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A REVIEW OF THE GENUS *RHAEBOTHRIPS* KARNY (Thysanoptera: Phlaeothripidae)[1]

By K. Sakimura[2]

Abstract: The genus concept and species concept of 2 old species are clarified, and one new species is erected. Two new synonymies have been found and several misidentifications are rectified. Adults and larvae of 3 species are fully described. *R. lativentris* is widely spread among various islands in the Indian and Pacific Oceans and Caribbean Sea, and *R. major* and *R. nigrisetis*, n. sp. are apparently localized species in Samoa and Fiji. All are rather common spore feeders in forest areas.

The genus *Rhaebothrips* Karny, a small cryptothripine genus, has long been in need of review to clarify synonymies and misidentifications recorded in the literature. Bianchi (1953) pointed out this situation but had not yet clarified it; instead, the material on which his remarks were based was made available for this study. Species of the genus were found to be highly polymorphic. Findings on a long series of *R. lativentris* collected in Hawaii from a single population clarified some hitherto obscure points in defining the species. There are only 3 species so far known. *R. lativentris* is widely spread from Mauritius in the Indian Ocean to the Virgin Islands in the Caribbean Sea, through many islands in the Pacific Ocean. The other 2 species are apparently localized species in Samoa and Fiji.

R. lativentris is not native to Hawaii, but was first noted on its invasion in 1943 (Bianchi 1945). During 1944 and 1945, this species became extremely abundant throughout the island of Oahu, but gradually subsided thereafter (Bianchi, unpubl. data). This is the usual pattern of temporary population explosions occurring soon after the arrival of many intruded insects into the island biomes. This observation justifies the surmise that the wide spread of *R. lativentris* was probably due, at least in part, to man-made causes. Incidences of such transport are likely to have occurred not only in modern days by advanced ways of transportation, but also in the prehistoric period by primitive means of interisland traffic. Species of the genus are able to colonize freely within concealed cavities among various plant debris. This habit facilitates the inadvertent transport from one place to another.

From a long series of collection data appearing on many labels as well as field ob-

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2. Bishop Museum, Honolulu, Hawaii.

servations made in Hawaii, the following conclusions are drawn for the feeding habits of the spore-feeding *R. lativentris*. This species is a rather common thrips in forest areas, and may breed freely wherever growth of various fungi is present in old tunnels of stem- or fruit-boring insects, or old deserted plant galls, or in dried seed pods or dried fruits, or under bark of dried twigs, but more often among leaf litter or other plant debris lying under plants, particularly grasses. When their food supply becomes exhausted, the transient adults, and less frequently larvae, may often crawl among the standing plants or plant debris lying on the ground, and may even come into flight. For collecting them, beating or sweeping and berlese extraction of plant debris may be useful. Because all the collections of the other 2 species were made by beatings only, little has been known of their feeding habits, which presumably are not much different from those observed for *R. lativentris*.

Genus **Rhaebothrips** Karny

Rhaebothrips Karny, 1913: 128; 1924: 29.—Priesner, 1961: 287.—Medina, 1961: 118.

Type species by monotypy: *Rhaebothrips lativentris* Karny.

Diagnosis: Gastrothripina of Cryptothripini. Black to dark brown medium-sized thrips; elongate head with elongate antenna, head reticulated, praepectus present, mesopraesternum well developed; ♂ with forefemur strongly bent inward and foretarsus armed, ♀ with forefemur slightly bent and foretarsus unarmed; hind wing with brown-colored double stripes; pelta hat-shaped, tergites with single pair only of wing-retaining setae, tube nearly as long as head.

Common Characters among the Species: In addition to the above. Head about 1.5× as long as wide, thickening along hind margin, front moderately convex above antennal base, foreocellus facing anteriorly, transversely reticulated, cheek with few short setae; eye about 1/4 to 1/3 as long as head, long postocular seta and shorter interocellar seta, the latter stands between hind ocelli or barely behind; antenna elongated, III about 2× as long as II and about 3 to 4× as long as wide, VII clearly constricted at base but VIII hardly so. Mouthcone rather short, broadly rounded, broad maxillary stylets long, retracted far into head in a V-form. Prothorax weakly sculptured except transverse reticulation along fore and hind margins, mesial and foremarginal thickenings well developed, epimeral suture complete, all setae except anteromarginal well developed, coxal seta short; mesonotum finely and transversely reticulated, metanotum faintly and longitudinally reticulated; oedymerism in ♂ pronounced on forefemur and prothorax; wing broad, double fringes on forewing, single brown-colored longitudinal vein (vestigial vein structure visible on fore as well as hind wing) on forewing, 2 veins (secondary vein near foremargin, thinner and less colored than primary vein) on hind wing, basal setae of forewing in length ratio of 1 : 2 : 3. Pelta clearly reticulated, other tergites faintly reticulated; wing-retaining setae in brachypterous form similar to macropterous form; tube practically unsculptured, nearly straight-sided but ♂ somewhat convex at base; bristles on IX nearly as long as tube, terminal bristles somewhat shorter. All body setae pointed.

Among the 3 species so far known, structural differences are extremely limited, but

color differences reliably separate the species, which, in contrast, are all highly polymorphic in structure.

Key to species of Rhaebothrips

1. Antenna V-VI uniformly dark grayish brown ; major setae deep brown, postocular seta 2× as long as eye. Samoa (type locality : Apia) ..... **major** Bagnall
   Antenna V basally brownish yellow and distally dark grayish brown ; postocular seta 1.5 × as long as eye. 2
2. Antenna VI uniformly dark grayish brown ; major setae brownish yellow, postocular seta and posteroangle setae of tergites VI-VIII brownish yellow. Mauritius, Java*, Philippines, Formosa* (type locality : Anping), southern Japan, Saipan, Guam, Yap, Ponape*, Solomon Islands***, northern Queensland, Hawaii, Jamaica, Puerto Rico**, and Virgin Islands ..... **lativentris** Karny
   *after Priesner (1935 : 370) ; **after Medina (1961 : 119) ; ***after Mound (1970 : 123).
   Antenna VI dark grayish brown with base brownish yellow, occasionally base only pale or not at all pale, if so, see abdominal setae ; major setae dark grayish brown, postocular seta and posteroangle setae of tergites VI-VIII dark grayish brown. Fiji (type locality : Bavata) and New Guinea. ..... **nigrisetis**, n. sp.

