

NEW CHOROLOGICAL DATA FOR THE VASCULAR
FLORA OF MESTA RIVER VALLEY FLORISTIC REGION
(SOUTHWESTERN BULGARIA)

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Abstract

The present study presents new chorological information on 19 vascular plant species and subspecies for Mesta River Valley floristic region. The larger number of species and subspecies belongs to the Mediterranean and Sub-Mediterranean floristic element, followed by the Balkan one. Three species are included in the Red Data Book of the Republic of Bulgaria, Vol. 1 – *Adiantum capillus-veneris* L., *Chondrilla urumoffii* Degen, *Micromeria juliana* (L.) Benth. ex Rchb. One of the reported species is alien for the Bulgarian flora – *Persicaria salicifolia* (Brouss. ex Willd.) Assenov. Being included in question in the Bulgarian floristic issues, the latter is confirmed for the flora of the country. Despite the increase of floristic investigations during the last years, the results of the present study emphasize the need for further floristic research in Mesta River Valley. Undoubtedly, this will be a great contribution to the studies of floristic diversity of Bulgaria as a whole.

Key words: chorology, floristic diversity, Mesta River Valley

Introduction. Floristic region Mesta River Valley [1] occupies an area along the middle stream of Mesta River in the southwestern part of the country. During the last years the increasing interest of florists and botanists in the region led to several new floristic records for the region in different chorological issues [2–5]. Yet the region stays one of the comparatively poorly studied in terms of its floristic diversity. The main reasons for this fact are the difficult accessibility of the region in certain parts, the high level of human influence as well as the lack of clear boundaries between floristic regions.

The present study aims to emphasize the floristic uniqueness of Mesta River Valley on the basis of new chorological information and to reveal its significance for the whole flora of the country. Some conclusions concerning the anthropogenic influence are also made. The study illustrates the importance of floristic diversity as a major component of biodiversity at regional and also at global level.

Object and methods. The visited and studied geographical area covers the lower reaches of the two biggest left tributaries of Mesta River – these are Bistritsa River and Dospat River. Thus the area includes parts of two Nature 2000 protected sites: Dolna Mesta BG0000220 and Zapadni Rhodopi BG 0001030 and also spans the territory between them (Figs 1, 2). It is important to note that the area of Mesta River Valley floristic region does not coincide with the Nature 2000 protected site of Dolna Mesta. The object of the present investigation is the floristic region.

The investigated territory belongs to Gotse Delchev geobotanical region of Mesta County, Macedonian–Thracian province [6]. According to [7], it belongs to the Lower Mesta biogeographic region of the Balkan biogeographic sub-province. According to the administrative division of the country [8], which is important for the development of local strategies for sustainable development, the area belongs to Satovcha Municipality and partly to the neighboring Hadjidimovo Municipality.

Mesta River Valley floristic region is a part of the Continental–Mediterranean Climatic region [9]. Characteristic climate features for that part of the country are warm summer and soft winter. Walter’s klimatogram for the region shows the availability of arid period between June and September (Fig. 3). According to [10], the average annual temperature for the nearest weather stations of Gotse Delchev and Dospat is respectively 11.3 °C and 7.7 °C. The average maximum temperature for both stations is in July [10] – respectively 38 °C and 33 °C. These data are not representative of the different parts of the region. The main reason for that is the entry of warm air in the valleys of Mesta River and its tributaries. Frequent inversions that are typical during the winter season of Gotse Delchev Valley do not occur in the central and eastern part of the floristic region. Generally, the investigated region distinguishes with the formation of highly varied microclimatic conditions in its different parts.

Because of the heterogeneity of the microclimatic conditions the typical precipitations are calculated based on numerical interpolation for 783 m a.s.l. (the village of Valkosel). Data from Gotse Delchev and Dospat weather stations are used for the interpolation [11]. The interpolated data show two-peak maximum of the rainfall (months VI and XI–XII, Table 1). These data define the area as a transitional one [11,12] of mountainous, Continental–Mediterranean climatic conditions.

