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Research article

Floristic updates and a new species record for the Bulgarian flora

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Abstract: This paper presents new regional chorological data for eighteen plant taxa, derived from our own collections and personal field observations during the vegetation seasons from 2015 to 2025. One of the recorded species – *Viola hymettia,* is new to the Bulgarian flora. The remaining records document new occurrences of these taxa within different floristic regions of the country. Four of the listed taxa are protected under Bulgaria's Biological Diversity Act and are categorised as threatened in the national Red List: *Geranium palustre* (VU), *Gagea amblyopetala* (VU), *Romulea linaresii* subsp. *graeca* (VU), and *Parvotrisetum myrianthum* (CR). Populations of *Dipsacus gmelinii* consist of critically low numbers of individuals and require urgent conservation measures. Additional information is provided on the habitats at the recorded sites, the state of the populations, the floristic composition, and relevant herbarium records.

Keywords: Bulgaria, chorological data, new records, Red List, threatened plants

Introduction

Floristic studies represent a fundamental component of botanical research, providing essential information on the composition, distribution, and dynamics of plant diversity within a given region. Field surveys facilitate the identification of previously undocumented taxa, the detection of invasive or expanding species, and the monitoring of population trends in rare or endemic plants. Herbarium collections provide verifiable records of species occurrence, phenology, and morphological variation, thereby facilitating taxonomic verification and long-term biodiversity assessments. Chorological data further reveal the spatial distribution of species and their biogeographical relationships. Taken together, the integration of herbarium research, field studies, and chorological data create an essential framework for documenting, interpreting, and conserving representative regional floras.

This paper is the second recent contribution to the knowledge of the distribution of vascular plants in Bulgaria, as published in the Historia naturalis bulgarica journal (see Kunev, 2024). The current study aims to continue this effort by presenting new floristic data, refining distributional knowledge, and supporting ongoing assessments of botanical diversity in the country.

Materials and methods

The new chorological information has been collected during botanical trips taken in the vegetation seasons of 2015–2025. The plant taxa were identified following Stoyanov et al. (2025), except for *Montia fontana* subsp. *amporitana* and *Viola hymettia* being identified via Walters (1993) and Scoppola & Lattanzi (2012), respectively. The nomenclature follows POWO (2025), with the exception of *Juncus capitatus* and *Hainardia cylindrica* for which the names fol-

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low Stoyanov et al. (2025). Voucher specimens of all listed taxa have been deposited in at least one of the indexed Bulgarian herbaria: the Herbarium of the National Museum of Natural History at the Bulgarian Academy of Sciences (BNHM), the Herbarium of the Faculty of Biology, Sofia University (SO), and the Herbarium of the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences (SOM). Herbarium acronyms follow Thiers (2025). The plant names are ordered as in the multivolume edition of Flora Europaea (Tutin et al., 1964–1980). National distributions of the studied taxa are presented according to the accepted floristic regionalisation of Bulgaria (Yordanov, 1966). Their broader geographical range is interpreted based on distributional data from POWO (2025). The habitat notes were based on authors' personal field observations. All the images (Figs 1–4) presented in the text were taken by the authors during their fieldwork.

Species list

1. *Montia fontana* subsp. *amporitana* Sennen (Montiaceae)

Voucher specimens: (1) The Rhodopes (East): Piavets Village, Momchilgrad Municipality, wet spot at a barraged streamlet, next to the Republican Road II-59, 580 m, UTM LF79, 41.487301°N, 25.463538°E, coll. date: 11 May 2025; leg. & det.: Georgi Kunev (SO-108455); (2) The Rhodopes (East): Dobromirtsi Village, Kirkovo Municipality, alongside temporary streamlet, 350 m, UTM LF58, 41.380766°N, 25.228674°E, coll. date: June 2023; leg. & det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000003163); (3) The Mesta Valley: Kornitsa Village, Gotse Delchev Municipality, temporary streamlet, 650 m, UTM GM21, 41.634265°N, 23.691326°E, coll. date: 16 May 2024; leg. & det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000004443); (4) The Tundzha Hilly Country: Sakar Mts, 'Chernite skali' PA near Topolovgrad, Topolovgrad Municipality, 400 m, UTM MG45, 42.049303°N, 26.358364°E, coll. date: 10 May 2025; leg. & det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000006365).