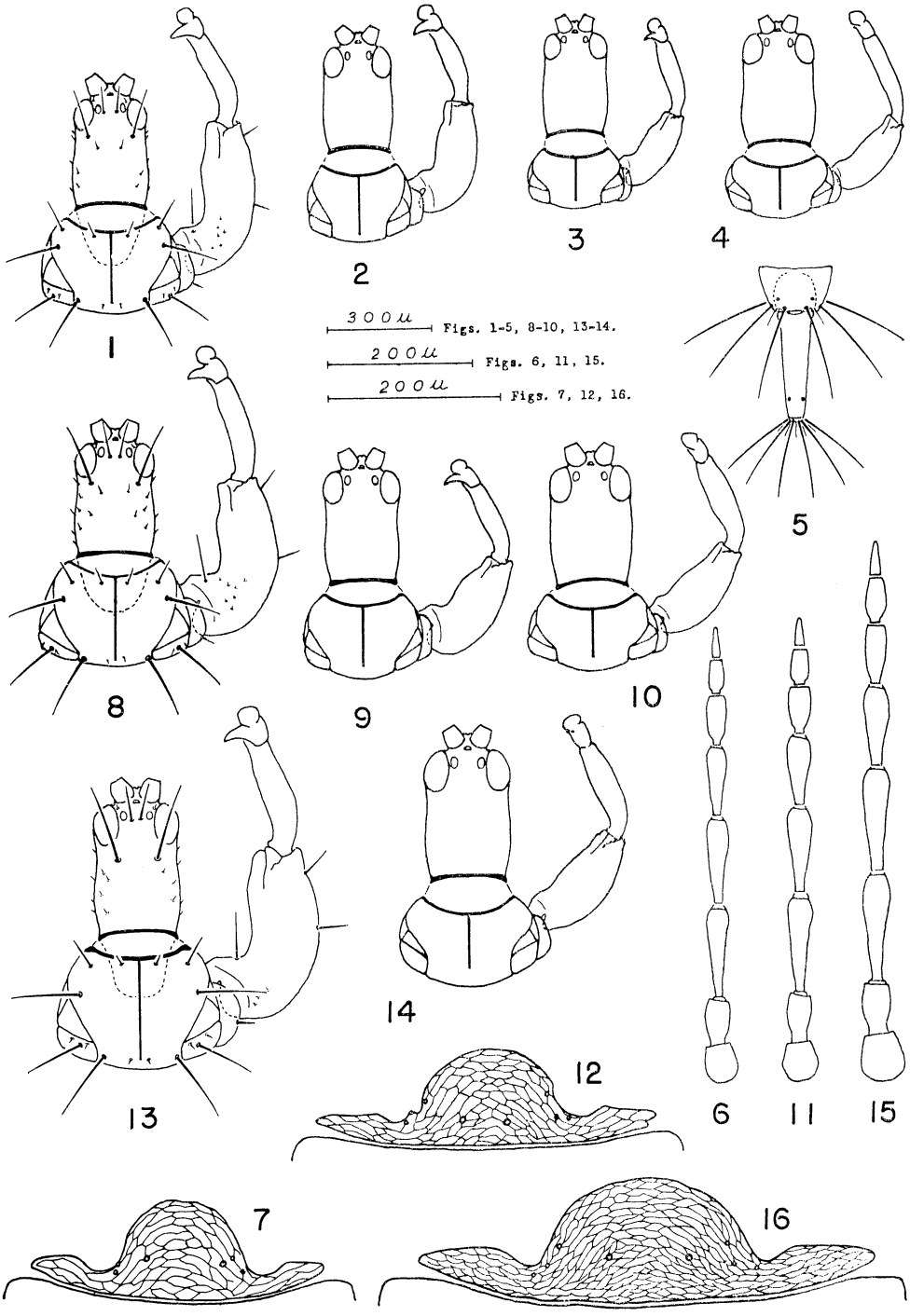
Rhaebothrips lativentris Karny Fig. 1-7, 17-23.

Rhaebothrips lativentris Karny, 1913 : 129, fig. — Priesner, 1935 : 370. — Takahashi, 1936 : 458. — Kurosawa, 1940 : 55 ; 1968 : 60, fig. — Moulton, 1942 : 15. — Medina, 1961 : 119. — Mound, 1970 : 123.
Rhaebothrips lativentris f. *macroptera* Karny, 1920 : 42 ; 1924 : 29, fig. **New Synonymy.**
Machatothrips ipomoeae Ishida, 1932 : 12, fig. — Takahashi, 1936 : 458. — Kurosawa, 1968 : 60.
Rhaebothrips fuscus Moulton, 1942 : 15. — Bianchi, 1965 : 75. **New Synonymy.**
Rhaebothrips major (nec Bagnall) : Bianchi, 1945 : 280, fig. ; 1953 : 108. — Zimmerman, 1948 : 446, fig. Misidentification.

Adult : Chestnut brown to blackish gray brown : foretibia somewhat lighter brown and all tarsi yellowish brown, both extremes of all femora and tibiae usually yellowish or lighter brown ; antenna I-II and VI-VIII dark grayish brown but II considerably lighter distally, III-V yellowish brown to brownish yellow but distal 1/4 of IV weakly brown-washed and distal 1/2 to 2/3 of V dark grayish brown ; distal extreme of tube usually lighter brown ; major setae brownish yellow, with exception of grayish brown posteromarginal and posteroangle setae of tergites III-V and posteromarginal setae of tergites VI and VIII ; posteromarginal seta of tergite VII, posteroangle setae of VI-VIII, all setae of IX and XI always all brownish yellow, on teneral or less sclerotized specimens all abdominal setae uniformly yellow ; wing weakly brown-washed, with conspicuous brown veins on fore and hind wings. Transverse elongated-reticulation on head, mesonotum, pelta (fig. 7) coarse, coarser than *major* but similar to *nigrisetis*.

