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Review article

Recent progress in floristic and taxonomic studies in Bulgaria

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ABSTRACT: An overview of floristic and taxonomic research on vascular plants in Bulgaria during the period of 2005-2016 has been made. The Bulgarian flora currently comprises 4064 species, belonging to 921 genera and 159 families. About 490 published papers were checked, in which 127 species were reported for the first time for the country by Bulgarian or foreign botanists, 11 of these taxa being ones new to science, while 51 are aliens. In the papers checked, 17 subspecies (two of them new to science) and 18 hybrids (four of them new to science) were also reported for the first time for the country, nine species were confirmed, and another 78 were unconfirmed, synonymised, or erroneously reported. In numerous papers, new localities for various species in different floristic regions in Bulgaria were reported. The books *Flora of the Republic of Bulgaria* Vol. 11, *Red Data Book of the Republic of Bulgaria* Vol. 1. *Plants and Fungi*, *Atlas of Endemic Plants in Bulgaria*, *Invasive Alien Species of Vascular Plants in Bulgaria*, *Proceedings of Balkan Botanical Congress IV, etc*., were published during the given period.

Keywords: Bulgaria, flora, literature, vascular plants

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INTRODUCTION

This overview of floristic and taxonomic studies on the Bulgarian vascular flora covers the period of 2005-2016, following the last similar contribution, which treated the period of 1993-2004 (Petrova *et al.* 2005b; Petrova & Vladimirov 2007). During this 12-year period, more than 480 papers were published dealing with floristics and taxonomic characteristics of the Bulgarian flora and with the conservation of vascular plant diversity.

The main research centres for taxonomic and floristic studies on the Bulgarian flora are as follows: the Department of Plant and Fungal Diversity and Resources, Institute of Bidiversity and Ecosystem Research, Bulgarian Academy of Sciences; the Botanical Garden, Bulgarian Academy of Sciences; the National Museum of Natural History, Bulgarian Academy of Sciences; the Department of Botany, Biological Faculty, St. Kliment Ohridski University of Sofia; the University of Forestry in Sofia; the Department of Botany, Agrarian University in Plovdiv; the Department of Biology and Aquacultures, Agrarian Faculty, Trakia University in Stara Zagora; and the Faculty of Natural Sciences, Bishop Konstantin Preslavski University of Shumen.

The author's abbreviations are according to Brummitt & Powell (1992). The information in the article is organised into the following divisions: studies of different families and genera; Floras, guides and other books; inventories of the floristic diversity in particular geographic regions or protected areas (serpentinite territories, aquatic areas, and wetlands); groups of species of special interest, e.g., alien and invasive alien species; new chorological records; contribution of foreign botanists to study of the Bulgarian flora; and conclusion.

Studies of different families and genera. Numerous papers dealt with the study of different families (Asteraceae, Brassicaceae, Cyperaceae, Poaceae, *etc*.) or genera (*Aethionema*, *Aubrieta*, *Bupleurum*, *Campanula*, *Cardamine*, *Centaurea*, *Hieracium*, *Onosma*, *Salix*, *Sesleria*, *Silene, etc*.). In these papers, 127 species (11 new

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to science) (Table 1), 17 subspecies (two new to science) (Table 2), and 18 hybrids (four described for the first time) (Table 3) were reported for the first time for the country. Nine species were confirmed for the flora of the country (Table 4), new combinations were also proposed (Table 5), and another 78 species were unconfirmed, synonymised, or erroneously reported (Tables 6, 7, and 8).

The distribution of species of the family Rosaceae in Bulgaria is summarised in the three volumes of *Atlas Florae Europaeae* published during this period (Kurtto *et al.* 2007, 2010, 2013 – Vol. 14: *Alchemilla* & *Aphanes*, coordinators for Bulgaria A. Petrova & S. Fröhner; Vol. 15: *Rubus*, coordinators A. Petrova & J. Zieliński; Vol. 16: *Cydonia* to *Prunus*, coordinators V. Vladimirov & J. Zieliński). The distribution of 36 *Alchemilla* species is mapped, five of them are reported for the first time for Bulgaria, eight names currently used in the Bulgarian taxonomic literature are considered as synonyms, and one species is under question; seven species of *Rubus* are mapped, two are under question, and many other names currently used in Bulgaria are considered as synonyms; in Vol. 16 (*Cydonia* to *Prunus*), 27 species from seven genera (*Amelanchier*, *Cotoneaster*, *Crataegus*, *Malus*, *Prunus*, *Pyracantha*, and *Pyrus*) are mapped for the country. The new species and nomenclature changes accepted in these volumes are included in Tables 1, 6, and 7.

Nedelcheva (2005) and Stoyanov (2005a, 2009a, b, 2012a) studied the genus *Orobanche* and reported valuable information on its chorology with critical notes; Stoeva *et al.* (2005) published data on the patterns and levels of variation within *Carex* sect. *Phacocistys*; Pavlova (2006) provided information about the species of *Astragalus* as steppe geoelements; and important information can be found in the publications of Ančev & Polatschek (2006) for *Erysimum*, Ančev & Goranova (2006, 2009) for 11 genera of the tribe *Alysseae* (Brassicaceae) and *Aubrieta*, and Ančev & Krendl (2011) for *Galium*. Ančev (2007) published a taxonomic catalogue of Brassicaceae in the Bulgarian flora. It presents all relevant species and subspecies with their basionyms and synonyms used in national Floras and Keys. Kirjakov & Cheshmedzhiev (2007) published information about the narrow-leaved species of *Potamogeton*; Yankova & Cherneva (2007) studied the genus *Angelica*; Niketić *et al.* (2007) presented a few new nomenclature combinations in the Caryophyllaceae which include taxa distributed in Bulgaria; Raycheva & Dimitrova (2007) and Raycheva (2009a) critically reassessed the distribution of some taxa of *Rumex* subgenus *Rumex*; Raycheva (2009b) reported data about natural hybrids of subgenus *Rumex* and ecologically assessed species of the same subgenus (Raycheva 2013); Stoyanov & Goranova (2009) published notes on some critical species of *Bupleurum* sect. *Aristata* in Bulgaria; Tosheva *et al.* (2009) reported data on chorology of the genus *Lathyrus*; Kolarčik *et al.* (2010) published information concerning the systematics and evolutionary history of *Onosma* species, some of them distrubuted in Bulgaria; Bancheva (2012) studied the distribution, taxonomy, and evolution of *Centaurea*; Petrova *et al.* (2012c) added to available information about the distribution of orchids in the Sinite Kamani Nature Park; and Krahulcová *et al.* (2016) studied the agamic complex of *Pilosella* and reported a few hybrids for the first time for Bulgaria (Table 3).

Floras, guides, and other books. The report period saw publication of the 11th volume of *Flora of the Republic of Bulgaria* edited by Kožuharov & Ančev (2012), which includes the taxonomic treatments of four families – Dipsacaceae, Morinaceae, Campanulaceae, and Asteraceae subfam. Asteroideae (from *Eupatorium* to *Calendula*), totally 61 genera and 262 species (21 adventive). All native species and six adventive, weedy, and invasive plants of Asteraceae are illustrated by the artist Dimiter Vlaev on the basis of original plant specimens.

The *Red Data Book of the Republic of Bulgaria.* Vol. 1. *Plants and Fungi* was published recently (Peev *et al.* 2015). Included in it are 808 species (algae – six; bryophytes – 102; ferns – eight; gymnosperms – four; angiosperms – 539; and fungi – 149). The vascular plants include two extinct, 12 regionally extinct, 204 critically endangered, 295 endangered, and 38 vulnerable species, which were previously assessed according to the criteria of IUCN and the results summarised in the *Red Lists of Bulgarian Vascular Plants* (Petrova & Vladimirov 2009a). Each species is illustrated by an original colour drawing or photo and is accompanied by a map of its distribution.

The *Atlas of Bulgarian Endemic Plants*, edited by Petrova (2006a) and based on the first edition (Velchev *et al.* 1992), includes 104 Bulgarian taxa (84 species and 20 subspecies) and 60 Balkan taxa (56 species and 4 subspecies) belonging to 34 families. All taxa are illustrated by colour drawings. A *List of Bulgarian endemics* (172 species) is given at the end of the book (Petrova & Velchev 2006).

Two editions of *Conspectus of the Bulgarian vascular flora* (Assyov *et al.* 2006, 2012) were issued in the given period. They provide distribution maps by floristic regions for more than 4102 species recorded in the country up to 2012.

Cheshmedziev & Vassilev (2009) published *Flora of Plovdiv*, a local Flora, the first and only one for a city in Bulgaria. It includes 1430 species (57 of them of conservation concern; native and cultivated trees, shrubs, and herbs from 161 families and 655 genera), illustrated with many black-and-white drawings and 97 original colour photos.

Reissued was *Key to the Plants of Bulgaria* (Delipavlov & Cheshmedzhiev 2011). It includes keys for the families, genera, species and subspecies of all vascular plants in the country, altogether more than 3800 wild-growing as well as 528 of the most widespread introduced and cultivated species.

Tsoneva *et al.* (2012) published *Atlas of aquatic and wetland plants*. The *Atlas*, richly illustrated with original photographs, contains information about the diversity of aquatic macrophytes (ferns, seed plants, and mosses) and presents data on the morphology, biology, and distribution of a significant number of widely distributed and common species, as well some protected and endangered species.

Peev *et al.* (2012) published *Important plant areas in Bulgaria*, which includes descriptions of 125 areas.

Petrova *et al.* (2013c) published *Invasive Alien Species of Vascular Plants in Bulgaria*, a work that includes 60 invasive and potentially invasive alien plants distributed on the territory of Bulgaria, representatives of 25 families. Each species is illustrated with original colour photographs.