This taxon was first reported for Bulgaria by Hájek et al. (2005); however, no records from the Eastern Rhodopes and the Mesta Valley were included in their account of the Bulgarian wetland flora. In the Eastern Rhodopes the taxon participate in a plant community belonging to the alliance *Isoetion* Br.-Bl. 1936. This community includes *Isoetes* cf. *gymnocarpa* (Gennari) A.Braun, *Juncus bufonius* L., *Lotus angustissimus* L., *Mentha pulegium* L., *Veronica acinifolia* L., *Poa jubata* A.Kern., *Ranunculus thracicus* Azn., *Tripleurospermum rosellum* (Boiss. & Orph.) Hayek, *Molineriella minuta* (L.) Rouy, *Philonotis* sp., *Pleurochaete squarrosa* (Brid.) Lindb., among others. This taxon has been previously reported in the Tundzha Hilly Country region, specifically at the 'Dervishka Mogila' site, Sakar Mts (SO-18791: Hájek et al., 2005). We provide an additional record of this taxon from the region of Sakar Mts, where it was also collected within a plant community of *Isoetion* alliance.

2. *Polycarpon tetraphyllum* subsp. *diphyllum* (Cav.) O.Bolòs & Font Quer (Caryophyllaceae)

Voucher specimens: The Black Sea Coast (South): Sinemorets Village, Tsarevo Municipality, Bourgas Province, 15 m, UTM NG85, 42.053417°N, 27.988706°E, coll. date: 10 June 2025; leg. & det.: G. Kunev & Gabriela Petrova (SO-108430; BNHM: BG-NMNHS-BOT-000000006351).

This taxon was recorded on the cliffs over Butamyata Beach, where it occurs in groups of several dozen individuals growing next to *Juniperus deltoides* R.P.Adams. Associate species include *Urospermum picroides* (L.) Scop. ex F.W.Schmidt, *Silene dichotoma* Ehrh., *Hedypnois rhagadioloides* (L.) F.W.Schmidt, *Jurinea* sp. This represents a new taxon for the Black Sea Coast (South) floristic region. Previously, this taxon was known only from the Struma Valley floristic region (Stoyanov et al., 2025).

3. *Sisymbrium irio* L. (Brassicaceae) (Fig. 1)

Voucher specimens: (1) The Balkan Mts (East): Sliven Town, in a green area next to an alley, ruderal site, 230 m, UTM MH42, 42.66711°N, 26.33434°E, coll. date: 14 April 2023; leg.: Ivan Kostadinov, det.: I. Kostadinov & G. Kunev (SO-108457; BNHM: BG-NMNHS-BOT-000000006362); (2) The Black Sea Coast (South): Sozopol Town, ruderal sites in the urban area and along the seaside cliffs, coll. date: 21 May 1971; leg. & det.: Panayot Panov (SO-66263; SOM-128318); (3) The Black Sea Coast (South):

Fig. 1. *Sisymbrium irio* at ruderal stands in Sliven Town, 14.04.2023 (photo I. Kostadinov).

Nessebar Town, ruderal sites along the fences and as a garden weed, coll. date: 22 April 1974; leg. & det.: P. Panov (SO-66264; SOM-129285); (4) The Black Sea Coast (South): Southern coastal area of Black Sea, N of Nessebar, 15 m, NH52, 42.66333°N, 27.71917°E, coll. date: 27 May 1999; leg. & det.: Di Martino et al. OPTIMA Iter IX 24, 1-3-20 (W 2007-0000841) https://www.gbif.org/occurrence/1848999111.

To date, *S. irio* has been known in Bulgaria from the regions of the North-Eastern Bulgaria and the Black Sea coast (North) floristic regions (Stoyanov et al., 2025). The species is distributed in Mediterranean and Irano-Turanian regions but occurs as a sub-cosmopolitan taxon outside its natural range (POWO, 2025). It is a ruderal species typical of anthropogenically disturbed habitats and was recorded by the fourth author as a roadside weed within the urban area of the town of Sliven. Additional records (Panov, 1975) not considered in the most recent floristic summaries of the Bulgarian flora (Assyov & Petrova, 2012; Stoyanov et al., 2025) are preserved in the collections of SO and SOM herbaria or are available through GBIF (2025).

4. *Lepidium latifolium* L. (Brassicaceae)

Voucher specimens: Sofia Region: Voluyak Village, Stolichna Municipality, Sofia City Province, along the sidewalk on the main road through the settlement, 530 m, UTM FN83, 42.777114°N, 23.249630°E, coll. date: 16 June 2025; leg. & det.: G. Kunev (SO-108422; SOM-179601).

The species is new for the Sofia floristic region (Stoyanov et al., 2025).

5. *Geranium palustre* L. (Geraniaceae)

Voucher specimens: The Rhodopes (West): Sarnitsa Municipality, on the southwestern side of the Dospad Dam, close to the road leading to the Chairdzhik locality, 1262 m, UTM KG52, 41.71079°N, 24.04001°E, coll. date: 11 August 2022; leg. & det.: G. Petrova (SO-108458; BNHM: BG-NMNHS-BOT-000000006363).

