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DIATOMS FROM A PEAT BOG ON THE PEŠTER PLATEAU (SOUTHWESTERN SERBIA): NEW RECORDS FOR DIATOM FLORA OF SERBIA

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Abstract: The distribution of diatoms was studied in three types of diatom communities (epiphytes, benthos and plankton) of a peat bog on the Pešter plateau. The observed diatom flora inhabited all investigated communities, comprising in total 250 taxa in 53 genera. Among them, 45 taxa were new records for the Serbian diatom flora. Identified taxa belonged to different groups of algae, however alkaliphile diatoms were dominant. New ecological data for *Encyonopsis minuta*, *Pinnularia isostauron* and *P. marchica* are presented here. All the diatoms were documented by light micrographs, and brief notes on their morphology, distribution and ecology are provided.

Key words: diatoms; new records; peat bog; Pešter plateau

INTRODUCTION

Among aquatic ecosystems, peat bogs are a very specific environment, possessing unique ecological properties and remarkably high diversity of diatom flora. In Serbia, they are not as numerous as in northern and western Europe. In addition, they are gradually disappearing due to anthropogenic and climatic factors (Buczko and Wojtal, 2005; Kulikovskiy et al., 2010; Šovran et al., 2013). These factors mutually affect the composition of the total algal flora, including diatom flora, which is a permanent component of the biota in peat bogs (Kulikovskiy, 2008).

The main purpose of the study was to record the floristic characteristics of the diatom assemblages of the peat bog on the Pešter plateau due to its uniqueness not only in Serbia but in Europe as well. There are relatively little literature data about the morphology, distribution and ecology of diatoms from the peat bog on the Pešter plateau (Krizmanić, 2009; Vidaković et al., 2013).

Description of the study area

The Pešter plateau is located in southwestern Serbia and lies at an altitude of 1150-1492 m a.s.l. With an area of around 50 km², Pešter is the largest plateau in Serbia, and the highest on the Balkan Peninsula. Four rivers (Uvac, Vapa, Jablanica and Grabovica) flow through the plateau. The peat bog from the Pešter plateau is one of the last large preserved peat bogs in Serbia. It has a somewhat acid reaction, with a fair amount of organic matter, but with humic acids predominating (Tešić et al., 1960).

MATERIALS AND METHODS

The study was based on 29 samples collected in June and September 2008, May 2009 and August 2011 from three localities (Fig. 1). Epiphytic samples were collected by squeezing out or scraping off dominant submerged macrophytes and mosses. Samples of phytobenthos were collected with a pipette from the surface of the bottom deposits. Phytoplankton samples were collected by towing a plankton net (Ø 25 µm)

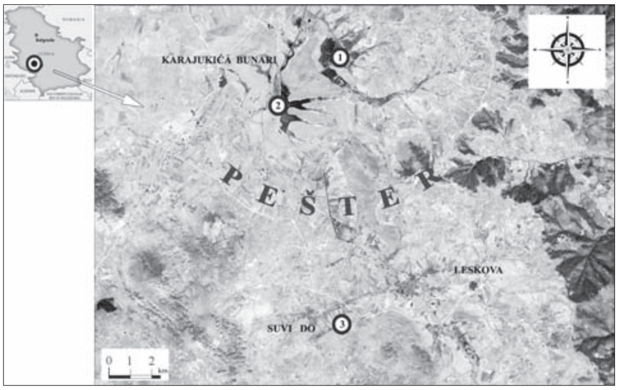

Fig. 1. Map of the Pešter plateau with investigated localities: 1 – Excavation of peat, 2 – Jezero, 3 – Suvi Do.

through the open water. All samples were fixed with formaldehyde to a final concentration of about 4% shortly after sampling.

Water temperature and transparency were measured *in situ* at all localities. Water samples for chemical analysis were collected using a Ruttner sampler (depth 0.5 m). The samples were stored in plastic containers at 4°C for transfer to the laboratory for further analyses. The analysis of physicochemical parameters of water (pH, conductivity, Ca^{2+} concentrations) was performed at the Institute of Public Health of Serbia "Dr Milan Jovanović Batut", by standard analytical methods.

In laboratory algological samples were treated using standard methods to obtain permanent slides of diatoms (Krammer and Lange-Bertalot, 1986). Light microscope observations and micrographs were made using a Zeiss AxioImagerM.1 microscope with DIC optics and AxioVision 4.8 software.