Examined were macropterous and brachypterous forms of both sexes, oedymerous and gynecoid forms of ♂ ; little difference between macropterous and bracypterous forms of the same sex, except prothorax, forefemur and pterothoracic width of oedymerous ♂ more enlarged and forefemoral bent more pronounced in macropterous form than brachypterous forms (fig. 1, 2), gynecoid ♂ smaller than brachypterous-oedymerous ♂ (fig. 2, 3).

Head (fig. 1, 2, 3, 4) about 1.5 × as long as wide, more slender in oedymerous ♂, eye nearly 1/4 as long as head ; postocular seta about 1.5 × dorsal eye length. Antenna (fig. 6) about 2 × as long as head in all forms and sexes ; III shorter than 2 × length of II and shorter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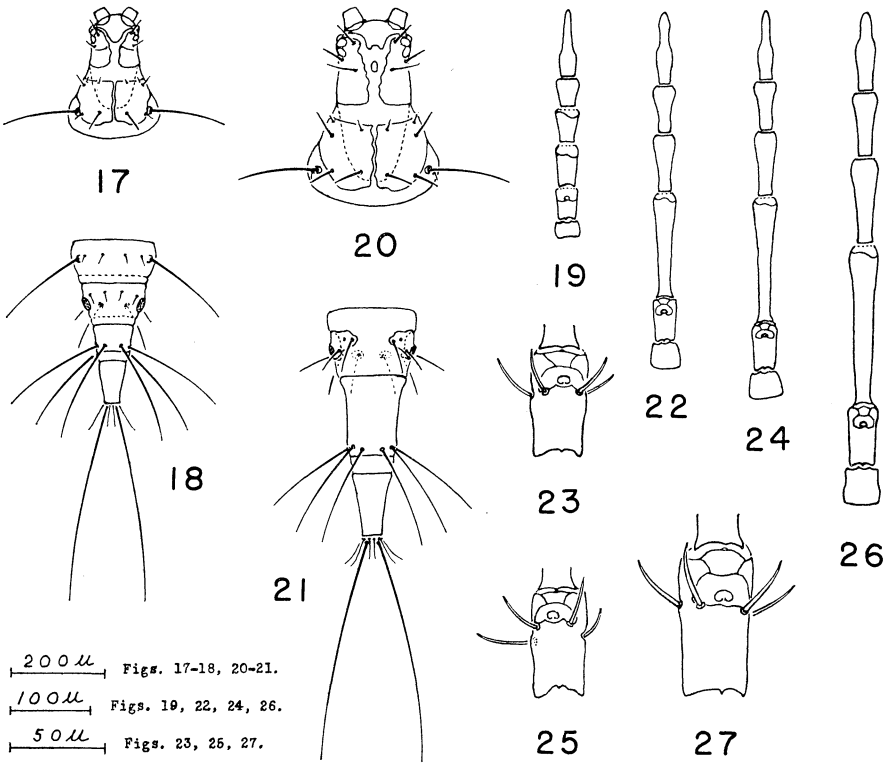

Fig. 1-7. *Rhaebothrips lativentris* Karny: 1-4, Head, prothorax, and foreleg: 1, macropterous-oedymerous ♂, ex Yap; 2, brachypterous-oedymerous ♂, ex Jamaica; 3, macropterous-gynecoid ♂, ex Hawaii; 4, macropterous ♀, ex Hawaii. 5, abdominal IX-XI, macropterous-oedymerous ♂, ex Hawaii; 6, right antenna, macropterous-oedymerous ♂, ex Hawaii; 7, pelta, macropterous ♀, ex Hawaii. Fig. 8-12. *Rhaebothrips nigrisetis*, n. sp.: 8-10, Head, prothorax, and foreleg: 8, macropterous-oedymerous ♂, paratype ex Lakemba; 9, macropterous-gynecoid ♂, paratype ex Moala; 10, macropterous ♀, paratype ex Naitamba. 11, right antenna, macropterous-oedymerous ♂, paratype ex Vanua Mbalavu; 12, pelta, macropterous ♀, paratype ex Naitamba. Fig. 13-16. *Rhaebothrips major* Bagnall: 13-14, Head, prothorax, and foreleg: 13, macropterous-oedymerous ♂, ex Upolu; 14, macropterous ♀, allotype ex Upolu; 15, right antenna, macropterous-oedymerous ♂, ex Upolu; 16, pelta, macropterous-oedymerous ♂, ex Upolu. Note: In fig. 1-4, 8-10, and 13-14, transverse elongated-reticulation on heads and prothoraxes are not shown, and setae are also not shown in some figures. In fig. 6, 11, and 15, setae, sense cones, and striae on antennae are not shown. (del. K. S.)

Fig. 17-23. *Rhaebothrips lativentris* Karny: 17-19, Larva I: 17, head and prothorax; 18, abdominal VII-XI; 19, right antenna. 20-23, Larva II: 20, head and prothorax; 21, abdominal VIII-XI; 22, right antenna; 23, right antenna II; all ex Jamaica. Fig. 24-25. *Rhaebothrips nigrisetis*, n. sp., larva II: 24, right antenna; 25, right antenna II; both ex Mango. Fig. 26-27. A related species, larva II: 26, right antenna; 27, right antenna II; both ex Naitamba. Note: In fig. 19, 22, 24, and 26, setae and sense cones on antennae are not shown. (del. K. S.)

