

ON THE GENERA ALLIED TO LIOTHrips OF THE ORIENTAL  
FAUNA. II. (INSECTA - THYSANOPTERA) \*)

by

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The genera of the *Liothrips-Gynaikothrips*-Complex of the Oriental Fauna have partly been treated by the author, namely: *Gynaikothrips* (Mitt. Münchner Ent. Ges. 29, 1939: 475-487), *Chaetokarnyia*, *Mesicotriphs*, *Tetradothrips*, *Thlibothrips*, *Zelotothrips* (Ind. Journ. Ent., XIII, 2, 1952: 190 - 200), *Aliothrips*, *Eugynothrips*, *Manothrips*, *Pnigmothrips* and *Sauridothrips* (*Treubia*, 22, 2, 1953: 357 - 380).

In the present publication the genus *Liothrips* is being dealt with most of the species described under this name, and also the bulk of the species formerly under *Gynaikothrips* (in the older sense), in spite of the fact that they have a more or less rounded mouth-cone.

The revised diagnosis of the genus runs as follows:

**Liothrips UZEL**

Head more or less elongate, eyes large, without a conspicuous major facet posteriorly. Cheeks very slightly convex or parallel-sided or narrowed towards base, without spines, at most with some weak, minute setae. Mouth-cone from broadly rounded to sharply pointed, maxillary stylets fine, seldom very broadly separated, labrum blunt or pointed. Antennae normal or slender, never short and moniliform, joint 3 not exceptionally long, 4 not distinctly smaller (shorter) than 5; joints 4-6 in some cases constricted at the apex, slightly vasiform; sense-cones in most cases 1 on joint 3, 1 + 2 on joint 4, 1 + 1 on joints 5 - 6, moderately to very long. Vertex with only one pair of postocular setae, or these setae vestigial. Major anteocellar or postocellar setae wanting. Wings slender to moderately broad, always with at least a few cilia duplicated. Legs simple, fore femora never enlarged in both sexes, fore tarsi (or tibiae) without teeth, the tarsi only with the hamus (claw) on the under side. Abdomen with long bristles, slender; tube more or less evenly conical, never very long and parallel-sided, and never with longitudinal ribs. Body not reticulated,

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\*) Part I in *Treubia*, 22, 1953.

except in a few cases in which only the ocellar area and the pronotum are slightly reticulated.

Typ. Gen. *Liothrips setinodis* REUT.

Synonyma: *Smerinthothrips* SCHMUTZ, *Gynaikothrips* KARNY partim, *Dolerothrips* KARNY (nec BAGNALL) partim.

From the above diagnosis it appears that similar species having very short, moniliform antennae, or short head, enlarged fore femora (in one or both sexes), tibial or tarsal teeth (in one or both sexes), parallel-sided tube, wings without double fringe, — do not belong to *Liothrips* as conceived in this paper.

The genus comprises many species, and can be divided into three not sharply defined groups which can be regarded as subgenera, namely:

1) *Phaenothrips* nov. Antennae very elongate and slender, joints (4-)5-6 more or less constricted and vasiform at the apex. Head often much elongated. Mouth-cone mostly rounded. Species typica: (*Gynaikothrips*) *daetymon* KARNY.

2) *Liothrips* s.str. Antennae moderately long to long. Mouth-cone from narrowly rounded to sharply pointed. Bristles long.

3) *Zopyrothrips* nov. Antennae and sense-cones moderately long. Mouth-cone more or less broadly rounded to truncate. Bristles mostly shorter than in *Liothrips* s.str. Species typica: (*Gynaikothrips*) *heptapleuri* KARNY.

It is not advisable to divide the genus into groups according to the colour of the tibiae, i.e. in such with wholly yellow tibiae and another having middle and hind tibiae dark, because a further separation of these in species with rounded and pointed mouth-cone would be necessary. The shape of the antennae and the mouth-cone are, though not of generic value in this group, still more important characters than the coloration of the tibiae.

It should be mentioned again that the type of the Genus *Smerinthothrips* SCHMUTZ, i.e. *tropicus* SCHM., is a *Liothrips* belonging to the same group as the generotype, *L. setinodis* REUT. *Smerinthothrips* is, therefore, an outright synonym of *Liothrips*, and cannot be used as prior name for the species having blunt mouth-cone (sc. *Zopyrothrips*).

In the following key to the Oriental species of *Liothrips* the subgenera are, to facilitate identification, not considered.

#### Key to the species.

1. All tibiae pale yellow, middle and hind tibiae darkened at most at extreme base . . . . .

- Middle and hind tibiae for the major part dark, the former pale yellow at most in distal half . . . . . 32
- 2. Antennal joint 3 at least about 5 times as long as broad. Head parallel-sided, 1.7 - 1.9 times as long as broad. Wings hyaline . . . 3
- Antennal joint 3 and head less elongate . . . . . 4
- 3. Head about 1.9 times as long as broad. Length of epimeral bristles of prothorax 84 - 88  $\mu$  (On *Planchonia valida* and *Barringtonia spicata*) . . . . . *gracilis* (KARNY)
- Head about 1.7 times as long as broad. Length of epimeral bristles 100 - 120  $\mu$  (On *Ficus callosa*) . . . . . *callosae* sp.n.
- 4. Postocular bristles very short, at most 50  $\mu$  long, or vestigial. Mouth-cone more or less broadly rounded . . . . . 5
- Postocular bristles well developed, at least 80  $\mu$  long \*) . . . . . 9
- 5. Antennal joints 7 and 8 combined 78 - 85  $\mu$  long. Wings hyaline. (On *Styrax* sp.) . . . . . *styracinus* sp.n.
- Antennal joints 7 and 8 combined 95 - 115  $\mu$  long . . . . . 6
- 6. Wings strongly shaded, with longitudinal stripe . . . . . 7
- Wings hyaline or only slightly shaded along the margins. Postoculars small, knobbed . . . . . 8
- 7. Postocular bristles vestigial . . . . . *spectator* sp.n.
- Postocular bristles 40 - 50  $\mu$  long . . . . . *macromma* sp.n.
- 8. Wings hyaline. Head somewhat longer, cheeks parallel-sided, eyes slightly protruding laterally. Anterior ocellus slightly overhanging. Antennal joints 7 and 8 combined 95 - 105  $\mu$  long. (On *Eugenia* sp.). . . . . *daetymon* (KARNY).
- Wings slightly shaded at the margins. Head somewhat shorter, cheeks slightly narrowed, eyes posterolaterally not convex. Anterior ocellus on a level with the fore margin of the eyes. Antennals 7 and 8 combined 110 - 115  $\mu$  long. (*Eugenia* sp.) . . . . . *eugeniae* PR.
- 9. Wings hyaline . . . . . 10
- Wings at least slightly infumated or with longitudinal streak, or both . . . . . 13
- 10. Large species with long head (360 - 390  $\mu$  long, 210 - 216  $\mu$  broad). Tube length about 280  $\mu$ . Close to *gracilis* (KARNY). (On *Ficus callosa*). . . . . cf. *callosae* sp.n.
- Smaller species. Head shorter . . . . . 11

\*) If two pairs of postocular bristles are present the genus *Adelphothrips* PR. has to be compared.

11. Major bristles of body pointed, longer. Joints 3 - 8 of antennae yellow. Epimeral bristles 0.8 of length of pronotum. *karnyi* (BAGN.) \* . . . . .

— Major bristles blunt or knobbed. Apex of joints 7 and 8 dark. Epimeral bristles 0.6 - 0.7 of the length of the pronotum . . . . . 12

12. Sense-cones and antennae normal. (On *Terminalia* sp.) . . . . .  
. . . . . *interlocatus* (KARNY).

— Sense-cones very long and slender, antennal joints 5 and 6 constricted at apex. Mouth-cone narrowly rounded. Anterior ocellus slightly overhanging. (On *Dipterocarpus alatus*) . . . . . *siamensis* (KARNY).

13. Also joint 4 of antennae darkened at apex. Major bristles of body strongly curved, knobbed. Antennal joint 8 fusiform. (On *Ficus punctata*) . . . . . *longicornis* (KARNY).

— Antennae paler, joints 3 and 4 wholly yellow.

14. Antennal joints 3 - 6 pale yellow, joints 7 and 8 abruptly dark, 6 sometimes shaded at apex. . . . . 15

— Joint 7 of antennae, and sometimes also 8, yellow at base . . . . . 19

15. Length of tube 300 - 315  $\mu$ . Body bristles very long and strongly curved. (On *Elatostema strigosum*) . . . . . cf. *suavis* sp.n.

— Tube moderately long . . . . . 16

16. Head of female more than 300  $\mu$  long. . . . . cf. *reynvaanae* sp.n.

— Head shorter . . . . . 17

17. Antennae very long and slender. Bristles more distinctly knobbed and very dark. Wings shaded with strong longitudinal streak. Eyes larger, elongate-oval, lateral diameter 128  $\mu$ . (On *Ficus* sp.) . . . . .  
. . . . . *inquilinus* (KARNY).

— Antennae normal. Eyes smaller. Major bristles not particularly dark. Wings shaded, usually paler at the apex, with slight longitudinal streak. (On *Piper* spp.) . . . . . 18

18. Head and tube of female shorter, the former 208 - 235  $\mu$  long. (On *Piper sarmentosum*, *retrofractum*, *bettle* and *nigrum*) . . . . .  
. . . . . *pallipes* (KARNY).

— Head and tube of female longer, the former 230 - 260  $\mu$  long. (On *Piper futokadsura*, *muricatum* and *recurvum*). *kuwanai* (MOULT.) \*\* . . . . .

19. Length of tube at least 280  $\mu$  . . . . . 20

— Tube shorter . . . . . 24

20. Tube of female never shorter than the head. Major bristles exceptionally long, strongly curved, fine . . . . . 21

<sup>\*)</sup> The description of *Gynaikothrips karnyi* BAGNALL does not refer to the wing colouration.

\*\*) cf. *Gynaikothrips citritibia* MOULTON. — This species must come very close to *L. kuwanai* MLT., but the author only compares it with *pallipes*.

- Tube of female distinctly shorter than the head. Bristles not or little curved, only the epimerals sometimes slightly curved, knobbed . . . . . 23
- 21. Sense-cones long, setiform. Mouth-cone pointed or only slightly rounded. Head strongly narrowed towards base. Postocular bristles blunt. 6 - 7 double fringe cilia. (On *Elatostema strigosum*) . . . . . suavis sp.n.
- Sense-cones slender but not setiform . . . . . 22
- 22. Anterior prothoracic bristles long. Postoculars nearly pointed. Mouth-cone broadly rounded. 11 - 12 double fringe cilia present. Tube length 280  $\mu$ . (On *Piper* spec.) . . . . . reynvaanae sp.n.
- Anterior prothoracic bristles only to 20  $\mu$  long. Head almost parallel-sided. Tube length 277 - 295  $\mu$ . (On *Elatostema strigosum*). . . . . collistratus sp.n.
- 23. Double fringe cilia 10 - 12. Mouth-cone pointed. Epimeral bristles somewhat curved. (On *Piper* spec.) . . . . . tibialis PR. \*)
- Double fringe cilia 16 - 20. Mouth-cone very broadly rounded. Epimeral bristles not curved, almost pointed, thick. . . . . lividipes sp.n.
- 24. Major bristles sharply pointed. Interior antero-marginal prothoracic bristles vestigial . . . . . 25
- Major bristles blunt, or knobbed, or open . . . . . 26
- 25. Antennae about 1.8 times as long as the head. Mouth-cone broadly rounded . . . . . mirabilis (SCHMUTZ)
- Antennae 1.5 times as long as the head. Mouth-cone somewhat pointed. (On *Piper nigrum*). . . . . karnyi (BAGN.)
- 26. Interior antero-marginal prothoracic bristles very small, lateral bristles small. Postocular bristles far back. Eyes comparatively strongly convex laterally. Head scarcely narrowed towards base. Wings evenly shaded, streak faint (*Elatostema* sp.) . . . . . ingratus sp.n.
- Interior anteromarginal prothoracic bristles well developed; if small, the postoculars closer to the eyes . . . . . 27
- 27. Wings not very strongly infumated but with strongly marked longitudinal stripe. Tube short, conical, 215 - 225  $\mu$  long. . . . . 28
- Wings more or less distinctly infumated, often with little marked stripe. Head scarcely or little narrowed towards base . . . . . 29
- 28. Head distinctly narrowed towards base. (On *Vitis lanceolaria*) . . . . . pallicrus (KARNY)
- Head little narrowed towards base. (On *Mallotus philippinensis*). . . . . flavitibia MOULT.

\*) In *L. karnyi* (BAGN.) the bristles are pointed.

29. Wings only at the margins slightly shaded. Antennal joint 3 about  $93 \mu$  long,  $30 \mu$  broad. (On *Monstera deliciosa*). **monsterae** (MOULT.)  
 — Wings distinctly infuscated. Antennal joint 3 shorter . . . . . 30
30. Fore femora wholly dark. Length of tube of female  $249 - 257 \mu$ . (On *Scindapsus* sp.) . . . . . **astutus** sp.n.  
 — Fore femora abruptly pale yellow at extreme apex. Tube length  $200 - 230 \mu$ . Sense-cones long and very fine. . . . . 31
31. Mouth-cone broadly rounded. Wings broadly paler behind base. (On *Rhaphidophora foraminifera*). . . . . **rhapsidophorae** sp.n.  
 — Mouth-cone slightly pointed. Wings without paler area behind base. (On *Elatostema* sp.) . . . . . **assimilans** sp.n.
32. Wings hyaline or with only extremely slight indication of a longitudinal streak. . . . . 33  
 — Wings distinctly infuscated or pale, but in this case with strong brown longitudinal stripe, or shaded and striped . . . . . 56
33. Antennae at most  $435 \mu$  long. Mouth-cone strongly pointed. Head distinctly narrowed towards base, cheeks straight. Antennal joint 7 broadest near base. Wings hyaline, with only 4 - 8 cilia duplicated. Small species. (On *Loranthus schulthesi*). . . . . **loranthi** sp.n.  
 — Antennae longer than  $435 \mu$ , or if not, the mouth-cone rounded . 35
34. Vacat.
35. Antennal joint 4 strongly and abruptly shaded at apex, 5 in basal half, 6 at base abruptly yellow. Head narrowed towards base. Wings with very faint infuscation and very faint streak. Fore tibiae strongly shaded, middle and hind tibiae wholly dark. Mouth-cone pointed. (On *Elaeocarpus* sp.) . . . . . **elaeocarpi** sp.n.  
 — Antennal joint 4 sometimes shaded, but never abruptly so . . 36
36. Basal wing bristles short, b. 1 and b. 2 not more than  $56 - 65 \mu$  long. Major bristles knobbed or very blunt. Lateral eye diameter  $95 - 100 \mu$ . Head not conspicuously narrowed towards base . . . . . 37  
 — Basal wing bristles longer or, if shorter, the head is distinctly narrowed towards base . . . . . 39
37. Eyes somewhat flattened laterally. Cheeks with some distinct small bristles. Interior anteromarginal prothoracic bristles small. (On *Cinnamomum camphora*) . . . cf. **Manothrips floridensis** (WATS.)  
 — Eyes not flattened laterally. Cheeks smooth. . . . . 38
38. Antennae longer, joints 5 - 7: 82, 80,  $62 \mu$  long, respectively. Tube of female, length  $240 - 260 \mu$ . Cheeks slightly convex posteriorly. (On *Vitis* sp.) . . . . . **vitivorus** PR.

\*) *L. bosei* MOULT. (from *Mallotus philippinensis*) may come in here, but female with head 366  $\mu$  long, 216  $\mu$  bread, and antennae 633  $\mu$  long.

47. Mouth-cone sharply pointed. (On *Litsea chinensis*) . . . . . **litsaeae** MOULT.  
 — Mouth-cone narrowly to broadly rounded . . . . . 48
48. Length of tube 240 - 290  $\mu$  . . . . . 49  
 — Length of tube only 207 - 230  $\mu$  . . . . . 52
49. Antennae shorter, in the female 520 - 540  $\mu$  long. Length of tube 240 - 265  $\mu$  . . . . . 50  
 — Antennae longer, in the female 580 - 590  $\mu$  long. Sense-cones longer and finer, on joints 4 and 5: 50 - 70  $\mu$  long. . . . . 51
50. Mouth-cone rather broadly rounded. Head distinctly narrowed towards base. (On *Chavica densa* or *Melastoma polyanthum*) . . . . .  
 . . . . . **chavicae** (ZIMM.)
- Mouth-cone narrowly rounded. Stout species having longer body bristles. (On *Schefflera elliptica*) . . . . . **heptapleurinus** PR.
51. Middle and hind tibiae wholly dark. Mouth-cone broadly rounded. Tube of female 280 - 290  $\mu$  long. (On *Fagraea litoralis*). . . . .  
 . . . . . **litoralis** (KARNY)
- Middle and hind tibiae narrowly yellow at the extreme apex. Mouth-cone more or less narrowly rounded. Tube of female 268 - 277  $\mu$  long. (On *Schefflera* sp.) . . . . . **fraudulentus** sp.n.
52. Interior antero-marginal prothoracic bristles somewhat longer than the exterior (angular) bristles. Epimeral bristles 140 - 150  $\mu$  long . . . . .  
 . . . . . **soembanus** sp.n.
- Interior antero-marginal bristles shorter than the angular bristles. Epimeral bristles 120 - 135  $\mu$  long. (On *Piper retrofractum*). . . . .  
 . . . . . **retrofracti** sp.n.
53. Mouth-cone more or less narrowly rounded, almost pointed. Middle and hind tibiae not pale yellow at apex. Head little narrowed towards base. Head length 225 - 245  $\mu$  . . . . . 54  
 — Mouth-cone broadly rounded. \*) . . . . . 55
54. Wings hyaline. Epimeral bristles very blunt or knobbed. . . . .  
 . . . . . cf. **claripennis** (KARNY)  
 — Wings very slightly shaded with quite faint streak. Epimerals longer, only narrowly rounded at tip . . . . . cf. **nigripes** (KARNY)
55. Head narrowed towards base, 265 - 275  $\mu$  long, 224 - 228  $\mu$  broad. Middle and hind tibiae dark. (On *Fagraea litoralis*). . . . .  
 . . . . . **praetermissus** sp.n.
- Cheeks evenly wide, head 282  $\mu$  long, 183 - 193  $\mu$  broad. Middle and hind tibiae pale yellow at apex . . . . . cf. **vitivorus** PR.

\*) *L. moultoni* (AYYAR) may also belong in this section.

56. Antennal joint 3 with dark *subbasal* ring. (On *Elatostema sesquifolium*) . . . . . ***annulifer*** sp.n. . . . .
- Antennal joint 3 pale or before or at the apex darkened . . . . . 57
57. Fore wing with more than 30 cilia duplicated, broad, infumated, paler at base, without longitudinal streak. Antennae dark brown, joint 3 pale brownish yellow, shaded spot-like, 4 and 5 brownish yellow at base. Head strongly narrowed towards base, constricted at base. Cheeks with a pair of spines in posterior third. . . . . cf. ***Manothrips fortis*** PR. . . . .
- Duplicated cilia less numerous. . . . . 58
58. Mouth-cone pointed or narrowly to moderately broadly rounded. 59
- Mouth-cone broadly rounded or nearly truncate at apex, about as in *Gynaikothrips ficorum*. Body bristles mostly shorter than in *Liothrips* s.str. (Subg. *Zopyrothrips* m. pro parte) . . . . . 107
59. Antennal joint 5 pale, 6 scarcely or slightly shaded, 7 mostly at base or wholly pale, often also 8 so. . . . . 60
- Antennal joints 5 and 6 distinctly shaded with brown at the apex or more extensively; sometimes also joint 4 shaded, seldom also 3; joint 6 may be shaded in apical half, and 7 and 8 be quite dark . . 79
60. Mouth-cone long, slender and sharply pointed. . . . . 61
- Mouth-cone narrowly or very moderately broadly rounded . . . . 67
61. Only 1 - 6 cilia duplicated in fore wing. Middle and hind tibiae at the extreme apex, fore tibiae and all tarsi pale yellow. Smaller species. (On *Melastoma malabathricum* v. *polyanthum*) . . . . .
- cf. ***Isotrichothrips longirostris*** (KARNY) . . . . .
- At least 8 cilia duplicated. Fore tibiae darkened at least at base or at the margins. . . . . 62
62. Antennal joint 3 longer, 110  $\mu$  long, 30  $\mu$  broad. (On *Ficus* sp.) . . . . .
- praelongus*** MOULT. . . . .
- Antennal joint 3 at most 96  $\mu$  long, but mostly much shorter . . . . 63
63. Epimeral prothoracic bristles open at tip or bluntly rounded. Bristle 2 of segment IX of the male much shorter than b. 1 or b. 2 . . . 64
- Prothoracic bristles with a short, fine hyaline tip. . . . . 66
64. Tube length 250 - 270  $\mu$ . Middle and hind tibiae narrowly pale yellow at the extreme apex. Wings having 13 - 16 cilia duplicated. (On undetermined climber). . . . . ***apicatus*** sp.n. . . . .
- Tube at most 235  $\mu$  long. Middle and hind tibiae wholly dark, at most brownish at the extreme apex. Wings with 10 - 12 (or less) cilia duplicated. . . . . 65

65. Antennal joint 4 : 35 - 36  $\mu$  broad. Tube longer on an average. (On *Dissochaeta gracilis*) . . . . . dissochaetae sp.n.

— Antennal joint 4 : 38 - 42  $\mu$  broad. Tube shorter on an average. (On *Mallotus repandus*) . . . . . brevitubus KARNY (*malloti* MLT.)

66. Fore wing with 9 - 12 cilia duplicated. Antennal joint 3 : 68 - 72  $\mu$  long, 38  $\mu$  broad. Tube not quite evenly conical. Bristle 2 of segment IX of male long, hair-like, as bristles 1 or 3. (On *Elaeocarpus stipularis*) . . . . . cf. *Isotrichothrips consanguineus* (KARNY)

— Fore wing with 13 - 17 cilia duplicated. Antennal 3 : 95  $\mu$  long, 38  $\mu$  broad. Tube evenly conical. Bristle 2 of segment IX of male much shorter than bristles 1 or 3. (On *Piper* sp.) . . . . . acuminatus sp.n.

67. Head longer and slenderer, 1.4 - 1.5 times as long as broad, only slightly narrowed posteriorly, or slightly convex at the sides . . . . . 68

— Head shorter . . . . . 69

68. Major bristles black. Head of female 337 - 365  $\mu$  long, 230 - 250  $\mu$  broad. Wings slightly shaded, with strong longitudinal stripe. Antennal 7 pale yellow at base. Postocular bristles well developed. (On *Fagraea obovata*) . . . . . fagraeae sp.n.

— Major bristles pale. Head of female 232  $\mu$  long, 215  $\mu$  broad. Antennals 3 - 8 pale yellow. Wings with slight brown infumation. Postoculars very small . . . . . tenuicornis MOULT.

69. Antennal joint 3 at most 34  $\mu$  broad, less distinctly widened towards apex . . . . . 70

— Antennal joint 3 more strongly widened, 36 - 40  $\mu$  broad, sometimes with a slight emargination indicated within. Somewhat stouter species . . . . . 78

70. Somewhat larger species. Antennal joints 5 and 6 (or only 6) slightly shaded with grey-brown, 7 and 8 wholly dark. Joint 8 not constricted at base . . . . . 71

— Smaller species, or antennae differently shaded . . . . . 73

71. Wings evenly and rather strongly infumated. Basal wing bristles pointed. (On *Medinilla* sp., *Ardisia javanica*) . . . . . cognatus (KARNY)

— Wings more or less strongly shaded, but always with dark longitudinal streak. Basal wing bristle 1 blunt . . . . . 72

72. Antennae and legs longer and slenderer. Head longer (340  $\mu$ ), more distinctly narrowed towards base. Antennal joint 7 three times as long as broad . . . . . cf. longiceps (KARNY)

— Antennae and legs less slender. Head shorter (305  $\mu$ ), less distinctly narrowed towards base. Antennal joint 7 little more than twice as long as broad. (*Piper baccatum*) . . . . . baccati sp.n.

73. Antennae about  $430 \mu$  long. Joint 8 conical, broadest at base. (On *Jasminum* spec.) . . . . . cf. *jasmini* sp.n.
- Antennae longer, joint 8 elongate-conical or constricted at base . . . . . 74
74. Head strongly narrowed towards base, cheeks straight . . . . . 75
- Head little narrowed or the sides slightly convex; base slightly constricted . . . . . 76
75. Eyes large, elongate-oval, lateral diameter  $140 - 146 \mu$ . Length of antennal joint  $7 : 84 - 87 \mu$ . Antennae ( $690 \mu$ ) and sense-cones very long and slender, the latter measuring on joint 4  $: 95 - 100 \mu$  . . . . .  
cf. *Eugynothrips sumatranaus* PR.
- Eyes smaller, lateral diameter  $112 - 116 \mu$ . Sense-cones on joint 5 and  $4 : 40 - 50 \mu$  long. Wing stripe conspicuous. (On *Ardisia* sp.) . . . . .  
dux sp.n.
76. Antennal joint 4 about  $84 \mu$  long,  $36 \mu$  broad, joint 7 about  $60 \mu$  . . . . .  
long . . . . . 77
- Antennal joint  $4 : 68 - 72 \mu$  long,  $40 \mu$  broad, joint  $7 : 50 - 56 \mu$  long.  
Wings distinctly shaded with greyish yellow, with faint but broad longitudinal stripe. (On *Piper*. spec.) . . . . . *exiguus falsus* nov.
77. Wings hyaline or only extremely slightly shaded with quite indistinct stripe. Epimeral prothoracic bristles  $140 - 150 \mu$  long. Antennae somewhat longer . . . . . cf. *soembanus* sp.n.
- Wings distinctly shaded with brown, with very faint longitudinal stripe. Length of epimeral bristles  $115 \mu$ . (On *Piper sarmentosum*).  
. . . . . *sarmentosi* sp.n.
78. Postoculars shorter. Head not distinctly constricted at base. Antennal 6 slightly shaded. Tube shorter, evenly conical. (On *Piper nigrum*,  
*P. bettle*) . . . . . *crassipes* (KARNY)
- Postoculars longer. Head distinctly constricted at base. Antennal 6 strongly darkened. Tube longer, its sides not quite straight . . . . .  
. . . . . cf. *maximus* (KARNY)
79. Antennal joint 3 very long and slender,  $140 - 143 (36) \mu$ . Mouth-cone almost pointed. Head narrowed towards base. Also antennal joint 3 darkened at the apex. Wings strongly infumated, with strong longitudinal stripe. Tube not quite evenly conical. 24 - 25 cilia duplicated . . . . . *fulmekianus* sp.n.
- Antennal segment 3 not so elongate . . . . . 80
80. The whole antenna grey-brown, joints 3 and 4, too, infumated, not yellow. Head strongly narrowed towards base. Epimeral bristles long, curved. Wings darkened all along, slightly punctured towards apex. Tube not evenly conical, having a slight concavity before the middle,

- and being distinctly longer than the head. (On *Elatostema sesquifolium*) . . . . . elatostemae sp.n.
- Antennae partly pale yellow, joints 3 - 5 (-6) at least at base so . . . . . 81
  - 81. Fore tibiae wholly dark, antennal joint 3 shaded at apex . . . . . 82
  - Fore tibiae at least partly pale, usually darkened only at the margins, or wholly yellowish. . . . . 83
  - 82. Wings infumated all along, with strong longitudinal stripe. Antennae much slenderer, joint 6 : 87  $\mu$  long, 22 - 25  $\mu$  broad. All tarsi pale yellow. Mouth-cone rounded. (On *Elatostema sesquifolium*) . . . . . devriesi (KARNY)
  - Wings behind base partly hyaline, streak faint. Antennae less slender, joint 6 : 73  $\mu$  long, 29  $\mu$  broad. Middle and hind tarsi strongly shaded. Mouth-cone long and pointed . . . . . sibajakensis sp.n.
  - 83. Antennae of female very long, at least 580  $\mu$ . Sense-cones usually very long and slender, setiform. Larger species . . . . . 84
  - Length of antennae less than 580  $\mu$  . . . . . 92
  - 84. Head with slight but distinct concavity before the middle of the cheeks. Tube not quite evenly conical, 360  $\mu$  long. Mouth-cone pointed or nearly so. Sense-cones setiform. Wing with 20 - 22 interlocated cilia. (On *Fagraea obovata*) . . . . . convergens sp.n.
  - Cheeks without concavity about the middle . . . . . 85
  - 85. Tube of female long, 360  $\mu$ . Body bristles comparatively very stout, epimerals at base 7.5 - 8.5  $\mu$  thick. Antennal joint 4 strongly darkened, 6 pale only at base. (On *Rubia cordifolia*) . . . . . rubiae sp.n.
  - Tube shorter. Body bristles less thick, at most (in *piperinus*) 6  $\mu$  thick at base . . . . . 86
  - 86. The major body bristles blunt or open at the tip but not or only very slightly widened at tip. Wings slightly shaded with longitudinal streak . . . . . 87
  - The major bristles (postoculars, epimerals) not blunt, either with a short, hyaline 'pencil-tip' or hair-like and pointed . . . . . 88
  - 87. Postocular bristles more distant from the eyes (ab. 45 - 50  $\mu$ ). Major body bristles thick (ab. 6  $\mu$  at base). Middle and hind tibiae distinctly yellow at apex, fore femora yellow at apex. Antennal joint 5 : 112 - 120  $\mu$  long, 30 - 32  $\mu$  broad, like joint 4 slightly constricted at the apex. Head little narrowed towards base. Mouth-cone more pointed. (On *Piper* spec.) . . . . . piperinus PR.
  - Postoculars less distant (to 36  $\mu$ ) from the eyes. Major bristles finer. Middle and hind tibiae little paler at apex. Antennal joint 5 about

- 100  $\mu$  long, 34  $\mu$  broad. Antennae 623 - 640  $\mu$  long. Mouth-cone more or less narrowly rounded. (On *Gynopogon reinwardti*) . . . . . ***gynopogoni* sp.n.**
88. Wings behind the dark basal plate hyaline or nearly so, then more or less strongly infumated, and with longitudinal stripe. Tube length 310 - 335  $\mu$ . Antennal joint 6: 100 - 105, joint 7: 76 - 80  $\mu$  long. The major bristles with white pencil-tip (like in *longiceps*). (On *Ficus retusa*). Var. *ficarius* PR. (On *Ficus benjamina*). Var. *silvaticus* n. (On *Dissochaete gracilis*) . . . . . ***takahashii* (MOULT.)**
- Wings evenly, more or less strongly, infumated, with dark longitudinal streak . . . . . 89
89. Antennae shorter, about 580  $\mu$  long; joints 4, 5 and 6 yellow with sharply defined strong darkening at apex. Middle and hind tibiae wholly dark. Sense-cones shorter than in *takahashii* . . . . . cf. ***polybotryae* sp.n.**
- Antennae longer, joints 5 and 6 with apical darkening not sharply defined. \*) . . . . . 90
90. Postocular and epimeral bristles hair-like, sharply pointed. Antennae longer, ab. 690  $\mu$ ; joint 5: 112 - 120, joint 7: 88 - 92  $\mu$  long. Sense-cones very long, fine. Head distinctly narrowed towards base, 1.4 - 1.5 times as long as broad. Joints 7 and 8 dark brown. (On *Ficus cuspidata*) . . . . . ***cuspidatae* sp.n.**
- Body bristles, as in *L. takahashii*, with pale pencil-tip. Antennae shorter, joint 5: 92 - 105  $\mu$  long, 30 - 35  $\mu$  broad. Wings all along distinctly, sometimes strongly infumated, with dark longitudinal stripe. Hind wings distinctly shaded. Head strongly narrowed towards base, about 1.3 times as long as broad . . . . . 91
91. Middle and hind tibiae narrowly abruptly yellow at the extreme apex. Tube of female 285 - 303  $\mu$  long. (On *Piper recurvum*) . . . . . ***longiceps* (KARNY)**
- Middle and hind tibiae dark to the extreme apex. Fore femora slightly stouter. Sense-cones shorter. Tube of female 310 - 320  $\mu$  long. (On *Polyosma ilicifolia*) . . . . . cf. ***polyosminus* sp.n.**
92. Head more slender, in the female 348  $\mu$  long, 232  $\mu$  broad, not very distinctly narrowed towards base, 1.5 times as long as broad. Bristles stout. Sense-cones very long and slender; joints 4 and 5 very slightly constricted before apex. Mouth-cone pointed. Fore tibiae scarcely shaded . . . . . cf. ***piperinus* PR.**

\*) *L. orchidis* (MOULT.) may belong in this section.

- Head less slender or strongly narrowed towards base. . . . . 93

93. Postocular and pronotal bristles distinctly knobbed. Epimeral and basal wing bristles moderately long. Postoculars far backward. Antennae moderately long, ab. 450  $\mu$ ; joint 6 at apex, 7 and 8 wholly dark. Labrum strongly pointed. Tube evenly conical. (On *Vernonia arborea* and *V. elaeagnifolia*) . . . . . *rectigenis* (KARNY)

— Major bristles pointed, pencil-tipped or scarcely rounded at tip. . 94

94. Tube of female about 300 - 320  $\mu$  long. Mouth-cone not sharply pointed, but only narrowly rounded. . . . . 95

— Tube of female at most about 270  $\mu$  long. . . . . 96

95. Antennal joints: 5 and 6 at apex rather abruptly and strongly darkened, 7 and 8 wholly dark. Sense-cones at least 50  $\mu$  long. Wing length almost 1.4 mm. (On *Schefflera polybotrya* and *Sch. scandens*). . . . . *polybotryae* sp.n.

— Antennal joints: 3-6 pale yellow, 7 pale at base, 8 wholly dark. Sense-cones on joints 4 and 5 at most 45  $\mu$  long. Wing length as in the former. (On *Polyosma ilicifolia*) . . . . . *polyosminus* sp.n.

96. Tube of female 240 - 277  $\mu$  long. . . . . 97

— Tube of female 195 - 233  $\mu$  long. Wings mostly slightly shaded all along, with or without longitudinal stripe. (cf. *soembanus* and *retrofracti*) . . . . . 105

97. Epimeral bristles very long, 180 - 210  $\mu$ , fine, curved, pointed. Inferior antero-angular prothoracic bristles 65 - 70  $\mu$  long. Mouth-cone more or less narrowly rounded. Middle and hind tibiae narrowly pale yellow at the extreme apex. (On *Piper miniatum*). . . . . *miniati* sp.n.

— Epimeral bristles shorter, rarely 170  $\mu$  long . . . . . 98

98. Mouth-cone long, pointed. Head slender (e.g. 277  $\mu$  long, 212  $\mu$  broad), strongly narrowed towards base, cheeks straight. Middle and hind tibiae scarcely paler at the extreme apex. (On *Omphalopus fallax*). . . . . *omphalopinus* sp.n.

— Mouth-cone more or less narrowly rounded at apex. . . . . 99

99. Wings scarcely shaded with only indistinct longitudinal shade instead of stripe. Middle and hind tibiae wholly dark. Mouth-cone rather broadly rounded. Antennals 3 - 5 pale, 6 at apex rather sharply defined dark, 7 and 8 wholly dark. Postocular bristles 108 - 116  $\mu$ , epimerals 104 - 112  $\mu$  long . . . . . cf. *nigripes* (KARNY)

— Not the above characters combined . . . . . 100

100. Middle and hind tibiae broadly yellow at the apex. Head 266 - 283  $\mu$  long, 215  $\mu$  broad. Wings 1.12 mm. long (In bulbs of *Lilium* spp.). . . . . *vaneekiei* PR.



