

On Finding a Single-Clawed Aphid, *Germaraphis ungulata* (Homoptera, Aphidinea), in a Syninclusion with the Ant *Monomorium mayrianum* (Hymenoptera, Formicidae) in the Saxonian Amber

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Abstract—The first syninclusion of the myrmicine *Monomorium mayrianum* Wheeler (two workers) and the aphid *Germaraphis ungulata* Heie (one nymph) is described from the Bitterfeld amber. Additionally, *G. ungulata* is recorded in a syninclusion with *Ctenobethylus goepperti* (Mayr) in the Rovno amber for the first time.

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This article continues a series of papers on syninclusions of aphids and ants in the Late Eocene amber (Perkovsky, 2006, 2007, 2008a, 2008b).

The aphid *Germaraphis* (*Henningsenia*) *ungulata* Heie, 1967 has been described “by four apterous specimens, probably all larvae in four pieces of amber” (Heie, 1967, p. 86). This is the only known species of single-clawed *Germaraphis* (P. Węgierek, personal communication). This species had not been known from syninclusions until the discovery of six nymphs of *G. ungulata* in a syninclusion with three worker ants *Lasius schiefferdeckeri* Mayr, 1868 in the Late Eocene Rovno amber (Perkovsky, 2008). For the second time, this aphid was found in a syninclusion in the Saxonian amber from the collection of Manfred Kutscher (Sassnitz, Rügen, MKK), the specimen MKK No. F-167. This syninclusion, in a small, teardrop-shaped, rather contaminated amber piece, contains two worker ants *Monomorium mayrianum* Wheeler, 1915 and a nymph of *G. ungulata*. Other syninclusions are stellate hairs. This syninclusion has been listed by Perkovsky (2006) without indication of the aphid’s species name. In our opinion, the Saxonian amber is the Baltic amber redeposited in Germany. The composition of the ant fauna also allows considering this amber as an approximately synchronous analogue of the Baltic amber (Perkovsky et al., 2007; Dlussky and Rasnitsyn, 2009, pp. 38–56 this volume).

Comparison of the representative collections of the Rovno and the Baltic amber has demonstrated that aphids from the genus *Germaraphis* Heie are five times

less abundant in the Rovno than in the Baltic amber (Perkovsky et al., 2007). We think that this is associated with the differences between the ant faunas of the Rovno and Baltic amber, particularly with the ants *Ctenobethylus goepperti* (Mayr, 1868) being poorly represented in the Rovno amber, while superdominating in the Baltic (and Saxonian) amber (Perkovsky 2006, 2007, 2008; Dlussky and Rasnitsyn, 2009, pp. 38–56 this volume).

Until now, in numerous syninclusions of *C. goepperti* with aphids (Wheeler, 1915), only one apterous aphid species has been known: *Germaraphis* (*Germaraphis*) *dryoides* (Germar et Berendt, 1856), which dominates in all the Late Eocene ambers. Among the aphids that we have found in syninclusions with *Lasius schiefferdeckeri* Mayr in the Saxonian amber, all the apterous specimens that can be identified to species belong to *G. dryoides*. Recently, a syninclusion of *L. schiefferdeckeri* and *G. dryoides* has also been found in the Baltic amber (Perkovsky, 2008). However, in the Rovno amber, which contains significantly less *C. goepperti* and five times less *Germaraphis*, the aphids *G. dryoides* have not been found in syninclusions with *L. schiefferdeckeri*, the second most abundant ant species, which is significantly more common here than in the Baltic amber. At the same time, *L. schiefferdeckeri* has been found in the Rovno amber in syninclusions with *Germaraphis* (*Balticorostrum*) *oblonga* Heie (Perkovsky, 2007) and *G. ungulata* (Perkovsky, 2008), which had not been known from syninclusions with ants in the past. One of the aphid nymphs (UA-1419a)

from the previously described syninclusion of *Germaraphis* and *C. goepperti* (only the head of the ant is enclosed in the amber) (Perkovsky, 2006) also turned out to be single-clawed. The same inclusion has been previously mentioned as the only Rovno amber piece containing more than a single specimen of *Germaraphis* (Perkovsky et al., 2007); the second nymph is indistinguishable in dorsal view from the first one, but its legs are in the “milky” clouded area, and the claws are not visible.

We suggest that the superdominance of *G. dryoides* in the Baltic syninclusions is associated with the superdominance of *C. goepperti* in the Baltic amber forest, where the ant species was building nests on amber-producing trees. Other ant species could have been more closely associated with other aphid species. This could have been true of *L. schiefferdeckeri*, which was also building nests on amber-producing trees, at least in the Rovno amber forest, as indicated by records of its larvae and pupae in the amber (Perkovsky, 2007, 2008).

Monomorium mayrianum is one of the five most common amber species of Myrmicinae. This species occurs in all the Late Eocene ambers, except the Danish, but comprises less than 0.25% of all the amber ants identified to species. It is best represented (0.80–0.96%) in the Saxonian amber collections (Dlussky and Rasnitsyn, 2009, pp. 1024–1042 this volume). The syninclusion described is the second among more than 40 known syninclusions that contains two specimens of this species (the first one has been listed in the redescription by Wheeler, 1915). Symbiotic relationships between the recent *Monomorium* ants and homopterans have been recorded by various authors (Adenuga, 1975; Taylor, 1981; Carver et al., 1993, etc.), but they remain insufficiently studied.

Therefore, all the known Saxonian amber syninclusions of ants and aphids where the aphid can be identified to species contain *G. dryoides* (Perkovsky, 2006, 2007), with the only exception of *M. mayrianum*, found in association with *G. ungulata* (previously unrecorded from the Saxonian amber). The total of eight specimens of *G. ungulata* have been found so far in syninclusions with ants (the previously reported number was four (Heie, 1967). Only *G. dryoides* is known from a larger number of syninclusions. This suggests that the record of *G. ungulata* in a syninclusion with *Monomorium* is not accidental, despite the fact that tropical species of *Monomorium* are more often associated with scale insects, which are more common in the tropics.

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