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TWO NEW FOSSIL THRIPS FROM BALTIC AMBER (THYSANOPTERA; TEREBRANTIA)

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In 1953, Chicago Natural History Museum acquired a valuable collection of fossil arthropods preserved in Baltic amber (Wenzel, 1953). These specimens belonged to the A. F. Kohlman collection. It is reasonably certain that most of them were obtained by Kohlman from the late William Haren of St. Louis, Missouri. The larger part of the Haren collection was acquired by the Museum of Comparative Zoology at Harvard College in 1938.

In the Kohlman collection were five thrips which were kindly lent to me for study through the courtesy of Mr. R. L. Wenzel, Curator of Insects, Chicago Natural History Museum. Two of these thrips are larvae, one is an unclassified species belonging to the Thripidae, and the other two are described herein as new.

The photographs were taken by Mr. Wenzel with a photomicrographic camera fitted with Leitz Ultropak illuminator and achromatic dry objective UO 22/0.45.

Family **AEOLOTHRIPIDAE?**

Stenurothrips bagnalli sp. nov. Figures 99, 100.

Female (macropterous).—Length, not distended, exclusive of the antennae, about 1.8 mm. Head similar to *succineus* (as sketched by Bagnall, 1914), suggestive of *Rhipidothrips;* cheeks slightly bulged; ocelli well developed; antennae each 9-segmented, segments III and IV each with a short, conical sense cone projecting from the outer apical angle of each of these segments (fig. 99, *d*).

Prothorax with long epimeral setae; fore wings long, with two conspicuous longitudinal veins in addition to the peripheral veins, with two cross veins on the leading margin, with one cross vein on the trailing margin, and with an incomplete cross vein between the longitudinal veins, all of which are disposed as in figure 99, *e;* setae of the longitudinal veins stout and uniformly spaced; fringe cilia wavy, with many accessory cilia overlapping the cilia of the trailing margin.

Abdomen with the tenth segment elongate, tube-like, about 0.35 mm. in length, decidedly more than twice as long as the head (fig. 99, *c*); saw-like ovipositor slightly protruding from ventral slit of tube, seemingly straight but possibly barely down-turned at tip.

Holotype.—A macropterous female in Baltic amber, CNHM slide no. A-1 in the amber insect collection, Division of Insects, Chicago Natural History Museum.

Discussion.—Only two other species, *succineus* and *brevisetis*, also amber fossils, have been described in this extinct genus. *Bagnalli* is supposedly more closely related to *succineus*, which is about the same size. The third species, *brevisetis*, is slightly smaller, about 1.5 mm., and according to Bagnall's description has a longer and more slender tube and a broader abdomen. Until these three fossils can be compared and the differences evaluated in regard to possible distortion due to preservation, it seems best to regard them as separate entities. Dr. Bagnall has told me that the specimens of his species, *succineus* and *brevisetis*, are still in his possession but that they are not immediately accessible, being in storage.

Stenurothrips bagnalli differs from all other species of the Aeolothripidae in the formation of the marginal setae of the trailing edge of the fore wing. As far as I have been able to discover, these setae are straight in every genus in the Aeolothripidae except *Stenurothrips*, in which they are wavy, as they are in many members of the more advanced family Thripidae. Only rarely are a few of these setae wavy in the Heterothripidae, at least in the North American forms. Since wavy or undulated fringe setae are characteristic of the higher thrips of the Terebrantia, this condition in *Stenurothrips* indicates advanced specialization.

The odd, short, triangular sense cones of antennal segments III and IV of *bagnalli* are not unique for the Thysanoptera. Similar sense cones are found in another fossil genus, *Opadothrips;* they reportedly occur in the extant *Adiheterothrips*, *Holarthothrips*, and *Oligothrips;* and are developed to a lesser degree in the African *Fauriella* and *Opisthothrips*. Some authors place these genera in the Heterothripidae, to which they may belong, but *Fauriella* and *Opisthothrips* are definitely transitional, in other respects, between the Aeolothripidae and the Heterothripidae. In the family Aeolothripidae at least one living species, *Orothrips yosemitii* Moulton, also has such triangular sense cones. Since this type of sense cone is found in both of the aforementioned families, it is not in itself diagnostic at the family level. This conclusion is based on the assumption that the above genera are correctly assigned to family.

