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**NEW AND RARE WATER MITE (*HYDRACHNIDIA*)
SPECIES IN POLISH FAUNA FOUND IN THE KRĄPIEL RIVER
AND VALLEY WATER BODIES IN IŃSKIE LAKE DISTRICT**

Abstract

During investigation in river Krąpiel valley 7 water mite species new to Polish fauna (*Arrenurus falciger*, *Bandakia concreta*, *Eylais degenerata*, *Hydrachna juncta*, *Lebertia longiseta*, *Lebertia (Mixolebertia) sinuata*, *Rutripalpus limicola*) and 29 rare species were recorded.

Keywords: faunal data, water mites, Polish fauna

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Introduction

In the years 2008–2011 the occurrence of water mites (*Hydrachnidia*) was studied in current and marginal pool environments of the Krąpiel River and in water bodies of the river valley: peat bogs, oxbow lakes, springs, fish ponds and temporary pools. The Krąpiel, with a length of 70 km, is a right-bank tributary of the Ina River. In its upper and in part its middle course it has the character of a mountain river with a fast current and a bottom of rocks, gravel or sand. In its upper course it flows through two eutrophic lakes. The landscape of the river valley is varied – mixed forests, meadows and farmland. In the Krąpiel and the valley water bodies 116 water mite species were recorded, including 7 species new to Polish fauna and 29 rare species.

Below we present descriptions of the sampling sites in which new or rare water mite species were recorded. The site codes were taken from earlier publication (Stryjecki et al. 2016).

Study area

K1 – N 53°27'18.6" E 15°28'0.21", a site at the sources of the Krąpiel, river width about 1.5 m. Situated among meadows, with arable fields nearby: K1/5 – relatively fast current, sand and silt bottom with a large quantity of organic matter from withered herbaceous plants growing on the shores, depth 0.2 m., sunlit; K1/6 – marginal pool, sand, silt, thin layer of mud, covered with *Glyceria aquatica*.

K2 – N 53°28'16.37" E 15°24'54.77", situated among forests, before Lake Kamienny Most, river width 1.5–3 m; K2/2 – marginal pool, depth 0.2 m., sand with a small admixture of mud; K2/3 – fast current, depth up to 0.5 m., sand with a small admixture of organic matter (twigs, mud and leaves).

K3 – N 53°27'53.45" E 15°22'45.37", village of Lublino, site situated among meadows surrounded by arable fields beyond Lake Kamienny Most, river width about 2.5 m; K3/1 – marginal pools, *Sparganium*, *Carex*, admixture of leaves, sunlit, depth about 0.2 m, sandy and muddy bottom; K3/4 – gravel in a very fast current, sunlit, depth 1 m.

K4 – N 53°27'44.33" E 15°19'50.38", Chociwel, site situated beyond Lake Chociwel and under its strong influence (severely eutrophic), lies among meadows and near built-up areas, river width about 3 m; K4/1 – plants in the current, *Potamogeton perfoliatus*, *Elodea canadensis*, sunlit, depth 1 m, rapid current;

K4/3 – marginal pools, *Glyceria*, *Phragmites*, *Sparganium*, *Carex*, sunlit, depth 0.5 m.

K6 – N 53°27'55.82" E 15°14'54.79", Rosowo, site situated on the boundary between meadows and forests, river width about 4 m; K6/3 – river with relatively slow current, in the form of a canal in a peat substrate, yellow water-lily in slow current, depth 1 m, bottom-packed peat with a thin layer of mud; K6/6 – steep river bank, dense peat washed by a light current, depth 1 m; K6/8 – *Berula erecta* floating on the water surface and bordering on osiers, light current, depth 0.5 m.

K7 – N 53°27'28.17" E 15°11'49.98, site situated among forests, between Chlebowo and Chlebówko, river width about 5–5.5 m; K7/1 – gravel and large stones in a fast current, depth 0.5 m, shaded; K7/2 – large marginal pools, sand with a thin layer of mud, depth 0.2 m, shaded; K7/3 – sand with organic matter (twigs, leaves) in a fast current, depth 0.2 m, shaded; K7/6 – *Sparganium* in a fast current, only ribbon-like leaves, partially sunlit, depth 0.2 m.

K8 – N 53°26'48" E 15°10'56.24, Rokicie, site situated near damming, by an electric plant, among meadows, surrounded by farmland, river width about 5 m; K8/3 – vast marginal pool with *Glyceria aquatica* and a large amount of decaying organic matter, sunlit, depth 0.2 m; K8/6 – fast current, sand, some *Carex*, depth up to 0.7 m.

K9 – N 53°26'7.27" E 15°11'42.57", site beyond Dzwonowo on the old bed of the Krąpiel, among periodically flooded meadows surrounded by small forests, river width about 3 m; K9/1 – muddy bottom, depth about 0.1 m, weak current, sunlit; K9/3 – *Berula* and *Glyceria* in weak current, depth about 0.1 m.