RESULTS AND DISCUSSION

Physical and chemical parameters

The results of the physical and chemical parameters of water are summarized in Table 1. The peat bog on the Pešter plateau differed in physicochemical parameters from peat bogs such as the sphagnum bogs of the Volga Upland (Kulikovskii, 2008), Nur bog in northern Mongolia (Kulikovskii et al., 2010) or peat bogs in the Maritime Alps Nature Park (Falasco and Bona, 2011). The pH was significantly lower in the sphagnum bogs of the Volga Upland (4.4-5.1) and in Nur bog (5.5-5.6), but in the Maritime Alps Nature Park the pH was similar to our values (6.17-6.68). The conductivity range was much higher than in other peat bogs, sphagnum bogs of the Volga Upland (27.3-54 μS cm^{-1}), peat bogs in the Maritime Alps Nature Park (17-26 μS cm^{-1}).

Table 1. Ranges of physical and chemical parameters at peat bog localities of the Pešter plateau.

Locality	**Excavation of peat (1)**	**Jezero (2)**	**Suvi Do (3)**
Parameters	**Ranges of the parameter values**		
Temperature [°C]	13-21	13-22	14-20
Transparency [mm]	/	200-500	/
pH	6.5-7.1	7.1-7.2	7.1-7.3
Conductivity [μS cm^{-1}]	59-78	30-250	300-350
Ca^{2+} [mg L^{-1}]	2.8-18	46-48	60-69

Diatom communities

The Pešter plateau peat bog was characterized by high diversity of diatoms. A total of 250 taxa belonging to 53 genera were determined in the studied samples. The most abundant genera were *Pinnularia* (23 taxa), *Gomphonema* (22), *Nitzschia* (22) and *Navicula* (17). Among them, 45 taxa were new records to the Serbian diatom flora (Table 2). Recent studies of Kulikovskiy et al. (2010) have shown that the total number of species identified in peat bog microhabitats exceeds 200-300 species. Some of the most species-rich genera in peat bogs are *Amphora*, *Aulacoseira*, *Cymbopleura*, *Encyonema*, *Eunotia*, *Fragilaria*, *Gomphonema*, *Luticola*, *Navicula*, *Neidium*, *Nitzschia*, *Pinnularia*, *Psammothidium* and *Stauroneis*. This observation is based on results from peat bogs in Hungary (Buczkó and Wojtal, 2005), southern Poland (Wojtal et al., 1999), Volga Upland (Kulikovskiy, 2008) and the Nur bog in northern Mongolia (Kulikovskiy et al., 2010).

Descriptions of the new taxa, which occurred more than once in the samples, are presented below.

Adlafia bryophila **(Petersen) Moser (1998: 89) (Moser et al., 1998) (pl. 2, Fig. 23, Table 2)**

Valve length 14.4-18.67 µm, width 2.97-3.8 µm; striae 27-33 per 10 µm. At our sampling sites the pH varied from 6.5-7.3, conductivity from 77-350 µS cm^{-1} and the Ca^{2+} concentrations varied from 2.8-69 mg L^{-1}. It is probably cosmopolitan, locally frequent on intermittently wet bryophytes, periodically drying up aerophytic habitats (Lange-Bertalot, 2001; Buczkó and Wojtal, 2005). Occurring in various waters, except those of higher saprobity levels of more than β-mesosaprobic, predominantly under oligosaprobic conditions (Lange-Bertalot, 2001).

***Amphora alpestris* Levkov (2009: 34; 283; pl. 51, Figs 1-14; pl. 168, Figs 1-4; pl. 169, Figs 1-4) (Levkov, 2009) (pl.1, Figs11-12, Table 2)**

Valve length 26.66-5.79 µm, width 16.3-22.35 µm; dorsal striae 14-16, ventral striae 13-15 per 10 µm. In the material studied, pH varied from 6.5-7.3, conductivity from 77-350 µS cm^{-1} and the Ca^{2+} concentrations varied from 2.8-69 mg L^{-1}. According to Levkov (2009), it is widespread in Europe in oligotrophic up to dystrophic, slightly acidic peat bogs, streams and springs.

***Brachysira neglectissima* Lange-Bertalot (2004: 128; pl. 53, Figs 1-13; pl. 54, Figs 1-6) (Werum and Lange-Bertalot, 2004) (pl.2, Fig.29, Table 2)**

Valve length 16.53-19.9 µm, width 4.12-4.86 µm; striae 34-36 per 10 µm Recorded from samples with pH values ranging from 7.1-7.3, conductivity from 78-350 µS cm^{-1} and Ca^{2+} concentrations from 18-69 mg L^{-1}. Recorded from oligotrophic lakes together with *B. neoexilis*. Details about its distribution are missing, some habitats such as eutrophic lakes are doubtful (Hofmann et al., 2013; Werum and Lange-Bertalot, 2004).