109. Very large species with parallel-sided head. Wings strongly and almost evenly infumated, basal plate not darker than the rest of the wing. (On *Conocephalus suaveolens*) . . . . . **fumipennis** (KARNY)
- Somewhat smaller species, having the basal plate often darker than the rest of the wing . . . . . 110
110. Postocular and epimeral bristles rather long, pointed. Head distinctly narrowed towards base, and with indistinct concavity at the cheeks, slightly constricted at base. Middle and hind tibiae wholly dark. (On *Macropanax concinnum*). . . . . **macropanacis** sp.n.
- Cheeks straight or slightly convex, but without concavity anteriorly, head not or evenly narrowed towards base. . . . . 111
111. Epimeral bristles at least 140  $\mu$  long, narrowly rounded at tip. Middle and hind tibiae wholly dark. Tube at least 310  $\mu$  long. (On *Schefflera* spec.) . . . . . **jacobsoni** sp.n.
- Epimeral bristles shorter, with slight knob. . . . . 112
112. Antennal joints: 7 at apex, 8 wholly dark. Head very little longer than broad. Epimerals 84 - 100  $\mu$  long. Tube much narrowed at apex, length ab. 300  $\mu$ . (On *Conocephalus suaveolens*) . . **taurus** (KARNY)
- Antennae from joint 3 nearly wholly pale yellow. Head distinctly longer than broad. Epimerals longer. . . . . 113
113. Length of tube about 225  $\mu$ . Antennae and head shorter. (On *Jasminum* sp.) . . . . . **jasmini** sp.n.
- Length of tube 257 - 266  $\mu$  . . . . . 114
114. Lateral diameter of eye 105  $\mu$ . Basal wing bristles shorter, at most 65  $\mu$  long. (On *Schefflera* sp.) . . . . . **heptapleuri** (KARNY)
- Lateral diameter of the eye 120  $\mu$ . Head more elongate, mouth-cone more broadly rounded. Bristle 3 of wing base 85  $\mu$  long. Abdominal bristles pale (*Vitis lanceolaria*). . . . . **extractus** sp.n.
115. Postocular bristles long, longer than the eye . . . . . 116
- Postocular bristles shorter than the eye or very small . . . . . 120 \*)
116. Head elongate, 1.4 - 1.7 times as long as broad. Wings with strong dark longitudinal stripe. . . . . 117
- Head less elongate. Postocular bristles fine, long, pointed or slightly rounded at tip . . . . . 118
117. Basal wing bristles longer, b. 2 or 3 about 140  $\mu$ . Major bristles thicker. Tibiae at apex somewhat more broadly yellow. At least joints

\*) The following species seem to belong also to this section: *L. sodalis* (BAGN.) (on *Mesua ferrea*), male only; length of postoculars unknown; head length (breadth) 182 (190)  $\mu$ , tube length (breadth at base) 125 (60)  $\mu$ . — *L. heptapleuricola* (TAKAHASHI). Head length (breadth) 263 (208)  $\mu$ , tube length (breadth at base) 254 (90)  $\mu$ .

- 4 - 6 of the antennae distinctly darkened in their distal part. Large species, length of wing 1.63 mm. (On *Rubia cordifolia*). . . . . cf. *rubiae* sp.n.

— Basal wing bristles shorter, b. 2, 3 : 88 - 112  $\mu$  long. Bristles less thick. Antennal joints: 3 - 6 wholly yellow, 7 darkened at apex, 8 dark. (On *Fagraea obovata*) . . . . . cf. *fagraeae* sp.n.

118. Middle and hind tibiae pale yellow at extreme apex. Head longer and slenderer. Antennal joint 7 mostly paler at base. (On *Ardisia javanica* and *Medinilla* spp.) . . . . . cf. *cognatus* (KARNY)

— Middle and hind tibiae wholly dark, at most brownish at apex. Antennal joints: 6 at apex, 7 and 8 wholly dark . . . . . 119

119. Head strongly narrowed towards base. Basal wing bristles longer, b. 3 about 140  $\mu$  long. Larger species . . . . . *maximus* (KARNY)

— Head little narrowed towards base. Basal wing bristles shorter, b. 3 not exceeding 85  $\mu$ . (On *Eugenia* sp.) . . . . . *nigripes* (KARNY)

120. Tube short, conical, about 168  $\mu$  long, 84  $\mu$  broad, shorter than the head (215 - 225  $\mu$ ). Wings pale at base, slightly shaded towards the apex, without longitudinal streak. Small species. (On *Vitis pergamentea*, *Vitis* sp.) . . . . . *simillimus* (KARNY)

— Tube longer, almost as long as or longer than the head . . . . . 121

121. Head 1.3 - 1.5 times as long as broad. . . . . 122

— Head shorter . . . . . 123

122. Wings with dark longitudinal stripe. Tube of female, length 320 - 330  $\mu$ , width 100  $\mu$ . (On *Fagraea obovata*) . . . . . cf. *fagraeae* sp.n.

— Wings slightly shaded without conspicuous stripe. Tube, length 278 - 288  $\mu$ , width 105  $\mu$ . (On *Tetrastigma mutabile*) . . . . . *tetrastigmae* sp.n.

123. Tube of female 365 - 415  $\mu$  long. . . . . 124

— Tube shorter . . . . . 125

124. Head only slightly narrowed towards base, slightly constricted at base. Bristles on segment IX: 130 - 160  $\mu$  long. (On *Ardisia javanica*) . . . . . cf. *Chalepothrips ardisiae* sp.n.

— Head strongly narrowed towards base, cheeks straight. Bristles on segment IX of abdomen 190 - 210  $\mu$  long. (On *Ardisia* sp.) . . . . . *latro* sp.n.

125. Epimeral bristles shorter, at most 60  $\mu$  long. Head in front and pronotum distinctly reticulated . . . . . *nervisequus* (KARNY)

— Epimeral bristles longer. Head and pronotum without polygonal reticulation . . . . . 126

126. Antennae longer, about  $500\text{ }\mu$ . Anteroangular pronotal bristles very small. Wings evenly infumated. Bristles on segment IX  $195 - 210\text{ }\mu$  long. (On *Schefflera scandens*) . . . . . *schefflerae* sp.n.
- Antennae shorter,  $465 - 480\text{ }\mu$ . Anteroangular prothoracic bristles conspicuous. Bristles on segment IX  $240 - 250\text{ }\mu$  long. Wings scarcely shaded behind base. (On *Fagraea racemosa*). . . . *racemosae* sp.n.

Subg. **Phaenothrips** nov.

**Liothrips (Phaenothrips) callosae** spec. nov.

**Female:** Brownish-black, antennal joints 3 - 6 and all tarsi and tibiae pale yellow, antennal joint 7 pale at base. Wings hyaline. Body bristles more or less strongly infumated.

Very similar to *Liothrips (Phaenothrips) gracilis* (KARNY), and therefore considered identical with it by KARNY. The body bristles are longer. The postoculars at least  $80\text{ }\mu$  long and  $60 - 68\text{ }\mu$  distant from eyes, whilst they are only  $40 - 48\text{ }\mu$  long in *gracilis* and scarcely farther ( $72\text{ }\mu$ ) distant from the eyes. The epimeral prothoracic bristles are about  $100 - 120\text{ }\mu$  long; in *gracilis*, however, at most  $84 - 88\text{ }\mu$ . Bristle 1 of segment IX of abdomen has a length of about  $260\text{ }\mu$  in *callosae*, in *gracilis*  $280 - 290\text{ }\mu$ . The head is in the new species considerably shorter, measuring from eyes to hind margin of vertex  $363 - 390\text{ }\mu$  (being  $210 - 216\text{ }\mu$  broad), in *gracilis* the corresponding measurements are  $423 - 433\text{ }\mu$  ( $240 - 248\text{ }\mu$ ). Mouth-cone as in *gracilis* narrowly rounded, labrum pointed. 12 double fringe cilia present.

Further measurements (of holotype), in  $\mu$ : Lateral diameter of eye 136-140; length of cheeks behind eyes 272. Antennae, length about 657; lengths (breadths) of joints from joint 3: 120 (24), 136 (33), 120 (28), 105 (28), 80 (23), 40 (14). Anteroangular prothoracic bristles, length 65, interior postero-marginals 100; prothorax, length 173. Pterothorax, length 485, width 467 (in paratype 450). Bristle 2 of segment IX about 260; length of segment IX 92, width 195. Tube, length 280, width across base 96, at apex 48.

**Habitat:** 2 ♀♀, Sebesie, 22. IV.1921, causing yellow spots on leaves of *Ficus callosa* (leg. DOCTERS VAN LEEUWEN, no. 5095).

**Liothrips (Phaenothrips) gracilis** (KARNY)

New record: Semarang, 7.IV.1914, yellow spots (like those on *Planchnonia*) on *Barringtonia spicata* Bl. (leg. DOCTERS VAN LEEUWEN).

There is no difference between these specimens and those from *Planchnonia* described by KARNY, except that the antennal joints 3-6 are wholly

pale yellow. It may be added that the maxillary stylets originate in the middle of the head, far behind eyes, near the postoculars, like in *callosae*, and are closely approximated.

**Liothrips (Phaenothrips) lividipes** spec. nov.

**Male:** Brown (faded, originally most likely dark blackish-brown), all tibiae and tarsi pale yellow. Wings hyaline or only quite indistinctly infumated, but with conspicuous dark longitudinal vein which is fading out at base and apex. Antennae pale yellow from joint 3, joint 7 is obviously in normally coloured specimens pale at base only, slightly shaded in the apical two-thirds, like the whole of joint 8. The major body bristles dark.

Head elongate, not or quite indistinctly narrowed towards base; mouth-cone moderately broadly rounded, labrum scarcely pointed. Maxillary stylets originating somewhat behind middle of head, closely approximated at middle of vertex. Hind ocelli situated before middle of eyes, anterior ocellus on a level with fore margin of eyes. Postocular bristles about 76  $\mu$  long, 56  $\mu$  distant from eyes, tip not quite acute, but not knobbed. Antennae slender, joints 4-6 distinctly somewhat constricted at apex, joint 8 hardly constricted at base. Sense-cones very long and slender, their length on joints 4 and 5 about 80 - 85  $\mu$ ; joint 3 as usually with 1, joint 4 with 2 + 1<sup>+</sup>, joints 5 and 6 with 1 + 1<sup>+</sup>. Antero-angular prothoracic bristles short, but also the interior pair developed, postero-marginals moderately long, the epimerals much longer than the interior postero-marginal bristles, all somewhat open at tip, not knobbed. Pterothorax about as long as broad. Wings normal, basal bristles very moderately long, b. 1 and 2 not wholly acute, b. 3 nearly so. Fore wing with 16 - 20 interlocated cilia. Bristle 1 of abdominal segment IX 240, b. 2: 68, b. 3: 260  $\mu$  long. Tube with very slight concavity beyond base, otherwise conical, length 294 - 310, width across base 98, at apex 56  $\mu$ .

Further measurements (of holotype), in  $\mu$ : Head, length 380, width 240; lateral diameter of eye 140. Antennae, total length 710; lengths (breadths) of joints: 44 - 48 (base 52, apex 40), 68 - 72 (34 - 35), 116 (32), 128 (40), 140 (34), 108 (?) (32), 80 (?) (24), 45 (?) (14). Prothorax, length? 156, width 380, inclusive of coxae 433. Pterothorax 467 long and broad. Antero-angular prothoracic bristles 36, epimerals 116. Wings, length 1350-1367, width across middle 100.

**Habitat:** 1♂, Sumatra: Bukittinggi (Fort de Kock), 920 m., I. 1921, under tree bark (leg. E. JACOBSON, no. 1147).

The general aspect of this species is certainly not that of a bark thrips. It is a true *Phaenothrips*, differing from the other species having a longitudinal streak on the otherwise hyaline wings by the well developed postocular bristles and the longer head (length of cheeks behind eyes 228  $\mu$ ).

### **Liothrips (Phaenothrips) inquilinus (KARNY)**

*Gynaikothrips inquilinus* KARNY, Zeit. wiss. Ins.-Biol., 1915, p. 328.

**Female:** The unique type specimen is certainly a monstrous one, having 7-jointed antennae. To the description given by KARNY (l.c.) I can add:

The antennal joints 3 - 5 are pedicellate at base, but scarcely constricted at apex; joints 3 - 5 measure 80 (24), 96 - 100 (28) and 104 (24)  $\mu$ , respectively; the longest sense-cone on joint 4 is about 75  $\mu$  long. Wings shaded, with dark longitudinal streak. Head little elongate, 250  $\mu$  long, 225  $\mu$  broad; diameter of eye about 128  $\mu$ , cheeks behind eyes about 140  $\mu$ . Maxillary stylets starting in the middle of the sides, right behind the eyes, and are distally moderately widely separated. Postocular bristles knobbed, 68 - 72  $\mu$  long; antero-angular bristles 60  $\mu$ , interior antero-marginals 36  $\mu$ , epimerals 85  $\mu$ , interior postero-marginals 65  $\mu$ . Wings only 882  $\mu$  long, basal bristles dark, open, b. 1: 52, b. 3: 76  $\mu$  (b. 2 ?). Bristle 1 of segment IX 128, b. 2 and 3 about 148  $\mu$  long, all pointed. Tube, length 220 - 225, width at base 86 - 88, at apex 40  $\mu$ .

This species forms a transition to *Liothrips* s. str.

### **Liothrips (Phaenothrips) macromma spec. nov.**

**Female:** Blackish-brown, all tibiae and tarsi pale yellow, antennal joints: 3 - 6 pale yellow, 7 shaded with grey-brown, 8 as well but paler. Wings strongly infumated with dark longitudinal stripe.

Head and particularly the elongate-oval eyes longer than in the similar *L. inquilinus*. Head slightly narrowed posteriorly, very slightly constricted at base. Anterior ocellus on the same level as the fore margin of the eyes. Maxillary stylets originating behind eyes, and are little separated on the vertex. Postocular bristles short, only about 25  $\mu$  distant from eyes. Mouth-cone short, broadly rounded, more strongly so than in *inquilinus*. Antennae very slender, 3 - 5 with thin pedicel; sense-cones very long and fine, setiform, their length on joints 4 and 5: 80 - 88  $\mu$ . Antero-angular prothoracic bristles well developed, the interior antero-marginals somewhat shorter, epimerals rather long, all bristles pale at tip, blunt. Pterothorax a little broader than long. Wings as in *inquilinus*, of typical *Liothrips*-shape, i.e.

very slightly narrowed towards apex; basal wing bristles blunt, dark, moderately long; 6 - 8 cilia duplicated. Bristles on segment IX of abdomen comparatively short, much shorter than tube. The latter shorter than the head, evenly conical.

Measurements of female, in  $\mu$ : Head, length 308 - 312, width across eyes 208, before base 180; lateral diameter of eye 145, length of cheeks behind the eyes 140 (inclusive of basal thickening 160). Antennal joints, length (breadths) from joint 3: 76 (24), 100 (28), 103 (24), 90 (24), 60 (20), 45 (12). Prothorax, length 113, width without coxae 277; antero-angular bristles 52, epimerals 80 - 88. Pterothorax, length 310, width 337 - 346. Wings, length 900, width across middle 72. Abdominal segment IX, length 104, width 156; bristle 1 on segment IX about 120, b. 2: 140, b. 3: 80 - 87. Tube, length 216, width across base 82, at apex 40; anal setae, length ca. 150.

**Habitat:** 2 ♀♀, Java: Goen. Tjibodas, Tjiampea, ± 350 m., 24. V. 1925, in pseudocecidium on unknown plant (no. 8373), leg. DOCTERS VAN LEEUWEN.

#### *Liothrips (Phaenothrips) spectator* spec. nov.

**Female:** Brown, all tibiae and tarsi pale yellow. Antennae pale yellow from joint 3 onwards, having apical half of joint 7 and all of 8 pale grey; joint 6 may have an indistinct shade at apex. Both wings shaded with brown all along, with very conspicuous longitudinal stripe. Bristles on prothorax and base of wing as well as anal setae darkened, other abdominal setae lighter, especially at apices.

Head elongate, cheeks scarcely narrowed posteriorly but somewhat constricted at base; eyes large, rounded laterally, oval as a whole; front ocellus slightly anterior to the level of the fore margins of the eyes, but not surpassing interantennal production; mouth-cone broadly truncate at the apex; maxillary stylets narrowly separated, inserted oculad; postocular bristles vestigial. Antennae very slender, joints 4 and 5 pedicellate, both slightly constricted also at the apex, joint 8 elongate-conical, broadly attached to 7; sense-cones very long and fine, setiform, about 80  $\mu$  long on joint 4 and 88  $\mu$  on 5; joint 3 with one, 4 with 1 + 2<sup>+1</sup> sense-cones. Bristles of the fore margin of the prothorax long, interiors about 60  $\mu$ , longer than the exteriors (angulars); epimerals 95 - 100  $\mu$  long, open at tip or somewhat obliquely truncate, interior postero-marginals about 88  $\mu$  long. Basal wing setae slightly knobbed, 48, 64 and 68  $\mu$  long; wings moderately broad, with 6 interlocated cilia. Abdominal bristles fine, the longest

on segment VII nearly pointed, 116  $\mu$ , b. 1 obliquely truncate and open; bristles 1 and 2 of segment IX pointed, 152  $\mu$ . Tube rather evenly conical, length 204, basal width 76, apical width 38  $\mu$ . Longest anal seta 180  $\mu$ .

Further measurements of female (holotype), in  $\mu$ : Head length 260 - 265, width 196; eyes, lateral diameter 120, length of cheeks behind them 144 - 156. Antennae, lengths (breadths) of segments: 20 - 24 (base 44, apex 36), 52 - 56 \*) (29), 72 \*) (26), 92 (32), 96 (24), 90 (27), 72 (18), 34 (11). Prothorax, length 128, width (without coxae) 286. Pterothorax, length 345, width 337 - 346. Wings, length 900, breadth at middle 72 - 76. — Male unknown.

**Habitat:** 1 ♀, Philippines: Luzon, Mt. Makiling, leg. BAKER, (ex coll. KARNY).

#### Liothrips (Phaenothrips) siamensis (KARNY)

1923. *Gynaikothrips siamensis* KARNY, Treubia, III, p. 349.  
 1923. " " KARNY, Journ. Siam Soc., 16, p. 133.  
 1926. " " KARNY, Mem. Dept. Agr. Ind., Ent. Ser., 9, p. 236.  
 1926. " " PRIESNER, Treubia, VIII, Suppl., p. 210.  
 1936. *Smerinthothrips siamensis* TAKAHASHI, Philipp. Journ. Sci., 60, p. 443.

A small species. — **Female:** Brown to brownish black, all tibiae and tarsi pale yellow, fore femora pale yellow at the extreme apex. Antennal joints: 3 - 6 pale yellow, 7 so in basal half, apical half and the whole of 8 dark. Bristles on anterior body hyaline towards apex, abdominal bristles pale, bases of those on segment IX shaded. Wings, inclusive of basal plate, hyaline.

Head elongate, somewhat broader across the large eyes than across the cheeks which are only indistinctly narrowed towards base; mouth-cone narrowly rounded, labrum pointed; maxillary stylets inserted at posterior third of sides of head, moderately widely separated behind; post-ocular setae extremely short. Antennal joints 4 and 5 constricted near apex, joint 8 parallel-sided at base; sense-cones very long setiform, those on joint 4 at least 60  $\mu$ ; joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup> sense-cones. Both pairs of antero-marginal prothoracic bristles developed, but short, about 34  $\mu$ ; epimerals 87  $\mu$  long, open or obliquely truncate at tip. Basal wing bristles slightly knobbed, 60, 65 and 72  $\mu$  long, double-fringe cilia 6 - 9 in both sexes. Abdominal bristles blunt, also the longest on segment VII, about 100  $\mu$ , not pointed; bristles on segment IX 184 - 208  $\mu$ , pointed.

\*) Not quite horizontal.

Tube short, evenly conical, length 205  $\mu$ , basal width 76  $\mu$ , apical width 40-41  $\mu$ . Anal setae, length about 200  $\mu$ .

Further measurements of female (cotype), in  $\mu$ : Head, length 277, width 196; lateral eye diameter 68 - 72; length of cheeks behind eyes 160, Antennae, lengths (breadths) of joints from 3rd: 80 (26), 88 - 92 (32), 88 (30), 80 (27), 60 - 64 (24), 36 (12 - 13). Prothorax, length 120 - 125, width 290 (inclusive of coxae 310). Pterothorax, length 310, width 330. Wings, length approximately 865.

**Male:** More slender. Antennae, lengths (breadths) of joints, in  $\mu$ : 22 (base 34, apex 32), 52 (26), 84 (24), 88 - 92 (30 - 31), 84 (26), 76 (24), 58 (20), 36 (12). Wings, length 727  $\mu$ . Tube, length 196 - 200  $\mu$ , basal width 72  $\mu$ , apical width 39  $\mu$ .

**Habitat:** Some ♂♂ and ♀♀, Siam: Bangkok, 7. and 9.X.1920, in leaf galls on seedlings of *Dipterocarpus alatus* (Herb. 146 & 153), leg. DOCTERS VAN LEEUWEN.

### Liothrips (Phaenothrips) daetymon (KARNY)

1923. *Gynaikothrips daetymon* KARNY, *Treubia*. III, p. 371, fig. 81c.  
 1923. " " KARNY, *Journ. Siam Soc.*, XVI, p. 133.  
 1926. " " KARNY, *Mem. Dept. Agr. Ind., Ent. Ser.*, IX, p. 236.

A slender species having very slender antennae and legs. — **Female:** Brown, all tibiae and tarsi pale yellow. Antennae from joint 3 pale yellow, joint 7 apically or in apical half, joint 8 wholly shaded with pale grey-brown. Wings hyaline, bristles on prothorax and wing base darkened, those on the abdomen more or less pale, anal setae darker at base.

Head long, nearly parallel-sided, eyes slightly protruding laterally, slightly convex; anterior ocellus on a small hump but not overhanging; postocular bristles very short (28  $\mu$ ), not quite pointed, about 40  $\mu$  distant from eyes. Antennal joints 4 - 6 slightly constricted apically; sense-cones very long, setiform, curved, those on joint 5 measuring 72 - 76  $\mu$ ; joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup> sense-cones; joint 8 conical, broadly attached to 7. Mouth-cone truncate at the apex. Maxillary stylets inserted near postoculars, about middle of sides, approximated along middle of vertex. Both pairs of antero-angular prothoracic bristles developed, moderately long, exteriors about 25  $\mu$ ; epimerals moderately long, 72 - 80  $\mu$ , blunt or rounded at tip, interiors shorter. Wings normal, narrow, having short, open or round-tipped basal bristles, b. 1, 2: not surpassing 45, b. 3: 52 - 56  $\mu$  long; 8 - 10 cilia duplicated. Bristles on the basal abdominal segments (II-V) comparatively short, rounded at tip,

longest bristle on segment VII measuring 100  $\mu$ , and being not quite sharp; bristles 1 on IX not quite acute but not lanceolate either, 192-200  $\mu$  long, b. 2, 3 pointed, the former 160  $\mu$  long. Tube almost evenly conical, about 235  $\mu$  long, at base 80  $\mu$ , at apex 40  $\mu$  broad. Anal setae, length 212 - 225  $\mu$ . All femora weak.

Further measurements of female (large specimen), in  $\mu$ : Head, length 295, width 200: eyes, lateral diameter 116, cheeks behind them 188. Antennae, lengths (breadths) of joints: 28 (base 40, apex 32), 56 (28), 84 (24), 108 (32), 108 (27), 88 (26), 72 (19), 34 (11). Prothorax, length 132 - 136, width without coxae 277. Pterothorax, length 330, width 337. Wings, length 1038 - 1055, width at middle 80.

**Male:** Very similar, somewhat smaller, head very slightly narrowed towards base. Bristle 1 on segment IX of abdomen about 180, b. 2: 44-48  $\mu$ , b. 3: 168 - 172  $\mu$  long. Tube, length 200 - 208  $\mu$ , basal width about 76  $\mu$ , apical width 39  $\mu$ .

**Habitat:** ♂♂ and ♀♀, Saigon (Indochina), 28.X.1920, in leaf gall on *Eugenia* sp. (*polyantha*?), Herb. no. 274, leg. DOCTERS VAN LEEUWEN.

#### Subgen. *Liothrips* s. str.

##### *Liothrips pallipes* (KARNY)

- |       |                               |                                                                                         |
|-------|-------------------------------|-----------------------------------------------------------------------------------------|
| 1913. | <i>Gynaikothrips pallipes</i> | KARNY, <i>Bull. Jard. Bot. Buitenzorg</i> , X, pp. 108, 110.                            |
| 1914. | "                             | DOCTERS VAN LEEUWEN, <i>Marcellia</i> , XIII, pp. 127 - 135.                            |
| 1914. | "                             | DOCTERS VAN LEEUWEN, <i>Bull. Jard. Bot. Buitenzorg</i> , XV, pp. 47, 48.               |
| 1915. | "                             | KARNY, <i>Zeit. wiss. Ins.-Biol.</i> , pp. 324, 330.                                    |
| 1922. | "                             | KARNY, <i>Treubia</i> , III, pp. 110, 122.                                              |
| 1923. | "                             | KARNY, <i>Treubia</i> , III, p. 314.                                                    |
| 1926. | "                             | KARNY, <i>Mem. Dept. Agr. Ind.</i> , IX, pp. 236, 238.                                  |
| 1926. | "                             | PRIESNER, <i>Treubia</i> , VIII, Suppl., pp. 178, 190, pl. XIII, fig. 88.               |
| 1928. | "                             | RAMAKRISHNA AYYAR, <i>Contr. knowl. Thys. Ind.</i> , p. 304.                            |
| 1931. | "                             | RAMAKRISHNA AYYAR & MARGABANDHU, <i>Journ. Bombay Nat. Hist. Soc.</i> , XXXIV, p. 1040. |

Among the species having pale yellow tibiae and shaded wings this species is easily recognizable by the characteristic coloration of the antennae in which joints 3 - 6 are pale yellow, while joints 7 and 8 are quite and abruptly dark. Since this species can hardly be confused with any other, except the following, I refer to the description given by KARNY (l.c. 1913). This insect is recorded from India, Java, Sebesie, Salayer and West Borneo. The types were taken from galls on *Piper sarmentosum*, but it also occurs on *Piper retrofractum*, *P. bettle* and *P. nigrum*.

***Liothrips kuwanai* (MOULTON)**

1928. *Gynaikothrips kuwanai* MOULTON, *Annot. Zool. Japon.*, XI, p. 308, fig. 7.  
 1932. *Mesothrips claripennis* TAKAHASHI (*nec* MOULTON), *Iconogr. Ins. Japon.*, p. 1890  
     (Takahashi's synonymy).  
 1934. *Gynaikothrips kuwanai* TAKAHASHI, *Bot. & Zool. Tokyo*, II, p. 1833.  
 1936. *Smerinthothrips kuwanai* TAKAHASHI *Philipp. Journ. Sci.*, 60, p. 443.  
 1937. *Smerinthothrips kuwanai* TAKAHASHI, *Tenthredo*, I, 3, p. 350.

This form is extremely similar to the former (*L. pallipes*), and on comparison of the type specimens one can only distinguish them by the measurements. In *pallipes*, the head is a bit more elongate and the tube is longer. However, I possess a series of specimens from *Piper muricatum*, among which there are some that can as well be referred to *pallipes* as to *kuwanai*. The males, particularly, I can not distinguish at all. Moulton mentions, besides the measurements, the coloration of the wings as being different, but in both forms one finds specimens having apically more or less pale wings. The head is in *kuwanai* 240 - 260  $\mu$  long, in *pallipes* 208 - 235  $\mu$ . I have the impression that *kuwanai* is a biological race of *pallipes*. *L. kuwanai* is recorded from Formosa, Java and from Bonerate Island; as host plants are known *Piper futokadsura*, *P. recurvum*, *P. muricatum* and also *Smilax* spp.

***Liothrips pallicrus* (KARNY)**

1923. *Gynaikothrips pallicrus* KARNY, *Treubia*, III, p. 315.  
 1926.     "         "     KARNY, *Mem. Dept. Agr. Ind., E.S.* IX, 6, p. 235.  
 1926.     "         "     PRIESNER, *Treubia*, VIII, *Suppl.*, pp. 173, 183; pl. XII,  
                          fig. 83.  
 1927.     "         "     PRIESNER in STELLWAAG, *Weinbauins.*, p. 192, figs. 87,  
                          88.

**Female:** Mature specimens black-brown, major bristles dark, all tibiae and tarsi pale yellow. Antennal joints: 3 - 6 pale yellow, 7 and 8 very slightly shaded with brown-grey, 7 paler at base, or only darker at extreme apex. Wings having basal plate and scale brown, being then hyaline and becoming slightly infumated towards apex, with a distinct longitudinal streak that disappears well before apex.

Head elongate, with distinctly convex large eyes; cheeks somewhat narrower, slightly narrowed towards base, head distinctly constricted at base; mouth-cone rounded; maxillary stylets inserted somewhat behind middle of head, moderately widely separated behind; postocular bristles far (40 - 50  $\mu$ ) from eyes, moderately long (to 76  $\mu$ ), open at apex. Antennae normal, joints slender, sense-cones long and slender, on joint 4 about

50  $\mu$ , on joint 5: 56  $\mu$  long; joint 3 with 1, 4 with 1 + 2<sup>+1</sup> sense-cones; joint 8 conical, not narrowed at the base. Anteroangular prothoracic bristles not very long, epimerals long, 100 - 120  $\mu$ , open or slightly knobbed, interiors shorter. Basal wing bristles knobbed or blunt, shaded or dark, 80, 88 and 96  $\mu$  long; double fringe 8 - 12 in both sexes. Bristles on abdominal segment IX fine, 200 - 212  $\mu$  long. Tube, length 208 - 212  $\mu$ , basal width 84 - 96  $\mu$ , apical width 45 - 47  $\mu$ , shape evenly conical.

**Male:** Quite normal, having bristles on segment IX pointed, 180, 60 and 220  $\mu$  long. Tube, length 196  $\mu$ , basal width 84  $\mu$ , apical width 40  $\mu$ .

**Habitat:** The type specimens were taken on the islands of Kalao Toea and Kajoeadi, south of Celebes, from leaf-galls on *Vitis lanceolaria* VAHL. I saw a couple of fully mature specimens from Sumatra: Sibolangit ( $\pm$  450 m.), 3.IX.1920, from leaf-galls on the same plant (leg. DOCTERS VAN LEEUWEN).

#### Liothrips longicornis (KARNY)

- |       |                                  |                                                                  |
|-------|----------------------------------|------------------------------------------------------------------|
| 1915. | <i>Gynaikothrips longicornis</i> | KARNY, Zeit. wiss. Ins.-Biol., pp. 324, 327.                     |
| 1926. | "                                | KARNY, Mem. Dept. Agr. Ind., E.S. IX, 6, p. 235.                 |
| 1926. | "                                | PRIESNER, Treubia, VIII, Suppl., pp. 172, 185; pl. XII, fig. 84. |

This species has comparatively short head (length 200  $\mu$ , width across eyes 188  $\mu$ ), very long postocular (104 - 116  $\mu$ ) and prothoracic bristles; the two pairs of anteroangulars are in comparison with other species very long (interiors 80  $\mu$ ), and the epimerals measure 130 - 140  $\mu$ , they are all strongly curved. The antennae have joints 6 - 8 dark, 6 pale at base only, 4 and 5 are distinctly shaded at the club, even the 3rd may have a pale grey shade at the extreme apex. Antennae long, especially the apical joints; measurements of them, from joint 3 : 68 (29), 76 (34), 76 (31), 72 (27), 62 (22), 44 (13)  $\mu$ ; joint 7 oval, 8 fusiform, its greatest width in basal third; sense-cones long and slender, setiform, measuring on joint 4 about 56; joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup> sense-cones. All tibiae and tarsi and the fore femore at the apex pale yellow. Mouth-cone narrowly rounded at the apex. Maxillary stylets inserted about middle of sides, near postoculars, moderately widely separated behind. Cheeks only slightly arched, somewhat narrowed at the base. Eyes moderately large, lateral diameter about 88. Wings little darkened, but probably distinctly so in fully mature specimens, the stripe weak; basal bristles long, b. 1: 68 - 72, b. 2, 3: 84 - 88  $\mu$ , blunt. Only 5 - 7 cilia duplicated. Bristles on segment IX fine, but ending rather abruptly;

though neither rounded nor knobbed, b. 1 about 120, b. 2: 140  $\mu$  long. Tube evenly conical, 156  $\mu$  long, at base 76, at apex 40  $\mu$  broad.

**Habitat:** The types come from Java: Ungaran mountains (in ± 600 m.), 15.X.1913, in marginal leaf rolls on *Ficus punctata* (leg. DOCTERS VAN LEEUWEN).

### Liothrips interlocatus (KARNY)

- |       |                                   |                                                                                             |
|-------|-----------------------------------|---------------------------------------------------------------------------------------------|
| 1926. | <i>Gynaikothrips interlocatus</i> | KARNY, <i>Mem. Dept. Agr. India, E.S. IX</i> , pp. 236, 237,<br>fig. 28; pl. XXIII, fig. 6. |
| 1928. | "                                 | RAMAKRISHNA AYYAR, <i>Contr. knowl. Thys. Ind.</i> , p. 302.                                |
| 1931. | "                                 | RAMAKRISHNA AYYAR & MARGABANDHU, <i>Journ. Bombay<br/>Nat. Hist. Soc.</i> , XXXIV, p. 1040. |

**Female:** Tibiae, tarsi and antennal joints 3 - 7 pale yellow, joint 7 at the extreme apex and joint 8 darkened. Wings wholly hyaline. Bristles of the anterior body dark.

Head elongate, little rounded laterally, though very slightly narrowed towards base. Eyes laterally not protruding and moderately long, their lateral diameter about 105  $\mu$ . First ocellus slightly protruding. Postocular bristles moderately long, straight, 60 - 68  $\mu$ , open at tip, from the eyes distinctly, about 50  $\mu$ , distant. Mouth-cone narrowly rounded. Maxillary stylets inserted right behind eyes, almost in anterior third of head, much approximated behind. Bristles on antennae and sense-cones very short. Measurements of antennal joints (from joint 2), in  $\mu$ : 60 (30), 80 (28), 80 (34), 74 (31), 74 (28), 58 (24), 28 - 30 (12); joint 3 very slender, little widened towards apex, joint 4 much thicker, joint 7 elongated-oval, joint 8 short, conical. Antero-marginal prothoracic bristles about 45  $\mu$ , epimerals 95  $\mu$  long, interior postero-marginals 80  $\mu$ ; all stout, scarcely curved. Basal wing bristles shaded, open at tip and whitish, b. 2: 65  $\mu$ , b. 3: 75  $\mu$  long; 14 cilia duplicated. Central plate of tergite I pointed anteriorly, about triangular as a whole, hind angles somewhat produced; longest bristle on segment VII pencil-tipped, 120  $\mu$ , b. 1 blunt, 128  $\mu$  long; bristles on IX pointed, b. 1, 2: 195 - 200  $\mu$  long; tube evenly conical, length 208  $\mu$ , basal width 80  $\mu$ , apical width 40  $\mu$ .

**Male:** Coloration the same. Fore femora very slightly stouter. Double fringe 13. Bristle 1 of segment IX about 175, b. 2 spine-like, 60 - 65  $\mu$ , b. 3: 190  $\mu$ . Tube, length 184  $\mu$ , basal width 72 - 76  $\mu$ , apical width 36  $\mu$ .

**Habitat:** India: Coimbatore, "inside Psyllid galls in *Terminalia* leaves", X.1923, leg. RAMAKRISHNA AYYAR (no. 33).

*Liothrips styracinus* spec. nov.

**Female:** Originally blackish-brown (the specimens are faded out). All tibiae and tarsi pale yellow, fore femora yellow at extreme apex. Antennal joints: 1 and 2 dark, 3 - 6 pale yellow, 6 in apical half or third (in fresh specimens perhaps strongly so) dark, 7 pale in apical half, 8 wholly dark (in the faded specimens pale grey). Wings hyaline. The bristles of the anterior part of the body are supposed to have been slightly infumated, the abdominal bristles pale, only the anals darker.

