

New and interesting water beetles from Hesse (Coleoptera: Dytiscidae, Helophoridae, Hydraenidae)

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Abstract: *Hydraena reyi* Kuwert and *Hydraena angulosa* Mulsant (Hydraenidae), and *Helophorus arvernicus* Mulsant (Helophoridae), are reported for the first time from Hesse. *Deronectes latus* (Stephens) (Dytiscidae), last recorded prior to 1900, was rediscovered. The sampling-localities of these and some other interesting species (including all species from the Red List) are shortly described.

Zusammenfassung: Funde von *Hydraena reyi* Kuwert, *Hydraena angulosa* Mulsant (Hydraenidae), und *Helophorus arvernicus* Mulsant (Helophoridae) werden als neu für Hessen aufgeführt. *Deronectes latus* (Stephens) (Dytiscidae) wurde zum ersten Mal seit 1900 nachgewiesen. Die Fundorte dieser und weiterer interessanter Arten (eingeschlossen alle Arten der Roten Liste) werden kurz beschrieben.

Introduction

The first week of April 1999 was spend in Hatzfeld (Rothaargebirge) in the northwestern part of Hesse (Germany). During this week 14 localities were sampled on water beetles. The localities examined concerned streams (9), shallow seepage puddles with a nearly invisible current (2), ponds (2) and one small lake. Ponds and lake were artificial as they were entered by small streams on one side and had dams on the other side. Only the lake was stocked with fish. Natural ponds and lakes were not found in the area; typical and common fishponds were not investigated.

On most localities some water quality variables were measured: pH (acidity), electrical conductivity, chlorinity and total hardness. These variables are easy to measure with electrodes or a simple titration. They

can give an indication of heavy pollution, heavy eutrophication or the intake of water from other areas. As far as can be concluded the investigated waters were characteristic for non-calcareous areas with a low conductivity and chlorinity, a normal pH, and hardly polluted.

The addition to the fauna of Hesse of three species and the rediscovery of one species are based on their absence in the recent survey of German beetles (KLINGER 1998). The sampling localities of these and some other interesting water beetles (including all Red List species (GEISER 1998; HESS et al. 1999) are shortly described.

Part of the material is placed in the collection of the Senckenberg Museum, Frankfurt am Main; the remainder of the material is preserved in the collection of the author.

New and rediscovered species

***Deronectes latus* (Stephens)**

Two males of *Deronectes latus* were collected in the Elbrighäuser Bach near Dodenu (Battenberg; Kreis Waldeck-Frankenberg) at an altitude of 315 m on 8 April 1999. This meandering stream with a width of 3.5-5 m and a depth of 20-40 (90) cm flowed over small boulders and coarse gravel. Both sides of the stream were partly overgrown by *Alnus glutinosa* and small-leaved *Salix*. The swift current and shade allowed only a very sparse vegetation of *Phalaris arundinacea* along the margins. The water had a pH of 6.2, conductivity of 113 $\mu\text{S}/\text{cm}$, a chlorinity of 5.5 mg/l and a total hardness (ED) of 2. *Deronectes latus* was found in a rather shallow but nearly stagnant pool in the stream with coarse organic litter as leaves and branches of trees covering the substrate.

Deronectes latus is the most widely distributed species of the genus in Europe (FERY & BRANCUCCI 1997). The distribution area comprises nearly the whole of Europe, but the species is lacking in Ireland, Spain, Portugal, and Italy south of the Apennines; two Turkey females possibly represent a different (sub)species (FERY & BRANCUCCI 1997). In Germany, the species is represented in most areas (KÖHLER & KLAUSNITZER 1998); additional information on recent records is presented in SCHAEFFLEIN (1979; 1983) and FERY & BRANCUCCI (1997). According to KLINGER (1998) *Deronectes latus* was only recorded prior to 1900 from Hesse.

The sampling-locality of *D. latus* is typical for the species: hidden among leaf-litter in a partly shaded, fast flowing, middle-sized stream with more stagnant water in shallow and deep holes around the root-systems of trees.

