

Water beetles of the Novohradské hory Mts.

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Abstract. We review the distribution of water beetles within the proposed Novohradské hory Protected Landscape Area and along its western border, based on data from 109 localities. In total, at least 154 species were found (3 spp. of Gyrinidae, 7 spp. of Haliplidae, 2 spp. of Noteridae, 61 spp. of Dytiscidae, 13 spp. of Hydraenidae, 1 sp. of Spercheidae, 11 spp. of Helophoridae, 2 spp. of Hydrochidae, 38 spp. of Hydrophilidae including 12 terrestrial spp. of subfamily Sphaeridiinae, at least 6 spp. of Scirtidae, 9 spp. of Elmidae, and 1 sp. of Heteroceridae). Species composition is typical of well-preserved foothill areas. Most of the species are either euryoecious or preferring rather cold and/or acidic habitats. Although the number of species is similar to that found in other recent, comparable faunistic surveys in the Czech Republic, many sampled localities were rather depauperate in species numbers. We discuss possible causes of this phenomenon, identify the most valuable water beetle habitats within the studied area that should be legally protected and/or managed, and list the most interesting faunistic records. Among them, we record *Laccobius ytenensis* Sharp, 1910 for the first time and provide the only recent and reliable records of *Hydraena lapidicola* Kiesenwetter, 1849 from the Czech Republic.

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Klíčová slova: Novohradské hory, vodní brouci, check-list, faunistika

Abstrakt. V této práci předkládáme rozšíření druhů vodních brouků navrhované CHKO Novohradské hory a podél její západní hranice na základě dat ze 109 lokalit. Celkem jsme zaznamenali alespoň 154 druhů (3 spp. Gyrinidae, 7 spp. Haliplidae, 2 spp. Noteridae, 61 spp. Dytiscidae, 13 spp. Hydraenidae, 1 sp. Spercheidae, 11 spp. Helophoridae, 2 spp. Hydrochidae, 38 spp. Hydrophilidae včetně 12 terestrických spp. podčeledi Sphaeridiinae, alespoň 6 spp. Scirtidae, 9 spp. Elmidae a 1 sp. Heteroceridae). Zjištěné druhové spektrum je typické pro zachovalé oblasti podhorského pásma. Převažují euryekní druhy a druhy preferující chladnější a kyselejší stanoviště. Ačkoliv je počet nalezených druhů podobný jako u faunistických studií podobného rozsahu, které byly v nedávné době prováděny v České republice, mnoho zkoumaných lokalit bylo druhově poměrně chudých. V práci diskutujeme možné příčiny tohoto zjištění a vyzdvihujeme lokality, které jsou z hlediska vodních brouků v rámci zkoumané oblasti nejhodnotnější a zasluhující ochranný režim. Dále zmiňujeme nejvýznamnější faunistické nálezy, z nichž druh *Laccobius ytenensis* Sharp, 1910 jsme našli v České republice poprvé; uvádíme také jediné současné a spolehlivé nálezy druhu *Hydraena lapidicola* Kiesenwetter, 1849 z našeho území.

Introduction

The Novohradské hory Mts. are situated between the Šumava Mts. and the Českomoravská vrchovina hills along the Czech-Austrian border. The investigated area is approximately delimited by the state border in the east/south and the settlements of Nové Hrady, Žár, Kaplice, and Tichá in the north/west (approximately 48°36' to 48°19' N and 14°30' to 14°49' E, see also Fig. 1). It consists of the Czech part of the Novohradské hory Mts. and their foothills, spanning altitudes from ca. 480 m a.s.l. in the north (environs of Nové Hrady) to 1072 m a.s.l. in the south (Mt. Kamenec). Average annual temperate varies between ca. 5°C and 7°C; the 6°C isotherm occurs at 700-850 m a.s.l. (Rypl 2002). Annual rainfall increases from the north (ca. 650 mm) to the south (ca. 950 mm), with most rains in summer (Rypl 2002). The majority of the area is hilly and about half of it is covered by cultivated forests, followed by pastures and fields (Kubeš & Mičková 2002).

In the recent decades, faunistic surveys have been carried out in several regions across the territory of the Czech Republic. However, the water beetle fauna of the Novohradské hory Mts. and their foothills has been virtually unknown until recently (Boukal et al. 2001). In this paper, we extend that preliminary report and summarize the results of a survey of the water beetle families Haliplidae, Gyrinidae, Noteridae, Dytiscidae, Hydraenidae, Helophoridae, Hydrochidae, Spercheidae, Hydrophilidae, Scirtidae, Elmidae, Dryopidae,

Limmichidae, Psephenidae, and Heteroceridae within the proposed Novohradské hory Protected Landscape Area and along its western border. Due to several reasons (see Methods and Discussion), we were not able to carry out full quantitative assessment of the localities and we therefore provide only a detailed list of records. We discuss the results and briefly compare them to other faunistic surveys of similar scope and range, identify most valuable water beetle habitats within the studied area, and list the most important faunistic records.

Methods and localities investigated

Our survey is based mainly on adult beetles collected during the years 1999-2003; only a small proportion of the data was obtained in early 1980s and 1990s. We also include the larvae of *Elodes* sp(p)., whose adults are much less easily collected. Altogether, water beetles have been found in more than 100 localities (see Fig. 1); the sampled localities are summarized in Table 1. They are approximately arranged from the south-eastern edge of the studied area outwards, so that localities with higher numbers are generally found at lower altitudes. Unfortunately, our sampling has been constrained by extreme floods in September 2002 and pronouncedly dry weather in 2003.