Head little elongate, with straight cheeks, very slightly narrowed towards base. Eyes normal; posterior ocelli situated at the anterior third of the eyes, the front ocellus on a level with the fore margin of the eyes. Antennae slender, normal, with thin sense-cones of which those on joint 4 are up to 50  $\mu$  long, joint 8 not narrowed at base where it is as broad as joint 7 at apex and closely attached to it, conical. Mouth-cone slightly pointed, labrum pointed. Maxillary stylets originating from posterior third of side of head. Postocular bristles rudimentary, not longer than the other very small bristles on the vertex. Legs slender, fore femora only very slightly stouter, tarsi unarmed. Prothoracic bristles blunt and open, antero-angulars well developed, 40 - 45  $\mu$  long, the interior antero-marginals 32 - 35  $\mu$  long; lateral bristles 72  $\mu$ , epimerals 96 - 100  $\mu$ , interior postero-marginals 85  $\mu$  long. Pterothorax about as long as broad. Basal wing bristles open, 56 - 60  $\mu$ , 65  $\mu$  and 88  $\mu$  long, pale. 7 - 8 fringe cilia duplicated. Central plate of tergite I triangular, with somewhat laterally produced hind angles. Of the two dorso-lateral abdominal bristles is b. 1 blunt, b. 2 pointed; bristles on segment IX fine, b. 1 not wholly acute, 128  $\mu$ , b. 2 sharp, 148 - 152  $\mu$  long. Tube evenly conical, somewhat shorter than the head.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 260, width across eyes 208; lateral diameter of eye 116, length of cheeks behind eyes 160; dorsal distance of eyes 64, distance of eyes from hind margin of vertex 140 - 145. Antennae, total length 484 - 502; lengths (breadths) of joints: 36 (base 40, apex 32), 56 (28), 84 (24), 84 (28), 78 (27), 68 - 70 (24), 50 (20), 28 - 32 (12). Prothorax, length 140, width 295 (inclusive of coxae 345). Pterothorax 345 long and broad. Hind tibiae, length 280. Segment IX of abdomen, length 100, width 185. Tube, length 212 - 220, width at base 74 - 76, at apex 36; anal setae, length 190.

**Male:** Very similar, head somewhat more strongly narrowed towards base, postocular bristles also very small, at most 16  $\mu$  long. Duplicated wing cilia 7. Measurements of (allotype), in  $\mu$ : Antennal joints from joint 3: 84 (22), 84 (26), 80 (22), 68 (22), 52 (18), 32 (12). Epimeral prothoracic

bristles 84 - 89, antero-angulars 40. Bristles on segment IX of abdomen, b. 1: 100 - 112, b. 2: 64 - 68, b. 3: 184 (all pointed). Tube, length 208, width across base, 68, apex 36.

**Habitat:** 1 ♂, 1 ♀, Taiwan (Formosa) : Suisha, 11.VI.1933, on leaf of *Lithocarpus* spec. (which is obviously *Styrax* spec. (*Styracaceae*), leg. R. TAKAHASHI).

***Liothrips reynvaanae* spec. nov.**

**Female:** Black-brown, all tibiae and tarsi, and antennal joints 3-6 pale yellow, joints 7 and 8 brown, 7 at base on underside distinctly yellowish. Bristles on anterior part of body dark, epimerals, basal wing and abdominal bristles (except the anal setae which are dark), pale. Wings infumated, but beyond base and about apex somewhat paler, with a dark longitudinal stripe that is sharp and fine from 2nd fourth of wing, then broader, and is accompanied by a pale longitudinal line within hind margin; hind wings with fine, sharp longitudinal vein.

Cheeks and eyes slightly and separately convex, the former slightly constricted at base. Posterior ocelli in anterior third of eyes, anterior ocellus very little in front of a line across fore margin of eyes. Postocular bristles very long and curved (144 - 160  $\mu$ ), their distance from eyes 40 - 45  $\mu$ , their tips pointed or nearly so. Mouth-cone very broadly rounded, labrum blunt. Maxillary stylets inserted in posterior third to fourth, very broadly separated behind. Antennae normal, having the normal number of sense-cones which are moderately long, on joint 4 about 52 - 60  $\mu$ ; antennal joint 8 conical. Prothorax normal, but its bristles very long, especially the laterals and postero-marginal pairs, open at tips, the antero-marginals well developed, particularly the interior pair. Pterothorax hardly longer than broad. Fore femora scarcely stouter than middle and hind femora. Wings evenly wide, scarcely narrowed at apex, basal bristles long, open or slightly knobbed, number of duplicated cilia 11 - 12. Central plate of tergite I triangular. Bristles on abdomen long, on segment IX hair-like, b. 1 and 2 about 240  $\mu$  long, b. 3 little shorter. Tube evenly conical, length 280  $\mu$ , basal width 92  $\mu$ , apical width 46  $\mu$ .

Measurements of female (holotype), in  $\mu$ ; Head, length 320, width across eyes 236, across cheeks 224, across base 195; lateral diameter of eye 125, length of cheeks behind the eyes 160 - 176. Antennae, length of joints from joint 3: 88 - 92 (30), 96 (38), 100 (30), 80 - 84 (28), 64 - 68 (27), 36 (16). Prothorax, length 155, width 310 (with coxae 363), interior antero-marginals 69 - 72, angulars 45, laterals 128, epimerals 172 - 180.

Pterothorax, length 467, width 450. Wings, length 1263, width across middle 100. Anal setae, length 240.

**Male:** Like the female, all bristles on segment IX pointed, b. 2 slender, but spine-like. Wings having 10 - 12 cilia duplicated.

Measurements of male (allotype), in  $\mu$ : Head, length 252, width across eyes 200, across cheeks 195; lateral diameter of eye 108, length of cheeks behind eye 148. Antennae, lengths (breadths) of joints: 32 (base 44, apex 40), 60 (32), 76 - 80 (31), 82 - 84 (36), 84 (28), 76 (18), 60 (23), 36 (14). Pterothorax, width 363. Wing, length 1055. Tube, length 220 - 225, width at base 80, at apex 40. Bristles on segment IX of abdomen, b. 1 about 210, b. 2: 52, b. 3: 212 - 225.

**Habitat:** ♂♂, 1 ♀, East Java: Kletak, ± 1800 m., 18.XII.1920, in leaf gall (no. 4584) on *Piper* spec. (leg. Mrs. DOCTERS VAN LEEUWEN-REYNVAAN).

Among the species having all tibiae pale yellow this new species is characterized by the long tube and the very long, curved postocular and prothoracic bristles, especially also by the well developed antero-marginal prothoracic bristles. *L. suavis* sp.n. has also very long epimerals, but its antennae are more slender, the mouth-cone is not broadly rounded, the prothoracic bristles much shorter, the interlocated fringe-cilia much less numerous. From *L. kuwanai* (MOULT.) and *L. citritibia* (MOULT.) it is easily distinguished by the much longer prothoracic bristles.

#### Liothrips mirabilis (SCHMUTZ)

- |       |                                |                                                                |
|-------|--------------------------------|----------------------------------------------------------------|
| 1913. | <i>Gynaikothrips mirabilis</i> | SCHMUTZ, <i>Sitzungsb. Akad. Wiss. Wien</i> , p. 1041.         |
| 1915. | "                              | KARNY, <i>Zeitschr. wiss. Ins. Biol.</i> , p. 324.             |
| 1925. | "                              | RAMAKRISHNA AYYAR, <i>Journ. Bombay E. Soc.</i> , sep. p. 9.   |
| 1926. | "                              | KARNY, <i>Mem. Dept. Agr. Ind., Ent. Ser.</i> , IX, 6, p. 235. |

From a faded specimen of SCHMUTZ's type series in KARNY's collection the following details could be taken:

**Male:** Dark, all tibiae and tarsi pale yellow, antennal joints: 3 - 8 pale yellow, 1 dark, 2 pale at least in apical third. Fore femora yellow at apex, Wings slightly infumated, without distinct longitudinal streak, hind wing with fine longitudinal shade. Bristles on anterior part of body originally most likely dark, those on abdomen pale, except bristle 2 of segment IX and anal setae.

Postocular bristles long, pointed. Vertex between ocelli not reticulate. Mouth-cone rounded, labrum scarcely pointed. Maxillary stylets originating from the middle of the head's length, beneath postoculars, very moderately separated behind. Antennae comparatively short. Sense-cones

normal, 3 with one, 4 with  $3+1$ , 5 and 6 with  $2+1$ ; joint 8 scarcely constricted at base, but narrower than 7 at apex, joint 4 exteriorly more distinctly convex; intermediate joints not constricted at apex. Antero-angular prothoracic bristles conspicuous, interior antero-marginals small, epimerals long, all bristles pointed. Fore femora slightly stouter than the others. Tarsi unarmed. Basal wing bristles long, pointed, in one row. 11 wing cilia duplicated. Bristles 1 and 3 of segment IX long, longer than tube, b. 2 short, stout. Tube short, evenly conical.

Measurements, in  $\mu$ : Head, length 232, width ?; lateral diameter of eye 100, distance of eye from basal margin of vertex 133, length of cheeks behind eyes 140 - 150; distance of postoculars from eye 32, length of postoculars 84 - 88. Antennae, total length 433; lengths (breadths) of segments: 36 (42), 52 (30), 64 - 68 (28), 68 (32), 60 (30), 60 - 64 (28), 54 (20), 36 (12); sense-cones on segments 4 and 5: 28 long. Prothorax, length 128, width ?. Antero-angular bristles 48 - 52, interior antero-marginals 20 - 22, epimerals 140 - 160, interior postero-marginals 120 - 132. Pterothorax, length 372, width ?. Wings, length about 865; basal bristles, b. 1: 65, b. 2 and 3: 76 - 80. Fore femora, width 96, length 208; hind tibiae, length 245. Bristles on segment IX of abdomen 200, 60 and 220. Tube, length 172, width (of somewhat crushed tube) across base 96, across apex 38. Anal setae 152 - 160.

The specimen bears the label: Ceylon, Peradeniya (Uzel 118, "Hendratgoda". The label number 118 is mentioned by SCHMUTZ (l.c.), but I cannot say whether the specimen is one taken from *Piper* or from *Pavetta hispida*.

#### *Liothrips suavis* spec. nov.

**Female:** Chestnut-brown, all tibiae and tarsi pale yellow; antennal joints: 1 and 2 dark, 3 - 7 pale yellow, the latter slightly shaded in apical half, 8 wholly pale grey-brown. Wings strongly infumated, with darkening along middle and a hyaline longitudinal stripe behind it; hind wings in anterior half (or more) nearly hyaline, in posterior half (at hind margin) shaded, besides, with fine brown longitudinal line. Bristles in anterior part of body dark, on abdomen paler, anal setae at least basally dark.

Head with large, laterally slightly protruding, eyes, cheeks slightly convex, strongly narrowed from middle to base. Postocular bristles very long, curved, slightly knobbed or open at tip, inserted far ( $50 \mu$ ) distant from eyes. Antennae long and slender, joint 1 narrowed towards apex,

8 somewhat narrowed at base, 7 yet 80  $\mu$  long; sense-cones long and slender, setiform, on joint 4: 72 - 80  $\mu$  long, number as in *mirabilis*. Mouth-cone narrowly rounded at apex, labrum pointed. Maxillary stylets inserted orad, widely separated behind. Prothoracic bristles very long, strongly curved, open at tip, but antero-angulars very short. Pterothorax somewhat longer than broad. Wings normal, but with long basal bristles (b. 3: 133  $\mu$ ) which are open and fringed at tip. Duplicated cilia 7. Bristles on segment IX long, fine, b. 1 about 180 - 200  $\mu$ , b. 2, 3: 250  $\mu$ . Tube long, about as long as head, not quite evenly conical, having a slight concavity beyond base. Legs very slender.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 292 - 296, width across eyes 228, across cheeks just behind eyes 208, at base 168; lateral diameter of eye 132, length of cheeks behind eyes 172 - 180; distance of eye from base of vertex 165. Postocular bristles, length 128 (and more). Antennae, total length (at least) 623; lengths (breadths) of joints from joint 3: 92 (29), 100 (33), 102 (28), 92 - 94 (26), 82 (23), 48 (15). Prothorax, length about 138, width 294, incl. coxae about 345; lateral bristles at least 120, epimerals and interior posteromarginals 168 - 176. Pterothorax, length 415, width 398. Wings, length 1176-1195, width at middle about 80. Tube, length 288 - 292, width across base 88, across apex 43.

**Male:** Very similar, femora slender. B. 2 of segment IX short, bristle-shaped, 68  $\mu$ , b. 1 long, 212  $\mu$ , b. 3 very long, nearly 280  $\mu$ . Head strongly narrowed towards base, cheeks very slightly rounded. Double fringe 7 - 10.

Measurements of ♂ (allotype), in  $\mu$ : Head, length 252, width 220; lateral diameter of eye 120 - 125. Antennae, total length, 554; lengths (breadths) of joints: 32 (base 40, apex 32), 64 (28), 84 (28), 92 (30), 94 (26), 84 - 86 (24), 72 (20), 40 (12). Antero-angular prothoracic bristles, length 25, interior antero-marginals 24-32, epimerals 164 - 168, interior postero-marginals 148. Tube, length 248 (in paratype 280), width across base 72 - 76, at apex 40.

**Habitat:** 1 ♀, 2 ♂♂, Java: Tjibodas, ± 1600 m., 25.VI.1920, on *Elatostema strigosum* (no. 4262), leg. DOCTERS VAN LEEUWEN. The label does not indicate whether the insect was found in a gall, though this is likely so.

This species is easily recognized by the yellow tibiae, the comparatively long tube, the long antennae having setiform sense-cones. It should not be confused with the following species, also having yellow tibiae and living on *Elatostema*. The latter species is distinguished by its much shorter tube, the somewhat more pointed mouth-cone, the shorter anten-

nae (joint 7: 56 (20 - 22)  $\mu$ ), and the fore femora which are pale in apical half or third. Both forms are transitional to the *Phaenothrips*-group.

**Liothrips assimulans** spec. nov.

**Male:** Brown, all tibiae and tarsi pale yellow, in some cases the hind tibiae may be slightly shaded basally; antennae pale yellow from joint 3, but joint 7 shaded with grey about apical half (or less), joint 8 pale grey-brown. Fore femora in apical half (or somewhat more or less) pale yellow. Bristles dark, only those of segment IX of abdomen paler. Fore wings strongly infumated, with dark longitudinal band that is lined with pale grey at hind margin.

Head less strongly narrowed towards base than in the former species, though cheeks with slight convexity; eyes as in the former; maxillary stylets inserted before posterior third of sides, at the postoculars; postocular bristles long (76 - 88  $\mu$ ), open at tip, about 35  $\mu$  distant from eyes. Mouth-cone slightly pointed. Antennae slender, sense-cones setiform, on joints 4 and 5: 52 - 56  $\mu$  long; their number as in the former species. Anteromarginal prothoracic bristles short, interiors about 32  $\mu$ , angulars only 25  $\mu$ , epimeral bristles 112 - 120  $\mu$  long; tips open. Basal wing bristles with open or somewhat widened tips; 6 - 7 cilia duplicated. B. 1 of segment IX 165 - 188  $\mu$ , b. 2 short, 60  $\mu$ , b. 3 about 280  $\mu$ , all pointed. Tube not quite evenly conical, with distinct slight concavity beyond base, length 204 - 208  $\mu$ , width at base 72  $\mu$ , at apex 35  $\mu$ . Length of anal setae about 205  $\mu$ .

Further measurements of ♂ (holotype), in  $\mu$ : Head, length 228, width across eyes 192; diameter of eye 112, length of cheeks behind eyes 136 - 140. Antennae, lengths (breadths) of joints: 24 - 28 (base 40, apex 34), 56 (28), 72 - 76 (24), 76 (28), 80 (25), 76 (23), 56 (20), 40 (13); total length 480 - 488. Prothorax, length 105, width 234 (inclusive of coxae 277 ?). Pterothorax, length 310, width 306. Wing length 813, width across middle 75; basal wing bristles, length 72, 80 - 85 and 84 - 88.

**Female:** unknown.

**Habitat:** 5 ♂♂, Sumatra (East Coast): Sibolangit, ± 400 m., 15.vii. 1921, virgin forest, in leaf gall (no. 5545) on *Elatostema* spec. (leg. DOCTERS VAN LEEUWEN).

A third, certainly specifically different species (though only 2 ♂♂) was found in the material of *Elatostema strigosum* (no. 4262). This species is characterized by its slender, posteriorly not narrowed, head, the much shorter sense-cones and the nearly evenly conical tube (that is

about as long as in *suavis*). This species is probably inquiline in the same galls:

**Liothrips collistratus** spec. nov.

**Female:** Brown, tibiae and tarsi, antennal joints 3-8 pale yellow; joint 8 sometimes very slightly shaded with grey. Bristles of anterior part of body dark, bristles at base of abdomen at least basally darkened, towards the end of the abdomen they are getting paler and are pale on segment IX, the anal setae are darkened at base. Wings rather evenly infumated, longitudinal stripe not sharply marked, indistinct, the pale stripe behind it is only indicated.

Head elongate, cheeks parallel-sided, only quite indistinctly convex; behind, the head is only extremely slightly constricted. Eyes very slightly protruding; anterior ocellus situated on a level with fore margin of eyes, posterior ocelli in anterior third of eyes. Postocular bristles long, inserted far back, 48-52  $\mu$  distant from eye, length perhaps 80  $\mu$ ; they are knobbed or open. Antennal joint 1 scarcely narrowed towards apex, all joints slender, normal, 7 laterally little convex, nearly parallel-sided; joint 3 with 1, 4 with 2<sup>+1</sup>, 5 and 6 with 1+1<sup>+1</sup>; sense-cones **not very long**, on joints 4 or 5 only 34-36  $\mu$  long; antennal 8 not constricted at base. Mouth-cone little rounded, labrum somewhat pointed but not long. Maxillary stylets inserted in posterior fourth of sides of head, rather widely separated behind. Legs long and slender, fore femora very slender. Antero-marginal prothoracic bristles very short, the angulars measuring not more than 17  $\mu$ ; the laterals 87  $\mu$ , the epimerals 120  $\mu$ ; the two latter bristles knobbed. Pterothorax about as long as broad (ca. 400  $\mu$ ); wings slightly narrowed towards apex, basal bristles knobbed, b. 2 about 80  $\mu$  long; 9 cilia duplicated (only one wing visible). Lateral bristles on segment VIII distinctly knobbed, 116  $\mu$  long, bristles on segment IX long, b. 1: 220-260  $\mu$ , b. 2: 280  $\mu$ , b. 3: 260  $\mu$ , pointed. Tube, long, nearly evenly conical, little longer than head, 277-295  $\mu$ , basal width 84-87  $\mu$ , apical width 42-43  $\mu$ ; anal setae, length 180  $\mu$ .

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 260, width across eyes 190, across cheeks 184; lateral diameter of eye 105, lengths of cheeks behind them about 150. Antennae (total length 540-556), lengths (widths) of joints: 40 (40-42), 64 (32), 80-84 (25), 84-88 (29), 80 (26), 76-80 (26-28), 68-72 (23), 48 (16). Prothorax, length ?, width (without coxae) 303. Wings, length 1142, width at middle 100-104.

**Male:** unknown.

**Habitat:** 2 ♀♀, Java: Tjibodas, ± 1600 m., 25.vi.1920, on *Elatostema strigosum* (no. 4262), together with *Liothrips suavis* sp.n.

**Liothrips raphidophorae** spec. nov.

**Female:** Brown, all tibiae and tarsi pale yellow, antennal joints : 3-7 pale yellow, 7 mostly slightly shaded at apex, 8 infumated about in apical half, base in all specimens pale yellow. Fore femora pale yellow at apex. Wings infumated, but with broad nearly hyaline space beyond base, and a pale longitudinal line close to hind margin of fore wing, a dark longitudinal stripe is not developed; apical portion of wing sometimes indistinctly punctured; hind wing with dark longitudinal vein. Bristles dark, those on abdomen somewhat paler though not quite yellow, anal setae again darker.

Head moderately long, cheeks more or less distinctly narrowed towards base in a straight line, or little narrowed; mouth-cone broadly rounded; maxillary stylets originating from posterior third of sides of head, separated; cheeks anteriorly with a few very fine bristles. Postocular bristles moderately long, much varying in length, mostly 40 - 52  $\mu$ , somewhat open, inserted not far from eyes, but distance somewhat irregular. Ocelli in normal position, as in *L. collistratus*. Antennae slender, moderately long, joint 1 somewhat narrowed towards apex, joint 4 convex at sides; sense-cones long and slender, curved, nearly setiform, length on joint 3: 52  $\mu$ , on joint 4 or 5: 56 - 60  $\mu$ ; joint 3 with 1, 4 with 1 + 1<sup>1</sup>, 5 and 6 also with 1 + 1<sup>1</sup>; joint 8 not constricted at base. Anteroangular prothoracic bristles long, 48 - 56  $\mu$ , blunt, other bristles also comparatively long, epimerals about 112 - 120  $\mu$ , slightly knobbed. Pterothorax a little broader than long. Wings normal, somewhat narrowed towards apex, basal bristles long, blunt, 8 - 11 fore wing cilia duplicated. Bristles on abdomen long, the dorso-lateral bristles blunt, on segment IX all bristles are long, pointed, b. 1 and 2: 230 - 240, b. 3 about 220  $\mu$  long. Tube short, evenly conical, length 210 - 225  $\mu$ , width across base 84 - 88  $\mu$ , at apex 45 - 47  $\mu$ . Anal setae, length 180  $\mu$ .

Further measurements (of holotype), in  $\mu$ : Head, length 277, width across eyes 232; lateral diameter of eye 120, length of cheeks behind eyes 172 - 184. Antennae, total length 550 - 564; lengths (breadths) of joints: 36 (base 46, apex 36), 60 (32), 92 (29), 96 (37), 92 (30), 76 - 80 (30), 56 - 60 (25), 44 - 48 (?) (16). Pterothorax, length 345, width 370. Wing, length 986 - 1020, width across middle 80; basal wing bristles, b. 1: 68 - 72, b. 2, 3: 80 - 96.

**Male:** Very similar to female, bristles on abdomen partly shorter, b. 1 on segment IX 230  $\mu$ , b. 2 short, spine-like, b. 3: 240, hair-like. Other measurements of male (allotype), in  $\mu$ : Head, width 204, lateral diameter

of eye 105. Antennae, total length about 505; lengths (breadths) of joints: 36 (44), 56 (30), 76 - 80 (26), 84 (36), 84 (25), 76 (28), 60 (22), 40 - 44 (14). Tube, length 200, basal width 76, apical width 40 - 45.

**Habitat:** Several ♂♂ and ♀♀, Sumatra: Sibolangit, ± 500 m., 15.vii. 1921, in leaf-rolls of *Rhaphidophora foraminifera* ENGL. (no. 5544) (leg. DOCTERS VAN LEEUWEN). In the same material there was one ♂ of *Liothrips (Zopyrothrips) ingratus* sp. n. \*)

***Liothrips hyalinipennis* spec. nov.**

A very slender species, having not the habitus of a typical *Liothrips*.

**Female:** Black, fore and middle tibiae pale yellow at the extreme apex, hind tibiae most likely similar in colour (hind legs missing). Antennal joints: 1 and 2 black, 3 - 6 pale yellow, 6 slightly grey in apical half, 7 and 8 dark grey, 7 abruptly pale at extreme base. Bristles of the anterior body darkened at base, abdominal bristles wholly pale, anal setae darker. Wings hyaline.

Head practically parallel-sided, cheeks with quite inconspicuous concavity in anterior third; behind extremely slightly narrowed towards base. Eyes large, oval. Posterior ocelli far forward, almost in anterior fourth of eyes, the 1st ocellus seems not to surpass fore margin of eyes. Mouth-cone narrowly rounded, labrum slightly pointed. Maxillary stylets inserted about the middle of the sides of the head, approximated. Postocular bristles long, inserted far backward, at least 45  $\mu$  distant from eyes, length 80 - 85  $\mu$ . Antennae very slender, the segments not at all pedicellate, but joints 4 and 5 are somewhat constricted at apex, like in some *Phaenothrips*; sense-cones fine, measuring 48 - 52  $\mu$  on joints 4 and 5; number of sense-cones as usual; joint 8 of antennae slender, not constricted at base. Prothorax normal, bristles very long, except those on fore margin, of which the inner bristles measure 28 - 30  $\mu$ , and are most likely pointed while the angulars are extremely minute; laterals and postero-marginals long, epimerals rather pale, 105  $\mu$ , coxals ab. 50  $\mu$ , all knobbed or open. Pterothorax about as long as broad. Wings as usual, basal bristles long, 72  $\mu$  (or more), 84  $\mu$ , 100 - 105  $\mu$ , pale, knobbed; Double fringe numbering 7 - 9. Central plate of tergite I triangular. Bristles on segment IX of abdomen long, b. 1, 2: 176  $\mu$ , b. 3 somewhat shorter, all fine, practically pointed. Tube evenly conical, length 236  $\mu$ , basal width 82  $\mu$ , apical width 42  $\mu$ . Anal hairs 200  $\mu$  long. — Male unknown, and therefore the position of this species is uncertain yet.

\*) cf. *Zooc. Ned. East Indies*, 1926, p. 78, no. 81 - DOCTERS VAN LEEUWEN.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 304 - 308, width across eyes 212, across middle of cheeks 205; lateral diameter of eye 126, length of cheeks behind eyes 176 (without basal collar), distance of eye from hind margin of vertex 160 - 164. Antennae, total length about 520. Lengths (breadths) of joints: ? (base 40, apex 32), ? (28), 88 (23-24), 96 (30), 84 (26), 72 - 76 (25), 60 - 62 (20), 36 - 38 (12). Prothorax, length 133, width 295, inclusive of coxae 345. Pterothorax, length 355, width 355. Wings, length 880 - 900, width across middle 72.

**Habitat:** 1 ♀, Bogor, 23.IX.1923, on the wing (leg. H. H. KARNY). This species is most likely not a gall thrips.

#### *Liothrips loranthi* spec. nov.

Somewhat deviating from the bulk of the species by the **smaller size** and **shorter antennae**, combined with a sharply pointed mouth-cone, convergent cheeks, black body bristles and short tube. The antennae are strongly infumated, joint 6 for the major part, 7 and 8 wholly dark. Wings hyaline, basal plate scarcely darkened. Resembles somewhat certain *Rhynchothrips* species.

**Female:** Black, paler specimens brown-black, body bristles for the major part black; joints: 1 and 2 of antennae dark, 3 yellow, sometimes with greyish apical margin, 4 interiorly and apically slightly shaded, 5 about in apical half pale grey, 6 pale in basal third (or somewhat more), 7 and 8 blackish. Wings hyaline, basal plate not or hardly shaded. Legs dark, tarsi yellowish, fore tibiae brown-yellow towards apex.

Head with cheeks narrowed towards base in a straight line; mouth-cone sharply pointed. Maxillary stylets emerging from a level across middle of head, moderately broadly separated posteriorly. Postocular bristles dark, length 70 - 87  $\mu$ . Posterior ocelli in front of middle of eyes, not in anterior third, ocellar triangle pointed. Antennae not long, length 433 - 450  $\mu$ , joint 1 somewhat narrowed towards apex, joint 3 straight to apex at the whole exterior margin, somewhat convex interiorly, and thus asymmetrical; joints: 7 broadest in basal third or fourth, 8 conical; sense-cones moderately long, joints: 3 with 1, 4 with 3<sup>+1</sup>, 5 and 6 with 1 + 1<sup>+1</sup>; length of longest sense-cone on joint 4: 34 - 36  $\mu$ . Prothorax with well developed antero-marginal bristles, which are 43 to (angulars) 52  $\mu$  long; interior postero-marginals about 80  $\mu$ , epimerals 96 - 120  $\mu$  blunt or open. Fore femora simple, fore tarsi in both sexes, unarmed. Pterothorax about as long as broad. Wings about evenly wide, with long, dark basal setae that are knobbed and 60 - 72, 76, 76  $\mu$  long. Double fringe cilia numbering 6 - 8.

Abdomen with two pairs of the long lateral bristles knobbed, on segment VIII also the 3rd (ventral) pair knobbed; bristles on segment IX hair-like pointed, longer than tube; b. 1 - 3; 200 - 220  $\mu$  long, tergite I with triangular central plate. Tube evenly conical, short, length 188 - 193  $\mu$ , width across base 84 - 88  $\mu$ , across apex 42 - 45  $\mu$ . Anal setae, length about 168  $\mu$ .

Measurements of ♀ (holotype), in  $\mu$ : Head, length 242, width across eyes 209, across base 172; lateral diameter of eye 98. Antennae, lengths (breadths) of joints: 32 (base 40, apex 36), 60 (34), 64 (34), 64 (37 - 38), 64 (33), 64 (28), 50 (23), 40 (18). Prothorax, length 328, width 277 (inclusive of coxae 320). Pterothorax, length 328, width 336. Wings, length 865, width at middle 78. Hind tibiae, length 225. Longest bristle on segment VII of abdomen 130.

**Male:** Very similar, usually smaller, double fringe numbering 4 - 6. Measurements (in  $\mu$ ): Antennae, length about 380; lengths (breadths) of joints: 24 (base 36, apex 32), 52 (30), 56 (29), 56 (32), 60 (28), 60 (25), 48 (20), 36 (12). Head, length 216, width across eyes 182. Epimeral prothoracic bristles, length 85. Pterothorax, width 295. Wings length 745 - 760. Bristles on segment IX, b. 1: 190, b. 2: 48, b. 3: 200 - 210. Tube, length 164 - 168, width across base 68 - 76, across apex 40.

**Habitat:** Numerous ♀♀ and ♂♂. Sumatra: Sibolangit, ± 400 m., IX. 1920, in leaf galls of *Loranthus schultesii* BL. (no. 35 and 85), leg. DOCTERS VAN LEEUWEN.

#### **Liothrips elaeocarpi** spec. nov.

**Male:** Black, all major body bristles black; joints 1, 2, 7 and 8 of antennae wholly black; joints: 3 pale yellow, 4 and 5 as well but dark in apical third or half, 6 pale yellow in basal third, rest dark. Fore femora and middle and hind tibiae wholly dark, **also the tarsi strongly infumated**; fore tibiae dark brown, pale yellow at apex, fore tarsi pale yellow. Wings hyaline, basal plate slightly infumated, and along the middle of the wing there is a scarcely noticeable longitudinal shade visible; hind wings wholly hyaline, without the trace of a longitudinal vein. The species is characterized even by its coloration alone.

Head elongate, cheeks narrowed towards base, straight; mouth-cone decidedly pointed, reaching hind margin of prosternum, if segments normally distended. Maxillary stylets inserted right behind eyes, strongly approximated posteriorly. Postocular bristles long, practically pointed, black, close to eyes, only 16 - 18  $\mu$  distant, probably about 90  $\mu$  long. Front ocellus on a slight hump, only very little surpassing fore margin of eyes.

Antennae moderately long (490  $\mu$ ), joint 3 elongate, somewhat longer than 4 (84: 78  $\mu$ ), exterior margin straight, interior one little curved, joint 4 much more strongly convex, joint 8 narrower at base than joint 7 at apex, but scarcely constricted; sense-cones moderately long, on joints 3 and 4 only about 24 - 28  $\mu$ ; joint 3 with 1, joint 4 with 3<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup>. Prothorax with antero-marginal bristles very well developed, the angulars of which measuring 55 - 60  $\mu$ ; interior and exterior (epimeral) postero-marginal bristles about 120  $\mu$  long, not really blunt at tip but with white pencil-tip. Legs slender, fore legs somewhat stouter than middle and hind legs, but not enlarged, fore tarsi unarmed. Pterothorax a little longer than broad. Wings normal, with 12 - 14 double-fringe cilia, and well developed basal bristles arranged in one row, and black with white pencil-tip, lengths 76, 84 - 92 and 80 - 92  $\mu$ . Bristles on abdomen well developed, neither blunt nor pointed but with pencil-shaped pale tip, bristles 1 and 3 on segment IX hair-like, pointed, b. 2, as usual, spine-like. Tube nearly evenly conical, sides only beyond base somewhat swollen.

Measurements of ♂ (holotype), in  $\mu$ : Head, length 250, width across eyes, 188, across base 165; lateral diameter of eye 88 - 92, length of cheeks behind eyes 176 - 185. Antennae, lengths (breadths) of joints: 32 (base 40, apex 32), 56 (32), 84 (29), 80 (36), 74 (31), 72 (28), 58 (24), 32 - 34 (14). Prothorax, length 140 - 145, width (without coxae) 275. Pterothorax, length 400, width 360 - 370. Wings, length 1038, width at middle 90. Bristles on segment IX (1,3) 240, b. 2: 50. Tube, length 220 (?), width across base 87, at apex 40.

**Habitat:** 1 ♂, Java: Tjibodas, 1600 m., Gg. Gedeh, 2.I.1925, in flowers of *Elaeocarpus* spec. (leg. DOCTERS VAN LEEUWEN).

#### *Liothrips fraudulentus* spec. nov.

Obviously allied to *L. adusticornis* (KARNY) but differing by its shorter head, tube and bristles and the more broadly rounded mouth-cone.

**Female:** Dark or blackish brown, middle and hind tibiae dark, very narrowly pale yellow at extreme apex, fore tibiae yellow, more or less darkened at the margins, all tarsi pale yellow. Antennal joints: 3 - 6 pale yellow, 5 and 6 not or scarcely shaded at apex, 7 pale yellow at base up to the middle, rest and all of 8 brown. Body bristles dark. Wings hyaline, basal plate only slightly shaded.

Head longish, with towards base slightly narrowed cheeks, and quite inconspicuous concavity in anterior third, more or less distinctly constricted at base. Ocelli in normal position. Mouth-cone distinctly rounded, labrum

little pointed. Maxillary stylets inserted at middle of sides of head, beneath postocular setae, little separated. Postocular bristles moderately long, 80 - 90  $\mu$ , with short hyaline pencil-tip, from the eyes 36 - 40  $\mu$  distant. Antennae moderately long; joints: 1 narrowed towards apex, 3 straight at the exterior margin, 8 scarcely narrowed at base. Sense-cones long and slender, on joints 4 and 5 measuring 48 - 68  $\mu$ , number as usual. Antero-marginal prothoracic bristles well developed, moderately long (ab. 50  $\mu$ ), epimerals 116 - 128  $\mu$ , with pencil-tip. Pterothorax about as long as broad (485-500  $\mu$ ). Wings normal, basal bristles shorter than in *L. adusticornis*, 80, 93 - 96 and 100 - 105  $\mu$  long, b. 1 rounded at tip, b. 2 and 3 blunt or pencil-tipped; double fringe numbering 14 - 16 (rarely 11). Abdominal bristles long, b. 2 of segment VII ab. 165  $\mu$  long, pointed, b. 1 pencil-shaped, bristles on IX (b. 1, 2) 240 - 265  $\mu$  long, b. 3: 208 - 220  $\mu$ , pointed. Tube evenly conical, 268 - 288  $\mu$  long, across base 100 - 105  $\mu$ , at apex ab. 50  $\mu$  broad.

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 330, width 232; lateral diameter of eye 116 - 125; cheeks behind eyes 210. Prothorax, length 173, width without coxae 372. Antennae, total length ab. 590; lengths (breadths) of joints: 32 (base 50, apex 40), 68 (36), 92 (39), 100 - 104 (46), 100 (40), 80 - 88 (35), 68 - 70 (27), 40 - 42 (16). Wings, length 1384, width across middle 112. Hind tibiae, length 360.

**Male:** Like the female. Double fringe 13 - 14. Measurements of allotype, in  $\mu$ : Head, length 292, width 208; lateral diameter of eye 108, Postocular bristles 90. Antennal joints lengths (breadths) : 32 - 36 (base 48, apex 36), 60 (32), 84 (36), 88 - 92 (40), 90 (35), 80 (33), 60 (26), 40 (14). Prothorax, length 155, width without coxae 330. Pterothorax, length (width) 415 - 433. Wings, length 1090. Bristles on segment IX; b. 1: 240, b. 2: 70 - 80, b. 3: 280. Tube, length 240 - 250, basal width 92, apical width 47 - 49.