The investigated area was visited twice during the vegetation season in 2011. Different transects were selected in advance to cover the habitat diversity of the

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Average sum of precipitations in floristic region Mesta River Valley [11]

Station/Altitude, m	Average precipitation, mm												Annually
	Monthly												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
G. Delchev, 511 m	76	57	51	53	57	64	49	30	32	63	80	83	696
Interpolated data for 783 m a.s.l. (Village of Valkosel)	79	61	55	59	71	78	59	37	39	63	83	83	763

region in the greatest possible degree. Species determination is according to the relevant Bulgarian guides [13,14] and *Flora of the (People's) Republic of Bulgaria* [15–17]. Floristic elements for the new species are determined according to [1]. For the distribution of subspecies and for some additional specifications, web-based databases for plant information are also used [18]. Voucher specimens from the species and subspecies new for Mesta River Valley floristic region are deposited in the Herbarium of the Bulgarian Academy of Sciences (Table 2).

Results and discussion. According to most recent literature data [5] 1359 species of vascular plants are known for the flora of Mesta River Valley floristic region. The present research proved to be a contribution to this number with 19 more species and subspecies for the flora of the region (Table 2, Fig. 1).

In compliance with the Transitional-Mediterranean character of the flora of the region, the larger number of species belongs to the Mediterranean (2) and Sub-Mediterranean (4) floristic element. Three species are Pontic–Mediterranean and one is Pontic. The latter are predominantly anthropophytes and their distribution here is probably related to the favourable conditions for the penetration of anthropophytes – mild climate and increased human activity.

The Balkan element is also noteworthy. Six species are Balkan endemics, one is Balkan–Anatolian element and one is Balkan–Dacian. Although only hinted, the mountain influence from the surrounding mountains is evident from the Sub-Boreal element presented by one species – *Adiantum capillus-veneris*. With its warm weather, low altitudes and anthropogenic influence, the region is an appropriate place for the penetration of alien and invasive species downstream. Previous floristic investigations have announced the aliens *Amorpha fruticosa*, *Erigeron annuus*, *Erigeron sumatrensis* and *Helianthus tuberosus* [5], which are confirmed during the present study and their new localities are identified.

The present study confirms the alien *Persicaria salicifolia* (Table 2). The species is firstly reported for the Eastern Balkan by VELENOVSKY [19] and later by ASSENOV [15]. It is included in the Bulgarian guides to vascular flora [13,14] but in question. The species is present in the list of species alien to Europe [20]. Its population was registered on sandy soils in a flooded riverside habitat with *Epilobium*