Several individuals during the flowering and fruiting stage were observed near to the road leading to the 'Chairdzik' locality in the Dabrash part of the Western Rhodopes. They occupy a narrow, sun-exposed and moist site at the edge of a spruce forest, which represents the dominant forest type in the region. *G. palustre* is evaluated as 'Vulnerable' according to the national Red List (Petrova & Vladimirov, 2009) and is protected under the Annex 3 of the Biological Diversity Act of Bulgaria. Consequently, the reported population may be negatively affected by ongoing building construction observed nearby by the second author. However, suitable habitats occur in the region and could be surveyed for additional populations under appropriate environmental conditions. The current report confirms the presence of the species in the Western Rhodopes (Petrova and Kozhuharov, 1979).

6. *Erodium botrys* (Cav.) Bertol. (Geraniaceae)

Voucher specimen: The Black Sea Coast (South): Primorsko, approximately 3 km in SW of the mouth

of the Ropotamo River, a rocky grassland off the main road by the bridge over the river, 20 m, UTM NG58, 42.307961°N, 27.723044°E, coll. date: 22 March 2025; leg. & det.: G. Kunev & G. Petrova (BNHM: BG-NMNHS-BOT-000000005725).

This species is reported here as new for the Black Sea Coast (South) floristic region. In Bulgaria, it has so far been recorded only from the vicinity of Kirkovo Village in the Eastern Rhodopes (Kunev & Tsonev, 2018). During our botanical trips, it was also observed in similar habitats at 'Begliktash' locality (Primorsko Municipality). The species was repeatedly documented in the same area between 'Begliktash' locality and cape 'Maslen nos' during the period 2000–2020 by Dr Antoaneta Petrova (Director of the Botanical Garden at the Bulgarian Academy of Sciences during this period) and Zhivko Barzov (experienced nonprofessional naturalist) according personal communications. It inhabits open grasslands with *Poa bulbosa* L., *Trifolium subterraneum* L., *T. cherleri* L., *Vulpia ciliata* Dumort., *Chrysopogon gryllus* (L.) Trin., *Anemone hortensis* subsp. *pavonina* (Lam.) Arcang., *Asphodeline liburnica* (Scop.) Rchb., *Briza maxima* L., and others.

7. *Viola hymettia* Boiss. & Heldr. (Violaceae) (Fig. 2)

Voucher specimens: (1) The Tundzha Hilly Country: Slivenski Mineralni Bani, Sliven Municipality, 160 m, UTM MH31, 42.61351°N, 26.24134°E, coll. date: 21 March 2021; leg.: I. Kostadinov; det.: I. Kostadinov & G. Kunev (SO-108403; SOM-179376); (2) The Tundzha Hilly Country: Seliminovo Village, Sliven Municipality, 500 m to W from the railway station, 205 m, UTM MH22, 42.64225°N, 26.13958°E, coll. date: 13 March 2021; leg.: I. Kostadinov; det.: I. Kostadinov & G. Kunev (SO-108402; SOM-179366); (3) The Balkan Mts (East): Hamam bair, Sliven, Sliven Municipality, 265 m, UTM MH42, 42.66964°N, 26.31815°E, coll. date: 28 March 2021; leg.: I. Kostadinov; det.: I. Kostadinov & G. Kunev (SO-108401; SOM-179368); (4) The North-Eastern Bulgaria: Povelyanovo, Devnya Municipality, 180 m, UTM NH58, 43.22178°N, 27.65922°E, coll. date: 11 April 2021; leg.: I. Kostadinov; det.: I. Kostadinov & G. Kunev (SO–108404); (5) The Black Sea Coast (South): S of Ahtopol, Tsarevo Municipality, in pastures, on the cliffs over the sea, 20 m, UTM NG76, 42.093781°N, 27.952723°E, coll. date: 23 March 2025; leg. & det.: G. Kunev & G. Petrova (SO-108433); (6) The Struma Valley (South): Kresna Gorge, Blagoevgrad province, dry rocky site along goat's path, 280 m, UTM FM73, 41.831513°N, 23.153435°E, coll. date: 29 March 2021; leg. & det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000003201, https://www.gbif.org/occurrence/4920293607; (7) The Struma Valley (North): Polska Skakavitsa Village, Kyustendil Municipality, in dry grasslands utilised as pasture, 650 m, UTM FM39, 42.414376°N, 22.682620°E; 9 April 2015; G. Kunev, pers. obs.; (8) The Struma Valley (South): N of Ripite Village, Petrich Municipality, W facing slope of Kozhuh Hill next to the abandoned quarry, on a pile of quarry waste composed of stone fragments, 210 m, FL89, 41.462152°N, 23.258013°E; 2 March 2026; leg. & det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000006848); (9) The Struma Valley (South): Kamentsa Village, Strumyani Municipality, on grazed pasture, 160 m, FM81, 41.650194°N, 23.168028°E; 2 April 2025; leg.: Boris Assyov; det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000006850); (10) The Tundzha Hilly Country: E of Srem Village, Topolovgrad Municipality, on eroded ground along the roadside to stone quarries, 210 m, MG55, 42.04726°N, 26.512111°E; 18 April 2025; leg.: Rossen Vassilev; det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000006849); (11) The Tundzha Hilly Country: Sakar Mts, Dervishka mogila locality, Svilengrad Municipality, dry grassland near abandoned orchard, 480, MG43, 41.906186°N, 26.351161°E; leg.: R. Vassilev; det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000006851).