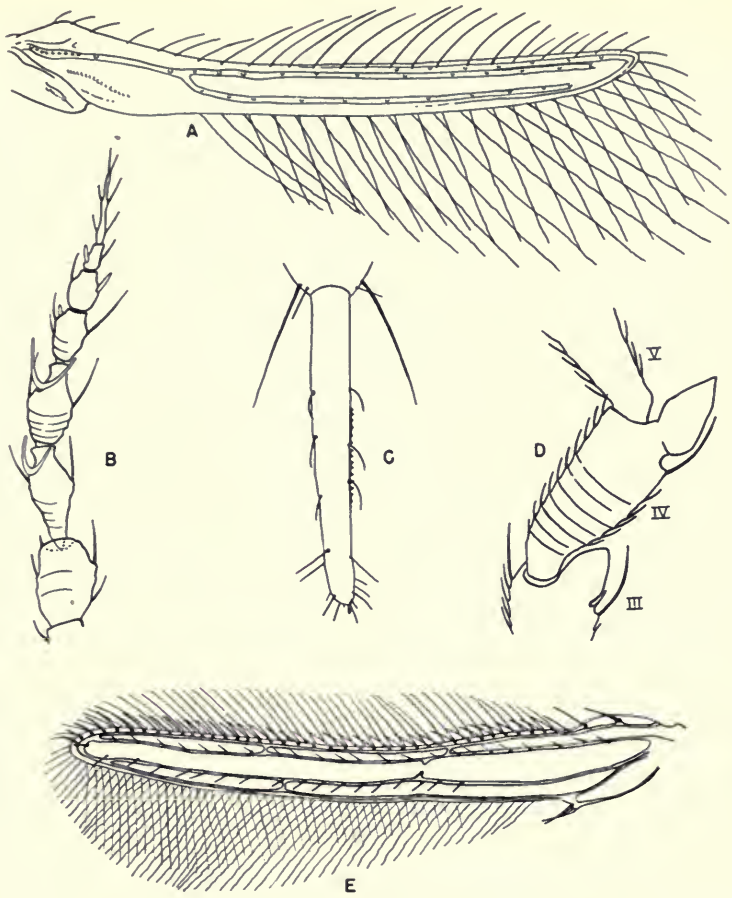

FIG. 99. *a* and *b*, *Hercinothrips extinctus* sp. nov.: *a*, fore wing; *b*, antenna, dorsal view. *c–e*, *Stenurothrips bagnalli* sp. nov.: *c*, tube; *d*, antennal segment IV; *e*, fore wing.

As nearly as I can determine, the saw of *Stenurothrips bagnalli* is straight or turned just slightly down at the tip. All species of the family Aeolothripidae have up-turned ovipositors, whereas species of other terebrantian families have the ovipositor turned down with but two exceptions. The exceptions are species of the genera *Fauriella* and *Opisthothrips*, which have the saw straight. As previously stated, these two genera are intermediate between the Aeolothripidae and the Heterothripidae. Like these two genera, *Stenurothrips* is more advanced in the form of the saw than are the majority of Aeolothripidae. Actually, *Stenurothrips* is slightly

more advanced, not only in that the saw is beginning to show a down-turn trend, but also in having wavy fringe setae on the fore wing. *Fauriella* and *Opisthothrips* retain straight fringe setae.

The tubed condition of *Stenurothrips* definitely represents a high degree of specialization. The tenth abdominal segment is modified into a tube that is much longer than the head (fig. 99, *c*). Some few other genera in the Terebrantia also have long tubes, for example, *Macrurothrips* (see Priesner, 1949a) and *Dinurothrips*. However, these latter two genera belong to the Thripidae and are not relatives of *Stenurothrips*. There seems to be an evolutionary tendency toward the development of a tube in the Thysanoptera. It has originated several times independently. All members of the suborder Tubulifera have tubes, but these tubes are quite different from those found in the Terebrantia. Aside from the presence or absence of a saw, there is a fundamental difference in the position of the major apical setae of the tubes in each suborder. These major apical setae arise directly from the sides of the tube in the Terebrantia. By contrast, in the Tubulifera the major setae arise from additional sclerites attached to the tip of the tube. In *Stenurothrips* the major apical setae arise from the sides of the tube as they do in the Terebrantia.

