

## A RECENT MAY FLY SPECIES (EPHEMEROPTERA, HEPTAGENIIDAE) IN BALTIC AMBER

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On the basis of adult winged stages from Baltic amber, Demoulin has described eight species of may flies, which he assigned to the family Heptageniidae [1-3]. Seven of these species were assigned to the Recent genera *Heptagenia* Walsh, 1863, *Rhithrogena* Eaton, 1881 and *Cinygma* Eaton, 1885, and one was established as a separate genus *Electrogenia* Demoulin, 1956. The generic assignment of these species needs to be reconsidered, however, since the only generic criteria used by Demoulin [2] was the proportion of the legs; in the Recent forms, the proportions of the legs vary strongly within each genus and may be the same for species of different genera. The system of the Recent may flies, and particularly the identification of the genera belonging to the family Heptageniidae, is based primarily on their larval features: the structure of the mouth apparatus, the branchiae etc. In most cases, of course, these are not accessible to study in fossil material. This applies especially to the fauna in amber, which is known chiefly on the basis of winged insects. The most reliable criteria for identifying the genera of the family Heptageniidae in the imago stage are the distinctive features of their thoracic structure.

Thanks to the kindness of Dr. T. Kronstedt (Stockholm), I have been able to study the almost complete remains of a male may fly imago from Baltic amber of Late Eocene age (Spec. Ar. 8984, Paleozoological Department of the Royal Swedish Museum of Natural History), which according to all its features that are accessible to study, including the structure of the genitalia (Fig. 1c, d) turned out to be indistinguishable on the specific level from the representatives of the Recent species *Heptagenia* (*Kageronia*) *fuscogrisea* (Retzius, 1783), which occurs today throughout Europe and in Siberia. In particular, the structure of the thorax (Fig. 1a, b) unambiguously shows that the fossil insect belongs to the genus *Heptagenia* Walsh, 1963, which is characterized by the following: 1) the anterior part of the mesonotum has a distinct transverse groove, strongly curved where it connects with the medial parapsidal grooves; 2) in the posterior part of the mesonotum, the lateral parapsidal grooves are not curved outward, but terminate against the medial parapsidal grooves; 3) the prosteronum has a distinct transverse ridge separating the inflated basisternum from the concave furcasternum; and 4) the medial trough of the furcasternum on the mesothorax is very narrow anteriorly and widens rearward. Among the characteristics used to differentiate the species of *Heptagenia* that are also clearly discernible on this specimen, the most important are the following. The first segment of the foretarsus is considerably longer than half the length of the second segment. The first segment of the hindtarsus is somewhat longer than the second. The cross veins in the pterostigma of the forewing may branch and anastomose (but not always, in Recent specimens). The genitalia are as in Fig. 1d, e; the double part of the penis has lateral processes (shown by arrows), the dorsolateral spines are well developed, and the titillators are massive and curved. The length of the insect's body is 9 mm (in Recent specimens, 9-14 mm). Of these features, the length of the first segment of the foretarsus reliably differentiates the fossil from all the Recent Palearctic species of *Heptagenia*, except for *H. (K.) fuscogrisea*, and the above-described structure of the genitalia in general from all other Recent species of the genus. No differences between the specimen under study and the Recent specimens of *H. (K.) fuscogrisea* were found in other respects.

As for the species described from the Baltic amber, all of them except "*Heptagenia*" *ligata* Demoulin, 1968 show clear differences from *H. (K.) fuscogrisea* "*Heptagenia*" *sinex* Demoulin, 1968, "*H. atypica*" Demoulin, 1968, "*H. gleissi*" Demoulin, 1968 and "*Rhithrogena*" *sepulta* Demoulin, 1968 differ in the shorter first segment of the foretarsus in the male (which is considerably shorter than half the length of the

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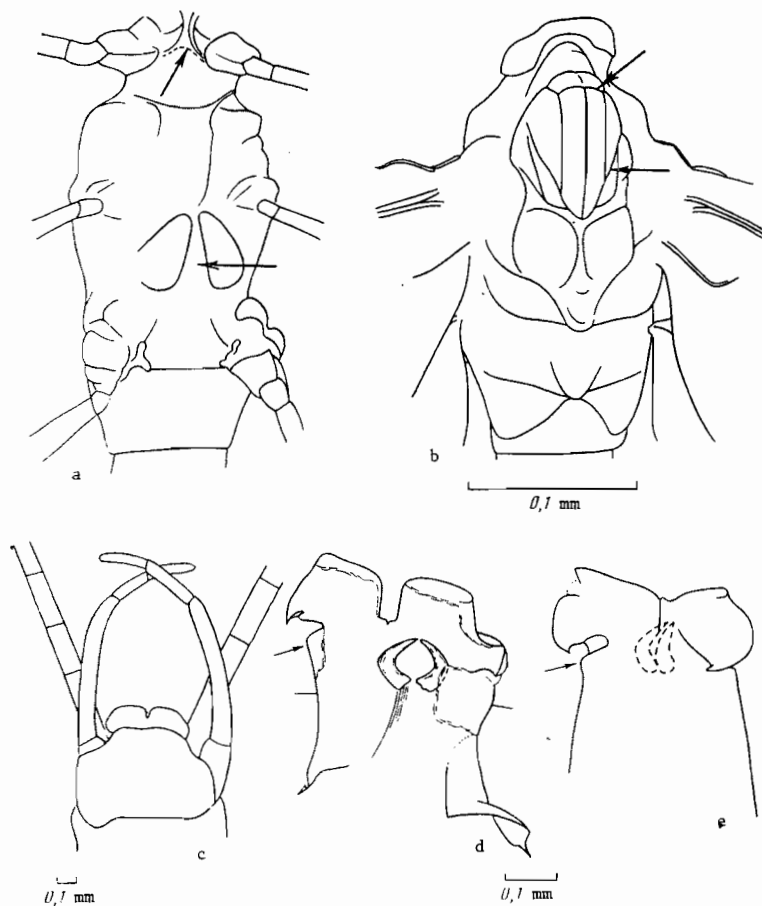


Fig. 1. *Heptagenia (Kageronia) fuscogrisea* (Retzius): a-d) Spec. Ar. 8984; a) ventral side of thorax; b) dorsal side of thorax (arrows pointing to features indicated in diagnosis of genus); c) central view of genitalia; d) dorsal view of penis (with large part of dorsal wall destroyed, showing titillators); Kaliningrad; Upper Eocene; e) dorsal view of penis; Leningrad region; Recent.

second segment). "*H.*" *baohofeni* Demoulin, 1968 differs in having a first segment of the hindtarsus that is shorter than the second. "*Cinygma*" *baltica* Demoulin, 1968 and "*Rhithrogena*" *sepulta* Demoulin, 1968 differ in the narrow lobes of the penis. "*H.*" *ligata* has been described only on the basis of the male imago, and its description contains no features enabling it to be differentiated from *H. (K.) fuscogrisea*.

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