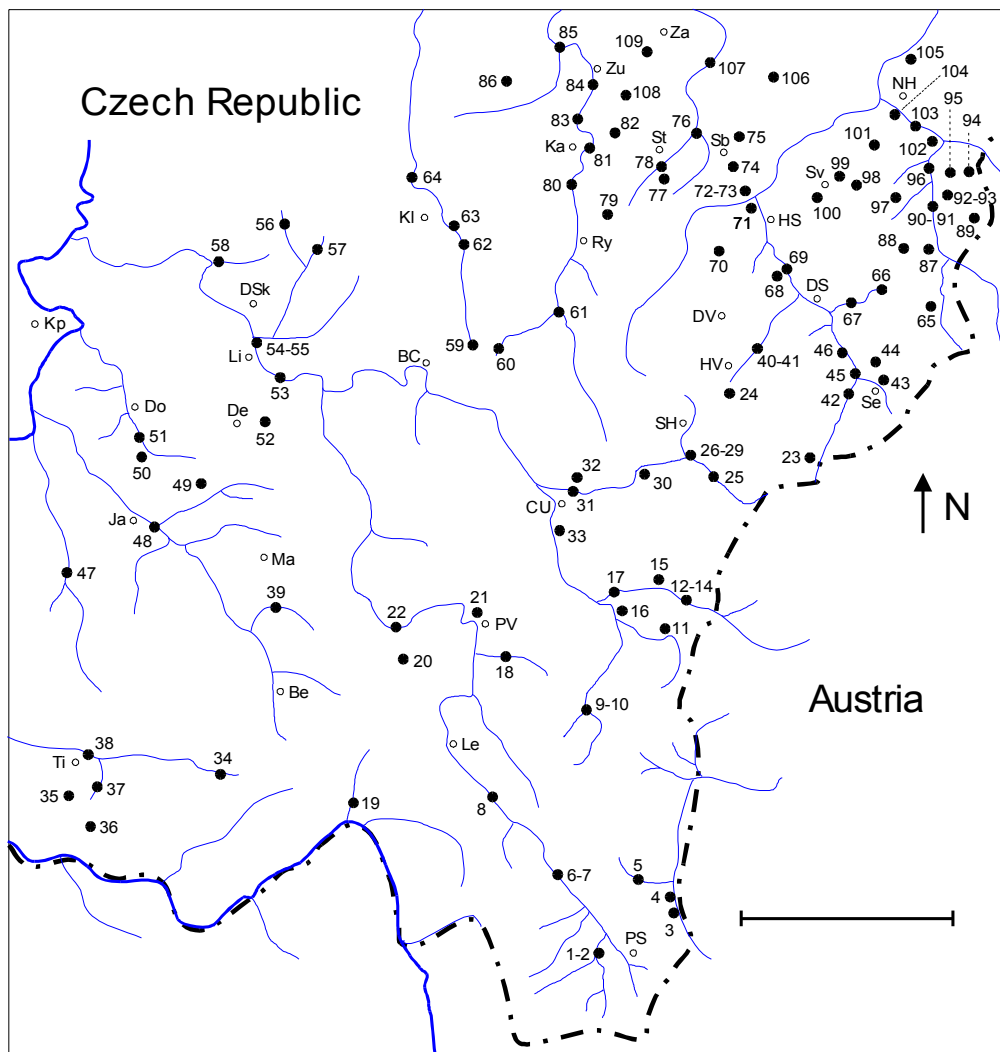


Figure 1. Map of sampled localities (without localities at which no water beetles were found). Thick dot-dashed line = state border; thin solid lines = streams (not all shown); thick solid line = Malše river; full circles = localities (numbers as in Table 1); empty circles = settlements mentioned in Table 1 (BC = Benešov nad černou, Be = Bělá, CU = Černé Údolí, De = Desky, Do = Dobečov, DS = Dlouhá Stropnice, DSk = Děkanské Skaliny, DV = Dobrá Voda, HS = Horní Stropnice, HV = Hojná Voda, Ja = Jaroměř, Ka = Kamenná, Kl = Klení, Kp = Kaplice, Le = Leopoldov, Li = Ličov, Ma = Malonty, NH = Nové Hradě, PS = Pohorí na Šumavě, PV = Pohorská Ves, Ry = Rychnov u Nových Hradů, Sb = Svěbohy, SH = Staré Hutě, Se = Šejby, St = Střeziměřice, Sv = Světví, Ti = Tichá, Za = Žár, Zu = Žumberk). Scale bar = 5 km.

Since water beetles show a wide range of life histories and inhabit a very wide range of (micro)habitats, we used a number of collecting techniques to find as many species as possible within each habitat. These techniques included mainly the use of an aquatic net and kitchen sieve in stagnant, open water habitats, substrate-pressing and subsequent netting in small water bodies with rich plant growth and/or debris (such as floating *Sphagnum* mats), "kicking technique" in stream habitats, sweeping of vegetation surrounding the aquatic habitats, and individual collecting. At each locality, we screened as many microhabitats as possible until no more new species could be found at that site for approximately 20 minutes, and we sorted all material in situ. We immediately released (most) specimens of common and/or easily identifiable species; all other material is kept in our reference collections. Some of the data were provided by researchers who investigated aquatic insects as a whole and/or put emphasis on other insect orders (dates in Table 1 italicised). Thus, their techniques might have been different and/or might have revealed fewer species present at the locality. Finally, we complement our data on aquatic habitats with a limited set of data on the copro- and saprophagous species of the hydrophilid subfamily Sphaeridiinae.

Table 1 (continued on following pages). List of sampled localities (without localities at which no water beetles were found). Altitudes rounded to nearest 10 m above sea level (in few unambiguous cases to nearest 5 m a.s.l.). NR = Nature Reserve, E = east, N = north, S = south, W = west. Asterisk = pooled data, collected in several closely located sites (similar habitats). Sampling dates in square brackets; italics indicates data provided by other researchers.

No.	Locality description [sampling dates]
1-2	Pohoří na Šumavě ca. 0.7 km W, Prameniště Pohořského potoka NR, 895 m a.s.l.; (1) exposed moor with vegetated ditches, <i>Sphagnum</i> mats, small shaded puddles, (2) and small stream, hypocrenal/epirhithral, ca. 1 m wide, gravel [8.5. 2002, 31.5. 2003]
3	Pohoří na Šumavě ca. 1 km NE, Lužnice stream, 860 m a.s.l.; stream in forest above Kapelung pond, shore rootlets, unstable gravel, small pools [31.5. 2003]
4	Pohoří na Šumavě 1 km NE, Kapelníkův rybník pond, 810 m a.s.l.; pond (dammed Lužnice stream) in forest [3.8. 1999]
5	Pohoří na Šumavě, Jánský vrch hill, 860 m a.s.l.; unnamed streamlet in forest, hypocrenal [4.8. 1994, 3.8. 1999]
6-7	Pohoří na Šumavě ca. 2 km NW, Pohořský rybník pond, 890 m a.s.l.; (6) exposed pond (dammed Pohořský potok stream), unstable muddy-sandy bottom, submerged macrophytes, and (7) exposed shallow stream, ca. 1-2 m wide, gravel, moderate current [5.7. 1994, 4.8. 1994, 3.7. 1999, 3.8. 1999, 18.5. 2002, 31.5. 2003]
8	Leopoldov ca. 2 km SE, Pohořský potok stream, 850 m a.s.l.; stream in forest, ca. 3-4 m wide, mossy stones, very compact substrate [18.5. 2002]
9-10	Pohorská Ves 3 km SE, Hutský rybník pond, 815 m a.s.l.; (9) shallow littoral zone with <i>Sphagnum</i> mats and other macrophytes, plus small shaded puddles, and (10) small stream, hypocrenal/epirhithral, stones, gravel and moss [3.7. 1994, 6.7. 1994, 20.7. 1999, 6.7. 2000, 13.7. 2000, 18.5. 2002, 31.5. 2003, 21.9. 2003]
11	Černé Údolí 3.5 km SE, Žofínský prales NR, 740 m a.s.l.; at light [16.7. 2003]
12-14	Černé Údolí 3.5 km SE, Zlatá Ktiš pond, 765 m a.s.l.; (12) Černá stream, epirhithral, bottom of empty pond, exposed, ca. 2-3 m wide, shallow, substrate partly unstable, gravel, sand, stones, mud, grass; (13) empty pond, puddles on sandy bottom, algae; (14) pond shore, littoral vegetation [4.7. 1994, 6.7. 1994, 20.7. 1999, 7.4. 2000, 21.9. 2003]
15	Černé Údolí 3 km SE, Zlatá Ktiš pond env., 750 m a.s.l.; sandy-muddy puddles on forest road [21.9. 2003]
16	Černé Údolí 3 km SSE, Žofín settlement, ca. 750 m a.s.l.; small pond [3.9. 1999]
17	Černé Údolí 2.5 km SSE, Černá stream, 730 m a.s.l.; epirhithral, stones, gravel [30.6. 1990]
18	Pohorská Ves 1 km SSE, 780 m a.s.l.; small pond on a tiny streamlet [3.8. 1999]
19	Bělá 3 km SSE, Mráček pond, 785 m a.s.l.; exposed littoral zone, dense vegetation, and clayey shore pool [6.8. 1999, 20.7. 2003]
20	Pohorská Ves 2 km WSW, 740 m a.s.l.; small pond in forest [17.7. 1999]
21	Pohorská Ves, ca. 740 m a.s.l.; shallow puddles in abandoned sandpit [18.5. 2002]
22	Pohorská Ves ca. 2 km W, Pohořský potok stream, 690 m a.s.l.; metarhithral, ca. 4-5 m wide, flow moderate, gravel, mossy stones [18.5. 2002]
23	Hojná Voda 3 km SE, Prales Hojná Voda NR, ca. 800 m a.s.l.; helocrene spring in mixed forest [9.5. 2003]
24	Hojná Voda env., ca. 800 m a.s.l.; horse dung [9.5. 2003]
25	Staré Hutě 1.5 km SSE, 780 m a.s.l.; small shaded pond on Lužní potok stream, with <i>Carex</i> and moss [5.7. 2000, 20.5. 2001]
26	Staré Hutě 1 km S, 760 m a.s.l.; Lužní potok stream near Mlýnský rybník pond, epirhithral, shaded, gravel, stones, pools [17.8. 2000, 19.5. 2001]

