Distribution of *Elodea nuttallii*, an invasive alien species of EU concern, in Bulgaria

Valeri Georgiev[1], Sonya Tsoneva[1], Lyubomir Kenderov[2], Teodora Trichkova[3], Milcho Todorov[3] & Vladimir Vladimirov[1, 4]

[1] Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Acad. Georgi Bonchev Street, Bl. 23, 1113 Sofia, Bulgaria; E-mail: valeri@bio.bas.bg

[2] Biological Faculty, Sofia University "St. Kliment Ohridski", 8 Dragan Tsankov Blvd., 1164 Sofia, Bulgaria

[3] Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd., 1000 Sofia, Bulgaria

[4] Faculty of Forestry, University of Forestry, 10 Kliment Ohridski Blvd., 1797 Sofia, Bulgaria

Received: November 28, 2019 ▷ Accepted: December 10, 2019

Abstract. *Elodea nuttallii* (*Hydrocharitaceae*) is an aquatic plant, native to North America. In Bulgaria, the species was recorded as a naturalised alien relatively recently – in 2002. Since then, the number of the recorded localities has increased rapidly. In Europe, the species has been considered to have high ecological impact in the invaded areas, and therefore, it is included in the List of invasive alien species of EU concern under Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species. Article 24(1) of the same Regulation obliges the EU Member States to report by 1st June 2019, and every six years thereafter, the distribution of the invasive alien species of Union or regional concern. Therefore, the reporting of all known localities of *Elodea nuttallii* in Bulgaria is urgently needed. The article presents the currently known distribution of the species, including a UTM-distribution map, and provides some comments about the information gaps in the chorological information which are relevant to the control of the invasion of this species in Bulgaria.

Key words: Bulgarian flora, mapping, Regulation (EU) 1143/2014, species distribution.

Introduction

Elodea nuttallii (Planch.) H.St. John (*Hydrocharitaceae*) is an aquatic plant, native to temperate North America. In Europe, it was first recorded in the wild in 1914 in the United Kingdom (Josefsson 2011; Steen & al. 2019). Since then it has spread in many countries in Northern, Western, Central and Eastern Europe (Steen & al. 2019). This species has been imported to Europe as an ornamental and aquarium species. Secondary spread across the continent is achieved through vegetative reproduction of the plant, accidental or deliberate release of cultivated plants to natural and semi-natural fresh water, and movement of viable plant fragments with water currents, by water birds and by some human activities (Josefsson 2011; Steen & al. 2019). In the invaded range it inhabits mostly meso- to eutrophic slow-flowing or stagnant fresh water – lakes, reservoirs, ponds, rivers, streams, canals, and ditches (Steen & al. 2019). This species has been recently reported as a new alien to the Bulgarian flora (Georgiev & al. 2011). In neighbouring Romania, the

species was first reported in 1998 from the Danube Delta (Ciocârlan & al. 1998).

Elodea nuttallii is considered as one of the high-risk alien species which has high ecological impact in the invaded areas (Brunel 2009; Josefsson 2011). It is included in the List of invasive alien species of EU concern under Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (CIR 2017). Article 24(1) from the same Regulation obliges the EU Member States to report by 1st June 2019, and every six years thereafter, the distribution of the invasive alien species of Union or regional concern. Therefore, reporting of the known localities of *E. nuttallii* in Bulgaria is urgently needed.

The aim of the present article is to present the currently known distribution of the species in Bulgaria and to highlight the major information gaps of relevance to the control of the species invasion.

Material and methods

The data about distribution and habitat preferences of the species were collected from all available sources – published articles, project reports, existing collections (herbaria SO, SOA and SOM), as well as from field studies in different parts of the country in the period 2002–2019. The habitats were determined according to the EUNIS classification (Davies & al. 2004; EEA, https://eunis.eea.europa.eu/habitats-code-browser.jsp).