than 4 × own width, somewhat shorter in gynecoid ♂, VIII a bit longer than 3/4 of VII; anomaly in segmentation rather common; sense cones moderate in length and slender, 2 on III, 4 on IV, 3 on V, 2 on VI, 1 on VII. Prothorax (fig. 1, 2, 3, 4) of ♀ and gynecoid ♂ 1/2 as long as head and 2 × as wide as own length, but a bit narrower in gynecoid ♂; that of oedymerous ♂ 2/3 as long as head in macropterous form and 3/5 as long as head in brachypterous form, about 1-2/3 as wide as own length in both forms; longest seta on hind margin about 4/5 as long as prothoracic length in both ♀ and gynecoid ♂, 2/3 to 3/4 as long as prothoracic length in oedymerous ♂. Forefemur (fig. 1, 2, 3, 4) about 4/5 as long as and 1/2 as wide as head, that of gynecoid ♂ about 9/10 as long as and 1/2 as wide as head, that of oedymerous ♂ about 1/8 to 1/4 longer than head and about 2/3 as wide as head, somewhat longer and wider in macropterous than brachypterous form, ranges of dimension for macropterous and brachypterous forms of oedymerous ♂ overlap but those for gyneoid ♂ and brachypterous-oedymerous ♂ practically incontinuous; tarsal tooth and forefemoral bent of ♂ more exaggerated in oedymerous ♂. Forewing with 13 to 21 double fringes. Pelta (fig. 7) consistent in shape in all forms and sexes, brim portion narrower than *nigrisetis* and *major*. Tube (fig. 5) about 9/10 as long as head; bristles on IX nearly as long as tube, bristles on XI about 3/4 as long as tube. All body setae pointed.

Measurements (*range in* μ): *Oedymerous* ♂♂ (14 macro. and brachy. cases): Body length 2600-3270; head (excluding interantennal projection) 283-320, w. 175-205; eye (dorsal) 73-90, postocular seta 100-145, interocellar seta 45-65; antenna 550-670, length (width) of segments of a representative: 54 (45), 65 (34), 118 (31), 113 (31), 93 (30), 72 (28), 50 (21), 42 (13), total 620. Prothorax (macro.) 175-225, (brachy.) 155-190, w. (excluding coxae) (macro.) 315-390, (brachy.) 270-360, prothoracic setae: anteroangle 18-75, midlateral 58-100, posteromarginal 100-160, posteroangle 90-125; forefemur (macro.) 340-430, (brachy.) 300-380, w. (macro.) 113-140, (brachy.) 110-115; foretarsal tooth 38-50; pterothoracic w. (macro.) 400-460, (brachy.) 320-420; wing 1020-1220, basal seta iii 163-183; tube 255-310, w. at base 90-109; IX setae 210-290, XI setae 195-235. Pelta (inclusive of all ♀♀ and ♂♂): crown height 80-115, crown w. 125-190, brim w. 275-400.

Gynecoid ♂♂ (12 macro. and brachy. cases): Body length 2310-2790; head 265-293, w. 175-188; antenna 540-600; prothorax 125-153, w. 225-260; forefemur 225-270, w. 83-105; foretarsal tooth 20-33; pterothoracic w. 295-340; wing 900-1000; tube 230-265, IX setae 220-245, XI setae 175-208.

♀♀ (23 macro. and brachy. cases): Body length 2460-3500; head 275-365, w. 188-230; eye 78-93, postocular seta 100-155, interocellar seta 50-88; antenna 560-710, length (width) of segments of a representative: 55 (48), 70 (34), 120 (32), 115 (33), 97 (30), 77 (28), 53 (21), 43 (13), total 645. Prothorax 120-175, w. 238-365; prothoracic setae: aa 30-65, ml 50-100, pm 93-150, pa 83-138; forefemur 215-315, w. 80-125; pterothoracic w. 300-460; wing 950-1290, basal seta iii 125-170; tube 250-340, w. at base 85-115; IX setae 200-290, XI setae 185-240.

Larva II: Head, prothoracic dorsal plates, legs, lateral plates of abdominal VIII, and many tiny sclerotized blotches at bases of thoracic and abdominal setae light grayish brown; antenna and abdominal IX-X dark grayish brown; antennal I-II, basal part of abdominal IX, distal part of X somewhat lighter. Hypodermal pigments orange-red or dirty yellow or blackish (probably depending upon kinds of food fed upon, sometimes differently-colored larvae mixed in 1 population). Eye orange-red or blackish red. All setae brownish yellow, 1 pair of long terminal bristles of abdominal XI dark grayish brown.

Head (fig. 20) longer than wide; eye with 3 large ommatidia, laterally protruding; sutures between 4 plates as illustrated; antenna (fig. 22) about 2.5 × as long as head, 6 segmented, distal 1/2 of VI narrowed, II with membranous window area and areaola as illustrated (fig. 23), sense cones normal, 1 prominent sickle-shaped cone on inside of IV. Mouth cone long and heavy, broadly rounded at tip, maxillary stylets broad and retracted far into head. Prothoracic dorsal plates as illustrated (fig. 20); abdominal VIII-XI as illustrated (fig. 21), plates of VIII discon-

tinuous on dorsum and also venter, IX longer than X. Chaetotaxy on head, thorax and abdomen normal; all setae weakly blunt at tip; with exception of finely pointed posteroangle setae of pro-, meso-, and metathoraxes, lateral setae of abdominal II-VIII, all bristles on abdominal IX-XI; posteroangle seta of prothorax, lateral seta of abdominal VII long; bristles on abdominal IX about 1.5 × as long as the segment, terminal bristles about 2 × as long as bristles on IX. Measurements (range): Body length (probably fully grown) 1950-2500; head 150-170, w. 125-155; antenna 350-450, II 45-53, w. 25-30, III 110-135, VI 70-95, narrow distal portion 38-50; mouthcone (from front to labial tip) 300-355; prothoracic dorsal plates 120-135, w. 190-220; hind tibia 200-225; abdominal VIII 45-63, IX 140-190, X 115-135; major setae: prothorax 175-190, metathorax 95-145, abdominal VII 120-170, IX 225-260, X 420-500.