The species is reported here as new to the Bulgarian flora (Delipavlov, 1979; Assyov & Petrova, 2012; Stoyanov et al., 2025). There is an earlier report of this taxon from the vicinity of 'Nova mahala', Zemen Town (Stoyanov & Stefanov, 1925); however, this report was not confirmed in the subsequent monographic treatment of the genus *Viola* in the multivolume Flora of Bulgaria (Delipavlov, 1979). No further collections from within the borders of Bulgaria were traced, as verified by our revision of the available herbarium material.

The species is an annual plant belonging to *Viola* sect. *Melanium* Ging. The material collected by us was identified via Valentine et al. (1968); Scoppola & Lattanzi (2012), and Čičmir (2025). It is a Mediterranean-Caucasian element in Bulgarian flora,

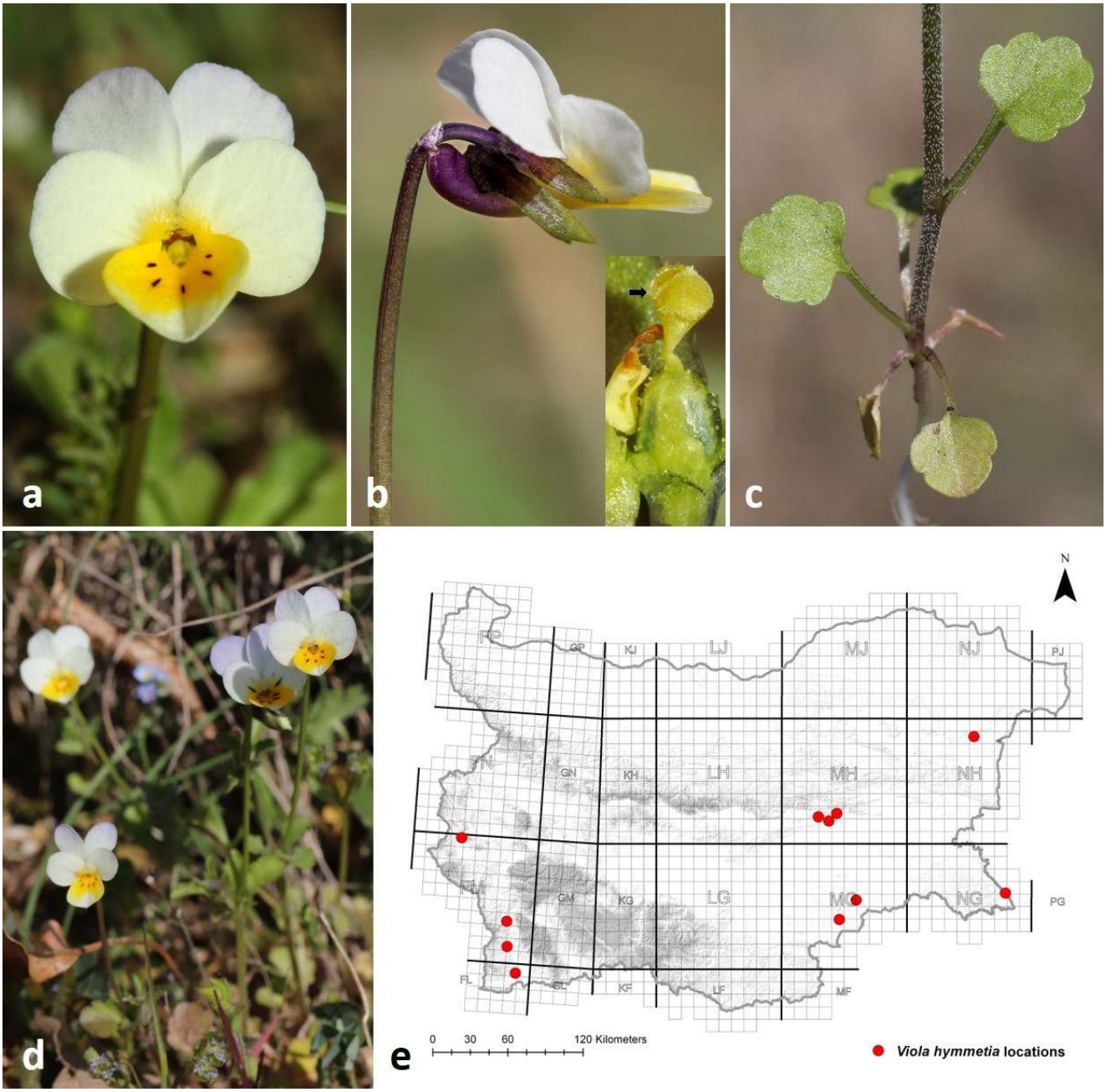

Fig. 2. *Viola hymettia*: a) first flower front view; b) first flower side view and side view of the ovary with black arrow pointing the stigmatic lip; c) lower leaves; d) general habit; e) distribution in Bulgaria (photos: a, b, d – G. Kunev; d – I. Kostadinov; map – G. Petrova).

possibly broadly distributed in Bulgaria. It was probably misidentified in the past as *V. kitaibeliana* Schult. or *V. arvensis* Murray, which may explain why it has remained unreported until now.

V. hymettia is distinctive by its flat corolla, 1.0–1.5 mm in dia.; petals longer than sepals; lateral petals orbicular–obovate, spread laterally or slightly upwards; stigmatic lip present. In contrast, *V. kitaibeliana* exhibits cyanthiform (cup-shaped) flowers, 0.4–1.0 mm in dia., and absence of stigmatic lip. Both, *V. kitaibeliana* and *V. arvensis* show petals equal to or shorter than sepals and oblong-obovate lateral petals spreading somewhat upwards. In Bulgaria *V. hymettia* is an early ephemeral species of rocky pastures, dry open grasslands or open shrub-grassland vegetation, flowering from February to

