<i>Hieracium schmidtii</i> subsp. <i>balkanum</i> (Pančić) Niketić, comb. & stat. nov.	W Bulgaria	<i>Hieracium balkanum</i> Pančić [101]
<i>Seseli besserianum</i> Stoyanov & Ostr., nom. nov.	Black Sea Coast (Northern), Northeast Bulgaria, Danubian Plain	<i>S. peucedanifolium</i> Besser, nom. illeg. [102], restored
<i>Inula spiraeifolia</i> L.	Valley of River Stuma	confirmed [103]
<i>Ranunculus thracicus</i> Azn.	Rhodopi Mts (Eastern)	confirmed [104]
<i>Verbascum adenanthum</i> Bornm.	Black Sea Coast (Southern), Balkan Range (Western)	confirmed [105]
<i>Veronica thracica</i> Velen.	Black Sea Coast (Northern), Thracian Lowland	restored [106]

Senecio sarracenicus, a species recently confirmed for the Bulgarian flora, is not included in Table 4, as it was reported without a specific locality [109].

Among the newly reported or confirmed taxa, 11 are Balkan endemics: *Allium goumenissanum*, *A. melanogyne*, *Cyanus adamovicii*, *C. austrobalcanicus*, *Fumana bonapartei*, *Hieracium schmidtii* subsp. *balkanum*, *Onosma kittaniae*, *Ophrys epirotica*, *Saxifraga scardica*, *Thymus aznavourii*, and *Verbascum adenanthum* (Tables 1–3).

A few species, such as *Galatella cana*, *Inula spiraeifolia*, *Ranunculus thracicus*, and *Verbascum adenanthum*, have been confirmed for the flora of the country, while others, like *Cyanus adamovicii* and *Veronica thracica*, have been restored. *Carex*

lazarei and *Seseli besserianum* have been given new names (nom. nov.). *Buglossoides rochelii*, *Campanula neiceffii*, and *Cyanus adamovicii* have new taxonomic statuses or combinations (Table 4).

A total of 46 alien species, accounting for approximately 27 % of all species reported for the first time, have been established (Tables 1–2, marked with an asterisk). This count does not include 12 species presented at scientific conferences or symposia, which were published in the *Book of Abstracts* but lacked specified floristic regions. These species include *Petrosedum montanum*, *P. thartii*, *Phedimus spurius*, *Sedum pallidum* var. *bithynicum*, and *S. sexangulare* [110], as well as some woody plants like *Abies pinsapo*, *Berberis julianae*, *Buxus sempervirens*, *Ginkgo biloba*,

Metasequoia glyptostroboides, *Pseudotsuga menziesii* subsp. *glauca*, and *Sapindus mukorossi* [111]. Possible sources of seed dispersal, according to the authors, include flower boxes on balconies and high buildings, as seeds can be easily spread by the wind and settle in natural areas. Tram tracks, sidewalks, and asphalt paths in urban envi-

ronments provide favorable conditions for their establishment and rapid growth [110].

The name *Quercus protoroburoides* Tashev & Tsavkov was validated [112], after being invalidly described as new to Bulgaria in 1969 [113].

Additionally, 37 species were erroneously reported or not confirmed for the country (Table 5).