Larva I: Color as in larva II, antenna light grayish brown with only VI dark grayish brown, light grayish brown tiny sclerotized blotches limited at bases of few major setae only on thorax and abdomen, abdominal IX-X somewhat darker than head. Head (fig. 17) about as long as wide, central plate wanting; antenna (fig. 19) about 2.5 × as long as head, not as elongate as in larva II, membranous area of II circumscribes distal 1/3, sense cones on inside of IV not sickle-shaped; abdominal VII-XI as illustrated (fig. 18), VIII without any sclerotized plate, IX shorter than X; chaetotaxy normal, bluntly tipped and finely pointed setae as in larva II; major lateral setae as in larva II, lateral seta on abdominal VII proportionally longer than that in larva II, ventral seta on abdominal VIII considerably longer than others on the segment, bristles on abdominal IX about 4 × as long as the segment, terminal bristles about 2 × as long as bristles on IX. Measurements (range): Body length (probably fully grown) 1150-1350; head 103-108, w. 93-108; antenna 260-285, II 38-43, w. 25-30, III 48-53, VI 73-88, narrow distal portion 40-45; mouth cone 213-260; prothoracic dorsal plates 83-90, w. 150-165; hind tibia 130-145; abdominal IX 45-58, X 70-93; major setae: prothorax 120-155, metathorax 65-110, abdominal VII 150-215, IX 190-215, XI 380-470.

SPECIMENS EXAMINED: Total: 231 (46 macro. and 38 brachy. ♀♀; 27 macro.- and 24 brachy.-oedymerous ♂♂; 17 macro.- and 10 brachy.-gynecoid ♂♂; 69 immature stages).

MAURITIUS: 2 ♀♀, 2 ♂♂ (Bianchi), 1950, R. Mamet, det. by H. Priesner. PHILIPPINES: 4 ♀♀, 3 ♂♂, 29 immature stages (CAS = California Academy of Sciences), Victorias, Negro, 1927-1929, W. D. Pierce (Moulton 4237, 4261, 4262, 4281); 3 ♂♂, 2 larvae (CAS), Los Banos, Luzon, 9.VII.1931, I. D. Dobroscky (Moulton 4667, 5062). JAPAN: 1♀, 6♂♂ (NIAS = National Institute of Agricultural Science, Tokyo), Yukuhashi, Kyushu, X. 1938, S. Sato (Kurosawa 907). SAIPAN: 1 ♀ (Bianchi), 14.XII.1963, F. A. Bianchi. GUAM: 11 ♀♀, 3 ♂♂ (CAS, Andre), Umatac, 14.V.1936, O. H. Swezey (Moulton 5466); 3 ♀♀, 5 ♂♂ (holotype ♀, macropterous, of *R. fuscus* at CAS*, paratypes at CAS and Andre), Sasa (type locality), 25.VI.1936, R. L. Usinger (Moulton 5493); 1 ♂ (allotype, brachypterous-oedymerous, of *R. fuscus* at CAS*), Sumay, 18.VI.1936, O. H. Swezey (Moulton 5473); 2 ♀♀, 1 ♂ (paratypes of *R. fuscus* at CAS and Bianchi), Piti, 1.V.1936, R. L. Usinger (Moulton 5487). YAP: 2 ♀♀, 4 ♂♂ (NIAS), Nit-Guilifez and Gatzapar, IX.1939, T. Esaki (Kurosawa 1298, 1299). QUEENSLAND: 1 ♀, 1♂ (CAS), Darnley I, Torres Strait, no date, A. M. Lea (Moulton 3416); 1 ♀ (CAS), Moa I, Torres Strait, no date, C. T. McNamara (Moulton 3470). HAWAII: 9 ♀♀, 6 ♂♂, 6 larvae (Bianchi), Honolulu, VIII.1943 to XI.1944, J. S. Rosa, O. H. Swezey, F. X. Williams, F. A. Bianchi; 13 ♀♀, 5 ♂♂, 1 larva (Sakimura), Konahuanui, Kunia, Kaalaea, Honolulu, V.1944 to II. 1945, K. Sakimura (Saki 1648-1650, 1742); 5 ♀♀, 2 ♂♂ (Bianchi), Barbers Point, XII.

* Label data on the holotype and allotype slides were found to be different from those published (Moulton 1942: 15).

1955 to II.1960, F. A. Bianchi ; 3 ♀♀, 2 ♂♂ (Sakimura), Waimanalo, 10.II.1955, M. Tamashiro (Saki 3767) ; 14 ♀♀, 17 ♂♂ (Sakimura), Waipio, 27.XI.1966, K. Sakimura (Saki 4706, 4709-4712). JAMAICA : 3 ♂♂ (Sakimura), Bryan Castle, 3.VI.1964, R. Latta (Saki 4248) ; 11 ♀♀, 13 ♂♂, 31 immature stages (Sakimura), Woodstock, Kildare, Round Hill, XI.1964, K. Sakimura (Saki 4302b, 4304b, 4326d, 4328b, 4337a, 4343a, 4448b, 4486a). VIRGIN ISLANDS : 1 ♀, 1 ♂ (Medina), St. John, IV.1961, J. Maldonado.

Discussion : According to the inquiries made by G. Schliephake, the holotype in the Deutsches Entomologisches Institut Collection at Eberswalde was missing and a search in the Zoologisches Museum at Berlin was also futile. The particular reason for seeking the type was for confirmation of the seta color. The seta color, which is one of the primary characters for separating this species from the others was only indirectly indicated in the original description (Karny 1913). Although the type as well as topotype from Formosa was not available for this study, specimens from Japan and also the Philippines, and those determined by H. Priesner who had previously seen the type (no paratype in existence, however) provided the necessary confirmation.

Macropterous and brachypterous ♀♀ and ♂♂ were described by Karny (1913, 1924), Ishida (1932), Priesner (1935), Moulton (1942), and Bianchi (1945). All the males described are, however, either now referable to oedymerous form or not specific at all, and gynecoid form has not been recognized. Gynecoid ♂♂ are usually smaller than ♀♀. Apterous form has not been encountered throughout this study, and the apterous form mentioned by Karny (1913), Ishida (1932), and Moulton (1942) must have been brachypterous. Wing pads are as short as 88-190 μ, and often difficult to recognize.