Results and discussion

Elodea nuttallii was first recorded in Bulgaria in 2002, in the mouth of the Topolovets River at the confluence with the Danube River (Georgiev & al. 2011, see also Annex 1). Since then, new chorological data about this species have been reported both from the Bulgarian bank of the Danube River as well as from the inland water bodies (e.g. Gecheva & al. 2011; Petrova & al. 2012; Savchovska & al. 2013). So far, *E. nuttallii* has been recorded in the following floristic regions: Black Sea Coast (*Southern*), Northeast Bulgaria, Danubian Plain, Forebalkan, Balkan Range (*Western*), Sofia region, Vitosha region, Znepole region, West Frontier Mts., Valley of River Struma (*Northern*), Rhodopi Mts (*Western*) and Thracian Lowland (see Annex 1 and Fig. 1). It is worth noting that most of the localities are situated in the northern and western parts of the country. Apparently, the Danube River has been a major corridor for the introduction and further spread of the species in the country. Secondary spread of viable stem fragments and winter dormant buds is most likely achieved by water currents, water birds, and by human activities such as recreational activities (fishing, boating, swimming) (Josefsson 2011; Petrova & al. 2012; Savchovska & al. 2013). After the initial introduction to a water reservoir, the species spreads rapidly and occupies all the suitable micro-habitats. Some studies, e.g. in Ognyanovo Reservoir, have shown that the rapid invasion of the species is facilitated by multiple-point spread (very likely multiple introductions as well) and by the rapid vegetative growth enabling 150–200 m/year spread (Savchovska & al. 2013). Taking into account the present high number of localities in Bulgaria, including some relatively remote and isolated water bodies, it can be inferred that introduction of the species in the country certainly occurred before 2002. It is very likely that for at least a decade before its first recording in Bulgaria, the species had been overlooked due to misidentification for *E. canadensis* and the generally low interest in the alien plants at that time.

In Bulgaria, *E. nuttallii* invades slow-flowing rivers, lakes, reservoirs, ponds, and canals. According to the EUNIS classifications the habitats belong to the following types: **C1.2:** Permanent mesotrophic lakes, ponds and pools; **C1.3:** Permanent eutrophic lakes, ponds and pools; and **C2.3:** Permanent non-tidal, smooth-flowing watercourses (Davies & al. 2004; EEA, https://eunis.eea.europa.eu/habitats-code-browser.jsp).

The introduction and spread of this species in the Balkan Peninsula is a relatively recent event as well. So far, the species has been recorded in the following Balkan countries: Albania (Mesterházy 2017), Bulgaria (Georgiev & al. 2011), Croatia (Kočić & al. 2014), Romania (Ciocârlan & al. 1998; Sârbu & al. 2015), Serbia (Vukov & al. 2006), and Slovenia (Király & al. 2007; Grudnik & al. 2014). For most of these countries, the status of the species is 'invasive alien' (Lansdown 2016). In fact, in most European countries where it has been recorded, it is a common or a widespread species in water bodies (Prokopuk & Zub 2019).

