Updating the water beetle fauna of Luxembourg, with notes on the habitat of *Enochrus fuscipennis* (Thomson, 1884) in Luxembourg, Lorraine and Switzerland (Coleoptera: Dytiscidae, Helophoridae, Hydrophilidae, Dryopidae)

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Abstract. Nine species of water beetles are reported for the first time from Luxembourg, which increases the tally to 244. Another two species, *Cybister lateralimarginalis* and *Hydrous piceus*, have been rediscovered after more than a century. Their presence in Luxembourg might be linked to the exceptionally dry spring of 2011 which is thought to have triggered an increase in dispersal activity. *Enochrus fuscipennis*, falsely listed in Gerend (2003) due to a misidentification, does in fact occur in Luxembourg. This species is also recorded from Ticino (Switzerland) and eastern Lorraine (France) and its habitats are described as the presence of this hydrophilid in highly calcareous waters has not been mentioned by previous authors. Additional records are given for 6 species rarely found in the Grand Duchy.

Introduction

Up to now 235 species of aquatic and semi-aquatic Coleoptera were known to occur in Luxembourg (Gerend, 2003, 2006). Although no systematic recording scheme was operated during recent years, aquatic habitats of different quality and size, and located in different parts of the country, continued to be targeted by the author for the sake of their water beetle fauna. The upshot of this sampling effort was the discovery of a further six species hitherto unknown from Luxembourg. Additional data were provided by Roland Proess (L-Steinsel) who, while operating newt traps in an effort to monitor populations of the endangered Great Crested Newt *Triturus cristatus* (Laurenti, 1768), paid attention to other aquatic life as well. This led to the rediscovery, after more than a century, of *Hydrous piceus* (L., 1758), a species recorded twice by Victor Ferrant, Luxembourg's first known coleopterist whose collection is housed at the MNHNL. The same traps also yielded additional records of *Cybister lateralimarginalis* (Degeer, 1774), larvae of which had been previously retrieved from a gravel pit pond in the Moselle valley. Again, this large diving beetle had not been found since Ferrant's days.

As the labels written by V. Ferrant, unfortunately, do not give the year of the capture but only day and month, no exact dates can be given. We can only try to deduce the approximate dates from other sources. One such source could be a paper on molluscs published by Ferrant (1892). Localities given in this paper are often the same as those found on the labels born by water beetles in his collection. It is thus not unreasonable to infer that at least part of Ferrant's water beetles were collected along with aquatic molluscs while he gathered material for this paper, i.e. prior to 1892.

In recent years large batches of beetles from localities in the southeast of Luxembourg were collected by members of the Luxembourg Natural History Museum's staff and later identified by Frank Köhler (Germany-Bornheim). None of these data have been

published so far. Those concerning noteworthy aquatic beetles are included here.

The aim of this paper is to report the species that are to be added to the national list. Along with this, records of some aquatic Coleoptera rarely found in Luxembourg are presented along with detailled information about their habitats, occurrence in the larger area around Luxembourg and sampling methods.

Methods

Specimens were caught with a sturdy pond net. Those meant to be preserved in a reference collection were killed with ethyl acetate vapours and then transferred to vials containing an alcohol-acetic acid-based solution. They were later card-mounted or pinned and placed in the author's collection. Specimens sampled in newt traps by Roland Proess were photographed from above and below and then released. The identifications by the author are hence based on these pictures.

Adult beetles were identified with Angus (1992), Drost et al. (1992), Hansen (1987), Nilsson & Holmen (1995) and Olmi (1976). The Ferrant and Mousset collections housed in the MNHNL were consulted when necessary.

Abbreviation: MNHNL = Musée national d'histoire naturelle du Luxembourg / National Natural History Museum of Luxembourg.

Results

Dytiscidae

Rhantus grapii (Gyllenhal, 1808)

Remerschen: gravel pit area „Haff Réimech" (nature reserve) in Moselle floodplain, exact location of trap unknown, roughly 49°29'50"N 6°21'36"E, 1 specimen, 11.07.2005, light trap operated by MNHNL staff, det. Frank Köhler (Germany).

Dudelange: „Wal" (Natura 2000 area LU0001029), 49°29'24.5"N 6°07'11"E, 310 m a.s.l., 1 specimen, 08.04.2011, newt trap operated by Roland Proess, det. R. Gerend; same locality: 1 male, 25.05.2011, pond net, leg. et det. R. Gerend; same locality: 1 female, 29.06.2013, pond net, leg. et det. R. Gerend.

New to Luxembourg.

Rhantus (synonym *Nartus*) *grapii* is a diving beetle with a wide European range (Nilsson & Holmen, 1995) and it is known to occur in all the neighbouring countries (though according to Köhler & Klausnitzer, 1998, there are no records from Saarland). Hence its presence in Luxembourg does not come as a surprise. As for its status, there seems to be no absolute unanimity. Although considered to be overall unthreatened in its German range (Hess et al. 1999), it seems to be vulnerable in Belgium (Dopagne, www.users.swing.be/p.martin/dytiscus.htm), fairly rare in the Netherlands (Van Nieukerken 1992), and with only a handful of recent records from Alsace (Callot 1990) and Lorraine (Gerend, unpublished).

