Heptagenia orbiticola Kluge, a mayfly species new to Europe (Ephemeroptera, Heptageniidae)

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The mayfly species *Heptagenia orbiticola* Kluge, 1986, described from East Siberia, is recorded from Europe for the first time. The ten known records from Finland and Sweden are mapped. The morphology of the imago and nymph is described including characters for the separation of *H. orbiticola* from other Fennoscandian species of the genus. Information on phenology and habitat is presented.

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Introduction

In 1987, A.N. Nilsson collected in northern Sweden a series of heptagenid nymphs that could not be properly identified to species. In the following years, adults of both sexes were reared from mature nymphs in captivity. When this material was compared with literature descriptions and type material, it became evident that it was conspecific with the East Siberian species *Heptagenia orbiticola* Kluge, 1986.

H. orbiticola was first described by Kluge in Tshernova et al. (1986) from the Khabarovsk region in easternmost Russia. It was later presented as a new species twice, i.e. by Kluge (1987, 1988), including material also from the Chita region (Transbaikal). Together with *H. fuscogrisea* (Retzius, 1783) and the Japanese *H. kihada* Matsumura, 1931, *H. orbiticola* belongs to the subgenus *Kageronia* Matsumura (Kluge 1989).

Identification

Heptagenia orbiticola Kluge

Heptagenia orbiticola Kluge, in Tshernova et al. 1986:119 (orig. descr., key); Kluge 1987:305 (redescr.); Kluge 1988:63 (redescr.); Kluge 1989:4 (class.); Tiunova 1989:52 (cat.).

Imago

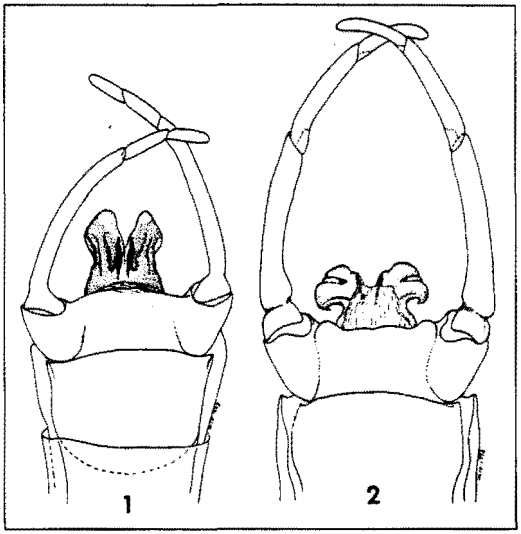
A small heptagenid species with body length ca. 6-10 mm. Wings transparent with yellowish veins. Crossveins of pterostigma unbranched. Penis lobes with roundish apical part pointing backwards; both with a strong ventral spine and without dorsal one (Fig. 1).

The species is fairly easy to distinguish from other Fennoscandian heptagenid species. Its size is roughly the same as that of *Heptagenia joernensis* (Bengtsson, 1909), but the latter has clear wing veins and laterally pointing penis lobes (Fig. 2). The other possible species, *H. fuscogrisea*, *H. (H.) sulphurea* (Müller, 1776), and *H. (H.) dalecarlica* Bengtsson, 1912, are on an average about one third larger than *H. orbiticola*, and have the penis armed also with dorsal spines. Additional generic and subgeneric differences were given by Kluge (1989), that placed *H. joernensis* in the genus *Ecdyonurus*.

Nymph

Gills ca. twice as long as wide (Fig. 6); last pair without a tuft of filaments. Anterior margin of head with a relatively deep notch (Fig. 3). Caudal filaments with short swimming hairs in distal parts. Glossae semicircular with pointed apex (Fig. 4). Spines on femur of equal thickness and apically truncate (Fig. 5). Tarsal claws narrow, more than three times longer than wide (Fig. 7).

The nymphs of *H. orbiticola* are distinguished from those of *H. joernensis* which also have slightly notched anterior margin of head and fringed caudal filaments, according to the broa-



Figs 1-2. ***Heptagenia,*** *male genitalia, ventral view. -1.* ***H. orbiticola*** *Kluge, Sweden. -2.* ***H. joernensis*** *(Bengtsson), Finland. M. Saaristo del.*

Hangenitalier av ***Heptagenia.***

der gills (Fig. 12) and the widely spaced, round pointed glossae (Fig. 11). *H. sulphurea* and *H. dalecarlica* nymphs have the same type of glossae as *H. joernensis* and also a tuft of filaments in the last pair of the gills and their caudal filaments are without swimming hairs. In practice *H. orbiticola* may be confused with *H. fuscogrisea* which have the same type of glossae and the last pair of gills without a tuft of filaments. However, *H. fuscogrisea* has a head without an anterior notch (Fig. 8), there are no swimming hairs, femoral spines apically pointed (Fig. 9), and claws broad (Fig. 10).