***Brachysira neoexilis* Lange-Bertalot (1994: 51; pl. 5, Figs 1-35; pl. 6: Figs 1-6, pl. 17: Figs 7-11: pl. 32: Figs 27-30, pl. 46, Figs 19-27) (Lange-Bertalot and Moser, 1994) (pl.2, Figs 27-28, Table 2)**

Valve length 13.7-26.99 µm, width 3.98-5.54 µm; striae 29-36 per 10 µm. At the sampling sites pH was 6.5, conductivity varied from 59-77 µS cm^{-1} and Ca^{2+} concentrations from 2.8-4.4 mg L^{-1}. According to Hofmann et al. (2013) it is known from oligotrophic and mesotrophic water with low nutrient content.

***Brachysira procera* Lange-Bertalot and Moser (1994: 55; pl. 7: Figs 8-26, pl. 9: Figs 4-6, pl. 32: Figs 21-26) (Lange-Bertalot and Moser, 1994) (pl.2, Fig.26, Table 2)**

Valve length 22.53-30.4 µm, width 4.59-5.62 µm; striae 32 per 10 µm. Recorded from samples with pH values from 6.5 to 7.1, conductivity from 77-78 µS cm^{-1} and Ca^{2+} concentrations from 2.8-18 mg L^{-1}. According to Hofmann et al. (2013), it occurs in oligotrophic, slightly acid water with low nutrient content.

***Caloneis fontinalis* (Grunow) Cleve-Euler (1932: 130) (Cleve-Euler, 1932) (pl.1, Fig.28, Table 2)**

Valve length 12.75-16.95 µm, width 3.46-4.76 µm; striae 23-25 per 10 µm. In the material studied, pH was 7.3, conductivity 350 µS cm^{-1} and the Ca^{2+} concentration was 69 mg L^{-1}. Widespread species recorded in calcium rich, mesotrophic and eutrophic waters (springs and running waters) of low saprobity with a medium or high ion content (Lange-Bertalot and Metzeltin, 1996; Solak and Wojtal, 2005; Hofmann et al., 2013)

***Caloneis tenuis* (Gregory) Krammer (1985: 17) (Krammer and Lange-Bertalot, 1985) (pl.1, Figs 25-26, Table 2)**

Valve length 19.32-29.9 µm, width 4.43-5.94 µm; striae 19-23 per 10 µm. Recorded from samples with pH values from 6.5-7.3, conductivity from 77-350 µS cm^{-1} and Ca^{2+} concentrations from 2.8-69 mg L^{-1}. According to Van Dam et al. (1994), mainly occurring in mesotrophic waters or on wet and moist or temporarily dry places, with very small concentrations of organically bound nitrogen, at pH values of about 7. Widespread in the Nordic-alpine region, especially in standing, occasionally very slowly flowing, oligosaprobic water with a low to medium ion content (Hofmann et al., 2013).

***Chamaepinnularia hassiaca* (Krasske) Cantonati and Lange-Bertalot (2009: 228) (Cantonati and Lange-Bertalot, 2009) (pl.2, Figs 34-35, Table 2)**

Valve length 8.85-12.15 µm, width 2.7-2.98 µm; striae 18-22 per 10 µm. In the material studied pH