List of the new floristic records for Mesta River Valley floristic region

Family name	Species/subspecies name	Vaucher specimen	Geoelement	Additional information
Adiantaceae	<i>Adiantum capillus-veneris</i> L.	Mesta River Valley, 4595649.51 N 249479.74 E (UTM, WGS 84), 20.09.2011. The species is not collected because of its high conservation status.	Sub-Boreal	Near a karst spring on the left bank of the river, 3 km to the south-west of Slashten village; critically endangered
Apiaceae	<i>Foeniculum vulgare</i> Mill.	Mesta River Valley, 19.09.2011, Coll. D. Dimitrov (SOM 167918)	Sub-Med	Left of the road to the village of Slashten
Asteraceae	<i>Centaurea orientalis</i> L. ssp. <i>macrantha</i>	Mesta River Valley, 4595923.66N 248747.78E (UTM, WGS 84), 20.09.2011, Coll. D. Dimitrov (SOM 167975)	Pont-Med	Below the village of Slashten on rocks above the left shore of Mesta river
	<i>Chondrilla urumoffii</i> Degen	Mesta River Valley, 4599095.25N 254479.21E (UTM, WGS 84) 22.09.2011, Coll. D. Dimitrov (SOM 167932)	Bal	On steep marble cliffs in Dospat Gully, below the village of Tuho-vishte; vulnerable
	<i>Echinops oxydonthus</i> Bornm. & Diels	Mesta River Valley, 4599095.25N 254479.21E (UTM, WGS 84), 22.09.2011, Coll. D. Dimitrov (SOM 167929)	Bal	On steep marble cliffs in Dospat Gully, below the village of Tuho-vishte
Campanulaceae	<i>Hieracium olympicum</i> Boiss. ssp. <i>argirotrichum</i> Freyn.	Mesta River Valley, 23.09.2011, Coll. D. Dimitrov (SOM 168076)	Bal	Below the village of Kribul, above the Bistrica River
	<i>Campanula sphaerotrity</i> Griseb.	Mesta River Valley, 23.09.2011, Coll. D. Dimitrov (SOM 167977)	Bal	Below the village of Kibul, along the Bistrisa River
Caryophyllaceae	<i>Cerastium tauricum</i> Spreng.	Mesta River Valley, 23.09.2011, Coll. D. Dimitrov (SOM 167967)	Pont-Med	Below the village of Kribul
	<i>Dianthus quadrangulus</i> Ven.	Mesta River Valley, 20.09.2011, Coll. D. Dimitrov (SOM 167939)	Bal	Below the village of Slashten
	<i>Paronychia kapela</i> (Hacq.) Kern.	Mesta River Valley, 4598971.18N 244926.67E (UTM, WGS 84), 24.09.2011, Coll. D. Dimitrov (SOM 167966)	Pont	On rocky calcareous places below the village of Ablanitsa

Table 2
Continued

	<i>Gypsophila glomerata</i> Pall. ex M. Bieb.	Mesta River Valley, 4595473.56N 249602.60E (UTM, WGS 84), 20.09.2011, Coll. D. Dimitrov; 4601068.74N 254565.62E (UTM, WGS 84), 22.09.2011, Coll. D. Dimitrov (SOM 167941)	Sub-Med	In a limestone rocky habitat below the village of Slashten; on sheer marble cliffs in Dospat Gully be- low Zhizhevo village
Fabaceae	<i>Chamaecytisus lejocarpus</i> (A. Kern.) Rothm.	Mesta River Valley, 4596258.61N 255288.30E (UTM, WGS 84), 19.09.2011, Coll. D. Dimitrov (SOM 167940)	Bal-Dac	In a mixed oak forest on calcare- ous terrain below the village of Slashten
	<i>Ononis adenotricha</i> Boiss.	Mesta River Valley, 4599102.22N 254479.83E (UTM, WGS 84), 22.09.2011, Coll. D. Dimitrov (SOM 167937)	Med	On sheer marble cliffs in Dospat Gully below the village of Tuho- vishte
Lamiaceae	<i>Micromeria juliana</i> (L.) Benth. ex Rchb.	Mesta River Valley, 4598155N 246281.145E (UTM, WGS 84), 21.09.2011, Coll. D. Dimitrov (SOM 167920)	Med	On limestone rocks near the vil- lage of Slashten; threatened
Linaceae	<i>Linum nervosum</i> Waldst. & Kit.	Mesta River Valley, 4599295.72N 254529.75E (UTM, WGS 84), 22.09.2011, Coll. D. Dimitrov (SOM 167916)	Sub-Med	In a mixed deciduous forest, on a marble terrain in Dospat Gully below the village of Tuhovishte
Polygonaceae	<i>Persicaria salicifolia</i> (Brouss. ex Willd.) As- senov	Mesta River Valley, 4598974.88N 244930.82E (UTM, WGS 84), 24.09.2011, Coll. D. Dimitrov (SOM 167954)	Sub-Kos	At the mouth of Bistritsa River, to the south of the village of Ablan- itsa, in a flooded riverside habitat; confirmed for the Bulgarian flora; alien species
Rosaceae	<i>Rubus sanguineus</i> Friv.	Mesta River Valley, 4601068.74N 254565.62E (UTM, WGS 84), 22.09.2011, Coll. D. Dimitrov (SOM 167935)	Pont-Med	In Dospat Gully below the village of Tuhovishte towards the village of Zhizhevo