Fig. 3. *Dipsacus gmelinii*: a) newly established plant groups recorded in 2025 on Persin Island; b) showing specific details on the flower head: bluish flowers shorter than bracteoles and upcurved bracts shorter than flower head (photos D. Mihova).

April, similarly to *V. kitaibeliana*. In contrast, *V. arvensis* occupies mesic, rather ruderal-segetal weed vegetation types and flowers from (March) April to October (November) (Delipavlov, 1979).

8. *Lythrum hyssopifolia* L. (Lythraceae)

Voucher specimens: (1) The Mesta Valley: NE from Valkosel Village, Satovcha Municipality, exposed terraces of a temporary streamlet within *Isoetion* communities 840 m, UTM KG50, 41.537517°N, 24.006508°E, coll. date: 29 June 2025, leg. & det.: G. Kunev (SO-108451; BG-NMNHS-BOT-000000006360); (2) The Rhodopes (East): W from Mogilyane Village, Kirkovo Municipality, exposed terraces of a temporary streamlet within *Isoetion* communities, 355 m, UTM LF58, 41.367346°N, 25.221936°E, coll. date: 12 June 2025, leg. & det.: G. Kunev (SO-108456; BNHM: BG-NMNHS-BOT-000000006359).

Although this annual hygrophyte, typical of seasonal waterbodies, is seemingly widely distributed in Bulgaria, it was not previously been reported from the Mesta Valley or the Eastern Rhodopes floristic regions (Stoyanov et al., 2025). Earlier records of the species from the Eastern Rhodopes are preserved in the vascular plant collection of BNHM and in the SO herbarium.

9. *Dipsacus gmelinii* M.Bieb. (Caprifoliaceae) (Fig. 3)

Voucher specimen: The Danubian Plain: Belene island, Pleven province, Persina Nature Park, marsh

peripheries, 20 m, UTM LJ53, 43.670849°N, 25.187435°E, coll. date: 19 August 2024, leg. & det.: G. Kunev, Daniela Mihova and Rosen Tzonev (BNHM: BG-NMNHS-BOT-000000004448).

The first record for Bulgaria of *D. gmelinii* was reported from the island of Belene (Persin) following botanical expedition carried out in the summer of 2022 (Kunev et al., 2024). The species was observed at two microsites (coord.: 43.66250°N, 25.24222°E; 43.66111°N, 25.24167°E) with a total of 20 individuals participating in plant communities developed in wet depressions along a drainage channel.