A Pilot Network of Small Protected Sites for Conservation of Rare Plants in Bulgaria was edited by Vladimirov (2014b). The book presents the results of a project aimed at protecting some small populations of species of high conservation concern situated outside any larger protected area.

Zahariev (2012a, b) published the two-volume *Flora of Northeast Bulgaria* covering the Provadiisko Plateau and Mt. Preslavska, respectively, and Zahariev & Radoslavova (2010) *Plants of the Shumensko Plateau*.

Three Proceedings were published during this period: *Current State of Bulgarian Biodiversity – Problems and Perspectives* (Petrova 2005a); *Proceedings of Balkan Botanical Congress IV, Sofia, 20-26.06.2006* (Ivanova 2009); and *Proceedings of National Botanical Conference VII, Sofia, 29-30.09.2011* (Petrova 2012e).

Inventories of floristic diversity in particular geographic regions or protected areas:

Mountains. A series of studies treating the floristic diversity of a number of mountains, e.g., Slavyanka, Belasitsa, Osogovska, Zemenska, Shipka, Golo Bardo, Vrushka Chuka, and Chepun, were published during the given period.

Apostolova-Stoyanova & Stoyanov (2009) stidied the contemporary status of the flora and phytogeographical characteristics of Mt. Golo Bardo and identified 724 vascular plants belonging to 358 genera and 77 families; Vassilev *et al.* (2009a) reported the occurrence of 52 plant species of conservation concern on Mt. Chepun; Vladimirov (2012a) recorded 265 species belonging to 188 genera and 58 families on Mt. Vrushka Chuka; Tashev *et al.* (2012a, b) reported new localites of different species in the flora of Mt. Osogovka; Asenov (2015a) published a systematic and phytogeographic analysis of the vascular flora of Mt. Zemenska; Asenov & Dimitrov (2012, 2013) analysed protected, endemic, and relict taxa, as well as anthropophyte and invasive species, of that mountain; Marinov *et al.* (2015) identified 621 species of vascular plants belonging to 355 genera and 88 families in the flora of the region around Malusha Peak (Mt. Shipka, Central Balkans); Aneva *et al.* (2015) reported the results of floristic and vegetation studies of Mt. Slavyanka, identifying 1661 plant taxa belonging to 576 genera and 105 families, of which 69 species are included in the *Red List of Bulgarian Vascular Plants*; and Dimitrov & Vutov (2016c) presented the results of floristic investigations of Mt. Belassitsa carried out in 2011–2012, reporting 1515 species belonging to 517 genera and 106 families.

Reserves. The floristic composition of more than 15 reserves was studied and their floras analysed during the given period. The Gabra Reserve on Mt. Vlahina was studied by Gussev *et al.* (2005); Dimitrov *et al.* (2005b) studied floristic, vegetation, and habitat diversity of the Baltata Reserve; in the Beli Lom Nature Reserve (Northeast Bulgaria), Bancheva & Vassilev (2006) identified 367 species, classified into 35 chorological groups; Tonkov *et al.* (2006) reported 360 taxa from 234 genera and 72 families for the locality of Kirilova Polyana in the Rilomanastirska Gora Nature Reserve (central Rila Mts.); Georgiev *et al.* (2010) studied the flora of the Chirpanskata Gora Reserve and presented its biological and ecological characteristics, in addition to which they mapped the relicts, endemics, and medicinal plants on its territory; Dimitrov & Vutov (2012) established the presence of 256 vascular plant species belonging to 181 genera and 54 families in the Sokolata Reserve (Mt. Maleshevska); Dimitrov *et al.* (2012) recorded 322 species from 219 genera and 68 families in the Dervisha Reserve (Northeast Bulgaria); the Debelata Koriya Reserve (village of Chernozemen) was studied by Koev *et al.* (2010), who established 132 taxa from 94 genera and 44 families, defining the overall diversity of species as exceptionally high for the small territory of the researched site; and the Kupena Reserve was studied by Velev *et al.* (2015), the Dolna Topchiya Reserve by Koev *et al.* (2015), the Kongura Reserve by Pedashenko *et al.* (2015), and the Chamdzha Managed Reserve by Vassilev & Gavrilova (2015). Finally, the Kutelka Reserve in the eastern Stara Planina Mountains was investigated by Sopotlieva *et al.* (2016).

Protected sites. Natcheva *et al.* (2013) provided information about the creation of a pilot network of small protected sites for plant species in Bulgaria based on the plant micro-reserve (PMR) model. The network consists of 60 sites selected as PMRs. The Bulgarian PMR

Table 1. Species reported for the first time in Bulgaria during 2005–2016 (in bold – new to science; *alien species).

No	Taxa	family	floristic region(s)	author(s)
1.	*Achillea ochroleuca* Ehrh.	Asteraceae	Danubian Plain	Nedelcheva & Tzonev (2006)
2.	***Aethionema rhodopaeum* D. Pavlova**	**Brassicaceae**	**Rhodope Mts.**	**Pavlova (2007a)**
3.	*Alchemilla czywczynensis* Pawl.	Rosaceae	Rhodope Mts.	Kurtto *et al.* (2007)
4.	*Alchemilla lanuginosa* Rothm.	Rosaceae	Pirin Mts., Rila Mts.	Kurtto *et al.* (2007)
5.	*Alchemilla obsoleta* Fröhner	Rosaceae	Balkan Range (*Central*), Mt. Vitosha, Pirin Mts., Rila Mts.	Kurtto *et al.* (2007)
6.	*Alchemilla pallens* Buser	Rosaceae	Pirin Mts.	Kurtto *et al.* (2007)
7.	*Alchemilla serbica* (Paulin) Pawł.	Rosaceae	Balkan Range, Pirin Mts., Rila Mts.	Kurtto *et al.* (2007)
8.	*Allium balcanicum* Brullo, Pavone & Salmeri	Alliaceae	Znepole Region, Thracian Lowland	Brullo *et al.* (2015)
9.	*Allium phthioticum* Boiss. & Heldr.	Alliaceae	Balkan Range (*Central*)	Cheshmedzhiev & Marinov (2009)
10.	*Ambrosia trifida* L.*	Asteraceae	Northeast Bulgaria	Stoyanov *et al.* (2014)
11.	*Anchusa spruneri* Boiss.	Boraginaceae	Black Sea Coast (*Southern*), Rhodope Mts. (*Eastern*)	Dimitrov (2009)
12.	*Avena byzantina* K. Koch*	Poaceae	Sofia Region	Petrova (2010a)
13.	*Bidens bipinnatus* L.*	Asteraceae	Black Sea Coast (*Northern*)	Petrova & Vladimirov (2009b)
14.	*Bidens vulgatus* Greene*	Asteraceae	Danubian Plain	Petrova & Vladimirov (2009b)
15.	*Bromus parvispiculatus* H. Scholz	Poaceae	Black Sea Coast (*Northern*)	Scholz (2010)
16.	*Bufonia perennis* Pourr.*	Caryphyllaceae	Black Sea Coast (*Northern*)	Dimitrov & Vutov (2015a)
17.	*Buglossoides minima* (Moris) R. Fern. *	Boraginaceae	Northeast Bulgaria	Dimitrov (2013a)
18.	***Bupleurum uechtritzianum* S. Stoyanov**	**Apiaceae**	**Northeast Bulgaria**	**Stoyanov (2010a)**
19.	*Carex appropinquata* Schumach.	Cyperaceae	Sofia Region, Rila Mts.	Hájek *et al.* (2006a)
20.	*Carex hartmanii* Cajander	Cyperaceae	Mt. Vitosha, Pirin Mts., Rila Mts., Mt. Sredna Gora (*Western*), Rhodope Mts. (*Western*)	Hájek *et al.* (2005)
21.	*Carex lasiocarpa* Ehrh.	Cyperaceae	Rhodope Mts. (*Western*)	Hájek *et al.* (2005)
22.	*Celtis tournefortii* Lam.	Ulmaceae	Western Frontier Mts.	Zieliński *et al.* (2012)
23.	*Cenchrus longispinus* (Hack.) Fernald*	Poaceae	Northeast Bulgaria	Jehlík & Scholz (2009) [sub *C. incertus*]
24.	*Cenchrus purpurascens* Thunb.*	Poaceae	Sofia Region	Dimitrov & Vutov (2015b)
25.	*Centaurea formanekii* Halacsý	Asteraceae	Tundzha Hilly Country	Dimitrov (2013b)
26.	*Centaurea jankae* D. Brândză	Asteraceae	Northeast Bulgaria	Petrova (2007)

