

**New and little known Palearctic species of the
genus *Hydraena* (s.l.) KUGELANN, 1794
XII. Description of a new species of the
H. saga complex from Italy
(Coleoptera: Hydraenidae)**

M.A. JÄCH & J.A. DÍAZ

Abstract

Hydraena (s.str.) *kahleni* is described from north-eastern Italy (Veneto Region, Treviso District). It is closely related to *Hydraena* (s.str.) *saga* ORCHYMONT, 1930. So far it was collected only in one small forest streamlet in a hilly area known as the Prosecco Hills of Conegliano and Valdobbiadene.

Key words: Coleoptera, Hydraenidae, *Hydraena*, taxonomy, new species, Italy.

Introduction

In May 2007 Manfred Kahlen (Hall, Austria) collected a single male specimen of *Hydraena* KUGELANN, 1794 (*Haenydra* lineage) in a small nameless streamlet (right tributary of Torrente Campea) (Figs. 19–20) near the village of Premaor (north-eastern Italy, Veneto Region, Treviso District) at the southern rim of the Venetian Alps. It was collected together with several specimens of the microendemic *H. tarvisina* (FERRO, 1992), which is externally quite similar. When M. Kahlen dissected this specimen he was surprised to see that the aedeagus was remarkably different from that of *H. tarvisina*, instead closely resembling that of *H. saga* ORCHYMONT, 1930. However, *H. saga* had never been collected in or near Italy or anywhere in the Alps. It is in fact distributed north of the Alps, in the Carpathians and in a few countries southwest of the Carpathians (see Fig. 21; JÄCH & SKALE 2015).

Eventually, M. Kahlen sent this specimen to the senior author, who identified it as “*H. cf. saga*”. Exact determination of this single individual, which was not collected in high-proof alcohol, was not possible. Since no additional material turned up in the following years, the senior author decided to travel to Veneto in 2014, where he took numerous samples in springs, streams and rivers in the area, where “*H. cf. saga*” had been collected by M. Kahlen seven years earlier. He thoroughly examined Torrente Campea, but he did not take samples in that particular nameless tributary of Torrente Campea. Altogether he collected seven species of *Hydraena* in Veneto: *H. devincta* ORCHYMONT, 1940, *H. intermedia* ROSENHAUER, 1847, *H. melas* DALLA TORRE, 1877, *H. morio* KIESENWETTER, 1849, *H. nigrita* GERMAR, 1824, *H. pulchella* GERMAR, 1824, and *H. tarvisina*. Surprisingly, no specimen of “*H. cf. saga*” was found!

One year later, in June 2015, Monika Hess & Ulli Heckes (Munich, Germany) tried their luck. They spent one day in the area where they found two males of “*H. cf. saga*”. These were taken in exactly the same small nameless tributary, where M. Kahlen had collected his specimen.

Six weeks later, in September 2015, the first author traveled to Veneto once more, but this time focussing mainly on this enigmatic “*H. cf. saga*”-streamlet – with success: he collected (on his birthday) six specimens of “*H. cf. saga*”, including females, which were completely unknown until then. Again, no specimen of “*H. cf. saga*” could be found in any of the other streams examined in Veneto.



Fig. 1: *Hydraena kahleni*, holotype.

After detailed examination of all nine specimens available, including DNA sequencing and comparison with *Hydraena saga* and other species of the *H. saga* complex, it became obvious, that they represent a new species, which is described herein.

Acronyms and Abbreviations:

| | |
|------|--|
| CH2M | Coll. Hess & Heckes, München, Germany |
| IBE | Institute of Evolutionary Biology, Barcelona, Spain |
| NMW | Naturhistorisches Museum Wien, Austria |
| TLFI | Tiroler Landesmuseum Ferdinandeum (Coll. Kahlen), Innsbruck, Austria |

Hydraena (s.str.) *kahleni* sp.n.

TYPE LOCALITY (Figs. 19–20): Small (nameless) stream (right tributary of Torrente Campea (= right tributary of Fiume Soligo)), ca. 1–2 m wide, flowing through rather undisturbed forest, ca. 180 m a.s.l., 45°55'43.1"N 12°07'42.8"E, ca. 1 km S Premaor, ca. 1.7 km E Campea, ca. 14 km NW Conegliano, Treviso District, Veneto Region, north-eastern Italy.

TYPE MATERIAL: Holotype ♂ (NMW): “ITALY: Veneto Region Treviso District ca. 2 km E Campea ca. 14 km NW Conegliano 1.IX.2015, leg. M.A. Jäch (IT 1)”, “175–200 m a.s.l. 45°55'43.10"N/12°07'42.80"E small stream right trib. of Torrente Campea”. **Paratypes**: 6 exs. (4 ♂♂, 2 ♀♀) (IBE: 1 ♂, NMW: 3 ♂♂, 2 ♀♀): same locality data as holotype; 1 ♂ (TLFI): “I – Treviso, Miane-Premaor, Borgata Chech leg. Kahlen”, “Torr.Campea, rechter Seitengraben [right tributary] 165 m, 26.5.2007”, “FERDINANDEUM INNSBRUCK SLG. KAHLEN”; 2 ♂♂ (CH2M): “I, Veneto, Treviso, Miane: Quellbach zum Bach Campea 900 m S Premaor (M484); 175 m. 17.06.2015, Hess & Heckes”.