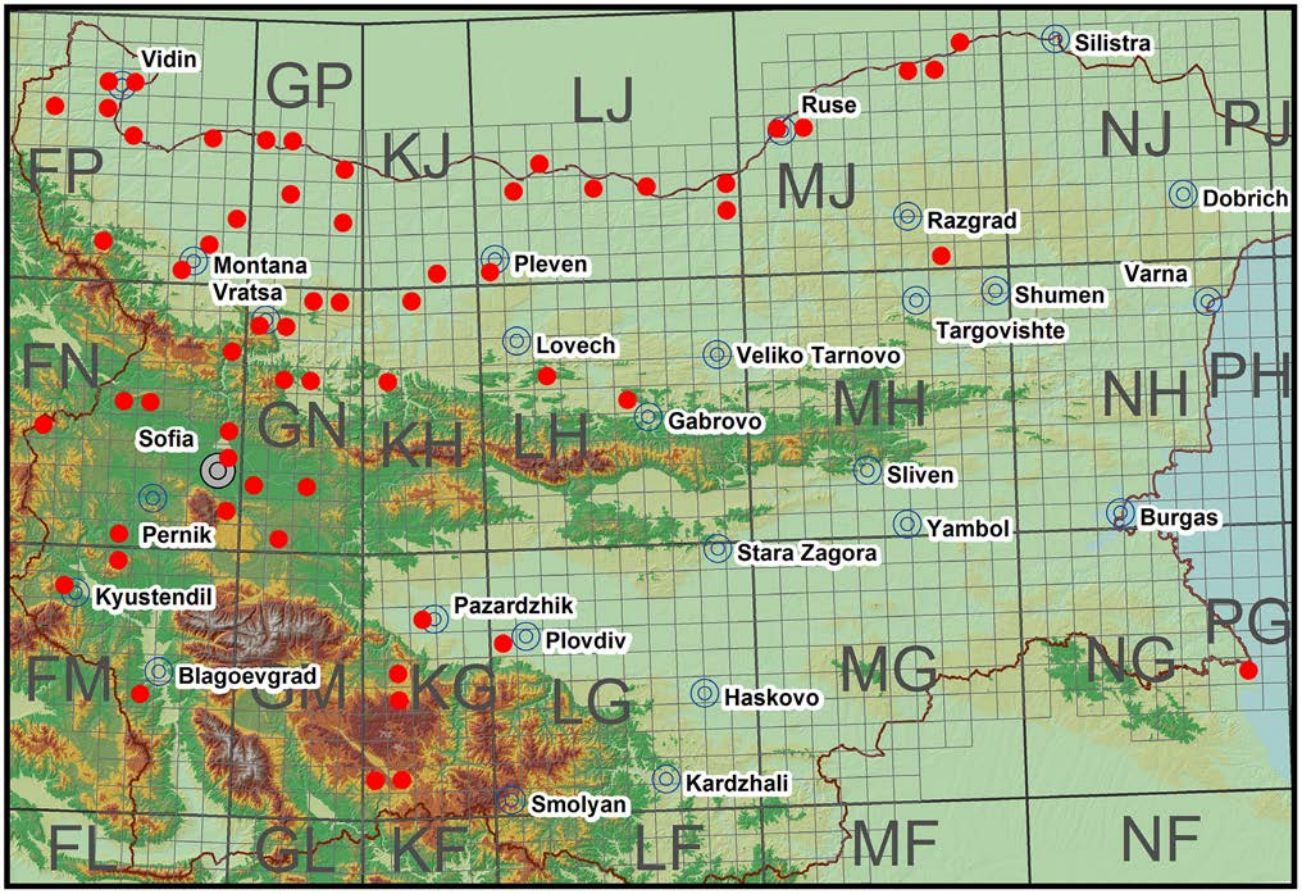

Fig. 1. UTM (10 × 10 km) distribution map of *Elodea nuttallii* in Bulgaria.

Elodea nuttallii has the ability to spread rapidly through vegetative reproduction and growth and to form large monospecific stands. It may fill the whole reservoir or watercourse, and thus, it may change the balance of the entire ecosystem and have negative effects on the recreational activities (Josefsson 2011). When it grows together with *E. canadensis*, *E. nuttallii* is more competitive and gradually replaces the other congeneric species. Also, in some lakes in Scandinavia cycles of mass development of *Elodea* spp. followed by a collapse of the populations of the species have been observed in 5–6-year intervals (Josefsson 2011). Similar phenomena have been observed in some of the Bulgarian reservoirs (e.g. Dabnika Reservoir near Vratsa town) as well.

Once established, the species is very difficult to control (Steen & al. 2019). The most cost-effective control mechanisms would be mainly prevention of further spread to new localities and to a lesser extent – early detection and rapid eradication. Therefore, the good knowledge of the distribution of the species within a country and the size of the local populations are of crucial importance. The review of the chorological information for the species in the Bulgarian flora shows, that contrary to the other invasive alien species of EU concern (Vladimirov & Georgiev 2019), most of the locations have been attributed to geographic coordinates and can be easily re-located if necessary. However, data about the size of the populations and the impact of the species are very scattered. It is believed that the current article will stimulate further studies on the actual distribution of *E. nuttallii* in Bulgaria, and the new chorological data will be published following the recommendations suggested by Vladimirov & Georgiev (2019).