K10 – N 53°23'9.69" E 15°10'19.34", Dalewo, site among meadows, river width 5–6 m; K10/1 – oxbow covered with *Glyceria* and *Lemna*, with young alders near the shore, completely filled with water and connected to the river, depth up to 0.5 m; K10/2 – ecotone on the boundary between *Glyceria* and grasses, fallen leaves, *Lemna*; K10/3 – marginal pool, *Glyceria*, *Phalaris arundinacea*, depth up to 0.5 m; K10/4 – weak current, ribbon-like leaves of *Sagittaria*, muddy bottom, depth up to 1 m.

K11 – N 53°20'17.33" E 15°9'10.43", site among forests downstream from Pęzino, steep valley walls, river width about 10 m; K11/3 – marginal pool, sand and a thin layer of mud, shaded, depth 0.2 m; K11/4 – plants in the current, ribbon-like leaves of *Sparganium*, sand, depth 0.5 m.

K12 – N 53°19'56.25" E 15°7'57.81", Ulikowo, surrounded by a small alder carr, meadows and farmland, river width 10 m; K12/3 – stones with *Fontinalis*,

very fast current, partly shaded, depth 0.4 m; K12/4 – sand in current with organic matter, some *Glyceria*, depth up to 1 m; K12/5 – marginal pool, mud on sand, *Anemone*, depth 0.2 m.

K13 – N 53°19'9.76" E 15°6'16.54", upstream from Strachocin, among meadows surrounded by farmland, narrow strip of alder carrs and riparian forests by the river, river width about 7 m; K13/1 – shaded marginal pool, sand and mud, grass in places, depth 0.2 m; K13/2 – sand in the current, some *Phalaris*, organic matter in places, shaded, depth 0.5 m.

K14 – N 53°19'6.41" E 15°4'36.94", Święte, site among meadows and farmland, willows and alders by the river, river width about 7 m; K14/5 – sand in the current, steep bank, depth 0.5 m; K14/6 – marginal pool, sand, thin layer of mud, depth 0.1m; K14/7 – ribbon-like *Sparganium* leaves, depth 0.5 m, sunlit, fast current; K14/8 – gravel and debris in the current, depth 0.5 m, sunlit, fast current.

Z1, R1 – N 53°28'8.05" E 15°21'38.12", Krąpiel near Lake Chociwel; in an alder carr and in open terrain, width about 1 m, depth up to 0.5 m, sandy bottom, in places rocky in riffles, springs on the floodplain terrace – in a trough with springs, dry in the summer except the uppermost limnocrène, in May water flows to the limnocrène. R1/1 – riffle, coarse sand, depth 0.2 m; in an alder carr; Z1/2 – limnocrène with sparse *C. aquitiformis*, depth up to 0.4 m.

Z2, R2 – N 53°27'48.15" E 15°17'29.82", Krąpiel near Karkowo, regulated like a canal, width about 4 m, depth up to 1.2 m, open land, *Phragmites* on the banks, springs in an alder carr, low-lying terrain with respect to the river, helocrène seepages and micro-limnocrenes throughout, bottom covered with leaves, a lot of vegetation associated with springs (mainly *C. amara*). Z2/1 – rheocrène, fairly large flow from the aquifer, forming a small stream below, sandy bottom, with a few small pebbles and large quantities of mud and leaves on the sides; depth up to 0.1 m, in an alder car; about 20 m from the river; Z2/2 – helocrène just above the rheocrène, situated amid willows, leaves, a few sedges, mosses, small microlimnocrenes – very thin layer of water (1–2 cm) above a muddy bottom with leaves; Z2/3 – helolimnocrène on the edge of an alder carr, leaves and a few sedges, *C. amara*, very thin layer of water (1–2 cm) with visible flow over a muddy bottom with leaves, about 50 m from the river; Z2/4 – helolimnocrène on the edge of an alder carr, leaves and a few sedges, *C. amara*, very thin layer of water (1–2 cm) over a muddy bottom with leaves, about 30 m from the river.

Z3, R3 – N 53°27'34.98" E 15°12'22.39", Krąpiel upstream from Chlebówko, flowing through an alder carr, partly shaded, character of a mountain river, width about 7 m, depth up to 0.7 m, bottom of rocks and gravel, in places gravel and sand, *Fontinalis* on the rocks, fungi, a lot of oligochaetes – *Lumbricidae* – on the bottom in the current), system of helorheocrenes and small rheocrenes on a slope and helolimnocrenes situated low in the river valley, slope bordering on farmland, covered with broadleaved forest, near the river flat terrain covered with *Ribeso nigri-Alnetum* with large helocrenes, limocrenes of varying surface areas forming in depressions – very shallow (up to 2 cm). R3/1 – a small riffle with a sand and gravel bottom by the river bank, with some organic matter (leaves, branches, a little mud), shaded, depth 0.2 m; R3/4 – marginal pools, sand and mud, shaded, depth 0.2 m; R3/5 – marginal pools, mud on sand, *Mentha* and *C. aquitiformis*; Z3/2 – helocrene, high on the slope of the valley, about 50 m from the river, thick layer of black, viscous mud, with leaves and in places *C. amara* and *Carex*, microlimnocrenes forming, with a thin layer of liquid mud, depth up to 2 cm; Z3/3 – small stream flowing out of Z3/2, sand and gravel bottom, a lot of mud and leaves on the sides, depth up to 2 cm; Z3/5 – helocrene on a slope in an alder carr, thick layer of black mud with tree leaves, very little water (1 cm).