Additional localities of *D. gmelinii* were observed by the third author during the vegetation seasons of 2024–2025 on Persin Island, approximately 4.5 km west of the previously known sites. In 2024, the micropopulations were distributed along both sides of a 420 m stretch of a road at the periphery of a marsh. Observations, made on 2 August 2024 within the territory of the Persin Protected Area, included the following sites: (1) 43.6708806°N, 25.1874335°E – 1 plant; (2) 43.6708287°N, 25.1877193°E – 3 plants; (3) 43.6707713°N, 25.1881836°E – 29 plants; (4) 43.6707115°N, 25.1881836°E – 3 plants; (5) 43.670671°N, 25.1885084°E – 14 plants; (6) 43.6706081°N, 25.1889176°E – 33 plants; (7) 43.6705856°N, 25.1890679°E – 11 plants; (8) 43.6705362°N, 25.1892905°E – 19 plants; (9) 43.670418°N, 25.1896241°E – 1 plant; (10) 43.6699247°N, 25.1925294°E – 1 plant. The total number of individuals recorded in 2024 was 115.

The botanical trips taken in 2025 confined to the same general area as in 2024 yielded markedly fewer observations and substantially reduced number of individuals. During a field excursion held on 25 July 2025 only 7 plants were recorded at the following sites: (1) 43.67082636°N, 25.18773431°E – 2 plants; (2) 43.67084444°N, 25.18775303°E – 1 plant; (3) 43.67103501°N, 25.18690916°E – 1 plant; (4) 43.67100781°N, 25.18698738°E – 1 plant; (5) 43.67100205°N, 25.18680893°E – 2 plants (Fig. 3).

The low number of individuals recorded in 2025 may be explained by the biennial life cycle of the species and its probable recent introduction. Following three years of monitoring of the species it could be concluded that the occurrence of *D. gmelinii* in Bulgaria is highly vulnerable due to a single known locality on Belene Island, the limited number of microsites and individuals, and considerable distance from the closest stable population in Romania (Kunev et al., 2024). We therefore recommend the inclusion of *D. gmelinii* in next edition of the Red Data Book of Bulgaria and Annex 3 of Biological Diversity Act, as well as its regular monitoring within the framework of the National Biodiversity Monitoring System, coordinated by the Executive Environment Agency of Bulgaria.

10. *Rhagadiolus stellatus* (L.) Gaertn. (Asteraceae)

Voucher specimens: The Thracian Plain: W from Harmanli, on the slopes over Harmanlyiska River, at 'Defileto' PA, 100 m, UTM MG04, 41.919587°N, 25.885408°E, coll. date: 10 May 2025; leg. & det.: G. Kunev (SO-108439; SOM-179598; BNHM: BG-NMNHS-BOT-000000006353).

This species represents an Atlantic-Mediterranean element in the Bulgarian flora and has so far been recorded from the Struma Valley (South), the Eastern Rhodopes, the Tundzha Hilly Country, the Strandzha, and the Black Sea Coast (South) floristic regions of Bulgaria (POWO, 2025; Stoyanov et al., 2025). It was observed at three closely situated sites, each supporting of up to ten individuals, on steep slopes occupied by open shrub-grassland communities with *Paliurus spina-christi* Mill., *Orlaya grandiflora* (L.) Hoffm., *Avena* sp., *Poa bulbosa, Trifolium cherleri, T. incarnatum* subsp. *molinerii* (Hornem.) Ces., *Thymus striatus* Vahl, among others.

11. *Gagea amblyopetala* Boiss. & Heldr. (Liliaceae)

Voucher specimens: (1) The Black Sea Coast (South): Primorsko, approx. 1.2 km N from the bridge over Ropotamo river on E99, in grass-shrub communities of SE facing slope, 25 m, UTM NG58, 42.311936°N, 27.725242°E, coll. date: 22 March 2025; leg. & det.: G. Kunev & G. Petrova (SO-108424); (2) Strandzha: Kondolovo vilage, Tsarevo Municipality, approx. 700 m NW from the village on the side of E99 road, in grasslands with *Poa bulbosa*, 310 m, UTM NG56, 42.096575°N, 27.674476°E, coll. date: 23 March 2025; leg. & det.: G. Kunev & G. Petrova (SO-108425).

In Bulgaria this species has been keyed out under the name *Gagea chrysantha* (Jan) Schult. & Schult.f. in Stoyanov et al. (2025). It has been reported from the following floristic regions: the Struma Valley (South), the Eastern Rhodopes, the Thracian Plain,

and the Tundzha Hilly Country. It is a legally protected species listed in Annex 3 of the Biological Diversity Act of Bulgaria and is evaluated as 'Vulnerable' in the national Red List (Petrova & Vladimirov, 2009). However, *G. chrysantha* s.s. is currently regarded narrow endemic restricted to Sicily (Peruzzi et al., 2015). Consequently, we assign our collections to *G. amblyopetala*, treated as part of *G. chrysahtha* aggr. (Peruzzi et al., 2015; POWO, 2025). These records represent the first confirmed occurrences of *G. amblyopetala* in the Black Sea Coast (South) and the Strandzha floristic regions of Bulgaria (Stoyanov et al., 2025).