Acknowledgements: Part of the study was carried out within the project *National reporting on invasive alien species under Article 24(1) of the Regulation (EU) 1143/2014* (Contract № D-30-43/28.05.2019). The financial support by the Financial Mechanism of the European Economic Area, Programme BG03 'Biodiversity and Ecosystems', under the projects ESENIAS-TOOLS (Contract D-33-51/30.06.2015) and IBBIS (Contract D-33-72/20.07.2015) for part of the field work is acknowledged as well.

Annex 1. List of the localities of *Elodea nuttallii* in Bulgaria

No.	Locality	UTM coordinates	GPS coordinates
1.	Bulgaria, **Black Sea Coast (*Southern*)**: Rezovska River, 8 m a.s.l., 25.10.2008, *V. Georgiev*, *V. Valchev* & *S. Tsoneva* obs.	NG84	41.98069°N 28.01311°E
2.	Bulgaria, **Northeast Bulgaria**: Danube River at Batin village, 11.11.2011, *L. Kenderov* & *T. Trichkova* obs.	LJ93	43.673411°N 25.688163°E
3.	Bulgaria, **Northeast Bulgaria**: Danube River at Ruse town – Prista site, upstream of Ruse town, 10.09.2015, *L. Kenderov* & *T. Trichkova* obs.	MJ15	43.813693°N 25.918159°E
4.	Bulgaria, **Northeast Bulgaria**: Danube River near Ruse town, 502 rkm, 17 m a.s.l., 10.08.2003, *V. Georgiev* & *V. Valchev* obs.	MJ25	43.882918°N 26.007999°E
5.	Bulgaria, **Northeast Bulgaria**: Beli Lom Reservoir, 280 m a.s.l., 09.09.2009, *V. Valchev* obs.	MJ70	43.40926°N 26.6836°E
6.	Bulgaria, **Northeast Bulgaria**: Antimovo Reservoir, 98 m a.s.l., 2009 (Gecheva & al. 2011)	MJ77	43.98737°N 26.69923°E
7.	Bulgaria, **Northeast Bulgaria**: Antimovo Reservoir near Tutrakan town, 04.08.2015, *L. Kenderov* obs.	MJ77	43.986843°N 26.694715°E
8.	Bulgaria, **Danubian Plain**: Kula Reservoir near the dam, Kula village, 203 m a.s.l., 17.07.2009 & 20.10.2016, *V. Georgiev* & *S. Tsoneva* obs.	FP26	43.91529°N 22.52802°E
9.	Bulgaria, **Danubian Plain**: Kula Reservoir, Kula village, 202 m a.s.l., 2009 (Gecheva & al. 2011)	FP26	43.91435°N 22.52832°E
10.	Bulgaria, **Danubian Plain**: mouth of the Topolovets River (Danube River, 784.5 rkm), Vidin District, 12.08.2002, coll. *V. Valchev* & *V. Georgiev* (SOM 159684)	FP46	43.935698°N 22.850971°E
11.	Bulgaria, **Danubian Plain**: Topolovets River near Vidin town, 43 m a.s.l., 16.07.2009, *V. Georgiev* & *S. Tsoneva* obs.	FP47	43.98343°N 22.81742°E
12.	Bulgaria, **Danubian Plain**: Archar River near Archar village, 40 m a.s.l., 17.07.2009, *V. Georgiev* & *S. Tsoneva* obs.	FP55	43.81247°N 22.91793°E
13.	Bulgaria, **Danubian Plain**: Danube River upstream of Vidin town, near the Danube River bridge, 03.09.2012, *L. Kenderov* & *T. Trichkova* obs.	FP57	44.010556°N 22.949167°E