Z4, R4 – N 53°21'5.36" E 15°11'3.62", Krąpiel upstream from Peżino, width about 5 m, depth up to 1 m, traces of prior regulation, riffles only near the bank, sandy bottom, partly shaded, complex of helocrenes in a long trough from the edge of a field about 70 m from the river, slight slope down to the river, covered with alders and willows, *C. amara* and *Carex*, a lot of leaves, microlimnocrenes forming. R4/4 – riffle by the bank, sand covered with *Sagittaria* with ribbon-like leaves, depth 0.7 m; R4/2 marginal pool, mud on sand, sunlit, *Sagittaria* with ribbon-like and above-water leaves, depth 0.2 m; Z4/1 – helocrene in upper part of the trough – 70 m from the river, thin layer of water (1–2 cm) over a muddy bottom with leaves, among vegetation, shaded.

Z5, R5 – N 53°20'30.2" E 15°9'13.37", river downstream from Peżino, width about 10 m, depth up to 1.5 m, flows in a broadleaved forest, fast current, complex of helorheocrenes on a steep slope down to the river, in the upper part an outflow from the aquifer onto a helocrene seepage, gravel bottom with a large amount of organic matter alternating with a mud bottom (black, viscous mud) with leaves, water only in microlimnocrenes; beyond the helocrene seepage a steep downward slope with a hard, limestone bottom, gravel and leaves. R5/1 – riffle near the bank, depth 0.7 m, sand with an admixture of organic matter (leaves, branches);

R5/2 – marginal pool, sand and mud, shaded, depth 0.2 m; Z5/1 – helorheocene in the upper part, gravel and mud; Z5/2 – stream flowing from a helocene on the slope beyond Z5/1, very steep, thin layer of fast-flowing water on a limestone substrate, Z5/4 – stream flowing from a helocene on the slope on a soil substrate, moderate incline, covered with mud in places.

Z6, R6 – N 53°19'47.05" E 15°7'55.35", river in Sułkowo, width 5–10 m, depth up to 1 m, sunlit just below the dam, sandy bottom, shaded a bit further on – a broadleaved forest, rocky bottom, spring alder forest on the floodplain of the river, from the banks to about 20 m into the valley, numerous seepages – helocrenes and limnocrenes, some shaded with leaves on the bottom and some sunlit and overgrown with sedges or vegetation typical of springs; some dry out periodically. R6/1 – riffle 30 m past the damming, coarse sand, depth 0.7 m, sunlit; R6/2 – marginal pool, sand and mud, isolated plants, shaded under a willow, depth 0.2 m; R6/3 – riffle 100 m past the damming, in a broadleaved forest, rocks, depth 0.7 m; R6/4 – marginal pool, sand with mud, under trees, depth 0.4 m; Z6/2 – helolimnocrene, layer of water up to 5 cm, under trees, surrounded by *Carex*, mud and leaves on the bottom, shaded, about 10 m from the river.

D – N 53°24'53.21" E 15°12'42.41", site near fish ponds in the village of Krzywnica. The river assumed the character of a slow-flowing channel strongly shaded by willows and alders, about 1 m deep, with a muddy bottom irregularly covered by arrowhead and Canadian waterweed, with comparatively steep banks with alluvial deposits in some places, covered mainly by rushes, i.e. *Phalaridetum arundinaceae*. D0/1 – bottom of gravel and rocks with an admixture of sand and small amounts of silt and mud; fast-flowing water, about 0.7 m; D0/2 – a location near the river bank among *Sparganium emersum*; sandy and silty bottom, depth about 0.5 m; D1/1 – sunlit, silty bottom with very thick sediment; water velocity very slow, about 0.5 m deep; D1/2 – partly shaded, silty and muddy bottom, very thick; depth: about 0.2 m, covered by *Phalaris arundinacea*; D2/1 – partly shaded, mud and silt bottom with very thick sediment; depth about 0.2 m, covered by reeds, very slow velocity; D2/2 – partly shaded, depth about 0.1 m, silt bottom with very thick sediment, covered by reeds and canary grass, bank overgrown with reeds; D3/1 – partly shaded, very slow velocity, mud and silt bottom with very thick sediment and arrowhead with emergent leaves in some places, depth: about 0.5 m; D3/2 – partly shaded, muddy bottom with very thick sediment; overgrown by canary grass, depth about 0.1 m; D4/1 – partly shaded, depth 0.5 m, sand and gravel bottom with considerable sediment thickness, slow

velocity; D4/2 – partly shaded, depth 0.2 m, sand and gravel bottom with considerable sediment thickness; D5/1 – marginal lake by the bank, straightened river, steep bank, partly shaded, silt bottom covered by broadleaf cattail, depth about 0.5 m, slow water velocity 0.001 m/s; D5/2 – sunlit, silt bottom sparsely covered by waterweed and yellow waterlily, depth about 0.5 m.

Abbreviation: dny – deutonymphs.