Rhantus grapii is seen by most authors as an inhabitant of mature, sometimes temporary water bodies with dense vegetation and accumulation of organic detritus at the bottom. Its association with fenland habitats is stressed by several authors (Van Nieukerken 1992, Nilsson & Homen 1995). Hess et al. (1999) mention a wide range of trophic conditions, including dystrophic, and report its occurrence in shaded woodland pools.

The fact that the species has never been caught prior to 2011 (the catch at light is not considered here) is probably due to insufficiently searching the right type of water body rather than it suddenly becoming more numerous.

Nothing is known about the origin of the specimen caught at light in the Remerschen-Wintrange gravel pit area near the Moselle. Recently created ponds are not its usual habitat, but most water bodies in this nature reserve have evolved over the years and large reed beds and even patches of swamp forest can now be found, making the presence in this place of water beetles confined to mature ponds and detritus-rich situations highly likely.

The specimens caught in Dudelange are from a small detritus pool in mature oak-hornbeam woodland on heavy, clayey soil

(Fig. 1). The pool is partially shaded and temporary in most years, usually drying up in the course of summer. The water body is almost completely clogged with leaves from deciduous trees and fringed by *Glyceria fluitans*-beds, the only other plants being *Lemna minor* and *Riccia* sp. along with some scattered *Iris pseudacorus* and *Oenanthe aquatica*. Due to an exceptionally dry spring, there was not much water left at the end of May 2011, when values for pH and electric conductivity were 6,43 and 109 µS/cm respectively. The water of this pool can thus be regarded as slightly acid and mesotrophic, a situation pertaining to most of the dozen or so pools that can be found in this forest (Gerend, unpubl.).

Despite its small size and rather unspectacular looks, the pool yielded a total of 23 species of aquatic Coleoptera on both visits (though only 6 were caught in the newt trap in April).

Hydrovatus cuspidatus (Kunze, 1818)

Remerschen: gravel pit area „Haff Réimech" (nature reserve) in Moselle floodplain (ca. 144 m a.s.l.), 49°30'00"N 6°21'29"E, at least 10 specimens, 13.05.2011, pond net, leg. R. Gerend. (2 spec. in coll.).

This tiny diving beetle had not previously been recorded from Luxembourg. It has a Circum-Mediterranean distribution with the northernmost populations reaching the European lowlands along the coasts of the North Sea and the Baltic. Further inland the species seems to have been much rarer in the past with only sporadic records from Germany (Horion, 1941) and it is very likely that it is currently expanding its range towards the northeast in the western and central parts of Europe. Similarly it is thought to have reached the German federal state of Mecklenburg-Vorpommern during the past 10 or 20 years (Hendrich et al., 2011), this time from its bases in south-eastern Europe.

In the western parts of its range it is mainly associated with permanent, fairly eutrophic water bodies such as ponds and ditches, on the edges of which it can be found amidst the root systems of riparian plants (Drost et al. 1992, Foster & Friday 2011).

In the gravel pits of the "Haff Réimech" specimens could be found, quite typically, on the extreme edge of a pond with generally rather steep banks. The beetles were hiding at the base of *Juncus inflexus*-tussocks or amidst debris and rootlets of *Phragmites*, *Typha*, *Lythrum salicaria*, *Carex* sp. in well-mineralized water (conductivity 390 µS/cm).

Hygrotus parallelogrammus (Ahrens, 1812)

W of Bech-Kleinmacher and SE of Heesberhaff: "Ënnescht Lach" (woodland edge), 49°34'01.7"N 6°18'55.6"E, 199 m a.s.l., at light, 21.07.1998, 1 specimen, leg. Marc Meyer (MNHNL), det. F. Köhler.

New to Luxembourg.

Hygrotus parallelogrammus is a halophile species with a large Palaearctic area which can usually be found in coastal habitats with brackish water (Nilsson & Holmen 1995). The nearest known populations are those from the Seille valley in eastern Lorraine (département Moselle), an area renowned for its saline habitats and their associated specialized fauna and flora. According to Jacquemin (2001) the species can be locally quite common there and its presence some 390 km from its nearest coastal populations has been known for at least 116 years (Horion, 1941 citing Bourgeois, 1898). It is known to occur inland in open ponds as well, though one can presume that this is not its normal habitat (Nilsson & Holmen, op.cit.).

As the origin of the specimen caught at light near Bech-Kleinmacher is unknown, one can only speculate that its presence might be linked to the area's numerous ponds ("Haff Réimech" nature reserve) whose water is generally well-mineralized due to seepage from gypsum-rich layers of the Triassic.