The DNA of one of the male paratypes (voucher number IBE-AN337) was non-destructively extracted in the IBE and the barcode gene (5' end of the cytochrome oxidase I) sequenced (GenBank accession number: LT906393). The extracted specimen and DNA are deposited in the IBE.

DESCRIPTION: Habitus as in Figs. 1–2. Body length: 2.04–2.12 mm. Head and pronotum usually dark, elytra dark brown to black, palpi and tarsi yellowish brown to reddish brown, femora and tibiae reddish brown to dark brown.

Labrum densely microstriate, except in middle; with very deep, V-shaped notch anteriorly; margins more or less slightly upturned. Clypeus microstriate laterally. Fronto-clypeal suture slightly arcuate, not strongly impressed. Middle of frons moderately densely punctate, interstices shining; lateral portions of frons more densely (sometimes rugosely) punctate and microstriate; interocular grooves hardly noticeable. Eyes moderately large, protruding, more than 20 facets visible in dorsal view. Maxillary palpi very long, about twice as long as distance between eyes; terminal palpomere about 1.75 times as long as preterminal.

Pronotum subcordiform, wider than long; anterior margin concave; anterior angles more or less rectangularly rounded; lateral margin strongly convergent to anterior angle, sinuately convergent to posterior angle; lateral rim slightly denticulate; disc moderately convex, more or less densely punctate near anterior and posterior margin, along midline and at area of posterior foveae; smooth and punctate between punctures; foveae hardly perceptibly impressed; anterior and posterior sublateral foveae well impressed, elongate, partly microstriate; lateral portion of pronotum evenly deflexed, usually sparsely and superficially punctate.

Elytra elongate, parallel-sided; rather strongly declivitous laterally; with nine rows of punctures between suture and shoulder; striae punctures moderately large, not very deeply impressed and arranged in lines, which are not or shallowly impressed; punctures rather densely arranged within lines; intervals and interstices flat and glabrous or superficially microreticulate; intervals

slightly wider than one puncture diameter; apical declivity comparatively flat; apices sexually dimorphic, separately rounded in both sexes; explanate margin of elytra moderately wide.

Mentum and submentum microreticulate, micropunctate to microstriate. Posterior genal ridge not very prominent, glabrous. Prosternum with indistinct median keel. Mesoventrite with a pair of sublateral distinct glabrous streaks; very deeply impressed transversely between mesoventral disc and convex mesoventral process. Metaventral disc shallowly impressed between meta-ventral plaques; the latter well developed, divergent posteriad. First ventrite with glabrous areas behind metacoxal sockets not very well pronounced; abdominal sternites III–VI more or less entirely covered with hydrofuge pubescence; abdominal sternites VII and VIII largely glabrous, the latter superficially microreticulate.

Male terminal sternite and spiculum as in Fig. 5.

Aedeagus (Fig. 4): Main piece (520 μm long) with four setae, three long ones on left side and a very short one on right side; apex quite variable: rounded or obliquely truncate (ascending from ventral to dorsal), dorsal corner of apex often very slightly subacuminately produced, ventral corner more or less rounded or very slightly produced; dorsal margin of main piece gently emarginate in apical third (lateral view); prebasal tooth not very prominent, sometimes rounded (lateral view). Phallobase symmetrical in ventral view. Distal lobe as in *H. saga* and several other related species.

Gonocoxite (Fig. 6) subquadrate; apex rounded; inner plate distinctly projecting basally and laterally.

Female tergite X (Fig. 7) transverse; subtriangular; apex widely rounded; disc with subbasal squamose setae and with few trichoid setae mainly near distal margin; subapical fringe admedially with vermiform setae, and with few trichoid setae laterally.

Spermatheca as in Fig. 8.

Secondary sexual characters: Female elytral apices slightly produced. Female ventrites V and VI with fringes of long setae. All femora of male slightly inflated. Male ventrite VI enlarged. Male mesotibia with a row of ca. eight minute denticles along mesial face of posterior half. Male metatibia with fringe of long setae along mesial face of posterior half.

DIFFERENTIAL DIAGNOSIS: *Hydraena kahleni* is obviously most closely related to *H. saga* and its allies (*H. saga* complex): *H. alpicola* PRETNER, 1931, *H. diazi* TRIZZINO, JÄCH & RIBERA, 2011, *H. emarginata* REY, 1885, *H. fosterorum* TRIZZINO, JÄCH & RIBERA, 2011, *H. larissae* JÄCH & DÍAZ, 2000, and *H. samnitica* FIORI, 1904. They are all characterized by the same type of distal lobe and the rounded or truncate apex of the aedeagal main piece.

Within this complex *Hydraena kahleni* seems most close to *H. saga*. Males of *H. saga* and *H. kahleni* can hardly be distinguished externally, mainly due to the variability of the elytral apices in the former. The spiculum of *H. saga* (Fig. 10) appears to be considerably longer than that of *H. kahleni* (Fig. 5), but more material must be examined to check the variability of this character.

The aedeagus of *H. saga* (Fig. 9) differs from the new species in the following characters: Main piece distinctly longer (580–600 μm); dorsal margin of apical third of basal piece distinctly concave; hump on left aedeagal margin less distinctly pronounced (dorsal view); base of aedeagus more widely curved (lateral view). The shape of the apex of the main piece is variable (rounded or obliquely truncate) in both species and thus not diagnostic.

Females of *H. saga* differ from those of *H. kahleni* in the elytral apices, which are more distinctly produced and acuminate in the former.