Habitat: 4 ♀, 1 ♂, Sumatra, Fort de Kock (Bukittinggi), 920 m., II.1921, in horn galls (no. 1164) on *Schefflera* spec. (leg. E. JACOBSON).

## **Liothrips cognatus (KARNY)**

1915. *Gynaikothrips cognatus* KARNY, *Zeit. wiss. Ins.-Biol.*, p. 325, 326; 1916, p. 18.  
 1926. " " PRIESEN, *Treubia*, VIII, Suppl., p. 174, 197; Taf. XIII, fig. 93.  
 1928. " " KARNY, *Treubia*, X, p. 38.

This species, being of medium size, is characterized by the comparatively broad wings that are evenly infumated and have no longitudinal stripe; there is only near the hind margin a pale longitudinal streak. Body

black, all tarsi and fore tibiae pale yellow, middle and hind tibiae very narrowly yellow at extreme apex. Body bristles blackish, those of segment IX of abdomen paler towards tip. Antennal joints: 3 - 6 pale yellow, 6 scarcely infumated, 7 and 8 dark (pale yellowish grey-brown), 7 sometimes paler at base.

Head little narrowed towards base, slightly constricted at base. Mouth-cone rather broadly rounded. Maxillary stylets emerging from behind middle of sides of head, at the postoculars, moderately widely separated. Postocular bristles very long, hair-like, not very close to eyes, at least 44 - 50  $\mu$  distant from them. Antennae with joint 3 distinctly longer than 4, the sense-cones are moderately long, on joints 4 and 5 only about 40  $\mu$ , joint 8 of antennae shortly conical, not narrowed at base. Epimeral pro-thoracic bristles pointed (with very fine pencil-tip), about 160  $\mu$  long. Tube slightly incrassate at base, nearly evenly conical, length 268 - 285  $\mu$ . Double fringe numbering 12 - 15.

Of the unique specimen (♀) of the type material (ex coll. Karny), the following additional measurements (in  $\mu$ ) may be taken: Head, length 277, antennae, total length 575; lengths (breadths) of joints: 32 - 36 (base 45, apex 40), 68 (40), 96 - 100 (34), 88 (40), 84 (36), 80 (33 - 34), 80 (28), 42 - 44 (16). Wing, length 1211, width across middle 116, basal bristles, lengths, b. 2: 92 - 96, b. 3: 100. Longest bristle on segment VII of abdomen 208, on segment IX, b. 2: 240 - 260. Tube, length 268, width at base 94, at apex 48. The specimens were taken in galls of *Medinilla horsfieldi* MIQ.

Other specimens (from *Medinilla verrucosa* BL.) are similar in every respect, though the basal wing bristles vary considerably in length (e.g. 96, 108 and 96).

**Habitat:** The species seems to be common and is obviously polyphagous. The type material (I only saw 1 ♀ and juvenes) is from Java, Ungaran mountains, ± 2000 m., 22.III.1913, in leaf rolls on *Medinilla horsfieldi* MIQ.; further records: ♂♂ and ♀♀, Java, G. Gedè, Tjibodas, 1400 m., 31.XII.24, in leaf galls of *Medinilla verrucosa* BL.; ♂♂ and ♀♀, ibidem, ± 1800 m., on *Medinilla laurifolia* BL. (no. 8551); 2 ♀♀, G. Pangarango, 26.VI.1920, in leaf galls on *Medinilla laurifolia* BL. (no. 4272); ♀♀, Pangarango, ± 2700 m., 3.VII.1925, in leaf galls on *Ardisia javanica* D.C. (all collected by DOCTERS VAN LEEUWEN). The specimens from *Ardisia* are in no way differing from those from *Medinilla* spp.

#### *Liothrips dux* spec. nov.

**Male:** Black-brown, antennal joint 2 paler at apex, joints 3 - 6 wholly pale yellow, joint 7 yellow, or slightly infumated in about apical half, joint

**Habitat:** 7 ♀, 1 ♂ (type material), Bolang, 8.XI.1924, on *Dissochaeta gracilis* BB. (leg. DAKKUS); 2 ♀, G. Salak, ± 1000 m., 18.VII.20, virgin forest on *Dissochaeta gracilis* (leg. DOCTERS VAN LEEUWEN); Sumatra, Sibolangit, virgin forest, VII.1922, in leaf rolls (no. 4415) on *Dissochaeta* sp. (leg. L. FULMEK); 1 ♀, Sumatra, Bandarbaru, ± 800 m., IX.1920, on *Dissochaeta* sp. (Herb. no. 29) (leg. DOCTERS VAN LEEUWEN); 1 ♀, G. Pantjas, ± 600 m., 8.I.1923, in leaf galls on *Dissochaeta gracilis* (leg. DOCTERS VAN LEEUWEN).

### *Liothrips brevitubus* KARNY

1912. *Liothrips brevitubus* KARNY, *Marcellia*, XI, p. 156.  
 1913. " " KARNY, *Bull. Jard. Bot. Buitenzorg*, p. 115.  
 1926. " " PRIESNER, *Treubia*, VIII, Suppl., p. 173, 224.  
 1927. " " MOULTON, *Bull. Brooklyn E.S.*, XXII, p. 196.  
 1933. " " " , *Ind. Forest Records, Ent. Ser.* XIX, p. 2 (Sep.).  
 1934. " " TAKAHASHI, *Bot. & Zool.*, p. 1829.  
 1936. " " " , *Philippine Journ. Sci.*, 60, p. 446.

Synonym: *malloti* Moulton, teste TAKAHASHI.

This species is extremely similar to *L. dissochaetae* sp. n., but differs specifically, particularly by the stouter antennae, with their broader joint 4. The tube is somewhat shorter, on an average. Example of measurements of antennal joints, in  $\mu$ : ? (base 44, apex 36), 74 - 76 (36), 72 - 80 (38 - 42), 80 (39), 70 (36), 64 (28), 36 (16).

The types are from Java, Salatiga, 7.4.13, in leaf galls on *Mallotus repandus* (leg. DOCTERS VAN LEEUWEN); the species is also known from India and Taiwan (Formosa).

### *Liothrips acuminatus* spec. nov.

**Female:** Dark brown, originally probably blackish; middle and hind tibiae dark, pale yellow at the extreme apex, fore tibiae, apex of fore femora and all tarsi pale yellow. Antennal joints 3 - 8 pale yellow. Wings slightly infumated, with broad brown longitudinal stripe which may be less faint in fresh specimens, hind wings with conspicuous, apically broadened fine longitudinal streak. Body bristles dark.

Head strongly narrowed towards base, cheeks straight, slightly constricted at base. Postocular bristles long, about 120  $\mu$ , little (ab. 28  $\mu$ ) distant from hind margin of eyes. Mouth-cone pointed, labrum pointed, protruding. Maxillary stylets inserted in posterior third, moderately separated. Antennae normal, but segment 8 strongly constricted at base; sense-cones in the usual number, moderately long, on joints 4 and 5 about

40  $\mu$ . Antero-marginal prothoracic bristles well developed, reaching a length of 40  $\mu$ ; epimerals curved, with fine pale pencil-tip, 155 - 170  $\mu$  long. Wings normal, basal bristles long, with pencil-tip, e.g. 108, 124 and 124  $\mu$  long; fore wing with 13 - 17 cilia duplicated. Abdominal bristles long, pencil-tipped, the longest (b. 2) on segment VII measuring 188 - 200  $\mu$ ; those on segment IX hair-like, pointed, 260 - 300  $\mu$  long, evenly conical, 250 - 256  $\mu$  long, at base 104 - 112, at apex 58  $\mu$  broad.

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 348, width 252, lateral diameter of eye 132, length of cheeks behind them 190. Antennae, lengths (breadths) of joints: ? (?), 68 (38), 96 (38), 96 - 100 (45), 90 (35), 84 (32), 74 (26), 48 (16). Prothorax, length 155. Pterothorax, length 467, width 433. Wings, length 1176, breadth at middle 108.

**Male:** Scarcely differing from the female. Measurements of male (allotype), in  $\mu$ : Head, length 277, width 220; lateral eye diameter 120. Postocular bristles 92 - 96. Antennal joints, lengths (breadths): 32 (base 44, apex 36), 64 (32), 92 (35), 92 (40), 82 (31), 74 (28), 64 (24), 44 (14). Prothorax, length 138; antero-angulars length 52, epimerals, length 120 - 140. Basal wing bristles: 92, 116, 88. Wing, length 1073. Pterothorax, length 425, width 400. Bristles on segment IX of abdomen, b. 1: 225 - 240, b. 2: 60, b. 3: 280 - 300. Tube, length 232, width across base 94, at apex 45.

**Habitat:** ♀, 1 ♂, Java: Salak mountains, ± 800 m., 26.X.1921, in leaf galls on *Piper* spec. (no. 5723), leg. DOCTERS VAN LEEUWEN.

The species comes near to *L. apicatus* but is at once distinguished by the pointed major bristles and the longer head.

### *Liothrips adusticornis* (KARNY)

1915. *Gynaikothrips adusticornis* KARNY, Zeit. wiss. Ins.-Biol., p. 325. 1916, p. 21.  
1923. " " KARNY, Journ. Siam Soc., XVI, p. 144.

**Female:** A larger, more slender species, with slender legs and antennae. Black-brown, fore tibiae yellow, strongly infumated at the sides, middle and hind tibiae dark, very narrowly pale yellow at extreme apex, all tarsi pale yellow. Antennal joints: 3 and 4 pale yellow, 3 scarcely, 4 slightly shaded with pale grey at apex, 5 and 6 pale yellow, distinctly infumated in apical half (or joint 6 somewhat more so), 7 and 8 dark brown. Body bristles blackish. Wings hyaline.

Head elongate, cheeks slightly narrowed towards base, somewhat constricted at base; mouth-cone very narrowly rounded at apex. Maxillary stylets emerging from right behind middle of head, at the postoculars, little separated. Postocular bristles very long, 172 - 180  $\mu$ , with pencil-tip.

Ocelli placed normally, the anterior ocellus very slightly protruding, but not surpassing interantennal process. Antennae slender, total length about 570  $\mu$ , joint 8 narrower at base than joint 7 at apex, at base about parallel-sided; sense-cones long and fine, on joints 4 and 5 about 48 - 53  $\mu$ , number as usual. Antero-angular prothoracic bristles comparatively long, angulars and others 56 - 72  $\mu$ ; epimeral bristles strongly curved, like the interior postero-marginals 128 - 144  $\mu$  long; these bristles blunt, slightly rounded at tip. Basal wing bristles long, blunt, b. 1: 100  $\mu$ , b. 2, 3: 112  $\mu$ . Wings normal, double fringe numbering 16 - 19. Abdominal bristles long, blunt to pencil-tipped, b. 2 on segment VII (longest) 160  $\mu$ . B. 1 on segment IX (all bristles being hair-like, pointed) measuring about 280  $\mu$ .

Example of measurements from a ♀ of the cotype series, in  $\mu$ : Head, length 312, width 234; lateral diameter of eye 128, length of cheeks behind eyes (inclusive of collar) 208. Antennae, lengths (breadths) of joints: 28 (base 46, apex 38), 68 (32), 92 - 96 (35), 100 (40), 92 (35), 80 - 85 (34), 64 - 66 (26), 40 (13). Prothorax, length 156, width 355 (with coxae 415), Pterothorax, 467 - 519 long and wide. Wing, length 1159, width at middle 96. Tube, length 300 - 315, width across base 96 - 98, at apex 50. Anal setae, length 260.

**Habitat:** Redescribed after the cotype specimens, 3 ♀♀, from Java: Muriah mountains,  $\pm$  400 m., 26.IX.1918, in leaf rolls on *Gnetum latifolium* BL. (leg. DOCTERS VAN LEEUWEN).

#### *Liothrips devriesi* (KARNY)

1928. *Gynaikothrips devriesi* KARNY, *Treubia*, X, p. 33, 39, larvae, p. 40.  
 1928. " " DOCTERS VAN LEEUWEN, *Rec. Trav. bot. neerl.*, XXVa, p. 99 - 114.

A large species, having very slender legs and antennae. **Female:** Black-brown to black, tarsi pale yellow, all tibiae dark, only the middle and hind tibiae pale yellow at extreme apex. Wings strongly infumated all along, with dark longitudinal streak that is accompanied behind by a pale longitudinal line. Body bristles dark, those of segment IX of abdomen paler, also the remaining abdominal bristles somewhat paler towards tips. Antennal joints: 3 - 6 pale yellow at base, darkened at apex, 3 only at extreme tip slightly shaded, 4 in apical half, 5 in apical two-thirds (or less); 6 pale at base only, 7 and 8 dark, grey-brown.

Head with large, oval eyes, cheeks slightly narrowed towards base, with a small angle in front, not or scarcely constricted at base. Ocelli normal. Mouth-cone narrowly rounded. Maxillary stylets varying as to

their position. Postocular bristles long, 100 - 113  $\mu$ , curved, blunt or open at tip, not very close to eyes, about 40  $\mu$  distant. Antennae very slender, particularly joints 5 and 6, joint 8 only gradually narrowed near base, having a truncate fusiform appearance; sense-cones fine, setiform, the longest on joints 4 and 5 about 56 - 68  $\mu$ . Prothoracic bristles very long, antero-angulars about 60  $\mu$ , epimerales 148 - 170  $\mu$ , blunt, mostly obliquely truncate at tip and open. Legs conspicuously slender. Wings normal, basal bristles 100  $\mu$ , 120  $\mu$  and 125  $\mu$  long, obliquely truncate, open. Double fringe numbering 11 - 13. Abdominal bristles long, longest on segment VII hair-like, pointed, 188 - 212  $\mu$ , b. 1 of the segments rounded or open at tip. Bristles on segment IX pointed, hair-like, b. 1 about 200  $\mu$ , b. 2: 240  $\mu$  long. Fustis long, 40 - 45  $\mu$ . Tube evenly conical, length 250 - 268  $\mu$ , width across base 84 - 96  $\mu$ , at apex 44 - 46  $\mu$ . Anal setae probably 240  $\mu$  long.

Measurements of a medium sized specimen (?) of the cotype series, in  $\mu$ : Head, length 280, width 208; lateral diameter of eye 120, length of cheeks behind them 165. Antennae, lengths (breadths) of segments: 40 (base 44, apex 34), 68 (31), 84 - 88 (27), 94 (32), 94 (27), 90 (27), 76 (22), 44 (12). Prothorax, length 138, width 346 (inclusive of coxae 380), Pterothorax, length and width about 450. Wing, length 1330, width at middle 112. Hind tibiae, length 320 - 340.

**Male:** Somewhat weaker, though scarcely differing. Bristles on segment IX of abdomen, b. 1: 200  $\mu$ , b. 2: 55 - 60  $\mu$ , b. 3: 240 - 260  $\mu$ .

**Habitat:** Besides the specimens described by KARNY (l.c.) from *Elatostema sesquifolium* HASSK., from Java, G. Gedé,  $\pm$  1500 m., in leaf gall (no. 8433), collected by DOCTERS VAN LEEUWEN, I saw a specimen from the same locality and host plant, 25.VIII.1925; a mutilated specimen, Java, Ungaran mountains,  $\pm$  1500 m., 11.IV.1914, from similar galls on the same plant (leg. DOCTERS VAN LEEUWEN). Together with the types there was a specimen of *Liothrips elatostemae*, n.sp.

#### *Liothrips elatostemae* spec. nov.

**Female:** Brownish-black, all tibiae dark, only the fore tibiae gradually yellow-brown towards apex. None of the antennal joints pale yellow; joints: 3 - 6 greyish yellow-brown, 7 and 8 grey-brown. Wings strongly infumated, the longitudinal streak not distinctly pronounced, as it is very broad and punctured in distal third of wing. Hind wings less distinctly shaded, with conspicuous dark longitudinal vein. Body bristles not black, but yellowish-brown, the anal setae darker.

Head moderately long, with straight, strongly convergent cheeks; eyes somewhat convex but without notch between them and the cheeks, so that the head is broadest across eyes. Mouth-cone rather broadly rounded, but labrum somewhat pointed. Maxillary stylets inserted right behind eyes, much approximated. Ocelli in normal position. Postoculars close to eyes, only about 25  $\mu$  distant, shorter than eyes, about 75  $\mu$  long, pointed. Inferior distance of eyes 75  $\mu$ . Antennae long and slender, joint 3 slender at base, slightly convex exteriorly, joint 8 not constricted at base. Sense-cones moderately long, on joints 4 and 5 only about 28 - 32  $\mu$  long, number as usual. Antero-angular prothoracic bristles moderately long, interiors about 55  $\mu$ , angulars shorter, curved; epimerals very long, curved, pointed, 164 - 172  $\mu$ , the interior postero-marginals much shorter. Pterothorax scarcely longer than broad. Wings normal, basal bristles (b.1 about 110  $\mu$ ), rounded at tip; double fringe about 11. Abdominal bristles long, pointed, longest on segment VII measuring about 220  $\mu$ . Bristle 1 on segment IX: 260, b.2: 300 - 310  $\mu$  long. Tube not quite evenly conical, with distinct slight concavity beyond base and slight convexity behind middle, length 337 - 345, width across base 100  $\mu$ , at apex 52  $\mu$ . Anal setae only about 220  $\mu$  long.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 290, width 228 - 232, lateral diameter of eye 105, length of cheeks behind them 184 - 188. Antennae, total length 615; lengths (breadths) of joints: 40 - 45 (base 52, apex 40), 76 (36), 100 (32), 96 - 98 (36), 96 (35), 84 - 88 (28), 68 (24), 52 (16). Prothorax, length 145, width 375 (inclusive of coxae 425). Pterothorax, length 536, width 520. Wing, length 1384, width at middle 124-128.

**Male:** unknown.

**Habitat:** 1 ♀, (holotype), Java, Tjibodas, Goen. Gedé, 1.I.1925, in a cecidomyiid gall on *Elatostema sesquifolium* HASSK.; 1 ♀, ibidem, 8.VII. 1925, in a cecidomyiid gall (no. 8433), together with *L. devriesi* (KARNY), leg. DOCTERS VAN LEEUWEN.

The chaetotaxy of the prothorax, the coloration of the antennae and legs, the shape of the head and the measurements are characteristic to the species so that it can hardly be confused with *L. annulifer* sp.n. or *L. devriesi* (KARNY); with *L. annulifer* it agrees in the shape of the tube, but is readily distinguished by the coloration of the antennae, the shape of the head, and the shape and lengths of the major bristles.

#### *Liothrips chavicae* (ZIMMERMANN)

1900. *Mesothrips chavicae* ZIMMERMANN, Bull. Inst. Bot. Buitenzorg X, p. 14.

*Gynaikothrips chavicae* KARNY, pro parte.

**Female:** Blackish-brown to black, middle and hind tibiae scarcely paler at apex, fore tibiae pale yellow; antennal joints: 3 - 6 pale yellow, 7 and 8 darkened, 7 paler at base. Wings hyaline, with slight yellowish hue, a longitudinal shade, if present, only very faint, no longitudinal streak visible.

Head about  $295 \mu$  long, across eyes  $234 \mu$  broad, cheeks distinctly narrowed towards base, mouth-cone more or less broadly rounded. Maxillary stylets arising from posterior third or fourth, moderately separated. Length of postocular bristles about  $120 \mu$ . Antennae normal, total length  $520 - 535 \mu$ . Example of measurements of joints, in  $\mu$ : 36 - 40 (base 48, apex 40), 60 - 65 (34), 96 - 100 (34), 92 (41), 82 (33), 74 (32), 60 - 62 (26), 36 (12). On the prothorax the antero-angular bristles are somewhat longer than the interior ones ( $64 - 72 \mu$ , as against  $40 - 52 \mu$ ), these and the postoculars practically pointed; epimerals about  $140 \mu$ , interior postero-marginals  $120 \mu$  long. All bristles, inclusive of those on abdomen, dark. Basal wing bristles long, b. 1:  $100 \mu$ , b. 2, 3:  $108 - 112 \mu$  long, pointed or with pencil-shaped tip. Number of double-fringe cilia: 11 - 13. Abdominal bristles long, pointed, b. 1 - 3 on segment IX about as long as tube,  $250 - 260 \mu$ . Tube evenly conical, length  $240 - 250 \mu$ , basal width  $96 - 108 \mu$ , apical width  $47 - 50 \mu$ .

**Male:** Head, length  $260 - 265 \mu$ , width  $220 \mu$ . Postocular bristles, length  $95 \mu$ , Epimeral bristles  $112 - 116$ . Bristles on segment IX of abdomen, b. 1:  $230 \mu$ , b. 2:  $65 \mu$ , b. 3:  $240 - 248 \mu$ .

The above description refers only to specimens of ZIMMERMANN's type material. If these come from *Chavica densa* or *Melastoma polyanthum* is not indicated on the labels. These specimens are, however, specifically different from all those forms which KARNY later referred to this species which are all different from one another, too.

Most closely allied to *L. chavicae* ZIMM. are the two following species: *L. retrofracti* nov. (= *chavicae* KARNY p.p.) and *L. soembanus* nov. Both have also pale wings, only *L. soembanus* represents a transition to those forms that have either a conspicuous dark longitudinal streak or wholly shaded wings, or both.

#### *Liothrips retrofracti* spec. nov.

Syn.: *Gynaikothrips chavicae* KARNY, pro parte, (nec ZIMMERMANN), *Marcellia*, XI, p. 131. - 1912.

**Female:** Brown-black, tarsi pale yellow, fore tibiae as well, scarcely slightly shaded at base, middle and hind tibiae dark, scarcely paler at extreme apices. Body-and basal wing bristles dark, those of segment IX

lighter towards tip. Antennal joints: 1 and 2 have, as usually, the colour of the body, 3 - 6 pale yellow, 6 distally very slightly infumated, 7 and 8 dark (pale brown), 7 mostly pale yellow at extreme base. Wings hyaline, basal plate slightly shaded, longitudinal streak indicated as a very narrow longitudinal shade, or it is hardly visible.

Head distinctly narrowed towards base, somewhat constricted behind; postocular bristles long, practically pointed like the prothoracic bristles. Eyes laterally not at all protruding. Antennae normal, joints 4 - 6 and 8 not constricted at apex, joint 3 with 1, 4 with  $1 + 2^{+1}$ , joints 5 and 6 with  $1 + 1^{+1}$  sense-cones; the latter fine, moderately long, on joints 4 and 5: 40 - 45  $\mu$ . Mouth-cone more or less narrowly rounded, labrum blunt or scarcely pointed. Maxillary stylets situated as in *chavicae*, somewhat more widely separated. Legs slender. Prothoracic bristles long, the interior antero-marginal bristles are at least somewhat shorter than the angulars. Pterothorax about as long as broad. Wings narrow, with long, pencil-tipped basal bristles, and 11 - 14 interlocated cilia. Bristles on abdomen long, dark, the tips often paler. Bristles on IX pointed, longer than the tube, 207 - 230  $\mu$  long. The latter evenly conical.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 294, width 252 - 232, basal width 185, lateral diameter of eye 120 - 125; cheeks behind them, length 220 (collar excluded). Postocular bristles, length 100 - 112. Antennae, total length 546; lengths (breadths) of joints: 40 (base 48, apex 40), 64 (32), 93 (33), 92 (39), 82 (32), 80 (32), 60 (25), 36 (12). Prothorax, length 138, width 330, with coxae 380 - 400. Prothoracic bristles, antero-angulars 60 - 70, antero-marginals 48 - 52, epimerals 120 - 130. Pterothorax, length 433, width 433. Wings, length 1055 - 1070. Basal wing bristles (paratype) 84 - 92, 108 - 112, 100. Bristles on segment IX of abdomen, b. 1: 240, b. 2: 260; anal setae 230. Tube, length 232, width at base 106, at apex 50. Longest bristle on segment VII: 160 - 176.

**Male:** Like the female, fore femora very slightly stouter.

Measurements of male, in  $\mu$ : Head, length 270, width 208. Antennae, length 508; lengths (breadths) of joints: 32 (base 44, apex 36), 60 (38), 90 (30), 84 (36), 76 (30), 72 (28), 58 (22), 34 - 36 (12). Bristles on segment IX of abdomen, b. 1: 240, b. 2: 52 - 60, b. 3: 250. Tube, length 208, width at base 92, at apex 44 (smaller specimens: 176 (80 and 40)).

**Habitat:** 2 ♂♂, 3 ♀♀, Klein Kombuis, Java-Sea, 27.I.1922, in leaf galls of *Piper retrofractum* VAHL.; 1 ♀, larvae, Poeloe Bokor, Klein Kombuis, 20.V.1923, in leaf gall of *Piper retrofractum* VAHL.; ♂♂ & ♀♀, Isle Edam, 2.I.1922, on *Piper retrofractum* VAHL.

The specimens mentioned by KARNY from the same plant (*Bull. Jard. Bot. Buitenzorg*, X, 1913, p. 109) from Karang Anjar near Semarang, 14.VII.1912, may also belong to this species, but I have not seen them.

**Liothrips soembanus** spec. nov.

This species is very similar to the two foregoing ones, but differs chiefly (according to a good series) by the longer antero-marginal prothoracic bristles.

**Female:** Coloration as in the foregoing species, joint 7 always somewhat paler than joint 8, pale at base or evenly shaded with pale brown. Body bristles dark.

Head narrowed towards base, cheeks very slightly arched, slightly constricted at base. Mouth-cone more or less broadly rounded. Maxillary stylets inserted oral, widely separated. Antennae (525  $\mu$  long) of the same structure as in *L. retrofracti*. The sense-cones on joints 4 and 5 have a length of about 35  $\mu$ . The antero-marginal (interior) prothoracic bristles have a length of 70  $\mu$ , the angulars about 55  $\mu$ . The bristles are pencil-tipped or obliquely truncate at tip. Double fringe cilia: 10 - 13. Tube evenly conical, 207 - 225  $\mu$  long.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 280, width 225, at base 180; diameter of eyes 116, length of cheeks behind them 175; postocular setae, length 128, their distance from eyes 24 - 26. Antennae, total length 525; lengths (breadths) of joints: 36 - 40 (base 44, apex 36), 60 (37), 88 (32), 84 (36), 76 (32), 78 (31), 62 - 64 (21), 38 (13). Prothorax, length 144 - 148, width 330 (inclusive of coxae 380). Epimeral and postero-marginal bristles, length 140 - 150. Pterothorax, length 433, width 398 - 415. Wing, length 1038, width across middle 95; basal bristles: 92, 116 and 124. Longest lateral bristle on segment VII of abdomen: 170; bristles on segment IX: b. 1, 2: 260 - 280. Tube, length 228 - 232, width at base 96, at apex 48. Anal setae, length 225.

**Male:** Very similar. Measurements of ♂ (allotype): Head, length 252, width 204; lateral diameter of eye 100. Antennae, total length 460; lengths (breadths) of joints: 32 (base 40, apex 36), 56 (28), 76 (28), 72 - 76 (34), 68 (29), 64 (28), 54 (24), 36 (13). Epimeral prothoracic bristles, length 120. Bristles on segment IX of abdomen, b. 1: 240, b. 2: 72 - 105, b. 3: 244 - 252. Tube, length 208, basal width 88, apical width 44.

**Habitat:** ♂♂ and ♀♀, North - West Sumba: Laora, 100 m., iv.1925, host plant unknown (leg. DAMMERMAN, no. 101); 2 females, Indochina: Langson, 6.ii.1925 (leg. KARNY.?).

**Liothrips confusus** spec. nov.

1916. *Gynaikothrips chavicae* KARNY p.p. (nec ZIMMERMANN), *Zeit. wiss. Ins.-Biol.*, XII, p. 19, line 11).

This is one of the four species that were formerly confused with *L. chavicae* ZIMM.

**Female:** Black-brown, fore tibiae pale yellow, middle and hind tibiae dark, but pale yellow at apex for about one-fourth to one-fifth of their length, the yellow colour exteriorly much more produced basad than exteriorly. Body bristles black, those of segment IX brownish. Antennal joints: 3 and 4 pale yellow, 5 as well, but slightly shaded with grey in apical third, 6 pale yellow only in basal half, 7 and 8 dark. Wings very slightly shaded, the fore wings with broad, stout longitudinal streak that extends nearly all over the wing, hind wings with fine brown longitudinal vein that becomes paler but much broader towards apex.

Head not much elongate, sides scarcely narrowed towards base, indistinctly convex. Postocular bristles long, 115 - 120  $\mu$ , narrowly rounded at tip, very close to eyes, only about 12  $\mu$  distant. Cheeks with few very fine and small setae. Mouth-cone short, very narrowly rounded, labrum pointed. Maxillary stylets inserted at posterior fourth, i.e. orad, rather widely separated. Ocelli in normal position. Antennae about 475  $\mu$  long, joint 3 thin at base, much widened towards apex, with 1 sense-cone, joint 4 with 1 + 2<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup> sense-cones; these are short, on joint 4 about 24 - 26, on joint 5 about 32  $\mu$  long; antennal joint 8 somewhat but little constricted at base. Legs moderately long, weak. Antero-angular prothoracic bristles long, 56 - 68  $\mu$ , antero-marginals 72 - 80  $\mu$ ; all prothoracic bristles rounded at tip or somewhat open; epimeral bristles 132 - 136  $\mu$ , postero-marginals 140 - 148  $\mu$ . Wings normal, length 920  $\mu$ , width across middle 88  $\mu$ ; basal wing bristles: 88  $\mu$ , 100  $\mu$  and 95  $\mu$  long, rounded at tip or somewhat open. Double fringe: 11 - 13. Central plate of tergite I of abdomen regularly triangular. Bristles on abdomen long, longest lateral bristle (b. 2) on segment VII pointed, 176  $\mu$ , b. 1: 144  $\mu$ , open. Bristles on segment IX hair-like, b. 1 and 2 about 260  $\mu$ , b. 3: 240  $\mu$  long. Tube almost evenly conical, short, 220 - 225  $\mu$  long, at base 92  $\mu$ , at apex 45  $\mu$  broad.

Further measurements (of holotype, ♀), in  $\mu$ : Head, length 252, width 220, lateral diameter of eye 108 - 112, length of cheeks behind them 155. Antennae, lengths (breadths) of joints: 36 (base 40 - 48, apex 36 - 38), 60 (32), 72 - 76 (34), 72 - 76 (40), 68 - 70 (32), 66 - 68 (31), 54 (26), 40 (14). Prothorax, length 136, width without coxae 330. Pterothorax, length 467.

the fore angles of the prothorax very well developed, 64 - 68  $\mu$ , like the inferior antero-marginals; epimerals strongly curved, pointed, 180 - 208  $\mu$  long. Pterothorax scarcely longer than broad, 433  $\mu$ : 415 - 433  $\mu$ . Wings normal, rather long, 1.125 - 1.147 mm. long, at middle about 100  $\mu$  broad; number of double fringe cilia 9 - 15; basal wing bristles short and pointed, b. 1: 90  $\mu$ , b. 2 & 3: 112 - 116  $\mu$  long. The 2nd lateral bristle (longest) of segment VII is pointed and measures at least 180  $\mu$ , b. 1 is pencil-tipped. Bristles on segment IX hair-like pointed, about 280  $\mu$  long. Tube evenly conical, 245 - 260  $\mu$  long, at base 96  $\mu$ , at apex 48  $\mu$  broad. Anal setae about 200  $\mu$ .

**Male:** Not essentially different. Antennae not measureable. Head, length (in allotype) 268  $\mu$ , with across eyes 220  $\mu$ . Bristles on segment IX of abdomen, b. 1 about 250  $\mu$ , b. 2: 72 - 88  $\mu$ , b. 3: 228  $\mu$ ; tube, length 236  $\mu$ , width at base 92  $\mu$ , at apex 44  $\mu$ .

**Habitat:** Cotypes (in one slide), Java: Ungaran mountains,  $\pm$  1200 m., 23.III.1913, in leaf galls on *Piper miniatum* BL. (leg. DOCTERS VAN LEEUWEN).

#### *Liothrips insidiosus* spec. nov.

The rather stout, pencil-tipped to blunt major bristles, the length and shape of the head, the coloration of the wings characterize this species which rather reminds of *L. takahashii* (MLT.), but has shorter head and antennae, shorter sense-cones; in comparison with the species allied to *L. chavicae* (ZIMM.), however, it has apically much longer antennae, joint 6 being most slender among the species of this group.

**Female:** Black, all tarsi and the fore tibiae pale yellow, at the middle and hind tibiae the extreme apices are narrowly pale yellow, and also the base of the tibiae may be paler interiorly, as well as the apex of the fore femora. The antennae have joints: 3 and 4 pale yellow, 5 slightly shaded in apical half, 6 pale yellow mostly only in basal third, 7 and 8 wholly dark. Body bristles black. Wings distinctly but not strongly shaded, with mostly nearly hyaline portion beyond basal plate, and with weak longitudinal streak, that fades out long before apex.

Head moderately long, distinctly narrowed towards base, cheeks straight, distinctly constricted at base; cheeks with some very minute fine setae. Position of ocelli normal. Mouth-cone narrowly rounded. Maxillary stylets situated as in *L. miniati*. Postocular bristles long, with short pencil-tip, length not well measureable, distance from eyes 20 - 25  $\mu$ . Antennae slender, joint 8 not constricted at base; number of sense-cones as usual, and though they are fine, they are shorter than in *L. takahashii*, on joints

4 and 5: 35 - 40  $\mu$  long. Bristles on prothorax stout, those at fore margin well developed, the interior bristles shorter and weaker than the angulars, the latter about 55  $\mu$  long; epimeral bristles blunt at tip but not widened, about 130  $\mu$  long and 6  $\mu$  thick at base. Pterothorax about as long as broad. Wings normal, basal bristles blunt or (b. 2 & 3) obliquely truncate, length about 96, 115, 116  $\mu$ ; double fringe: 11 - 15. Abdominal bristles long, the longest one on segment VII 168 - 172  $\mu$ , pointed, the dorsi-lateral ones with pencil-tip. Bristles on segment IX hair-like pointed, 248 - 260  $\mu$  long. Tube, short, evenly conical, length 244 - 252  $\mu$ , width at base 92 - 100  $\mu$ , at apex 44 - 48  $\mu$ . Anal setae about 220  $\mu$  long.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 290, width across eyes 240, across base 180; lateral diameter of eyes 128, length of cheeks behind them 180. Antennae, total length: 555; lengths (breadths) of joints: 32 (base 44, apex 36), 68 (32), 92 (30), 92 - 96 (38), 88 (30), 82 (26), 64 (24), 36 (13). Prothorax, length 142, width without coxae 325, with coxae 390. Pterothorax, length (width) 363 - 400. Wings, length 1038 - 1055, width at middle 95. Hind tibiae, length 312.

Male (measurements in  $\mu$ ): Like the female, but b. 1 on segment IX 240, b. 2: 60 - 70, b. 3: 260. Head, length (of allotype) 260, width 205, lateral diameter of eye 116. Pterothorax width 363. Wings, length 880. Tube, length 208, width at base 88, at apex 44. Antennae, lengths (breadths) of joints from joint 3: 72 (31), 76 (36), 76 (26), 72 (24), 52 (24), 38 (14 - 16).

**Habitat:** ♂♂ and ♀♀, Java: Bogor (Buitenzorg), 13.III.1921, on *Piper* sp. (leg. DOCTERS VAN LEEUWEN).

#### *Liothrips sarmentosi* spec. nov.

Most similar to *L. exiguus*, *L. soembanus* and *L. insidiosus*; from *L. exiguus* differing by the somewhat longer and more slender antennae and the basally paler middle and hind tibiae (like in *L. insidiosus*); from *L. soembanus* by the colour of the wings, the less slender, at apex darker antennae and the shorter epimeral bristles specifically different; from *L. insidiosus* the new species is distinguished by the smaller size, the less distinctly striped fore wings, the shorter tube, the lesser number of double fringe hairs of the fore wing, the shorter antennae, particularly their apical joints, but is similar in the shape of the head and the general habitus.