Hydraena reyi Kuwert

Identification of *Hydraena*-species is often difficult without examination of the male genitalia, especially in the *H. riparia*-group. Females not associated with males or in the presence of males of more than one species are often impossible to identify. Females of *H. reyi* can be distinguished from the other species of this group by the elevated frontal margin of the clypeus (JÄCH 1988), though a slighter elevation can be present in other species.

Males of *Hydraena reyi* were sampled on five localities, all in the Kreis Waldeck-Frankenberg. On one occasion they occurred together with *H. melas* Dalla Torre, the species most resembling *H. reyi*.

The first locality with *H. reyi* (9 ♂♂, 4 ♀♀) is a seepage area with small, very shallow pools and trickles (only 2-5 cm deep) at the edge of a quarry near Biebighausen (Hatzfeld). The unshaded pools had a loamy substrate with little gravel and a wealthy vegetation dominated by *Montia fontana*, grasses and several unidentified Bryophyta. The clear water had a pH of 6.3, a conductivity of 146 µS/cm, a chlorinity of 6.6 mg/l and a total hardness of 3. The second locality (12 ♂♂, 25 ♀♀), a small pond, is situated near the bridge over the Eder near Reddighausen (Hatzfeld). This pond with a surface of 200 m² and a depth of 70 cm had a loamy substrate and was unshaded. The pond was fringed with *Glyceria fluitans* and floating algae dominated the deeper parts of the pond. The water had the following characteristics: pH: 6.3; conductivity: 147 µS/cm; Cl: 7.5 mg/l; ED: 2. The third locality (2 ♂♂, 1 ♀) is the Riedgraben near Dodenau (Battenberg) at an altitude of 355 m. Despite the name this half shaded stream with a width of 3 m and a depth of 15-25 (60) cm had no vegetation except for some mosses on stones. The substrate consisted of small stones and gravel in a loamy matrix. Some water characteristics: pH: 6.2; conductivity: 107 µS/cm; Cl: 4.3 mg/P; ED: 2. The last two localities with *H. reyi* are both situated in the river Eder at Biebighausen (9 ♂♂, 10 ♀♀; altitude 318 m), respectively at Rennertehausen (16 ♂♂, 10 ♀♀; altitude 286 m). This fast flowing stream with a width of circa 30 m and a depth of 30-70 (150) cm was locally shaded with isolated *Alnus glutinosa*

and small-leaved *Salix*. The sparse vegetation at the loamy margins consisted of *Phalaris arundinacea*, while stones in the stream were covered by algae and the moss *Fontinalis antipyretica*. The water was analysed only at Rennertehausen: pH: 6.2; conductivity: 141 $\mu\text{S}/\text{cm}$; Cl^- : 10.3 mg/l; ED: 2. In the Riedgraben and the Eder *H. reyi* was confined to the (loamy) edges of the stream, most often between the roots of *Phalaris arundinacea* on overhanging banks.

Hydraena reyi is a central European species. The distribution area extends from France in the west to Russia in the east; the species is lacking in Scandinavia, Great Britain, the Iberian peninsula, Italy and Greece (JÄCH 1988). The species is widely distributed in Germany, but absent from several areas (KÖHLER & KLAUSNITZER 1998). Given the present number of records its absence from Hesse til so far is remarkable.

In Austria, JÄCH (1988) found *H. reyi* only in larger rivers of the Alps. In the present investigation *H. reyi* was collected in large numbers in the largest stream in the area (Eder), but also in a (flushed) small pond, and in very shallow puddles and trickles in a seepage area. Only in a middle-sized stream the numbers were small. The habitat of *H. reyi* therefor seems wider than normally is thought, but perhaps the species can build up large populations only in nearly stagnant (parts of) waters.

***Hydraena angulosa* Mulsant**

Hydraena angulosa was taken on three localities together with the more common *H. nigrita* Germar. The clear angle at one-third of the sides of the elytra permitted an unambiguous identification of females.

Two localities with *H. angulosa* (Riedgraben: 2 ♀♀) and Elbrighäuser Bach: 1 ♀) have been described above. One male was taken in the Linspher Bach at the foot of the Seibertskeochen south of Bromskirchen at an altitude of 374 m. This fast stream with a width of 3-5 m and a depth of 10-30 (70) cm resembled in further characteristics both other streams. Only the marginal vegetation was better developed with *Phalaris arundinacea*, *Juncus effusus* and *Scirpus sylvaticus* locally abundant. Also the physico-chemical variables were similar (pH: 6.2; conductivity: 132 $\mu\text{S}/\text{cm}$; Cl^- : 8.3 mg/l; ED: 2).