Fig. 2: *Hydraena kahleni*, paratype, female.



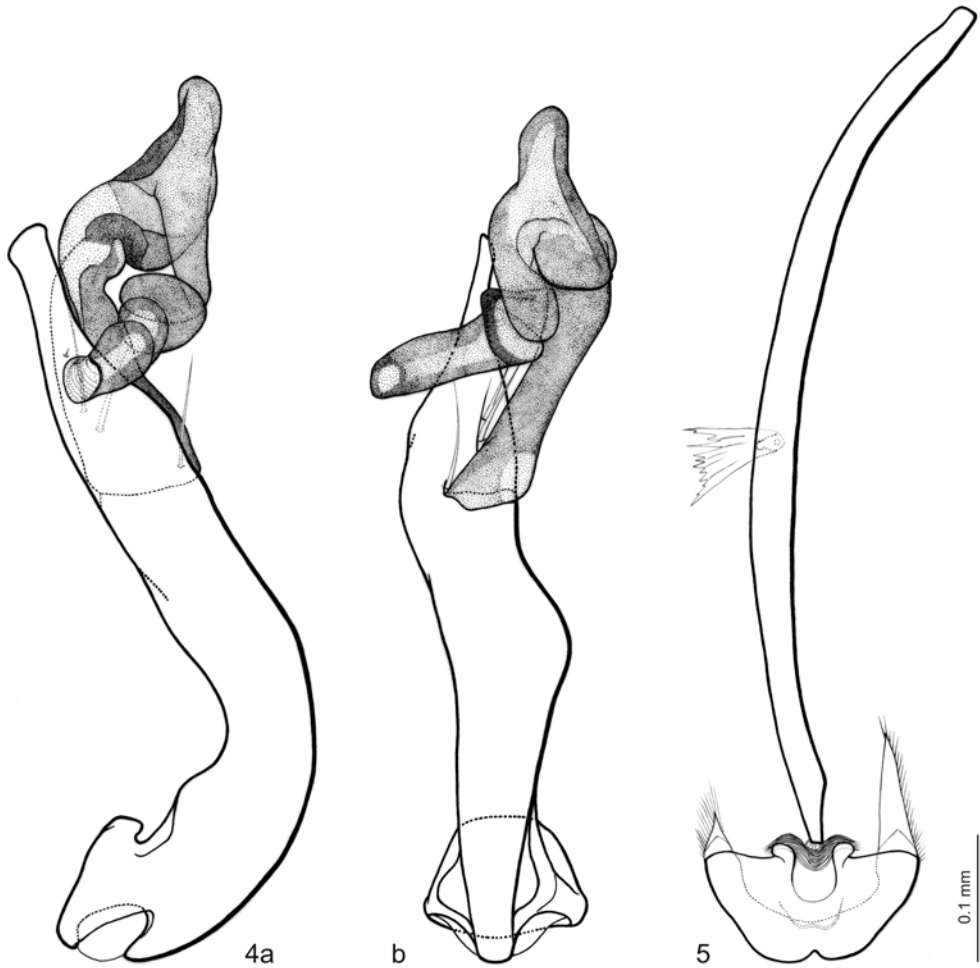
Fig. 3: *Hydraena tarvisina*, elytra, a) male, b) female.

Gonocoxite and female tergite X of *H. saga* (Figs. 11–12) and *H. kahleni* (Figs. 6–7) obviously do not provide good diagnostic characters to distinguish these two species.

The proximal portion of the spermatheca of *H. saga* is provided with a small longitudinal crest, which seems absent in *H. kahleni*. However, since we have examined only one spermatheca per species, the value of this character remains uncertain.

Hydraena larissae also has to be regarded as closely related to *H. kahleni*. Males are, however, easily distinguished based on the elytral apices (conjointly rounded in *H. larissae*) and the aedeagus (see JÄCH & DÍAZ 2000: fig. 6): apical third of main piece wider, dorsal margin almost straight. The elytral apices of the females of *H. larissae* are most variable (conjointly rounded, separately rounded, or subtruncate) and therefore a general distinction seems difficult. Gonocoxite, female tergite X and spermatheca (see JÄCH & DÍAZ 2000: figs. 8–11) do not seem to enable distinction between *H. larissae* and *H. kahleni*. These two species probably do not occur together. While *H. larissae* seems to prefer cold water at higher elevations inside the Alps, *H. kahleni* is so far known only from low elevation at the base of the Alps.

The remaining species of the *H. saga* complex are more easily distinguished from *Hydraena kahleni*, especially by the aedeagus: *H. alpicola* (aedeagus distinctly larger (ca. 600 μm long), apical slant of main piece ascending from dorsal to ventral), *H. diazi* and *H. fosterorum* (apical third of main piece bent dorsad, its dorsal margin strongly curved), *H. emarginata* and *H. samnitica* (distal lobe much larger).



Figs. 4–5: *Hydraena kahleni*, male, 4) aedeagus in a) lateral and b) dorsal view, 5) terminal sternite and spiculum.

At the type locality, *Hydraena kahleni* occurs together with *H. tarvisina* (*H. belgica* complex). Although *H. kahleni* and *H. tarvisina* are not closely related, the males of these two species are quite similar externally. The elytral apices (Fig. 3a) are usually more conjointly rounded and more declivitous in *H. tarvisina*. In *H. kahleni*, the metaventral plaques seem to be on average very slightly wider than in *H. tarvisina*. Sternite VIII seems more strongly microreticulate in *H. tarvisina*. The two latter characters are not always reliable and genital dissection is strongly recommended to distinguish males of these two species.