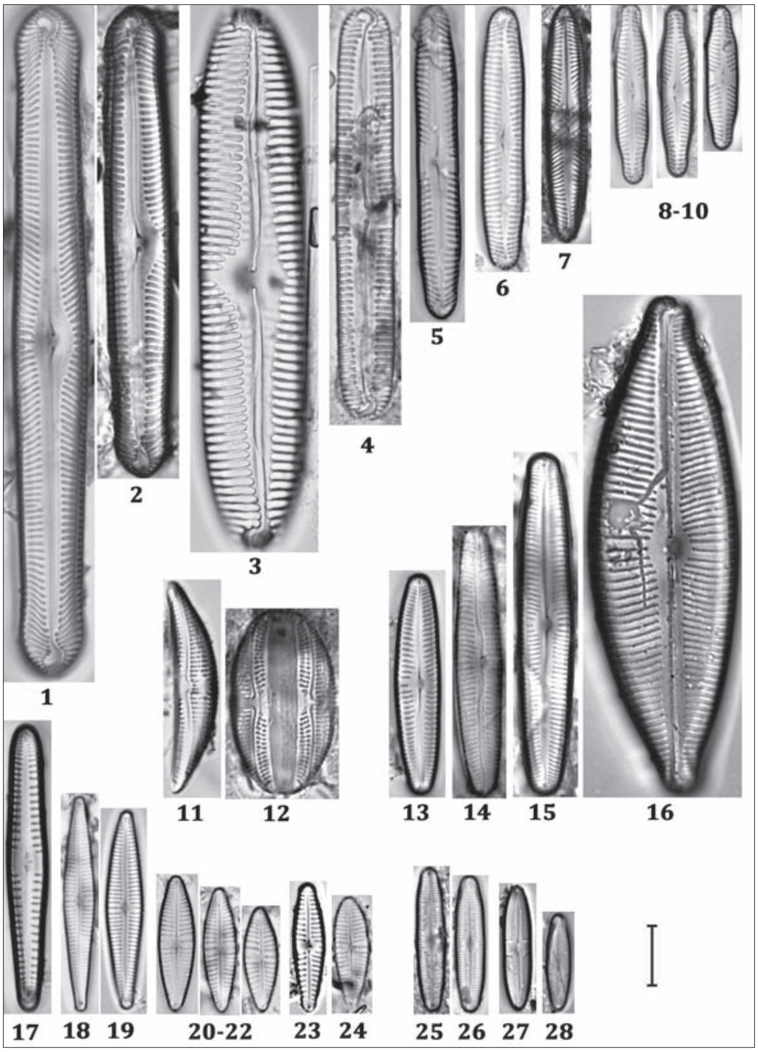

Plate 1 (Figs 1-28). LM micrographs. Figs **1-2** *Pinnularia macilenta*; **Fig. 3.** *P. reichardtii*; **Fig. 4** *P. isostauron*; **Fig. 5.** *P. nodosa*; **Fig. 6.** *P. submicrostauron*; **Fig. 7.** *P. microstauron* var. *angusta*; **Figs 8-10.** *P. marchica*; **Figs 11-12.** *Amphora alpestris*; **Fig. 13.** *Cymbopleura subaequalis* var. *truncata*; **Fig. 14.** *C. subaequalis* var. *alpestris*; **Fig. 15.** *C. oblongata*; **Fig. 16.** *C. lata* var. *truncata*; **Fig. 17.** *Gomphonema lateripunctatum*; Figs 18-19 *G. hebridense*; Figs 20-22 *G. utae*; Fig. 23 *G. occultum*; **Fig. 24.** *G. innocens*; **Figs 25-26.** *Caloneis tenuis*; **Fig. 27.** *C. aerophila*; **Fig. 28.** *C. fontinalis*. Scale bar=10 µm.

values were from 6.5 to 7.1, conductivity from 77-78 µS cm^{-1} and Ca^{2+} concentrations varied from 2.8-18 mg L^{-1}. It is known from streams with silicate surface (Hofmann et al., 2013).

Diploneis krammeri **Lange-Bertalot and Reichardt (2000: 652; pl. 4: Figs 1-10, 12; pl. 5: Figs 1-5; pl. 6: Figs 1-5) (Lange-Bertalot and Reichardt, 2000) (pl.2, Fig.17, Table 2)**

Valve length 32.49-39.51 µm, width 15.97-19 µm; striae 13-14 per 10 µm; areolae 13-15 per 10 µm; central area 4.32-5.29 µm. At our sampling, sites pH was from 7.1-7.3, conductivity varied from 78-350 µS cm^{-1}

Table 2. Checklist of the 45 new observed taxa for Serbian diatom flora from the peat bog at Pešter plateau.