No.	Locality description [sampling dates]
27- 28	Staré Hutě 1 km S, Mlýnský rybník pond, 760 m a.s.l.; (27) littoral zone, and (28) shallow shaded swamp below pond [17.8. 2000 (27), 31.5. 2003 (28)]
29	Staré Hutě 1 km S, Mlýnský rybník pond env., 770 m a.s.l.; wet meadow with puddles in old tracks, partly shaded, some submerged grass [17.5. 2002]
30	Staré Hutě 2 km SW, Starý Holand, 745 m a.s.l.; swampy forest, peatbog [22.7. 2000]
31	Černé Údolí, Lužní potok stream, 710 m a.s.l.; epirhithral, stones, gravel, moss [8.10. 1989]
32	Černé Údolí 1 km NE, 715 m a.s.l.; fresh puddles at forest edge [17.5. 2002]
33	Černé Údolí 0.5 km S, 710 m a.s.l.; small pond near Černá stream [13.7. 1999]
34	Tichá 3.5 km E, Janova Ves, 700 m a.s.l.; eutrophic pond in pasture [17.7. 1999]
35	Tichá 1 km S, ca. 700 m a.s.l.; small pond (spring) [25.9. 1999]
36	Tichá ca. 1.5 km SSE, 690 m a.s.l.; small roadside pool, partly shaded, plants, detritus, <i>Sphagnum</i> mats [18.5. 2002]
37*	Tichá 1 km SE, ca. 670 m a.s.l.; small ponds on streamlet [15.9. 1999, 25.9. 1999, 7.7. 2000, 8.7. 2000]
38	Tichá, Hláška pond, 650 m a.s.l.; eutrophic [7.7. 2000]
39	Malonty 1 km S, 675 m a.s.l.; right tributary of Kamenice stream, hypocrenal/epirhithral, shaded, stony cascades and pools, sand, gravel, tree roots, leaf packs [17.7. 1999, 20.7. 2003]
40	Hojná Voda 0.7 km ENE, Pasecký potok stream, ca. 680 m a.s.l.; epirhithral, very cold, steep cascades [17.5. 2002, 21.9. 2003]
41	Hojná Voda 0.7 km ENE, ca. 690 m a.s.l.; tiny streamlet in forest (left tributary of Pasecký potok stream), hypocrenal [17.5. 2002, 21.9. 2003]
42	Šejby 1km NW, Stropnice stream, 600 m a.s.l.; epirhithral, stones and gravel [17.8. 2000, 17.5. 2002]
43	Šejby, 610 m a.s.l.; small pond [17.5. 2000, 17.8. 2000]
44	Šejby, 610 m a.s.l.; small exposed eutrophic pond [24.3. 2000]
45	Šejby 1km NW, ca. 600 m a.s.l., puddles, drains [20.7. 1999]
46	Hojná Voda 2.5 km ENE, Stropnice stream, ca. 590 m a.s.l.; stream and pools in inundation zone [20.7. 2000]
47	Jaroměř ca. 2 km SW, Mladoňovský potok stream, 620 m a.s.l.; approx. metarhithral, almost no discharge, partly shaded, shore rootlets, trailing grass [30.8. 2003]
48	Jaroměř, Kamenice stream, 605 m a.s.l.; epi-/metarhithral, rather exposed, flow in runs moderate, gravel, stones, moss, leaf packs, few shore rootlets [20.7. 2003]
49	Jaroměř 1.7 km ENE, Velký Hodonický pond, 630 m a.s.l.; eutrophic pond with detritus-rich littoral zone, and shore puddles (clayey-muddy bottom) [11.6. 2000, 30.8. 2003]
50*	Dobechov ca. 1.5 km SSE, ca. 580 m a.s.l.; small ponds in forest [11.6. 2000, 3.7. 2000]
51	Dobechov 1km SSE, Dobechovská nádrž, 570 m a.s.l.; pond on Dobechovský stream [3.7. 2000, 9.7. 2000]
52*	Desky 1 km E, ca. 630 m a.s.l.; small eutrophic ponds [18.5. 2002]
53	Benešov nad Černou 3 km W, Černá stream, 590 m a.s.l.; 8-10 m wide, stones, gravel, moderate flow, partly canalized, slightly polluted [18.5. 2002]
54- 55	Ličov 0.5 km N, 585 m a.s.l.; (54) pond with fen, clayey-muddy bottom, submerged vegetation, and (55) Černá stream, approx. metarhithral, ca. 5m wide, 0.1-0.5 m deep, exposed, gravel, stones, leaves, rootlets [30.8. 2003]
56	Děkanské Skaliny ca. 2 km NNE, Popelický potok stream, 740 m a.s.l.; helocrene spring in peaty meadow [30.8. 2003]
57	Děkanské Skaliny ca. 2 km NE, Popelický potok stream, 690 m a.s.l.; epirhithral, steep cascades, shallow, gravel, mossy stones [30.8. 2003]
58	Děkanské Skaliny 1 km NW, 560 m a.s.l.; streamlet (right tributary of Černá stream), hypocrenal to epirhithral, shaded, gravel, leaves, exposed roots [30.8. 2003]
59*	Benešov nad Černou 1.5 km NE, 640 m a.s.l.; small eutrophic ponds, muddy-sandy bottom, submerged vegetation along shores [6.8. 1999, 22.8. 1999, 30.8. 2003]
60	Benešov nad Černou 2 km ENE, Rychnovský potok stream, 620 m a.s.l.; small streamlet [9.7. 2001]
61	Rychnov u Nových Hradů 1.8 km SW, Hartunkovský pond, 590 m a.s.l.; pond shore, submerged vegetation, gravel [30.8. 2003]
62	Klení 1.7 km SE, Klenský potok stream, 610 m a.s.l.; ditch; almost dried-up, muddy bottom [9.7. 2001]
63	Klení ca. 1 km ESE, Velký Klenský pond, 607 m a.s.l.; littoral zone, subm. vegetation, plant debris [21.9. 2003]
64	Klení ca. 1.5 km N, Klenský potok stream, 585 m a.s.l.; epi-/metarhithral, shaded, flow moderate to fast, shore roots, gravel, leaf packs [30.8. 2003]
65	Dlouhá Stropnice ca. 1 km E, 630 m a.s.l.; little pond in forest [1.5. 2000]
66	Dlouhá Stropnice ca. 2 km E, 620 m a.s.l.; small pond in forest, with <i>Sphagnum</i> [13.7. 1999, 20.7. 1999, 17.5. 2000]
67*	Dlouhá Stropnice ca. 1 km E, ca. 610 m a.s.l.; small ponds and vegetated pools on/along Váčkový stream [26.6. 1999, 3.7. 1999, 21.4. 2000, 1.5. 2000, 8.5. 2000, 17.5. 2000]