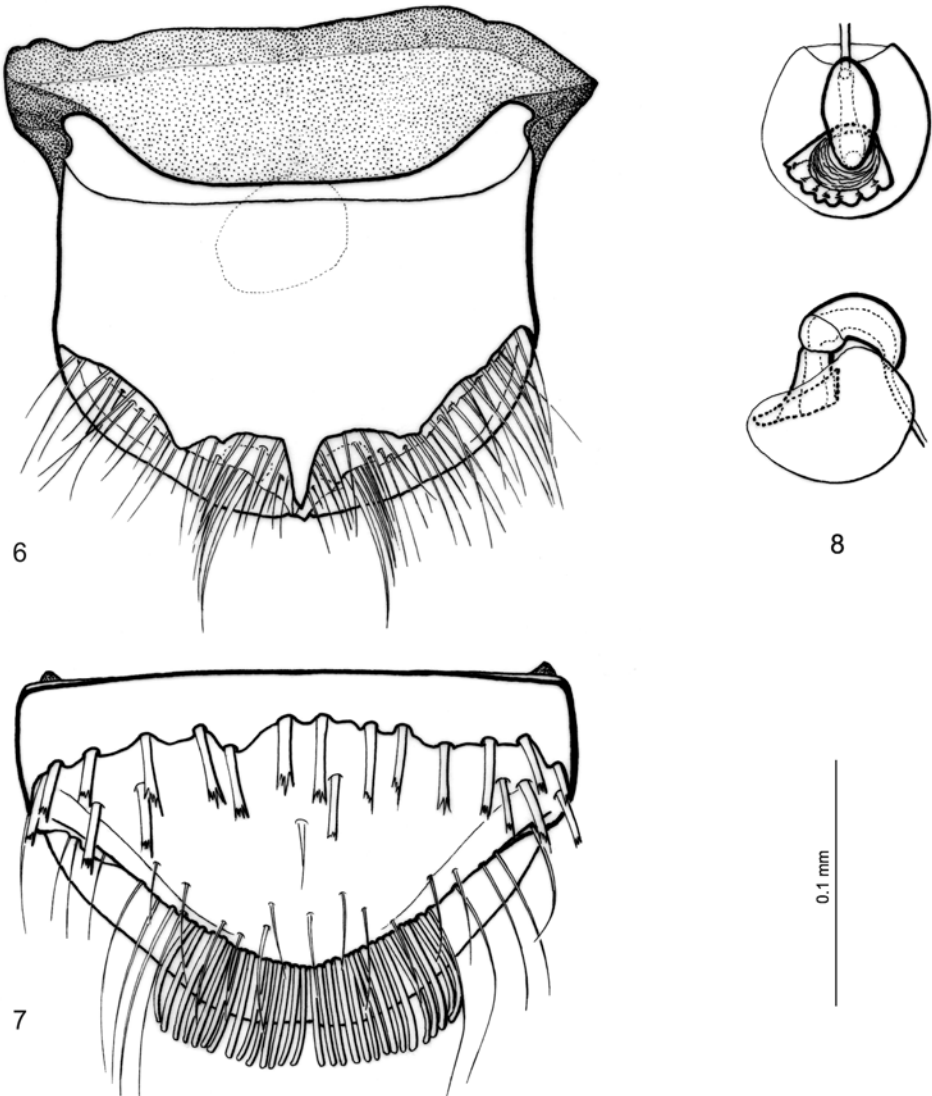
The aedeagus of *H. tarvisina* (Fig. 14) is, however, very different from that of *H. kahleni* (e.g., apex of aedeagal main piece acute; tiny seta on right side of main piece lacking; intermediate element of distal lobe narrower). Male terminal sternite and spiculum as in Fig. 15.

Females of *H. kahleni* and *H. tarvisina* are quite easily distinguished externally. In the latter the elytral apices are always excised and, although the width of this excision is quite variable, the lateral corners are always subacute or acute, never regularly rounded (see Fig. 3b; FERRO 1992:

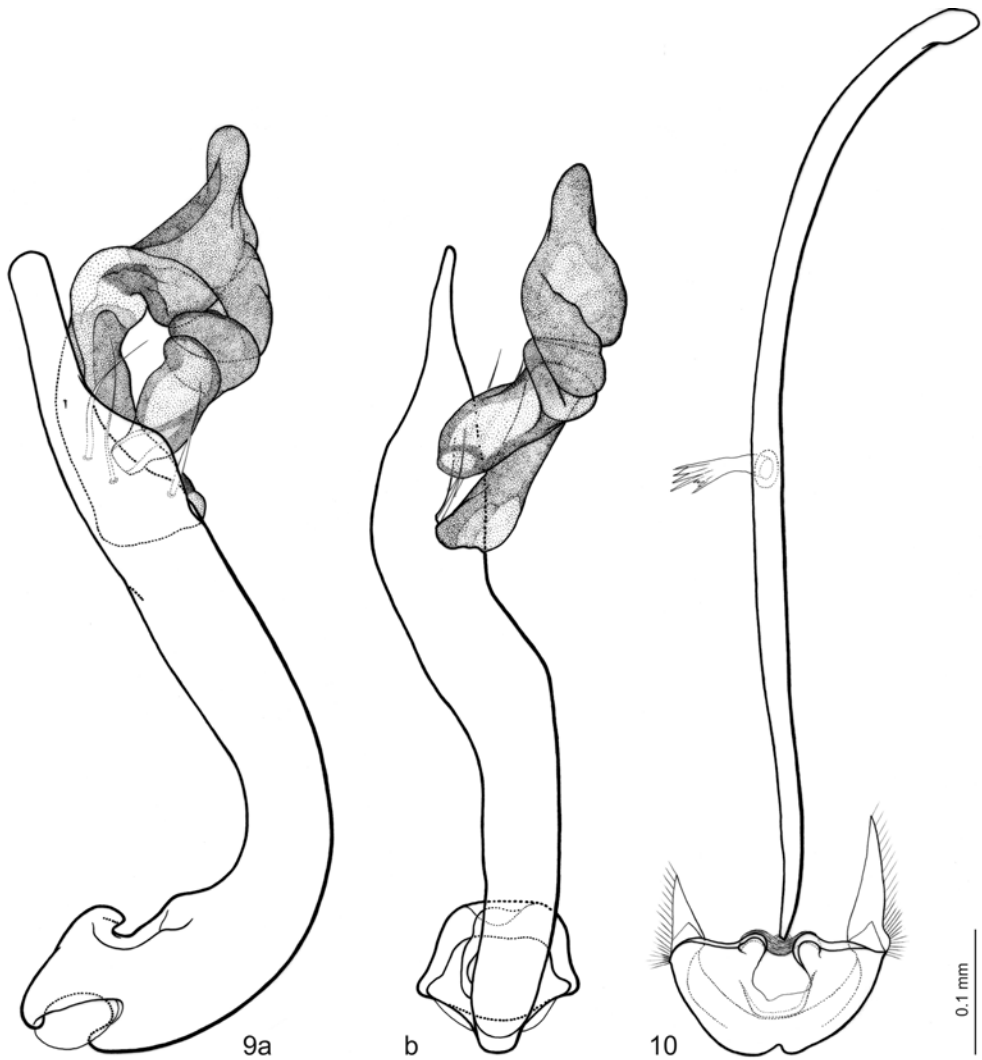
fig. 4). The gonocoxite of *H. tarvisina* (Fig. 16) is more trapezoidal than quadrate. Female tergite X and spermatheca of *H. tarvisina* as in Figs. 17–18.

HABITAT: The habitat of *H. kahleni* (Figs. 19–20) is a small stream, about ca. 1–2 m wide, flowing through rather undisturbed forest. Its total length is about 150–200 m. Its source is about 200 m a.s.l., and it flows into Torrente Campea at an elevation of ca. 165 m a.s.l.

The area extends through partly parallel chains of hills with steep slopes very rich in water sources and famous for viticulture. They are lying between the Venetian Plain and the Venetian Prealps. These hills are commonly known as the “Prosecco Hills of Conegliano and Valdobbiadene” (“Colline del Prosecco di Conegliano e Valdobbiadene”), and in 2010 they have been proposed to be included in the UNESCO’s World Heritage List.



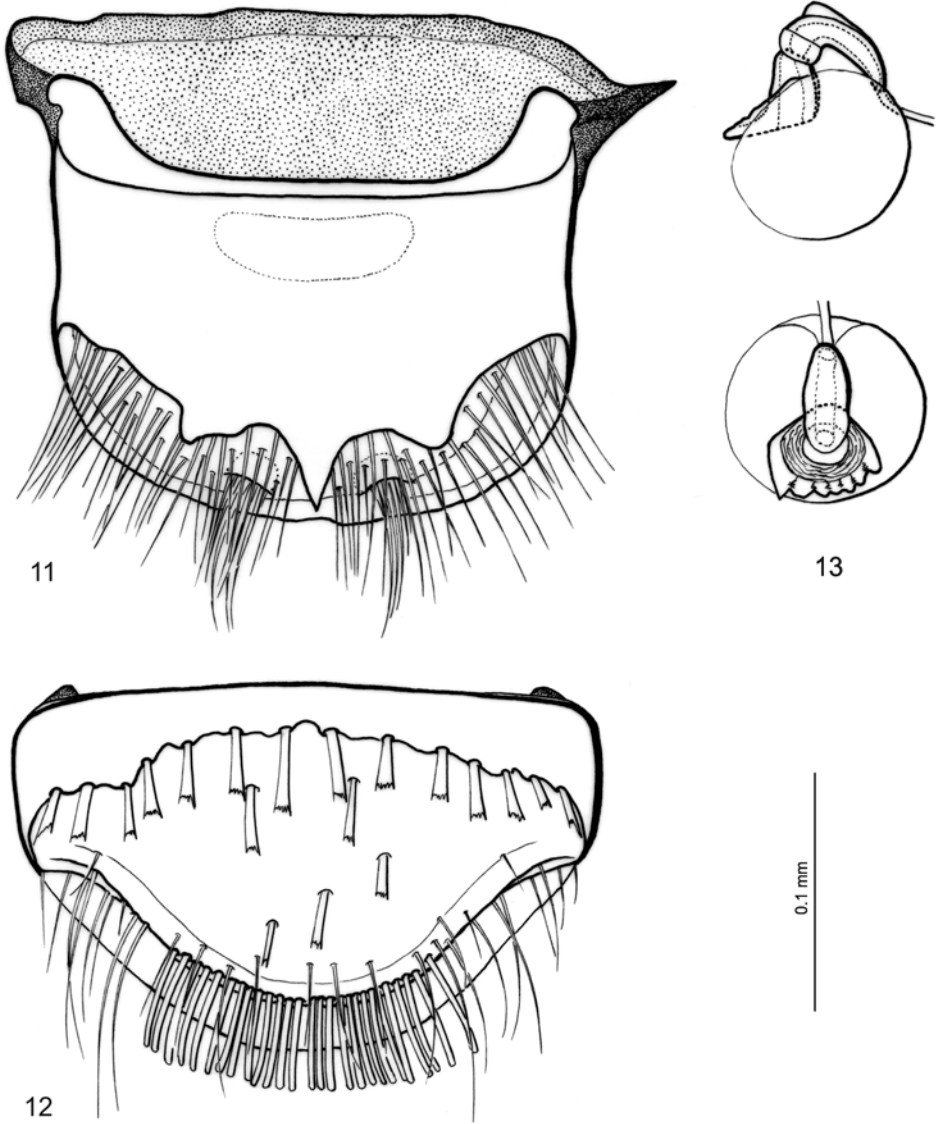
Figs. 6–8: *Hydraena kahleni*, female, 6) gonocoxite, 7) tergite X, 8) spermatheca.