Results and discussion

1. *Albia stationis* Thon, 1899

Material: K13: 8 V 2010, 2♂♂, 5 VI 2010, 2♀♀, 2♂♂, 1 dny; R/6: 21 V 2010, 1♀; K14: 5 VI 2010, 5♂, 2♀♀, 1 dny, 13 IX 2010, 2♀♀; K12: 5 VI 2010, 3♀♀, 12 IX 2010, 1♀, 15 X 2010, 1♀; R/5: 13 VII 2010, 1♂.

Species known in Central and Southern Europe. Everywhere considered rare, occurring in small numbers. Recorded in Poland in the Sandomierz Lowland (Kowalik, Biesiadka 1978, 1981; Kowalik 1981, 1984), the Wielkopolsko-Kujawska Lowland (Biesiadka 1971), the Lublin region (Kowalik, Biesiadka 1978), Roztocze (Kowalik 1989) and Pojezierze Mazurskie (Biesiadka et al. 1989). River species associated with lowland rivers. Prefers places with a weak current in detritus sediments. A eurythermal rheophile (Kowalik 1989).

2. *Arrenurus falciger* Viets, 1908

Material: D0: 22 V 2009, 2♀♀, 12 VI 2009, 1♀; D2: 22 V 2009, 1♀; D5: 12 VIII 2009, 1♀; D3: 12 VIII 2009, 1 dny.

Very rare species, new to Poland. It has been recorded in the Torfkanal in Bremen, in Rhineland and in Mecklenburg (Viets 1936).

3. *Arrenurus geminus* George, 1901; synonyms: *Arrenurus eugeminus* Piersig, 1901; *Arrenurus imitator* Koenike, 1908

Material: K10: 6 VIII 2010, 1♂.

Very rare species. Found in fish ponds, rivers and oligotrophic lakes (Lundblad 1968). In Poland it has been recorded in the Wielkopolsko-Kujawska Lowland (Biesiadka 1972) and the Sandomierz Lowland (Kowalik, Biesiadka 1978). It

has been found in a grassy channel in Bremen, Sweden, Denmark, Germany and Poland (Wielkopolska National Park) (Viets 1936). Prefers standing waters (Biesiadka 2008).

4. *Atractides nodipalpis neumani* Lundblad, 1962; synonyms: *Arrenurus neumani* Gerecke, 2003

Material: R/4: 13 VII 2010, 1♂.

Rare species. Noted in Sweden and north-eastern Poland (Biesiadka, Cichocka 2011). Occurs in clean lowland rivers with a rocky bottom.

5. *Bandakia concreta* Thor, 1913

Material: Z/2: 5 XI 2010, 1♂.

Rare species, new to Poland. Noted in Turkey, Germany, Ireland, Norway, Sweden, France and Bornholm (Boyaci, Özkan 2004; Viets 1936).

6. *Brachypoda montii* Maglio, 1924

Material: D5: 22 V 2010, 2 dny; R/4: 13 VII 2010, 2♀♀.

Rare species. Noted in Poland and Turkey (Stryjecki 1997; Esen et al. 2013). A rheophilic species (Biesiadka 2008).

7. *Eylais degenerata* Koenike, 1897; synonyms: *Eylais angulata* Viets, 1911; *Eylais asiatica* Viets, 1926; *Eylais consors* Szalay, 1912; *Eylais galeata* Viets, 1911; *Eylais hispanica* Viets, 1919; *Eylais indica* Viets, 1926; *Eylais intermedia* Thor, 1902; *Eylais microstoma* Viets, 1921; *Eylais pseudorimosa* Piersig, 1906; *Eylais sumatrensis* Viets, 1926; *Eylais transvaalensis* Viets, 1934

Material: R/3: 12 VII 2010, 1♀.

Species new to Poland. It has been recorded in Southern Europe and Africa, Asia Minor, India, China, Iran (Pesic et al. 2007) and Australia (Halliday 1998).

8. *Hydrachna goldfeldi* Thor, 1916; synonym: *Hydrachna hormuzakii* Husiatinschi, 1937

Material: K13: 5 V 2010, 1 dny; K8: 4 VI 2010, 1♂.

It has been recorded in the vicinity of Gdańsk, in Denmark, Sweden, Russia and Turkestan (Viets 1936) as well as in France (Smit, Gerecke 2010). A lowland species, associated with astatic water bodies, prefers standing waters (Biesiadka 2008).

9. *Hydrachna juncta* Walter, 1926; synonym: *Hydrachna globosa juncta* Walter, 1926

Material: K9: 9 VII 2010, 3♀♀.

Recorded in France (Smit, Gerecke 2010), Spain (García-Valdecasas 1988) and the Czech Republic (Kůrka 2005: 146), previously unrecorded in Poland.

10. *Hydrachna skorikowi* Piersig, 1900

Material: DS1: 15 VII 2009, 1 dny, 1♀.

Noted in Silesia, Hungary, Lithuania, Germany and Russia (Viets 1936). A lowland species preferring standing waters (Biesiadka 2008).