12. *Romulea linaresii* subsp. *graeca* Bég. (Iridaceae)

Voucher specimen: The Pirin Mts (South): Rozhen Village, Sandanski Municipality, Rozhen Monastery, near shelter on the path to Melnik pyramids, 41.530815°N, 23.421216°E, 640 m, UTM GM00, coll. date: 20 March 2025; leg. & det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000005721).

This taxon is a Balkan endemic. It is assessed as 'Vulnerable' in the national Red List (Petrova & Vladimirov, 2009). It is also included in the Annex 3 of the Biological Diversity Act of Bulgaria. The newly discovered locality occupies low inclined slope of SE exposition, covered by mosaic of shrub-grassland communities with *Paliurus spina-christi, Juniperus deltoides* and *Chrysopogon gryllus, Poa bulbosa*, and many annuals as *Sabulina tenuifolia* (L.) Rchb., *Teesdalia coronopifolia* (J.P. Bergeret) Thell., *Draba verna* aggr., *Erodium cicutarium* (L.) L'Hér., *Molineriella minuta*, etc. The micropopulation consisted of about 50 individuals. This represents the first record of the taxon for the Pirin Mts (South) floristic region (Stoyanov et al., 2025).

13. *Juncus capitatus* Weigel (Juncaceae)

Voucher specimens: (1) The Black Sea Coast (South): Begliktash locality, Primorsko Municipality, temporary wet habitats amongst rock outcrops, 170 m, UTM NG68, 42.309428°N, 27.746384°E, coll. date: 9 June 2025; leg. & det.: G. Kunev & G. Petrova (SO-108453); (2) the Tundzha Hilly Country: NW from the archaeological complex Paleokastro, Topolovgrad Municipality, 380 m, UTM MG45, 42.081618°N, 26.300408°E, coll. date: 10 May 2025; leg. & det.: G. Kunev (SO-108454).

The species is a hygrophilous dwarf annual, known from the lowlands and sub-mountainous areas of southern Bulgaria (Stoyanov et al., 2025). In the country, it occupies pioneer substrates, predominantly siliceous, associated with temporary waterbodies. However, it has not previously been reported from the Black Sea Coast (South) or the Tundzha Hilly Country floristic regions. It is a diagnostic species for the class *Isoëto-Nanojuncetea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952. (Mucina et al., 2016), and commonly co-occurs with *Juncus bufonius, Isolepis setacea* (L.) R.Br., *Lysimachia arvensis* (L.) U.Manns & Anderb., *Molineriella minuta*, and others.

14. *Hainardia cylindrica* (Willd.) Greuter (Poaceae)

Voucher specimen: (1) The Rhodopes (East): E from Zagorsko Village, Momchilgrad Municipality, 280 m, UTM LF69, 41.487319°N, 25.385802°E, coll. date: 11 June 2025; leg. & det.: G. Kunev & G. Petrova (SO-108424; SOM-179597; BNHM: BG-NMNHS-BOT-000000006354); (2) The Thracian Plain: Manole Village, Maritsa Municipality, a small group of plants observed in the ruts of a dirt road, 160 m, 42.204426°N, 24.897341°E, 23.06.2019; G. Kunev (pers. obs.).

These records represent new localities and floristic regions for the species in Bulgaria, which was previously known only from the Black Sea Coast and the Tundzha Hilly Country regions (Stoyanov et al., 2025). The substrates at both sites were slightly saline due to intense soil moisture evaporation. Only solitary individuals or small groups composed of up to fifty plants were observed.

15. *Poa infirma* Kunth (Poaceae)

Voucher specimens: (1) The Tundzha Hilly Country: Sakar Mts, on a dirt road at Chernite skali PA, Topolovgrad Municipality, 410 m, UTM MG45, 42.049398°N, 26.357240°E, coll. date: 29 March 2025; leg. & det.: G. Kunev (SO-108429); (2) The Black Sea Coast (South): In trampled area of a pasture, on the side of the road to Begliktash locality, Primorsko Municipality, 40 m, UTM NG68, 42.292344°N, 27.750252°E, coll. date: 22 March 2025; leg. & det.: G. Kunev & G. Petrova (SO-108426; SOM-179600;

Fig. 4. *Parvotrisetum myrianthum*: a) dry specimens cataloged at BNHM Herbarium (BG-NMNHS-BOT-000000006361); b) panicle with erect branches; c) details on spikelets each baring two awned florets (photos G. Kunev).