Figs. 9–10: *Hydraena saga*, male, 9) aedeagus in a) lateral and b) dorsal view, 10) terminal sternite and spiculum.

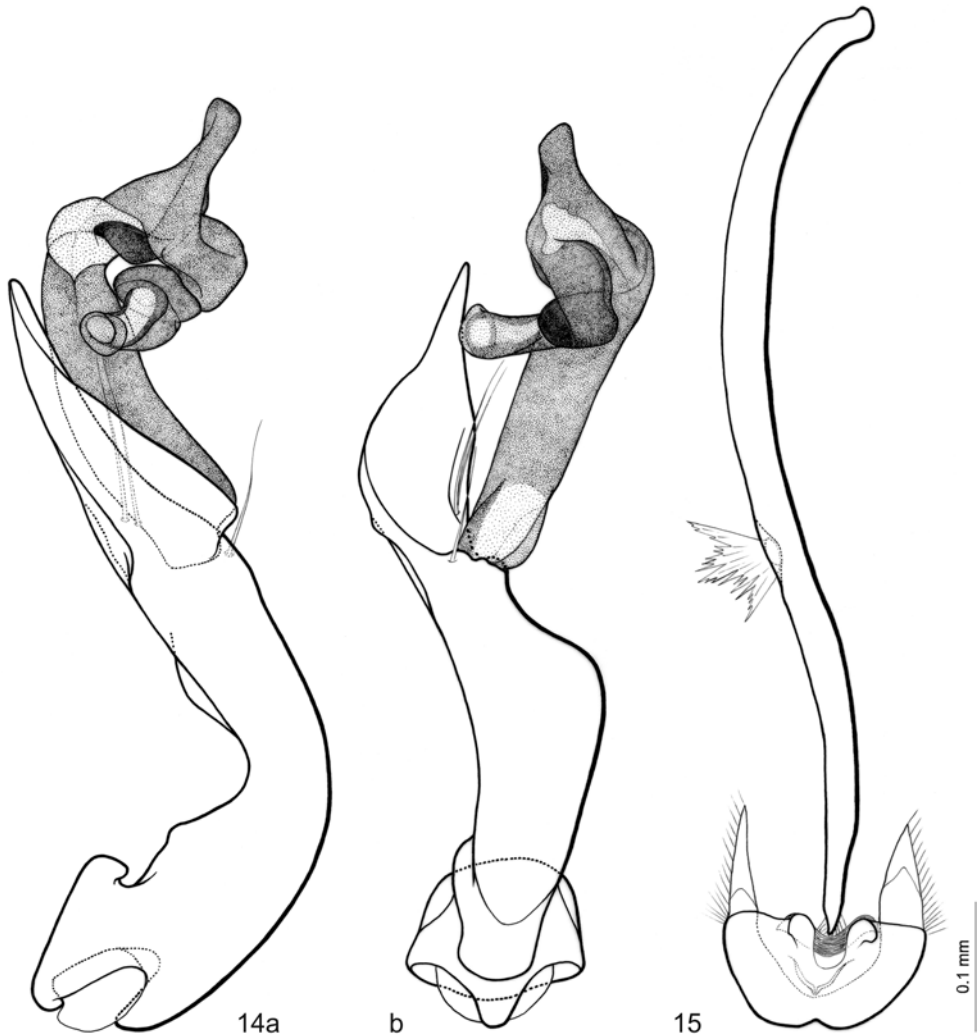
These hills are composed of 1) indistinct Quaternary deposits, 2) the Conegliano complex (clays, sands, conglomerates; Middle Pliocene-Lower Pleistocene), and 3) Southalpine Molasse (Upper Oligocene-Miocene). The type locality lies in the zone of Southalpine Molasse.