Known records

Finland: Puolanka, Jänisjoki (720:54), 4.vii.1981, one nymph, A. Miettinen leg.; Suomussalmi, Tervajoki (721:61), 4.vii. 1984, six nymphs, A. Pulkkinen leg.; Suomussalmi, Raatejoki (722: 58), 15.vi.1983, one nymph, A. Pulkkinen leg. [these nymphs were earlier misidentified as *H. fuscogrisea* (Savolainen & Pulkkinen 1987)]; Rovaniemen mlk., Norvajoki, 27.vii.1991, one nymph, M. Leppä leg.

Sweden: Västerbotten: 25 km NNW of Vindeln, Vargbäcken (714890, 167710), 1987-1992, nymphs and adults, A. Johansson & A.N. Nilsson leg. - Norrbotten: 8 km S of Masugnsbyn, Juterijoki (749065, 176870), 11.vii.1984; Lovikka, Pussujoki (748535, 179120), 3.viii.1983; 10 km SSW of Tärendö, Vähäjoki (745725, 178925), 3.viii.1983, nymphs, E. Engblom & P.-E. Lingdell leg. & det. - Lycksele lappmark: Övre Sandsele, Vindelälven (730250, 153860), 25.vii.1961, nymphs and adults, S. Ulfstrand leg., E. Engblom det. - Pite lappmark: 9 km SSO Strömnäs, Skiljemyrbäcken (730550, 164800), 7.viii.1983, nymphs, E. Engblom & P.-E. Lingdell leg. and det.

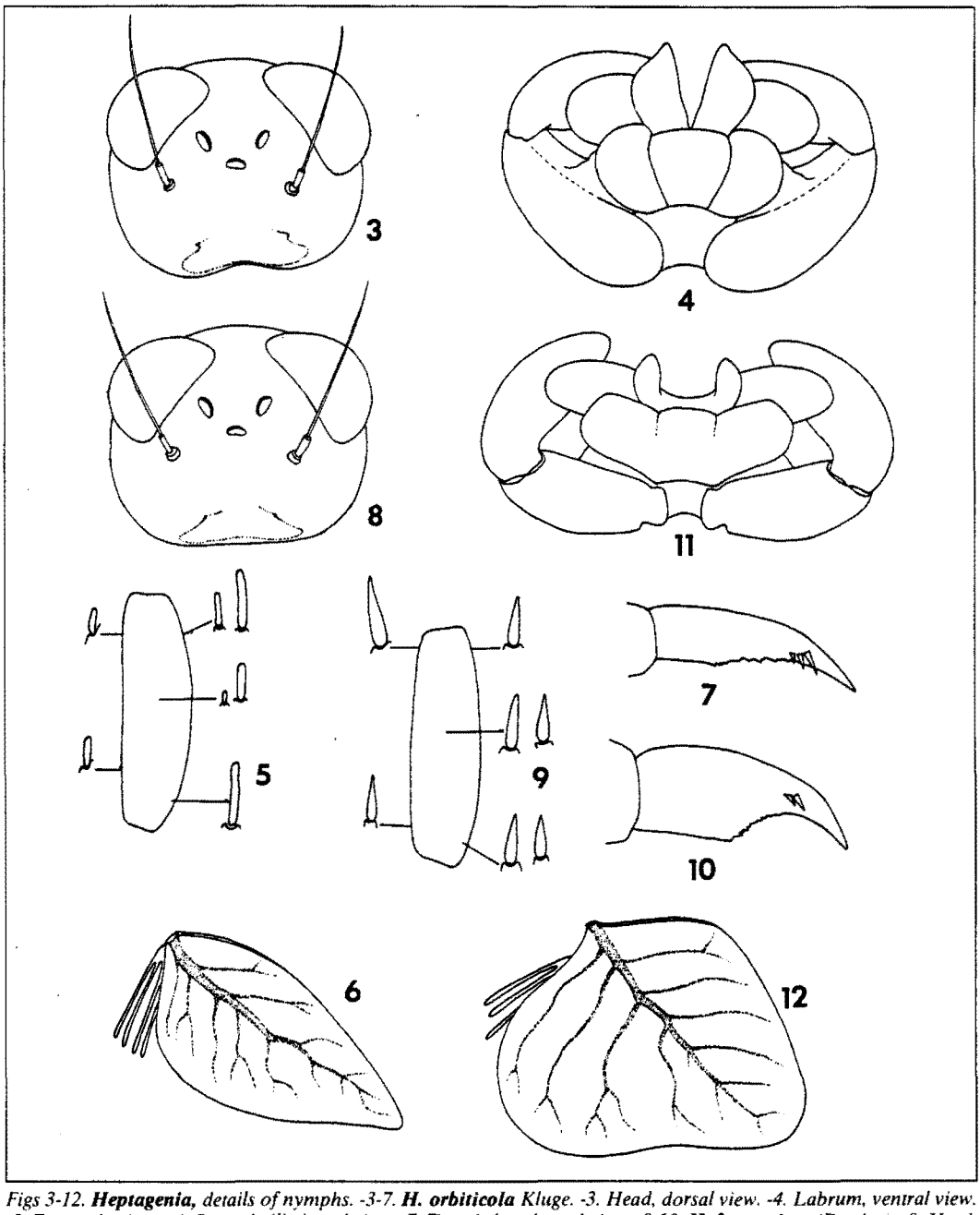
The known records from Fennoscandia (Fig. 13) suggest that the species is widespread in boreal and subarctic regions. In this case, the chance that it has previously been confused with other species, also in Sweden, is pronounced.

