MIXOTHRIPS, A NEW GENUS OF GALL MAKING THRIPS (THYSANOPTERA: PHLAEOTHRIPIDAE)

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ABSTRACT

Mixothrips is erected for craigheadii, new species and type-species, from Florida and priesneri (da Costa Lima), new combination from Eugynothrips, from Brazil. Both species make leaf roll galls on Eugenia.

One of the species representing the new genus described herein has been known to Miss Kellie O'Neill, United States National Museum, and me for the past 10 years. Although we knew it differed from any taxon recorded from North America, its characteristics were such that we thought it might be assignable to any of several exotic, unavailable, genera whose published descriptions were inadequate for proper placement in our present system. Further, we were not certain whether one or two genera, or species, were actually involved. In 1961 Miss O'Neill secured another, larger, series of this thrips and forwarded them to me for analysis and systematic assignment.

It is my opinion, now, that the Florida material represents but a single species with two highly divergent forms and that this dimorphic species, together with another species from Brazil, constitutes a distinctive genus so far limited to the New World feeding and causing leaf-roll galls on the plant genus Eugenia.

Until rearing experiments can be made to determine the exact relationships of the two forms from Florida—either one or two species, their taxonomic status must be surmised. I have based my guess of one species on the knowledge that in the Phlaeothripidae several forms are often produced in a single species (see Ananthakrishnan 1965), that ordinarily in the Thysanoptera only one species occupies a given niche, and that when on occasion two species do occur naturally in the same place on the same plant they are usually from widely divergent genera—the case of Holothrips signatus Hood and H. tenuis Hood from Panama to the contrary (if it is contrary), notwithstanding.

Opportunity to compare critical material for this study was made possible by a grant from the University of Illinois Research Board.

Mixothrips, new genus

OEDYMEROUS FORM (major form): Head longer than wide, sharply but not deeply incut just behind eyes, cheeks each with a small hyaline tooth at angle of incut, surface weakly sculptured with transversely anastomosing striae. Eyes moderate in size, nearly as long as lengths of antennal segments I and II combined. Ocelli far forward, fore ocellus nearly to barely overhanging antennal notch. Post ocellar setae small, post ocular and mid dorsal setae small but not minute, pointed. Antennae each 8-segmented, intermediate segments fairly compact, segment III with one inner and one
outer, short, sense cones, segment IV subequal in length to V, segment VIII closely joined to segment VII. Mouth cone broadly rounded. Maxillary stylets slender, extending half way into head, moderately widely spaced. Maxillary bridge weakly developed.

Prothorax weakly sculptured with transverse anastomosing striae, nearly smooth in spots, anteromarginal, anterolateral, and midlateral setae small, major posterior setae well developed, pointed; anterolateral and midlateral setae widely separated from each other. Epimeral sutures incomplete, with a partial second suture near each minor epimeral seta. Praepectus absent. Mesopraesternum wide, fractured into small platelets at lateral posterior angles. Metascutum with longitudinal anastomosing striae. Macropterous. Fore wings evenly broad with a few accessory fringe cilia. Fore legs moderately enlarged. Neither sex armed with an inner tarsal tooth, but apical claw strongly developed in both sexes.

Abdomen not as wide as thorax. Pelta bell shaped, weakly hexagonally reticulate. Wing holding setae present, generally sinuate. Abdominal sternites each with a transverse row of median setae in addition to posterior pairs. Female with spermatheca thickened in middle, at least; males without sternal glandular areas. Abdominal tergite IX with major posterior setae long and pointed in both sexes. Tube more than half as long as head, nearly smooth; anal setae slightly shorter than tube.

All body setae pointed.

Gynaecoid Form (minor form): Head nearly as wide as long, cheeks not incur behind eyes, with a small, inconspicuous, hyaline tooth on cheeks just behind eyes, surface weakly sculptured with transversely anastomosing striae. Eyes fairly large in size, decidedly longer than lengths of antennal segment I and II combined. Ocelli far forward, fore ocellus not quite reaching anterior margin of antennal notch. Post ocellar and mid dorsal setae minute. Post ocular setae moderately well developed, pointed. Antennae each 8-segmented, intermediate antennal segments more slender and elongate than in oedemerous form, segment III with one inner and two outer, moderately sized sense cones, segment VIII not closely joined to VII, non-pediculate. Mouth cone broadly rounded. Maxillary stylets extending half way into head, moderately widely spaced. Maxillary bridge weakly developed.

Prothorax nearly smooth with some weak transverse striae laterally, anterior setae small, midlateral setae moderate in size, posterior setae well developed, pointed; midlateral setae placed closer towards anterolateral setae than as in oedemerous form. Epimeral sutures incomplete with faint partial second suture near each minor seta. Praepectus absent. Mesopraesternum wide, lateroposterior angles entire. Metascutum with closely spaced longitudinal striae. Fore wings broad with a few accessory fringe cilia. Fore legs not enlarged, both sexes unarmed, fore tarsal claw small in size in both sexes.

Abdomen not as wide as thorax. Pelta bell shaped, hexagonally reticulate. Wing-holding setae present, sinuate. Abdominal sternites each with a transverse row of median setae in addition to posterior pairs. Female with spermatheca more elongate and slenderer than oedemerous form; males without sternal glandular areas. Abdominal tergite IX with major
Fig. 1 *Mixothrips craigheadi*, n. sp., *a*—ecdymereous form, *b*—gynecoid form. 1.—head and thorax, dorsal aspect. 2.—right front leg. 3.—spermatheca.
posterior setae long and pointed in both sexes. Tube more than half as long as head, nearly smooth; and setae slightly longer than tube.

