NEW CHOROLOGICAL DATA OF SOME SUBMERGED MACROPHYTES IN BULGARIA

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ABSTRACT

The data on the distribution of some submerged macrophytes from different types of limnetic water bodies from the ecoregions of Bulgaria were summarized. New chorological data for 11 species were found: Ceratophyllum demersum, Ceratophyllum submersum, Elodea canadensis, Hydrocharis morsus-ranae, Myriophyllum spicatum, Najas marina, Nymphaea alba, Potamogeton gramineus, Potamogeton pectinatus, Potamogeton pusillus, Trapa natans. The distribution of Potamogeton berchtoldii Fieb. has been confirmed for the territory of Bulgaria.

Keywords: chorology, submerged macrophytes, Bulgaria

Introduction

Despite its small territory Bulgaria has quite rich and diverse flora, which is due to the medial geographic location of the country, its varied landscape and its geological history. As a result, total of 3,997 vascular plant species (without mosses) occur in the country, which is more than half of the flora on the Balkan Peninsula (1).

The changes in distribution have been significant for individual species. Sometimes the specific studies prove that species regarded as rare have in fact been relatively widely distributed in the country.

In the course of the survey of submerged macrophytes according to the aim of the project "Trophic state assessment and distribution of main monitoring groups – phytoplankton and aquatic macrophytes in different types of limnetic water bodies from the ecoregions of Bulgaria" (MU-0114/2008), new chorological data for 11 species were found:

The species *Nymphaea alba* L. and *Trapa natans* L. are under protection as threatened by the Biodiversity Act and are included in Red List of Bulgarian vascular plants (8) as category Endangered.

In the main generalizing editions for the Bulgarian flora (Flora NR Bulgaria (4, 5, 6), Guidebook to the higher Plants in Bulgaria (7), Key to the Plants in Bulgaria (2), Conspectus of the Bulgarian Vascular Flora (1)), chorological data are pointed for the investigated species concerning their distribution according to floristic regions and altitude.

In the course of the survey new chorological data for 11 species distributed in Bulgaria were found. Those species are *Ceratophyllum demersum, Ceratophyllum submersum, Elodea canadensis, Hydrocharis morsus-ranae, Myriophyllum spicatum, Najas marina, Nymphaea alba, Potamogeton gramineus, Potamogeton pectinatus, Potamogeton pusillus, Trapa natans.*

Materials and Methods

The information for the distribution of the studied species is based on the available literature data and specimens deposited in the Herbaria of Sofia University (SO) and in personal collection.

The transect method has been used in the studied water bodies (Fig. 1). Macrophytes have been collected along three transects of 50 meters each at different parts of the reservoir. The samples were collected between June and September, 2009 in accordance to the altitude of the water bodies. The vaucher specimens are deposited in the Herbarium of Sofia University St. Kliment Ohridski (SO).

The localities are indicated on an UTM Grid map of Bulgaria (Scale 1:1500 000, 10 km square) (Fig. 1). This distribution is presented according to the floristic division of Bulgaria by Jordanov (4). The floristic elements follow Assyov and Petrova (1).

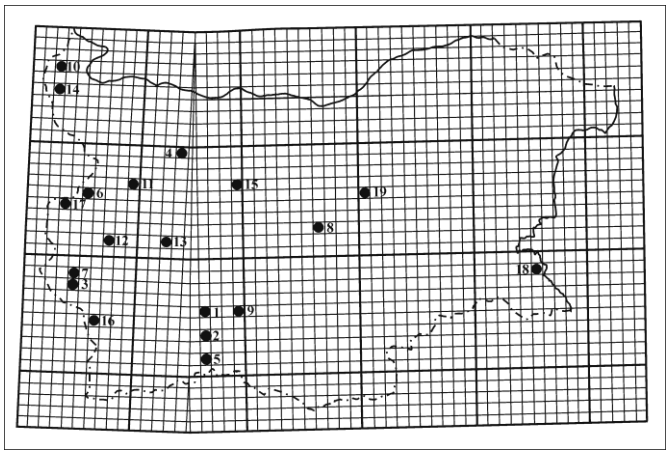

Fig. 1. An UTM grid map of Bulgaria showing the location of surveyed water bodies mentioned in the text (Scale 1:1500000): **1** - Batak, **2** - Beglika, **3** - Bersin, **4** - Devets, **5** - Dospat, **6** - Dragomansko Blato marsh, **7** - Drenov dol, **8** - Koprinka, **9** - Krichim, **10** - Kula, **11** - Lakatnik, **12** - Marchaevo, **13** - Ognyanovo, **14** - Rabisha, **15** - Sopot, **16** - Stoykovtsi, **17** - Yarlovtsi, **18** - Yasna polyana, **19** - Yovkovtsi.

Results and Discussion

***Ceratophyllum demersum* L.**

A new species for the floristic regions: Eastern Balkan foothill region, Western and Central Stara planina Mts, Vitosha Mt, West frontier Mts, Western Rhodopes Mts.