11. *Hydrodroma pilosa* Besseling, 1940

Material: K6: 5 V 2010, 1♂, 8 VII 2010, 1 dny; K3: 6 V 2010, 1♂, 10 IX 2010, 1♂, 1♀; K4: 3 VI 2010, 1♂, 1♀, 8 VII 2010, 1♀, 1 dny, 5 VIII 2010, 1♀, 1♂, 10 IX 2010, 1♂, 1♀; K10: 9 VII 2010, 2♀♀, 1 dny, 6 VIII 2010, 1♂, 12 IX 2010, 1♂.

Recorded for the first time in Poland in brackish water in south-east Poland (Kowalik 2002). Noted in France (Smit, Gerecke 2010). A lowland species, considered rare (Biesiadka 2008), probably considerably less rare, mistaken for *H. despiciens*.

12. *Hydrodroma torrenticola* Walter, 1908

Material: K4: 8 VII 2010, 1 dny.

A lowland river species, rarely encountered. Noted in Poland in the vicinity of Poznań (Biesiadka 1978b) and in the Sandomierz Lowland (Kowalik, Biesiadka

1978). Found in Australia (Pestic, Smit 2011), Europe, Turkey and Iran (Pestic et al. 2007).

13. *Hydryphantes peroviensis* Udalzew, 1907

Material: K10: 15 X 2010, 1♂.

A lowland species associated with temporary water bodies (Biesiadka 2008).

14. *Hygrobates norvegicus* Thor, 1897; synonyms: *Hygrobates imminutus* Maglio, 1909; *Rivobates norvegicus* Thor, 1897

Material: Z/2: 2 IX 2010, 1♂.

Boreal-mountain species, associated with springs, crenophile (Biesiadka 2008). Noted in Germany, Scandinavia, Poland, Latvia, Russia, France and the Caucasus (Viets 1936).

15. *Hygrobates setosus* Besseling, 1942.

Material: K6: 3 IV 2010, 2♀♀, 8 VII 2010, 1♂; K5: 26 IV 2010, 2 dny, 4 V 2010, 2 dny; K2: 26 IV 2010, 1 dny, 11 IX 2010, 12♂♂, 17♀♀; K1: 2 V 2010, 3♀♀; K4: 2 V 2010, 21♀♀; K12: 7 V 2010, 1♀, 15 X 2010, 2♂♂ 2♀♀; K13: 8 V 2010, 1♂, 13 IX 2010, 1♂, 1♀; R/5: 20 V 2010, 4♂, 3 IX 2010, 4♂♂, 8♀♀, 7 dny, 5 XI 2010, 6♂♂, 4♀♀; R/6: 21 V 2010, 3♂♂, 1♀, 13 VII 2010, 3♂♂, 4 dny, 3 IX 2010, 3♂♂, 7♀♀; K7: 3 VI 2010, 19♂♂, 14♀♀, 8 VII 2010, 2♂♂, 1♂, 6 VIII 2010, 12♂♂, 6♀♀, 2 dny, 11 IX 2010, 19♂♂, 30♀♀; K8: 4 VI 2010, 3♂♂, 5 VI 2010, 1♀, 6 VIII 2010, 14♂♂, 12♀♀, 11 dny, 11 IX 2010, 109♂♂, 136♀♀; K10: 4 VI 2010, 1♀; K11: 5 VI 2010, 1♂, 2♀♀, 12 IX 2010, 5♂, 1♀, 15 X 2010, 4♂♂, 3♀; K14: 5 VI 2010, 2♀♀, 6 VIII 2010, 1♂; 7 VIII 2010, 3♂♂, 13 IX 2010, 13♂♂, 13♀♀, 16 X 2010, 2♂♂; D2: 12 VIII 2010, 1♂; R/3: 2 IX 2010, 1♂, 1♀, 4 XI 2010, 4♂♂, 8♀♀.

A species recently separated from *H. nigromaculatus* (Martin et al. 2010). The latest data show that it is widespread in rivers all over Poland, prefers current habitats, rheophilic. Prefers flowing waters (Biesiadka 2008). Noted in Germany, Scotland, Norway, the Netherlands, Denmark, Poland, Russia, Austria, Switzerland, France, Lithuania, Latvia, Hungary and Siberia (Viets 1936).

16. *Lebertia glabra* Thor, 1887; synonym: *Lebertia tigillifera* Viets, 1923.

Material: Z/5: 20 V 2010, 1♀, 3 IX 2010, 1♀; Z/4: 3 IX 2010, 1♂.

A very rarely encountered species, associated with springs, crenophilic (Biesiadka 2008). Recorded in Germany, Scotland, Norway, Switzerland and France (Viets 1936).

17. *Lebertia longiseta* Bader, 1955

Material: K13: 8 V 2010, 1♂; K7: 14 X 2010, 1♀.

Very rare species, previously unrecorded in Poland.

18. *Lebertia maglioi* Thor, 1907

Material: K10: 2 V 2010, 1♀; Z/3: 20 V 2010, 1♂.

Mountain species, rare, prefers flowing waters, rheophilic (Biesiadka 2008). Recorded in Austria, Italy, Spain and France (Viets 1936).

19. *Lebertia minutipalpis* Viets, 1920

Material: K12: 6 VIII 2010, 2♂♂, 1♀.