**Female:** Black-brown, fore tibiae and all tarsi pale yellow, fore femora and middle and hind tibiae narrowly pale yellow at extreme apex, the middle and hind tibiae also paler at bases, like in *L. insidiosus*. Antennal joints: 3 - 5 pale yellow, 6 yellow about in basal half, its apical half and

the whole segments 7 and 8 pale grey-brown. Fore wing rather clear beyond base, then slightly shaded with brown to apex, with quite indistinct longitudinal streak; hind wing very slightly shaded in apical half, with fine not very sharp-dark longitudinal vein. Body bristles blackish, those on segment IX paler.

Head moderately long, cheeks slightly narrowed towards base, distinctly constricted at base, a slight lateral convexity is noticeable. Mouth-cone narrowly rounded. Maxillary stylets as in the former species. Postocular bristles 87 - 95  $\mu$  long, practically pointed. Antennal joints: 3 slender, with straight interior margin, 4 not thickened, 8 not or scarcely narrowed at base. Sense-cone in the usual number, fine, length on joints 4 and 5: 35 - 45  $\mu$ . The interior antero-marginal bristles about 40  $\mu$ , the angulars 45 - 52  $\mu$ , the epimerals 108 - 120  $\mu$ , the latter blunt at tip or with short, hyaline pencil-tip. Pterothorax, 345 - 380  $\mu$  long and broad. Wings, length 880 - 935  $\mu$ , width at middle 80 - 85  $\mu$ ; basal bristles open at tip, b. 2 and 3: 92 - 96  $\mu$  long; double fringe: 8 - 12. Longest bristle on segment VII of abdomen (b. 2) hair-like, 140 - 150  $\mu$  long, b. 1 with pencil-tip. Tube evenly conical length 208 - 225  $\mu$ , basal width 80 - 85  $\mu$ , apical width 40 - 42  $\mu$ . Bristles 1 or 2 on segment IX, 220  $\mu$ .

Measurements of ♀ (holotype), in  $\mu$ : Head, length 252, width 212, basal width 164 - 168, lateral diameter of eye 115, length of cheeks behind eyes, 140 - 160. Antennae, length 480  $\mu$ ; lengths (breadths) of joints: 32 - 36 (base 44, apex 34), 60 (31), 76 (32), 80 (36), 76 (31), 64 (28), 56 (24), 36 (12).

**Habitat:** 1 ♀ (holotype), Java, Penang, 28.IX.1920, in leaf gall (no. 35) on *Piper* spec. (Herb. 101), together with *Liothrips exiguum*: 2 ♀♀, Sebesie, 22.IV.1921, in leaf gall (no. 5085) on *Piper sarmentosum* ROXB. (leg. DOCTERS VAN LEEUWEN).

#### *Liothrips fumicornis* spec. nov.

1916. *Gynaikothrips chavicae* KARNY p.p. (nec. ZIMMERMANN), *Zeit. wiss. Ins.-Biol.*, XII, p. 18, line 13).  
 1926. *Gynaikothrips chavicae* PRIESNER p.p. (*Treubia*, VIII Suppl., p. 198-200).-Larvae.

This species is rather similar to *L. aemulans* (described above) in size, colour of wings and shape of bristle-tips. It differs by somewhat diverging measurements, and the constantly darker antennae.

**Female:** Black, fore tibiae and all tarsi pale yellow, middle and hind tibiae dark, at the extreme apex pale yellow. Wings shaded all along, with distinct but weak dark longitudinal streak; hind wings more faintly shaded but also for all their length with fine longitudinal vein. Antennal joints: 1

and 2 dark, 3 pale yellow, very slightly shaded at apex, 4 shaded with pale brown in apical half (or more), 5 and 6 pale only at base (about in basal third or below somewhat more), 7 and 8 wholly dark. Body bristles black, those on segment IX somewhat paler, as usual.

Head very moderately long, eyes large but not protruding laterally. Ocelli in normal position. Postocular bristles well developed, practically pointed, about 100  $\mu$  long, very close to eyes. Mouth-cone rather narrowly rounded. Maxillary stylets as in the former species. Antennae about 500 - 510  $\mu$  long, joint 3 slender, joint 8 pointed, not constricted at base; sense-cones normal, on joints 4 and 5 only about 30  $\mu$  long, their number as usual. Antero-angular prothoracic bristles well developed, length 64 - 68  $\mu$ , angulars 60 - 65  $\mu$  long, with pale, sometimes blunt tips, epimerals about 160, interior postero-marginals 150  $\mu$  long, curved, with pencil-tip or hardly rounded at tip. Wings rather short, basal bristles 1 and 2 blunt, 3 pencil-tipped, lengths 96, 108, 108  $\mu$ . Double fringe consisting of about 10 cilia. Central plate of tergite I triangular. The upper one of the lateral abdominal bristles with pencil-tip or slightly rounded tip, b. 2 pointed, the longest on segment VII measuring 170  $\mu$ . Bristles on segment IX hair-like, pointed, b. 1 about 240, b. 2 and 3 about 260  $\mu$  long. Tube evenly conical, length 242  $\mu$ , width across base 96  $\mu$ , across apex 48  $\mu$ . Anal setae, length 180 - 200  $\mu$ .

Measurements of ♀ (holotype), in  $\mu$ : Head, length 260 (somewhat pressed, width therefore not measurable), lateral diameter of eye 120 - 125, cheeks behind them 160 - 170. Antennae, lengths (breadths) of joints: 32 - 36 (base 44 - 48, apex 36), 64 (34), 84 (32), 76 - 80 (38), 76 (32), 74 (28), 62 (24), 40 (13). Prothorax, length 140, width ?. Pterothorax, length 400. Wings, length 1003, width at middle 88.

**Male:** Coloration as in the female. Double fringe 8 - 10. Measurements of allotype, in  $\mu$ : Head, length 228, width 205; lateral diameter of eye 108, length of cheeks behind them 140 - 150; postocular bristles, length about 95, distance from eye 16. Antennae, total length 440; lengths (breadths) of joints: 28 (40), 56 (32), 76 (30), 64 - 68 (33), 64 (28), 60 (28), 52 (24), 36 (13). Prothorax, length 120, width without coxae 310, with coxae 337. Pterothorax, length 370, width 390. Bristles on segment IX of abdomen, b. 1: 240 - 250, b. 2: 95, b. 3: 270. Tube, length 205, width at base 85, at apex 44.

**Habitat:** 1 ♂, 2 ♀♀, Java, Nusa Kambangan, 11.X.1913, in leaf roll on *Piper* spec. (leg. DOCTERS VAN LEEUWEN).

The description of the larvae given by me (l.c.) refers partly to this, partly to *L. miniati* n. sp.

**Liothrips exiguus spec. nov.**

**Female:** Black-brown, fore tibiae and all tarsi pale yellow, middle and hind tibiae dark, pale yellow at extreme apex. Antennal joints: 3,4 and 5 pale yellow, 5 sometimes in apical half (or more) slightly shaded with pale grey-brown, 6 pale grey-brown, pale yellow at extreme base, 7 and 8 wholly pale grey-brown. Major body bristles black. Wings distinctly but not strongly shaded for all their length, with little pronounced longitudinal streak, behind which runs a pale parallel line.

Head moderately long, very distinctly convex at cheeks, and therefore, narrower across eyes than across cheeks. Position of ocelli normal. Postocular bristles long, abruptly hyaline at tip, not really pointed, at least 140  $\mu$  long, little (20  $\mu$ ) distant from eyes. Mouth-cone more or less narrowly rounded, moderately long. Maxillary stylets inserted in posterior third, moderately separated. Antennae about 435  $\mu$  long, joint 1 little narrowed towards apex, joint 4 rather stout, joint 8 narrower at base than joint 7 at apex, but not constricted; number of sense-cones normal, length of them on joints 4 and 5: 28 - 32  $\mu$ . Antero-marginal prothoracic bristles well developed, interiors 28 - 32  $\mu$ , angulars 40 - 50  $\mu$  long, epimerals 112 - 120  $\mu$  long, with pencil-like hyaline tip. Pterothorax about as long as broad. Wings normal, basal bristles rounded at tip or pencil-shaped, b. 1: 85  $\mu$ , b. 2 and 3: 92 - 95  $\mu$  long; fore wing with 10 - 13 interlocated cilia. Bristles at the sides of the abdomen long, the longest (b. 2 of laterals) of segment VII measuring about 150  $\mu$ , pointed, b. 1 pencil-shaped. Bristles 1 and 2 of segment IX hair-like, about 240  $\mu$  long. Tube short, evenly conical, length 196  $\mu$ , basal width 92  $\mu$ , apical width 42  $\mu$ . Anal setae 160  $\mu$  long.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 236, width across eyes 200, across cheeks 205; lateral diameter of eye 105, length of cheeks behind them (without collar) 128. Antennae, lengths (breadths) of joints: 28 (base 42, apex 36), 56 (32), 68 - 72 (32), 68 - 70 (40), 64 (32), 60 (29), 48 - 52 (24), 36 (14). Prothorax, length 128, width without coxae 277, with coxae 315. Pterothorax, length (width) 345. Wings, length 848, width at middle 85.

**Male:** Like the female, fore femora may be yellowish at extreme apex, joint 8 somewhat narrowed at base. B. 1 on segment IX of abdomen is not quite acute, measuring 180  $\mu$ , b. 2 and 3 pointed, b. 2: 48 - 65  $\mu$ ; b. 3: 250 - 260  $\mu$ , hair-like. Fore femora very slightly stouter. Double fringe cilia numbering 9 - 11.

Measurements of ♂ (allotype), in  $\mu$ : Head, length 228, width across eyes 188, across cheeks 192, at base 152; lateral diameter of eye 98.

Antennae, total length about 400; lengths (breadths) of joints: 28 (40), 50 (30 - 31), 68 (28), 64 - 68 (39), 56 (28), 52 (28), 48 (22), 36 (14). Postocular bristles (nearly pointed) 80 - 88. Epimeral prothoracic bristles, length 112 - 116. Pterothorax, length 325, width 320. Wings, length 830; basal wing bristles 72, 88, 88. Tube, length 188, basal width 88, apical width 42.

**Habitat:** 2 ♀, 5 ♂, Java, Penang, 28.IX.1920, in leaf gall (no. 35) on *Piper* spec. (herbarium no. 101), leg DOCTERS VAN LEEUWEN. — In the same material was a ♀ (holotype) of *Liothrips sarmentosi* nov. (described above).

The above is the smallest species of this group, which is characterized, besides the measurements, by the coloration of the antennae and wings, the evenly conical, short tube, and the distinctly convex cheeks.

#### *Liothrips exiguus falsus* subsp. nov.

Like *L. exiguus*, but differing by the following characters: Fore femora pale yellow at extreme apex, middle and hind tibiae somewhat more broadly yellow at apex, the middle tibiae so far for about a length of 40 - 50  $\mu$ . The antennal joints: 3 - 6 wholly pale yellow, 7 and 8 shaded with pale brown. Epimeral bristles somewhat longer, 120 - 132  $\mu$ , with hyaline, short pencil-tip as in *L. exiguus* f. typ.; the antero-marginal prothoracic bristles longer, 60  $\mu$ . Postocular bristles 92 - 96  $\mu$  long. Diameter of eyes about 108  $\mu$ . Head, length about 225  $\mu$ , width 208  $\mu$ . Mouth-cone very narrowly rounded, labrum pointed. Length of wing 865  $\mu$ . Number of interlocated cilia: 9 - 10; basal wing bristles 80, 88, 96  $\mu$ . Longest bristle on segment VII of abdomen 165  $\mu$ ; bristles on segment IX 244, 260 and 235  $\mu$ . Antennae, lengths (widths) of joints (of holotype), in  $\mu$ : ? (38), 56 (32 - 36), 76 (34), 68 - 72 (40), 64 (30), 56 (28), 56 (26), 40 (14); joint 8 is distinctly constricted at base, joint 4 comparatively stout, sense-cones a little shorter than in *L. exiguus*, on joints 4 and 5 about 24 - 30  $\mu$ . Tube, length 192, basal width 88, apical width 40  $\mu$ .

**Male:** Agreeing with the female also in number of double fringe cilia and coloration. Measurements of allotype, in  $\mu$ : Head, length 212, width 200 - 205. Antennae, lengths (breadths) of joints: 36 (base 38 - 40, apex 32), 52 (30), 72 (30), 66 - 68 (36), 56 (30), 50 (26 - 27), 48 (22), 36 (13). Bristles on segment Ix, b. 1: 240, b. 2: 65, b. 3: 280. Tube, length 180, basal width 84, apical width 38.

**Habitat:** 1 ♂, 1 ♀, Sebesie, 23.IV.1921, in leaf gall on *Piper* spec. (no. 5128), leg. DOCTERS VAN LEEUWEN.

I do not consider the differences of this form from *L. exiguus* to be sufficient to treat it as a proper species.

**Liothrips baccati** spec. nov.

Somewhat similar to *L. longiceps* (KARNY), but easily distinguished by the shorter head and the shorter antennae, particularly their apical joints.

**Female:** Blackish-brown to black, fore tibiae and all tarsi yellow, middle and hind tibiae dark, narrowly pale yellow at extreme apex. Antennal joints: 1 and 2 dark, 3 - 5 pale yellow, 6 about in apical half (or more) very slightly infumated, joints 7 and 8 dark. Wings with basal plate dark, otherwise only slightly shaded, but with conspicuous dark longitudinal stripe: hind wings nearly hyaline, with sharp dark longitudinal vein that is widened towards apex to a brown stripe. Major body bristles black.

Head moderately long, with distinctly narrowed cheeks towards base, which are straight, somewhat constricted at base. Postocular bristles long, about 120  $\mu$ , pointed, moderately far from eyes (about 30  $\mu$  ?). Mouth-cone narrowly rounded. Maxillary stylets as in *exiguus*. Legs rather stout. Antennae slender, joint 1 narrowed towards apex, joint 8 somewhat narrowed at base; sense-cones short, on joint 5 at most 32  $\mu$  long, their number as usual. Antero-marginal prothoracic bristles comparatively moderately long, the interiors shorter, all much varying in length, in some cases up to 50  $\mu$ ; epimeral bristles long, 125 - 150, width pencil-tip. Basal wing bristles having b. 1 blunt, b. 2 and 3 with pencil-tip, lengths b. 1: 108  $\mu$ , b. 2 and 3: 116 - 128  $\mu$ . Wings normal, with 11 - 17 interlocated cilia. Pterothorax about as long as broad. Bristles on abdomen long, practically pointed, longest bristle on segment VII 175 - 185  $\mu$ . Bristles on IX pointed, hair-like, B. 1 - 3: 260 - 288  $\mu$ . Tube evenly conical, length 260 - 268  $\mu$ , width across base 106  $\mu$ , at apex 47  $\mu$ . Anal setae, length 200  $\mu$ .

Further measurements (of holotype), in  $\mu$ : Head, length 295, width 237 - 240; lateral diameter of eye 128 - 132, length of cheeks behind them 172 - 176. Antennae, lengths (breadths) of joints, from joint 3: 92 (30 - 32), 92 (38), 76 - 80 (32), 80 (28), 60 (27), 40 (14). Prothorax length 165, width without coxae 335, with coxae 400. Pterothorax, length 450 - 467, width 435. Wings, length 1090 - 1125, width at middle 100.

**Male** (measurements in  $\mu$ ): Not differing except in the bristles of segment IX: B. 1: 240, b. 2: 88, b. 3: 280. Further measurements (of allotype), in  $\mu$ : Head, length 272, width 204; lateral diameter of eyes 108 - 112. Antennae, lengths (breadths) of joints: ? (42, apex 32), ? (30) 72 - 74 (28),

72 (34), 72 (31), 68 (28), 56 (24), 36 (14). Epimeral bristles, length 110. Pterothorax, length (width) 363 - 372. Wings, length 880. Tube, length 200, basal width 80, apical width 43.

**Habitat:** 4 ♀♀, 1 ♂, Java: Gn. Pantjar, ± 700 m., 8. I.1923, in leaf gall on *Piper baccatum* BL. (leg. DOCTERS VAN LEEUWEN).

*Liothrips oculatus* spec. nov.

**Female:** Brown to black-brown, fore tibiae and all tarsi pale yellow, middle and hind tibiae dark, at extreme apex narrowly pale yellow. Antennal joints: 3 pale yellow, rarely very slightly shaded with pale grey, 4 and 5 pale yellow but slightly infumated in apical third, 6 in apical half so, 7 and 8 wholly dark, more or less brown. Wings distinctly infumated for all their length, the fore and hind wings with conspicuous longitudinal stripe that is nearly complete. Body bristles blackish.

Head normal, cheeks slightly narrowed towards base, scarcely convex, eyes in most specimens very slightly protruding laterally, cheeks behind eyes with indistinct concavity. Mouth-cone narrowly rounded, slightly pointed, labrum somewhat pointed. Maxillary stylets inserted in posterior third of sides of head, rather widely separated. Legs very slender. Postocular bristles long, in the holotype about 150  $\mu$ , pointed, from the eyes about 32  $\mu$  distant. Antennae slender, joint 1 narrowed towards apex, joint 8 distinctly constricted at base. Sense-cones moderately long, on joints 4 and 5 about 30  $\mu$ , number as usual. Antero-marginal prothoracic bristles developed, the interiors 60 - 70  $\mu$  long, the angulars somewhat shorter; epimerals practically pointed, long, 140 - 150  $\mu$ . Pterothorax little longer than broad. Wings normal, basal bristles 100, b. 2, 3: 104 - 112  $\mu$  long, b. 1 and 2 pencil-tipped, b. 3 pointed. Wings with 12 - 15 interlocated cilia. Bristles on abdomen long, practically pointed, lateral bristle (b. 2) on segment VII 150 - 165  $\mu$  long. Bristles on segment IX hairlike, pointed, 240 - 260  $\mu$  long. Tube evenly conical, length 240 - 248  $\mu$ , basal width 84 - 88  $\mu$ , apical width 44  $\mu$ . Anal setae, length about 220  $\mu$ .

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 277 - 288, width across eyes 230, across cheeks behind them 220 - 225, basal width 185; lateral diameter of eye 116, length of cheeks behind them 180 - 190. Antennae, total length 560; lengths (breadths) of joints: 28 - 32 (base 44, apex 32), 66 (36), 88 (29), 84 (34), 80 (29), 74 (32), 64 (26), 40 (16). Prothorax, length 138, width without coxae 330. Pterothorax, length 450, width 425. Wings, length 1120 - 1140, width at middle 95.

**Male:** Like the female. Head somewhat more strongly narrowed towards base. Double fringe 12 - 14. Measurements of male (allotype), in  $\mu$ : Head, length 277, width 212, at base 160; lateral diameter of eye 114, length of cheeks behind them 180 - 190. Antennae, total length 505; lengths (breadths) of joints: 32 (base 42, apex 32), 60 (32), 84 (26), 80 (32), 78 (28), 72 (26), 60 (22 - 23), 38 (15). Bristles on segment IX of abdomen, b. 1: 240 - 250, b. 2: 60 - 88, b. 3: 260. Tube, length 240, basal width 84, apical width 40.

**Habitat:** Numerous ♂♂ and ♀♀, Java, Tjibodas, G. Gedé, 1500 m., 8. XII.1925, in leaf galls on *Lasianthes purpurea* BL. (M. BRUGGEMAN leg.).

#### Liothrips crassipes (KARNY)

1912. *Gynaikothrips crassipes* KARNY, *Marcellia*, XI, p. 137.  
 1913. " " " *Bull. Jard. Bot. Buitenzorg*, p. 107.  
 1915. " " " *Zeit. wiss. Ins.-Biol.*, p. 326.  
 1928. " " " *Treubia*, X, p. 38

**Female:** Blackish (the specimens of the type material are pale brown, i.e. faded out by the alcohol), fore tibiae and all tarsi pale yellow, middle and hind tibiae dark, very narrowly pale yellow at extreme apex. Antennal joints 3 - 6 pale yellow, in very dark specimens only joint 6 may be slightly brownish at extreme apical margin, joints 7 and 8 wholly brownish, joint 7 may be yellowish at extreme base. Wings infumated for all their length, with conspicuous and broad longitudinal stripe, that may be dissolved into dots in apical half or less; hind wings with distinct, posteriorly broadened, longitudinal streak. Body bristles black, those on segment IX of abdomen more or less brownish.

Head little elongate, slightly narrowed towards base, not constricted at base. Ocelli in normal position. Postocular bristles long, practically pointed. Mouth-cone narrowly to rather broadly rounded. Maxillary stylets inserted in posterior third, separated for the middle third of the hind margin of the vertex. The antennae are characterized in having joints: 3 somewhat emarginated (concave) anteriorly, 4 rather thickened, 7 slender, 8 slightly narrowed at base. Sense-cones normal in number, stout, not setiform, on joints 4 and 5 about  $35\mu$  long. Antero-marginal prothoracic bristles long, like the epimerals with hyaline pencil-tip, the latter longest,  $150 - 160\mu$ . Basal wing bristles of the normal wings long, nearly pointed with pencil-tip, but b. 1 or also 2 may be somewhat rounded at tip. Double fringe cilia numbering 10 - 15. Abdominal bristles long. Tube evenly conical, shorter than the head (from eyes).

From the type material (cotypes) the following exact measurements (in  $\mu$ ) can be given:

**Female:** Head, length 270, width 230; postocular bristles, length 112; lateral diameter of eye 120, length of cheeks behind them 172 - 176. Antennae, length (breadths) of joints from joint 3 : 92 (40 - 43), 90 (48), 84 (40), 76 (38), 62 (26), 42 (14). Anteromarginal prothoracic bristles 60 - 70. Wings, length 1211, width across middle 100 - 105; basal bristles, b. 1 : 100, b. 2, 3 : 112 - 120. Longest lateral bristle on segment VII 188; bristles on segment IX of abdomen 280. Tube, length 240 - 252, basal width 100 - 108, apical width 52 - 56.

**Male:** Like the female, but somewhat more slender and smaller. Joint 3 straight interiorly, but slightly concave before apex, exteriorly.

Measurements of ♂ (allotype), in  $\mu$ : Head, length 260, width 222, lateral diameter of eye 112, length of cheeks behind them 168 - 172. Antennae, total length 515 - 520; lengths (breadths) of joints: 32 - 36 (base 48, apex 40), 60 (32), 84 - 88 (38), 80 (42), 80 (36), 74 (33), 62 (25), 40 (14). Prothorax 152 long, 345 (with coxae 390) broad. Pterothorax 440 long (broad). Abdominal bristles, longest on segment VII 160, those on segment IX, b. 1 : 260, b. 2 (fine) 52 - 60, b. 3 : 268. Tube, length 228 - 232, basal width 96, apical width 50.

**Habitat:** The female cotypes are taken from leaf galls on *Piper nigrum* L. (Java: Salatiga, 26.V.1909, leg. DOCTERS VAN LEEUWEN). Further females and 1 male (allotype), Sumatra: Wai lima, Lampongs, 11.XII. 1921, in leaf galls on *Piper bettelle* BL. (leg. H. H. KARNY); 2 females, Sumatra: Fort de Kock (Bukittinggi), 920 m., X.1920, in leaf galls on *Piper bettelle* BL. (no. 1039), leg. E. JACOBSON; 1 ♂, Sebesie, 25.IV.1921, in leaf gall (no. 5329) on *Piper bettelle* BL., leg. DOCTERS VAN LEEUWEN.

The name *crassipes* was obviously chosen by KARNY, because of the somewhat collapsed femora of the type specimens which were obviously kept too long in low grade alcohol. The femora are not stouter in normal specimens than in many other species of the genus.

#### *Liothrips fagraeae* spec. nov.

**Female:** A large species. Black-brown to black, middle and hind tibiae not or indistinctly paler at apex, fore tibiae brownish-yellow, dark about basal third. Antennal joints: 1 and 2 dark, 3 - 6 pale yellow, 7 yellow in basal half, apical half (or somewhat more) slightly shaded, 8 darker, strongly shaded with grey-brown. Fore wings with basal plate and scale darkened, otherwise nearly hyaline except a broad grey-brown longitudinal streak, and a slight shade along hind margin of wing; hind wings hyaline

with fine, dark longitudinal vein. Body bristles dark, those on segment IX and the anals paler.

Head elongate, 1.4 - 1.5 times as long as broad, cheeks distinctly slightly narrowed towards base, eyes not protruding laterally, but having between them and the eyes a slight notch so that the cheeks protrude slightly and angularly right behind eyes; basal cephalic constriction not or scarcely marked. Mouth-cone short, **broadly rounded**. Maxillary stylets emerging from behind middle of sides of head, rather approximated. Antennae slender but moderately long, 570 - 588  $\mu$ ; joints: 3 slender, with nearly straight sides, 4 strongly convex in apical half, 8 narrower at base than 7 at apex, but not distinctly narrowed at base; joint 3 with 1, 4 with 1 + 2<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup> sense-cones, i.e. the normal number; Sense-cones moderately long, 28 - 32  $\mu$ . Ocelli in normal position, i.e. the anterior ocellus on a level with the fore margin of the eyes, the posterior ones in anterior third of eyes. Postocular bristles moderately long to long (60 - 72  $\mu$  ?), with hyaline tip; they are close to eyes. Prothorax normal, antero-marginal bristles developed, interiors somewhat shorter than angulars, the latter 48-52  $\mu$  long; epimerals long, 132 - 136  $\mu$ , with hyaline pencil-tip or slightly rounded. Legs very slender, fore femora not incrassate. Pterothorax about as long as broad. Wings normal, with moderately long basal bristles which are pale at tip and rounded or blunt, length 72  $\mu$ , 88 - 92  $\mu$  and 92 - 96  $\mu$ ; double fringe numbering 14 - 17. Central plate of tergite I of abdomen triangular, hind angles laterally slightly produced. Abdominal bristles long, dorsilaterals nearly, laterals (b.2) fully, pointed, those on segment IX hair-like, very long, b. 1: 348  $\mu$ , b. 2: 300 - 320  $\mu$ , b. 3: 260  $\mu$  (in the holotype). Tube long, 320 - 332  $\mu$ , basal width 108  $\mu$ , apical width 52  $\mu$ ; conical as a whole, with very slight concavity beyond base, and more strongly narrowed towards apex in posterior third so that in the latter portion a slight convexity can be noticed. Tube slightly longer than head.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 337, width 230; lateral diameter of eye 128, length of cheeks behind eyes 220. Antennae, lengths (breadths) of joints: 36 (base 48, apex 44), 64 (36), 100 (36), 88 (40), 92 (36), 84 (34), 72 (28), 44 (15). Prothorax, length 173, width without coxae 380, with coxae 433. Pterothorax, length 485, width 500. Wings, length 1315, width at middle 110.

**Male:** Very similar in all characters, but having shorter tube. — Measurements of allotype, in  $\mu$ : Head length 315, width 216. Antennae, lengths of segments from joint 2: 64, 100, 96, 84, 76, 66, 42. Total length about 555. Bristles on segment IX of abdomen, b. 1: 260 - 270, b. 2: 88 - 92,

b. 3: 284 - 308. Tube, length 272 - 280, width across base 96 - 100, at apex 48 - 50.

**Habitat:** 3 ♀, 2 ♂, Java: Tjibodas, 1400 m., 15.VI.1925, in leaf galls (no. 8388) on *Fagraea obovata* WALL., together with a species of *Androthrips* as inquiline (M. BRUGGEMAN leg.).

### **Liothrips annulifer** spec. nov.

**Female:** Black-brown, legs (inclusive of fore tibiae) dark, the tibiae pale yellow at the extreme apex (about apical fifth). Antennal joints: 1 and 2 dark, 3 characteristically shaded, pale yellow with broad dark ring beyond base, 4 and 5 pale yellow, 6 shaded with grey in apical half, 7 and 8 dark, 7 may be pale yellow in basal third, or less. All major bristles dark, those of segment IX pale. Wings distinctly infumated and with conspicuous longitudinal stripe that is accompanied posteriorly by a pale line.

Head elongate, eyes oval, very slightly convex laterally so that a slight concavity appears between them and the cheeks; the latter slightly convex behind the eyes, and then distinctly narrowed towards base. Mouth-cone broadly rounded, labrum blunt. Maxillary stylets rising from middle of head, at the postoculars, much approximated. Postocular bristles well developed, about 70  $\mu$ , distant from eyes (40  $\mu$ ), blunt or rounded at tip. Ocelli in normal position (anterior ocellus on a level with fore margin of eyes, hind ocelli in anterior third of eyes). Antennae slender; joints: 1 narrowed towards apex, 4 much broader than 3; sense-cones fine but not very long, on joints 4 and 5 about 40 - 45  $\mu$  long; joint 3 with 1, joints 4, 5 and 6 with 1 + 1<sup>+1</sup> sense-cones. Legs very slender, fore legs nearly not stouter than the others. Antero-marginal prothoracic bristles moderately long, not more than 35  $\mu$  long, epimerals and interior postero-marginals stout, blunt, about 100  $\mu$  long. Pterothorax about as long as broad (380  $\mu$ ). Wings as typical for *Liothrips*, basal bristles stout, blunt, open, dark, b. 3 more than 80  $\mu$  long; 10 - 12 double fringe hairs present. Abdominal bristles long, bristle 1 of the lateral tergite bristles not quite pointed, all others pointed, those on IX hair-like; longest bristle on segment VII (b.2): 180  $\mu$ , those on VIII: 120  $\mu$ ; bristles on IX: b.1 about 200  $\mu$ , b. 2: 240  $\mu$ . Tube long and slender, not quite evenly conical, with slight concavity behind base, length 260 - 263  $\mu$ , width across base 85  $\mu$ , at apex 47  $\mu$ . Anal setae, length 230 - 240  $\mu$ .

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 270 - 285, width 200 - 205; lateral diameter of eye 105; length of cheeks behind them 185. Antennae, total length 528 - 535; lengths (breadths) of segments:

28 - 32 (base 46, apex 36), 64 (32), 84 - 88 (24), 84 (30), 80 (28), 76 - 80 (28), 66 - 68 (24), 40 (14). Wings, length 1107, breadth in the middle 98. Prothorax, length 136, width without coxae 295. Pterothorax, length 364 - 380, width 364 - 380. Hind tibiae, length 305.

**Male:** Somewhat slenderer. Antennae as in the female or joints 4 - 6 wholly pale yellow. Mouth-cone narrowly rounded, with slightly pointed labrum. Legs slenderer. Wings with 9 - 11 cilia duplicated. Tube nearly straight at the sides, thickened at base.

Measurements (in  $\mu$ ) of ♂ (allotype) : Head, length 256; lateral eye diameter 102. Antennae, total length: 485; lengths (breadths) of joints from 3rd: 88 (24), 80 (28), 76 - 78 (26), 74 (24), 62 (20), 40 (14). Wings, length 1020; basal wing bristles, lengths: 70, 76, 84 - 88. Bristles on segment IX, lengths, b. 1: 208, b. 2: 48 - 60, b. 3: 250. Tube, length 248 - 252, width across base 66, at apex 42.

**Habitat:** 1 ♀, 3 ♂♂, Java: Gn. Gedé, Tjibodas, 1400 m., 25. VIII.1925, on the under side of leaves of *Elatostema sesquifolium* HASSK. (leaves with yellow spots on upper side), together with *L. devriesi* (KA.), leg. DOCTERS VAN LEEUWEN.

#### *Liothrips fulmekianus* spec. nov.

A very large species, characterized also by the long, strongly converging head, the long, not quite evenly conical 3rd antennal joint, the comparatively dark antennae, and the not quite evenly conical tube.

**Female:** Black, middle and hind tarsi testaceous (distinctly shaded), fore tarsi paler, middle and hind tibiae dark, only the fore tibiae pale at apex. Antennae with joint 3 pale yellow, shaded with grey in apical third, joint 4 yellow in basal half (or less), shaded in apical half, somewhat paler at apex exteriorly, joint 5 yellow in basal third (or somewhat more), joint 6 only in basal 4th (or more) pale yellow, joints 7 and 8 wholly dark brown. Body bristles dark, those on abdominal segment IX paler but distinctly shaded, more so than in most other species. Wings strongly infumated, and with dark longitudinal stripe.

Head with sides straight and converging towards base, with a few dark fine minute bristles at the cheeks; head, length 398  $\mu$ , width 264 - 268  $\mu$ ; lateral diameter of rather convex eye 144 - 148  $\mu$ . Mouth-cone very narrowly rounded, almost pointed, labrum pointed. Maxillary stylets emerging from behind middle, much approximated. Postocular bristles well developed, close to the eyes, not quite sharp, 104 - 113  $\mu$  long. Antennae slender, 775  $\mu$  long; measurements (in  $\mu$ ) of antennal joints: 48 ? (base 52, apex 40),

80 (36), 148 - 152 (36), 140 (42), 128 (38), 105 (36), 80 (28), 46 - 48 (15); joint 1 distinctly narrowed towards apex, joint 3 slender, margins not straight, showing a slight concavity near middle within, and exteriorly beyond middle, joint 8 not constricted at base; sense-cones rather long, fine, on joint 4: 60  $\mu$ , on joint 5: 70  $\mu$  long, curved; joint 3 with 1, 4 with 1 + 2<sup>+1</sup>, 5 and 6 with 1 + 1<sup>+1</sup> sense-cones. Antero-marginal prothoracic bristles developed, angulars about 65 - 70  $\mu$  long, interiors little shorter, rounded or nearly pointed; epimerals not quite acute, too, 180 - 190  $\mu$  long. Pterothorax heavy, 605  $\mu$  long, 570  $\mu$  broad. Wings normal, 1557  $\mu$  long, 126  $\mu$  in the middle broad; basal wing bristles in a straight line, 144 - 148, 152 - 168 and 164 - 176  $\mu$  long, with fine hyaline pencil-tip; duplicated cilia numbering 24 - 25. Bristles on the abdomen long, nearly pointed or with hyaline pencil-tip, longest on segment VII measuring 190  $\mu$ . Bristles on segment IX, b. 1 and 3 about 320, b. 2: 360  $\mu$ . Tube little thickened at base, slightly concave beyond base, slightly convex from middle, and strongly narrowed towards apex, length 384, basal width 105, apical width 56  $\mu$ . Length of hind tibiae about 520  $\mu$ .

**Male:** unknown.

**Habitat:** 1 ♀, Sumatra: Medan, Sibajak (1212 m), leg. L. FULMEX (ex coll. KARNY).

#### *Liothrips sibajakensis* spec. nov.

Also this species has dark tarsi and fore tibiae, but differs greatly from *L. fulmekianus* by the shape of the head and antennae, and by the coloration of the wings. The mouth-cone is pointed, the labrum acute.

**Male:** Black-brown, tibiae and tarsi dark, also the fore tarsi infumated. Antennal joints: 3 pale yellow with slight infumation of the narrow apical margin, 4 and 5 yellow, the former in apical third, the latter in apical half, darkened, 6 infumated also in basal half but paler than in apical half, 7 and 8 wholly dark. Body bristles dark. Wings dark at the basal plate, rather pale beyond base, otherwise is the wing blade slightly shaded, and has a very faint longitudinal stripe that is only developed in the middle; hind wing hyaline.

Head slightly longish, with cheeks narrowed towards base, and distinctly somewhat convex, somewhat constricted at base, without minute lateral bristles. Head, length 292  $\mu$ , width across eyes 200  $\mu$ , across cheeks 205  $\mu$ ; ocellar triangle narrow, posterior ocelli right in front of middle of eyes, anterior ocellus ending at fore margin of eyes; lateral diameter of eyes 96  $\mu$ . Postocular bristles pointed, about 93  $\mu$  long, 20 - 25  $\mu$  distant from

eyes. Mouth-cone and labrum pointed. Maxillary stylets inserted at hind margins of eyes, almost touching in the middle of the vertex. Antennae, length about 510  $\mu$ ; measurements (in  $\mu$ ) of joints: 28 (base 40, apex 32), ? 65 (32), 88 - 92 (32), 88 (38), 80 - 85 (30), 76 (30), 62 - 64 (25), 36 - 38 (14). Prothorax normal, 155  $\mu$  long, without coxae 310  $\mu$  broad; antero-angular bristles almost pointed, 48 - 52  $\mu$  long, interiors slightly shorter; epimerals narrowly rounded at tip, curved, 112 - 132  $\mu$  long. Fore femora slightly stouter than middle femora. Pterothorax with sides slightly rounded, length 467  $\mu$ , width 433  $\mu$ . Wings normal, 1168  $\mu$  long, 96 - 100  $\mu$  broad; basal bristles nearly pointed, 88 - 95  $\mu$ , 108 - 112  $\mu$  and 92  $\mu$ , long, b. 2 and 3 closer to each other; 16 - 18 cilia duplicated. Abdominal bristles rather long, the longest on segment VII shortly pencil-tipped, ab. 135  $\mu$  long; bristles on IX, b. 1: 270  $\mu$ , b. 3: 280  $\mu$ , both hair-like, b. 2 spine-like, 65  $\mu$ . Tube short, with very slight concavity behind base, length 240  $\mu$ , basal width 96  $\mu$ , apical width 45  $\mu$ . Anal setae ab. 240  $\mu$  long.