Eastern Balkan foothill region, Sopot Dam, 360 m a. s. l., KG96, 43°00′ N, 24°25′ E, 22.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106081); Western Stara planina Mts, Lakatnik Dam, 365 m a. s. l., FN96, 43°05′ N, 23°24′ E, 30.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106073); Central Stara planina Mts, Yovkovtsi Dam, 335 m a. s. l., MH05, 42°56′ N, 25°45′ E, 26.08.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106088); Vitosha Mt, Marchaevo Dam, 768 m a. s. l., FN71, 42°35′ N, 23°09′ E, 25.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106063); West frontier Mts, Stoykovtsi Dam, 600 m a. s. l., FM64, 41°58′ N, 22°58′ E, 27.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106065); Western Rhodopes Mts, Dospat Dam, 1195 m a. s. l., KG61, 41°38′ N, 24°09′ E, 04.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106075).

The species has been known so far from the floristic regions Black sea coast, North-Eastern Bulgaria, Danube plain, Sofia region, River River Struma Valley, Tracian plain, Tundzha hilly region, up to 200 m a. s. l. (1, 2, 5, 7). Floristic element: Cosmopolitian.

***Ceratophyllum submersum* L.**

A new species for the Znepole region.

Znepole region, Dragomansko Blato swamp, 705 m a. s. l., FN55, 42°55′ N, 22°57′ E, 24.09.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106090).

The species has been known so far from the floristic regions Black sea coast, Tracian plain, Tundzha hilly region, up to 200 m a. s. l. (1, 2, 5, 7). Floristic element: Euro-Asiatic.

***Elodea canadensis* Michx.**

A new species for the floristic regions: Danube plain, Western Balkan foothill region, Western Stara planina Mts, Znepole region, River Struma Valley, Western Rhodopes Mts, West frontier Mts.

Danube plain, Kula Dam, 196 m a. s. l., FP26, 43°54′ N, 22°31′ E, 18.08.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106085); Western Balkan foothill region, Devets Dam, 280 m a. s. l., GN39, 43°10′ N, 23°41′ E, 26.08.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106087); Western Stara planina Mts, Lakatnik Dam, 365 m a. s. l., FN96, 43°05′ N, 23°24′ E, 30.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106071); Znepole region, Dragomansko Blato swamp, 705 m a. s. l., FN55, 42°55′ N, 22°57′ E, 24.09.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106091); Znepole region, Yarlovtsi Dam, 780 m a. s. l., FN34, 42°47′ N, 22°32′ E, 08.08.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106082); River Struma Valley, Drenov Dol Dam, 540 m a. s. l., FM48, 42°18′ N, 22°41′ E, 28.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106069); Western Rhodopes Mts, Dospat Dam, 1195 m a. s. l., KG61, 41°38′ N, 24°09′ E, 04.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106076); Western Rhodopes Mts, Batak Dam, 1103 m a. s. l., KG65, 42°01′ N, 24°12′ E, 12.08.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106084); West frontier Mts, Stoykovtsi Dam, 600 m a. s. l., FM64, 41°58′ N, 22°58′ E, 27.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106066).

The species has been known so far from the floristic regions Southern Black sea coast, Western Stara Planina Mts, Sofia region, Tracian plain, up to 1000 m a. s. l. (1, 2, 4, 7). Floristic element: North-American (Adventive). Some plants were found in the Western Stara planina Mts (Lakatnik Dam), Western Rhodopes Mts (Dospat Dam) and Znepole region (Dragomansko Blato swamp) demonstrating a set of morphological characters similar to *Elodea nuttallii* (Planchon) St. John. Further investigations are necessary to elucidate the taxonomic status of the mentioned materials.

***Hydrocharis morsus-ranae* L.**

A new species for the Znepole region.

Znepole region, Dragomansko Blato swamp, 705 m a. s.

l., FN55, 42°55′ N, 22°57′ E, 24.09.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106089).

The species has been known so far from the floristic regions Black sea coast, North-Eastern Bulgaria, Danube plain, River Struma Valley, Western Rhodopes Mts, Tracian plain, up to 1200 m a. s. l. (1, 2, 4, 7). Floristic element: Euro-Asiatic.

***Myriophyllum spicatum* L.**

A new species for the floristic regions: Vitosha Mt, West frontier Mts, Western and Central Rhodopes Mts.

Vitosha Mt, Marchaevo Dam, 768 m a. s. l., FN71, 42°35′ N, 23°09′ E, 25.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106062); West frontier Mts, Stoykovtsi Dam, 600 m a. s. l., FM64, 41°58′ N, 22°58′ E, 27.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106068); West frontier Mts, Bersin Dam, 505 m a. s. l., FM47, 42°15′ N, 22°46′ E, 27.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106064); Western Rhodopes Mts, Beglika Dam, 1505 m a. s. l., KG63, 41°49′ N, 24°07′ E, 04.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106077); Western Rhodopes Mts, Batak Dam, 1103 m a. s. l., KG65, 42°01′ N, 24°12′ E, 12.08.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106083); Central Rhodopes Mts, Krichim Dam, 418 m a. s. l., KG95, 41°59′ N, 24°28′ E, 03.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106074).