Agabus congener (Thunberg, 1794)

Beaufort: small woodland bog "Elteschmuer" on top of the sandstone plateau at 410 m a.s.l., 49°50'20.43"N 6°15'45.15"E, 1 female, 02.03.2011, leg. R. Gerend.

New to Luxembourg.



Fig. 1. Dudelange "Wal". Temporary pool in oak-hornbeam woodland with regular presence of *Rhantus grapii* and 22 other aquatic Coleoptera. This pool is just one of at least a dozen similar ones in the Luxemburgish part of the vast Zoufftgen forest. Photo: R. Gerend.

Agabus congener is a diving beetle of the northern Palaearctic with a range extending from the British Isles eastwards into Siberia (Nilsson & Holmen, 1995) It is known from all the neighbouring countries of Luxembourg, the nearest populations being those of the "Plateau des Tailles" in Belgium (N of Bastogne) and of the Hunsrück and Eifel in Germany (Horion 1941, Gerend, unpubl. data). Although there are no data from Lorraine, the species is well established in the bogs of the Vosges mountains on both granite and sandstone, and does even occur in acid-oligotrophic habitats at lower altitude in northern Alsace (Callot 1990).

Agabus congener is a typical inhabitant of water bodies with a low pH such as pools on bogs or acid heaths. Although it is not restricted to *Sphagnum*, this seems to be the preferred habitat type in the southern parts of its range (Nilsson & Holmen 1995).

Compared to areas like the above-mentioned "Plateau des Tailles" or the even



Fig. 2. Larva of *Cybister lateralimarginalis* from the Remerschen/Wintrange gravel pits. Detail of the head with characteristically three-toothed margin of frontoclypeus and inner margin of mandibles with a row of short setae. Scale bar: 2 mm. Photo: R. Gerend.

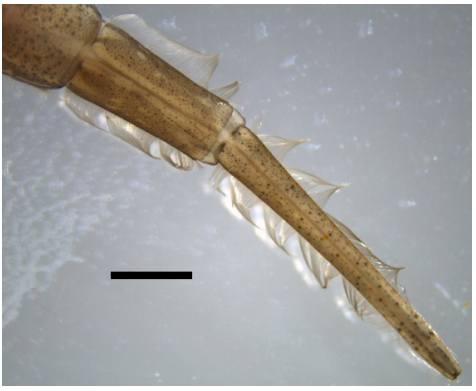


Fig. 3. Larva of *Cybister lateralimarginalis*. Detail of seventh and eighth abdominal segments. The last one is elongated and bears a pair of extremely reduced urogomphi. Scale bar: 2 mm. Photo: R. Gerend.

more formidable "Hautes Fagnes", which are both only a short distance from Luxembourg's northernmost tip, the Grand-Duchy harbours only an impoverished peatland fauna. Apart from the different climatic conditions, the "Hautes Fagnes" are much wetter and cooler, this is essentially explained by the fact that the Devonian rocks of northern Luxembourg make for a far less acidic substrate than those of the Belgian massifs. The absence of periglacial structures such as the famous "lithalsas" (formerly known as "pingos") further explains why several highly specialized acidophile species are absent from Luxembourg simply through lack of suitable habitats.

On the other hand tiny islands of acid-oligotrophic habitats have developed amidst vast swathes of limestone landscape in the southern two-thirds of the country. These are mainly isolated local and rain-fed pools of the sandstone and marl landscapes of central and eastern Luxembourg where the calcareous bedrock has been sealed from the overlying water body by a more or less thick layer of organic detritus and a subsequent colonization by fen mosses which further increased the acid character of the water. In some places the decalcification of the topmost layers may have favoured the development of such acidic and meso- to oligotrophic conditions. The small woodland bog "Elteschmuer" may be seen as one of the more prominent instances of the latter. Situated on the heights of the sandstone plateau it lies in a small depression and is exclusively fed by rainwater and run-off from the surrounding acidic woodlands. The vegetation consists of birch (*Betula pubescens*) and willow carr with *Sphagnum* moss covering the ground.

Agabus congener co-occurs with *Agabus affinis* and the equally acidophile *Hydroporus neglectus* and *H. gyllenhalii*.

Agabus unguicularis (Thomson, 1867)

Bous: "Weiergewan", 17.06.2011, swampy, shallow farmland pond, 49°32'17.43"N 6°18'26.67"E, 210 m a.s.l., 5 leg. (several males), leg. R. Gerend.

This northern Palaearctic species (Nilsson & Holmen 1995) is currently only known from a few locations in southwestern Luxembourg (Gerend, unpubl. data) and it used to be unknown to both Victor Ferrant and Alfred Mousset as their collections do not contain specimens of this species. As an inhabitant of very shallow waters, it seems to prefer situations with amphibic mosses or accumulations of organic debris in meso- rather than eutrophic conditions (Foster & Friday 2011, Drost et al. 1992, Nilsson & Holmen 1995). At the location near Bous it was mainly found in an area of only a few square meters with very shallow water and



Fig. 4. Bous "Weiergewan". A large shallow pond with a very diverse fauna and flora, arguably one of the richest freshwater habitats of Luxembourg. One adult *Cybister lateralimarginalis* has been caught here in a newt trap. Photo: R. Gerend.

thick mats of an unidentified aquatic or amphibic bryophyte.