The distribution area of *H. angulosa* is confined to mountainous areas in western Europe, Pyrenees and the southern Alps in Italy (HORION 1949). The species seems to be rare everywhere. In Germany, the species is recently recorded from Bayern, Baden, Württemberg, Rheinland and

Sachsen-Anhalt (KÖHLER & KLAUSNITZER 1998). More precise localities are given by HORION (1949, 1960) and HEBAUER (1980). The species is new to Hesse.

The habitat of *Hydraena angulosa* is not well known. The species seems to be restricted to upper and middle courses of running waters.

***Helophorus arvernicus* Mulsant**

Specimens of *Helophorus arvernicus* were taken on four localities in Hesse.

Three localities have been described above: Eder (Reddighausen; 1 ♀), Eder (Rennertehausen; 2 ♂♂) and Linspher Bach (1 ♀). The fourth locality concerns the Sonsenbach near Hatzfeld at an altitude of 400 m (2 ♂♂). This moderately running stream had a width of 0.5-1.5 m and a depth of 5-10 (25) cm and was unshaded. The soil consisted of gravel and loam. The margins of the stream had a sparse vegetation of *Glyceria fluitans* and *Juncus effusus*. The water analysis had the following results: pH: 6.6; conductivity: 152 µS/cm; Cl: 5.8 mg/l; ED: 3.

The range of *H. arvernicus* extends from Scotland and Scandinavia in the north to southern France and Austria in the south. The distribution area also comprises large parts of Russia (ANGUS 1992). In Germany, *H. arvernicus* is known from all areas except Hesse (KÖHLER & KLAUSNITZER 1998). Already HORION (1949) wondered about its remarkable absence from Hesse. At least in the environment of Hatzfeld-Battenberg *H. arvernicus* is common.

The habitat description, clean moderately fast streams, normally in upland areas (ANGUS 1992) is in agreement with the above described habitats.

Other species

Hydroporus gyllenhalii Schiödte (3 ♂♂, 1 ♀) was found in a small forest-pond at an altitude of 280 m near Christenberg (Münchhausen; Kreis Marburg-Biedenkopf) on 7 April 1999. In Germany *H. gyllenhalii* is known from all, except one, areas (KÖHLER & KLAUSNITZER 1998), though the species is more common in the northern and western part (HORION & HOCH 1954). Hesse being the exception not mentioned by KLINGER (1998). However, old records from Seligenstadt were published by SCRIBA (1863) and more recently *H. gyllenhalii* was collected in the

same area near Hanau (22 August 1970, leg. DEHNERT and 10 April 1982, leg. HÖHNER) (W. LUCHT, in litteris).

Hydroporus gyllenhalii is most often encountered in stagnant, acidic waters with a low chlorinity (CUPPEN 1986) as heathland-ponds, peat-pits, forest ditches and forest ponds, frequently in association with *Sphagnum*. The locality at Christenberg is very characteristic for the species.

Deronectes platynotus (Germar) (2 ♂♂, 7 ♀♀) was collected in the Biebighausen Bach, at an altitude of 330 m. A shallow pool with nearly stagnant water in front of a nearly destroyed weir in this small tributary of the river Eder formed the habitat. The European distribution area of *D. platynotus* is more or less restricted to Central Europe and the (western) Balkan (SCHAEFLEIN 1971; FERY & BRANCUCCI 1997). Within Germany the species is confined to the mountainous areas in the middle and southern part of the country (KÖHLER & KLAUSNITZER 1998). The species is mentioned on the Red List as threatened (GEISER 1998), probably because of its rarity, the relative small distribution area and its restriction to unpolluted, middle-sized, shaded streams. *Deronectes platynotus* is only occasionally reported in large numbers (DETTNER et al. 1986; FERY & BRANCUCCI 1997).