BNHM: BG-NMNHS-BOT-000000006356); (3) The Rhodopes (East): E from Zagorsko Village, Momchilgrad Municipality, along temporary streamlet, 270 m, UTM LF69, 41.487262°N, 25.386214°E, coll. date: 15 March 2025; leg. & det.: G. Kunev (SO-108428); (4) The Rhodopes (East): E from Dobromirtsi Village, Kirkovo Municipality, in pasture, 380 m, UTM LF58, 41.380148°N, 25.221857°E, coll. date: 15 March 2025; leg. & det.: G. Kunev (SO-108427; SOM-179604).

The species was only recently reported in Bulgaria, based on collections from the Struma Valley (South) floristic region (Tomović et al., 2025). Here, we add new localities and regions for the species in Bulgaria. It often co-occurs with the somewhat similar *Poa annua* L., with which it can be distinguished by its yellowish-green appearance; lower and more compressed habit; lower number of florets per spikelet; shorter anthers (0.2–0.5 mm); and somewhat early flowering period from February to April. It is a Mediterranean element in Bulgarian flora found on flat terrains or in shallow depressions where meteoric water retained for extended periods. It typically occupies trampled and overgrazed areas in regions with Mediterranean climatic influence.

16. *Parvotrisetum myrianthum* (Bertol.) Chrtek (Poaceae) (Fig. 4)

Voucher specimens: The Struma Valley (South): S from Ribnik Village, Petrich Municipality, at the bed of a temporary wet and exposed drainage canal, 120 m, UTM FL89, 41.471647°N, 23.253184°E, coll. date: 26 May 2025; leg. & det.: G. Kunev (SO-108452; BNHM: BG-NMNHS-BOT-000000006361).

The species was first reported for the Bulgarian flora by Delipavlov (1992) on the basis of a single collection made on 02 June 1987, at the foothills of 'Malkiya kozhuh' height (Pchelina height, a/n), Petrich Municipality. Dried specimens of his gathering are kept in the indexed herbarium of the Agricultural University of Plovdiv, Bulgaria (SOA), mounted on a single sheet. The species has not been recollected since. Furthermore, it was evaluated as 'Critically Endangered' for the national Red List (Stoyanov, 2015). The label information on Delipavlov's material (SOA-38169) does not specify the precise locality; however, the site documented by us is probably situated approximately 2.5–3.0 km to the northwest of the original collection spot. The species is a Balkan-Apennine element with somewhat

ruderal ecological traits (Mucina et al., 2016; POWO, 2025). The reported micropopulation occupies an area of about 5 m^2, and is associated with *Poa bulbosa, P. infirma* Kunth, *P. annua* L., *Montia fontana* aggr., *Ornithogalum sigmoideum* Freyn & Sint., *Teesdalia coronopifolia, Myosurus minimus* L., *Polygonum aviculare* L., etc. This record is of considerable importance for protecting the species in Bulgaria, since it is the only confirmed population documented over the last 38 years.

17. *Polypogon viridis* (Gouan) Breistr. (Poaceae)

Voucher specimen: The Rhodopes (East): E from Zagorsko Village, Momchilgrad Municipality, along temporary streamlet, 270 m, UTM LF69, 41.487193°N, 25.386233°E, coll. date: 11 June 2025; leg. & det.: G. Kunev & G. Petrova (BNHM: BG-NMNHS-BOT-000000006355).

This species is a new for the East Rhodopes floristic region (Stoyanov et al., 2025). An earlier observation was made by the first author in October 2020 along the banks of the Varbitsa River near Dobromirtsi Village, Kirkovo Municipality.

18. *Eleocharis quinqueflora* (Hartmann) O.Schwarz (Cyperaceae)

Voucher specimen: The Rhodopes (East): E from Krilatitsa Village, Kirkovo Municipality, in the ditches of the roadside, 340 m, UTM LF67, 41.351996°N, 25.348624°E, coll. date: 11 May 2025; leg. & det.: G. Kunev (BNHM: BG-NMNHS-BOT-000000006352).

It is a sub-cosmopolitan hygrophilous species (POWO, 2025) known in Bulgaria from several floristic regions, occurring from the lowlands up to 2100 m a.s.l. (Assyov & Petrova, 2012; Stoyanov et al., 2025). It is reported here for the first time from the region of the Eastern Rhodopes.

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Conflicts of interest

No potential conflict of interest has been reported by the authors, reviewers, or subject editor.

Author' contributions
(using CrediT)

Georgi Kunev: conceptualisation, data curation, investigation, supervision, validation, visualisation, writing—original draft, writing—review and editing; Gabriela Petrova: data curation, investigation, validation, visualisation, writing—original draft, writing—review and editing; Daniela Mihova: data curation, investigation, validation, visualisation, writing—original draft; Ivan Kostadinov: data curation, investigation, validation, visualisation.

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