Taxon	Plate	Figure	Diatom communities
Adlafia bryophila (Petersen) Moser	2	23	B, EP
Amphora alpestris Levkov	1	11-12	B, EP, P
Brachysira neglectissima Lange-Bertalot	2	29	B, P
Brachysira neoexilis Lange-Bertalot	2	27-28	B, EP, P
Brachysira procera Lange-Bertalot and Moser	2	26	B, EP, P
**Caloneis aerophila* Bock	1	27	B
Caloneis fontinalis (Grunow) Cleve-Euler	1	28	B, EP
Caloneis tenuis (Gregory) Krammer	1	25-26	B, EP
Chamaepinnularia hassiaca (Krasske) Cantonati & Lange-Bertalot	2	34-35	B, EP
**Cymbopleura lata* var. *truncata* Krammer	1	16	P
**Cymbopleura oblongata* Krammer	1	15	B
**Cymbopleura subaequalis* var. *alpestris* Krammer	1	14	B
**Cymbopleura subaequalis* var. *truncata* Krammer	1	13	B
**Diploneis fontanella* Lange-Bertalot	2	18	B
Diploneis krammeri Lange-Bertalot & Reichardt	2	17	B, EP
Diploneis petersenii Hustedt	2	19-20	B, EP
Diploneis separanda Lange-Bertalot	2	21	B, EP
Encyonema neogracile Krammer	2	15-16	B, EP, P
Encyonema perminutum Krammer	2	13-14	B
**Encyonema persilesiacum* Krammer	2	12	B
Encyonopsis microcephala var. *robusta* (Hustedt) Krammer	2	30-31	B, EP
Encyonopsis minuta Krammer & Reichardt	2	32-33	B, EP, P
Eunotia meisterioides Lange-Bertalot	2	24-25	B, EP, P
Gomphonema hebridense Gregory	1	18-19	B, EP, P
**Gomphonema innocens* Reichardt	1	24	B
**Gomphonema lateripunctatum* Reichardt & Lange-Bertalot	1	17	EP
**Gomphonema occultum* Reichardt and Lange-Bertalot	1	23	B
Gomphonema utae Lange-Bertalot and Reichardt	1	20-22	B, P
**Navicula broetzii* Lange-Bertalot and Reichardt	2	3	EP
Pinnularia isostauron (Ehrenberg) Cleve	1	4	B, P
Pinnularia macilenta Ehrenberg	1	1-2	B, P
Pinnularia marchica Ilka Schönfelder	1	8-10	B, EP, P
**Pinnularia microstauron* var. *angusta* Krammer	1	7	B
**Pinnularia nodosa* (Ehrenberg) Smith	1	5	B
**Pinnularia reichardtii* Krammer	1	3	B
**Pinnularia submicrostauron* Schroeter	1	6	B
**Placoneis navicularis* (Ehrenberg) Cox	2	1-2	B
Psammothidium daonense Lange-Bertalot	2	36-39	B
Psammothidium helveticum (Hustedt) Bukhtiuarova & Round	2	40-41	B
**Sellaphora parapupula* Lange-Bertalot	2	22	B
**Stauroneis acidoclinatopsis* Van de Vijver & Lange-Bertalot	2	4	B
Stauroneis neohyalina Lange-Bertalot	2	7-8	B
Stauroneis reichardtii Lange-Bertalot, Cavacini, Tagliaventi & Alfinito	2	5-6	B, EP, P
Stauroneis separanda Lange-Bertalot & Werum	2	9	B, EP
**Staurosirella pinnata* var. *intercedens* (Grunow) Hamilton	2	10-11	EP

*In the material studied it occurred as a single specimen and will not be described in this paper. **B** – benthos, **EP** – epiphytes, **P** – plankton