Concerning synonymy of *M. ipomoeae*, Takahashi (1932) first noted a probable relationship, but Kurosawa (1958) ascertained it through a direct examination of the type series. Moulton (1942) differentiated *R. fuscus* from *lativentris* on the basis of the incomplete description by Karny (1913), and Moulton was apparently unaware of the amendments provided by Priesner (1935) on the description of the latter. In reality, however, no difference was seen between them when a direct comparison was made.

A misidentification of the Hawaiian *lativentris* by Bianchi (1945) was first noted by himself (Bianchi 1953), and final clarification has been made here. *R. fuscus* recorded from Fiji (Moulton 1942) and *R. lativentris* recorded from New Guinea (Moulton 1947: 178) are both misidentifications of *R. nigrisetis*. *R. lativentris* recently recorded from Solomon Islands (Mound 1970) was not available for this study. In recording a *Rhaebothrips* sp. from Puerto Rico (Medina 1961), a tentative determination of *lativentris* by L. J. Stannard was cited. Although the specimens from Puerto Rico were not examined, the fact that the species is also present in the Virgin Islands as well as Jamaica in the Caribbean region leaves no doubt of Stannard's determination. Collections of *R. lativentris* in Mauritius, Philippines, Jamaica, and Virgin Islands are new.

The larva of the species was briefly described by Ishida (1932) and Priesner (1935). A full description presented here of both instars may be useful for recognizing the species. "Macrothripid-larva" (Kurosawa 1940: 55) recorded from Ponape is not conspecific with either species of *Rhaebothrips*.

Rhaebothrips major Bagnall Fig. 13-16.

Rhaebothrips major Bagnall, 1928 : 75. — Bianchi, 1953 : 108. — Mound, 1968 : 148.

Dark chestnut brown, foretibia and all tarsi somewhat lighter, both extremes of all femora and tibiae narrowly brownish yellow ; antenna I concolorous with head, II to VIII grayish brown, II lighter distally ; III lighter grayish brown and extreme base pale, III rarely as dark as IV, or IV rarely as light as III, V-VIII somewhat darker grayish brown ; major setae deep brown but not as dark grayish brown as in *nigrisetis*, bristles on abdominal IX-XI, setae on antenna, basal setae of forewing brownish yellow ; wing deeply brown-washed, one vein on forewing and 2 veins on hind wing deep brown. Transverse elongated-reticulation on head, mesonotum and pelta (fig. 16) fine, denser than that on *nigrisetis* and *lativentris*.

Macropterous ♀ and macropterous-oedymerous ♂ only represented in material examined. Head (fig. 13, 14) about 1.6 × as long as wide in both sexes ; eye about 1/3 as long as head ; postocular seta very long, about 2 × as long as eye. Antenna (fig. 15) a bit shorter than 2 × head length, III about 2 × as long as II and about 4 × as long as own width, somewhat stouter in ♀, VIII about 3/4 as long as VII, sense cones as in *lativentris*. Prothorax (fig. 13, 14) about 1/2 as long as head in ♀ and about 4/5 as long as head in oedymerous ♂ ; longest seta on hind margin about as long as prothorax in ♀ and 2/3 as long as prothorax in oedymerous ♂. Forefemur (fig. 13) of oedymerous ♂ very large and strongly bent inward, about 1-1/3 × as long as and 4/5 as wide as head, foretarsus with a powerful tooth ; forefemur (fig. 14) of ♀ smaller and slightly bent, somewhat shorter than and less than 2/3 as wide as head. Double fringes of forewing range 22 to 36. Pelta as illustrated (fig. 16), reticulation very fine, no difference in size and sculpture-density between sexes. Tube about as long as head in both sexes, base 2 × as wide as tip ; bristles : on IX about as long as tube, on XI about 3/5 as long as tube. All setae pointed.

Measurements (range in μ) : ♂♂ (16 macropterous-oedymerous cases) : Body length 3620-4350 ; head (excluding interantennal projection) 345-418, w. 220-250 ; antenna 670-775, length (width) of segments of a representative : 58 (60), 75 (38), 150 (38), 138 (39), 113 (34), 83 (29), 63 (26), 49 (16), total 743 ; eye (dorsal) 100-120 ; postocular seta 200-235, interocellar seta 95-138 ; prothorax 268-330, w. (excluding coxae) 425-490 ; prothoracic setae : anteroangle 70-105, midlateral 148-210, posteromarginal 200-240, posteroangle 133-175 ; forefemur 460-580, w. 168-200, foretarsal tooth 58-80 ; pterothorax w. 480-620 ; forewing 1580-1820, basal seta iii 315-388 ; pelta (inclusive of both sexes) : crown height 125-140, crown w. 213-238, brim w. 445-513 ; tube 365-420, w. at base 108-125 ; bristles : IX 320-415, XI 205-270.

♀♀ (5 macropterous cases ; allotype in parenthesis) : Body length 3620-4070 (3880) ; head 325-388 (388), w. 200-248 (245) ; antenna 630-740 (735), length (width) of segments of allotype : 59 (58), 76 (38), 147 (38), 130 (38), 104 (34), 84 (30), 64 (25), 48 (17) ; eye 98-113 (113), postocular seta 175-230 (225) ; prothorax 158-200 (195), w. 325-390 (375) ; prothoracic setae : aa 50-60, ml 68-93, pm 160-218 (200), pa 95-150 ; forefemur 270-338 (320), w. 115-145 (125) ; pterothorax w. 450-580 (530) ; forewing 1330-1700 (1690), basal seta iii 188-295, double fringes (27 in number) ; tube 305-375 (375) ; bristles : IX 325-360 (355), XI 210-240 (240).

SPECIMENS EXAMINED : Total : 23 (5 macro. ♀♀, 18 macro.-oedymerous ♂♂). WESTERN SAMOA, Island of Upolu : Allotype ♀ (BISHOP 9224), Afiamalu, beatings at 2200 feet, 2. VII.1940, E. C. Zimmerman ; 16 ♂♂, 1 ♀ (BISHOP, USNM, Bianchi, Sakimura), same as allotype except at 2100 and 2200 feet, 13.VI.-10.VII.1940. AMERICAN SAMOA, Island of Tutuila : 2 ♂♂, 3 ♀♀ (BISHOP, Bianchi, Sakimura), Fagatoga, beatings at 700 and 1000 feet, 8.-28.VIII.1940, E. C. Zimmerman.