Habitat and phenology

In Siberia, *H. orbiticola* inhabits more or less stagnant pools in small, cold streams, often formed at road-crossings (Kluge 1987). All Fennoscandian records but one come from small boreal streams. The specimens collected in the Vindelälven river may well originate from a small tributary, as mature *Heptagenia* nymphs are known to drift long distances during emergence (Lingdell in litt.).

The phenology of *H. orbiticola* was studied in the cold, small stream Vargbäcken in the Västerbotten province (64°25'N, 19°30E', see Nilsson 1989 and Solem & Johansson 1991 for a general description). This stream has a maximum flow of 0.2 m^3/s and the bottom substrate is chiefly sand. It freezes to the bottom in winter and is periodically dry in summer. The highest temperature recorded in this stream is 14.1 °C, and in one year the maximum temperature was 10.7 °C. Nymphs occurred chiefly in pools, but were also collected in parts with more fast-flowing water.

In the Vargbäcken stream, *H. orbiticola* nymphs occurred from 14 July to 2 September in net samples (cf. Nilsson 1989) taken every ten days during the ice-free season 1987. Altogether 85 nymphs were found as follows (five samples pooled on each occasion): July 14 - 29, 24 - 9, August 2 - 14, 12 - 5, 22 - 13, and September 2 - 15 nymphs. During the warmer summer of 1989, mature nymphs were found already in late July and emergence was more or less completed on 10 August. In 1992, the first small nymph was found on 20 June when water temperature had reached 11.0 °C. The other Fennoscandian records of nymphs orginate from 15 June to 7 August. In Siberia, adults were collected from late July to mid August (Kluge 1987). These data suggest a univoltine life-cycle with overwintering eggs. However, the possibility of small nymphs overwintering down in the bottom substrate cannot be excluded.



Figs 3-12. ***Heptagenia,*** *details of nymphs. -3-7.* ***H. orbiticola*** *Kluge. -3. Head, dorsal view. -4. Labrum, ventral view. -5. Femoral spines. -6. Second gill, dorsal view. -7. Tarsal claw, lateral view. -8-10.* ***H. fuscogrisea*** *(Retzius). -8. Head, dorsal view. -9. Femoral spines. -10. Tarsal claw, lateral view. -11-12.* ***H. joernensis*** *(Bengtsson). -11. Labrum, ventral view. -12. Second gill, dorsal view. M. Saaristo del.*

Detaljer av nymfer hos ***Heptagenia.***

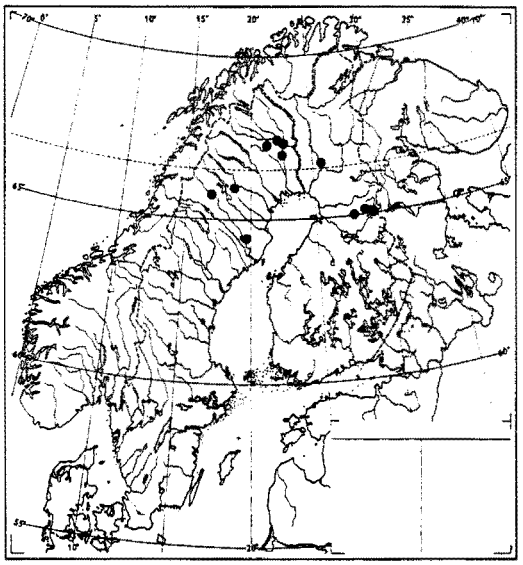


Fig. 13. Map of Fennoscandia showing known records of ***Heptagenia orbiticola*** *Kluge.*

Kända fyndlokaler för dagsländan ***Heptagenia orbiticola*** *i Fennoskandien.*

The life-cycle of *H. fuscogrisea* is in northern Fennoscandia univoltine with larvae that grow from autumn to early summer (Söderström 1991), i.e. that reach maturity about one or two months before those of *H. orbiticola.*

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Sammanfattning

Dagsländan *Heptagenia orbiticola* Kluge, 1986, beskriven från östra Sibirien, rapporteras här från Europa för första gången. De tio kända fyndlokalerna i Finland och Sverige anges. Imagons och nymfens morfologi beskrivs, inklusive karaktärer som separerar *H. orbiticola* från andra fennoskandiska arter av släktet. Vidare presenteras information om fenologi och habitat.