27.	***Centaurea sakariensis* Bancheva & Raimondo**	**Asteraceae**	**Tundzha Hilly Country**	**Bancheva & Raimondo (2013)**
28.	*Centaurea trinervia* Willd.	Asteraceae	Northeast Bulgaria	Petrova (2007)
29.	***Centaurea wagenitziana* Bancheva & Kit Tan**	**Asteraceae**	**Tundzha Hilly Country**	**Tan *et al.* (2009)**
30.	*Chenopodium missouriense* Aellen*	Chenopodiaceae	Tundzha Hilly Country	Grozeva (2010a)
31.	*Chenopodium pratericola* Rydb. *	Chenopodiaceae	Black Sea Coast (*Southern*)	Grozeva (2012a)
32.	*Chenopodium probstii* Aellen*	Chenopodiaceae	Sofia Region, Thracian Lowland	Grozeva (2010a)
33.	*Chenopodium pumilio* R. Br.*	Chenopodiaceae	Balkan Range (*Eastern*), Thracian Lowland	Grozeva (2007)
34.	*Cirsium rivulare* (Jacq.) All.	Asteraceae	Balkan Range (*Western*)	Hájek *et al.* (2006a)
35.	*Clematis tibetana* Kuntze*	Ranunculaceae	Northeast Bulgaria	Vladimirov *et al.* (2014b)
36.	*Colchicum haynaldii* Heuff.	Liliaceae	Valley of Struma River	Kew World Checklist of Selected Plant Families (2010)
37.	*Colchicum triphylum* Kunze	Liliaceae	Pirin Mts. (*Northern*)	Persson (2007)
38.	*Convolvulus pilosellifolius* Desr. *	Convolvulaceae	Black Sea Coast (*Southern*)	Dimitrov & Trifonov (2006)
39.	*Crepis rubra* L.	Asteraceae	Rhodope Mts. (*Eastern*)	Peev *et al.* (2009)
40.	*Cyperus odoratus* L.*	Cyperaceae	Northeast Bulgaria, Danubian Plain	Verloove (2014) [sub *C. strigosus*, Tzonev *et al.* (2003)]
41.	*Datura innoxia* Mill.*	Solanaceae	Danubian Plain, Sofia Region, Znepole Region, Valley of Struma River (*Southern*), Thracian Lowland	Dimitrov (2005a)
42.	*Dianthus leptopetalus* Willd.	Caryophyllaceae	Black Sea Coast (*Northern*)	Negrean (2010)
43.	*Diplachne fascicularis* (Lam.) P. Beauv. *	Poaceae	Thracian Lowland	Vladimirov & Delcheva (2016)
44.	*Eclipta prostrata* (L.) L.*	Asteraceae	Northeast Bulgaria	Tzonev (2007)
45.	*Elaeagnus multiflora* L.*	Elaeagnaceae	Black Sea Coast (*Southern*)	Petrova (2008)
46.	*Elodea nuttallii* (Planch.) H. St. John*	Hydrocharitaceae	Danubian Plain, Thracian Lowland	Georgiev *et al.* (2011)
47.	*Epilobium adenocaulon* Hausskn.*	Hydrocharitaceae	Sofia Region, Znepole Region, Rila Mts.	Kalníková & Palpurina (2015)
48.	*Epipactis exilis* P. Delforge	Orchidaceae	Balkan Range (*Central*), Mt. Vitosha, Rila Mts, Rhodopi Mts. (*Central*), Mt. Strandzha	Petrova & Venkova (2008)
49.	*Epipactis greuterii* H. Baumann & Künkele	Orchidaceae	Rhodope Mts. (*Central*)	Petrova & Venkova (2008)
50.	*Epipactis leptochila* (Godfery) Godfery	Orchidaceae	Balkan Range (*Central*), Mt.Vitosha, Rila Mts	Petrova & Venkova (2006a)
51.	*Epipactis pontica* Taubenheim	Orchidaceae	Balkan Range (*Central*), Znepole Region, Mt. Vitosha Region, Rila Mts., Mt. Sredna Gora (*Western*), Rhodope Mts. (*Central*)	Petrova & Venkova (2006b)
52.	*Erigeron sumatrensis**	Asteraceae	Black Sea Coast (*Northern*), Northeast Bulgaria, Forebalkan (*Western*), Valley of Struma River, Thracian Lowland	Vladimirov (2009b)

53.	*Eucommia ulmoides* Oliv. *	Eucommiaceae	Black Sea Coast (*Southern*)	Tashev & Tashev (2015)
54.	*Euphorbia davidii* Subils*	Euphorbiaceae	Black Sea Coast (*Northern*)	Vladimirov & Petrova (2009b)
55.	*Euphorbia prostrata* Aiton*	Euphorbiaceae	Black Sea Coast (*Northern*), Northeast Bulgaria, Forebalkan (*Eastern*), Sofia Region, Valley of River Struma (*Southern*), Pirin Mts. (*Southern*)	Vladimirov *et al.* (2014a)
56.	*Geranium aristatum* Freyn & Sint.	Geraniaceae	Western Frontier Region	Petrova (2006b)
57.	*Grindelia squarrosa* (Pursh) Duna.*	Asteraceae	Black Sea Coast (*Northern*), Northeast Bulgaria	Vladimirov & Petrova (2012)
58.	*Gymnadenia densiflora* (Wahlenb.) A. Dietr.	Orchidaceae	Balkan Range (*Central*), Pirin Mts. (*Northern*), Rhodope Mts. (*Western* & *Central*)	Hájek *et al.* (2005)
59.	*Heteranthera rotundifolia* Griseb.*	Pontederiaceae	Thracian Lowland	Cheshmedziev & Stojchev (2005)
60.	***Hieracium crinitopannosum* Szeląg & Vladimirov**	**Asteraceae**	**Rhodope Mts. (*Central*)**	**Szeląg & Vladimirov (2013)**
61.	***Hieracium petrovae* Vladimirov & Szelag**	**Asteraceae**	**Rhodope Mts. (*Central*)**	**Vladimirov & Szeląg (2006)**
62.	***Hieracium werneri* Szeląg**	**Asteraceae**	**Rhodope Mts. (*Central*)**	**Szeląg (2006)**
63.	*Himantoglossum jankae* Somlyay, Kreutz & Óvári	Orchidaceae	Northeast Bulgaria	Molinár *et al.* (2012)
64.	*Impatiens balfourii* Hook.f.*	Balsaminaceae	Valley of Struma River	Adamowski (2009)
65.	*Juncus hybridus* Brot.	Juncaceae	Thracian Lowland	Dimitrov (2010e)
66.	*Koelreuteria paniculata* Laxm. *	Sapindaceae	Rhodope Mts. (*Central*)	Vladimirov (2006b)
67.	*Laburnum anagyroides* Medik. *	Fabaceae	Northeast Bulgaria, Balkan Range (*Western*), Sofia Region, Znepole Region, Tundzha Hilly Counry	Petrova *et al.* (2013c)
68.	*Lathyrus filiformis* (Lam.) J. Gay	Fabaceae	Rhodopi Mts. (Rhodope Mts.) (*Central*)	Tosheva (2005)
69.	*Laurus nobilis* L. *	Lauraceae	Black Sea Coast (*Southern*)	Tashev & Tashev (2015)
70.	*Leontodon saxatilis* Lam.	Asteraceae	Northeast Bulgaria, Forebalkan (*Western*)	Dimitrova *et al.* (2005)
71.	*Leontodon tuberosus* L.	Asteraceae	Black Sea Coast (*Southern*), Northeast Bulgaria	Vladimirov & Dimitrova (2006)
72.	*Lepidium virginicum* L. *	Brassicaceae	Northeast Bulgaria	Stoyanov & Vladimirov (2015)
73.	*Modiola caroliniana* (L.) G.Don*	Malvaceae	Thracian Lowland	Cheshmedzhiev & Sokolov (2007)
74.	*Molinia horanzskyi* Milk.	Poaceae	Sofia Region, Balkan Range (*Central*), Mt. Sredna Gora (*Western*), Rhodope Mts. (*Western* & *Central*)	Hájek *et al.* (2005)
75.	*Montia hallii* (A. Gray) Greene*	Portulacaceae	Black Sea Coast (*Southern*), Balkan Range (*Central*), Mt. Slavyanka, Rila Mts, Rhodope Mts. (*Western* & *Central*), Thracian Lowland, Tundzha Hilly Country , Mt. Strandzha	Hájek *et al.* (2005)
76.	*Oenothera glazioviana* Micheli*	Onagraceae	Valley of Struma River (*Northern*)	Kalníková & Palpurina (2015)

77.	***Onosma malkarmayorum* Teppner**	**Boraginaceae**	**Rhodope Mts. (*Western* & *Central*)**	**Teppner (2008)**
78.	***Onosma pavlovae* Petrova & Kit Tan, nom. novum**	**Boraginaceae**	**Rhodope Mts. (*Eastern*)**	**Tan & Petrova (2009) [≡*O. bulgarica* D. Pavlova, non Velen. (Pavlova 2009a)]**
79.	*Orobanche hederae* Duby	Orobanchaceae	Rhodope Mts. (*Central*)	Stoyanov (2013a)
80.	*Panicum dichotomiflorum* Michx.*	Poaceae	Northeast Bulgaria, Danubian Plain	Petrova & Vladimirov (2012)
81.	*Parthenocissus inserta* (A. Kern) Fritsh*	Vitaceae	Sofia Region	Zieliński *et al.* (2012)
82.	*Parthenocissus quinquefolia* (L.) Planch.*	Vitaceae	Northeast Bulgaria, Forebalkan (*Eastern*), Balkan Range (*Eastern*)	Petrova (2006c)
83.	*Pennisetum setaceum* (Forssk.) Chiov.*	Poaceae	Black Sea Coast (*Northern*)	Velchev & Petrova (2011)
84.	*Petrorhagia glumacea* (Chaub. & Bory) P. W. Ball & Heywood	Caryophyllaceae	Znepole Region	Nedelcheva & Vasileva (2009)
85.	*Peucedanum obtusifolium* Sm.	Apiaceae	Black Sea Coast (*Northern* & *Southern*)	Ostroumova & Stoyanov (2016)
86.	*Phytolacca esculenta* Van Houtte*	Phytolaccaceae	Sofia Region, Mt. Sredna Gora (*Eastern*)	Zieliński *et al.* (2012)
87.	*Pilosella byzantina* (Boiss.) P.D. Sell & C. West	Asteraceae	Prin Mts. (*Northern*)	Krahulcová *et al.* (2016)
88.	*Plantago maxima* Jacq.	Plantaginaceae	Znepole Region	Tzonev & Karakiev (2007)
89.	*Plantago sempervirens* Crantz	Plantaginaceae	Valley of Struma River (*Northern*)	Stoyanov & Vassilev (2011)
90.	*Polypodium interjectum* Shivas	Polypodiaceae	Forebalkan (*Western*), Valley of Struma River (*Northern*), Mt. Belasitsa, Rhodope Mts. (*Eastern*), Mt. Strandzha	Ivanova (2006a)
91.	*Potamogeton berchtoldii* Fieber	Potamogetonaceae	Black Sea Coast (*Northern*), Danubian Plain, Forebalkan (*Eastern*), Balkan Range (*Eastern*), Znepole Region, Rhodope Mts. (*Western*), Thracian Lowland	Kirjakov & Cheshmedzhiev (2007)
92.	*Potamogeton obtusifolius* Mertens & Koch	Potamogetonaceae	Rhodope Mts. (*Western*)	Kirjakov & Cheshmedzhiev (2007)
93.	*Prunus serotina* Ehrh.*	Rosaceae	Mt. Vitosha Region	Zieliński *et al.* (2012)
94.	*Ptelea trifoliata* L.*	Rutaceae	Black Sea Coast (*Southern*)	Tashev *et al.* (2016a)
95.	*Pulsatilla styriaca* (Pritz.) Simonk.	Ranunculaceae	Mt. Sredna Gora (*Western*)	Tashev (2013)
96.	*Quercus rubra* L. *	Fagaceae	Mt. Vitosha Region; Tundzha Hilly Country	Tashev *et al.* (2013c); Vladimirov (2013b)
97.	*Ranunculus polyanthemoides* Boreau	Ranunculaceae	Rhodope Mts. (*Central*)	Baltisberger (2006)
98.	*Ribes aureum* Pursh*	Grossulariaceae	Balkan Range (*Western*), Mt. Vitosha Region	Zieliński & Petrova (2012)
99.	*Salix viminalis* L.	Salicaceae	Rhodope Mts. (*Central*)	Zieliński *et al.* (2012)