Together with *Hydraena kahleni* the following six hydraenids were collected (by U. Heckes, M. Hess, M.A. Jäch, M. Kahlen) at the type locality: *Hydraena carniolica* PRETNER, 1970 (very rare), *H. devincta* (rare), *H. intermedia* (abundant), *H. morio* (rare), *H. nigrita* (rare), and *H. tarvisina* (very abundant). Other species of water beetles: *Pomatinus substriatus* MÜLLER, 1806 (very abundant) (Dryopidae), *Elmis* sp., *Limnius volckmari* PANZER, 1793, *Riolus subviolaceus* MÜLLER, 1817 (Elmidae), *Laccobius* sp. (Hydrophilidae). The *Elmis* sp. is noteworthy. According to a DNA sequence analysis it represents an undescribed species.



Figs. 11–13: *Hydraena saga*, female, 11) gonocoxite, 12) tergite X, 13) spermatheca.

In September 2014 the senior author examined the Torrente Campea, very close to the place where the “*Hydraena kahleni* streamlet” flows into it. Torrente Campea is a small river, ca. 5 m wide, with gravel banks, partly flowing through forest. Six species of *Hydraena* were collected: *H. devincta*, *H. intermedia*, *H. melas*, *H. nigrita*, *H. pulchella* and *H. tarvisina*. While *H. tarvisina* was quite common, there was no trace of *H. kahleni*. Apart from *Hydraena* the author collected four species of Dytiscidae, one species of Dryopidae (*Pomatinus substriatus*), one species of Hydrophilidae (*Laccobius* sp.), and five species of Elmidae (*Elmis aenea* (MÜLLER, 1806), *Esolus parallelepipedus* (MÜLLER, 1806), *Limnius* cf. *intermedius* FAIRMAIRE, 1881, *L. volckmari* (PANZER, 1793), *Oulimnius* ? *tuberculatus* (MÜLLER, 1806)).

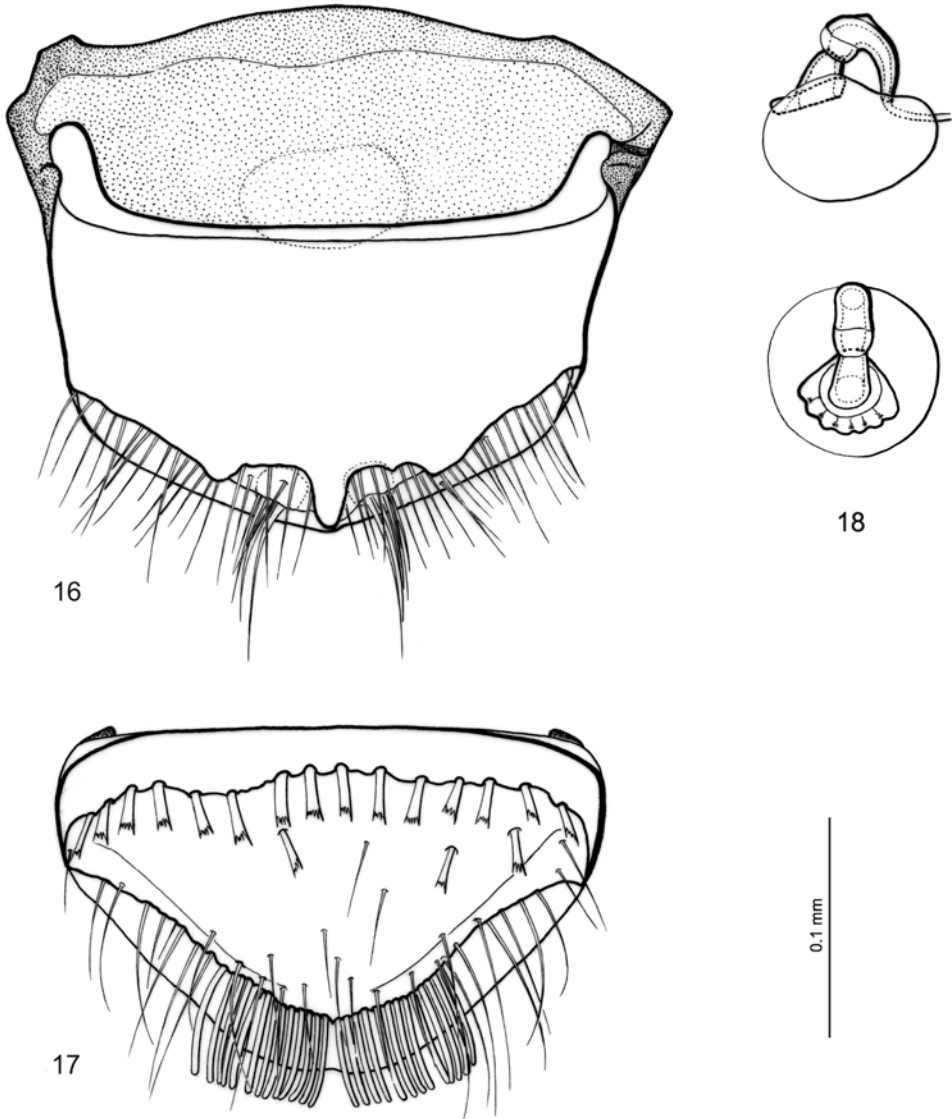


Figs. 14–15: *Hydraena tarvisina*, male, 14) aedeagus in a) lateral and b) dorsal view, 15) terminal sternite and spiculum.