Lowland species, very rarely encountered, prefers flowing waters, rheophilic (Biesiadka 2008). Recorded in Russia, St. Petersburg and the Caucasus (Viets 1936).

20. *Lebertia* (*Lebertia* s. str.) *pusilla* Koenike, 1911; synonyms: *Lebertia* (*Neolebertia*) *olonensis* Sokolow, 1930; *Lebertia* (*Lebertia* s. str.) *pallida* Laska, 1954; *Lebertia* (*Lebertia* s. str.) *silesiaca* Laska, 1955; *Lebertia* (*Lebertia* s. str.) *dalmatica* Viets, 1936; *Lebertia* (*Lebertia* s. str.) *coacta* Walter, 1944

Material: K14: 5 VI 2010, 1♂, 13 IX 2010, 5♂♂, 2♀♀; K11: 5 VI 2010, 1♂, 1♀, 7 VIII 2010, 1♂; K13: 6 VIII 2010, 2♂♂; K12: 7 V 2010, 2♂, 8 V 2010, 1♂, 15 X 2010, 1♀; R/6: 21 V 2010, 1♂, 1♀.

Mountain species, rarely encountered (Biesiadka 2008). Cold-stenothermal rheobiont. Noted in streams in the Pieniny Mountains and in Białka Tatrzańska.

Inhabits Central and Southern Europe. Characteristic of very clean waters (Biesiadka 1979; Zawal, Kowalik 2013).

21. *Lebertia* (*Lebertia* s. str.) *salebrosa* Koenike, 1908; synonyms: *Lebertia* (*Pseudolebertia*) *salebrosa* Thor, 1911; *Lebertia* (*Lebertia* s. str.) *granulosa* Koenike, 1911; *Lebertia* (*Lebertia* s. str.) *inuitata* Koenike, 1919; *Lebertia* (*Lebertia* s. str.) *sculptata* Walter, 1925

Material: Z/2: 12 VII 2010, 1♀; Z/5: 20 V 2010, 1♀, 13 VII 2010, 2♂♂, 3♀♀; Z/3: 2 IX 2010, 1♀.

Very rare species. Cold-stenothermal rheobiont, species associated with springs, crenophilic. Like *L. lineata*, colonizes upper stretches of brooks and rheocrenes. Found in Central and Western Europe, in Poland in the south. Characteristic of the upper section of the epirhithron (Biesiadka 1979, 2008) (Kowalik et al. 1999). Found in European mountains and lowlands, single records in the Alps, Pyrenees and North Africa (Di Sabatino et al. 2010; Goldschmidt, Melzer 2011). On the southern boundaries of its range noted only in springs (Ullrich 1978).

22. *Lebertia* (*Hexalebertia*) *separata* Gerecke, 2006; synonyms: *Lebertia* (*Mixolebertia*) *separata* Lundblad; *Lebertia* (*Hexalebertia*) *stigmatifera* var. *separata* Lundblad, 1930

Material: Z/3: 20 V 2010, 1♂; K5: 4 V 2010, 1 dny.

Species typical of vernal peat bogs (Więcek et al. 2013). Also noted in springs and streams (Gerecke et al. 2005, 2010). Rare and probably often mistaken for *L. stigmatifera*, a crenobiont (Gerecke 2009). Found in Central and South-western Europe (Gerecke 2009) and in Turkey (Esen, Erman 2015).

23. *Lebertia* (*Mixolebertia*) *sinuata* Viets, 1930

Material: Z/2: 12 VII 2010, 2♂♂, 2 IX 2010, 1♂, 1♀.

Species considered a rhithrobiont. Known only in Spain (Gerecke 2009), new to Poland.

24. *Lebertia* (*Lebertia* s. str.) *sparsicapillata* Thor, 1905; synonyms: *Lebertia* (*Neolebertia*) *sparsicapillata* Thor, 1905; *Lebertia* (*Neolebertia*) *westfalica* Koenike, 1919; *Lebertia* (*Lebertia* s. str.) *rufipes cylindrica* Laska, 1952; *Lebertia* (*Lebertia* s. str.) *longieprimerata* Laska, 1953; *Lebertia* (*Pseudolebertia*) *corsica* Angelier, 1954; *Lebertia* (*Lebertia* s. str.) *purpurea* Laska, 1953

Material: Z/2: 24 VII 2010, 1♂.

Mountain species, everywhere very rarely encountered. Present in flowing waters, prefers current environments, rheophilic (Biesiadka 2008). In southern Germany *L. fimbriata* and *L. sparsicapillata* inhabit similar microhabitats in different catchment areas as vicariants. *L. sparsicapillata* appears more often in crystalline waters with a rocky substrate, and *L. fimbriata* in waters with sediments of limestone and clay with higher conductivity. In Sicily *L. fimbriata* is restricted to springs and spring streams at greater heights, while *L. sparsicapillata* chooses larger streams at intermediate and low heights (Gerecke 2009). Found in Europe except for most northern and eastern regions (Di Sabatino et al. 2010), and in Italy (Gerecke, Di Sabatino 2013) and Bavaria in springs and streams (Goldschmidt, Melzer 2011). One of the species that may relocate from southern ecoregions to the north due to climate change (Hop, Heusinkveld 2011).