No.	Locality description [sampling dates]
68	Dlouhá Stropnice 1 km NW, 570 m a.s.l.; small pool (empty small pond) [12.6. 2000]
69	Horní Stropnice, Stropnice stream, 550 m a.s.l.; approx. metarhithral, gravel, stones, moss [2.8. 1982, 2.8. 1994]
70	Horní Stropnice 1 km SW, 580 m a.s.l.; small pond [19.5. 2000, 5.7. 2000]
71	Horní Stropnice env., ca. 600 m a.s.l.; small, shallow, exposed pond with very rich littoral vegetation [5.8. 1999, 1.5. 2000, 20.5. 2001]
72	Horní Stropnice 1 km NW, Kapříkovský rybník pond, 560 m a.s.l.; eutrophic [12.6. 2000]
73	Horní Stropnice 0.7 km NW, Martin pond, 560 m a.s.l. [5.8. 1999]
74	Svébohy 0.5 km SE, Kubelův pond, 550 m a.s.l.; large, partly shaded eutrophic pond with very sparse littoral vegetation [22.8. 1999, 20.5. 2001]
75	Svébohy, pond, ca. 535 m a.s.l.; exposed, rather eutrophic pond with rich littoral vegetation [16.7. 1999, 10.5. 2003]
76	Svébohy, Nový rybník pond, 520 m a.s.l.; large exposed pond with very rich littoral vegetation [20.5. 2001]
77	Střeziměřice, ca. 540 m a.s.l.; small shaded pond with sparse littoral vegetation (<i>Phragmites</i>) [20.5. 2001]
78	Střeziměřice, 530 m a.s.l.; small drain, slow current, sand, gravel, dense vegetation [20.7. 2003]
79	Rychnov u Nových Hradů 1 km NE, 600 m a.s.l.; pond in forest, muddy bottom, dense submerged vegetation (almost dried-up in 2003) [8.5. 2000, 17.5. 2002, 20.7. 2003]
80	Kamenná 1km SSE, Svinenský potok stream, 555 m a.s.l.; metarhithral, rather shaded, shallow, flow moderate to slow, meandering, sandy-gravelly bottom, shore rootlets, leaf packs [20.7. 2003]
81	Kamenná, Svinenský potok stream, 540 m a.s.l.; metarhithral [12.7. 2001]
82	Kamenná 0.9 km NE, Kamenný pond, 545 m a.s.l.; small pond in forest [12.7. 2001]
83	Kamenná 0.5 km N, 545 m a.s.l.; small semiartificial reservoir in village [12.7. 2001]
84	Žumberk 0.3 km S, Svinenský potok stream, 530 m a.s.l.; metarhithral, sandy bottom, 3 m wide [12.7. 2001]
85	Žumberk 0.8 km WNW, Kondračský potok stream, 520 m a.s.l.; epirhithral, rather shaded, sand, mossy stones [9.7. 2001, 30.8. 2003]
86	Žumberk 2 km WSW, Velký Kondračský pond, 550 m a.s.l. [9.7. 2001]
87*	Nové Hrady 4 km S, 570 m a.s.l.; unnamed ponds, littoral zone and fen/pool in forest below one pond, partly shaded, plants, detritus [27.8. 1999, 14.7. 2000, 17.5. 2002, 10.5. 2003]
88	Nové Hrady 4 km S, ca. 600 m a.s.l.; pastures, sheep dung [11. 5. 2003]
89	Nové Hrady ca. 3.5 km SSE, 570 m a.s.l.; small pond in forest [31.7. 1999, 27.8. 1999, 7.4. 2000, 5.7. 2000, 1.8. 2000]
90-	Nové Hrady ca. 3 km SSE, Veverský potok stream, 540 m a.s.l.; (90) epirhithral, shaded, gravel, stones,
91	and (91) side ditch [31.7. 1999, 3.9. 1999]
92	Nové Hrady 2.5 km SSE, Veverský rybník pond, 545 m a.s.l.; shallow shore, sand/mud, reeds, <i>Sphagnum</i> mats [17.5. 2002]
93	Nové Hrady 2.5 km SSE, 545 m a.s.l.; small pond [27.8. 1999, 3.9. 1999]
94*	Nové Hrady 2.5 km SE, Přesličkové rybníky NR, 540 m a.s.l.; peaty ponds, shallow littoral zone, <i>Sphagnum</i> mats, submerged macrophytes, reeds, detritus, leaves [31.7. 1999, 19.5.2001, 17.5. 2002, 21.9. 2003]
95	Nové Hrady ca. 2.5 km SE, 540 m a.s.l.; sandpit [31.7. 1999]
96	Nové Hrady 2 km S, Veverský potok stream, 470 m a.s.l.; epirhithral, gravel, flow moderate to slow [23.6. 2003]
97*	Nové Hrady ca. 2.5 km S, Mýtiny, ca. 550 m a.s.l.; pools near forest [29.7. 1999, 13.7. 2000]
98	Světví 1 km E, 560 m a.s.l.; small exposed pond and ditch [13.7. 2000]
99	Světví 0.5 km ENE, Pendlerův rybník pond, 555 m a.s.l. [2.8. 1999]
100	Světví, 560 m a.s.l.; eutrophic pond [13.7. 2000]
101	Nové Hrady 1.5 km SSW, 545 m a.s.l.; small exposed pond with large littoral zone (<i>Typha</i> , <i>Sphagnum</i>) [13.7. 2000, 9.5. 2003]
102	Nové Hrady 1.5 km SE, Zevlův rybník pond, ca. 510 m a.s.l.; large eutrophic pond, sparse littoral vegetation (<i>Phragmites</i>) [2.8. 1999, 19.5. 2001]
103	Nové Hrady 1 km S, Novohradský potok stream, 490 m a.s.l.; approx. metarhithral, polluted [2.8. 1999]
104	Nové Hrady, ca. 520 m a.s.l.; cadaver of <i>Erinaceus</i> sp.[9.5. 2003]
105	Nové Hrady 1 km N, 480 m a.s.l.; wet meadow [4.4. 1990]
106	Nové Hrady 3 km WNW, Ovčín pond, 515 m a.s.l.; eutrophic [16.7. 1999]
107	Žár 1 km SE, Žárský rybník pond, 510 m a.s.l.; pond inflow, muddy bottom, detritus [20.7. 1999, 17.5. 2002]
108	Žumberk 1 km SE, ca. 550 m a.s.l.; pool, clayey bottom, dense vegetation, eutrophic [20.7. 1999, 18.8. 2000, 20.7. 2003]
109	Žár 0.7 km SW, Malý Žár pond, 515 m a.s.l.; exposed sandy-muddy shore, sparse vegetation, dumped plant debris [20.7. 2003]

Results

We recorded at least 154 species from 12 families during the survey: 3 species of Gyrinidae, 7 species of Haliplidae, 2 species of Noteridae, 61 species of Dytiscidae, 13 species of Hydraenidae, 1 species of Spercheidae, 11 species of Helophoridae, 2 species of Hydrochidae, 38 species of Hydrophilidae (22 Hydrophilinae, 4 aquatic Sphaeridiinae, and 12 terrestrial Sphaeridiinae), at least 6 species of Scirtidae, 9 species of Elmidae, and 1 species of Heteroceridae. We found no members of the families Dryopidae, Limmichidae and Psephenidae, and did not study other beetle families with semiaquatic species including all Phytophaga. The results are summarized in Table 2. In the table, we list all genera and species alphabetically within each family and use current nomenclature; ecological characteristics and distribution data largely follow Boukal (1999), Hamet et al. (2002), Šťastný et al. (1999), and Trávníček et al. (1999). The abbreviations used in Table 2 indicate only major characteristics and may not include all detailed data that are presently known.

Table 2 (continued on following pages). List of species collected in localities # 1-109. Localities arranged in ascending order under each species. Abbreviations used for ecological characteristics: ac = acidophilous, co = coprophagous, cr = crenophilous, et = eutrophilous, eu = euryoecious, hg = hygrophilous, li = limnophilous, il = iliophilous, le = lentic habitats, lo = lotic habitats, re = rheophilous, rh = rhithral habitats, ri = riparian habitats, sa = saprophagous, si = silicophilous, tb = tyrphobiont, tr = thermophilous, ts = terrestrial, ty = tyrphophilous. Abbreviations used for distribution: AOP = Australian-Oriental-Palaeartic, CSM = Cosmopolitan, EUA = Euroasian, EUR = European, EUS = Eurosiberian, HOL = Holoarctic, ?HOL = probably Holoarctic, PAL = Palaeartic, PON = Pontic, SBB = Subboreal, SBM = Submediterranean, TUR = Turanic, C (N, S, W) = central (northern, southern, western).