14.	Bulgaria, **Danubian Plain**: Yama Reservoir adjacent to the Ogosta River, near Portitovtsi Hydropower Plant, Boychinovtsi Municipality, 16.06.2017, *T. Trichkova* & *M. Todorov* obs.	FP81	43.48110°N 23.34812°E
15.	Bulgaria, **Danubian Plain**: Lom River near Lom town, 35 m a.s.l., 18.07.2009, *V. Georgiev* & *S. Tsoneva* obs.	FP85	43.81477°N 23.24712°E
16.	Bulgaria, **Danubian Plain**: Madan Reservoir at Madan village, Boychinovtsi Municipality, 16.06.2017, *T. Trichkova* & *M. Todorov* obs.	FP92	43.57624°N 23.46448°E
17.	Bulgaria, **Danubian Plain**: Danube River near Dolni Tsibar village, 01.11.2012, *L. Kenderov* & *T. Trichkova* obs.	GP05	43.820927°N 23.514336°E
18.	Bulgaria, **Danubian Plain**: Ogosta River near Hayredin village, 100 m downstream of the bridge, in a small dam-lake, upstream of Elena Hydropower Plant, 25.10.2018, *L. Kenderov* obs.	GP13	43.59532°N 23.66661°E
19.	Bulgaria, **Danubian Plain**: Danube River at Kozloduy town, near the Radetski Ship, 19.02.2013, *L. Kenderov* & *T. Trichkova* obs.	GP15	43.798444°N 23.680194°E
20.	Bulgaria, **Danubian Plain**: Skat River near Byala Slatina town, 100 m a.s.l., 19.07.2009, *V. Georgiev* & *S. Tsoneva* obs.	GP32	43.50636°N 23.88533°E
21.	Bulgaria, **Danubian Plain**: Ogosta River near the confluence with the Danube River, 30 m a.s.l., 18.07.2009, *V. Georgiev* & *S. Tsoneva* obs.	GP34	43.7409°N 23.87683°E
22.	Bulgaria, **Danubian Plain**: Telish Reservoir, 21.06.2015, *L. Kenderov* obs.	KH79	43.317941°N 24.232542°E
23.	Bulgaria, **Danubian Plain**: Gorni Dabnik Reservoir, 21.06.2015 & 24.05.2016, *L. Kenderov* obs.	KJ80	43.354993°N 24.319208°E
24.	Bulgaria, **Danubian Plain**: Kaylaka Pond in front of the burned restaurant, Pleven town, 10.08.2009, coll. *V. Valchev* (SOM 167140)	LJ00	43.35694°N 24.63689°E
25.	Bulgaria, **Danubian Plain**: Vit River near confluence with the Danube River, 25 m a.s.l., 13.08.2003, *V. Georgiev* & *V. Valchev* obs.	LJ13	43.681192°N 24.742791°E
26.	Bulgaria, **Danubian Plain**: Danube River near the fishing camp, Cherkovitsa village, Nikopol Municipality, 11.07.2007, coll. *V. Valchev* (SOM 167136)	LJ24	43.70668°N 24.838867°E
27.	Bulgaria, **Danubian Plain**: drainage canal near Belene town, 25 m a.s.l., 19.08.2006, *V. Georgiev* & *S. Tsoneva* obs.	LJ43	43.65178°N 25.11304°E
28.	Bulgaria, **Danubian Plain**: Danube River, 4 km upstream of Svishtov town, 20 m a.s.l., 11.08.2003, *V. Georgiev* & *V. Valchev* obs.	LJ63	43.646367°N 25.303308°E

Annex 1. Continuation.