DISCUSSION: *Hydraena kahleni* is, besides *H. tarvisina*, the second *Hydraena* species known only from the Prosecco Hills in Veneto so far. *Hydraena tarvisina* is very common; it is found in all springs, streams and rivers examined. In contrast, *H. kahleni* is so far known only from one small stream. This stream flows entirely through rather undisturbed forest, and it seems that *H. kahleni* is very sensitive to water quality and water temperature.

DISTRIBUTION: So far known only from the type locality. Further studies are needed to find out whether *Hydraena kahleni* is more wide-spread or endemic to the Prosecco Hills.

ETYMOLOGY: Named for Manfred Kahlen (Hall, Austria), who collected the first specimen of this new species. Manfred Kahlen collected about 90 (!) new species of Coleoptera in the Alps so far. More than 40 of these were dedicated to him by various authors (see also HEISS 2014).



Figs. 16–18: *Hydraena tarvisina*, female, 16) gonocoxite, 17) tergite X, 18) spermatheca.

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The habitus photographs were made by H. Schillhammer (NMW).



Fig. 19: Type locality of *Hydraena kahleni*; nameless streamlet (right tributary of Torrente Campea) near Premaor village (north-eastern Italy, Veneto Region, Treviso District); upper course of the streamlet.



Fig. 20: Type locality of *Hydraena kahleni*; lower course of the streamlet.

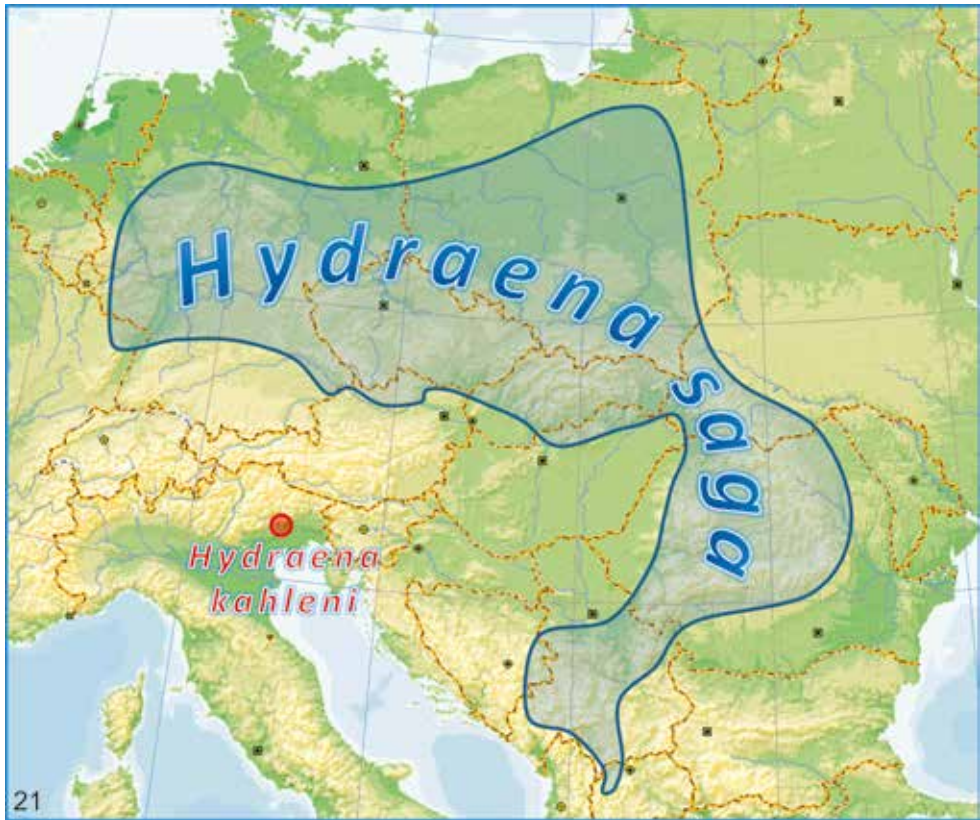


Fig. 21: Geographical distribution of *H. kahleni* and *H. saga*.

References

- FERRO, G. 1992: Due nuove specie paleartiche appartenenti al genere *Haenydra* Rey XXV Contributo alla conoscenza degli Hydraenidae. – Bulletin et Annales de la Société royale belge d'Entomologie 127 [1991]: 217–221.
- HEISS, E. 2014: Laudatio für Manfred Kahlen anlässlich der Verleihung der Ehrenmedaille. – Gredleriana 14: 23–26.
- JÄCH, M.A. & DÍAZ, J.A. 2000: New and little known Palearctic species of the genus *Hydraena* VI (Coleoptera: Hydraenidae). – Entomological Problems 31 (2): 155–162.
- JÄCH, M.A. & SKALE, A. 2015: Hydraenidae, pp. 130–162. – In Löbl, I. & Löbl, D. (eds.): Catalogue of Palearctic Coleoptera. Vol. 2. Hydrophiloidea – Staphylinoidea. Revised and updated edition. – Leiden: Brill, xxvi + 1702 pp. [printed in two parts: pp. i–xxvi + 1–900, pp. 901–1702]

Dr. Manfred A. JÄCH

Naturhistorisches Museum Wien, Burgring 7, A – 1010 Wien, Austria (manfred.jaech@nhm-wien.ac.at)

Dr. Juan Angel DÍAZ

Departamento de Zooloxía e Antropoloxía Física, Facultade de Veterinaria, Universidade de Santiago, Campus de Lugo, E – 27002 Lugo, Spain (juanangel.diaz@usc.es)