Taxon	Ecology	Distr.	Localities
GYRINIDAE			
<i>Gyrinus marinus</i> Gyllenhål, 1808	li/ac	EUS	51, 67, 71, 75
<i>Gyrinus substriatus</i> Stephens, 1828	eu	W PAL	14, 37, 78, 107
<i>Orectochilus villosus</i> (O.F. Müller, 1776)	lo	PAL	55, 80, 81, 84, 103
HALIPLIDAE			
<i>Haliphys flavicollis</i> Sturm, 1834	eu/li	EUS	9, 14, 26, 33, 37-39, 44, 50, 67, 71, 72, 74, 79, 87, 89, 92, 94, 101
<i>Haliphys fulvus</i> (Fabricius, 1801)	ac	HOL	50, 89
<i>Haliphys heydeni</i> Wehncke, 1875	eu	EUS	4, 9, 15, 16, 37, 39, 45, 50, 59, 61, 71, 72, 78, 89, 108
<i>Haliphys immaculatus</i> Gerhardt, 1877	et	PAL	67, 89
<i>Haliphys lineatocollis</i> (Marshall, 1802)	eu/et/lo	PAL	9, 13, 67
<i>Haliphys ruficollis</i> (De Geer, 1774)	eu/et	EUS	6, 9, 14, 19, 27, 37, 39, 49-52, 54, 67, 71-75, 79, 87, 89, 92, 94, 108
<i>Haliphys wehnckeii</i> Gerhardt, 1877	lo	EUS	6, 9, 14, 20, 37, 44, 51, 71, 73, 87, 108
NOTERIDAE			
<i>Noterus clavicornis</i> (De Geer, 1774)	il	EUA	9, 19, 38, 39, 52, 54, 61, 63, 72, 79, 87, 92, 94, 98, 109
<i>Noterus crassicornis</i> (O.F. Müller, 1776)	il	EUR	9, 36-38, 49, 54, 63, 67, 70-72, 75, 79, 87, 92, 94, 98, 99, 108
DYTISCIDAE			
<i>Acilius canaliculatus</i> (Nicolai, 1822)	eu/il	N PAL	35, 94
<i>Acilius sulcatus</i> (Linnaeus, 1758)	eu	PAL	35, 37, 54, 59, 75, 86, 89, 98, 100, 108
<i>Agabus affinis</i> (Paykull, 1798)	ty	PAL	1, 9, 30, 36, 54, 79, 94, 105
<i>Agabus bipustulatus</i> (Linnaeus, 1767)	eu	EUS	1, 4, 8, 9, 14, 21, 30, 33, 49, 75, 78, 79, 94, 95, 101, 105, 108
<i>Agabus congener</i> (Thunberg, 1794)	ac	PAL	1, 9, 30, 87, 94, 105
<i>Agabus guttatus</i> (Paykull, 1798)	lo/re	EUS	2, 12, 23, 30, 36, 43, 46, 89, 105
<i>Agabus melanarius</i> Aubé, 1836	ac	SBB	1, 3, 9, 23, 30, 46, 49, 94, 105
<i>Agabus paludosus</i> (Fabricius, 1801)	lo	W PAL	9, 47, 78
<i>Agabus sturmi</i> (Gyllenhål, 1808)	eu/il	EUS	1, 6, 9, 26, 30, 32, 36, 49, 52, 63, 72, 87, 91, 94, 105
<i>Agabus undulatus</i> (Schrank, 1776)	eu/ac	SBB	9, 23, 44, 52, 79, 86, 87, 92, 94, 100, 101

Taxon	Ecology	Distr.	Localities
<i>Agabus unguicularis</i> (Thomson, 1867)	il	N PAL	79
<i>Colymbetes fuscus</i> (Linnaeus, 1758)	il	PAL	52, 54, 72, 75, 93, 94, 97, 107, 109
<i>Deronectes latus</i> (Stephens, 1829)	re/rh	EUR	10, 80, 84, 85
<i>Deronectes platynotus platynotus</i> (Germar, 1834)	re/rh	EUR	7, 8, 10, 12, 31, 46
<i>Dytiscus circumflexus</i> Fabricius, 1801	si/tr/ac	EUR	108
<i>Dytiscus marginalis</i> Linnaeus, 1758	eu	PAL	9, 35, 37, 52, 66, 79, 93
<i>Graphoderus austriacus</i> (Sturm, 1834)	eu/et	EUS	108
<i>Graphoderus cinereus</i> (Linnaeus, 1758)	eu/et	PAL	61, 75, 79
<i>Graphoderus zonatus</i> (Hoppe, 1795)	et/ac	PAL	9, 86
<i>Graptodytes pictus</i> (Fabricius, 1787)	il	EUR	1, 4, 6, 9, 14, 23, 28, 52, 59, 61, 87, 89, 92, 94, 101
<i>Hydaticus continentalis</i> J. Balfour-Browne, 1944	et/ac	EUS	75
<i>Hydaticus seminiger</i> (De Geer, 1774)	il	PAL	75, 65, 92, 108
<i>Hydroglyphus geminus</i> (Fabricius, 1792)	eu/si/tr	PAL	9, 13, 21, 33, 52, 54, 61, 79, 92, 94, 95, 105, 108, 109
<i>Hydroporus angustatus</i> Sturm, 1835	ac	EUS	1, 4, 9, 36, 52, 54, 75, 79, 92, 94, 107, 108
<i>Hydroporus discretus</i> Fairmaire & Brisout, 1859	cr/si	S EUR	6, 87
<i>Hydroporus erythrocephalus</i> (Linnaeus, 1758)	ac	EUS	1, 9, 30, 36, 46, 52, 94, 105
<i>Hydroporus ferrugineus</i> Stephens, 1828	cr	C EUR	23, 30, 46
<i>Hydroporus gyllenhalii</i> Schiödte, 1841	ty/ac	N, C EUR	105
<i>Hydroporus incognitus</i> Sharp, 1869	ac/il	EUR	1, 4, 9, 21, 28-30, 36, 46, 49, 52, 54, 63, 67, 75, 79, 87, 91, 94, 105, 108
<i>Hydroporus longicornis</i> Sharp, 1871	cr/ac	SBB	1
<i>Hydroporus melanarius</i> Sturm, 1835	ty	EUS	1, 3, 9, 29, 30, 46
<i>Hydroporus memnonius</i> Nicolai, 1822	ac/ty	W PAL	1, 9, 15, 29, 30, 36, 46, 94, 105
<i>Hydroporus neglectus</i> Schaum, 1845	ac/ty	EUR	36, 54, 79, 94
<i>Hydroporus nigrita</i> (Fabricius, 1792)	ac	W PAL	1, 29, 30, 46, 105
<i>Hydroporus obscurus</i> Sturm, 1835	ty	HOL	1, 9, 87
<i>Hydroporus palustris</i> (Linnaeus, 1761)	eu/il	EUS	1, 9, 28, 36, 37, 39, 49, 52, 54, 59, 63, 72, 75, 87, 89, 92, 94, 98, 100, 101, 105, 108
<i>Hydroporus planus</i> (Fabricius, 1781)	eu	EUA	1, 79-81, 94, 105, 108
<i>Hydroporus striola</i> Gyllenhal, 1827	ac	HOL	9, 75, 87, 101
<i>Hydroporus tristis</i> (Paykull, 1798)	ac	HOL	1, 9, 15, 30, 36, 94
<i>Hydroporus umbrosus</i> (Gyllenhal, 1808)	ac	N PAL	9, 30, 36, 75, 79, 80, 94
<i>Hygrotus decoratus</i> (Gyllenhal, 1810)	il/ac	W PAL	75, 79
<i>Hygrotus impressopunctatus</i> (Schaller, 1783)	il	HOL	9, 23, 75, 79, 87, 105, 108, 109
<i>Hygrotus inaequalis</i> (Fabricius, 1777)	eu/et	PAL	36, 54, 67, 72, 75, 79, 86, 87, 92, 94, 98, 100, 101, 105, 107, 108
<i>Hygrotus nigrolineatus</i> (Steven, 1808)	si	W PAL	109
<i>Hygrotus versicolor</i> (Schaller, 1783)	li/lo	PAL	63
<i>Hyphydrus ovatus</i> (Linnaeus, 1761)	il	EUA	9, 14, 34-38, 49, 52, 54, 59, 61, 67, 72, 75, 79, 82, 83, 92-94, 87, 97-99, 100, 105, 108
<i>Ilybius ater</i> (De Geer, 1774)	il	W PAL	36, 39, 54, 62, 63, 75, 79, 83, 86, 92-94, 108
<i>Ilybius crassus</i> Thomson, 1854	ty	N EUR	1, 4, 9, 19, 30
<i>Ilybius fenestratus</i> (Fabricius, 1781)	eu/il	PAL	6, 9, 18, 19, 23, 34, 52, 54, 59, 63, 67, 79, 92, 94, 98, 99, 108
<i>Ilybius fuliginosus</i> (Fabricius, 1792)	eu	PAL	9, 13, 18, 19, 23, 30, 35-39, 47, 52, 54, 60-63, 67, 70-72, 78, 83, 85, 87, 90, 97, 101, 103, 105, 108, 109
<i>Ilybius guttiger</i> (Gyllenhal, 1808)	ty	EUR	67, 94, 108
<i>Ilybius subaeneus</i> Erichson, 1837	il	HOL	72, 108, 109
<i>Laccophilus hyalinus</i> (De Geer, 1774)	il	PAL	67
<i>Laccophilus minutus</i> (Linnaeus, 1758)	eu	PAL	36, 52, 59, 71, 87, 89, 94, 107-109