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Continued

Rubiaceae	<i>Asperula tenella</i> Heuff. Degen	ex Mesta River Valley, 4598536.84N 254297.82E (UTM, WGS 84), 22.09.2011, Coll. D. Dimitrov (SOM 167925)	Sub-Med	On marble terrain in Dospat Gully near the village of Tuhovishte
Scrophulariaceae	<i>Verbascum nobile</i> Velen.	Mesta River Valley, 4595473.56N 249602.60E (UTM, WGS 84), 20.09.2011, Coll. D. Dimitrov (SOM 167922); 4598155N 246281.145E (UTM, WGS 84), 21.09.2011, Coll. D. Dimitrov (SOM 167924)	Bal	On limestone rocks near the vil- lage of Slasthen; Kaleto place be- low the village of Valkosel

hirsutum, *Bidens tripartita*, *Persicaria hydropiper*, *Glyceria fluitans*, *Echinochloa crus-galli*, *Rorippa sylvestris* and others, most of them antropophytes.

Despite the high anthropogenic pressure, the region partially overlaps with a NATURE 2000 protected site and comprises habitats and plants with high conservation status. Three species are included in the Red list of Bulgarian Vascular Plants [21] and the Red Data Book of the Republic of Bulgaria, Vol. 1 [22]. One of them is critically endangered – *Adiantum capillus-veneris* CR B2ab (i, ii, iii, iv) [23] one is endangered – *Micromeria juliana* EN B1ab (ii, iii) + 2ab (ii, iii) [24] and one is vulnerable – the Balkan endemic *Chondrilla urumoffii* VU B2ab (ii, iii) [25].

Concerning the habitat diversity of the region, the new floristic records are marked in various habitats. Half of the species and subspecies are found in rocky habitats. These are predominantly Balkan endemics or sub-endemics – *Chondrilla urumoffii*, *Echinops oxyodonthus*, *Verbascum nobile*, *Hieracium olympicum* ssp. *argirotrichum*. Three species and one subspecies are found in forest habitats – oak forests or riparian forests. Three species are registered in herb communities and cultivated areas. Three species are described in surface inland waters, one of them being with high conservation status – *Adiantum capillus-veneris* (Fig. 4). The other one is the alien *Persicaria salicifolia* collected in the mouth of Bistritsa to Mesta River.

Conclusion. The number of 19 species and subspecies new to the flora of such a small region as Mesta River Valley is a significant contribution to its floristic diversity; moreover, this number was registered within one vegetation season. The unques-

tionable presence of new taxa from the group of the Mediterranean floristic element (Med and Sub-Med elements) confirms the fact that Mesta River Valley is one of the main roads for the penetration and distribution of Mediterranean flora on the territory of Bulgaria. The prevailing arid periods during the year and mild winter are the appropriate conditions for the distribution and the establishment of the Mediterranean flora and vegetation. The relatively well-presented Balkan endemic and sub-endemic element (7 species and subspecies) among the new chorological data of the present study underlines the geographical position of the investigated territory – the Balkan Peninsula. The presence of aliens and the newly-described one for the flora of the region corresponds to the tendency towards increasing invasion of alien species on the territory of the country. In contrast to this fact, the newly-announced conservation species, one of them being critically endangered, raises the question about the conservation status of the whole region and the observation of strong conservation criteria. The prevalence of the Balkan endemic species among the newly described in rocky habitats confirms the uniqueness and phytogeographical isolation of this habitat, which is very well presented in the region. The various composition and structure of the rocks in Mesta River Valley further contribute to the diversity of plant inhabitants there. Being strongly influenced by human activity, Mesta River Valley floristic region distinguishes with its floristic diversity full of anthropophytes, the presence of many aliens in it and the fragmentation of its natural habitat diversity from the large cultivated area. In these conditions, it is a matter of further monitoring of the flora and vegetation of the region.

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