Cybister lateralimarginalis (Degeer, 1774) (Figs 2 and 3)

Remerschen: "Haff Réimech" (nature reserve), flooded gravel pits in the Moselle valley, 49°29'51.17"N 6°21' 30.00"E, 141 m a.s.l., 26.06.2010, several larvae, leg. R. Gerend.

Koerich: "Lauterbur", shallow artificial well-vegetated pond, 49°40'59"N 5°56'26"E, 270 m a.s.l., 15.05.2011, 1 adult, leg. et det. Rol. Proess.

Bous: "Weiergewan", swampy, shallow farmland pond (Fig. 4), 49°32'17.43"N 6°18'26.67"E, 210 m a.s.l., 18.05.2011, leg. et det. Rol. Proess.

Victor Ferrant caught one specimen of this large and nimble diving beetle more than hundred years ago (no date on the label as usually) somewhere in the vicinity of Remich. It is tempting to explain the recent upsurge in sightings of a species hitherto considered a great rarity as a reaction of its populations to climate warming.

Helophoridae

Helophorus dorsalis (Marsham, 1802)

North of Bettemburg: "Beetebuerger Bësch" (FFH LU0001077), woodland, 49°33'4.26"N 6°5'9.69"E, 25.07.2008, 2 specimens in a light trap, leg. et det. F. Köhler (Köhler 2012).

Schengen: "Grouf" (FFH LU0001029), woodland, 49°28'20.52"N 6°20'36.88"E, 25.07.2008, 1 specimen beaten from vegetation, leg. et det. F. Köhler (Köhler 2013).

New to Luxembourg.

According to Hansen (1987) and Angus (1992), *Helophorus dorsalis* is a species ranging from England and France in the west, through central Europe and reaching the northern Caucasus and the Istanbul region of Turkey in the east. In the north Holstein is reached.

In the Netherlands the species has not been found since around 1900 (Drost et al., 1992), it seems to be absent from Alsace (Callot 2001) and the author knows of no records from Lorraine either. It is well known from the Cologne area in western Germany (Köhler pers. comm.) but has not been found in Saarland yet (Köhler & Klausnitzer 1998). No information seems to be available for Belgium.

Being an inhabitant of small, often temporary and muddy pools in wooded areas and also prone to turn up in flooded wheel ruts (Hansen 1987, Angus 1992, Angus cited in Drost et al. 1992, Köhler 2012) it should not be that hard to find the species in the field, although Köhler (op.cit.) claims just that and thinks that specimens are more easily recorded at light or with the famous "autocatcher" (a large net mounted on a car roof). This approach is supported by the fact that the three specimens he took in Luxembourg in 2008 were all caught the same day in July while out of water, very probably on the wing to effect their dispersal flight (Köhler, 2012). Nevertheless the species is probably rare in Luxembourg as the author so far failed to record it, even though apparently suitable habitats in southern Luxembourg were thoroughly sampled using different techniques, not least light trapping and driving around with an autocatcher.

Helophorus discrepans Rey, 1885

Consdorf: "Larebierg", seasonal *Carex* detritus pool, 49°47'38.37"N 6°19'34.73"E, 336 m a.s.l., 06.04.1994, 1 male, leg. R. Gerend.

Wintrange: "Haff Réimech", flooded gravel pit of Moselle valley, 49°29'51"N 6°21'27"E, 143 m a.s.l., 02.06.2001, 1 male flushed from bank, leg. et det. Oscar Vorst.

Roodt-sur-Eisch: "Grondbur", spring-fed artificial pool, 49°41'29.75"N 5°59'45.70"E, 261 m a.s.l, 02.04.2002, 1 male, leg. R. Gerend.

Berbourg:"Loch", seasonal *Carex* detritus pool (Fig. 5), 49°44'41.30"N 6°23'49.40"E, 318 m a.s.l., 14.03.2012, 1 male, leg. R. Gerend.

Gerend & Callot (2001) reported this species as new to the fauna of Luxembourg. This record was based on a single male caught in 1998 in a ditch in the upper Alzette valley. Subsequently a batch of water beetles from a seasonal pool near Consdorf sampled in 1994 yielded yet another male of this elusive species, followed by three more records in a little more than a decade. Not surprisingly all were males which can be reliably identified thanks to their quite unmistakable aedeagus. In the light of these new

data it seems obvious that the species is a genuine part of our fauna, although quite a rarity and that it might easily go unnoticed amid batches of other, more common Helophorus with which it shares the same habitat.