Taxon	Ecology	Distr.	Localities
<i>Laccophilus poecilus</i> Klug, 1834	li?	W PAL	9, 94
<i>Oreodytes sanmarkii sanmarkii</i> (C.R. Sahlberg, 1826)	re	HOL	2, 5, 8, 12, 17, 31, 42, 46, 48, 55
<i>Platambus maculatus</i> (Linnaeus, 1758)	re	EUA	2, 6, 7, 10, 18, 22, 26, 31, 33, 39, 43, 46-48, 55, 60-62, 64, 67, 78, 80, 81, 84, 85, 90, 96, 103
<i>Rhantus bistratus</i> (Bergstrasser, 1778)	eu	PAL	75
<i>Rhantus exsoletus</i> (Forster, 1771)	eu/il	PAL	6, 9, 37, 44, 52, 67, 75, 79, 82, 87, 92, 94, 97, 101, 105
<i>Rhantus frontalis</i> (Marsham, 1802)	eu/il	PAL	9, 75, 98, 109
<i>Rhantus suturalis</i> (MacLeay, 1825)	eu	AOP	37, 52, 54, 59, 75, 79, 94, 101, 105, 107-109
HYDRAENIDAE			
<i>Hydraena britteni</i> Joy, 1907	ri/ac	EUR	36, 39, 40, 56, 64, 85, 87, 96
<i>Hydraena dentipes</i> Germar, 1842	rh	C EUR	3, 7, 8, 11, 12, 17, 40, 48, 53, 55, 69, 80, 89
<i>Hydraena excisa</i> Kiesenwetter, 1849	re	EUR	58, 80, 85
<i>Hydraena gracilis gracilis</i> Germar, 1824	rh	EUR	1, 3, 7, 8, 11, 12, 17, 22, 31, 39-42, 48, 57, 58, 64, 67, 69, 78, 80, 85, 96
<i>Hydraena lapidicola</i> Kiesenwetter, 1849	rh	C EUR	40, 41
<i>Hydraena melas</i> Dalla Torre, 1877	le/lo/ri	EUR	9, 40, 47, 55, 58, 64, 80, 85, 87, 94
<i>Hydraena minutissima</i> Stephens, 1829	rh	EUR	80, 96
<i>Hydraena pygmaea</i> Waterhouse, 1833	rh	SW PAL	58
<i>Hydraena riparia</i> Kugellan, 1794	re/ri	PAL	3, 7, 22, 29, 31, 47, 48, 55, 64, 69, 78, 80, 85, 92, 96
<i>Hydraena saga</i> d'Orchymont, 1930	rh	EUR	5
<i>Limnebius atomus</i> (Duftschmid, 1805)	le/ri	W PAL	94
<i>Limnebius parvulus</i> (Herbst, 1797)	le/ri	SBB	108
<i>Limnebius truncatellus</i> (Thunberg, 1794)	le/lo/ac	EUR	7, 9, 10, 17, 22, 29, 31, 36, 39, 40, 42, 45, 47, 48, 56, 58, 69, 80, 85, 87, 94, 96
SPERCHEIDAE			
<i>Spercheus emarginatus</i> (Schaller, 1783)	et/tr	PAL	49, 52, 68, 75, 79, 106
HELOPHORIDAE			
<i>Helophorus aequalis</i> Thomson, 1868	eu/il	EUR	9, 13, 72, 67, 87
<i>Helophorus aquaticus</i> (Linnaeus, 1758)	eu/il	W PAL	1, 9, 29, 33, 45, 49, 66, 68, 70, 72, 67, 74, 92, 108
<i>Helophorus arvernensis</i> Mulsant, 1846	ri/lo	EUR	2, 33
<i>Helophorus brevipalpis</i> Bedel, 1881	eu	EUA	8, 19
<i>Helophorus flavipes</i> Fabricius, 1792	ac	EUR	1, 6, 9, 13, 15, 16, 19, 21, 29, 33, 45, 71, 75, 67, 79, 87, 89, 92, 94, 101, 102
<i>Helophorus granularis</i> (Linnaeus, 1761)	eu	EUS	6, 9, 13, 14, 19, 36, 45, 66, 67, 70, 79, 87, 89, 92, 94, 101, 106, 108, 109
<i>Helophorus griseus</i> Herbst, 1793	eu/il	EUR	67, 74, 78, 101, 108, 109
<i>Helophorus minutus</i> Fabricius, 1775	eu/il	EUR	9, 37, 45, 67, 79, 107-109
<i>Helophorus nanus</i> Sturm, 1836	le	EUS	9
<i>Helophorus obscurus</i> Mulsant, 1844	eu/et	EUS	66, 71, 75
<i>Helophorus strigifrons</i> Thomson, 1868	le	EUS	79
HYDROCHIDAE			
<i>Hydrochus crenatus</i> (Fabricius, 1792)	eu	EUR	79, 92
<i>Hydrochus ignicollis</i> Motschulsky, 1860	ac/il	EUR	87
HYDROPHILIDAE			
<i>Anacaena globulus</i> (Paykull, 1798)	lo	W PAL	1-3, 5, 9, 10, 19, 22, 23, 25, 26, 39, 40, 42, 47, 48, 56, 59, 60, 66, 78, 85, 94, 96
<i>Anacaena limbata</i> (Fabricius, 1792)	et	PAL	64, 78, 108, 109
<i>Anacaena lutescens</i> (Stephens, 1829)	et/ac	HOL	1, 6, 8, 9, 13-16, 18, 19, 29, 33, 36, 42, 45, 47-49, 51, 52, 54, 59, 61, 63, 66-68, 70, 75, 78, 79, 87, 89, 91, 92, 94, 98, 101, 108, 109