**Habitat:** 1 ♂, Sumatra: Sibajak, 1212 m., VIII.1923, leg. L. FULMEK.

### Liothrips longiceps (KARNY)

1915. *Gynaikothrips longiceps* KARNY, Zeit. wiss. Ins.-Biol., p. 325; 1916, p. 19.  
 1923. " " KARNY, Journ. Siam Ent. Soc., 16, p. 143. (Record referring to specimens from *Ficus benjamina*, and possibly not belonging to the same species).

This species shows a narrowly rounded mouth-cone (though broader than in *L. convergens*), towards base converging head without concavity of cheeks, evenly conical tube, slightly shaded wings, with longitudinal stripe; also the hind wings are shaded. The sense-cones are somewhat shorter than in the allied species. A specimen of the type series (from the Oengaran mountains) has the following measurements (in  $\mu$ ) of the antennal joints, from joint 2: 76 (36), 100 - 105 (36), 108 (40), 100 - 105 (34), 96 (31), 78 (24), 48 (14)  $\mu$ . Total length of antennae about 640. The maxillary stylets emerge from the posterior third or somewhat anteriorly, are moderately separated and strongly converging. Postocular bristles about 140  $\mu$  long, 30  $\mu$  distant from the eyes. Antero-angular prothoracic bristles 85  $\mu$ , interiors 80  $\mu$ , epimerals 160 - 170  $\mu$ , with pencil-tip. Longest bristle on segment VII (b. 2) pointed, 230  $\mu$  long. Bristles (1 & 2) of segment IX at least 300  $\mu$  long. Duplicated cilia 14 - 16.

New records: 1 ♀, Java: G. Pangarango, ± 2000 m., 26.vi.1920, in leaf gall (no. 4271) on *Piper recurvum* BL. (leg. DOCTERS VAN LEEUWEN);

1 ♀, East Java: Kletak, ± 1800 m., 18.XII.1920, on leaf gall (no. 4584), on *Piper* sp. (leg. Mrs. DOCTERS VAN LEEUWEN - REYNVAAN).

### **Liothrips takahashii (MOULTON)**

1928. *Gynaikothrips takahashii* MOULTON, *Annot. Zool. Japon.*, 11, p. 313, fig. 9.  
 1930. " *retusae* PRIESNER, *Treubia*, 12, p. 269.  
 1932. " *takahashii* TAKAHASHI, *Icon. Ins. Japon.*, p. 1891.  
 1934. " " " " *Bot. & Zool. Tokyo* 2, p. 1829.  
 1936. *Smerinthothrips* " " *Philipp. Journ. Sci.*, 60, p. 443.

Of this species I have a paratype of MOULTON's type series, and numerous specimens from Taihoku (Formosa), 21.III.1921, from *Ficus retusa* (leg. T. Okuni). Further record: Several specimens from Sumatra, Medan, III.1923, in leaf galls on *Ficus* sp.

The species is close to *L. longiceps* (KARNY), though at once to be distinguished by the coloration of the wings: They are very broadly hyaline (or nearly so) at base, slightly darkened towards apex, and have a very conspicuous dark longitudinal stripe. The antennae are rather light, also joint 7 mostly yellow at the base. Antennae and tube are longer, on an average, than in *L. longiceps*. I can only compare the pseudovirga of the aedeagus with that of *L. gynopogoni*, from which it differs in being strongly widened towards apex, forming two rounded lobes.

### **Liothrips takahashii ficarius (PRIES.)**

1930. *Gynaikothrips ficarius* PRIESNER, *Treubia*, XII, p. 267.

This is not a good species, as it is distinguished from (the typical) *L. takahashii* only by somewhat less elongate head and smaller size in general. I regard it as a biological race, though the material at hand does not suffice to come to a definite conclusion. This form was found on *Ficus benjamina*.

### **Liothrips takahashii silvaticus subsp. nov.**

Very close to the typical *takahashii*, showing the same shape of the bristles, i.e. they are dark having a short hyaline tip, but the mouth-cone is more distinctly pointed, and the antennae are darker, joint 4 showing a distinct apical shade, 7 and 8 being wholly dark. The pseudovirga is the same. Although in series compared with *takahashii* typicus it looks different, I cannot find any separating specific character.

**Habitat:** ♂♂ and ♀♀, Sumatra, Sibolangit, VII.1922, in virgin forest in leaf rolls on *Dissochaeta* spec., leg. L. FULMEK; 1 ♂, 3 ♀♀, Java, G. Pantjar, ± 600 m., 8.I.1923, in leaf gall on *Dissochaeta gracilis* BL., leg. DOCTERS VAN LEEUWEN; 1 female, Java, Bolang near Bogor, 8.XI.1924, leg. DAKKUS.

**Note:** While in the above named form (*L. takahashii silvaticus*) the number of duplicated cilia is 12 - 18, I have a larger specimen before me (antennae, length 467  $\mu$ , head length 345  $\mu$ , tube length 330  $\mu$ ) with 22 - 23 double fringe cilia, from Gn. Salak, ± 700 m., 3.VIII.1925, in leaf galls of *Dissochaeta gracilis* (leg. DOCTERS VAN LEEUWEN). MOULTON's paratype specimen shows 20 double fringe cilia, my own *L. retusae* which I regard as a synonym of *L. takahashii*, has 22 - 23 cilia duplicated. *L. takahashii* is obviously a rather variable species.

#### *Liothrips cuspidatae* spec. nov.

Another form of the *takahashii* group. Very similar to this species in many respects. The fore tibiae are mostly cloudily darkened interiorly. In the antennae joint 5 is darkened in apical third, joint 6 in apical half, joints 7 and 8 are wholly dark. The antennae are longer, joint 7 is in all female specimens before me 84 - 90  $\mu$  long (in *takahashii* 76 - 84  $\mu$ ), joint 5 is 110 - 112  $\mu$  long. Number of duplicated cilia 17 - 21 (mostly 17 - 18). The wings are not hyaline at base, but slightly infumated all along and with broad longitudinal stripe, while they are always broadly hyaline beyond base in *takahashii*, and strongly shaded about the apical half. This species is larger than *takahashii*, having a tube length of 294 - 337  $\mu$ .

Measurements of ♀ (holotype), in  $\mu$ : Head, length 390, width 268; lateral diameter of eye 140, length of cheeks behind them 270. Antennae, total length 690 (in other specimens up to 712); lengths (breadths) of joints: 36 - 40 (base 52, apex 40 - 44), 76 (40), 120 (36), 120 (45), 112 (40), 105 (38), 92 (28), 52 (15). Sense-cones on joints 4 and 5: 48 - 72. Epimeral prothoracic bristles 170. Pterothorax, length 588, width 500 - 520. Bristle 2 of segment IX: 315. Tube, length 330, width across base 96, at apex 52.

**Habitat:** ♂♂ and ♀♀, Java: Tjibodas, 1400 m., 13.VIII.1920, in leaf galls on *Ficus cuspidata*.

#### *Liothrips gynopogoni* spec. nov

**Female:** Black, middle tibiae little, hind tibiae distinctly but very narrowly, yellow at the apical margin (in *L. takahashii* quite dark), fore tibiae pale yellow, not or scarcely shaded, all tarsi pale yellow. In the antennae joints 3 and 4 pale yellow, the latter sometimes with an indistinct

shade at the club, joint 5 pale yellow, darkened in apical third, joint 6 so in apical half, joints 7 and 8 dark. Wings all along very faintly shaded and with dark longitudinal stripe, hind wings with fine dark longitudinal line. Body bristles black, those of segment IX somewhat paler.

Shape and structure similar to those of *L. takahashii*, i.e. shape of head, lengths of bristles, eyes, etc. Head slightly narrowed towards base. Antennal joint 8 slightly constricted at base. Postocular bristles shorter than in *L. takahashii*. Major bristles, particularly lateral and epimeral prothoracic bristles blunt and somewhat open at tip, while they are white pencil-tipped in *L. takahashii*. Double fringe cilia numbering 18-21. Bristles on segment IX longer than in *L. takahashii*, e.g. b. 2: 360  $\mu$  (in *L. takahashii* 280—300  $\mu$ ). Mouth-cone narrowly rounded, labrum somewhat pointed. Tube somewhat more elongate than in *L. takahashii*.

Measurements of ♀ (holotype), in  $\mu$ : Head length 346-355, width across eyes 248, across base 185; lateral diameter of eye 132; length of cheeks behind them 215. Postocular bristles, length about 64-68, their distance from the eyes ab. 28. Antennae, lengths (breadths) of joints: 32 (base 50, apex 40), ? 68 (32), 120 (33), 120 (42), 100-104 (35), 84 (34), 68 (27), 44 (15). Prothorax width (exclusive of coxae) 363; antero-angular bristles 50-70; epimerals 120-130. Pterothorax, length 500, width 475. Wings, length 1488, width across middle 112-120. Bristle 2 on segment VII of abdomen 168-172, bristle 2 on segment IX: 360. Tube, length 363, width across base 98, at apex 52.

**Male:** Like the female, the cheeks slightly more strongly narrowed towards base. Bristle 2 on segment IX spine-like. Double fringe cilia numbering 17-18. Pseudovirga of aedoeagus parallel-sided, about 50  $\mu$  broad, bipartite, the parts rounded at apex, obliquely truncate within so that a common triangular incision appears.

Measurements of ♂ (allotype), in  $\mu$ : Head, length 330, width 236; lateral diameter of eye 125, length of cheeks behind them 225. Antennae, total length 614-624; lengths (breadths) of joints: 40 (base 52, apex 40), 68-72 (32), 112 (31), 104-108 (40), 96 (32), 88 (28), 72 (24), 40 (15). Prothorax, length 165, width 330, inclusive of coxae 380; antero-angular bristles 56, interiors 32, epimerals 120-130. Pterothorax, length 467, width 440. Basal wing bristles, length 76, 108 and 125. Bristles on segment IX: b. 1: 240, b. 2: 76, b. 3: 320. Tube, length 330, basal width 96, apical width 49.

**Habitat:** 3 ♂♂, 5 ♀♀, Sumatra: Gn. Sibajak, ± 1800 m., 10.II.1924, in leaf galls (no. 7797) on *Gynopogon reinwardtii* BL., leg. DOCTERS VAN LEEUWEN.

*Liothrips convergens* spec. nov.

**Female:** Brown-black, middle and hind legs dark, fore tibiae pale brown, yellow at base and apex, or shaded at the sides only, middle and hind tibiae scarcely paler at the apical margin, all tarsi pale yellow. Antennal joints: 1 and 2 dark, 3 wholly pale yellow, 4 as well but slightly shaded before apex, 5 and 6 dark in apical half (or less), 7 and 8 blackish brown. Body bristles blackish, those of segment IX and the anal setae paler towards apex. Fore wings slightly infumated and with strong but not very broad dark stripe, hind wings with fine dark longitudinal line.

Head with large eyes, very strongly narrowed towards base, the cheeks slightly concave anteriorly, constricted at base. Mouth-cone very narrowly rounded at apex, labrum somewhat pointed. Maxillary stylets inserted at the posterior fourth (more anteriorly in the male), moderately separated. Postocular bristles long (ab. 120  $\mu$ ), blunt, only about 30  $\mu$  distant from the eyes. Ocelli in normal position. Antennae long (ab. 740  $\mu$ ), joint 1 narrowed towards apex, joint 3 almost straight at the interior margin, somewhat rounded-angular at apex exteriorly, joint 7 almost fusiform, joint 8 slender not consticted at base but not conical. Sense-cones very long and slender, on joints 4 and 5 about 80  $\mu$  long. Prothorax with the two pairs of antero-angular bristles very well developed, the interiors measuring 64 - 68  $\mu$  and being little shorter than the somewhat stouter angulars; epimerals about 180  $\mu$  long, curved, slightly rounded or (in lateral aspect) with pencil tip; interior postero-marginals 164 - 168  $\mu$  long. Legs slender. Pterothorax (length 555  $\mu$ , width 520  $\mu$ ) normal. Wings with basal bristles 132  $\mu$ , 144 - 148  $\mu$  and 124  $\mu$  long and open, b. 3 nearly pointed; 17 - 19 cilia duplicated. Abdominal bristles long, longest on segment VII about 180  $\mu$ , those on segment IX, b. 1 and 3: more than 280  $\mu$ , b. 2: 340  $\mu$ . Tube not quite evenly conical, with slight concavity beyond base and strongly narrowed from posterior third, length 363 - 370  $\mu$ , basal width 100  $\mu$ , apical width 52  $\mu$ . Anal setae, length about 300  $\mu$ .

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 363, width 260 at basal constriction 190; lateral diameter of eye 140 - 145; cheeks, length behind eyes 240. Antennae, lengths (breadths) of joints: 40 (base 52, apex 45), 80 (34), 128 - 132 (39), 132 (44), 124 (39), 104 (36), 84 (26 - 27), 52 (15). Prothorax, length ab. 190, width 400 (inclusive of coxae 440). Wings, length 1644, width across middle 132.

**Male:** Similar as usual, cheeks somewhat more strongly narrowed. The interior antero-angular prothoracic bristles are considerably shorter than the lateral, the latter being at least 56  $\mu$  long. Double fringe 21 - 22.

Longest bristle on segment VII 184 - 188  $\mu$  long, bristle 3 on segment IX 340  $\mu$ , (others not measurable). Tube about 337  $\mu$  long, without postbasal concavity, but more strongly narrowed in its posterior third than at basal two-thirds. (Antennae not horizontal in the unique specimen).

**Habitat:** 1 ♂, 1 ♀, Sumatra: Gn. Sibajak, ± 1800 m., 10.II.1924, on *Fagraea obovata* WALL., leg. DOCTERS VAN LEEUWEN (no. 7793).

**Liothrips rubiae** spec. nov.

A comparatively large species.

**Female:** Black, extreme tips of middle and hind tibiae often yellow, fore tibiae testaceous with distinct infumation except at base and apex, middle and hind tarsi testaceous with slight grey-brown shade, fore tarsi yellow. Antennal joints: 1 and 2 wholly dark, 3 pale yellow, slightly shaded with grey-brown at the extreme apex, 4 and 5 pale yellow in basal half, dark in apical half, 6 pale only in basal third, 7 and 8 wholly dark, black-brown. Major body bristles black. Wings distinctly infumated all along, just behind the basal plate a little paler, and with strong dark longitudinal stripe and dark hind margin so that there appears a paler longitudinal stripe between the stripe and the margin; hind wing with narrow dark longitudinal stripe, and with shaded hind margin, from the middle to the apex.

Head elongate, but the cheeks narrowed only in posterior third. Body bristles thick; postoculars far backward, blunt or open but not knobbed. Mouth-cone moderately broadly to rather narrowly rounded. Maxillary stylets emerging from about middle of head. Antennae slender, 657 - 775  $\mu$  long, joint 1 distinctly narrowed towards apex, joint 3 slightly convex inferiorly, joint 8 not constricted at base but narrower than joint 7 at the apex; sense-cones very long and slender, curved, on joint 5 about 65  $\mu$  long; joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup> sense-cones. Antero-marginal prothoracic bristles well developed, 60 - 72  $\mu$ , interiors much shorter, laterals and epimerals long and thick, 130 - 140  $\mu$ , with a basal thickness of 7.5 - 8  $\mu$ ; they are narrowly open at tip. Legs slender. Pterothorax heavy, about as long as broad. Wings normal, basal bristles black, thick, all three open or rounded at tip, in the holotype measuring 120  $\mu$ , 144 - 148  $\mu$  and 145 (in small specimens 136)  $\mu$ ; double fringe cilia numbering 12 - 18. Abdominal bristles long, black, b.1 of the laterals of segments VII and VIII with hyaline tip, b.2 pointed, sharp, the latter on VII ab. 188  $\mu$  long; b.2 of segment IX 260 - 270  $\mu$  long, like the other bristles on IX paler. Tube slender, not quite evenly conical, having a slight concavity behind base, and being very little more strongly narrowed

in posterior third, length 365 - 375  $\mu$ , basal width 108  $\mu$ , apical width 60  $\mu$ . (Smaller specimens: tube, length 334  $\mu$ , basal width 96  $\mu$ , apical width 54  $\mu$ ). Anal setae, length about 260  $\mu$ .

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 370 - 380, width 240, at base 196; lateral diameter of eye 124 - 128. Postocular bristles, length at least 105 (6 thick at base), distance from eye 60 - 65. Antennae, lengths (breadths) of joints, from joint 3: 132 (35), 140 - 145 (42), 124 - 132 (36), 110 (36), 84 (29), 48 (16); a small specimen: 44 (base 52, apex 40), 72 (34), 108, 124, 114, 100, 78, 46. Prothorax about 190 long, without coxae 400 broad. Pterothorax 488 long and broad. Wings, length 1626, width across middle 120 - 132.

**Male:** Fore femora simple like in the female. All bristles on segment IX pointed. Double fringe numbering 13 - 14,

Measurements of ♂ (allotype), in  $\mu$ : Antennae, lengths of joints; from joint 3: 108, 120 - 124, 112, 96, 78, 44. Longest bristle on segment VII: 150. Bristles on segment IX: B. 1 ab. 240, b. 2 (spine-like) 85, b. 3: 280. Tube, length 312, width across base 88, at apex 52.

**Habitat:** 1 ♂, 4 ♀♀, Java: Gn. Gedé, Tjibodas,  $\pm$  1600 m., 8.IX.1925, in leaf galls on *Rubia cordifolia* L., leg. DOCTERS VAN LEEUWEN.

#### *Liothrips polyosminus* spec. nov.

This species comes close to *L. longiceps* (KARNY), agreeing with it in the shape of the head, tips of the bristles, and colour of the wings, but differing by the wholly dark middle and hind tibiae, the longer tube, and somewhat stouter fore femora.

**Female:** Black or blackish brown, tarsi pale yellow, middle and hind tibiae dark, fore tibiae yellow but infumated especially at the margins almost all long. Body bristles black. Antennal joints: 3 - 6 pale yellow, 7 pale yellow at the base, 8 wholly dark, darker than 7 at apex. Both wings distinctly infuscated all along, and with longitudinal stripe that is, as usual, broad in the fore wing, fine in the hind wing; the fore wing may show some faint puncturation towards the margins when viewed under lower magnification.

Head about 1.3 times as long as broad, cheeks narrowed towards base, straight, slightly constricted at base. Postoculars long, ab. 120  $\mu$ , like the other major bristles of the anterior body with short hyaline pencil tip. Mouth-cone distinctly more or less narrowly rounded, labrum somewhat pointed. Sense-cones of the antennae as in *L. longiceps*, their length on joints 4 and 5: 40 - 44  $\mu$ . Antennal joint 8 is somewhat narrowed from

middle to base, the 6th joint appears comparatively slender. Ocelli in normal position. Antero-angular prothoracic bristles 48 - 56  $\mu$  long, interior postero-marginals 150  $\mu$ , epimerals 160  $\mu$ . Pterothorax slightly longer than broad. Basal wing bristles with fine hyaline pencil tip, 96  $\mu$ , 112  $\mu$  and 120  $\mu$  long. Double fringe cilia numbering 16 - 17. The longest bristles on segment VII of the abdomen 200  $\mu$  long, pointed; Bristles on IX: b. 1: 260 - 280  $\mu$ , b. 2: 300  $\mu$ . Tube, length 310 - 320  $\mu$ , basal width 96 - 100  $\mu$ , apical width 48  $\mu$ . The fore femora are slightly stouter than in *L. longiceps*, about 112  $\mu$  thick.

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 310, width 238, lateral diameter of eye 120, length of cheeks behind them 190. Antennae, lengths (breadths) of joints from joint 3: 104 (28), 96 (36), 88 (32), 84 (30), 72 (28), 46 (18). Prothorax, length 155, width 362 (inclusive of coxae 425). Pterothorax, length 520, width 485. Wings, length 1385, width across middle 125.

**Male:** A unique ♂ obviously belonging to this species is taken on another date than the females. The specimen is darker (fresher) but the antennae are of the same colour, the wings slightly more strongly infumated. Antennal 8 is distinctly constricted at the base.

Measurements of ♂ (allotype), in  $\mu$ : Head, length 286, width 208; diameter of eyes 116, cheeks length (behind eyes) 180. Antennae, total length 550; lengths (breadths) of joints: 32 (base 44, apex 36), 64 (34), 96 (30), 88 (37), 84 (32), 76 - 78 (28), 60 (25), 48 (16). Prothorax, length 138, width 310 (inclusive of coxae 380). Pterothorax, length 467, width 433. Wings, length 1230 width across middle 108. Bristles on segment IX of abdomen, b. 2: 88 - 96, b. 3: 300. Tube, length 276, width across base 88, at apex 45.

**Habitat:** 5 ♀, Java: Tjibodas, 21.VI.1920, in leaf gall (no. 4232) on *Polyosma ilicifolia* BL. leg. DOCTERS VAN LEEUWEN; 1 ♂, Tjibodas, 1400 m., 28.X.1923, in leaf gall on *Polyosma ilicifolia* BL., leg. BRUGGEMAN. In the first named galls (21.6.20) there is a unique female of a most likely new species of the *L. takahashi* group, having longer and darker antennae; I cannot describe it without having a series, since the similar forms of this group are difficult to distinguish.

#### *Liothrips polybotryae* spec. nov.

**Female:** Black, all tarsi pale yellow, middle and hind tibiae wholly dark, not pale at apex, fore tibiae pale yellow or slightly shaded. Antennae with joints: 3 pale yellow, 4 narrowly ring-like shaded with grey preapically, 5 and 6 also pale yellow but rather sharply defined shaded with

grey-brown, the former in basal half (or more), the latter in basal half (or less); joints 7 and 8 wholly blackish brown. Major body bristles black. Wings strongly infuscated and with very broad, towards apex narrower, longitudinal stripe, apex of wing slightly paler; hind wings with strong dark longitudinal line.

Head elongate, distinctly narrowed towards base, scarcely convex at the cheeks, constricted at base. Mouth-cone very narrowly to moderately broadly rounded. Maxillae as in *L. polyosminus*. Ocelli in normal position. Postocular bristles well developed, pointed, little distant from the eyes. Antennae moderately long (about 570  $\mu$ ), rather stout, segments normal in shape, joint 8 comparatively short, scarcely or little narrowed at base. Sense-cones in the usual number, rather long and fine, those on joints 4 and 5 about 50  $\mu$  long. Antero-angular prothoracic bristles developed but moderately long, interiors shorter, epimerals only about 140  $\mu$  long; these bristles are practically pointed. Pterothorax somewhat longer than broad. Wings normal, basal bristles practically pointed, 96  $\mu$ , 105  $\mu$ , 116  $\mu$  long; fore wing with 14 - 16 cilia duplicated. Bristles on the abdomen long, all pointed, b. 2 of segment VII measuring 165  $\mu$ . Bristles on segment IX: b. 1: 220 - 240  $\mu$ , b. 2: 260  $\mu$ , b. 3: 220  $\mu$ . Tube nearly evenly conical but sides not absolutely straight, length 300  $\mu$ , width across base 96  $\mu$ , at apex 48  $\mu$ . Fore femora not thickened. Anal setae (paler) about 240  $\mu$  long.

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 303, width across eyes 234, at base 182; lateral diameter of eye 128 - 132, length of cheeks 200. Antennae, lengths (breadths) of joints: ? (base 48, apex 38), 72 - 76 (36), 92 (36), 100 (42), 88 (38), 84 (34), 72 (28), 36 (15). Prothorax, length ab. 173, width 337 (inclusive of coxae 407). Pterothorax, length 500, width 435. Wings, length 1367, width across middle 112.

**Male:** Slightly differing in colour, middle and hind tarsi slightly shaded with grey, fore tibiae more strongly shaded than in the female. Antennae with 3rd joint, too, shaded at the apex, 4 and 5 only about in basal third pale, 6 pale at extreme base only: Femora not enlarged. Double fringe cilia 12 and 17.

Measurements of ♂ (allotype), in  $\mu$ : Head, length 295, width 208 (base 165); lateral diameter of eye 112, length of cheeks behind eyes 180. Antennae, total length 555; lengths (breadths) of joints: 36 (base 11, apex 9), 64 (32), 92 (36), 94 (45), 84 (36), 80 (34), 64 - 66 (26), 42 - 45 (14). Epimeral prothoracic bristles, length 108 - 112. Pterothorax, length ab. 400, width 355. Wings, length 1142, width across middle 92. Bristles on segment IX: b. 1: 260, b. 2; ab. 80, b. 3: 280 - 300. Tube, length 240, basal width 84, apical width 44.

**Habitat:** 3 ♀, 1 ♂, Java: Tjibodas, G. Gedè, 1400 m., 1.VII.1925, in horn galls of *Schefflera polybotrya* KDS. (no. 8411); 1 female, Tjibodas, G. Gedé, 17.II.1925, in leaf galls of *Schefflera scandens* KDS. (leg. DOCTERS VAN LEEUWEN).

The above species is characterized by the coloration of the antennae, the not very long stout antennae, provided with long sense-cones, the narrowly rounded mouth-cone, the strongly shaded, striped wings and the absolutely pointed bristles.

#### *Liothrips omphalopinus* spec. nov.

A very slender species, having a long, strongly pointed mouth-cone, slender antennae with moderately long sense-cones, long prothoracic bristles, and basally for some distance hyaline wings.

**Male:** Black-brown, fore tibiae pale yellow or more or less slightly shaded, middle and hind tibiae at the apical margin indistinctly paler, all tarsi pale yellow. Antennal joints: 3 and 4 pale yellow, 5 as well or shaded in apical third, 6 darkened in apical half or at apex only, 7 and 8 dark, sometimes 7 paler in basal half. Body bristles black. Wings only slightly infumated, being hyaline in more than their basal third, and with basally much reduced longitudinal stripe, sometimes slightly punctured towards apex, when viewed under lower magnification; hind wing with faint and broad stripe.

Head strongly narrowed towards base, cheeks straight, slightly constricted at base. **Mouth-cone long, strongly pointed.** Maxillary stylets inserted about in posterior third, moderately separated. Postoculars long, with pencil-tip, inserted near the eyes. Antennae slender, sense-cones fine, moderately long, 44 - 52  $\mu$  on joints 4 and 5; joint 8 of antennae slightly constricted at base. Bristles on the prothorax very long, antero-angulars at least 70  $\mu$ , epimerals 140 - 170  $\mu$ , blunt at tip. Basal wing bristles rounded at tip, 88  $\mu$  and 108 - 112  $\mu$  long (b. 2, 3); 11 - 14 cilia duplicated. Abdominal bristles long, lateral (b. 2) on segment VII blunt or pencil-tipped, 155  $\mu$ . Bristles on IX hair-like, pointed, b. 1: 260  $\mu$ , b. 2: 72 - 85  $\mu$ , b. 3: 280  $\mu$ . Tube evenly conical, length 264  $\mu$ , width across base 100  $\mu$ , at apex 47  $\mu$ . Anal setae ab. 240  $\mu$  long.

Further measurements of ♂ (holotype), in  $\mu$ : Head, length 277, width 212, at base 152; lateral diameter of eye 116; length of cheeks behind them 175. Antennae, total length 550; lengths (breadths) of joints: 36 - 40 (base 44, apex 36), 62 (32), 88 - 92 (32), 92 (38), 84 - 86 (32), 76 (29), 64 - 66 (25), 44 (15). Prothorax, length 138, width 306 (inclusive of coxae 372).

Ptero thorax, length 415, width 400. Wings, length 1125, width across middle 92 - 96.

**Female:** (Antennae missing). Very similar. Measurements, in  $\mu$ : Head, length 295, width 225; lateral diameter of eye 116. Bristles 2, 3 of wing base: 116. Bristles on segment IX of abdomen: 260. Tube, length 268 - 272, width across base 92, at apex 47.

**Habitat:** 3 ♂♂, 2 ♀♀, Java: Gn. Salak, ± 800 m., 3.VIII.1925, in leaf gall on *Omphalopus fallax* (leg. DOCTERS VAN LEEUWEN).

#### Subgen. *Zopyrothrips* nov.

##### *Liothrips (Zopyrothrips) claripennis* (KARNY)

1914 - 16. *Gynaikothrips claripennis* KARNY, Zeit. wiss. Ins.-Biol., X, p. 203; XI, p. 325 + 327; XII, p. 84.

1923. *Gynaikothrips claripennis* KARNY, Journ. Siam Soc., XVI, p. 144.

1926. " " PRIESNER, Treubia, VIII, Suppl., p. 172, 182, pl. XII, fig. 82.

nec *Gynaikothrips claripennis* MOULTON = *Liothrips vitivorus* PR.

A moderately large species with dark tibiae, having also the fore tibiae, except the apex, distinctly shaded; middle and hind tibiae only at the extreme margin very narrowly pale yellow; tarsi yellow, slightly shaded. Antennal joints: 3 - 5 pale yellow, 5 sometimes faintly shaded at the extreme apex, 6 darkened about in its apical half, 7 and 8 dark. Wings wholly hyaline, inclusive of basal plate and basal bristles. Postocular and prothoracic bristles shaded, abdominal bristles pale.

Eyes not convex laterally, moderately large, cheeks almost parallel-sided, mouth-cone narrowly rounded. Maxillary stylets inserted somewhat behind middle of head, by the postoculars, moderately separated. Postocular bristles well developed, 64 - 68  $\mu$ , blunt. Antennae short, joint 1 little narrowed towards apex, joint 3 somewhat more than twice as long as broad (68: 32), joint 4 strongly convex laterally. Sense-cones short, joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup>. Prothoracic bristles knobbed, antero-angulars 45  $\mu$ , epimerals about 95  $\mu$  long. Basal wing bristles knobbed, in one line. Wings moderately long, with 9 - 12 cilia duplicated. Tube short, evenly conical, 195 - 200  $\mu$  long, at base 88, at apex 44  $\mu$  broad. Legs moderately long.

Example of measurements of ♀, in  $\mu$ : Head, length 234 - 250, width 200, lateral diameter of eye 100 - 105. Antennae, measurements of joints of a smaller specimen: 40 (base 40, apex 36), 56 (36), 68 (33), 70 - 72 (38),

64 (33), 60 (32), 52 (26), 36 (16). Pterothorax, width 433 - 450. Fore femora, width 100, hind tibiae, length 265. Bristles on segment IX of abdomen, b. 1, 2: 200 - 212, b. 3: 168.

**Male:** Having somewhat paler fore tibiae. Bristle 1 of segment IX 180  $\mu$ , b. 2 short, spine-like, b. 3: 200  $\mu$ , all pointed. Tube, length 180  $\mu$ , basal width 85  $\mu$ , apical width 40  $\mu$ .

**Habitat:** KARNY's types are from Java: Tempuran, Djati forest, 15.IX. 1912, from leaf rolls on *Salacia oblongifolia* BL. (Hippocrataceae) (leg. DOCTERS VAN LEEUWEN). Other specimens are recorded by KARNY from Saigon and Siam. New records are the following: Sumatra, Perbaungan, 20.VIII.1922, on *Salacia* sp. (leg. FULMEK, no. 7); Sumatra, Perbaungan, 19.IV.1922, Mangrove shore, in rolled up leaves on *Bruguiera* spec. (leg. FULMEK).

#### *Liothrips (Zopyrothrips) comparandus* spec. nov.

**Female:** Blackish brown; middle and hind tibiae wholly dark, fore tibiae darkened at the sides, paler towards apex, all tarsi pale yellow. Antennal joints 3 - 8 pale yellow. Wings hyaline, with very faint indication of a longitudinal shade along the middle. Major bristles dark.

Head moderately long with large, oval eyes; cheeks slightly but distinctly narrowed towards base; eyes not protruding laterally. Mouthcone and maxillae as in *L. litoralis*. Postocular bristles moderately long, blunt, right behind eyes (20  $\mu$  distant). Ocelli in normal position. Antennae quite normal, 8 elongate conical. Epimeral prothoracic bristles stout, straight, about 120  $\mu$  long, open at tip and obliquely truncate; interior postero-marginals distinctly shorter; antero-marginals shorter than angulars, the latter 50  $\mu$ . Fore femora slightly stouter than middle and hind femora. Wings normal, with basal bristles 80  $\mu$ , 88  $\mu$  and 96  $\mu$  long, blunt, open; 15 - 18 cilia duplicated. Abdominal bristles long, blunt, longest on segment VII measuring 170  $\mu$ ; bristles on IX, b. 1: 240 - 260  $\mu$ , b. 2: 280 - 300  $\mu$ , b. 3: 320  $\mu$ , all practically pointed. Tube evenly conical, length 310 - 345  $\mu$ , width across base 115  $\mu$ , at apex 56  $\mu$ . Anal hairs 180  $\mu$  long, slightly rounded at the apex.

Measurements of ♀ (holotype), in  $\mu$ : Head, length 294 - 310, width across eyes or cheeks 260; lateral diameter of eye 125, length of cheeks behind them 195. Antennae, length 530; lengths (breadths) of joints: 44 (base 52, apex 44), 64 (36), 86-88 (36), 86 (42), 80 (36), 64-66 (34), 64 (26), 40 (14). Prothorax, length 160, width 400 (inclusive of coxae 450). Ptero-

thorax, length 433-476, width 495-520 (several specimens). Wing, length 1176, width across middle 120.

**Male:** Somewhat smaller, with 13-14 double fringe cilia. Bristle 2 of segment IX spine-like. Head, length 260  $\mu$ , width 225  $\mu$ ; lateral diameter of eye 116. Bristles on segment IX of abdomen, b. 1: 240  $\mu$ , b. 2: 72  $\mu$ , b. 3: 260  $\mu$ . Tube, length 280  $\mu$ . (Bad mount).

**Habitat:** 8 ♀♀, 1 ♂, Java: Pesawahan, Priangan,  $\pm$  600 m., 9.VIII. 1918, in leaf gall (no. 2893) on *Fagraea fastigiata* Bl., like the gall on *Fagraea littoralis* but much larger (ca. 20 cm.), cf. DOCTERS VAN LEEUWEN, Zoocec. Ned. Ind., 1926, pp. 463-464, fig. 885.

This species is very similar to *L. littoralis* (KARNY) but is larger, has less slender sense-cones, shorter and stouter major bristles, relatively and absolutely shorter antero-marginal prothoracic bristles, less distinctly narrowed head and somewhat stouter fore femora; in *L. comparandus* the basal wing bristles are about 5.5  $\mu$ , in *L. littoralis* about 4  $\mu$  thick at the base. *Liothrips praetermissus* sp. n. also belongs in this group but can hardly be confused with its allies, having shorter antennae and sense-cones, particularly shorter postoculars and interior postero-marginals of the prothorax, and smaller measurements of other parts of the body.

#### *Liothrips (Zopyrothrips) ingratus* spec. nov.

**Male:** A smaller species with wholly pale yellow tibiae, yellow antennae, parallel-sided joint 6 of them, strongly convex eyes, backwardly posited post-ocular bristles and slender legs.

Brown, all tibiae and tarsi pale yellow. Abdominal bristles distinctly shaded at base only, the rest of the bristles dark. Wings shaded all along and with a quite faint longitudinal shade, hind wings pale with indication only of a faint line.