No.	Locality	UTM coordinates	GPS coordinates
29.	Bulgaria, **Danubian Plain**: embayment of Yantra River near Tsenovo village, 2015, *B. Gyosheva*, *V. Valchev* & *R. Tzonev* obs. (Gyosheva & al. 2015)	LJ92	43.546352°N 25.664976°E
30.	Bulgaria, **Danubian Plain**: Kalimok-Brashlen wetland area, 15 m a.s.l., 22.09.2010, *V. Georgiev* & *S. Tsoneva* obs.	MJ67	44.02577°N 26.51807°E
31.	Bulgaria, **Danubian Plain**: Danube River, 413 rkm, 06.07.2005, coll. *A. Petrov* & *V. Valchev* (SOM 162055)	MJ88	44.100668°N 26.831306°E
32.	Bulgaria, **Danubian Plain**: Malak Preslavets Marsh, 27.03.2004, coll. *V. Valchev* (SOM 159981)	MJ88	44.096568°N 26.836374°E
33.	Bulgaria, **Forebalkan (*Western*)**: Lom River, slow running water near Dolni Lom village, Vidin District, 430 m a.s.l., 15.07.2017, *I. Ivanov* obs.	FP41	43.55664°N 23.34432°E
34.	Bulgaria, **Forebalkan (*Western*)**: Ogosta Reservoir near Montana town, *ca.* 150 m a.s.l., 14.06.2019, *I. Ivanov* obs.	FP70	43.23432°N 23.45643°E
35.	Bulgaria, **Forebalkan (*Western*)**: Dabnika Reservoir, near Vratsa town, 09.07.2007, coll. *V. Valchev* (SOM 167134)	GN08	43.208755°N 23.581555°E
36.	Bulgaria, **Forebalkan (*Western*)**: reservoir between Novachene and Lyuti Dol villages, 480 m a.s.l., 29.07.2006, *V. Valchev, V. Georgiev* & *S. Tsoneva* obs.	GN16	43.02836°N 23.66520°E
37.	Bulgaria, **Forebalkan (*Western*)**: reservoir between Novachene and Lyuti Dol villages, 480 m a.s.l., 19.10.2016, *V. Georgiev* & *S. Tsoneva* obs.	GN16	43.02836°N 23.66520°E
38.	Bulgaria, **Forebalkan (*Western*)**: Dabnika Reservoir, along the east shore, Vratsa town, 347 m a.s.l., 24.09.2006, 09.07.2007, 06.08.2009, *V. Georgiev* & *S. Tsoneva* obs.	GN18	43.20733°N 23.59064°E
39.	Bulgaria, **Forebalkan (*Western*)**: Dabnika Resservoir, along the east shore, Vratsa town, 347 m a.s.l., 19.10.2016, *V. Georgiev* & *S. Tsoneva* obs.	GN18	43.20733°N 23.59064°E
40.	Bulgaria, **Forebalkan (*Western*)**: Dabnika Reservoir, Vratsa town, 346 m a.s.l., 2009 (Gecheva & al. 2011)	GN18	43.20752°N 23.59096°E
41.	Bulgaria, **Forebalkan (*Western*)**: Bebresh River at Bozhenitsa village, Botevgrad Municipality, 12.05.2012, *L. Kenderov* & *T. Trichkova* obs.	GN26	43.008722°N 23.819194°E
42.	Bulgaria, **Forebalkan (*Western*)**: Skat River near Golyamo Peshtene village, Vratsa District, 220 m a.s.l., 19.07.2009, *V. Georgiev* & *S. Tsoneva* obs.	GN29	43.31881°N 23.74111°E