With the exception of one male taken by flushing the banks of a larger pond, all our specimens have been netted from small, temporary pools with much coarse debris in the shallows. The Consdorf and Berbourg locations are natural water bodies of the type regionally known under the French designation "mardelles" whose origin is still debated but which might have developed when the dissolution of pockets of mineral salts in the bedrock caused the topsoil layer to collapse. Those layers consisting of clay, the depressions were then effectively sealed and subsequently filled with rain water. In a landscape naturally devoid of larger water bodies these small pools have since become a most valuable habitat for many different aquatic species.

Helophorus flavipes Fabricius, 1792

Consdorf: "Larebierg", *Carex* pool, 49°47'38.37"N 6°19'34.73"E, 336 m a.s.l., 06.04.1994, 3 males, leg. R. Gerend.

Basbellain: "Kiirchermillen", valley of "Weierbaach", recently created pool with poorly mineralized water (cond. 66 µS/cm), 50°08'20.98"N 5°57'34.57"E, 460 m a.s.l., 01.05.2005, 2 specimens (1 male), leg. R. Gerend.

New to Luxembourg.

This is a widespread European species with no previous records from Luxembourg. In fact it is its sibling *Helophorus obscurus* which we used to find exclusively for years, prompting the thought that there might be something wrong with our identifications, until we found *Helophorus flavipes* on the "Plateau des Tailles" in Belgium and, eventually, on the nearby high grounds of northwestern Luxembourg (Basbellain). Helophorus obscurus on the other hand subsequently turned out to be very common in most parts of the country as well as in French Lorraine. This doesn't hardly come as a surprise as the latter seems to be the lowland vicariad of the sibling group, as well as having a preference for neutral or basic waters (Angus 1992, Hansen 1987), thus making it the likelier species in a country where limestone rocks and lower altitudes (< 500 m asl.) prevail.

According to the above-mentioned authors and Drost et al. (1992) *Helophorus flavipes* is a species more readily associated with acid waters and *Sphagnum* growth than most other Helophoridae. This fact is also corroborated by Callot (2001) who gives only high-altitude (> 700 m asl.) locations in bogs for it in Alsace whereas *H. obscurus* is dominant in the lowland parts of this region.

The species is not restricted to the upland "Ösling" though, as we recently found a couple of males (females have not been identified to species level) in an hitherto unidentified batch of water beetles from a small detritus pool in the eastern Gutland (Consdorf) dating back to 1994. Interestingly this is from a rather mesotrophic shallow pool with acidophile plants (*Potentilla palustris* e.g.) and which happens to harbour one of only two known luxemburgish populations of *Hydroporus umbrosus* (Gyllenhal, 1808), a diving beetle also reputed to prefer acid conditions. Sadly, a recent visit to this place failed to produce any of the afore-mentioned species as the whole pool had been dug out, exposing the underlying clay and thus utterly changing both its chemistry and its vegetation. This is a shocking example of how indiscriminate and uninformed management, well intended as it may be, can wreak havoc on sensitive parts of our natural heritage. This instance is the more infuriating as data could have been looked up in the national data base of the Natural History Museum prior to carrying out the works.

Hydrophilidae

Enochrus fuscipennis (Thomson, 1884)

Niedercolpach (Colpach-Bas): "Grendeler Bruch", alkaline mire in the floodplain of River Attert (Fig.6), 49°45'13.90"N 5°49'08.88"E, 286 m a.s.l., Belgian part of the reserve: Grendel: 49°45'14.11"N 5°49'06.65"E 286 m a.s.l., 16.08.2013, 3 males, 1 female, leg. R. Gerend.

Locations outside Luxembourg:

Switzerland, Ticino, SE Passo di Lucomagno, about 1.7 road km northwest of Acquacalda,



Fig. 5. Berbourg. Small temporary *Carex* detritus pool where one male of the elusive *Helophorus discrepans* was recorded in 2012. As there are neither natural lakes nor larger, well-preserved alluvial plains in Luxembourg, tiny pools like this one are often the only stagnant waters available in the agrarian setting. Photo: R. Gerend.



Fig. 6. Niedercolpach "Grendeler Bruch". Mire in the valley of River Attert straddling the border with Belgium. A small population of *Enochrus fuscipennis* was found here in 2013. Most specimens were caught in liquid mud to the left of the board walk. Photo: R. Gerend.

46°32'47.05"N 8°49'01.87"E, 1805 m a.s.l., calcareous mire (Fig. 7), 17.07.2013, in large numbers, leg. et det. R. Gerend.

France, département Moselle (57), NE Vittoncourt, "Marais de Vittoncourt", 49°01'40.57"N 6°27'58.53"E and 49°01'38.97"N 6°28'04.43"E, 231 m a.s.l., small pool on hay meadow and calcareous mire (Fig. 8), 08.08.2013, in large numbers, leg. et det. R. Gerend.

New to Luxembourg.