100.	*Sedum confertiflorum* Boiss.	Crassulaceae	Rhodope Mts. (*Eastern*)	Assyov *et al.* (2006); Dimitrov (2010c)
101.	*Sedum subulatum* (C.D. Mey.) Boiss.	Crassulaceae	Tundzha Hilly Country	Dimitrov (2010d)
102.	*Senecio hercynicus* Herborg. (*Senecio nemorensis* L. p.p.)	Asteraceae	Forebalkan, Balkan Range, Mt. Vitosha Region, Znepole Region, Western Frontier Mts., Mt. Slavyanka, Rila Mts., Mt. Sredna Gora, Rhodope Mts.	Greuter & Raab-Straube (2008); Vladimirov (2012c)
103.	*Senecio inaequidens* DC.*	Asteraceae	Sofia Region	Vladimitrov & Petrova (2009a)
104.	***Sesleria rhodopaea* Tashev & Dimitrov**	**Poaceae**	**Rhodope Mts. (*Central*)**	**Tashev & Dimitrov (2012)**
105.	*Sesleria uliginosa* Opiz	Poaceae	Tundzha Hilly Country	Hájek *et al.* (2005)
106.	*Sicyos angulatus* L.*	Cucurbitaceae	Danubian Plain	Tzonev (2005)
107.	***Silene fetlerii* D. Pavlova**	**Caryophyllaceae**	**Rhodope Mts. (*Eastern*)**	**Pavlova (2014)**
108.	*Silphium perfoliatum* L.*	Asteraceae	Northeast Bulgaria	Vladimirov & Petrova (2010b)
109.	*Solanum elaeagnifolium* Cav.*	Solanaceae	Valley of Struma River (*Southern*)	Vladimirov *et al.* (2015)
110.	*Stachys baldaccii* (Malý) Hand.-Mazz.	Lamiaceae	Pirin Mts. (*Southern*)	Baltisberger (2006)
111.	*Stachys beckeana* Dorfl. & Hayek	Lamiaceae	Rhodope Mts. (*Western* & *Central*)	Baltisberger (2006)
112.	*Sternbergia lutea* (L.) Spreng.	Amaryllidaceae	Valley of River Struma (*Southern*)	Vladimirov *et al.* (2016)
113.	*Stipa ucrainica* P.A. Smirn.	Poaceae	Black Sea Coast (*Northern* & *Eastern*), Northeast Bulgaria	Apostolova *et al.* (2008)
114.	*Symphoricarpos albus* (L.) S.F. Blake*	Caprifoliaceae	Sofia Region, Znepole Region	Zieliński & Petrova (2012)
115.	*Taraxacum acutiusculum* Sonck	Asteraceae	Balkan Range (*Western* & *Central*), Sofia Region, Mt. Sredna Gora (*Western*), Rila Mts.	Štěpánek & Kirschner (2014)
116.	*Taraxacum dorchocarpum* Soest	Asteraceae	without locality	Kirshner & Štěpánek (2007)
117.	*Taraxacum epirense* Soest	Asteraceae	Sofia Region, Vitosha Region, Pirin Mts. (*Southern*)	ŠTĚPÁNEK & KIRSCHNER (2014)
118.	*Taraxacum fragosum* Sonck	Asteraceae	Black Sea Coast (*Southern*)	ŠTĚPÁNEK & KIRSCHNER (2014)
119.	*Taraxacum gracilens* Dahlst.	Asteraceae	Valley of Struma River (*Southern*)	ŠTĚPÁNEK & KIRSCHNER (2014)
120.	*Taraxacum herae* Sonck	Asteraceae	Balkan Range (*Central*)	ŠTĚPÁNEK & KIRSCHNER (2014)
121.	*Taraxacum lingulobium* Sonck	Asteraceae	Valley of River Struma (*Southern*), Valley of River Mesta	ŠTĚPÁNEK & KIRSCHNER (2014)
122.	*Taraxacum salonikiense* Sonck	Asteraceae	Valley of River Struma (*Southern*), Valley of River Mesta	ŠTĚPÁNEK & KIRSCHNER (2014)
123.	*Taraxacum thracicum* Soest	Asteraceae	Thracian Lowland	Dimitrov (2010b)
124.	*Thuja orientalis* L.*	Cupressaceae	Northeast Bulgaria	Vladimirov (2012b)
125.	*Tragopogon floccosus* Waldst. & Kit.	Asteraceae	Danubian Plain	Vladimirov & Tsoneva (2006)
126.	*Vincetoxicum nigrum* (L.) Moench*	Asclepiadaceae	Sofia Region	Petrova (2010a)
127.	*Vulpia fasciculata* (Forssk.) Samp.	Poaceae	Black Sea Coast (*Southern*)	Petrova *et al.* (2005a)

network includes the populations of 47 species that need urgent conservation actions for their survival.

During the given period, comprehensive studies were also carried out on the floristic diversity of a number of other protected sites: Dimitrov (2005b) studied Orlitsite on Mt. Vurbishka; Mt. Preslavska was studied by Zahariev (2008a, 2012b); Dimitrov & Vutov (2009b) studied Blatata, near the village of Dolni Bogrov; Zahariev & Uzunov (2010) reported data on the flora of the "Madarski Skalni Ventsi" Protected Area; Marinov (2012) studied the Ispolin Massif of the central Balkan Mountains; Grozeva *et al.* (2012b) investigated Nahodishte na Div Bozhur, near the town of Sredets in the Burgas District; Georgiev & Koev (2012) studied Nahodishte na Blatno Kokiche, Gradina village; Ponor was studied by Pedashenko & Vassilev (2014); Elenina Bara on Mt. Lylin was investigated by Vutov & Dimitrov (2015); and three protected natural areas of the Sitovo municipality in the Silistra District were studied by Dimitrov (2016).

Other territories (*nature parks, natural monuments, natural landmarks, etc.*). A number of authors reported new and interesting data on richness of the flora of different areas in the country.

Dimitrov *et al.* (2005a) published the book *Botanical Characteristics of the Vrana Park*, in which the authors identified 831 vascular plants belonging to 435 genera and 118 families. The book is illustrated with original colour photos. Vladimirov (2005, 2009d) published two editions of the book *Vascular Plants in the Rhodopes – Photoguide* with original colour photos and morphological descriptions of 287 species and subspecies.

The vascular flora of the catchment basin of the river Russenski Lom was studed by Stoyanov (2005b), giving data on 877 species distributed in 87 families and 399 genera; the architectural reserve Nebet Tepe in Plovdiv was studied by Pavlova & Tonkov (2005); Dimitrov (2005c) reported data on vascular plants of conservation concern and endemics from the city of Sofia, and Dimitrov *et al.* (2011) published information about its flora and plant communities; Vutov & Dimitrov (2009) studied the higher flora of the Kremikovtsi mine, whose territory up to the time of the study was not recultivated; Grozeva & Georgieva (2005) and Grozeva *et al.* (2014) reported new floristic information about the Sinite Kamuni Nature Park; Delcheva *et al.* (2007) published information about the Tchelkov Rid (western Rhodope Mountains); Zahariev (2008b) gave data for the Lilyak Plateau; Dimitrov & Vutov (2009a) did so for the natural landmarks Kutina Pyramids and Stob Pyramids; Nedelcheva & Vasileva (2009) and Nedelcheva (2011) presented results of studying the wall flora of Kyustendil; the Provadiisko Plateau was studied by Zahariev (2011, 2012a), the Shumensko Plateau by Zahariev & Radoslavova (2010), and the Shumen Heights by Zahariev (2014); the Dobrostan Ridge (central Rhodopes) was investigated by Stoyanov & Raycheva (2013); Vladimirov & Stoyanov (2014) published data on the diversity and protection of plants of the Russenski Lom Nature Park; Dimitov & Vutov (2015c) published data on a natural phenomenon, the Zlatna Panega karst spring; Raycheva & Stoyanov (2015b) studied the floras of the Mechkovets and Dragoyna Ridges, (central Rhodope Mountains) and the Ostrova locality; and the flora of Plovdiv was studied by Stoyanov & Raycheva (2015), that of the environs of Rila Monastery by Pavlova & Georgieva (2015), and that of the Frangensko Pateau by Zahariev (2016b). Finally, Sokolov *et al.* (2016) studied the species composition of trees and shrubs in Plovdiv Municipality.