Hydraena flavipes Sturm (= *H. minutissima* Stephens) was found on two localities in small numbers: Linspher Bach (2 ♂♂) and the Elbrighäuser Bach (1 ♀), both described above. With the exception of Fennoscandia and Denmark, *H. flavipes* is widely distributed in Europe (HORION 1949). In Germany the species is confined to mountainous areas in the middle and south (KÖHLER & KLAUSNITZER 1998). HORION (1949) gives several old Hessian records, some possibly referring to the time period 1900-1950. According to KLINGER (1998) there are no post 1900 records of *H. minutissima* from Hesse, but W. LUCHT (in litteris) mentions several new records from Hesse (Steinau, 15 July 1971, leg. DEHNERT; 22 August 1981, leg. HÖHNER; Schotten, 28 May 1983, leg. HÖHNER; Rhön, 27 August 1983, leg. HÖHNER).

Hydraena flavipes is a running water species found in small and large streams between gravel and aquatic mosses (HEBAUER 1980; CUPPEN 1993), and the present localities are in accordance with this description.

Hydraena pygmaea Waterhouse (2 ♀♀) was collected in the Elbrighäuser Bach. This small, but broad-sized, *Hydraena* is regarded as coldstenotherm and crenophilic by HEBAUER (1980), and confined to upper courses of streams in The Netherlands (CUPPEN 1993). The occurrence in small numbers in middle courses of streams is, however, not exceptional.

Laccobius obscuratus Rottenberg (♂) was found on the banks of the Sonsenbach. This species has a large distribution area in Europe and western Asia (GENTILI & CHIESA 1976); in Germany *L. obscuratus* is recorded from most areas (KÖHLER & KLAUSNITZER 1998). This crenophilic species is mainly confined to springs and the upper courses of streams in mountainous areas (HEBAUER & KLAUSNITZER 1998) which is in accordance with the above described habitat.

Discussion

The beetle fauna of Hesse is well-known (see KLINGER 1998 and references). It was quite unexpected to find three new species and one species not collected since 1900. All new or rediscovered species were collected in running waters and they suggest an undersampling of streams in Hesse, at least from the northwestern part, as some of the species were collected on several occasions and in large numbers, e.g. *Helophorus arvernicus* and *Hydraena reyi*. This is confirmed by W. LUCHT (in literis) who states that the area between Hesse and Westfalen is hardly visited by coleopterists. Though confusion of *H. reyi* with *H. melas* in the past is possible, this does not account for *H. arvernicus* and maybe the sighs of HORION (1949) about its striking absence in Hesse were realistic (with the exception of the northwest).

The most interesting of the running water beetles is *Hydraena angulosa*, a species with a relatively small European distribution area and hitherto known from a limited number of sites. The three tributaries of the river Eder at altitudes between 300 and 400 m had the same general appearance: fast flowing, partly shaded, mainly coarse gravel and small stones as substrate, sparse marginal vegetation and few aquatic mosses. The physico-chemical conditions were nearly the same for the streams with a very low chlorinity and the water was unpolluted (based on the presence of numerous species of Ephemeroptera, Plecoptera and

Trichoptera and their abundance), but this counts for all streams examined. The most obvious differences with "normal" streams were the nearly absence of sand in the streambed and the banks consisting of loam. Again, this counts for all investigated streams in the area. Perhaps the granular size of the finest particles is important for the distribution of the species.

The presence of several species of the Red List of Germany (GEISER 1998; HESS et al. 1999), collected during a short stay in Hesse, indicates that the water quality in the more or less natural streams is still very good. Hopefully these conditions can be maintained in the future, despite an increasing impact of growing populations and agriculture. The acquisition of some streams by governmental organisations, followed by a management as nature reserve, will improve chances for these valuable aquatic communities.

Acknowledgements

My partner Arja SPAN was a constant stimulus during the collecting, even at sites unlikely to produce any water beetles. Oscar VORST and Wilhelm LUCHT are thanked for solving some problems with literature and information about some unpublished data.

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Jahr/Year: 2000

Band/Volume: [25 3-4 2000](#)

Autor(en)/Author(s): Cuppen Jan G. M.

Artikel/Article: [New and interesting water beetles from Hesse 147-155](#)