Discussion : The type, presumably a single specimen from Apia, Island of Upolu, was

described as a ♀ (Bagnall 1928), but it obviously should be an oedymerous ♂. Since the ♀ is newly recognized here, a ♀ of the Afiamalu series is herewith designated as allotype. Mound (1968) stated the type specimen was missing in the British Museum collection. If needed in the future, one of the males in the Afiamalu series which were collected only 4 miles E of the type locality may be available for neotype designation. These oedymerous ♂♂ are completely identical with what Bagnall described.

Bianchi (1953) rightly determined all the 23 specimens from Upolu and Tutuila as *major*, and he also noted that *major* from Fiji (Moulton 1944) and *major* from Hawaii (Bianchi 1945) had been misidentified. The former is herewith determined *nigrisetis*, and the latter, *lativentris*.

Rhaebothrips nigrisetis Sakimura, new species Fig. 8–12, 24–25.

Rhaebothrips fuscus (partim): Moulton, 1942: 15.
Rhaebothrips major (nec Bagnall): Moulton, 1944: 308. — Bianchi, 1953: 108. Misidentification.
Rhaebothrips lativentris (nec Karny): Moulton, 1947: 178. Misidentification.

♂ (*holotype*), *macropterous-oedymerous*: Chestnut to blackish grayish brown, foretibia and all tarsi lighter brown to yellowish brown, both extremes of all femora and tibiae usually yellowish brown; antenna I–II and VI–VIII dark grayish brown, II distally yellowish brown, VI basal 1/5 to 1/4 yellowish brown, occasionally instead somewhat pale at extreme base or not at all pale, III–V yellowish brown to brownish yellow, IV distal 1/4 to 1/3 weakly brown-washed, V distal 1/3 dark grayish brown; differs from *lativentris* in yellowish brown base of VI; distal extreme of tube usually lighter brown; major setae dark blackish brown, only bristles on abdominal IX–XI brownish yellow; differs from *lativentris* in dark blackish brown postocular seta and posteroangle setae of tergites VI–VIII; wing deeply brown-washed, with conspicuous brown veins. Transverse elongated-reticulation on head, mesonotum, pelta (fig. 12) as coarse as in *lativentris*.

Head (fig. 8) about 1.6 × as long as wide; eye nearly 1/4 as long as head; postocular seta 1.5 × as long as eye. Antenna (fig. 11) a bit shorter than 2 × head length, III a bit shorter than 2 × II and a bit shorter than 4 × own width, VIII about 3/4 as long as VII, sense cones as in *lativentris*. Prothorax (fig. 8) about 2/3 as long as head, 1-3/4 as wide as own length, longest seta on hind margin 2/3 as long as prothorax. Forefemur (fig. 8) strongly thickened and acutely bent inward, 1-1/3 × as long as and 3/4 as wide as head; foretarsus with a thick tooth. Forewing with 21 (range of 19 to 25) double fringes. Pelta (fig. 12) hat-shaped with broad brim, reticulation as coarse as *lativentris*, no difference in size and sculpture-density between sexes. Tube nearly as long as head, base 2 × as wide as tip; bristles : on IX nearly as long as tube, on XI about 2/3 as long as tube. All setae pointed.

Measurements (in μ; range among 8 paratypes in parenthesis): Body length 3270 (2930–3650); head (excluding interantennal projection) 340 (305–363), w. 210 (203–230); antenna 630 (593–700), length (width) of segments of holotype: 51 (58), 68 (35), 125 (34), 113 (35), 94 (33), 72 (30), 52 (23), 37 (13); eye (dorsal) 88 (85–105); postocular seta 135 (120–170), interocellar seta 70 (50–95); prothorax 230 (195–260), w. (excluding coxae) 400 (375–430); prothoracic setae: anteroangle 53 (28–70), midlateral 75 (68–163), posteromarginal 130 (113–200), posteroangle 110 (93–163); forefemur 410 (360–500), w. 160 (138–175); tarsal tooth 53 (45–65); pterothorax w. 470 (435–530); wing 1280 (1130–1450), basal seta iii 190 (175–260); pelta (inclusive of both sexes): crown height (100–120), crown w. (150–210), brim w. (360–450); tube 310 (270–360), w. at base 100 (88–113); bristles: IX 260 (250–325), XI 200 (180–238).

♂, *macropterous-gynecoid* (fig. 9): As oedymerous ♂; differs with shorter and thinner forefemur (as long as and 3/5 as wide as head), slenderer and sharper tarsal tooth, narrower prothorax (1.6 × as wide as long). Measurements (1 case only): Body length 3150; head 340, w. 213,

antenna 650; prothorax 205, w. 325; forefemur 335, w. 125; tube 340.

♂, *hemimacropterous-oedymerous*: Head length 345, w. 210, forefemur 430, w. 150, wing 840. (1 case only). Wing narrower and without any fringes at all.

♀ (*allotype*), *macropterous* (fig. 10): Color as oedymerous ♂; no difference in body length, head dimension, antennal length, eye length, pterothoracic width, wing length, tube dimension, terminal bristle length; prothoracic setae shorter than oedymerous ♂; prothorax decidedly shorter and narrower than oedymerous ♂, about 1/2 as long as head and 2 × as wide as own length; forefemur decidedly shorter and narrower than oedymerous ♂, about 4/5 as long as and 1/2 as wide as head, weakly bent inward, foretarsus unarmed; double fringes of forewing 20 (range of 16 to 20). Measurements (range among 17 paratypes in parenthesis): Body length 3410 (2980-3560); head 350 (308-365), w. 230 (220-235); antenna 655 (610-670), length (width) of segments of allotype: 50 (58), 72 (37), 129 (35), 122 (37), 94 (35), 73 (33), 54 (25), 39 (14); eye 95 (86-106); postocular seta 145 (105-165), interocellar seta 68 (55-75); prothorax 170 (150-180), w. 360 (310-365); prothoracic setae: aa 40 (28-40), ml 55 (43-68), pm 103 (80-145), pa 100 (80-135); forefemur 300 (245-305), w. 120 (100-125); pterothorax w. 510 (430-510); wing 1370 (1140-1370), basal seta iii 155 (115-175); tube 350 (265-350), w. at base 103 (93-103); bristles: IX 288 (250-310), XI 210 (190-230).