Taxon	Ecology	Distr.	Localities
<i>Berosus signaticollis</i> (Charpentier, 1825)	et	W PAL	43
<i>Cercyon convexiusculus</i> Stephens, 1829	eu/ri	EUS	77, 79, 87, 92, 94, 107
<i>Cercyon haemorrhoidalis</i> (Fabricius, 1775)	hg/eu/sa	CSM	24, 88
<i>Cercyon impressus</i> (Sturm, 1807)	hg/sa/co	EUR	24, 88
<i>Cercyon laminatus</i> Sharp, 1873	hg/eu/sa	CSM	88, 109
<i>Cercyon lateralis</i> (Marsham, 1802)	hg/eu/sa	PAL	88, 104
<i>Cercyon marinus</i> Thomson, 1853	ri	HOL	109
<i>Cercyon melanocephalus</i> (Linnaeus, 1758)	hg/co/sa	PAL	88
<i>Cercyon pygmaeus</i> (Illiger, 1801)	hg/eu/sa	PAL	88
<i>Cercyon quisquilius</i> (Linnaeus, 1761)	hg/co/sa	CSM	88
<i>Cercyon unipunctatus</i> (Linnaeus, 1758)	hg/eu/sa	PAL	109
<i>Cercyon ustulatus</i> (Preyssler, 1790)	eu/ri	EUS	9, 87, 108
<i>Coelostoma orbiculare</i> (Fabricius, 1775)	eu/et	PAL	9, 21, 25, 36, 59, 66, 75, 79, 87, 92, 94, 108
<i>Crenitis punctatostrata</i> (Letzner, 1840)	tb	C EUR	1, 6, 9, 36
<i>Cryptopleurum minutum</i> (Fabricius, 1775)	hg/co/sa	PAL	88
<i>Cymbiodyta marginella</i> (Fabricius, 1792)	eu	W PAL	25, 36, 94, 109
<i>Enochrus affinis</i> (Thunberg, 1794)	ac	EUS	49
<i>Enochrus bicolor</i> (Fabricius, 1792)	et/eu/tr	PAL	11, 25, 87, 107, 109
<i>Enochrus coarctatus</i> (Gredler, 1863)	ac	EUS	9, 25, 36, 49, 71, 75, 79, 87, 94, 101, 108
<i>Enochrus melanocephalus</i> (Olivier, 1792)	et/tr	W PAL	11, 75, 87
<i>Enochrus ochropterus</i> (Marsham, 1802)	ac	EUS	9, 25, 36, 52, 79, 89, 94, 101, 108
<i>Enochrus quadripunctatus</i> (Herbst, 1797)	eu/et	PAL	19, 79, 87, 94, 107, 109
<i>Enochrus testaceus</i> (Fabricius, 1801)	eu/et	EUS	9, 19, 52, 61, 71, 75, 79, 87, 92, 94, 98, 101, 109
<i>Helochares obscurus</i> (O.F. Müller, 1776)	eu	W PAL	25, 36, 49, 67, 71-73, 75, 79, 87, 92, 94, 100-102, 106, 108, 109
<i>Hydrobius fuscipes</i> (Linnaeus, 1758) not identified to subspecies	eu/ac	HOL	19, 23, 26, 36, 66, 76, 78, 101, 108
<i>Hydrobius fuscipes fuscipes</i> (Linnaeus, 1758)	eu	HOL	1, 3, 6, 9, 15, 87, 92, 94
<i>Hydrobius fuscipes rottenbergi</i> (Gerhardt, 1872)	eu/ac	HOL	9, 79, 109
<i>Hydrochara caraboides</i> (Linnaeus, 1758)	et	EUS	79, 108
<i>Hydrochara flavipes</i> (Steven, 1808)	et/tr	SBM-TUR	18, 43, 66, 70
<i>Laccobius bipunctatus</i> (Fabricius, 1775)	eu	W PAL	1, 9, 16, 21, 52, 59, 63, 87, 108
<i>Laccobius minutus</i> (Linnaeus, 1758)	eu	EUA	4, 6, 9, 11-14, 20, 21, 25, 33, 52, 54, 61, 67, 71, 73, 76, 75, 87, 92, 94, 98, 102, 106-109
<i>Laccobius striatulus</i> (Fabricius, 1801)	eu	W PAL	8, 12, 13, 78, 102, 107
<i>Laccobius ytenensis</i> Sharp, 1910	ac	W PAL	13
<i>Limnoxenus niger</i> (Zschach, 1788)	et/tr	W PAL	94
<i>Megasternum concinnum</i> (Marsham, 1802)	hg/sa	EUS	88
<i>Sphaeridium bipustulatum</i> Fabricius, 1781	hg/sa/co	?HOL	88
<i>Sphaeridium scarabaeoides</i> (Linnaeus, 1758)	hg/co	CSM	88
SCIRTIDAE			
<i>Cyphon coarctatus</i> Paykull, 1799	le/ac	EUR	6, 9, 11, 96
<i>Cyphon padi</i> (Linnaeus, 1758)	le/ac	EUR	8, 9, 54, 79, 87
<i>Cyphon palustris</i> Thomson, 1855	le/ac	EUR-PON	6, 11
<i>Cyphon variabilis</i> (Thunberg, 1787)	le/ac/ty	HOL	1, 9, 11, 19, 36, 67, 75, 79, 89, 94, 92, 100, 101, 108
<i>Elodes</i> sp(p). larvae	rh	-	40, 41, 43, 44, 57, 58, 60, 64
<i>Elodes marginata</i> (Fabricius, 1798)	rh	W EUR	40
<i>Scirtes hemisphaericus</i> (Linnaeus, 1767)	le/ac	EUS	19

Taxon	Ecology	Distr.	Localities
ELMIDAE			
<i>Elmis aenea</i> (Ph. Müller, 1806)	rh	EUR	2, 3, 7, 8, 10-12, 17, 31, 40, 42, 48, 53, 64, 69, 85, 96
<i>Elmis latreillei</i> Bedel, 1878	cr/rh	C EUR	5, 40, 41
<i>Elmis maugetii</i> Latreille, 1798	rh	EUR	8, 17, 22, 48, 55, 64, 69, 80
<i>Elmis obscura</i> (Ph. Müller, 1806)	rh	EUR	64
<i>Elmis rioloides</i> (Kuwert, 1890)	rh	SBM	7, 8, 31, 53, 55, 69, 85
<i>Esolus parallelepipedus</i> (Ph. Müller, 1806)	rh	EUR-SBM	12
<i>Limnius perrisi</i> (Dufour, 1834)	rh	EUR	2, 3, 7, 8, 10-12, 17, 31, 40, 42, 47, 48, 55, 57, 58, 69, 96
<i>Limnius volckmari</i> (Panzer, 1793)	rh	EUR-PON	10, 22, 39, 55, 57, 64, 85
<i>Oulimnius tuberculatus</i> (Ph. Müller, 1806)	rh	EUR	7, 12, 31, 48, 64, 80, 85
HETERO CERIDAE			
<i>Heterocerus fenestratus</i> (Ph. Müller, 1806)	hg/ri	PAL	4, 11

Discussion

Given the extreme climatic conditions during the main sampling period of 2002-2003 and the non-homogeneous data combined from various sources, we have refrained from a more detailed analysis of the data. Thus, the main result of the present paper is an extensive list of water beetles found in the Czech part of the Novohradské hory Mts. and their foothills. The recorded species composition is fairly rich and typical of well-preserved foothill areas; most of the species are either euryoecious or preferring rather cold and/or acidic habitats. Overall, we have recorded about the same amount of species in the studied families as those found in recent surveys of similar scale in areas of similar size (Boukal 1999, Hamet et al. 2002, Šťastný et al. 1999, Trávníček et al. 1999, Trávníček et al. unpublished data). The list of species found in stagnant water habitats is very similar to that found in the Žďárské vrchy hills (part of the Českomoravská vrchovina hills) by Trávníček et al. (unpublished data) and the entire list overlaps to a large extent with the Broumovsko Protected Landscape area (Hamet et al. 2002).