Head with distinctly somewhat convex eyes, laterally, which are not parallel-sided at base, cheeks slightly convex in the middle, forming thus a slight concavity between them and the eyes. Mouth-cone broadly rounded. Maxillary stylets emerging from posterior third, moderately separated. Ocelli in normal position. Postocular bristles blunt, perhaps 40-45  $\mu$  long, far backward, 36-40  $\mu$  from the eyes, 15-20  $\mu$  distant from the sides of the head. Antennae moderately long, joints: 3 conical with sides straight, 4 and 5 distinctly rounded at the sides, 6 parallel-sided, 8 slightly narrowed near base; joint 3 with 1, joint 4 with 0 + 2 (or 1)<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup> sense-cones; these are fine, moderately long, the longest on joint 4 about 30  $\mu$ . Prothorax emarginated in front; antero-angular bristles

minute, interiors longer but varying (12 - 22  $\mu$ ); epimerals probably 70  $\mu$  long, blunt or slightly knobbed, open at tip, inner postero-marginals slightly shorter. Fore femora weak, only 55  $\mu$  thick. Wings narrow, basal bristles measuring, b. 1: 45  $\mu$ , b. 2 or 3: 52 - 56  $\mu$ ; 5 - 6 cilia duplicated. Both lateral bristles on abdominal segment VII knobbed, b. 2: 84 - 88  $\mu$  long; bristle 1 on segment IX 180 - 190  $\mu$  long, with a slender oval thickening at the tip, b. 3 hair-like, 220 - 230  $\mu$  long. Tube (not quite horizontal) about 180  $\mu$  long, at base 68  $\mu$ , at apex 36  $\mu$  broad, conical, slightly more strongly tapering towards apex in its posterior third.

Further measurements of ♂ (holotype), in  $\mu$ : Head, length 204-208, width 168; lateral diameter of eye 84 - 92, length of cheeks behind them 125. Antennae, total length 380; lengths (breadths) of joints: 32 (base 36, apex 32), 48 (29), 56 (22 - 23), 52 - 54 (24 - 25), 54 (24), 56 (22), 50 - 52 (20), 32 - 36 (11). Prothorax, length 108, width 240 (without coxae). Pterothorax, length 295, width 300. Wings, length 760 - 780, width across middle 60.

**Habitat:** 1 ♂, Sumatra: Sibolangit, ± 400 m., 15.VII.1921, virgin forest, in leaf gall (no. 5545) on *Elatostema* spec., together with *Liothrips assimulans* sp. n.

#### *Liothrips (Zopyrothrips) astutus* spec. nov.

Owing to its very slender antennae this species cannot be regarded as a typical *Zopyrothrips*.

**Female:** Brownish black to black, eyes rounded laterally, cheeks almost parallel-sided, narrower only near base, narrower than the eyes throughout. Mouth-cone very broadly rounded. Maxillary stylets emerging from in front of posterior third, by the postocular setae. Postoculars straight, far backward (from the eyes about 50  $\mu$  distant), blunt and hyaline at tip, 70 - 80  $\mu$  long. Antennae slender, joints: 3 three times (or slightly more) as long as broad, 6 more than three times as long as broad, 8 conical; joints: 3 with 1, 4 with 1 + 1<sup>+1</sup> sense-cones. Legs very slender. Prothoracic bristles little curved, dark with white knob, antero-marginals well developed, 44 - 50  $\mu$ ; epimerals and interior postero-marginals 100  $\mu$  long. Wings normal, basal bristles dark, with white head, 56 - 65  $\mu$  long; 9 - 11 cilia duplicated. Abdominal bristles long, dark with white knob, longest (b. 2) on segment VII 150  $\mu$ ; bristle 1 on IX nearly pointed, b. 2 and 3 pointed, 230 - 240  $\mu$ . Tube almost evenly conical, length 247 - 260  $\mu$ , basal width 88 - 90  $\mu$ , apical width 45 - 46  $\mu$ . Anal setae, length 180  $\mu$ .

Further measurements of ♀ (syntype), in  $\mu$ : Head, length 260, width across eyes 212, across narrowest part behind them 205, at base 208;

lateral diameter of eye 116, length of cheeks behind them 170. Antennae, total length 515; lengths (breadths) of joints: 24 (base 42, apex 36), 60 (33), 86 - 88 (28), 80 (28), 80 (26), 78 - 80 (24), 60 (22), 42 - 44 (13). Prothorax, length 150, width 310 (inclusive of coxae 355). Fore femora, width 85. Pterothorax, length 390, width 400 - 415. Hind tibiae, length 290, width 48. Wings, length 935, width across middle 80 - 85.

**Habitat:** 3 ♀♀ (syntypes), Java: Gn. Pantjar, 9.XII.1923, in leaf gall (no. 7548) on (?) *Scindapsus* sp., leg. DOCTERS VAN LEEUWEN.

### Liothrips (*Zopyrothrips*) *litoralis* (KARNY)

- |       |                                |                                                                                   |
|-------|--------------------------------|-----------------------------------------------------------------------------------|
| 1912. | <i>Gynaikothrips litoralis</i> | KARNY, <i>Marcellia</i> , XI, p. 133.                                             |
| 1913. | "                              | <i>Bull. Jard. Bot. Buitenzorg</i> , p. 108.                                      |
| 1915. | "                              | <i>Zeit. wiss. Ins.-Biol.</i> , p. 326.                                           |
| 1926. | "                              | PRIESNER, <i>Treubia</i> , VIII, <i>Suppl.</i> , p. 174, 195; Taf. XIII, fig. 92. |

Of the species having hyaline wings *L. litoralis* comes nearest to (*Zopyrothrips*) *comparandus* nov., but it easily separated by the more slender sense-cones and the shorter tube.

**Female:** Black-brown, middle-and hind tibiae wholly dark, fore tibiae yellow, more or less slightly shaded with grey-brown; antennal joints: 3 - 6 pale yellow, 7 and 8 very slightly infumated, 7 often pale yellow at base. Wings hyaline, a longitudinal shade is wanting or very slightly indicated. Body bristles dark.

Head little elongate, cheeks narrowed towards base, scarcely rounded, constricted at base. Maxillary stylets inserted not far behind eyes, by the postoculars, rather approximated at middle of head. Postocular bristles moderately long (64-68  $\mu$ ), about 30  $\mu$  distant from eyes. Mouth-cone broadly rounded. Fore femora very slightly incrassate, slightly constricted before apex. Antennae slender, about 585  $\mu$  long, joint 8 not narrowed at base; sense-cones fine, on joints 4 and 5 about 60 - 65  $\mu$  long, number as usual. Antero-marginal prothoracic bristles moderately long, blunt, about 48 - 52  $\mu$ ; interior postero-marginals 105  $\mu$ , epimerals 112 - 120  $\mu$  long, blunt at tip or open. Pterothorax about as long as broad. Basal wing bristles rounded at tip, e.g. 84  $\mu$ , 96  $\mu$  and 105  $\mu$  long; double fringe numbering 13 - 14. Abdominal bristles well developed, b. 2 (longest) on segment VII measuring about 170  $\mu$ , with pencil-tip, the dorso-laterals blunt; those on segment IX hair-like pointed, b. 1, 2 about 240  $\mu$  long. Tube evenly conical, 280 - 290  $\mu$  long, at base 100  $\mu$ , at apex 50  $\mu$  broad. Anal setae, length 215  $\mu$ .

Measurements of ♀ (of type series), in  $\mu$ : Head, length 303, width 250, lateral diameter of eye 128 - 132, length of cheeks behind them (without collar) 180. Antennae, lengths (breadths) of joints: 36 - 40 (base 48, apex 40), 64 (36), 88 (40), 100 (45), 100 (36), 88 (30), 70 (24), 40 (14). Prothorax, length 152, width without coxae 363. Pterothorax, length and width 450 - 467. Wings, length 1073 - 1090, width at middle 85.

Measurements of ♂ (of type series), in  $\mu$ : Head, length 276, width 225, lateral diameter of eye 112 - 116, length of cheeks behind them 165. Antennae lengths (breadths) of joints; from joint 3: 84 (42), 88 (40), 84 (32), 74 (26), 62 - 64 (22), 36 (14). Prothorax, length 276. Pterothorax, length & width 400. Bristles on segment IX: b. 1: 240, b. 2: 64 - 76, b. 3: 248. Tube, length 256, width at base 88, at apex 44.

**Habitat:** 3 ♀♀, 1 ♂, Java: Salatiga, 29.V.1909, in leaf gall of *Fagraea litoralis* BL. (leg. DOCTERS VAN LEEUWEN), together with 3 females of *L. (Zopyrothrips) praetermissus* spec. nov. The latter specimens were in the same slide and obviously overlooked by KARNY.

#### *Liothrips (Zopyrothrips) praetermissus* spec. nov.

**Female:** Brown (originally obviously dark brown), fore tibiae testaceous, middle and hind tibiae dark. Antennal joints: 3 - 6 pale yellow, 7 and 8 the same or very faintly shaded. Wings hyaline. Body bristles dark.

Head moderately long, with straight, towards base very slightly narrowed, somewhat roughened cheeks which are not constricted at base. Ocelli in normal position. Mouth-cone broadly rounded. Maxillary stylets inserted behind middle of head, behind postoculars, moderately separated. Postocular bristles short, only ab. 32  $\mu$  long, obliquely truncate at tip, very close (15 - 20  $\mu$ ) to the eyes. Antennae short, normal, joint 8 broadest at base; sense-cones short, on joints 4 and 5 only ab. 25  $\mu$  long, in the normal number. Antero-angular prothoracic bristles short, 32 - 36  $\mu$ , epimerals comparatively short, straight, 64 - 76  $\mu$  long, open at tip, the interior postero-marginals 24 - 30  $\mu$  long. Basal wing bristles short, (44  $\mu$ , 52  $\mu$ , 56 - 60  $\mu$ ), open; double fringe numbering 11 - 13. Dorsolateral abdominal bristles moderately long, all b. 1 blunt, b. 2 not quite pointed, longest on VII: 144 - 148  $\mu$ ; bristles 1 of segment IX with lanceolate tip, 230  $\mu$ , b. 2 not quite hair-like though pointed, b. 3 hair-like, ab. 260  $\mu$  long. Tube not quite evenly conical, with indistinct concavity at the sides, and somewhat more strongly tapering in the posterior third, length 320  $\mu$ , basal width 100  $\mu$ , apical width 48  $\mu$ . Anal setae about 170  $\mu$  long.

Further measurements of female (holotype), in  $\mu$ : Head, length 276, width 228; lateral diameter of eye 108, length of cheeks behind them (to the hind margin) 170. Antennae, total length 460; lengths (breadths) of joints: 36 (base 48, apex 40), 60 (36), 74 (38), 74 (43), 66 (35), 60 (34), 58 - 60 (29), 32 (16). Prothorax, length 148, width 345 (with coxae 415). Pterothorax, length 415, width 450 - 467. Wings, length about 1038.

**Habitat:** 3 ♀♀, Java: Salatiga, 29.V.1909, in leaf galls of *Fagraea litoralis* BL. (together with *L. litoralis* (KA.)), leg. DOCTERS VAN LEEUWEN.

#### **Liothrips (Zopyrothrips) vitivorus (PRIESNER)**

1928. *Gynaikothrips claripennis* MOULTON, Annot. Zool. Japon., 11, p. 308.  
 1931. " " ISHIDA, Ins. Matsumur. Sapporo, 6, p. 39.  
 1934. " " TAKAHASHI, Bot. & Zool. Tokyo, 2, p. 1829.  
 1935. *Smerinthothrips vitivorus* PRIESNER, Philipp. Journ. Sci., 57, p. 364.  
 1936. " " TAKAHASHI, Philipp. Journ. Sci., 60, p. 442.

The pale yellow antennae (from joint 3) in which only joints 7 and 8 are very faintly shaded, the at the apex abruptly pale yellow middle and hind tibiae, the yellow fore tibiae (shaded at the extreme base only), the wholly hyaline wings, the almost hyaline basal wing bristles and lateral abdominal bristles, the slender, towards base very slightly widened head, the short postocular bristles, the short antero-angular prothoracic bristles, the vestigial interior antero-marginals, the 88 - 96  $\mu$  long, knobbed, dark epimeral bristles, and the 240 - 250  $\mu$  long tube, are the main characters of this species. The antennal joints are laterally comparatively little convex.

**Habitat:** Formosa (Daibu, Sozan, Koshun), on *Vitis* spec.

#### **Liothrips (Zopyrothrips) viticola (KARNY)**

1913. *Gynaikothrips viticola* KARNY, Bull. Jard. Bot. Buitenzorg, p. 112, fig. 79.  
 1915. " " KARNY, Zeit. wiss. Ins.-Biol., p. 327.  
 1921. " " Denkschr. Akad. Wiss. Wien, 98, p. 14.  
 1927. " " PRIESNER, in STELLWAAG, Weinbauinsekt., p. 191.  
 nec *Gynaikothrips viticola* PRIESNER, Treubia, VIII, Suppl., pp. 174, 200, pl. 14, fig. 96; 1926.

A rather large species having slender antennae and legs. **Female:** Black, middle and hind tibiae at the extreme apex narrowly pale yellow, fore tibiae wholly pale yellow, all tarsi pale yellow. Body bristles rather dark. Wings infumated, though paler at the extreme apex, with very little marked longitudinal stripe, that is accompanied posteriorly by a pale line;

hind wings with conspicuous dark longitudinal line, vanishing in posterior third. Antennae pale yellow from joint 3, joint 8 faintly shaded.

Head long, parallel-sided, cheeks behind eyes with a sharp angle, eyes parallel-sided in posterior half. Mouth-cone very broadly rounded. Maxillary stylets broadly separated, emerging from posterior third. Postocular bristles long, 92 - 96  $\mu$ , with pencil-tip, inserted far back and close to sides of head, about 55  $\mu$  distant from the eyes. Antennae slender, particularly joint 3 which is about 3.5 times as long as broad; joint 1 scarcely narrowed towards apex; joint 8 conical, not or scarcely narrowed at base; sense-cones moderately long, (longest on joint 4: 28  $\mu$ ) showing the normal number (3 with 1; 4 with 2 + 1<sup>1</sup>). Antero-marginal prothoracic bristles well developed, 45 - 80  $\mu$ , the inner bristles longer than the angulars. Epimeral bristles 150 - 160  $\mu$ , interior postero-marginals 120  $\mu$  long, all with hyaline pencil-tip. Basal wing bristles long, b. 2: 88  $\mu$ , b. 3: 112  $\mu$ , pencil-tipped; 11 - 14 cilia duplicated. Abdominal bristles long, pointed longest (b. 2) on segment VII ab. 213, b. 1: 165  $\mu$  long; bristles 1 - 3 on segment IX measuring 260 - 280  $\mu$ , pointed. Tube conical, without concavity, though strongly narrowed posterior third, length 287 - 293  $\mu$ , basal width 96  $\mu$ , apical width 45  $\mu$ . Legs slender, fore femora weak, fore tibiae long.

Further measurements of female, in  $\mu$ : Head, length 310, width 224; lateral diameter of eye 120, length of cheeks behind them 216. Antennae, total length 585; lengths (breadths) of joints: 32 - 36 (base 44), 60 (38), 96 - 100 (28), 93 - 96 (32), 94 (31), 88 (30), 72 (26), 42 - 44 (16). Prothorax, length 173, width 363 (inclusive of coxae 408). Pterothorax, length 450 - 467, width 500. Wings, length 1125, width across middle 128. Fore femora, width 108.

**Male:** unknown.

**Habitat:** ♀, Java, Kloet mountains ( $\pm$  1000 m.), 3.V.1912, in leaf galls of *Vitis lanceolaria* WALL., leg. DOCTERS VAN LEEUWEN.

### *Liothrips (Zopyrothrips) fumipennis* (KARNY)

1913. *Gynaikothrips fumipennis* KARNY, Bull. Jard. Bot. Buitenzorg, p. 104.  
 1915. " " " Zeit. wiss. Ins.-Biol., p. 326.  
 1925. " " " Bull. Deli Proefst. Medan, 23, fig. 19 (p. 49).  
 1926. " " " PRIESNER, Treubia, VIII, Suppl., pp. 173, 191; pl. XIII,  
     fig. 89.  
 1928. " " " KARNY, Treubia, X, p. 40.

A large species. **Female:** Blackish brown, middle and hind tibiae not paler at the apex, fore tibiae and tarsi wholly yellow. Immature spec-

imens are yellow with brown transverse spot on the prothorax, brown spot on the pterothorax, a dark cross-band on each abdominal tergite, and dark tube. Antennae wholly yellow from joint 3 onwards, only joint 8 somewhat infuscated towards apex. Wings strongly and evenly infumated, fore wing with an indistinctly indicated stripe; hind wing with conspicuous longitudinal stripe, and paler between it and fore margin.

Head parallel-sided, cheeks slightly roughened and set with minute setae, and sometimes having a slight concavity at the sides; eyes parallel-sided in posterior half. Mouth-cone very broadly rounded, truncate. Maxillary stylets broadly separated, inserted at posterior third of sides of head. Postocular bristles very short, blunt, not exceeding 32  $\mu$ , close to the eyes. Ocelli in normal position, area between them faintly reticulated. Fore legs not incrassate. Antero-angular prothoracic bristles short, blunt, not more than 32  $\mu$  long; epimerals moderately long, 140  $\mu$ , rounded at tip or with oval knob, interior postero-marginals small. Antennae normal, slender, also the terminal joints so, 8 narrowly conical; sense-cones moderately long, on joint 4 ab. 35  $\mu$ , number normal (1 on joint 3, 1 + 2<sup>+</sup> on joint 4). Metanotum longitudinally reticulate-striate anteriorly, nearly polygonally so in the middle, posteriorly. Basal wing bristles short, knobbed or much rounded at tip, 1 and 2 closer to each other than 2 to 3; lengths, 48  $\mu$ , 44  $\mu$ , 60  $\mu$ ; double fringe numbering 16 - 19. Abdominal bristles moderately long, b. 1 on segment VII knobbed, 105  $\mu$ , b. 2 narrowly rounded at tip, 165  $\mu$ ; bristles on IX narrowly rounded at tip, 240  $\mu$ , b. 2 pointed, 280  $\mu$ , b. 3 similar. Tube evenly conical, but somewhat constricted at the extreme apex, length 372  $\mu$ , basal width 128  $\mu$ , apical width 55  $\mu$ . Longest anal setae, length 230  $\mu$ .

Further measurements of female, in  $\mu$ : Head, length 263, width 230 - 235; lateral diameter of eye 116 - 120, length of cheeks behind them 173. Antennae, total length 575; lengths (breadths) of joints: 40 (base 56, apex 48), 68 (44), 96 (36), 84 (40), 82 (35), 82 (32), 68 - 70 (28), 52 (15). Prothorax, length 230, width 433 (inclusive of coxae 520). Pterothorax, length 520 - 535, width 623. Wings, length 1195, width across middle 136.

**Male:** Very similar, smaller, fore femora not enlarged, double fringe about 12. Bristle 1 of segment IX of abdomen with lanceolate tip.

Measurements of male, in  $\mu$ : Head, length 228, width 200. Epimeral prothoracic bristles, length 108 - 112. Tube, length 270. Bristles on segment IX: b. 1: 240 - 250, b. 2: Spine-like, short, b. 3: 280. (Description after the type material).

**Habitat:** Java: Plaboean forest near Weliri, 1.IX.1912, in leaf galls on *Conocephalus suaveolens*; 1 ♀, Salak mountains ( $\pm$  500 m.), 23.IX.

1921, in leaf roll on *Conocephalus suaveolens* (Herb. no. 5712); leg. DOCTERS VAN LEEUWEN.

***Liothrips (Zopyrothrips) macropanacis* spec. nov.**

**Female:** Black with black bristles, those of segment IX somewhat paler. Middle and hind tibiae wholly dark, fore tibiae and all tarsi pale yellow. Antennae pale yellow from joint 3 onwards, joint 7 indistinctly infuscated at the apex like the whole joint 8. Wings strongly infumated at the extreme base, otherwise faintly shaded all along, and with faint longitudinal stripe, hind margin of wing also pale grey; hind wing with broad, moderately strong longitudinal line.

Head slightly though distinctly narrowed towards base, cheeks with very slight concavity, somewhat constricted at the base. Mouth-cone broadly rounded. Maxillary stylets inserted at the middle of the sides of the head, rather approximated. Eyes large, oval. Postocular bristles well developed but not very long, 64 - 68  $\mu$ , pointed, ab. 30  $\mu$  distant from the eyes, and 36 - 40  $\mu$ , i.e. rather far from the sides of the head. Antennae normal, joint 3 longer than 4, joint 8 conical; sense-cones moderately long, on joint 4 32 - 36  $\mu$ ; joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup>, joints 5 and 6 with 1 + 1<sup>+1</sup> sense-cones. Antero-angular prothoracic bristles 40 - 45  $\mu$  long, the interiors shorter, 28 - 32  $\mu$ , all nearly pointed; epimerals slightly curved, pointed, 160 - 180  $\mu$ , the postero-marginals much shorter. Basal bristles of the normal wings almost pointed, b. 3: 113  $\mu$  (1 and 2 not visible); number of double fringe cilia about 14. Longest bristles on abdominal segment VII (b. 2) pointed, measuring 180 - 188  $\mu$ : Bristles on IX pointed, b. 1: 220  $\mu$ , b. 2: 228 - 240  $\mu$ . Tube slender, evenly conical, more strongly tapering only in posterior fourth, length 300  $\mu$ , basal width 96  $\mu$ , apical width 54  $\mu$ .

Further measurements (of female holotype), in  $\mu$ : Head, length 295, width 225 - 228; lateral diameter of eye 108 - 112, cheeks behind them 180. Antennae, total length 555; lengths (breadths) of joints: 28 (base 48, apex 42), 64 - 68 (40), 92 - 100 (40), 88 (47), 84 (40), 82 (36), 68 - 70 (28), 40 (15). Prothorax, length 180, width 363 (inclusive of coxae 407). Pterothorax, length 450, width 470. Wings, length about 1263, width across middle ab. 122. Hind tibiae, length 370.

**Male:** Basal wing bristle 1 short (probably also in the female) like b. 2 pointed, b. 3 rounded at tip. Bristle 2 on segment IX short but fine. Double fringe cilia numbering 10 - 14. Measurements of male (allotype), in  $\mu$ : Head, length 270, width 208. Antennae, from joint 3: 93 - 96 (40),

88 (42), 84 (36), 76 - 78 (32), 66 (24), 40 (15). Pterothorax, width 415. Wings, length 240. Bristles on segment IX of abdomen, b. 1: 220, b. 2: 52 - 64, b. 3: 240. Tube, length 265, basal width 84, apical width 48.

**Habitat:** 1 ♀, 1 ♂, Java: Tjibodas, 21.VI.1920, on *Macropanax cinnatum* Mig. (no. 4236); males & females, Java, G. Gedé, 1.VII.1925, in horn galls on *Schefflera polybotrya* KDS. (no. 8411), leg. DOCTERS VAN LEEUWEN.

### Liothrips (Zopyrothrips) heptapleuri (KARNY)

1913. *Gynaikothrips chavicae* ssp. *heptapleuri* KARNY, Bull. Jard. Bot. Buitenz., X, p. 109.  
 1915.        "        *heptapleuri* KARNY, Zeit. wiss. Ins.-Biol., p. 325.  
 1919.        "        *chavicae* var. *heptapleuri* UICHANCO, Philipp. Journ. Sci., XIV, 5, p. 549, pl. VI, fig. 3-5; pl. XV, fig. 5, 6.  
 1923.        "        *heptapleuri* KARNY, Treubia, III, p. 322.  
 1926.        "        "        PRIESNER, Treubia, VIII, Suppl., pp 173, 184.

**Female:** Fully mature specimens wholly black, middle and hind tibiae quite dark, fore tibiae yellow or slightly shaded at base and sides, all tarsi pale yellow. Antennae pale yellow from joint 3, joint 8 rarely infuscated. Wings very faintly infumated with little marked and not sharply defined longitudinal stripe and dark basal plate, seldom more strongly shaded. Body bristles dark, those of segment IX somewhat paler.

Head almost parallel-sided, sometimes cheeks very indistinctly convex, and slightly constricted at base, set with some minute dark bristles. Mouth-cone moderately broadly rounded. Maxillary stylets inserted about middle of head, moderately separated. Postocular bristles short, blunt, not surpassing sides of head, perhaps 30  $\mu$  long, and about as much distant from the eyes. Diameter of eye about 105  $\mu$ . Antennal, total length about 485  $\mu$ ; measurements of joints of a specimen of medium size; ? (base 46, apex 44), 60 (37), 84 - 88 (38), 80 (45), 74 (38), 68 (34), 62 (26), 36 (14)  $\mu$ . Sense-cones moderately long. Epimeral bristles of the prothorax rounded at tip, 120 - 125  $\mu$ , antero-angulars short, ab. 40  $\mu$ , interiors shorter. Pterothorax, width 467 - 520  $\mu$ . Wings moderately, 1 - 1.038 mm. long, ab. 100  $\mu$  broad across middle; basal bristles slightly knobbed, 56 - 65  $\mu$  long; 9 - 15 cilia duplicated. Bristles on segment IX practically pointed, though in some cases b. 1 (at least) seems to be slightly lanceolate at tip; b. 1: 240  $\mu$ , b. 2: 225  $\mu$  long. Tube conical, but slightly more strongly tapering in apical fourth, length 260 - 276  $\mu$ , basal width 100  $\mu$ , apical width about 50  $\mu$ .

**Male:** Very similar but with slightly larger fore femora. Bristle 2 of segment IX much varying in length, but shorter than b. 1 or 3.

**Habitat:** The types are from Java, Salatiga, 8.IV.1912, from leaf galls on *Schefflera elliptica* HARMS; further material is from Bogor, Botanical Gardens, 24.V.1919, leaf galls on *Schefflera odorata* MERR. & ROLFE, leg. DOCTERS VAN LEEUWEN; Sumatra, Fort de Kock, 920 m., II.1921, in horn galls on *Schefflera* sp. (no. 1164), leg. E. Jacobson; Sumatra, Sibolangit, 4.II.1924, in leaf gall on *Schefflera elliptica* (no. 7737), leg. DOCTERS VAN LEEUWEN; N.W. Soemba, Laora, 100 m., IV.1925, in galls on *Schefflera elliptica*, leg. DAMMERMAN.

**Liothrips (Zopyrothrips) extractus spec. nov.**

1923. *Gynaikothrips viticola* KARNY, p. parte *Treubia*, III, p. 326.

1926. " " PRIESNER, *Treubia VIII, Suppl.*, p. 174, pl. XIV, fig. 96 (larva).

**Female:** Brownish black, middle and hind tibiae not paler at the apex, or at least not pale yellow, fore tibiae and all tarsi pale yellow. Antennae wholly pale yellow from joint 3 onwards. Wings scarcely shaded and with only indistinct longitudinal shade along middle, and the hind wing, too, with a similar faint shade. Postocular and prothoracic bristles dark, basal wing bristles yellowish, and also *all abdominal bristles pale*, only the anal setae dark at the base.

Head much shorter than in *L. viticola*, cheeks very slightly narrowed towards base, head broadest at the base, the latter rounded at the sides, and only for a short space (one-third of the length) parallel-sided posteriorly. The posterior ocelli far forward. Mouth-cone very broadly rounded, almost truncate, labrum blunt. Maxillary stylets inserted at posterior third or fourth, much separated. Postocular bristles well developed, blunt or slightly knobbed, directed upwards, perhaps 80  $\mu$  long. Antennae moderately long, quite normal, joint 7 much shorter than 6, joint 8 conical; joint 3 with 1, joint 4 with 1 + 1<sup>+1</sup> sense-cones which are short, not more than 20  $\mu$  long on joint 4. Antero-angular prothoracic bristles moderately long, not exceeding 43  $\mu$ , epimerals stout, blunt and open at tip, 100 - 112  $\mu$ . Basal wing bristles in one row, 56  $\mu$ , 72  $\mu$  and 84  $\mu$  long, knobbed; double fringe cilia about 13. Abdominal bristles long, pale, longest ones on segment VII 215 - 220  $\mu$  long, pointed, b. 1 within it knobbed or rounded at tip, 160 - 170  $\mu$ ; bristles on IX, b. 1, 2: 248 - 260  $\mu$ , b. 3: 240 - 250  $\mu$ , pointed. Tube moderately long, evenly conical, 260 - 270  $\mu$  long, at base 100  $\mu$ , at

apex 46  $\mu$  broad. Anal setae, length ab. 180  $\mu$ . Fore femora very slightly thickened.

Further measurements of female (holotype), in  $\mu$ : Head, length 277, width across eyes 222 (length inclusive of mouth-cone 433); lateral diameter of eye 120, length of cheeks behind them 160 - 180. Antennae, lengths (breadths) of joints from joint 3: ? (32), 80 (36), 74 (30), 79 (32), 60 (28), 36 - 38 (16). Prothorax, length 150, width 330 (inclusive of coxae 385). Fore femora, width 107. Pterothorax, length 400, width 415 - 424.

**Male:** Only 1 laterally mounted specimen at hand that agrees with the female. Double fringe 12. Tube, length 256  $\mu$ . Bristles on segment IX pointed, b. 1 ab. 250  $\mu$ , b. 2 short. Antennae, lengths of joints from joint 2: 60, 76, 72 - 76, 66, 66, 52 - 54, 32 - 34  $\mu$ .

The specimens from Kajoeadi have somewhat longer major bristles but they belong as to my opinion to the same species. From *L. viticola* (KARNY) the species is totally different.

**Habitat:** 1 ♀ (holotype), Island Kalao Toa, 5.V.1913, in leaf gall on *Vitis (Tetrastigma) lanceolaria* WALL. together with *L. pallicrus* (KARNY); 1 ♀, 1 ♂, Island Kajoeadi, south of Celebes, 4.V.1913, in gall on *Vitis lanceolaria*, leg. DOCTERS VAN LEEUWEN.

#### *Liothrips (Zopyrothrips) jacobsoni* spec. nov.

**Female:** Similar to *L. extractus*, but at once to be distinguished by the dark abdominal bristles, the not truncate mouth-cone and the presence of three sense-cones on antennal joint 4.

Dark brown, tibiae of middle and hind legs not paler at the apex, fore tibiae yellow, fore femora yellow at the extreme apex, all tarsi pale yellow. Antennae pale yellow from joint 3, joint 7 indistinctly shaded at the apex, joint 8 so at the margins and apex. Wings infumated, with dark longitudinal shade that is accompanied by a pale stripe, and shows (if always?) in the proximal part a fine pale median line; hind wings with a broad longitudinal shade that occupies the posterior marginal half and is only developed in the posterior longitudinal half of the wing. Body bristles blackish, at the apex broadly hyaline.

Head moderately long, sides only slightly rounded and slightly narrowed towards base. Mouth-cone rather broadly rounded, but not truncate. Maxillary stylets inserted right behind eyes, about at middle of head, approximated. Eyes oval, i.e. rounded posteriorly. Cheeks with a few minute setae. Postocular bristles moderately long, 60 - 65  $\mu$ , blunt, about 28  $\mu$  distant from the eyes, somewhat nearer to the margin of the vertex

than to the fore margin of the eyes. Ocelli in normal position. Antennae moderately long, normal, joint 8 conical; sense-cones short, 28 - 32  $\mu$ . long on joint 4; joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup> sense-cones. Fore femora very slightly thickened. Bristles at the fore margin of the prothorax short, angulars ab. 30  $\mu$ , interiors smaller; epimeral bristles hyaline in apical third, tip obliquely truncate or open, length 130 - 144  $\mu$ , interior postero-marginals shorter, perhaps 70  $\mu$ . Pterothorax distinctly broader than long. Wings broad, somewhat curved, basal bristles blunt, (e.g. 76  $\mu$ , 88  $\mu$ , 88  $\mu$  long); 14 cilia duplicated. Abdominal bristles dark, broadly hyaline at the apex, longest bristle on segment VII pointed, 168 - 172  $\mu$  long, b. 1 of the same length, but blunt. Bristle 1 of segment IX with narrowly lanceolate tip, b. 2 indistinctly lanceolate, both about 250  $\mu$  long, b. 3 hair-like, pointed. Tube slender, conical, very slightly more strongly narrowed in posterior third; length 316 - 320  $\mu$ , basal width 112  $\mu$ , apical width 53  $\mu$ .

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 286, width 224; lateral diameter of eye 108, length of cheeks behind them 188 - 192. Antennae, total length 530; lengths (breadths) of joints: 32 - 36 (base 48, apex 40), 64 (38), 88 (42), 84 (48), 84 (40), 72 (36), 86 (27), 38 (15). Prothorax, length 190, width 380 (inclusive of coxae 433). Pterothorax, length 450, width 520. Wings, length 1160, width across middle 116. Fore femora, width 120.

**Habitat:** 1 ♀, Sumatra: Bukittinggi (Fort de Kock), 920 m, II.1921, in horn gall on *Schefflera* spec. (no. 1164), leg. E. JACOBSSON.

#### *Liothrips (Zopyrothrips) jasmini* spec. nov.

A small species. **Female:** Black, middle and hind tibiae blackish, very narrowly pale yellow at the extreme apex (apical margin), fore tibiae wholly pale yellow, little darker at the extreme base. Antennal joints: 3 - 7 pale yellow, 8 faintly shaded. Wings slightly shaded, paler again at the apex, with distinct but not very sharp longitudinal stripe, hind wings with finer, but not very dark, stripe. Body bristles and those at the wing base rather dark, abdominal bristles paler at their tip, those on segment IX still paler.

Head comparatively short, not distinctly narrowed towards base, ocelli in normal position, *postocular bristles vestigial*. Mouth-cone moderately broadly rounded, labrum blunt. Maxillary stylets inserted at posterior third, moderately separated. Antennae normal, moderately long, joint 8 conical, though narrower at the base than joint 7 at the apex; joint 3

with 1, joint 4 with  $1 + 2^{+1}$ , joints 5 and 6 with  $1 + 1^{+1}$  sense-cones; these are slender, on joint 4 only about  $25 \mu$  long. Legs moderately long, fore femora weak. Antero-marginal prothoracic bristles short, the interior bristles  $25 \mu$ , the angulars  $32 \mu$  long; epimeral bristles long,  $100 - 110 \mu$ , interiors  $60 \mu$ , all blunt. Basal wing bristles moderately long,  $44 - 56 \mu$ ,  $52 - 55 \mu$  and  $48 - 52 \mu$ , blunt or rounded at tip; wings short, ab.  $865 \mu$ , with  $9 - 11$  cilia duplicated. Interior lateral bristle (b. 1) on segment VII of the abdomen longer than b. 2, pointed, the exterior one rounded at the tip,  $120 - 124 \mu$  long; bristles on segment IX hairlike, pointed, b. 1 - 3 about  $220 \mu$  long. Tube short, evenly conical, length  $225 \mu$ , basal width  $96 \mu$ , apical width  $46 \mu$ . Anal setae  $180 - 190 \mu$  long.

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 225, width 225; lateral diameter of eye 103, length of cheeks behind them 135 - 140. Antennae, total length 440; lengths (breadths) of joints: 32 - 36 (base 44, apex 34), 56 (36), 64 (29), 64 (35), 68 (30), 64 (28), 58 (24), 34 (14). Prothorax, length 142, width 346 (inclusive of coxae 377). Pterothorax, length 400, width 450. Wings, length 865, widths across middle 95.

**Habitat:** 1 ♀, Java: Karang-Anjar near Semarang, 14.VII.1912, in leaf gall on *Jasminum* spec., leg. DOCTERS VAN LEEUWEN.

### (?) *Liothrips (Zopyrothrips) maximus* (KARNY)

1923. *Gynaikothrips maximus* KARNY, Journ. Siam Soc., XVI, p. 138.

1928. " " " Treubia, X, p. 39.

1926. " " PRIESNER, Treubia VIII, Suppl., p. 174.