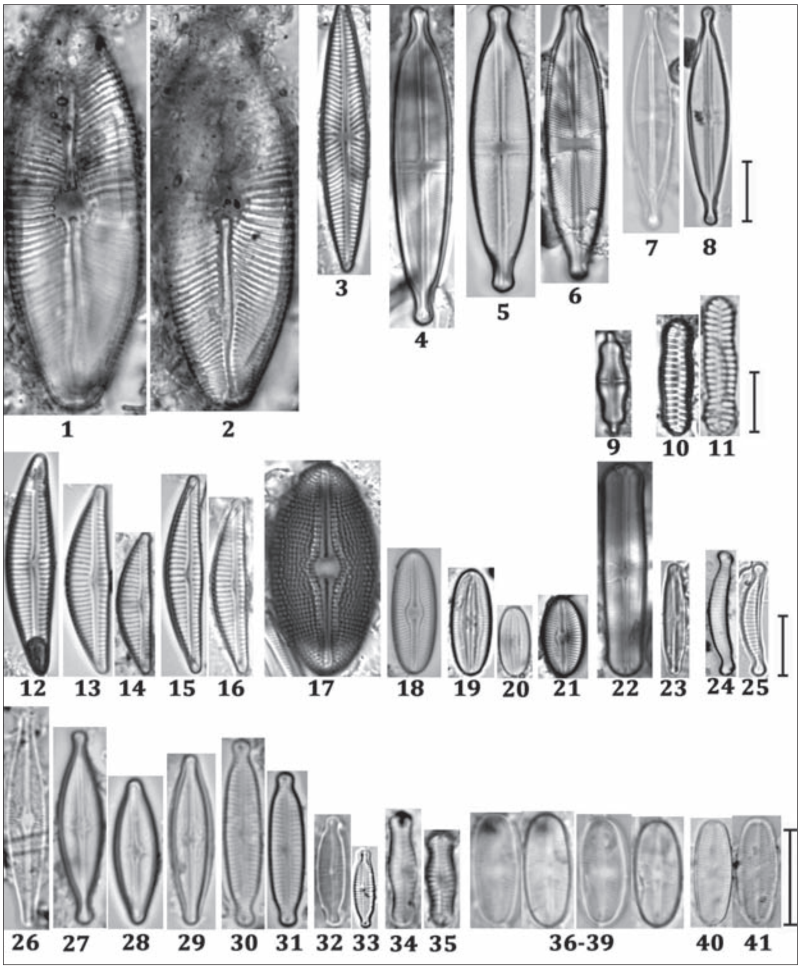

Plate 2 (Figs 1-41). LM micrographs. **Figs 1-2.** *Placoneis navicularis*; **Fig. 3.** *Navicula broetzii*; **Fig. 4.** *Stauroneis acidoclinatopsis*; **Figs 5-6.** *S. reichardtii*; **Figs 7-8.** *S. neohyalina*; **Fig. 9.** *S. separanda*; **Figs 10-11.** *Staurosirella pinnata* var. *intercedens*; **Fig. 12.** *Encyonema persilesiacum*; **Figs 13-14.** *E. perminutum*; **Figs 15-16.** *E. neogracile*; **Fig. 17.** *Diploneis krammeri*; **Fig. 18.** *D. fontanella*; **Figs 19-20.** *D. petersenii*; **Fig. 21.** *D. separanda*; **Fig. 22.** *Sellaphora parapupula*; **Fig. 23.** *Adlafia bryophila*; **Figs 24-25.** *Eunotia meisterioides*; **Fig. 26.** *Brachysira procera*; **Figs 27-28.** *B. neoexilis*; **Fig. 29.** *B. neglectissima*; **Figs 30-31.** *Encyonopsis microcephala* var. *robusta*; **Figs 32-33.** *E. minuta*; Figs **34-35.** *Chamaepinnularia hassiaca*; **Figs 36-39.** *Psammothidium daonense*; **Figs 40-41.** *P. helveticum*. Scale bar = 10 μm.

and Ca^{2+} concentrations from 18-69 mg L^{-1}. Recorded from oligotrophic up to mesotrophic calcareous waters (Hofmann et al., 2013).

Diploneis petersenii **Hustedt (1937: 676, Fig. 1068 f-h) (Hustedt, 1927) (pl.2, Figs 19-20, Table 2)**

Valve length 8.78-20.62 μm, width 5.53-6.15 μm; striae 26-29 per 10 μm. In the material studied pH value was 7.3, conductivity 350 μS cm^{-1} and the Ca^{2+} concentration was 69 mg L^{-1}. Mainly occurring in oligosaprobic and mesotrophic waters with very small concentrations of organically bound nitrogen and at pH values about 7. Especially widespread on wet and moist or temporarily dry places (Van Dam et al., 1994).

***Diploneis separanda* Lange-Bertalot (2004: 144; pl. 76: Figs 1-16; pl. 77: Figs 1-5) (Werum and Lange-Bertalot, 2004) (pl.2, Fig.21, Table 2)**

Valve length 11.12-34.77 μm, width 5.62-8.86 μm; striae 18-23 per 10 μm. Recorded from samples with pH 7.3, conductivity 350 μS cm^{-1} and Ca^{2+} concentration 69 mg L^{-1}. It occurs in calcareous, oligotrophic water (Hofmann et al., 2013; Werum and Lange-Bertalot, 2004).

***Encyonema neogracile* Krammer (1997: 128; pl. 82: Figs 1-13; pl. 83: Figs 1-7; pl. 85: Figs 1-12; pl. 91: Figs 1, 2; pl. 93: Fig. 1; pl. (?) 97: Figs 3, 6) (Krammer, 1997) (pl.2, Figs 15-16, Table 2)**

Valve length 22.89-37.56 μm, width 5.61-7.34 μm; striae 10-16/10 μm in the middle portion becoming 13-17/10 μm towards the ends. At our sampling sites, pH varied from 6.5-7.3, conductivity from 59-350 μS cm^{-1} and Ca^{2+} concentrations from 2.8-69 mg L^{-1}. Cosmopolitan, occurring in acid to circumneutral, oligotrophic lakes and streams with low ion content. Indicator of good water quality (Krammer, 1997; Hofmann et al., 2013).

***Encyonema perminutum* Krammer (1997: 61; pl. 25: Figs 20-27) (Krammer, 1997) (pl.2, Figs 13-14, Table 2)**

Valve length 24.19-31.95 μm, width 6.16-7.35 μm; striae 12-13/10 μm in the middle portion becoming 14/10 μm towards the ends. Found in samples with pH 7.1, conductivity 78 μS cm^{-1} and Ca^{2+} concentration 18 mg L^{-1}. Known only from type locality and quite often at the site (Krammer, 1997).

***Encyonopsis microcephala* var. *robusta* (Hustedt) Krammer (1997: 92; pl. 148: Figs 8, 9) (Krammer, 1997) (pl.2, Figs 30-31, Table 2)**

Valve length 15.23-19.59 μm, width 3.56-4.18 μm; striae 20-21 per 10 μm. Recorded from samples with pH 7.3, conductivity 350 μS cm^{-1} and Ca^{2+} concentration 69 mg L^{-1}. Cosmopolitan, from boreal to tropical zone and always often in suitable habitats. In northern Europe occurring in oligotrophic, acid waters with low electrolyte content. However, in Central Europe and North America occurring in calcium-rich waters with medium electrolyte content (Krammer, 1997).