43.	Bulgaria, **Forebalkan (*Western*)**: Devets Reservoir, Vratsa District, 200 m a.s.l., 07.08.2009, *V. Georgiev* & *S. Tsoneva* obs.	GN39	43.30598°N 23.95645°E
44.	Bulgaria, **Forebalkan (*Eastern*)**: small karst lake, NE of Yablanitsa town, 430 m a.s.l., 11.08.2009, *V. Georgiev* & *S. Tsoneva* obs.	KH66	43.04204°N 24.15327°E
45.	Bulgaria, **Forebalkan (*Eastern*)**: Krapets Reservoir, 410 m a.s.l., 28.07.2009, *V. Georgiev* & *S. Tsoneva* obs.	LH26	43.05647°N 24.88699°E
46.	Bulgaria, **Forebalkan (*Eastern*)**: Bilyakovets Marsh, W of Zdravkovets village, 621 m a.s.l., 26.08.2019, *M. Todorov*, *Z. Hubenov*, *I. Botev* obs.	LH55	42.96346°N 25.22409°E
47.	Bulgaria, **Balkan Range (*Western*)**: Lakatnik dam, 553 m a.s.l., 30.06.2009, coll. *A. Tosheva* & *I. Traykov* (SOM 106071) (Tosheva & Traykov 2010)	FN97	not available
48.	Bulgaria, **Sofia region**: Plazha Lake near Pancharevo Lake, 600 m a.s.l., 10.07.2008, *V. Georgiev* & *S. Tsoneva* obs.	FN91	42.58812°N 23.42387°E
49.	Bulgaria, **Sofia region**: Pancharevo Lake, near the east shore, Pancharevo village, 595 m a.s.l., 26.09.2016, *V. Georgiev* & *S. Tsoneva* obs.	FN91	42.58847°N 23.42156°E
50.	Bulgaria, **Sofia region**: Lesnovska River near Svetovrachane village, 513 m a.s.l., 02.07.2008, *V. Georgiev* & *S. Tsoneva* obs.	FN93	42.77512°N 23.39074°E
51.	Bulgaria, **Sofia region**: reservoir N of Katina village, 636 m a.s.l., 18.10.2016, *V. Georgiev* & *S. Tsoneva* obs.	FN94	42.84373°N 23.33153°E
52.	Bulgaria, **Sofia region**: Iskar River near Novi Iskar town, 515 m a.s.l., 07.10.2009, *V. Georgiev* & *S. Tsoneva* obs.	FN94	42.82178°N 23.36997°E
53.	Bulgaria, **Sofia region**: small reservoir near Krivina village, Sofia District, 534 m a.s.l., 18.07.2006, *V. Georgiev* & *S. Tsoneva* obs.	GN02	42.677257°N 23.471049°E
54.	Bulgaria, **Sofia region**: Ognyanovo Reservoir, near Ognyanovo village, Elin Pelin Municipality, 04.04.2004, coll. *V. Georgiev* (SOM 159982)	GN22	42.613913°N 23.743589°E
55	Bulgaria, **Sofia region**: near Ognyanovo Reservoir, Ognyanovo village, 629 m a.s.l., 17.10.2016, *V. Georgiev* & *S. Tsoneva* obs.	GN22	42.61503°N 23.74211°E
56.	Bulgaria, **Sofia region**: near the inflow of Ognyanovo Reservoir, Golema Rakovitsa village, 629 m a.s.l., 17.10.2016, *V. Georgiev* & *S. Tsoneva* obs.	GN22	42.60558°N 23.77812°E