Serpentinite territories. During the past two decades, serpentinite areas in Bulgaria have attracted the attention of some botanists. This interest was generated by the importance of these territories as sites of speciation processes closely related to the characteristic composition of the basic substrate. These areas usually have an unusual flora, with many rare and endemic species.

Three species new to science growing on serpentinite rocks in the eastern Rhodope Mountains were described during the given period, viz., *Aethionema rhodopaea* (Pavlova 2007a), *Onosma pavlovae* (sub *O. bulgarca*, Pavlova 2009a), and *Silene fetlerii* (Pavlova 2014). The species were defined by the author as typical obligate serpentinophytes. The same author investigated variation in the morphology of some populations of *Teucrium chamaedrys* growing on serpentinites and non-serpentinites (Pavlova 2009b), while Pavlova & Vasileva (2010) compared the morphology of *T. polium* populations growing on these two kinds of substrates. The aim was to document differences in their morphological traits and estimate which characters are most likely contributing to differentiation of the populations.

The largest serpentinite areas in Bulgaria are in the Rhodopes. Some of them were investigated during the given period and the results presented in several publications by Pavlova (2005a, b, 2007b) and Pavlova *et al.* (2005, 2012). A total number of 683 species of higher plants was established. Locations of the populations of 57 endemic and rare plants and a number of medicinal plants were reported by Nedelcheva *et al.* (2010).

Pavlova *et al.* (2006) reported for the first time chorological notes for plant species growing on serpentinite territories on Mt. Vlahina. In other studies on serpentinites of the Western Frontier Mountains (Mts. Vlahina and Ograzhden) by Pavlova (2010), 270 plant taxa and floristic structure of the investigated sites were presented. Species with a high conservation status and

Table 2. Subspecies reported for the first time in Bulgaria during 2005-2016 (in bold – new to science).

No	taxa	family	floristic region(s)	author(s)
1.	*Amaranthus blitum* subsp. *emarginatus* (Uline & W. L. Bray) Carretero	Amaranthaceae	Northeast Bulgaria	Petrova & Vladimirov (2012)
2.	*Aubrieta columnae* subsp. ***bulgarica*** Ančev	Brassicaceae	Valley of Struma River	Ančev (2007)
3.	*Bromus racemosus* subsp. *lusitanicus* (Sales & P.M. Sm.) H. Scholz & Spalton	Poaceae	Thracian Lowland	Raab-Straube & Scholz (2013)
4.	*Campanula sibirica* subsp. ***parviflora*** Ančev	Campanulaceae	Northeast Bulgaria	Ančev (2012a)
5.	*Chenopodium album* subsp. *pedunculare* (Bertol.) Arcang.	Chenopodiaceae	Black Sea Coast (*Northern* & *Southern*), Thracian Lowland	Grozeva (2012b)
6.	*Colchicum szovitsii* Fisch. & C.A. Mey. subsp. *szovitsii*	Liliaceae	Tundzha Hilly Country	Persson (2007)
7.	*Dactylorhiza maculata* subsp. *transsilvanica* (Schur) Soó	Orchidaceae	Balkan Range (*Western*)	Petrova *et al.* (2009c)
8	*Deschampsia caespitosa* subsp. *alpina* (L.) Tzvelev	Poaceae	Pirin Mts. (*Northern*)	Dimitrov (2006b)
9	*Genista tetragona* Besser subsp. *tetragona*	Fabaceae	Northeast Bulgaria	Stoyanov (2014)
10.	*Orobanche alba* subsp. *xanthostigma* Rätzel & Ulrich	Orobanchaceae	Rhodope Mts. (*Western* & *Central*)	Stoyanov (2009a)
11.	*Plantago maritima* subsp. *serpentina* (All.) Arcang.	Plantaginaceae	Rhodope Mts. (*Eastern*)	Dimitrov & Trifonov (2006)
12.	*Quercus ithaburensis* subsp. *macrolepis* (Kotschy) Hedge & Yalt	Fagaceae	Rhodope Mts. (*Eastern*)	Dimitrov (2011a)
13.	*Rochelia disperma* subsp. *retorta* (Pall.) Kotejowa	Boraginaceae	Northeast Bulgaria	Petrova (2010c)
14.	*Sesleria tenuifolia* Schrad. subsp. *tenuifolia*	Poaceae	Sofia Region, Znepole Region	Asenov (2010)
15.	*Thymus callieri* Velen. subsp. *callieri*	Lamiaceae	Thracian Lowland	Dimitrov (2006b)
16.	*Trifolium fragiferum* L. subsp. *fragiferum*	Fabaceae	Thracian Lowland	Dimitrov (2011b)
17.	*Verbascum niveum* Ten. subsp. *niveum*	Scrophulariaceae	Rhodope Mts. (*Western*)	Dimitrov (2013c)

new chorological data for some taxa were recorded in those studies. Nedelcheva & Pavlova (2006) reported the results of investigating medicinal plants on serpentines of Mt. Vlahina, their biodiversity, resources, and protection.

Asenov & Pavlova (2009) stidied the high-altitude serpentine flora of Mt. Belasitsa and reported 115 taxa of vascular plants from 37 families and 80 genera. The flora is mainly composed of sub-Mediterranean, Eurasian, and European geoelements. The obtained data indicated that the serpentine flora of this mountain is unique in comparision with other investigated regions in Bulgaria, endemic elements being predominantly Balkan species. Pavlova (2012) assessed vascular plant biodiversity and the conservation value of plants growing on serpentine sites at high altitudes in the Rila National Park. Tzonev *et al.* (2013b) analysed vegetation types at various serpentinite sites and compared them with those in other Balkan countries.

Aquatic areas and wetlands. Some of the floristic studies conducted in Bulgaria during this period are ones devoted to aquatic macrophytes and wetland plants. Tsoneva *et al.* (2012) published the *Atlas of Aquatic and Wetland Plants*. According to the authors, aquatic macrophytes of the country number about 345 species, belonging to 158 genera and 66 families.

In several publications, Hájek *et al.* (2005, 2006a, 2008, 2009) and Hájkova *et al.* (2006) reported and

Table 3. Hybrids reported for the first time in Bulgaria during 2005-2016 (in bold – new to science).

No	hybrids	family	floristic region(s)	author(s)
1.	***Campanula* × *lisecii* Ančev**	**Campanulaceae**	**Znepole Region**	**Ančev (2012a)**
2.	***Cardamine* × *rhodopaea* Ančev**	**Brassicaceae**	**Rhodope Mts. (*Western*)**	**Ančev *et al.* (2013)**
3.	*Dryopteris* ×*ambroseae* Fraser-Jenk. & Jermy	Dryopteridaceae	Rila Mts., Rhodopi Mts. (Rhodope Mts.) (*Western*)	Ivanova (2006b)
4.	*Equisetum* × *moorei* Newman	Equisetaceae	Danubian Plain, Forebalkan (*Eastern*), Valley of Struma River, Pirin Mts. (*Northern*), Mt. Sredna Gora (*Western*), Tundzha Hilly Country	Hájek *et al.* (2005)
5.	*Pilosella* ×*byzantina* (Boiss.) P.D. Sell & C. West	Asteraceae	Pirin Mts. (*Northern*)	Krahulcová *et al.* (2016)
6.	*Pilosella* ×*pavichiodes* S. Bräut. & Greuter	Asteraceae	Pirin Mts. (*Northern*)	Krahulcová *et al.* (2016)
7.	*Pilosella* ×*pintodasilvae* (de Retz) Mateo	Asteraceae	Pirin Mts. (*Northern*)	Krahulcová *et al.* (2016)
8.	*Polypodium* ×*mantoniae* (Rothm.) Shivas	Polypodiaceae	Valley of Struma River (*Northern*), Mt. Belasitsa	Ivanova (2006a)
9.	*Populus* ×*canadensis* Moench	Salicaceae	Danubian Plain, Balkan Range (*Eastern*)	Zieliński & Petrova (2012)
10.	*Rumex confertus* Willd. × *R. obtusifolius* L.	Polygonaceae	Northeast Bulgaria	Raycheva (2009b)
11.	*Rumex conglomeratus* Murray × *R. crispus* L.	Polygonaceae	Black Sea Coast (*Southern*), Znepole Region; Mt. Sredna Gora (*Western*), Rhodope Mts. (*Eastern*), Thracian Lowland	Raycheva (2009b)
12.	*Rumex cristatus* DC. × *R. obtusifolius* L.	Polygonaceae	Rhodope Mts. (*Eastern*)	Raycheva (2009b)
13.	*Rumex palustris* Sm. × *R. obtusifolius* L.	Polygonaceae	Mt. Sredna Gora (*Western*), Thracian Lowland	Raycheva (2009b)
14.	*Rumex patientia* L. × *R. pulcher* L.	Polygonaceae	Valley of Mesta River, Mt. Sredna Gora (*Eastern*), Rhodope Mts. (*Eastern*)	Raycheva (2009b)
15.	***Salix* ×*ardana* Ziel. & Petrova**	**Salicaceae**	**Rhodope Mts.**	**Zieliński *et al.* (2006)**
16.	***Salix* ×*velchevii* Ziel. & Z. Pancheva**	**Salicaceae**	**Rhodope Mts.**	**Zieliński *et al.* (2006)**
17.	*Sorbus* ×*latifolia* s.l.	Rosaceae	Balkan Range, Znepole Region, Mt. Sredna Gora (*Western*), Pirin Mts. (*Northern*), Rhodope Mts. (*Western* & *Central*)	Zieliński & Vladimirov (2013)
18.	*Spiraea* ×*pseudosalicifolia* Silverside	Rosaceae	Znepole Region, Rhodope Mts. (*Western*)	Zieliński & Petrova (2012)

Table 4. Species confirmed for the country during 2005-2016.