This species has been erroneously reported from Luxembourg in the first checklist (Gerend 2003) because of a confusion with *Enochrus ochropterus* (Marsham 1802). It is a Palaearctic species known from a large number of countries (Hansen 1999, Hebauer & Klausnitzer 1998) but its occurrence seems to be quite irregular and indications as to its ecology differ quite wildly. Van Berge Henegouwen (in: Drost et al. 1992) sees it mainly as an inhabitant of acid waters on sandy soils, yet also mentions a co-occurrence with *Enochrus quadripunctatus* (Herbst, 1797) in non-acid



Fig. 7. Switzerland, Ticino. Important calcareous mire with a large population of *Enochrus fuscipennis* south of the Passo di Lucomagno in the Swiss Alps. Photo: R. Gerend.



Fig. 8. France. "Marais de Vittoncourt" in eastern Lorraine: A calcareous mire dominated by *Phragmites* and *Cladium mariscus* with thick mats of Characean algae growing in the shallow pools. *Enochrus fuscipennis* was very common here in 2013. Photo: R. Gerend.

conditions. Hebauer & Klausnitzer (1998) mention detritus-rich ditches in mires and describe the species as acidophile. The preference for acid waters is also stressed by Hansen (1987) although he qualifies this by noting a proclivity to slightly more eutrophic waters, especially so when compared to the much more acidophile *E. ochropterus* Marsham, 1802. So the general picture is that of a species inhabiting shallow, generally well vegetated and detritus-rich waters with a marked tendency towards less eutrophic and acid waters. As the species was recently found under rather different circumstances in Luxembourg, France and Switzerland, especially with regard to the chemical conditions, the habitats shall be described in more detail here.

In fact the three localities, and those two where the species turned up in huge numbers decidedly so, are alkaline, spring-fed mires. The Swiss and French sites were dominated by *Phragmites communis* while the patches of open water were choked by Characeans. Amphibic bryophytes carpeted the ground between the reed stalks. At the

French site in Lorraine a pH of 7.42 and an electric conductivity of 2588 µS/cm were measured in August 2013. Other noteworthy plant species in France were *Cladium mariscus*, *Schoenus nigricans* and *Thelypteris palustris*, which are all characteristic elements of this type of habitat in Lorraine. In both countries specimens of *Enochrus fuscipennis* were found in shallow puddles amidst *Chara* mats or at the edges of semi-aquatic bryophyte tufts. A good measure of black, liquid and malodorous mud was generally involved.

The site known as "Marais de Grendel" or "Grendeler Bruch" straddles the border between Belgium and Luxembourg in the alluvial plain of River Attert. The vegetation of this site is much more heterogeneous than that of the Swiss and French mires and much of it was dry in August 2013. *Enochrus fuscipennis* was a good deal less common here than at the two other places and only a handful of specimens turned up in the northeastern corner of the reserve. The specimens were found in seepages of spring water with a bottom of liquid mud and large amounts of coarse detritus and a vegetation of unidentified grasses, *Scirpus sylvaticus*, *Iris pseudacorus*, *Equisetum* sp., *Nasturtium* sp. and even *Typha latifolia*. Characeans were not encountered here. The fauna was dominated by species rather typically found in spring-fed and well vegetated waters such as *Agabus paludosus*, *Hydraena britteni*, *Laccobius bipunctatus*, *Hydroporus incognitus*, *H. nigrita* and *Limnebius truncatellus* along with such generalists as *Agabus sturmii*, *Hydroporus angustatus*, *Coelostoma orbiculare*, *Helophorus minutus* and *H. obscurus*.

Enochrus bicolor (Fabricius, 1792)

W of Bech-Kleinmacher: S Reckingerhaff, valley of "Hesslèngerbaach", 49°32'00"N 6°18'37"E, 176 m a.s.l., caught at light, 08.10.1998, 2 specimens, leg. Marc Meyer (MNHNL), det. F. Köhler.

New to Luxembourg.

Enochrus bicolor is a halophile species distributed along the coasts of much of Europe (Hansen 1987). It is locally common in eastern Lorraine where its habitats are natural and industrial sites with high salinity (Jacquemin 2001, Gerend, unpubl.). Hansen (op.cit.) and Hebauer (1998) mention its occasional presence in fresh water habitats, most often clayey ponds in gravel pits along major rivers where the insects might be found amongst algal mats. As it flies readily specimens are often caught at light. The single specimen taken at Bech-Kleinmacher very probably flew in from one of the numerous ponds of the "Haff Réimech" area. Recent efforts to find the species there in situ with a net were unsuccessful.

Limnoxenus niger Zschach, 1788 (Fig. 9)

Bettemburg: "Huedert" ("Stréissel" nature reserve), eutrophic ditch in wetland of the Alzette floodplain, 49°31'27.82"N 6°05'50.46"E, 268 m a.s.l., 16.06.2009, 2 males, leg. R. Gerend.

Bertrange: S of "Gréiwelshaff", farmland pool, conductivity 620 µS/cm 49°35'33.40"N 6°02'38.95"E, 02.10.2012, 2 males, 287 m a.s.l., leg. R. Gerend.