Annex 1. Continuation.

No.	Locality	UTM coordinates	GPS coordinates
57.	Bulgaria, **Sofia region**: Ognyanovo Reservoir, 10.05.2015, *L. Kenderov*, *M. Kenderov* & *T. Trichkova* obs.; *loc. ibid.*, 20.06.2015 & 19.05.2016, *L. Kenderov* & *M. Kenderov* obs.	GN22	42.616056°N 23.742806°E
58.	Bulgaria, **Vitosha region**: Iskar Reservoir near the inflow of Iskar River, 820 m a.s.l., 08.10.2010, 26.09.2016, *V. Georgiev* & *S. Tsoneva* obs.	GN10	42.44498°N 23.55857°E
59.	Bulgaria, **Vitosha region**: Iskar Reservoir near Shtarkelovo Gnezdo Site, 05.09.2011, 28.07.2015 & 29.07.2016, *L. Kenderov* & *M. Kenderov* obs.	GN10	42.459147°N 23.558276°E
60.	Bulgaria, **Znepole region**: drainage canal connected to Choklyovo Marsh near Baykalsko village, 863 m a.s.l., 11.11.2016, *V. Georgiev* & *S. Tsoneva* obs.	FM59	42.39675°N 22.83253°E
61.	Bulgaria, **Znepole region**: drainage canal connected to Choklyovo Marsh near Baykalsko village, *ca.* 860 m a.s.l., 15.09.2019, *V. Vladimirov* obs.	FM59	42.396173°N 22.833373°E
62.	Bulgaria, **Znepole region**: Yarlovtsi Reservoir, near the dam, 798 m a.s.l., 23.08.2009, *V. Georgiev* & *S. Tsoneva* obs.	FN24	42.80352°N 22.54049°E
63.	Bulgaria, **Znepole region**: Pchelina (Lobosh) Reservoir, 637 m a.s.l., 11.10.2009, *V. Georgiev* & *S. Tsoneva* obs.	FN50	42.50905°N 22.82951°E
64.	Bulgaria, **Znepole region**: Arkata River, 632 m a.s.l., 22.08.2009, *V. Georgiev* & *S. Tsoneva* obs.	FN50	42.47965°N 22.91546°E
65.	Bulgaria, **Znepole region**: Dragomansko Marsh, 710 m a.s.l., 27.08.2010, *V. Georgiev* & *S. Tsoneva* obs.	FN55	42.93714°N 22.95215°E
66.	Bulgaria, **Znepole region**: small karst lake near Dragomansko Marsh, 710 m a.s.l., 12.09.2011, *V. Georgiev* & *S. Tsoneva* obs.	FN65	42.93869°N 22.96476°E
67.	Bulgaria, **West Frontier Mts.**: Stoykovtsi Reservoir E-SE of Logodazh village, 600 m a.s.l., 27.06.2009, coll. *A. Tosheva* & *I. Traykov* (SO 106066) (Tosheva & Traykov 2010)	FM64	not available
68.	Bulgaria, **Valley of River Struma (*Northern*)**: Drenov Dol Reservoir N of Kyustendil town, 540 m a.s.l., 28.06.2009, coll. *A. Tosheva* & *I. Traykov* (SO 106069) (Tosheva & Traykov 2010)	FM38	not available
69.	Bulgaria, **Rhodopi Mts (*Western*)**: reservoir NE of Satovcha village, 1214 m a.s.l., 23.06.2011, 28.09.2016, *V. Georgiev* & *S. Tsoneva* obs.	KG51	41.62946°N 24.01783°E
70.	Bulgaria, **Rhodopi Mts (*Western*)**: Dospat Reservoir, near the east shore, Dospat town, 1203 m a.s.l., 28.09.2016, *V. Georgiev* & *S. Tsoneva* obs.	KG61	41.66360°N 24.16235°E
71.	Bulgaria, **Rhodopi Mts (*Western*)**: Dospat Reservoir near Dospat town, 16.07.2016, *L. Kenderov* obs.	KG61	41.664676°N 24.159345°E
72.	Bulgaria, **Rhodopi Mts (*Western*)**: Batak Reservoir near Tsigov Tchark Site, 1067 m a.s.l., 29.09.2016, *V. Georgiev* & *S. Tsoneva* obs.	KG64	41.95742°N 24.15715°E
73.	Bulgaria, **Rhodopi Mts (*Western*)**: Batak Reservoir, near the east shore, 1067 m a.s.l., 29.09.2016, *V. Georgiev* & *S. Tsoneva* obs.	KG65	41.98953°N 24.20217°E
74.	Bulgaria, **Rhodopi Mts (*Western*)**: Batak Reservoir, 07.08.2015, *L. Kenderov* obs.	KG65	42.019534°N 24.203774°E
75.	Bulgaria, **Thracian Lowland**: fish-pond near Maritsa River, Pazardzhik town, 220 m a.s.l., 29.09.2016, *V. Georgiev* & *S. Tsoneva* obs.	KG77	42.19884°N 24.27531°E
76.	Bulgaria, **Thracian Lowland**: Potoka River near Orizari village, upstream of confluence with the Maritsa River, 16.07.2016, *L. Kenderov* obs.	LG06	42.155112°N 24.640440°E

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