	species	Family	floristic region(s)	author(s)
1.	*Alchemilla lunaria* Fröhner	Rosaceae	Pirin Mts	Kurtto *et al.* (2007)
2.	*Campanula sphaerotrix* Griseb.	Campanulaceae	Forebalkan, Balkan Range, Znepole Region, Mt. Vitosha Region, Western Frontier Mts., Valley of Struma River, Mt. Belasitsa, Mt. Slavyanka, Prin Mts., Rila Mts., Rhodope Mts., Tundzha Hilly Country	Ančev (2012a)
3.	*Centaurea* (*Cyanus*) *cyanomorpha* Stef. & T. Georg.	Asteraceae	Tundzha Hilly Country	Stoyanov (2016)
4.	*Chenopodium striatiforme* Murr	Chenopodiaceae	Black Sea Coast (*Southern*)	Grozeva (2012b)
5.	*Cynoglossum germanicum* Jacq.	Boraginaceae	Balkan Range (*Central*)	Marinov (2009a)
6.	*Edraianthus graminifolius* (L.) A. DC.	Campanulaceae	Znepole Region	Goranova *et al.* (2008)
7.	*Knautia longifolia* (Waldst. & Kit.) W.D.J. Koch	Dipsacaceae	Balkan Range (*Western* & *Central*), Western Frontier Mts., Pirin Mts., Rila Mts., Rhodope Mts. (*Central*)	Petrova (2012c)
8.	*Lathyrus transsilvanicus* (Spreng.) Fritsch	Fabaceae	Balkan Range (*Central*)	Marinov *et al.* (2014)
9.	*Persicaria salicifolia* (Willd.) Assenov	Polygonaceae	Valley of Mesta River	Assyov *et al.* (2012)

discussed the data of their floristic and vegetation studies in different wetlands. As a result of those studies, seven species of vascular plants were reported for the first time or "re-discovered" in the country (Table 1). Also, rare and endangered species were located, and new plant associations from Bulgarian mires were described. Tosheva & Traykov (2010, 2013, 2015) reported chorological data for some submerged macrophytes from various types of limnetic water bodies in different ecoregions of Bulgaria. Tosheva *et al.* (2010) reported data on the present and past distribution of aquatic vascular plants in the Seven Rila Lakes. Atanassova & Marinova (2005) presented information about the recent state of the disappearing wetlands in the northern part of the Tundzha Hill Country and the vascular flora found in them and their surroundings. As a result of that study, 120 plant species from 93 genera and 41 families were established. Information about the Atanasovsko Lake Nature Reserve was presented by Grozeva (2005) – a total of 311 species belonging to 205 genera and 63 families were reported for that territory, endemic elements being represented by eight species. According to the author, hygrophytes (35) and hygro-mesophytes (44) dominate, comprising altogether 25% of the flora. Valchev (2006, 2013) reported the results of his studies on the flora and vegetation of the Maluk Preslavets Marsh Protected Area and macrophytes growing alongside the Mesta River. Valchev *et al.* (2006) provided information about conservationally important macrophytes on the Bulgarian stretch of the Danube River and in adjacent water bodies, while Valchev & Stoeva (2010) reported data on aquatic macrophytes in wetlands on the territory of the Vrachanski Balkan Nature Park, and on the species composition and syntaxonomy of aquatic macrophytes in the Srebarna Lake Biosphere Reserve (Valchev *et al.* 2012). Savchovska *et al.* (2013) studied the abundance and species composition of aquatic macrophytes and their relationship with physicochemical parameters in the Ognyanovo Reservoir (near the town of Elin Pelin). Tzonev *et al.* (2013a) studied the Ranislavtsi wet meadows complex, in the Kostinbrod Municipality, which is very rich in rare and endangered plant species, some of them with localities unique in the country and even in the Balkans. Gecheva *et al.* (2013) studied the composition of

Table 5. New combinations and status (on the species and subspecies levels).

No	Taxa	Family	author(s)
1.	*Achillea kotschyi* Boiss. subsp. *urumoffii* (Halácsy) Ančev , comb. & stat. nov.	Asteraceae	†Kuzmanov & Ančev (2012b)
2.	*Cyanus cyanomorphus* (Stef. & T. Georgiev) S. Stoyanov, comb. nov.	Asteraceae	Stoyanov (2016)
3.	*Festuca stojanovii* (Acht.) Foggi & Petrova, comb. nova	Poaceae	Foggi & Petrova (2005)
4.	*Genista tetragona* subsp. *rhodopea* (Velen.) S. Stoyanov, comb. & stat. nov.	Fabaceae	Stoyanov (2014)
5.	*Jacobaea pancicii* (Degen) Vladimirov & Raab-Straube, comb. nova	Asteraceae	Vladimirov & Raab-Straube (2008)
6.	*Pilosella rhodopea* Griseb.) Szeląg, comb. nova	Asteraceae	Szeląg (2006)

aquatic bryophyte and vascular plant assemblages at 223 sites along 204 rivers during 2009 in the Pontic Province and Eastern Balkan Ecoregions of the country.

Hristeva *et al.* (2015) reported information about the species composition and distribution of 60 aquatic macrophytes in 13 rivers of Southern Bulgaria. Stoyneva *et al.* (2015) assessed the ecological status and potential of a number of water bodies based on their phytoplankton and macrophytes, and presented the results of monitoring 13 reservoirs and six lakes.

New data on the distribution of different macrophytes or wetland plants were also reported by Vassilev (2007), Petrova (2008, 2010b), Petrova *et al.* (2009b, 2011), Vladimirov (2009c), Vladimirov & Petrova (2009c, 2010a, b), Tzonev *et al.* (2010), etc.

Studies of species of special interest. The studies of this group are concerned with taxonomic revisions, morphology, conservation, or distribution of different species or groups of species. Petrova & Vladimirov (2010) published a list of Balkan endemics in the Bulgarian flora, including 270 species belonging to 116 genera and 35 families, while Zahariev (2016c) studied the biodiversity of relict vascular plants, including 346 species from 207 genera and 81 families. The distribution of Balkan endemics was mapped by Stevanović *et al.* (2007) using a grid of 50×50 km UTM squares. In that study, they mapped the distribution of *ca.* 175 endemic geophytic monocots in the Balkans as well.

Stojchev & Cheshmedziev (2005) reported data on the chorology and anatomy of the two *Lindernia* species in the Bulgarian flora; Trifonov (2005) studied the population of *Orchis provincialis* in the eastern Rhodopes; and Tsvetanov *et al.* (2005) published new localties of the rare species *Ophrys insectifera*. In several publications, Bancheva (2006, 2008), Bancheva & Gorgorov (2010), Bancheva *et al.* (2013), and Bancheva & Delcheva (2016) reported data on the distribution, taxonomy, populations, and conservation of different *Centaurea* species. Christensen *et al.* (2006) studied the distribution and ecology of *Salix xanthicola*. Tashev & Vitkova (2006) discussed the distribution of *Salix elaeagnos*, while Tashev *et al.* (2006) treated that of *Ophrys apifera*. Raycheva *et al.* (2007) reported new data on the distribution, morphology, and karyology of *Rumex pulcher*. Valkova & Vladimirov (2007) discussed the distribution of and threats posed by the alien invasive species *Ambrosia artemisiifolia* and *Iva xanthiifolia*. Szeląg (2008) published important data on the taxonomy and nomenclature of *Pilosella alpicola* agg., Nedelcheva (2008) on the morphology of *Achillea grandifolia*, and Niketić & Tomović (2008) on taxonomy and nomenclature of the *Linaria genistifolia* complex in Southeast Europe, including Bulgaria. Marinov (2009a) reported the "re-discovery" of *Cynoglossum germanicum* (the previous record was from 1908). Szeląg & Somlyay (2009) lectotypified the name *Haberlea rhodopensis* on the basis of the specimens stored at the Hungarian Natural History Museum in Budapest (BP). Vladimirov (2010) discussed lectotypification and the current taxonomic position of *Senecio arnautorum*. Sidjimova & Nikolova (2010) treated the distribution and resources of *Tribulus terrestris*. Raycheva (2011) revised the distribution of *Rumex confertus*. Vitkova *et al.* (2011) reported data on the current state of the only population of *Alchemilla mollis* known so far in Bulgaria. Grozeva (2011, 2014) and Grozeva & Cvetanova (2011) discussed the morphology, chorology, ecology, and population variability of different *Chenopodium* species. Pedashenko *et al.* (2010, 2012) studied *Artemisia chamaemelifolia* and *Amorpha fruticosa*. Tashev (2012) published new data on the species *Opuntia humifusa*. Bancheva & Delcheva (2012) and Delcheva & Bancheva (2012) discussed the conservation of *Astracantha thracica* and *Matthiola odoratissima* populations, respectively. Stoyanov (2013b) studied the distribution and environmental

Table 6. Taxa misidentified, new names, or synonyms.