New to Luxembourg.

This species has not previously been recorded from Luxembourg. It was known to occur in Lorraine and Alsace and there are old records from the German Lower Rhine dating back to the 19th century (Horion 1949) but it seems to have been absent there in Horion's own days "conspicuously so, despite the great efforts devoted to the collecting of water beetles" (op. cit. translated by the author). It is quite rare in the Netherlands with most records being from the southwest of that country (Drost et al. 1992).

Limnoxenus niger is an inhabitant of shallow, fairly eutrophic and unshaded water bodies with usually a well-developed gramineous vegetation such as ditches in wetland areas, grassy pools or pond margins and oxbow lakes in river valleys. Both our records are from the southwest of Luxembourg, from an area of mainly open agricultural landscape.

Helochares punctatus Sharp, 1869

Stockem: „Deddelburen", spring-fed pool, 50°04'47.41"N 05°56'00.30"E, 428 m a.s.l., 01.05.2005, 8 specimens, leg. R. Gerend.

Basbellain: „Kirchermillen", valley of "Weierbaach", recently created pool with poorly mineralized water (cond. 66 µS/cm), 50°08'20.98"N

5°57'34.57"E, 460 m a.s.l., 01.05.2005, ca. 15-20 specimens, leg. R. Gerend.

This species of acid and oligotrophic waters (Hansen 1987) was included in the first draft of the check list (Gerend 2003) at a time when only one population was known in the northwest of Luxembourg. While visiting this upland part of the country in 2005 two new locations were discovered in this very region which is notable for its altitude of up to 500 m, its cold and rainy climate and the residual presence of valley mires with their associated flora. So far *Helochares punctatus* has not been found outside these northwestern "highlands" and future field work should clarify whether this represents a genuine distribution pattern. If this were true, then the Luxembourg populations would mark the southern limit of an area with an altogether denser occurrence in the Belgian Ardennes mountains (Gerend, unpubl. records).

Chaetarthria simillima Vorst & Cuppen, 2003

Stockem: „Deddelburen", 01.05.2005, spring-fed pool, 50°04'47.41"N 05°56'00.30"E, 428 m a.s.l., 01.05.2005, 1 male, leg. R. Gerend.

This tiny species was recorded for the first time in 2004 (Gerend 2006) from a spring-fed mire in the north of Luxembourg. Its second known locality is a small recently created pool by a stream with dense beds of riparian grasses like *Carex*, *Glyceria*, *Eleocharis palustris*, *Juncus effusus* and *Sparganium erectum*. Locally growing *Sphagnum* mosses hint at less mineralized and more acid conditions.

Hydrous piceus (Linnaeus, 1758) (Fig. 10)

Niederdonven: "Steifland", former clay pit on quaternary terrace of the Moselle valley, 49°38'44.20"N 6°25'02.80"E, 261 m asl., 29.04.2011, 1 specimen in a newt trap, leg. R. Proess, det. R. Gerend.

This is yet another species of large water beetle not recorded for more than a century as the few specimens in the Natural History Museum's collection in Luxembourg had all been taken by Victor Ferrant. Hydrous piceus used to be quite common in parts of Lorraine a little over a decade ago (Woëvre, Pays des Etangs) and these populations seem to persist as recent sightings of both adults and larvae have shown (Gerend, unpubl.). It may well be that individuals of this species disperse from there, eventually reaching suitable sites in southern Luxembourg.

Cercyon granarius Erichson, 1837

Hellange: "Bëlsakerwues", eutrophic wetland along one of the headwaters of River Gander with extensive water meadows with *Carex*, *Phalaris*, *Juncus effusus*, *Caltha palustris* a.o., 49°29'38.85"N 6°09'02.35"E, 265 m a.s.l., 01.03.2009, 4 specimens, sifted from wet litter, leg. R. Gerend.

Aspelt: "Wolfsdréisch" ("Briedemsbaach" valley), grove of poplars on the banks of a small stream running through pastures, 49°31'36"N 6°12'54"E, 239 m a.s.l., 07.02.2010, 1 female sifted from wet litter, leg. R. Gerend.

According to Hansen (1987) this is mainly a Central European species ranging from Great Britain to the Caucasus and from Denmark to the northern parts of Southern Europe. Like most of the semi-aquatic *Cercyon* species it can be found among plant debris at the edges of freshwater biotopes but it seems to be much rarer than *Cercyon convexiusculus*, *C. sternalis* or *C. tristis*.

Both localities are in the extreme south of the country in the drainage basin of small River Gander which itself is a tributary of the Moselle. They are fairly eutrophic but well preserved and support a rich array of characteristic wetland species.

Cercyon granarius had only been found once before in Luxembourg by Alfred Mousset (unpubl.). It is known from the neighbouring German federal state of Saarland (Köhler & Klausnitzer 1998). Horion (1949) considers it to be a scarce species in western and southern Germany. According to the World Catalogue (Hansen 1999) there are no records from Belgium so far. Callot (2001) knows it from a couple of locations in the floodplain of River Andlau in Alsace where he found it in water meadows ("prés humides inondés") which is reminiscent of conditions at our site near Hellange.