Table 5. Species erroneously reported or not confirmed for the country

Species	Family	Reported instead of/References
<i>Acalypha virginica</i> auct. bulg., non L.	Euphorbiaceae	<i>A. australis</i> L. [4]
<i>Ammannia auriculata</i> auct. bulg., non Willd.	Lythraceae	<i>A. coccinea</i> Rottb. [8]
<i>Bupleurum gerardi</i> auct. bulg., non All.	Apiaceae	<i>B. commutatum</i> Boiss. & Balansa [15]
<i>Bupleurum uechtrizianum</i> Stoyanov	Apiaceae	<i>B. boissieri</i> Post [15]
<i>Carex bulgarica</i> (Domin) Lazare, nom. illeg.	Cyperaceae	<i>Carex lazarei</i> Jac. Koopman, Niketić, Wiesław & Govaerts [99]
<i>Cyanus tuberosus</i> (Vis.) Soják	Asteraceae	does not occur in Bulgaria [31]
<i>Cyanus velenovskyi</i> (Adamović) Wagenitz & E. Gamal-Eldin	Asteraceae	does not occur in Bulgaria [31]
<i>Iris aphylla</i> L.	Iridaceae	not confirmed [107]
<i>Isoetes lacustris</i> auct. bulg., non L.	Isoetaceae	<i>I. pirinica</i> D.F. Brunt. & D. Ivanova [51]
<i>Nigritella nigra</i> auct. bulg., non (L.) Rchb.f.	Orchidaceae	<i>Gymnadenia rhellicani</i> (Teppner & E. Klein) Teppner & E. Klein [39]
<i>Orobancha elatior</i> auct. bulg., non Sutton	Orobanchaceae	<i>O. centaurina</i> Bertol. [62]
<i>Orobancha kochii</i> F.W. Schultz	Orobanchaceae	<i>O. centaurina</i> Bertol. [62]
<i>Papaver apulum</i> auct. bulg., non Ten.	Papaveraceae	<i>P. nigrotinctum</i> Fedde [63]
<i>Phelipanche aegyptiaca</i> auct. bulg., non (Pers.) Pomel	Orobanchaceae	<i>Ph. ramosa</i> , <i>Ph. mutellii</i> , <i>Ph. oxyloba</i> [62]
<i>Taraxacum apenninum</i> (Ten.) DC.	Asteraceae	does not occur in Bulgaria [77]
<i>Taraxacum balcanicum</i> Rech. f.	Asteraceae	unclear name [77]
<i>Taraxacum bithynicum</i> DC.	Asteraceae	does not occur in Bulgaria [108]
<i>Taraxacum fontanosquameum</i> Soest	Asteraceae	does not occur in Bulgaria [77]
<i>Taraxacum helveticum</i> Soest	Asteraceae	does not occur in Bulgaria [77]
<i>Taraxacum hoppeanum</i> Griseb. & Schenk	Asteraceae	nom. superfl. [77]
<i>Taraxacum hybernum</i> Steven	Asteraceae	does not occur in Bulgaria [77]
<i>Taraxacum lividum</i> A. Heller	Asteraceae	nom. superfl. [77]
<i>Taraxacum mattmarkense</i> Soest.	Asteraceae	does not occur in Bulgaria [77]
<i>Taraxacum megalorrhizon</i> (Forssk.) Hand.-Mazz.	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum metriocallosum</i> Soest	Asteraceae	does not occur in Bulgaria [77]
<i>Taraxacum nigricans</i> auct., non (Kit.) Rchb.	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum ochrospermum</i> Soest	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum oostroomii</i> Soest	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum palustre</i> (Lyons) Symons	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum panalpinum</i> Soest	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum pseudovernelense</i> R. Doll	Asteraceae	belongs to <i>T. paludosiforme</i> R. Doll [77]
<i>Taraxacum reophilum</i> Soest	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum rhaeticum</i> Soest	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum saasense</i> Soest	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum silvicola</i> Soest	Asteraceae	does not occur Bulgaria [77]
<i>Taraxacum silvrettense</i> Soest	Asteraceae	belongs to <i>T. paludosiforme</i> [77]
<i>Thymus bracteosus</i> auct. bulg., non Benth.	Lamiaceae	<i>T. jalsianus</i> Stoyanov & Marinov [84]

CONCLUSION

A total of 169 new taxa have been reported for Bulgaria, including 151 species (Table 1), four new subspecies (Table 2), six new hybrids (Table 3), and eight species that have been confirmed or restored (Table 4). Additionally, two new alien genera, *Lagarosiphon* [10] and *Rotala* [43], were reported for the first time, along with 46 alien species (Tables 1–2). These new taxa belong to 40 families. Fifty-nine taxa new to science have been described, with the majority (48) from *Taraxacum*. It was also found that 37 species had been erroneously reported for the country.

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СТУДИИ ЗА БУГАРСКАТА ВАСКУЛАРНА ФЛОРА ВО ПЕРИОДОТ 2017 – 2023 ГОДИНА

Ана Петрова

Институт за биодиверзитет и екосистемски истражувања, Оддел за растителни и габични ресурси,
Бугарска академија на науките, ул. „акад. Георги Бончев“ 23, 1113 Софија, Бугарија

Со овој преглед на таксономските и флористичките студии на бугарските васкуларни растенија се сумирани информациите за новите видови идентификувани на нејзината територија во периодот 2017 – 2023 година, објавени од бугарски и од странски автори. Како резултат на тоа, во овој период се евидентирани вкупно 169 нови таксони за бугарската флора, кои припаѓаат на 40 фамилии. Беше воспоставена и дистрибуција на два нови инвазивни алохтони рода (*Lagarosiphon* и *Rotala*). Во овој период беа опишани 59 таксони нови за науката, од кои 48 припаѓаат на родот *Taraxacum*. Четириесет и шест видови (приближно 27 %) од новоидентификуваните видови се алохтони кои навлегле и се рашириле во земјата. Триесет и седум видови биле погрешно пријавени, непотврдени или распространети надвор од државните граници.

Клучни зборови: Бугарија; флора; нови таксони; алохтони видови