Schlechtendal's figure of his fossil, *Phloeothrips pohligi*, shows that the tube is terebrantian, not tubuliferan, in type. The setae are illustrated as arising from the sides of the tube and not from additional sclerites. Possibly *P. pohligi* should be placed in *Stenurothrips* or a nearly related genus. It almost certainly does not belong to the genus *Phlaeothrips* or to the suborder Tubulifera.

In summary, *Stenurothrips* seems to be more like the Aeolothripidae than the Heterothripidae, especially in the form of the wings. It bears sense cones similar to those of some species of the Aeolothripidae and the Heterothripidae. As in the transitional genera *Fauriella* and *Opisthothrips*, the saw of *Stenurothrips* is nearly straight. *Stenurothrips* could either be placed with the Aeolothripidae or separately placed as a specialized offshoot. *Phloeothrips pohligi*, which should be re-assigned, might be considered to be closely related to *Stenurothrips*.

Family **THRIPIDAE**

Hercinothrips extinctus sp. nov. Figures 99, 101.

Male (macropterous).—Length, not distended, exclusive of the antennae, probably about 0.8 mm. Body dark reddish brown, legs somewhat lighter.

FIG. 100. *Stenurothrips bagnalli* sp. nov. × 73.

FIG. 101. *Hercinothrips extinctus* sp. nov. × 63.

Antennal segments I and II concolorous with body, segments III to VIII yellowish. Wings pale, colorless, or faintly yellow, without dark bands or dark areas.

Head subreticulate in part; antennae as in figure 99, *b*, 8-segmented, with forked sense cones on segments III and IV; mouth cone moderately short; maxillary palps apparently 2-segmented.

Thorax reticulate on much of the visible surface; fore wings as in figure 99, *a;* vein setae broken off but their position marked by their sockets, trailing fringe setae wavy; tarsi each 2-segmented.

Abdomen without indications of sternal glands.

Holotype.—A macropterous male in Baltic amber, CNHM slide no. A-2 in the amber insect collection, Division of Insects, Chicago Natural History Museum.

Discussion.—Obviously a member of the heliothripoid group, this fossil species belongs in or near *Hercinothrips,* on the basis of the tarsi and the wings. In modern members of *Hercinothrips* and in this fossil, each tarsus is 2-segmented, and the leading edge of the fore wing does not have fine fringe setae in addition to the heavy fringe setae. By contrast, in species of the nearly related *Hercothrips*

(also sometimes called *Caliothrips*) each tarsus has only one segment and the fore wing bears a row of fine setae in addition to the heavy fringe setae.

Several other heliothripoid species have been described from Baltic amber and from fossil-bearing beds of approximately the same age, but as far as I know the species described herein is the only fossil species of *Hercinothrips* yet discovered. Other fossil heliothripoids include species assigned to *Selenothrips*, *Heliothrips*, and *Gerontothrips*.

As is the case with many fossils, certain details of *Hercinothrips extinctus* cannot be seen. The specimen lies partially sideways and is slightly twisted. Around the wings air bubbles somewhat mask the outline, and all of the vein setae are broken off. Some of the antennal segments seem to be compressed or at such an angle that it is impossible to determine the horizontal profile. The body sutures are not all visible. Even so, this fossil is remarkably well preserved, and it was possible to study it under 200X magnification.

Present-day species of *Hercinothrips* are confined to the tropics or subtropics. One can reasonably speculate that this fossil *Hercinothrips* required similar warm conditions for its existence. Such a conclusion adds another bit of circumstantial evidence to the theory that Baltic amber was formed in a tropical or nearly tropical climate.

Of the half dozen or so species of *Hercinothrips* described, all of which are extant, only *femoralis* is known to me and available for comparison. *H. extinctus* has a shorter and thicker third antennal segment than *femoralis* and, unlike *femoralis*, *extinctus* lacks a pedicel at the base of antennal segment VI. These and other differences which are difficult to evaluate indicate that these two are distinct entities.

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