***Encyonopsis minuta* Krammer and Reichardt (1997: 95; pl. 143: Figs 2, 3; pl. 143a: Figs 1-29; pl. 145: Fig. 15; pl. 149: Figs 17-19; pl. 150: Fig. 23; pl. 151: Figs 1-7; pl. 193: Fig. 5) (Krammer, 1997) (pl.2, Figs 32-33, Table 2)**

Valve length 11.88-14.03 μm, width 3.35-3.56 μm; striae 20-24 per 10 μm. Found in samples with pH 7.3, conductivity 350 μS cm^{-1} and Ca^{2+} concentration 69 mg L^{-1}. Cosmopolitan, from temperate to boreal zone and always often in suitable habitats (Krammer, 1997). Ecological characteristics still missing because of lack of differentiation from *Cymbella microcephala* complex (Hofmann et al., 2013).

***Eunotia meisterioides* Lange-Bertalot (2011: 149; pl. 119, Figs 1-26) (Lange-Bertalot et al., 2011) (pl.2, Figs 24-25, Table 2)**

Valve length 17.49-20.94 μm, width 2.61-4.21 μm; striae 15-17 per 10 μm. At our sampling sites, pH varied from 6.5-7.1, conductivity from 59-78 μS cm^{-1} and Ca^{2+} concentrations varied from 2.8-18 mg L^{-1}. Widespread in Scandinavia and higher mountains. According to Lange-Bertalot (2011), it occurs in acidic, electrolyte-poor, oligotrophic waters.

***Gomphonema hebridense* Gregory (1854: 99; pl. 4, Fig. 19) (Gregory, 1854) (pl.1, Figs 18-19, Table 2)**

Valve length 29.47-50.85 μm, width 5.4-7.12 μm; striae 14-16 per 10 μm. In the material studied, pH varied from 6.5-7.3, conductivity from 77-350 μS cm^{-1} and Ca^{2+} concentrations varied from 2.8-69 mg L^{-1}. According to Hofmann et al. (2013), reported from oligotrophic, circumneutral lakes and rivers of mountain zones with low electrolyte content.

***Gomphonema utae* Lange-Bertalot and Reichardt (1999: 27; pl. 28, Figs 1-37; pl. 29, Figs 1-7) (Reichardt, 1999) (pl.1, Figs 20-22, Table 2)**

Valve length 17.7-29.96 μm, width 5.51-6.48 μm; striae 11-15 per 10 μm. Recorded from samples with pH 7.3, conductivity varying from 59-350 μS cm^{-1} and

Ca^{2+} concentrations from 4.4-69 mg L^{-1}. Generally, species widespread in waters with low electrolyte content; also can be found in wet soil (Hofmann et al., 2013). Known from peat bogs around Valasco River, Italy (Falasco and Bona, 2011), Baryczka stream, Poland (Noga et al., 2013) and in Germany (Reichardt, 1999).

***Pinnularia isostauron* (Ehrenberg) Cleve (1895: 93) (Cleve, 1895) (pl.1, Fig.4, Table 2)**

Valve length 55.27-69.62 µm, width 9.72-10.8 µm; striae 9-10 per 10 µm. In the material studied, pH varied from 6.5-7.1, conductivity from 77-78 µS cm^{-1} and Ca concentrations from 2.8-18 mg L^{-1}. Widespread in arctic, subarctic and nordic areas, commonly isolated. Occurring in oligotrophic to dystrophic waters with very low electrolyte content; pH of 6 and less (Krammer, 2000).

***Pinnularia macilenta* Ehrenberg (1843: 421; pl. 2/1: Fig. 23 (Ehrenberg, 1843) (pl.1, Figs 1-2, Table 2)**

Valve length 79.25-117.45 µm, width 11.2-14.7 µm; striae 8-10 per 10 µm. At our sampling sites, pH varied from 6.5-7.3, conductivity from 59-350 µS cm^{-1} and Ca^{2+} concentrations varied from 2.8-69 mg L^{-1}. Cosmopolitan, records from the tropics and the temperate zone, abundant in places (Krammer, 2000).

***Pinnularia marchica* Ilka Schönfelder (2000: 80; 218; pl. 12, Figs 11-17; pl. 90, Figs 4, 5) (Krammer, 2000) (pl.1, Figs 8-10, Table 2)**

Valve length 24.08-32.39 µm, width 5.4-6.37 µm; striae 13-15 per 10 µm. Recorded from samples with pH values from 6.5-7.1, conductivity 59-78 µS cm^{-1} and Ca^{2+} concentrations 2.8-18 mg L^{-1}. It prefers eutrophic, alkaline waters with moderate electrolyte content (Hofmann et al., 2013). At the type locality not rare, pH values between 7.5-8.8, conductivity about 800 µS cm^{-1} (Krammer, 2000).