Fig. 9. *Limnoxenus niger*, a species inhabiting the muddy shallows of well vegetated, warm pools and ponds, which so far has only been recorded from two locations in southern Luxembourg. Scale bar: 2 mm. Photo: C. Braunert.



Fig. 10. *Hydrous piceus*. This specimen was caught in a newt trap in eastern Luxembourg. This largest indigenous hydrophilid had not been recorded for over a century. It is locally common in Lorraine and may have flown in from there. Scale bar: 10 mm. Photo: R. Proess.

Dryopidae

Dryops similaris Bollow, 1936 (Fig. 11)

Sandweiler: W of "Kréintgeshaff", artificial pool on meadow, 49°36'17.88"N 6°13'18.58"E, 324 m a.s.l., 11.04.2009, 3 (2 males, 1 fem.), leg. R. Gerend.

Dudelange: "Mäschhiel" ("Léi"), farmland pool, 49°29'07.20"N 6°06'29.94"E, 293 m a.s.l., 10.03.2012, 1 male, leg. R. Gerend.

Niederdonven: "Steifland", former clay pit with mossy edges on quaternary terrace of the Moselle valley (Fig. 12), 49°38'44.20"N 6°25'02.80"E, 261 m a.s.l., 21.03.2012, at least 4 males (slightly teneral).

According to Olmi (1976) this is a species with a very wide distribution in Europe, from the Mediterranean in the south to the northernmost parts of Fennoscandia and from the British Isles in the west to the Caspian in the east. It is known from all the neighbouring countries but specific information is hardly available for anyone of them. It seems to be absent from the federal state of Saarland though (Köhler &



Fig. 11. *Dryops similaris*. These beetles live on the shallow edges of pools, ponds and oxbow lakes and can often be found amidst patches of amphibian mosses in neutral waters. Unknown to both Victor Ferrant and Alfred Mousset, the species has been found in a handful of locations situated in southern and eastern Luxembourg in the course of the last decade. It is normally associated with the much commoner *Dryops auriculatus* and is also known to co-exist with the rare *Dryops griseus* in southwestern Luxembourg. All these species are literally indistinguishable in the field. Scale bar: 1 mm. Photo: C. Braunert.



Fig. 12. Niederdonven "Steifland". Flooded former clay pit being colonized by willows. The edges of the pools are rich in amphibian mosses amidst which both *Dryops similaris* and *Dryops luridus* could be found in 2012. The small dytiscid *Graptodytes bilineatus* was markedly common as were the hydrophilid *Cymbiodyta marginella*, the hydraenid *Ochthebius minimus* and the hydrochid *Hydrochus crenatus*. Photo: R. Gerend.

Klausnitzer 1998) but this might be due to a lack of prospection. In the Netherlands it is reported as very rare along the coast where it can be found in seasonally flooded pools in the dunes (Drost et al., 1992). It does occur in French Lorraine but only a handful of locations are currently known (Jacquemin & Vein, unpubl. report, 2004, Callot in litt. 2013, Gerend, unpubl. data). So far we do know of no populations in the region of Arlon in Belgium, where its presence is made likely by a number of a priori favourable habitats in the basin of River Semois.

Foster (1995), citing Bilton (1988), very aptly characterizes *Dryops similaris* as a member of the "moss edge community" typical of temporary fens and points out that it is capable of colonizing newly created habitats. These observations are supported by the data from Luxembourg. In fact all the locations given in this paper are man-made and of quite recent origin and at the two of them where more than one specimen was found, there are extensive areas of semi-aquatic mosses along the edges. The fact that the species quite surprisingly showed up in 2012 in a pool thoroughly sampled over the years (Dudelange: Léi/Mäschhiel) and the overall increase in records after 2000 might hint at an expansion of late. All the localities have base-rich water and clayey bottoms and are unshaded but for a few willow bushes at the Niederdonven site.

Discussion

Nine species previously not recorded can be added as new to the water beetle fauna of Luxembourg putting the count at 244. *Enochrus fuscipennis*, erroneously included in the check list in 2003, can be maintained as it does indeed occur in the Grand Duchy. Two species of larger water beetles, thought to be extinct as they hadn't been recorded since Victor Ferrant's time, seem to be in the process of recolonizing the country, though the dry spring of 2011 might come into the picture here as it certainly caused many shallow water bodies to dry up, forcing their inhabitants to disperse in search of water. Data show indeed that during the first five months of 2011 precipitations reached only about 54 % of their normal volume (Data: Meteorological service of Luxembourg airport). The fact that neither *Cybister* nor *Hydrous* was caught subsequently despite the ongoing deployment of newt traps suggests a onetime event and rules out the continuous presence of viable populations.

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