25. *Limnesia undulatoides* Davids, 1997

Material: K9: 7 V 2010, 3♂♂, 2♀♀, 4 VI 2010, 2♀♀, 9 VII 2010, 3♂♂, 6 VIII 2010, 6♂♂, 10♀♀; K6: 6 VIII 2010, 1♂; K4: 15 IV 2010, 1♀.

A species recently separated from *L. undulata* (Davids 1997). Rare species (ed. Pietrzak 2010). Stagnobiontic (Zawal, Kowalik 2013). Found in eutrophic, standing waters, mostly with well-developed submerged vegetation (Van Haaren, Tempelman 2009). Found in Central Europe (Smit 2010).

26. *Xystonotus willmanni* Pesic et al. 2013; synonyms: *Mideopsis willmanni* Viets, 1920

Material: K14: 5 VI 2010, 1♀; K12: 6 VIII 2010, 2♀♀.

Rarely encountered species, *associated with springs, crenophilic* (Biesiadka 2008). Crawling, found in springs and brooks, on moss and in detritus (Bazan-Strzelecka 1972). A crenobiont, prefers muddy springs with slow outflow

(Gerecke et al. 2005). A Palearctic species found in Western, Central, Southern (Asadi, Pešić 2010) and Northern Europe (Gerecke et al. 2005). In the Netherlands known only from two helocrenes (Smit, Hammen 2000).

27. *Nautarachna crassa* Koenike, 1908; synonyms: *Delmea crassa* Koenike, 1908; *Natarachna karamani* Viets, 1837; *Pionella karamanii* Viets, 1937

Material: K14: 5 VI 2010, 1♀, 10 VII 2010, 1♀; K12: 5 VI 2010, 1♀, 12 IX 2010, 1♀; K11: 12 IX 2010, 1♂, 2♀♀; K13: 13 IX 2010, 1♂.

Rarely encountered species, associated with flowing waters, prefers current environments, rheophilic (Biesiadka 2008). Found in Central Europe and in the Netherlands in slow-flowing water and lowland streams (Sanabria, Scheepens 2011; Smit, Hammen 2000). In Poland also found in springs (Zawal, Kowalik 2013).

28. *Parathyas palustris* Koenike, 1912; synonyms: *Thyas rivalis* Koenike, 1912

Material: K4: 3 VI 2010, 1♂; K10: 2 V 2010, 1♀; K6: 2 V 2010, 2♀♀, 3 dny, 8 VII 2010, 1♂; K7: 3 V 2010, 1♂, 1♀; Z/2: 19 V 2010, 2♂, 2♀, 4 XI 2010, 1♀; Z/1: 19 V 2010, 2♂♂, 3♀♀, 4 XI 2010, 1♂; Z/4: 3 IX 2010, 1♂, 1♀; Z/6: 5 XI 2010, 1♀; K12: 10 VII 2010, 1♂, 1♀, 6 VIII 2010, 3♂♂, 2 dny; K11: 17 IV 2010, 1♀; R/1: 19 V 2010, 3♂♂, 5♀♀, 1 dny; Z/3: 12 VII 2010, 1♀, 20 V 2010, 1♂; K3: 26 IV 2010, 2♀♀, 3 dny.

Species associated with springs, typical of helocrenes (Zawal, Sadanowicz 2012; Di Sabatino et al. 2010). Found mainly in Central Europe (Di Sabatino et al. 2010), very rare in the Netherlands (Smit, Van der Hammen 2012), France (Smit, Gerecke 2009) and Lithuania (Smit et al. 2010). Also known in mountainous regions, e.g. the Alps (Stoch et al. 2011) and Italy (Gerecke, Di Sabatino 2013).

29. *Parathyas thoracata* Piersig, 1896; synonyms: *Thyas thoracata* Piersig, 1896

Material: K1: 14 IV 2010, 2♂♂, 6 V 2010, 1♀, 7 VII 2010, 1♀.

Lowland species, rarely encountered, associated with temporary water bodies (Biesiadka 2008). Widespread in Europe, known in Tunisia. Present in small numbers in shallow waters that dry out periodically (Bazan-Strzelecka 1972). Also occurs on the Baltic island Öland (Nordqvist, Herrmann 2008).

30. *Piersigia intermedia* Williamson, 1912

Material: K6: 5 V 2010, 1♀, 5 VI 2010, 1♀.

Lowland species, rarely encountered, associated with peat and standing water (Biesiadka 2008). Characteristic of temporary semiaquatic habitats, e.g. peat bogs, marshes, swamps, ditches and reed beds becoming terrestrial ecosystems (Smit, Hammen 2000). *P. intermedia* is found in the transitional zone between land and water, which is mainly covered with dense vegetation and coarse organic matter (Smit et al. 2003).

31. *Protzia invalvaris* Piersig, 1898; synonyms: *Protzia pyrenaica* Viets, 1930; *Protzia sculptopetiolata* Szalay, 1936

Material: K9: 9 VII 2010, 1♂.