No	Taxa	family	current names	author(s)
1.	*Achillea depressa* Janka		= *A. pseudopectnata* Janka	
2.	*Achillea pannonica* Sheele	Asteraceae	= *A. seidlii* J. Presl & C. Presl	Greuter & Raab-Straube (2008)
3.	*Alchemilla anisiaca* auct., non Wettst.	Rosaceae	= *A. pallens* Buser	Kurtto *et al.* (2007)
4.	*Alchemilla cinerea* auct., non Buser	Rosaceae	= *A. lanuginosa* Rothm.	Kurtto *et al.* (2007)
5.	*Alchemilla erythropoda* auct., non Juz.	Rosaceae	= *A. serbica* (Paulin) Pawł.	Kurtto *et al.* (2007)
6.	*Alchemilla gracilis* auct., non Opiz	Rosaceae	= *A. micans* Buser	Kurtto *et al.* (2007)
7.	*Alchemilla gracillima* Rothm.	Rosaceae	incl. in *A. venosula* Busser	Kurtto *et al.* (2007)
8.	*Alchemilla obtusa* auct., non Buser	Rosaceae	= *A. obsoleta* Fröhner	Kurtto *et al.* (2007)
9.	*Alchemilla plicatula* Gand.	Rosaceae	aggregate taxon	Kurtto *et al.* (2007)
10.	*Alchemilla pyrenaica* Dufour	Rosaceae	incl. in *A. fissa* Günther & Schummel	Kurtto *et al.* (2007)
11.	*Alyssum campestre* auct. Stoj. & Stef., non L.	Brassicaceae	= *Alyssum minus* (L.) Rothm.	Ančev (2007)
12.	*Amygdalus delipavlovii* S. Seraf.	Rosaceae	= *Prunus webbii* (Spach) Vierh.	Kurtto *et al.* (2013)
13.	*Amygdalus nana* L.	Rosaceae	= *Prunus tenella* Batsch	Kurtto *et al.* (2013)
14.	*Aubrieta intermedia* auct., non Boiss.	Brassicaceae	*A. columnae* subsp. *bulgarica* Ančev & subsp. *pirinica* Assenov	Ančev (2007)
15.	*Campanula expansa* Friv., non J.H. Rudolph	Campanulaceae	= *Campanula frivaldszkyi* Steud.	Ančev (2012a)
16.	*Cardamine barbareoides* auct., non Halácsy	Brassicaceae	*C. amara* subsp. *balcanica* Marhold *et al.*	Ančev (2007)
17.	*Cardamine palustris* auct., non L.	Brassicaceae	*C. matthioli* Moretti	Ančev (2007)
18.	*Cardamine pratensis* auct., non L.	Brassicaceae	*C. penzesii* Ančev & Marhold	Ančev (2007)
19.	*Cenchrus incertus* M.A. Curtis	Poaceae	*C. longispinus* (Hack.) Fernald	Verloove & Sánchez Gyllin (2012)
20.	*Colchicum ancyrense* B.L. Burtt	Liliaceae	= *C. triphyllum* Kunze	Persson (2007)
21.	*Colchicum biebersteinii* Rouy., nom. illeg.	Liliaceae	= *C. triphyllum* Kunze	Kew World Checklist of Selected Plant Families (2010)
22.	*Colchicum borisii* Stef.	Liliaceae	= *C. autumnale* L.	Persson (2007)
23.	*Colchicum callycimbium* Stearn & Stef.	Liliaceae	= *C. haynaldii* Heuff.	Kew World Checklist of Selected Plant Families (2010)
24.	*Colchicum davidovii* Stef.	Liliaceae	= *C. szovitsii* Fisch. & C.A. Mey. subsp. *szovitsii*	Persson (2007)
25.	*Colchicum diampolis* Delip. & Cheschm.	Liliaceae	= *C. szovitsii* Fisch. & C.A. Mey. subsp. *szovitsii*	Persson (2007)
26.	*Colchicum rhodopaeum* Kov.	Liliaceae	= *C. autumnale* L.	Persson (2007)
27.	*Cotoneaster nebrodensis* auct., non (Guss.) C. Koch	Rosaceae	= *C. tomentosus* (Aiton) Lindl.	Kurtto *et al.* (2013)

28.	*Cotoneaster niger* (Fr.) Fr.	Rosaceae	= *C. laxiflorus* Lindl.	Kurtto *et al.* (2013)
29.	*Cyanus diospolitanus* Bancheva & Stoyanov	Asteraceae	= *C. cyanomorphus* (Stef. & T. Georgiev) S. Stoyanov	Bancheva & Stoyanov (2009); Stoyanov (2016)
30.	*Cynoglossum rotatum* Velen.	Boraginaceae	= *C. montanum* L.	Sutorý (2008)
31.	*Cyperus strigosus* auct., non L.	Cyperaceae	*C. odoratus* L.	Verloove (2014)
32.	*Gagea arvensis* Dumort., nom. superfl.	Liliaceae	= *G .minima* (L.) Ker Gawl.	Kew World Checklist of Selected Plant Families (2010)
33.	*Gagea fistulosa* Ker Gawl., nom. illeg.	Liliaceae	= *G. bohemica* (Zauschn.) Schult. & Schult. f.	Kew World Checklist of Selected Plant Families (2010)
34.	*Hieracium divergens* Nägeli & Peter	Asteraceae	*Hieracium neodivergens* Gottschl., nom. novum	Gottschlich (2010)
35.	*Hieracium heuffelii* Janka; *Hieracium banaticola* Sudre, nom. illeg.	Asteraceae	= *Pilosella petraea* F.W. Schutz & Schultz-Bip.	Szeląg (2008)
36.	*Hieracium stefanoffii* Hayek, nom. illeg.	Asteraceae	= *Hieracium georgieffii* Zahn	Greuter & Raab-Straube (2008)
37.	*Jasione laevis* Lam.	Campanulaceae	= *J. orbiculata* Velen.	Ančev (2012b)
38.	*Juncus alpinus* Vill., nom. superfl.	Juncaceae	=*J. alpinoarticulatus* Chaix	Kew World Checklist of Selected Plant Families (2010)
39.	*Laurocerasus officinalis* M. Roem.	Rosaceae	= *Prunus laurocerasus* L.	Kurtto *et al.* (2013)
40.	*Onosma bulgarica* auct. D. Pavlova, non Velen.	Boraginaceae	*O. pavlovae* Tan & Petrova	Tan & Petrova (2009)
41.	*Pyrus amygdaliformis*Vill.	Rosaceae	= *P. spinosa* Forssk.	Kurtto *et al.* (2013)
42.	*Rhaponticoides* (*Centaurea*) *amplifolia* auct. bulg., non (Boiss. & Heldr.) M.V. Agab. & Greuter	Asteraceae	*Centaurea wagenitziana* Bancheva & Kit Tan	Tan *et al.* (2007, 2009)
43.	*Rorippa islandica* auct., non (Oeder) Borbás	Brassicaceae	*R. palustris* (L.) Besser	Ančev (2007)
44.	*Rorippa lippizensis* auct., non (Wulfen) Rchb.	Brassicaceae	*R. thracica* (Griseb.) Fritsch	Ančev (2007)
45.	*Rubus discolor* auct., non Weihe & Nees	Rosaceae	= *R. praecox* Bertol.	Kurtto *et al.* (2010)
46.	*Rubus sanguineus* Friv.	Rosaceae	= *R. sanctus* Schreber	Kurtto *et al.* (2010)
47.	*Thlaspi jankae* auct. Velen., non A. Kern.	Brassicaceae	*Th. kovatsii* Heuff.	Ančev (2007)

characteristics of *Orobanche gracilis*. Marinov *et al.* (2014) "re-discovered" *Lathyrus transsilvanicus* 110 years after its first and only collection and discussed its current status. Petrova *et al.* (2016b) studied the genetic diversity of *Verbascum davidoffii*. Grozeva *et al.* (2015) reported data on *Crocus olivieri* in the Sinite Kamani National Park. In addition, Grozeva *et al.* (2016) studied the current distribution and state of populations of *Moehringia jankae* and *Moehringia grisebachii* in the same park.

In the past decade, special attention was paid to alien species in the Bulgarian flora. In total, 51 alien species were reported during the given period (Table 1), some of them recorded for the first time, others known long before as introduced for ornamental or other purposes, but escaped and naturalised in native communities and habitats (e.g., *Elaeagnus multiflora*, *Eucommia ulmoides*, *Koelreuteria paniculata*, *Laburnum anagyroides*, *Laurus nobilis*, etc.). Petrova *et al.* (2012e) published an overview of the distribution of alien and invasive plant

Table 7. Taxa unconfirmed.

No	Taxa	family	according to:
1.	*Alchemilla velebitica* (Janch.) Degen	Rosaceae	Kurtto *et al.* (2007)
2.	*Bellis annua* L.	Asteraceae	†Kuzmanov (2012a)
3.	*Cephalaria gigantea* (Ledeb.) Bobrov	Dipsacaceae	Petrova (2012a)
4.	*Dipsacus ferox* Loisel.	Dipsacaceae	Petrova (2012b)
5.	*Erysimum exaltatum* Besser	Brassicaceae	Ančev (2007)
6.	*Erysimum pusillum* subsp. *microstylum* (Hausskn.) Hayek	Brassicaceae	Ančev & Polatschek (2006)
7.	*Erysimum strictum* P. Gaertn. *et al.*	Brassicaceae	Ančev & Polatschek (2006)
8.	*Galatella* (*Aster*) *cana* (Waldst. & Kit.) Nees	Asteraceae	†Kuzmanov & Ančev (2012a)
9.	*Inula spiraeifolia* L.	Asteraceae	†Kuzmanov (2012b)
10.	*Inula thapsoides* (Willd.) Spreng.	Asteraceae	† Kuzmanov (2012b)
11.	*Inula urumoffii* Degen	Asteraceae	† Kuzmanov (2012b)
12.	*Rubus radula* Weihe	Rosaceae	Kurtto *et al.* (2010)
13.	*Senecio ovatus* (G. Gaertn. *et al.*) Willd.	Asteraceae	Vladimirov (2012c)
14.	*Senecio sarracenicus* L.	Asteraceae	Vladimirov (2012c)
15.	*Tanacetum achilleifolium* (M. Bieb.) Sch. Bip.	Asteraceae	†Kuzmanov (2012c)

Table 8. Taxa erroneously reported.