Most streams in the studied area are cold, rather fast flowing mountainous/foothill streams with well-developed water beetle assemblages corresponding to such habitats (although many streams were severely affected by extreme floods that hit most of the studied area in September 2002). The Pasecký potok stream and its unnamed left tributary (localities # 40 and 41) are the only reliably known Czech localities of *Hydraena lapidicola* on the northern limit of its distribution; their legal protection should be urgently considered. The Svinenský potok and the Klenský potok streams in the north-western part of the studied area (localities # 80, 81, 84 and # 64, respectively) show species composition that is characteristic of streams with preserved meanders, moderate to slow current, sandy-gravelly bottom and well-developed shore rootlet microhabitats. We suggest that especially the upper reaches of the Svinenský potok stream would be worth a more thorough investigation, possibly resulting in legal protection of some of the habitats.

The studied area harbours a wide range of stagnant water habitats. We recorded the highest number of species in locality # 9 (Huťský rybník pond, 59 species, but this locality was visited most often), followed by # 94 (Přesličkové Rybníky Nature Reserve, 51 species, but with data pooled over two disjoint ponds), # 79 (pond in forest, 1 km NE of Rychnov u Nových Hradů, 42 species), # 87 (small ponds/fen in forest, 4 km S of Nové Hradý, 41 species, but with data pooled over several similar water bodies), and # 108 (pool with clayey-muddy bottom, 1 km SE Žumberk, 38 species). All these localities are moderately sized to small ponds/pools that possess well-developed littoral zones and are not used for intensive commercial fish breeding. We suggest that especially localities # 9 and # 79 would be worth protection and/or habitat management to prevent excessive eutrophication. All other stagnant water habitats yielded less than 35 species; most of them were rather depauperate and totalled much less than 20 species. This apparent poverty of individual localities is probably caused by several independent factors. First, most unfavourable climatic conditions (the extreme 2002 floods and pronouncedly dry weather in 2003) temporarily decimated water beetle populations in the area and prevented us from a more thorough sampling (including more complete re-sampling of habitats covered only by other researchers).

Second, most of the area is hilly and habitats suitable for many water beetle species (wet meadows, small forest fens/bogs) are often lacking. Some of these habitats have been destroyed during the amelioration frenzy in the 1970s and 1980s (Kubeš & Mičková 2002). Although they have partly recovered since then, some may again become threatened by extensive cattle farming resulting in eutrophication (e.g., the wet meadows north of Nové Hradý, locality # 105, have been largely altered since early 1990). Many ponds at lower altitudes are regularly used for commercial fish breeding. They are often eutrophic and/or do not possess well-developed

littoral zones that are indispensable for most water beetles. On the other hand, other apparently stagnant water bodies within the studied area (mostly at altitudes above 700 m a.s.l.) have been created in the past 250 years by damming the streams to facilitate timber transport from the forests (e.g. localities # 4, 6, 9, and 14). Although they have been put out of use and some of them developed considerable littoral zones with growths of *Sphagnum* and other macrophytes, they cannot be considered as truly stagnant. Moreover, some of the species that usually live in these upland habitats might have so far failed to reach and colonise them. Taken together, these facts may explain why 1) we found all tyrphobiont and most tyrpho-/acidophilous species confined to a small number of habitats at higher elevations in the south-eastern part of the area and why 2) we did not record some of the rare tyrphobionts and tyrpho-/acidophilous species that occur in the neighbouring Šumava Mts. (e.g. *Agabus wasastjernae* (C.R. Sahlberg, 1834)) and in the Třeboňská pánev basin (e.g. *Hydroporus scalesianus* Stephens, 1828, *Bidessus grossepunctatus* Vorbringer, 1907, *Cyphon punctipennis* Sharp, 1873). According to our data, the most valuable water beetle habitats in the mountainous zone are the Hutský rybník pond and the Prameniště Pohořského potoka Nature Reserve (localities # 9-10 and # 1-2, respectively).

Third, species that are more or less thermophilous (*Haliphus fulvus*, *Dytiscus circumflexus*, *Laccophilus poecilus*, *Enochrus bicolor*, *E. melanocephalus*, *Hydrochara flavipes*, *Limnoxenus niger*) have been found mostly at lower altitudes along the northern and western border of the studied area, and all of them have been found only in a small number of localities and specimens. At least some of these species are fairly common in the neighbouring Budějovická and Třeboňská pánev basins and marginally extend into the studied territory. However, it is possible that some of them actually reach the area from the south and south-east (see e.g. one specimen of *L. poecilus* found at locality # 9 and two specimens of *E. bicolor* plus one specimen of *E. melanocephalus* collected at light at locality # 11). More thorough investigation might reveal further species from this group in the future.

Last but not least, we have found almost none of the "pioneering" silicophilous species, especially from the family Dytiscidae (e.g. in comparison with the Broumovsko Protected Landscape Area, see Hamet et al. 2002). During the present survey, we have collected only *Hygrotus nigrolineatus* at locality # 109 (freshly excavated pond side with sandy-muddy bottom). We explain this difference by the combination of the almost complete absence of suitable habitats (abandoned sandpits, clayey pools, and sandy pools along streams) and relatively high altitudes in the Novohradské hory Mts.

Brief comments on the most important bioindicators, rare species and otherwise interesting data found during the present survey are summarized in the following text:

Haliphus wehnckei. The records from the Novohradské hory Mts. are the southernmost ones known so far; the species has not been recorded in the neighbouring Austria or Bavaria.

Deronectes latus. Widely distributed from the French Pyrenees and northern Italy across most of the central and northern Europe to European Russia. In the Czech Republic rare and very localized throughout the entire territory. It inhabits unpolluted streams and rivers (approximately meta- and hyporhithral reaches), and is found among gravel, stones, and shore rootlets.

Hydroporus gyllenhalii. Central and North European species, in the Czech Republic (at least in the southern half) very rare. It usually inhabits peatbogs and forest fens.

Ilybius crassus. Boreal species with boreomontane distribution in central Europe. In the Czech Republic known mainly from mountain ranges along the state border. It prefers cold peatbog habitats.

Laccophilus poecilus. Western Palaearctic species, more common in southern Europe and western Asia. In the Czech Republic so far regularly found only in the southernmost parts of Moravia. It prefers sunlit stagnant habitats (including saline ones) with rich vegetation.

Crenitis punctatostriata. Tyrphobiont species, confined only to well-preserved peatbog areas at middle and high altitudes. However, local populations may be very dense under favourable conditions (e.g. localities # 1 and 9).

Laccobius ytenensis. 1 male, locality # 13, 21.9. 2003, D. Trávníček leg. and det., coll. Museum of South-Eastern Moravia. The species is known mainly from western Europe and north-western Africa; nearest records are from Germany and Poland (Hansen 1999). It is herein recorded from the Czech Republic for the first time.

Hydraena lapidicola. Approximately 30 specimens, locality # 40, 17.5. 2002 and 21.9. 2003, D.S. Boukal and D. Trávníček lgt. and det., coll. D.S. Boukal and Museum of South-eastern Moravia; 5 specimens, locality # 41, 17.5. 2002 and 21.9. 2003, D.S. Boukal lgt., det. and coll. The species is known only from the Alps and their foothills. The present records on the northern limit of its distribution are the only reliable ones from the Czech Republic (see Říha & Jelínek 1993).

Elmis obscura. Central- and South-European species, found almost exclusively among exposed shore roots of deciduous trees in hyporhithral and epipotamal stretches of streams. In the Czech Republic currently known only from a few localities in southern and central Bohemia, although probably more widespread; 585 m a.s.l. (locality # 64) is the highest altitude recorded so far in the Czech Republic.

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