Mountain species, very rarely encountered, prefers flowing water and current environments, rheophilic (Biesiadka 2008). Central European mountain rheobiont (Skorupski et al. 2000). A cold-stenothermal species (Pešić 1999), Palearctic (Pešić 2002). Found in Europe in the Bistrica and Opasanica Rivers in Montenegro (Dovgal, Pešić 2007; Pešić 1999), in Serbia in the rivers Visočica and Bela Reka (Pešić 2002), in northern Italy (Miccoli et al. 2005), in Germany, the Netherlands, Switzerland, the Czech Republic, Romania, Bulgaria, France and Spain (Szalay 1941; Margalef 1951; Camacho, Valdecasas 2006), in Turkey (Boyac, Özkan 2007) and in Japan (Pešić 1999).

32. *Rutripalpus limicola* Sokolow, 1934

Material: Z/2: 2 IX 2010, 1♀.

Species new to Poland, noted in Russia near St. Petersburg. Found in boggy seepages (springs) with ferruginous water, where it occurs in depressions (limnocrenes) with a black, muddy bottom overgrown with mosses and *Parathyas palustris* – a species associated with spring habitats (Sokolov 1934). Also present on Cape Breton Island in the Atlantic Ocean by the north coasts of North America (Smith 1987) and colonizes helocrenes in springs of the Mindelsee in Germany (Schwoerbel 1991).

33. *Teutonia cometes* Koch, 1837

Material: K11: 15 X 2010, 2♀♀; K12: 15 X 2010, 1♂, 1♀; K2: 14 IV 2010, 1♀; K10: 9 VII 2010, 1♀, 10 VII 2010, 4♂, 1♀, 6 VIII 2010, 1♀; K14: 7 VIII 2010, 1♂, 1♀, 15 X 2010, 2♀♀; K13: 13 IX 2010, 1♂, 1♀; K7: 11 IX 2010, 1♀; D3: 13 VIII 2009, 1 dny.

A boreal-mountain species, rarely encountered, prefers standing and flowing water (Biesiadka 2008). A lentobiont (Bernini et al. 2013) and rare stagnophilic species (Zawal, Kowalik 2013). Present in Europe. Found in Italy in lowland springs in Verona and in a river on Corsica (Gerecke, Di Sabatino 2013).

34. *Thyasides dentatus* Thor, 1897; synonym: *Thyas dentatus* Thor, 1897

Material: K1: 7 VII 2010, 1♀.

A lowland species associated with temporary water bodies (Biesiadka 2008). Noted in astatic pools in Polesie National Park (Stryjecki 2012).

35. *Thyopsis cancellata* Piersig, 1896; synonym: *Thyas cancellata* Protz, 1896

Material: K2: 12 IX 2010, 1♀; Z/4: 3 IX 2010, 1♀.

Rarely encountered species preferring spring habitats, crenophilic (Biesiadka 2008). A Holarctic species, found in North America (Lakes Michigan and Ontario). Very wide habitat tolerance. In North America it is found in temporary water bodies and seepage areas. In Europe *T. cancellata* is also known from springs and even brackish waters. Although it is found in many different habitats, its short strong legs with numerous dense bristles suggest that it developed in an interstitial environment and secondarily adapted to other habitats (Cook 1959).

36. *Tiphys scaurellus* Tuzovskij, 1983

Material: K12: 6 VIII 2010, 1♀; Z/2: 12 VII 2010, 1♀.

A species occurring in temporary water bodies and in sedges and peat bogs (Tuzovsky 2011), new to Poland. Widespread in Europe and Russia (Tuzovsky 1983, 1990; Semenchenko et al. 2010).

37. *Torrenticola similis* Viets, 1939; synonyms: *Atractides similis* Viets, 1939

Material: K11: 5 VI 2010, 1♀, 7 VIII 2010, 3♀♀; R/6: 3 IX 2010, 1♀.

Mountain species, rarely encountered, preferring flowing waters, rheophilic (Biesiadka 2008). Found in Central and Southern Europe (Pešić 2004). The species has been found in Italy in the province of Modena (Gerecke, Di Sabatino 2013), in the Krkonoše Mountains (Špaček 2014) in the Mały Samosz River in Romania (Battes et al. 2000–2001; Cîmpean et al. 2003) and in the Mrtvica and Morača Rivers in Montenegro (Di Sabatino et al. 2003).

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**NOWE I RZADKIE GATUNKI WODOPÓJEK (HYDRACHNIDIA)
W FAUNIE POLSKI ODNOTOWANE W RZECE KRĄPIELI
I ZBIORNIKACH DOLINNYCH NA POJEZIERZU IŃSKIM**

Streszczenie

W trakcie badań nad doliną rzeki Krąpieli stwierdzono obecność 7 gatunków wodopójek nowych (*Arrenurus falciger*, *Bandakia concreta*, *Eylais degenerata*, *Hydrachna juncta*, *Lebertia longiseta*, *Lebertia (Mixolebertia) sinuata*, *Rutripalpus limicola*) i 29 rzadkich w faunie Polski.

Słowa kluczowe: dane faunistyczne, wodopójki, fauna Polski

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