All body setae pointed.

**TYPE SPECIES.**—*Mixothrips craigheadi*, new species.

Although *Mixothrips* bears some resemblance to Asian gall making groups such as *Eothrips*, *Atouchedothrips*, *Sauridothrips*, *Chaetokarnyia*, *Pnigmatothrips*, *Tetradothrips*, etc., it differs decidedly in the male feature of having major posterior setae 2 of abdominal tergite IX long and not short and spine-like.

It is decidedly not a member of *Eugynothrips* on the basis of having shorter antennal sense cones, on having more than one sense cone on antennal segment III, and by having incomplete epimeral sutures. *Eugynothrips* was redescribed by Princen (1953) as having very long antennal sense cones, having only one sense cone on antennal segment III, and according to my observations, the epimeral sutures are complete.

*Mixothrips*, with its long setae of abdominal tergite IX (even in the male), its inculc cheeks, its type of prothorax, metasctum, pelta, and wings, appears to be more nearly like the American complexes comprising *Holothenothrips*, *Plagiorthrips*, *Homothrips*, *Anaplothrips*, and possibly the Asian *Aliothrips*. Except for *Anaplothrips* in which the male is unknown, all these later genera have male sternal glandular areas on more than one abdominal sternite and thereby they differ conspicuously from *Mixothrips* in which there are no glandular areas in the male.

The appearance of a partial second suture on the epimeron, suggests a possible though distant relationship to the North American *Diphyothrips* which has a complete second epimeral suture.

**Mixothrips craigheadi** new species

**FEMALE** *(MACROPTEROUS)*, OEDYMEROUS FORM: Length distended slightly over 2 mm. General color brown. Most of fore tibia and tarsus and antennal segments III and IV yellow. Antennal segment V, apexes of mid and hind tarsi, metathorax, basal abdominal segments, and tip of tube yellowish brown. Subintegumental pigments yellow with scattered red spots. Body setae generally brown except setae on terminal segments of abdomen which are pale apically. Wings lightly washed with yellowish brown.

Head as in Fig. 1a; all setae small. Antennae with segment III with one inner and one outer sense cones, segment IV with one inner and two outer sense cones, these cones short.

Prothorax as in Fig. 1a, only one pair of epimeral setae well developed. Mesopraesternum with lateral posterior angles fractured into small platelets. Metanotum with longitudinal striations, Fig. 4a. Fore legs, Fig. 2a, enlarged. Fore wings with 7 or 8 accessory fringe cilia.

Pelta bell shaped. Female spermatheca as in Fig. 3a, moderately thickened medially. Abdominal tergite IX with major posterior setae long but not quite attaining tip of tube.

**GYNEC OID FORM**: Length distended about 2 mm. Similar in color to oedymeroous form except antennal segment VI with yellow basally.

Head as in Fig. 1b, post ocular setae moderately developed. Antennae with segment III with one inner and two outer sense cones, segment IV...
Fig. 4.—Mizothisrips craigheadii, n. sp., a—oedymorous form, b—gyneacoid form. Metanotal striations, dorsal aspect. Photographs by J. V. Maddox.

with one inner and two outer sense cones, these cones longer than as in oedymorous form.

Prothorax as in Fig. 1b, only one pair of epineral setae well developed. Mesoscutellum entire. Metanotum with longitudinal striae placed closer together than as in oedymorous form, Fig. 4b. Fore legs, Fig. 2b slender. Fore wings with about 8 accessory fringe cilia.

Pelta bell shaped. Female spermatheca as in Fig. 3b, moderately slender throughout. Abdominal tergite IX with major posterior setae long but not quite attaining tip of tube.

**MALE (MACROPTEROUS), OEDYMEROUS FORM:** Length distended about 1.8 mm. Color and structure similar to oedymorous female. Fore wings with 6 accessory fringe cilia. Abdomen without sternal glandular areas.

**GYNAECOID FORM:** Length distended about 1.8 mm. Color and structure similar to gynacoid female. Abdomen without sternal glandular areas.

**HOLOTYPE:** Female (oedymorous form), Everglades National Park, Florida, Johnson Mound at headwaters of Lostman River, 18 November, 1960, F. C. Craighead, in leaf-roll galls, Fig. 5, on Eugenia axillaris (USNM 6110784).

**ALLOTYPE:** Male (oedymorous form), same data as for Holotype.

**PARATYPES:** 28♀♀ (oedymorous), 5♀♀ (gynacoid), 2♂♂ (gynacoid), same data as for Holotype. Types deposited in the collections of the U. S. National Museum and the Illinois Natural History Survey, Urbana.

This species is named in honor of its collector, Mr. F. C. Craighead, one of America's foremost entomologists and naturalists. It differs from M. priesneri in having the metanotal striation more closely spaced, in hav-
Fig. 5.—Leaf-roll galls of *Eugenia axillaris* caused by *Mixothrips craigheadi*, n. sp. Photographed from specimens preserved in alcohol by W. Zehr.

ing the spormathea more elongate, and in having the pelta more bulged along the lateral margins.

*Mixothrips priesneri* (da Costa Lima), new combination


According to Article 59, International Code of Zoological Nomenclature, adopted 1961, a secondary homonym may become the valid name whenever the two species involved are believed not to be congeneric. The species *priesneri* (da Costa Lima) is not congeneric with *Eugynothrips priesneri*...
Ramakrishnan and, indeed, the later species may not even belong to Eugyno-
trips either.

Mizothrips priesneri is known only from the material collected by da
Costa Lima from leaf-roll galls on Eugenia sp. in Brazil.

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