No	Taxa	family	according to:
1.	*Angelica archangelica* L.	Apiaceae	Yankova & Cherneva (2007)
2.	*Erysimum crepidifolium* Rchb.	Brassicaceae	Ančev & Polatschek (2006)
3.	*Erysimum helveticum* (Jacq.) DC.	Brassicaceae	Ančev & Polatschek (2006)
4.	*Erysimum pulchellum* (Willd.) Gay	Brassicaceae	Ančev & Polatschek (2006)
5.	*Erysimum smyrnaeum* Boiss. & Balansa	Brassicaceae	Ančev & Polatschek (2006)
6.	*Erysimum witmannii* Zaw.	Brassicaceae	Ančev & Polatschek (2006)
7.	*Hieracium oxyodon* Fr.	Asteraceae	Niketić (2005)
8	*Himantoglossum caprinum* (M. Bieb.) Spreng.	Orchidaceae	Molinár *et al.* (2012)
9.	*Orobanche aegyptiaca* Pers.	Orobanchaceae	Stoyanov (2005a)
10.	*Pilosella cymiflora* (Nägeli & Peter) S. Bräut. & Greuter	Asteraceae	Vladimirov (2007b)
11.	*Pilosella fuscoatra* (Nägeli & Peter) Soják	Asteraceae	Vladimirov (2007b)
12.	*Pilosella lactucella* (Wallr.) P.D. Sell & C. West	Asteraceae	Vladimirov (2007b)
13.	*Pilosella ziziana* (Tausch) F.W. Schultz & Sch. Bip.	Asteraceae	Vladimirov (2007b)
14.	*Rorippa sylvestris* subsp. *kerneri* (Menyh.) Soó	Brassicaceae	Ančev (2007)
15.	*Scabiosa cosmoides* Boiss.	Dipsacaceae	Petrova (2012d)
16.	*Taraxacum apenninum* (Ten.) DC.	Asteraceae	Greuter & Raab-Straube (2008)

species reported in the period 1991-2011. A special book on invasive alien species was published (Petrova *et al.* 2013c) that included 60 species. Many other authors also reported new data, mainly chorological, on alien species (Dimitrov 2005a; Grozeva 2007, 2010a, 2012a; Petrova 2008, 2010a; Petrova & Vladimirov 2009b, 2012; Vladimirov & Petrova 2009a, b; Zieliński *et al.* 2012; Vladimirov *et al.* 2014a, b, 2015; Kalníková & Palpurina 2015; etc.) (Table 1).

Reports of new chorological data. During the given period, new chorological data were published

for numerous species, mainly in a special series of *Phytologia Balcanica* entitled "New floristic records in the Balkans". New distribution records pertaining to different species can be found in the following works (cited in alphabetical order): Ančev (2010); Aneva & Zhelev (2015); Apostolova-Stoyanova & Stoyanov (2007); Asenov (2009a, b, 2010, 2012a, b, 2013, 2015a, b, 2016a, b); Assyov *et al.* (2007); Bancheva & Delcheva (2006); Bancheva *et al.* (2012); Borisova (2012); Dimitrov (2006a, b, 2007, 2010a, 2011b, 2012, 2013d); Dimitrov & Kachaunova (2013); Dimitrov & Trifonov (2006); Dimitrov & Vutov (2006, 2010, 2011, 2013, 2014, 2015d, 2016a, b); Dimitrov *et al.* (2006, 2010, 2013); Dimova & Vladimirov (2006); Făgăraş *et al.* (2010); Filipova & Vassilev (2015a, b); Goranova (2007); Goranova & Vassilev (2006); Goranova *et al.* (2008, 2009, 2010, 2011a, b, 2012); Grozeva (2006, 2010a, b, 2012a, b); Grozeva & Petkov (2013); Gyosheva & Valchev (2015); Hájek *et al.* (2006b, 2007); Ivanova (2013); Ivanova *et al.* (2011a, b, 2013); Karakiev (2009, 2011, 2012, 2014); Kenderova (2012); Kirjakov (2008); Langourov *et al.* (2012); Marinov (2009b); Marinov *et al.* (2016); Natcheva & Ivanova (2011a, b); Pedashenko (2006, 2010); Pedashenko *et al.* (2009); Petrova (2005b, 2006c, 2008, 2010b, c, 2011, 2013); Petrova & Assyov (2008); Petrova *et al.* (2006, 2007a, b, 2008, 2009a, b, 2010, 2011, 2012a, b, d, 2013a, b, 2015, 2016a); Petrova & Hubenov (2016); Petrova & Vassilev (2006, 2016); Petrova & Venkova (2015); Popatanassov (2014a, b, 2015a, b, c, 2016a, b); Raycheva & Stoyanov (2015a); Roniker & Roniker (2010); Seregin (2008); Sopotlieva (2006); Sopotlieva *et al.* (2012); Stanev & Delipavlov (2007); Stoyanov (2006, 2008, 2010b, 2012b); Stoyanov (2013a); Stoyanov & Apostolova-Stoyanova (2012), Stoyanov *et al.* (2006a, b, 2011); Stoyanov *et al.* (2012), Stoyanov & Goranova (2011, 2014), Stoyanov & Kolev (2008, 2014), Stoyanov & Marinov (2016), Stoyanov & Topalova-Rzerzycha (2014), Tashev (2006, 2008, 2009a, b, 2010a, b, 2011, 2014, 2015a, b), Tashev *et al.* (2010, 2012c, 2013a, b, c, 2015, 2016a, b, c, d); Tashev & Gavrilova (2013); Tashev & Tashev (2015, 2016); Tashev & Tsavkov (2009); Trifonov (2009); Tzonev (2006); Tzonev & Gussev (2016); Tzonev *et al.* (2010); Vassilev (2007, 2009, 2010, 2011, 2013a, b, 2015, 2016a, b); Vassilev & Filipova (2015); Vassilev & Pedashenko (2009, 2010, 2011, 2012, 2013a, b, 2015a, b, c, 2016a, b); Vassilev *et al.* (2007a, b, 2008, 2009b, 2012a, b); Velchev & Petrova (2011); Velev *et al.* (2010); Vladimirov (2006a, b, 2007a, 2009a, c, 2011, 2012b, 2013a, b, 2014a); Vladimirov & Petrova (2009c, 2010a, b); Vladimirov *et al.* (2006, 2012, 2016); Vutov & Dimitrov (2016); Zahariev (2016a); Zahariev & Taneva (2014); and Zieliński & Petrova (2012).

Contribution of foreign botanists to study of the Bulgarian flora. Botanists from many other countries contributed to the study of Bulgarian vascular plants during the given period: *Austria* (A. Polatschek, H. Teppner); *Belgium* (F. Verloove); the *Czech Republic* (M. Hájek, P. Hájkova, M. Horsák, V. Jehlik, F. Krahulec, A. Krahulcová, V. Kalníková, J. Kirschner, V. Plášek, Z. Rozbrojová, B. Shaw, J. Štěpánek, K. Sutory); *Denmark* (Kit Tan); *Germany* (M. Baltisberger, B. Foggi, G. Gottschlich, W. Greuter, H. Scholz, E. von Raab-Straube); *Italy* (F.M. Raimondo); *Poland* (W. Adamowski, Z. Szeląg, J. Zieliński); *Romania* (M. Făgăraş, P. Anastasiu, N. Gavril, G. Negrean); *Russia* (T. Ostroumova, A. Seregin); *Serbia* (M. Niketić, V. Stevanović, G. Tomović); *Slovakia* (V. Kolarčik, P. Mártonfi, J. Zozomová-Lihová); Spain (A. Susanna); and Sweden (K. Persson, G. Possnert).

CONCLUSION

The Bulgarian flora currently includes 4064 species belonging to 921 genera and 159 families. As a result of floristic surveys in the country conducted during the given period, many new localities of vascular plants have been reported, which has undoubtedly contributed to clarification of the current distribution of different species. During this period, 127 species (51 alien ones) were recorded for the first time on the country's territory, and 11 species new to science (Table 1) were described (Szeląg 2006; Vladimirov & Szeląg 2006; Pavlova 2007a, 2009a, 2014; Teppner 2008; Tan *et al.* 2009; Stoyanov 2010a; Tashev & Dimitrov 2012; Bancheva & Raimondo 2013; Szeląg & Vladimirov 2013). Seventeen subspecies were also reported for the first time for the country (Table 2), two of them new to science (Ančev 2007, 2012a, b), as were 18 hybrids (Table 3), four of them new to science (Zieliński *et al.* 2006; Ančev *et al.* 2013). Nine species were confirmed for the country (Table 4), while another 78 are synonyms, unconfirmed taxa, or erroneously reported species (Tables 6, 7, and 8). Six new combinations, five at the species level and two at the level of subspecies, were also made (Table 5).

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Botanica SERBICA

REZIME

Napredak u florističkim i taksonomskim istraživanjima u Bugarskoj

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Dat je pregled florističkih i taksonomskih istraživanja vaskularnih biljaka u Bugarskoj u periodu 2005-2016. Bugarska flora trenutno obuhvata 4057 vrsta, iz 921 roda i 159 familije. Pregledano je oko 490 radova, u kojima je 120 vrsta prvi put zabeleženo za Bugarsku od strane bugarskih ili stranih istraživača, od čega je 11 vrsta novih za nauku, a 51 su alohtone. U ovim radovima je 17 podvrsta (od čega su 2 nove za nauku) i 18 hibrida (4 nova za nauku) takođe po prvi put zabeleženo za ovu zemlju, od čega je 9 potvrđeno, a 78 je nepotvrđeno, sinonimizirano ili pogrešno navedeno. U brojnim radovima su navedeni novi lokaliteti različitih vrsta u različitim regionima Bugarske. Tokom ovog perioda su publikovane knjige kao što su *Flora Republike Bugarske 11, Crvena knjiga Republike Bugarske 1. Biljke I gljive, Atlas endemičnih vaskularnih biljaka Bugarske, Invazivne alohtone vaskularne biljke Bugarske, Zbornik IV Balkanskog botaničkog kongresa*, itd.

Ključne reči: Bugarska, flora, literatura, vaskularne biljke