Larva II: Color as in *lativentris*, differs by all dark grayish brown setae except brownish yellow setae on abdominal IX and minor setae on abdominal XI. Head, antenna (fig. 24, 25), mouthcone, thorax, legs, abdomen as in *lativentris*. Chaetotaxy with differentiation of bluntly tipped and finely pointed setae as in *lativentris*. Measurements (range of 2 cases): Body length 2180-2250, head 170-175, w. 150-155, antenna 480-490, II 55-58, w. 29-30, III 150-153, VI 80-83, narrowed distal portion 36-39, mouthcone (from front to labial tip) 380-390, prothoracic dorsal plates 140, w. 250, hind tibia 230-245, abd. VIII (lateral plate) 65, IX 190-195, X 140-150, major setae: prothorax 240, metathorax 130, adb. VII 160, IX 250, XI broken off.

Larva I: Color as in *lativentris*; seta color on a single specimen as in larva I of *lativentris*, not as in larva II of *nigrisetis*, unknown whether natural or not, all setae yellowish brown and only terminal bristles of abdominal XI dark grayish brown. Structure and chaetotaxy as *lativentris*. Measurements (1 case only): Body length 1400, head 125, antenna 305, II 45, III 58, VI 90, narrowed distal portion 50, mouthcone 260, prothoracic dorsal plates 100, hind tibia 160, abd. IX 58, X 88, major setae: prothorax 150, abd. VII 180, IX 210, XI 430.

SPECIMENS EXAMINED: Total: 79 (42 macro. ♀♀, 31 macro.- and 1 hemimacro.-oedymerous ♂♂, 1 macro.-gynecoid ♂, 4 immature stages). FIJI: Holotype ♂, allotype ♀ (BISHOP 9223), Island of Vanua Mbalavu, Bavata (Vavatu), beatings at 200-250 feet, 16.VIII.1938, E. C. Zimmerman (Moulton 5404). Paratypes: 3 ♀♀, 4 ♂♂ (BISHOP, CAS, USNM), same data as holotype; 11 ♀♀, 8 ♂♂ (CAS), Islands of Viti Levu (Moulton 3414), Ovalau (3447), Wakaya (3466, 3476), Vanua Levu (3468), Taveuni (3406), Mokondranga (3472), all VI (?).1924, A. M. Lea; 1 ♀, 2 ♂♂ (BISHOP, CAS), Islands of Namuka (Moulton 5418), Fulanga (5419), beatings, both VIII.1924, E. H. Bryan, Jr. and E. C. Zimmerman; 16 ♀♀, 14 ♂♂, 3 larvae, 1 pupa (BISHOP, CAS, USNM, Sakimura), Islands of Viti Levu (at Nandarivatu, 2600-3700 feet) (Moulton 5403, 5407, 5414, 5415), Vanua Mbalavu (5379, 5393, 5416), Mango (5412), Munia (5400), Lakemba (5410), Moala (5390, 5405), beatings, all VIII.-IX.1938, E. C. Zimmerman; 1 ♂ (CAS), Island of Viti Levu, Bulu Savi, 12.IV.1941, N. L. H. Krauss (Moulton 5621); 1 ♀, 1 ♂ (Bianchi), Island of Viti Levu, Tavua and Ndemba, I., IV.1951, N. L. H. Krauss; 9 ♀♀, 1 ♂ (Bianchi), Island of Naitamba, XII.1951, B. A. O'Conner. NEW GUINEA: 1 ♂ (CAS), Finschhafen, V.1944, E. S. Ross (Moulton 5666).

Discussion : The species was misidentified 3 times since first collected in 1924. Bianchi (1953) first noted the misidentification made by Moulton (1944). Moulton was apparently not satisfied with his own determination, and many specimens from Fiji remaining in the BISHOP and CAS Collections had been left unnamed or scribbled in pencil only. Some specimens from Fiji and New Guinea recorded as *fuscus* and *lativentris* (Moulton 1942, 1947) were found also misidentified. These findings clarified that *lativentris* so far has not yet been collected in Fiji and New Guinea, and *nigrisetis* is present not only in Fiji but also in New Guinea.

A color variation at the base of dark grayish brown antennal VI was noted among the specimens examined. A majority of 61% is brownish yellow, the minority of 15% is dark grayish brown, and the remaining 24% is pale grayish brown. They were apparently all intermixed in every population sampled on 14 different islands of Fiji where this species apparently is common and abundant. This color variation may cause some confusion in separating the species from *lativentris*, but color of postocular and abdominal setae provides a reliable separation.

Two larvae II mixed in materials from Lakemba (Moulton 5410) and from Naitamba (ex Bianchi Collection) were found not to be *R. nigrisetis*, but probably belong to another allied genus. In general appearance, they are extremely close to *nigrisetis*, but with decidedly larger body, shorter narrow distal portion on antennal VI (fig. 26, 27), subequal lengths of abdominal IX and X, and uniformly pointed body setae. Measurements (range of 2 cases) : Body length 3040–3200, head 250–260, w. 205, antenna 570–610, II 68–70, w. 38, III 193–195, VI 95–100, narrowed distal portion 35–38, mouthcone (front to labial tip) 590–600, prothoracic dorsal plates 205, w. 360, hind tibia 340, abd. VIII (lateral plate) 90, IX 240, X 250, major setae : prothorax 275, metathorax 240–270, abd. VII 300, IX 340, XI broken off.

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