***Psammothidium daonense* Lange-Bertalot (1999: 280) (Lange-Bertalot, 1999) (pl.2, Figs 36-39, Table 2)**

Valve length 9.18-12.08 µm, width 4.99-5.41 µm; striae 27-32 per 10 µm. In the material studied, pH was 7.1, conductivity varied from 59-78 µS cm^{-1} and Ca^{2+} concentrations varied from 4.4-18 mg L^{-1}. According to Hofmann et al. (2013), it occurs in oligotrophic up to dystrophic, circumneutral waters with low electrolyte content.

***Psammothidium helveticum* (Hustedt) Bukhtiyarova and Round (1996: 3) (Bukhtiuarova and Round, 1996) (pl.2, Figs 40-41, Table 2)**

Valve length 16.52-17.92 µm, width 5.83-6.59 µm; striae 20-23 per 10 µm. Found in samples with pH 7.1, conductivity 78 µS cm^{-1} and Ca^{2+} concentration 18 mg L^{-1}. Occurs in slightly acid to circumneutral rivers with low electrolyte content on silicate surfaces (Hofmann et al., 2013).

***Stauroneis neohyalina* Lange-Bertalot (1996: 188; pl. 35, Figs 7-10) (Lange-Bertalot and Metzeltin, 1996) (pl.2, Figs 7-8, Table 2)**

Valve length 36.32-37.67 µm, width 6.59-7.34 µm. Recorded from samples with pH values from 6.5-7.1, conductivity 77-78 µS cm^{-1} and Ca^{2+} concentrations 2.8-18 mg L^{-1}. Widely distributed in small humic-rich lakes and wetlands with pH values between 6.2-7.6 and with low electrolyte content (Lange-Bertalot and Metzeltin, 1996).

***Stauroneis reichardtii* Lange-Bertalot, Cavacini, Tagliaventi and Alfinito (2003: 142; pl. 36; pl. 37: Figs 1-14; pl. 61: Figs 6, 7) (Lange-Bertalot et al., 2003) (pl.2, Figs 5-6, Table 2)**

Valve length 46.21-55.28 µm, width 8.64-11.12 µm; striae 19-20 per 10 µm; puncta in the striae 22 per 10 µm. In the material studied, pH varied from 6.5-7.3, conductivity from77-350 µS cm^{-1} and Ca^{2+} concentrations from 2.8-69 mg L^{-1}. Prefers standing waterbodies (small pools and large lakes) with pH values between 6.1-8.1, low nutrient content and conductivity ranging from almost 0 µS cm^{-1} to 280 µS cm^{-1} (Van de Vijver et al., 2004).

***Stauroneis separanda* Lange-Bertalot and Werum (2004: 180; pl. 46, Figs 1-12) (Werum and Lange-Bertalot, 2004) (pl.2, Fig.9, Table 2)**

Valve length 13.83-16.52 µm, width 3.99-5.72 µm; striae 29 per 10 µm. At our sampling sites, pH varied from 6.5-7.3, conductivity from 77-350 µS cm^{-1} and

Ca^{2+} concentrations from 2.8-69 mg L^{-1}. It is widely distributed in chalk-rich springs of Europe with moderate electrolyte content (Hofmann et al., 2013; Werum and Lange-Bertalot, 2004).

The flora of diatoms from the peat bog on the Pešter plateau is formed of acidobiontic, acidophiles, neutrophiles, alkaliphiles, alkalibiontic, indifferents, aerophilic and widely distributed taxa. It is based on the ecological characteristics of taxa according to Lecointe et al. (1993) and Van Dam et al. (1994). Among them, alkaliphile diatoms were dominant. The large development of alkaliphilic species is evidently related to an insufficient study of acidic habitats, including peat bogs (Kulikovskiy, 2008).

The ecological characteristics of the new observed taxa presented in this text, are matched with literature data, with several exceptions. This is a contribution to the knowledge of ecological data for *Encyonopsis minuta*, because of the lack of differentiation within the *Cymbella microcephala* complex (Hofmann et al., 2013). In our samples, *Pinnularia isostauron* was observed at higher pH values than recorded in the literature (pH of 6 and less), while *P. marchica* was recorded at lower pH values and at lower conductivity values than suggested by literature data (pH from 7.5-8.8 and conductivity about 800 μS cm^{-1}) (Krammer, 2000).

Species composition and distribution in the Pešter plateau peat bog, according to Lecointe et al. (1993) and Van Dam et al. (1994), indicate the dystrophic, oligotrophic up to mesotrophic environment of the peat mound. On the whole, the flora is formed by cosmopolitan species with a large involvement of taxa from alpine and subalpine areas.

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