The species has been known so far from the floristic regions Black sea coast, North-Eastern Bulgaria, Danube plain, Balkan foothill region, Sofia region, Znepole region, River Struma Valley, Mesta valley, Eastern Rhodopes Mts, Tracian plain, Tundzha hilly region, Strandzha Mts, up to 500 m a. s. l. (1, 2, 6, 7). Floristic element: Boreal.

***Najas marina* L.**

A new species for the Sofia region.

Sofia region, Ognyanovo Dam, 618 m a. s. l., GN22, 42° 37′ N, 23°44′ E, 20.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106060).

The species has been known so far from the floristic regions Black sea coast, Danube plain, Tracian plain, Tundzha hilly region, up to 100 m a. s. l. (1, 2, 4, 7). Floristic element: Boreal.

***Nymphaea alba* L.**

A new species for the Znepole region.

Znepole region, Dragomansko Blato swamp, 705 m a. s. l., FN55, 42°55′ N, 22°57′ E, 24.09.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106092).

The species has been known so far from the floristic regions Black sea coast, North-Eastern Bulgaria, Danube plain, Tracian plain, Tundzha hilly region, up to 200 m a. s. l. (1, 2, 5, 7). Floristic element: Euro-Mediterranean.

The species has been mentioned by Jordanov (3) for Dragomansko Blato swamp (SO 22550, SO 22551, SO 22553) before draining of the bog. In the past it was known also from Batashko Blato swamp (SO 22548, SO 22549), but in this locality the species is nowadays extinct.

The species is under protection as threatened by the Biodiversity Act and is included in Red List of Bulgarian vascular plants (8) as category Endangered (EN B2ab(i,ii,iii,iv)).

***Potamogeton gramineus* L.**

A new species for the floristic regions: Balkan foothill region, Tundza hilly region.

Eastern Balkan foothill region, Sopot Dam, 360 m a. s. l., KG96, 43°00′ N, 24°25′ E, 22.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106080); Western Balkan foothill region, Rabisha Dam, 285 m a. s. l., FP24, 43°44′ N, 22°35′ E, 18.08.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106086); Tundza hilly region, Koprinka Dam, 390 m a. s. l., LH62, 42°36′ N, 25°19′ E, 22.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106079).

The species has been known so far from the floristic regions Danube plain, Znepole region, up to 200 m a. s. l. (1, 2, 4, 7). Floristic element: Boreal.

***Potamogeton pectinatus* L.**

A new species for the floristic regions: Sofia region, West frontier Mts, River Struma Valley.

Sofia region, Ognyanovo Dam, 618 m a. s. l., GN22, 42° 37′ N, 23°44′ E, 20.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106061); West frontier Mts, Stoykovtsi Dam, 600 m a. s. l., FM64, 41°58′ N, 22°58′ E, 27.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106067); River Struma Valley, Drenov Dol Dam, 540 m a. s. l., FM48, 42°18′ N, 22° 41′ E, 28.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106070).

The species has been known so far from the floristic regions Black sea coast, North-Eastern Bulgaria, Danube plain, Balkan foothill region, Strandzha Mts, up to 600 m a. s. l. (1, 2, 4, 7). Floristic element: Cosmopolitian.

Distribution in the Central Stara Planina Mts, Tracian plain and Tundzha hilly region is mentioned by Kozuharov (3), Delipavlov and Češmedžiev (7) and Assyov and Petrova (1).

***Potamogeton pusillus* L.**

A new species for the Western Stara planina Mts.

Western Stara planina Mts, Lakatnik Dam, 365 m a. s. l., FN96, 43°05′ N, 23°24′ E, 30.06.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106072).

The species has been known so far from the floristic regions of North-Eastern Bulgaria, Danube plain, Tracian plain, up to 200 m a. s. l. (1, 2, 4, 7). Floristic element: Cosmopolitian.

***Trapa natans* L.**

A new species from the Tundza hilly region.

Tundza hilly region, a small water body near Yasna polyana Dam, 40 m a. s. l., NG58, 42°16′N, 27°36′E, 13.07.2009, Leg./Det. A. Tosheva, I. Traykov (SO 106078).

The species has been known so far from the floristic regions Black sea coast, North-Eastern Bulgaria, Danube plain, Balkan foothill region, Eastern Stara Planina Mts, Eastern Rhodopes Mts, Tracian plain, up to 500 m a. s. l. (1, 2, 6, 7). Floristic element: Euro-Asiatic.

The species is under protection as threatened by the Biodiversity Act and are included in Red List of Bulgarian vascular plants (8) as category Endangered (EN B2ab(i,ii,iii,iv,v)).

The results of the present research are going to expand the available data for distribution of the studied aquatic vascular species in Bulgaria.

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