**Female:** Black, middle and hind tibiae wholly dark, scarcely paler at the apex, fore tibiae yellow, more or less shaded with grey-brown, tarsi yellow, slightly shaded with grey. Antennal joints: 3 - 5 pale yellow, 4 scarcely, 5 slightly shaded at the apex, 6 pale brown, basal half pale yellow, 7 and 8 dark. Wings shaded with yellow, with a broad but not very sharply defined brownish longitudinal stripe, hind wings with a sharper stripe that becomes paler but broader towards tip of wing. Body bristles black, those on abdominal segment IX paler.

Head moderately long, strongly narrowed towards base, distinctly constricted at the base. Mouth-cone broadly rounded. Maxillary stylets emerging about from posterior fourth, widely separated. Postocular bristles very long, pointed, at least  $130 \mu$ . Antennae stout, joint 8 little narrowed at base; sense-cones moderately long, fine, on joint 5 measuring  $40 - 45 \mu$ . Antero-marginal prothoracic bristles well developed, much varying in length, to  $70 \mu$  (angulars), with pencil-tip; epimerals long, slightly rounded

at apex, not well measurable. Fore femora stout, slightly thickened. Wings rather broad, basal bristles long (e.g. 112  $\mu$ , 136  $\mu$  and 150  $\mu$ , not quite pointed, sometimes shorter; double fringe cilia numbering 18 - 19. Abdominal bristles long, b. 2 on segment VII pointed, 200 - 212  $\mu$  long, b. 2 on segment IX, 260 - 280  $\mu$  long. Tube not exactly evenly conical, having a slight concavity behind base and slight convexity about the middle, length 280 - 320  $\mu$ , width across base 105 - 118  $\mu$ , at apex 48 - 52  $\mu$ .

Measurements of ♀, in  $\mu$ : Head, length 260 - 295, width 112 - 120, length of cheeks to constriction 170. Antennae, lengths (breadths) of joints of lectotype: 40 ? (base 52, apex 43), 68 (37), 90 (34), 90 (45), 84 (44), 76 (36), 64 (29), 40 - 42 (15). Pterothorax (of lectotype), length 467, width 485. Wings (of lectotype) length 1332, width across middle 132.

**Habitat:** ♀♀ (type material), Indochina: Dalat Lang Bien,  $\pm$  1500 m., 25.X.1920, in leaf galls (herb. no. 72) on unidentified plant, leg. DOCTERS VAN LEEUWEN.

To this species I have to remark that the fore femora of the female are slightly stouter than usual and the wings somewhat broader than in typical species of the genus; since the male is not yet known, and it might possess a tarsal tooth and enlarged femora, the species is possibly not a true *Liothrips*.

#### *Liothrips (Zopyrothrips) nigripes* (KARNY)

1916. *Gynaikothrips nigripes* KARNY, Zeit. wiss. Ins.-Biol., p. 193.

1926. " " PRIESNER, Treubia, VIII, Suppl., p. 211 (?).

1928. " " KARNY, Treubia, X, p. 38.

**Female:** Black, legs dark, middle and hind tibiae not paler at the apex, tarsi grey-yellow, fore tibiae testaceous, though strongly infuscated at the sides. Antennae (in all female specimens broken off) having joints: 3 - 5 (of male) pale yellow, 5 perhaps sometimes slightly shaded at the extreme apex, 6 pale yellow but rather abruptly dark in apical half, 7 and 8 wholly dark brown. Major body bristles darkened, those of segment IX paler. Wings with dark basal plate, then strongly infumated all along and with indistinct, ill-limited longitudinal stripe; basal wing bristles shaded.

Head moderately long, cheeks little rounded, very slightly narrowed towards base; mouth-cone broadly rounded. Maxillary stylets inserted at posterior third, rather widely separated. Postocular bristles long, 108 - 116  $\mu$ , about 25  $\mu$  distant from the eyes, lateral, with pale rounded tip. Eyes oval, ocelli normally posited. Antennae quite normal, joint 8 conical; sense-cones moderately long, slender, on joint 4 measuring about 30  $\mu$ ;

joint 3 with 1, joint 4 with  $2 + 1^+$ , joints 5 and 6 with  $1 + 1^+$ . Antero-angular prothoracic bristles not quite sharp, 44 - 48  $\mu$  long, interiors somewhat smaller; epimerals rounded at tip, 104 - 112  $\mu$ , interiors 44 - 48  $\mu$ . Basal wing bristles (e.g. 65  $\mu$ , 72  $\mu$  and 72  $\mu$ ) not quite acute, about pencil-tipped; double fringe (of 1 specimen) 9 - 13. Bristle 1 of segment VII 145, b. 2: 168, the former slightly rounded at tip, the latter pointed; bristles on IX (b. 1, 2) 250 - 260  $\mu$  long, pointed. Tube almost evenly conical, at the extreme apex somewhat constricted, length 244 - 256  $\mu$ , width across base 95  $\mu$ , at apex 45  $\mu$ . Anal setae, length 180  $\mu$ .

Further measurements of female, in  $\mu$ : Head, length 244, width 216; lateral diameter of eye 96 - 100, length of cheeks behind them 160. Prothorax, length 136, width 346 - 363 (without coxae). Pterothorax, length 380, width 435. Wings, length 900 - 917, width across middle 100.

**Male:** No apparent difference. Tube having a slight concavity behind base and being slightly more strongly narrowed in posterior third. Wing with 11 - 17 cilia duplicated. Measurements, in  $\mu$ : Antennae, lengths (breadths) of joints; ? 24 (base 44, apex 36), 56 (32), 80 (29), 72 (38), 66 (32), 66 (30), 60 (25), 32 (12). Head length 250. Prothorax, length 140. Pterothorax, width 433, length 390. Tube, length 260, basal width 90, apical width 42. Bristles on segment IX, b. 1: 260, b. 2 varying (80 - 100, in one case 170), b. 3: 280 - 290.

**Habitat:** The types are from Java, Tempoeran, 1.III.1914, in leaf rolls on *Eugenia* spec. (leg. DOCTERS VAN LEEUWEN). Two specimens from the same date and locality in leaf rolls of *Ficus* spec. (probably due to an error in labelling).

#### Liothrips (Zopyrothrips) simillimus (KARNY)

- 1915/16. *Gynaikothrips simillimus* KARNY, Zeit. wiss. Ins.-Biol., pp. 325 and 16, respectively.  
 1921. " " " Denkschr. Akad. Wiss. Wien, 98, p. 21.  
 1926. " " " PRIESNER, Treubia, VIII, Suppl., pp. 173, 187; pl. XII, fig. 85.  
 1927. " " " in STELLWAAG, Weinbauinsekten, p. 194, fig. 90.

**Female:** A smaller species having moderately long head, weak fore legs, short major bristles of the anterior body and short, evenly conical tube. Mouth-cone very broadly rounded. Black-brown, middle and hind tibiae dark, though abruptly pale yellow at the extreme apex, fore tibiae yellow or very indistinctly shaded, all tarsi pale yellow. Body bristles more

or less darkened, the abdominals somewhat paler. Base of wing hyaline, plate hyaline, too, slightly shaded in its three apical fourths, slightly punctured under low magnification, without longitudinal streak. Antennal joints: 3 and 4 pale yellow, 5 as well but sometimes slightly infumated at the apex, joints 6 - 8 dark, but 6 paler than 7 or 8.

Head normal, about 225  $\mu$  long, 200  $\mu$  broad; lateral diameter of eye 104 - 108  $\mu$ . Maxillary stylets emerging from posterior third or fourth, widely separated. Postocular bristles vestigial, situated 24 - 28  $\mu$  behind eyes. Antennae with joint 3 asymmetrical, joint 8 conical, broad at base. Sense-cones short, longest one on joint 4: 20  $\mu$ ; joint 3 with 1, joint 4 with  $1 \pm 2+1$  sense-cones. Antero-angular prothoracic bristles short, about 25  $\mu$ , the inner bristles minute, 12  $\mu$ . Epimeral bristles only 72 - 76  $\mu$  long, interiors 28 - 40  $\mu$ , knobbed. Fore wings having 6 - 10 cilia duplicated. Abdominal bristles rather long, longest on segment VII: 112  $\mu$ , practically pointed; bristles on IX, 165  $\mu$ , 180  $\mu$  and 160  $\mu$  long. Tube evenly conical, length 164 - 172  $\mu$ , basal width 84 - 88  $\mu$ , apical width 40  $\mu$ . Anal setae, length 150  $\mu$ .

Further measurements of female, in  $\mu$ : Antennae total length, 410 - 415; lengths (breadths) of joints: 28 (base 40, apex 38), 56 (34), 68 (30), 60 (28), 62 (31), 52 (28), 52 - 54 (24), 32 (14). Pterothorax, length 363, width 363 - 380. Wings, length ab. 865, width across middle 84 - 88.

**Male:** Fore legs also weak. Bristles on segment IX, b. 1 hair-like, about 160  $\mu$ , b. 2 long, pencil-tipped (not spine-like), 100 - 105  $\mu$ , b. 3: 145  $\mu$ , shape like b. 1. Tube, length 148  $\mu$ , basal width 80  $\mu$ , apical width 36  $\mu$ . Pterothorax, width 310  $\mu$ .

**Habitat:** Types from Java: Ungaran mountains ( $\pm$  900 m.), 20.X. 1913, in leaf galls on *Tetrastigma pergamaceum* PLANCH. (= *Vitis pergamacea* MIQ.), leg. DOCTERS VAN LEEUWEN.

#### *Liothrips (Zopyrothrips) tetrastigiae* spec. nov.

**Female:** A large species. Specimens not fully mature, brown; fore tibiae and all tarsi pale yellow, middle and hind tibiae dark, somewhat paler at the extreme apex. Antennal joints: 3 - 6 pale yellow, 7 only at the base pale yellow, otherwise like joint 8 dark. Bristles on anterior body dark, abdominals pale, though in mature specimens most likely infumated. Wings distinctly shaded, but the longitudinal stripe is scarcely indicated.

Head elongate, parallel-sided, with quite inconspicuous concavity of the cheeks behind the eyes, and scarcely noticeable constriction at the base, and anteriorly where they touch the eyes with a slight angle; cheeks

somewhat roughened. Eyes moderately large. Postoculars conspicuous, rounded at tip, not well measurable, about 35  $\mu$  distant from the eyes. Anterior ocellus slightly in front of fore margin of eyes, though not surpassing interantennal projection. Mouth-cone very broadly rounded. Maxillary stylets emerging from posterior third, rather widely separated. Antennae slender, particularly joint 3; joint 8 elongate-conical, narrower at the base than joint 7 at the apex; sense-cones moderately long, on joint 4 about 28  $\mu$ ; joint 3 with 1, joint 4 with 1 + 2<sup>+1</sup>. Fore femora slightly stouter than middle and hind femora. Anterior prothoracic bristles moderately long, interiors not more than 25  $\mu$ , angulars about 50  $\mu$ ; epimerals and postero-marginals rounded at tip, the former 135  $\mu$ , the latter 100  $\mu$  long. Pterothorax heavy, wings long, basal bristles, b. 1: 84 - 92  $\mu$ , pencil-tipped, b. 2 and 3 rounded at tip, 100 - 110  $\mu$  long; double fringe numbering 14 - 18. Longest bristle on segment VII about 175  $\mu$ , pointed; bristles on IX (1 or 2) about 240  $\mu$ , pointed. Tube nearly evenly conical, not thickened at base only margined, length 280 - 290  $\mu$ , basal width 105  $\mu$ , apical width 52  $\mu$ . Anal setae, length about 215  $\mu$ .

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 277, width across eyes 216, across cheeks 216 - 220; lateral diameter of eye 108, length of cheeks behind them 184 - 188. Antennae, lengths (breadths) of joints from joint 3: 88 - 92 (34), 92 (39), 92 (36), 76 - 80 (34), 66 (28), 44 (16). Width of fore femora 115. Prothorax, length 176, width 400 (inclusive of coxae 440). Pterothorax, length 485, width 535. Wings, length 1263, width across middle 105.

**Male:** Unknown.

**Habitat:** Java: G. Gedé, Tjibodas ( $\pm$  1700 m.), 8.IX.1925, in leaf galls on *Tetrastigma mutabile* PLANCH., leg. DOCTERS VAN LEEUWEN.

(?) **Liothrips (Zopyrothrips) latro** spec. nov.

**Female:** Chestnut-brown, middle and hind tibiae dark, very narrowly pale yellow at the extreme apex, fore tibiae and all tarsi pale yellow. Antennal joints: 3 - 5 (-6) pale yellow, 5 very faintly pale grey in apical half or at the apex, 6 more distinctly shaded in apical half, 7 and 8 dark, 7 sometimes paler at the base. Wings infumated all along and with faint longitudinal stripe that is accompanied by a pale line posteriorly from middle of wing to the apex; the longitudinal stripe of the hind wing finer and darker. Major body bristles dark.

Head not much elongate, cheeks straight, strongly narrowed towards base. Ocelli in normal position. Mouth-cone very broadly rounded, labrum

blunt. Maxillary stylets as in the former species. Postocular bristles moderately long, in the holotype about only 50  $\mu$ , pointed, situated much laterad, their distance from each other 190  $\mu$ . Eyes large, but laterally not protruding. Antennae long, also joint 7 slender, joint 8 slightly narrowed at the base; sense-cones moderately long, fine, joint 3 with 1, joint 4 with 1 + 2<sup>+</sup>, Antero-angular prothoracic bristles not quite acute, about 55  $\mu$  long, the interiors minute; epimerals curved, with somewhat thickened white pencil-tip, 144 - 153  $\mu$ . Basal wing bristles long, b. 1, 2: 68 - 80  $\mu$ , b. 3: 92 - 112  $\mu$ ; wings normal, with 11 - 15 cilia duplicated. Abdominal bristles long, the longest on segment VII 170  $\mu$ , pencil-tipped; bristles 1 and 2 of segment IX also with pencil-shaped tip (or b. 2 pointed), 192 - 208  $\mu$ , b. 3 pointed, of the same length. Tube long, evenly conical, though constricted at the extreme apex, length 363 - 385  $\mu$ , basal width 104 - 108  $\mu$ , apical width 56 - 58  $\mu$ . Anal setae about 220  $\mu$  long.

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 277, width 256; lateral diameter of eye 120, length of cheeks behind them 160. Antennae, total length 568; length (breadth) of joints: 36 (base 56, apex 44), 72 (38), 88 - 92 (32), 84 (36), 84 (34), 84 (32), 68 (25), 50 (17). Prothorax, length 180, width 372 (inclusive of coxae 425). Pterothorax, length 476, width 484 - 500. Wings, length 1298, width across middle 126. Hind tibiae, length 330.

**Male:** unknown.

This species has much in common with *Chalepothrips ardisiae* sp. n. namely wing shape and coloration, antennae, tube, but is different by the longer, differently shaped bristles, the totally different shape of the head, all characters constant in 6 specimens. Since the male is not known I am preliminarily describing it under *Liothrips*, though it may be congeneric with the above named new form that will be treated below.

**Habitat:** Java: Tjisarua near Bogor, 1000 m., 26.VII.1925, in leaf gall (no. 8440) on *Ardisia* spec. (leg. DOCTERS VAN LEEUWEN).

**Note:** A specimen agreeing in all essential characters with the above described *L. latro*, differs in having shorter basal wing bristles (56  $\mu$ , 68  $\mu$ , 72  $\mu$ ), and shorter bristles of segment IX of the abdomen, of which b. 1 is rounded at the tip, 160  $\mu$ , b. 2: 240  $\mu$ , b. 3: 225  $\mu$  long. This female specimen may belong to another very close species, although I cannot decide about this from a single example. **Habitat:** Sumatra, Bandarbaru, Oerbos, ( $\pm$  1000 m.), 14.VII.1921, in leaf gall (no. 5539) on *Ardisia* spec. (leg. DOCTERS VAN LEEUWEN).

**Liothrips (Zopyrothrips) schefflerae spec. nov.**

**Female:** A moderately sized species. Dark brown, middle and hind tibiae dark, scarcely paler at the extreme apex, not yellow, fore tibiae yellow, dark at the margins, particularly at the interior margin, all tarsi pale yellow. Antennal joints: 3-5 pale yellow, 5 faintly shaded at the apex, 6 pale yellow about basal half, shaded with grey-brown in apical half, 7 testaceous in basal half (or less), dark in apical half, like all of joint 8. Major body bristles blackish. Wings strongly infumated with brown, and with dark longitudinal stripe that is accompanied in the apical half of the wing by a pale line posteriorly, hind wing shaded and with sharp dark longitudinal line, and also a strong dark antero-marginal line.

Head short, cheeks only slightly narrowed towards base, mouth-cone broadly rounded. Maxillary stylets arising from posterior third or fourth of head, widely separated. Postocular bristles well developed, about 65  $\mu$ , much lateral, and little (about 17  $\mu$ ) distant from the eyes. Antennae much longer than in *L. racemosae* sp. n., joint 1 short, joint 7 broadest in basal third, joint 8 distinctly somewhat constricted at base; joint 3 with 1 (exceptionally 2), joint 4 with 1 + 2<sup>+1</sup>, sense-cones which are long and fine, the longest on joint 4 measuring 65  $\mu$ , the shorter ones 50  $\mu$ , all strongly curved. Antero-marginal prothoracic bristles very short, the angulars at most 26  $\mu$ , the interiors minute; epimeral bristles 124-128  $\mu$  long, blunt at tip. Wings long, slightly curved, basal bristles not fully sharp, in one row, length 60  $\mu$ , 60  $\mu$  and 80  $\mu$ ; double fringe numbering 10-11. Abdominal bristles moderately long, longest on segment VII 132-140  $\mu$ , pointed; bristles on segment IX pointed, b. 1 distinctly shorter than b. 2, the former 120  $\mu$ , the latter 220  $\mu$  long. Tube with a slight convexity in apical third narrowed towards apex with sides straight, length 277  $\mu$ , basal width 90  $\mu$ , apical width 48  $\mu$ . Anal setae only 140-160  $\mu$  long.

Further measurements of ♀, in  $\mu$ : Head, length 204-208, width 204-216; lateral diameter of eye 105, length of cheeks behind them 125. Antennae, total length 490; lengths (breadths) of joints: 22 (base 44, apex 40), 64 (36), 68 (32), 74-76 (36), 78 (32), 76 (30), 64 (25), 45 (14). Prothorax, length 173. Pterothorax, length 363 (?), width 407. Wings, length 1160, width across middle 100.

**Male:** unknown.

**Habitat:** 2 ♀♀, Java: Tjibodas, Gn. Gedé (1400 m.), 17.II.1925, in leaf gall on *Schefflera scandens* Kds., leg. DOCTERS VAN LEEUWEN.

**Liothrips (Zopyrothrips) racemosae spec. nov.**

**Female:** A smaller species. Black-brown, middle and hind tibiae dark, only very indistinctly and extremely narrowly pale yellow at the apex, fore femora yellow at the apical margin, fore tibiae yellow or with faint marginal shade, tarsi yellow. Body bristles black, those of segment IX little paler. Antennal joints: 3 - 6 pale yellow, 6 with a faint shade in apical third, 7 and 8 more or less pale grey-brown. Wings shaded with grey-brown, often paler behind the basal plate, and with a broad, faint longitudinal shade in apical half medianly; behind it (along hind margin) with longitudinal pale line.

Head short, cheeks distinctly narrowed towards base, sides straight, showing an acute angle right behind the eyes. Mouth-cone broadly rounded. Maxillary stylets inserted behind middle of sides of head, close to postoculars; moderately separated. Postocular bristles moderately long, about  $55\ \mu$ , from the eyes  $15 - 20\ \mu$  distant and situated far laterad. Eyes large, rounded. Antennae quite normal, though joint 4 comparatively short, joint 8 not or scarcely narrowed at the base; sense-cones moderately long,  $24 - 26\ \mu$  on joint 4; joint 3 with 1, joint 4 with  $1 + 2^{+1}$  sense-cones. Antero-marginal prothoracic bristles subequal in length,  $35 - 40\ \mu$ ; epimerals pointed, tip hyaline, about  $120\ \mu$  long. Fore femora stout but not enlarged. Basal wing bristles well developed, pencil-tipped,  $80 - 88\ \mu$  long; duplicated cilia of the comparatively shorter wings numbering 8 - 11. Abdomen with long bristles, the longest (b. 2) on segment VII  $144 - 148\ \mu$ , with hyaline pencil-tip; bristles on segment IX long, hair-like,  $260 - 280\ \mu$ . Tube not quite evenly conical but with slight concavity in the anterior third and convexity beyond middle, then narrowed towards tip with sides straight; length of tube  $286 - 288$ , basal width 100, apical width  $52\ \mu$ . Longest anal setae about  $180\ \mu$  long.

Further measurements of ♀ (holotype), in  $\mu$ : Head, length 260, width 240; lateral diameter of eye 108, length of cheeks behind them 160. Antennae, total length 460; length (breadth) of joints: 28 (base 50, apex 44), 60 (38), 80 (36), 64 (40), 64 - 66 (36 - 38), 62 - 64 (32), 60 (26), 36 - 38 (15). Prothorax, length 165, width 363 (inclusive of coxae 415). Pterothorax, length 260, width 303. Wings, length 1038, width across middle 105.

**Male:** Scarcely slenderer, double fringe the same. Bristle 1 and 3 of segment IX fine, hair-like,  $220\ \mu$ , b. 2 spine-like, somewhat curved,  $80 - 100\ \mu$ . Tube of the same shape as in the female, somewhat thickened at the base, length  $250\ \mu$ , basal width  $96\ \mu$ , apical width  $45\ \mu$ .

**Habitat:** Numerous specimens of both sexes, Java, Bogor, Tjikeumeuh, 17.VIII.1925, on *Fagraea racemosa* JACK., leg. DOCTERS VAN LEEUWEN.

The three following species deviate in certain characters from all those described above.

(?) **Liothrips rectigenis** (KARNY)

1923. *Gynaikothrips rectigenis* KARNY, Journ. Siam Soc., 16, p. 140.

1926. " " PRIESNER, Treubia, VIII, Suppl., pp. 172, 214.

**Female:** Black-brown, middle and hind tibiae dark, only slightly brownish or paler at the extreme apex, fore tibiae testaceous, darkened at the margins, tarsi yellow, shaded with grey. Antennal joints: 3 - 5 pale yellow, 5 not or scarcely shaded, 6 very slightly shaded in apical third, 7 and 8 dark, 7 yellowish at the base. Body bristles dark, but not black, the bristles towards the apex of the abdomen are paler. Wings slightly infumated, and with distinct, broad but not very dark longitudinal stripe that is punctured at apex (under low magnification); hind wing with sharper and narrower longitudinal stripe.

Head elongate, scarcely narrowed towards base, eyes laterally slightly protruding; anterior ocellus slightly in front of a level across fore margin of eyes. Mouth-cone very narrowly rounded, labrum distinctly pointed. Maxillary stylets emerging from behind middle of sides of head, very widely separated. Postocular bristles inserted far back, 36 - 56  $\mu$  distant from hind margin of eyes, and 60 - 65  $\mu$  long, open at the tip. Antennal joints: 1 little narrowed towards apex, 3 convex posteriorly, 8 pointed, not narrowed at the base; sense-cones in the usual number, moderately, on joints 4 or 5 about 30  $\mu$ , long. Antero-marginal prothoracic bristles blunt and open, length 48 - 53  $\mu$ ; epimerals short, about 100  $\mu$  long, knobbed. Pterothorax about as long as broad, 433  $\mu$ . Wings evenly wide, about 985  $\mu$  long, across middle 90  $\mu$  broad; basal bristles distinctly knobbed, measuring e.g. 60  $\mu$ , 72  $\mu$  and 72  $\mu$ ; 10 - 13 cilia duplicated. Lateral abdominal bristles moderately long, both pairs knobbed up to segment VI, b. 2 on segment VII rounded at tip, 120 - 125  $\mu$  long. B. 2 on segment IX not quite sharp, rounded at tip or nearly pointed, 220  $\mu$  long, b. 1 narrowly knobbed, 172 - 180  $\mu$  long, b. 3 hair-like, pointed. Tube short, nearly evenly conical, 235  $\mu$  long, 92  $\mu$  broad across base and 45  $\mu$  across apex. Anal hairs measuring about 160  $\mu$ .

Further measurements of (lectotype) female, in  $\mu$ : Head, length 260, width 208; lateral diameter of eye 105, length of cheeks behind them (exclusive of collar) 160. Prothorax, length 147, width 337 (inclusive of

coxae 380). Antennae, lengths (breadths) of joints: 24 (base 44, apex 40), 60 (36 - 40), 68 - 70 (32), 68 (36), 70 (32), 70 (32), 52 (28), 40 (14).

**Habitat:** 2 ♀♀ (one strongly mutilated), South Siam, Tatchei, 1.X.1920, in galls of unknown plant (herb. no. 118), leg. DOCTERS VAN LEEUWEN.

This species is very likely not a true *Liothrips*, but its correct place cannot be ascertained before the male will be discovered.

### *Liothrips (Zopyrothrips) nervisequus* (KARNY)

1915. *Dolerothrips nervisequus* KARNY, Zeit. wiss. Ins.-Biol., XI, p. 208.

A smaller species having short antennae. **Female:** Black, fore tibiae and all tarsi pale yellow, middle and hind tibiae only at the extreme apical margin pale. Antennal joints: 3 - 5 pale yellow, 6 slightly shaded at the apex, 7 yellow at the base or in basal half, 8 dark. Wings strongly infumated all along, longitudinal stripe not distinctly visible, hind wings with narrow, brown stripe.

Head short, scarcely narrowed towards base, sides slightly roughened, with a few minute setae. Mouth-cone broadly rounded. Maxillary stylets emerging from posterior fourth, widely separated. Postocular bristles vestigial. Antennae short, length only about 415  $\mu$ ; joint 3 straight at the interior margin, joint 7 more strongly convex interiorly than exteriorly, joint 8 conical, though narrower at the base than joint 7 at the apex; joint 3 with 1, joint 4 with 1 + 1<sup>+1</sup> sense-cone, like joints 5 and 6; longest sense-cone on joint 4 measuring 32 - 34  $\mu$ , i.e. comparatively rather long. Head around ocelli, and prothorax for the major part, the metanotum and the 1st abdominal tergite faintly reticulate. Fore femora slender. Anteromarginal prothoracic bristles minute, epimerals blunt, length 48 - 52  $\mu$ . Basal wing bristles, blunt, much varying in length, (28 - 52  $\mu$ ) ; double fringe numbering 9 - 11. Abdominal bristles comparatively short, longest bristle on segment VII blunt, 108  $\mu$  long; bristle 1 of segment IX with narrowly oval tip, 200  $\mu$ , b. 2 and 3 pointed, b. 2: 240  $\mu$ , b. 3 shorter. Tube conical with slight convexity in posterior third whence it is more strongly narrowed towards apex; length of tube 260  $\mu$ , basal width 102  $\mu$ , apical width 48  $\mu$ .

Further measurements of ♀, in  $\mu$ : Head, length 216, width 200, lateral diameter of eye 96, length of cheeks behind them 130. Antennae, lengths (breadths) of joints: 36 - 40 (base 48, apex 44), 56 (36), 68 (32 - 33), 52 - 56 (33), 52 (32), 52 - 54 (28), 54 (25), 40 (14). Wings, length 950, width across middle 105.

**Habitat:** The types are from Java: Muriah mountains ( $\pm$  800 m.), 4. IX.1912, in leaf galls on *Conocephalus suaveolens* BL.; further record: same locality, 4.X.1912, same galls (no. 836 b), leg. DOCTERS VAN LEEUWEN.

The above species is not a typical *Zopyrothrips*, by the slight reticulation of the cuticle of the prothorax, ocellar area and metanotum, but is difficult to place anywhere else.

### Liothrips (Zopyrothrips) taurus (KARNY)

1915. *Dolerothrips taurus* KARNY, Zeit. wiss. Ins.-Biol., pp. 146, 207.

1922. *Eothrips taurus* KARNY, Treubia, III, 1, p. 110.

**Female:** Brown-black, middle and hind tibiae narrowly pale yellow at the extreme apex, fore tibiae and all tarsi pale yellow. Antennae with joints: 3 - 7 pale yellow, 7 slightly greyish-brown towards apex, 8 brown. Body bristles infuscated, abdominal bristles paler towards tip, those of segment IX yellowish. Wings strongly infumated all along, but the longitudinal stripe little indicated.

Head short, cheeks nearly straight, not noticeably narrowed towards base, slightly roughened, and slightly reticulated behind the hind ocelli. Eyes large. Ocelli in normal position. Mouth-cone short, broadly rounded. Maxillary stylets about as in the former species. Postocular bristles short, not more than 20  $\mu$ . Antennae moderately long, with joint 3 slender, and joint 8 narrowly conical, at base much narrower than joint 7 at apex; sense-cones well developed, not bristle-like, length on joints 4 or 5 about 24 - 28  $\mu$ ; joint 3 with 1, joint 4 with 1 + 2<sup>+</sup>1, joints 5 and 6 with 1 + 1<sup>+</sup>1 sense-cones. Anteromarginal prothoracic bristles short, angulars 24 - 28  $\mu$ , interiors extremely minute. Surface of pronotum slightly reticulated. Epimeral prothoracic bristles short, nearly straight, blunt, 84 - 92  $\mu$ , interiors vestigial. Legs moderately long, fore femora not enlarged. Pterothorax broader than long. Wings evenly wide, with blunt or somewhat knobbed basal bristles (24 - 28  $\mu$ , 16 - 20  $\mu$  and 32  $\mu$ ), arranged in one row; 11 - 14 cilia duplicated. Abdominal bristles rather long, the longest on segment VII about 133  $\mu$ , pointed, b. 1 with oval tip, ab. 72  $\mu$  long; b. 1 and 2 on segment VIII knobbed, 52  $\mu$  and 92  $\mu$ ; bristles on IX, b. 1 with lanceolate tip, length 176 - 180  $\mu$ , b. 2 and 3 pointed, 220 - 240  $\mu$  long. Tube strongly sclerotized, not quite evenly conical, especially more strongly tapering in its posterior fourth, and constricted at the apex, length 277  $\mu$ , basal width 102  $\mu$ , apical width 48  $\mu$ .

Further measurements of ♀, in  $\mu$ : Head, length 228, width 188; lateral diameter of eye 108, length of cheeks behind them 120-128. Antennae,

total length 438; lengths (breadths) of joints: 30 (base 44, apex 38), 56 - 60 (36), 74 (30), 60 (33), 62 (31), 60 (28), 60 (23), 32 - 34 (12). Prothorax, length 176, width 363 (inclusive of coxae 400). Pterothorax, length 407, width 450. Wings, length 1003, width across middle 105.

**Male:** Very similar in every respect. Tube, length 236  $\mu$ , basal width 92  $\mu$ , apical width 42. B. 1 on segment IX not pointed but slightly rounded at tip, 192 - 208  $\mu$  long, b. 2 short, spine-like, 60 - 65  $\mu$ , b. 3 pointed, 220  $\mu$ .

**Habitat:** Types from Java, Muriah mountains (ca. 400 m.), 30.IX.1912, in leaf rolls (gall no. 63) on *Conocephalus suareolens* BL.; ♂ and ♀, Sumatra, Sibolangit ( $\pm$  500 m.), IX.1920, in a leaf gall on *Conocephalus* sp., leg. DOCTERS VAN LEEUWEN.

This species is not typical to the genus, and may be considered transitional to *Teuchothrips*.

I am adding a list (with references) of those species of *Liothrips* which were described previously. Those marked with an + are known to me and referred to the subgenera (or genera) where they belong. The others are known to me only from the descriptions, and can not be assigned with-certainty, as long as I have not examined them.

*Liothrips bosei* MOULTON, *Indian Forest Records*, 19, p. 2. (1933) — India, on *Mallotus philippinensis*.

*Gynaikothrips citricornis* MOULTON, *Trans. Nat. Hist. Soc. Formosa*, 18, p. 300, fig. 5 (1928); idem, *Annot. Zool. Japon.*, 11, p. 330 (1928); *Smerinthothrips citricornis* TAKAHASHI, *Philipp. Journ. Sci.*, 60, p. 443 (1936) — Taiwan, on *Liquidambar formosana*, — Probably belonging to Subgenus *Zopyrothrips*.

*Gynaikothrips citritibia* MOULTON, *Bishop Mus. Honolulu*, 15, p. 256 (1940). — New Britain.

- + *Liothrips (Phaenothrips) eugeniae* (PRIESNER), described as *Gynaikothrips*, *Treubia*, XII, p. 266 (1930) — Malacca, on *Eugenia* sp.
- Liothrips flavitibia* MOULTON, *Indian Forest Records*, 19, p. 2, 4 (1933). — India, on *Mallotus philippinensis*.
- + *Liothrips floridensis* WATSON, described as *Cryptothrips*, *Ent. News*, XXIV, p. 145 (1913); XXVI, p. 52 (1915); *Florida Buggist*, pp. 73, 74 (1918); *Synopsis*, p. 69, 70 (1923); *Florida Entomologist*, IX, p. 39 (1925); KARNY, *Zeit. wiss. Ins.-Biol.*, p. 92 (1916); YOTHERS & MASON, *U.S. Dept. Agric. Bull.* 1225, p. 1-29 (1924); BLUNCK, in SORAUER, *Handb. f. Pflanzenkr.*, p. 269 (1925); 5. Aufl., p. 421 (1950); MOULTON, *Annot. Zool. Japon.*, 11, p. 329 (1928). — Described as *Liothrips*, HOOD, *Mem. Queensld. Mus.*, 6,

- p. 132 (1918); PRIESNER, *Treubia*, VIII, Suppl., 173, 223, Taf. XV, Fig. 109; TAKAHASHI, *Philipp. Journ. Sci.*, 60, p. 446 (1936). — This species will have to be referred to *Manothrips* PR.  
*Smerinthothrips heptapleuricola* TAKAHASHI, *Tenthredo*, I, 3, p. 341, fig. 1 (1937). — Taiwan, on *Schefflera* sp. — Belonging to *Zopyrothrips*.  
*Liothrips heptapleurinus* PRIESNER, *Philippine Journ. Sci.*, 57, p. 360 (1935). — Taiwan, on *Heptapleurum* spec.  
*Gynaikothrips kannani* MOULTON, *Journ. Bombay Nat. Hist. Soc.*, sep. p. 1 (1929). — India, on *Eugenia* sp.  
*Gynaikothrips karnyi* BAGNALL, *Ann. Mag. Nat. Hist.* (8), 13, p. 28 (1914); KARNY, *Zeit. wiss. Ins.-Biol.*, p. 324 (1915); RAMAKRISHNA AYYAR, *Journ. Bombay Nat. Hist. Soc.*, Sep. p. 9 (1925); KARNY, *Mem. Dept. Agr. Ind., Ent. Ser.* 9, p. 235 (1926); BLUNCK, in SORAUER, *Handb. f. Pflanzenkr.*, p. 268 (1925); 5. Aufl., p. 421 (1950). — India, Ceylon, on *Piper nigrum*. — Probably belonging to *Liothrips* s. str.  
*Gynaikothrips kuwayamai* MOULTON, *Trans. Nat. Hist. Soc. Formosa*, 18, p. 302 (1928); idem, *Annot. Zool. Japon.*, 11, p. 330 (1928); *Smerinthothrips kuwayamai* TAKAHASHI, *Philipp. Journ. Sci.*, 60, p. 443 (1936). — Taiwan.  
*Liothrips litsaeae* MOULTON, *Ind. Forest Records, Ent.* 19, p. 3 (1933). — India, on *Litsea chinensis*.  
*Gynaikothrips messuicola* BAGNALL, *Ann. Mag. Nat. Hist.* (10), 3, p. 602 (1929) — Malaysia, on *Mesua ferrea*.  
*Gynaikothrips monsterae* MOULTON, *Bishop Mus. Honolulu*, 15, p. 255 (1940). — New Guinea, on *Monstera deliciosa*.  
*Gynaikothrips moultoni* RAMAKRISHNA AYYAR, *Contr. knowl. Thys. Ind. (thesis)*, p. 303 (1928); RAMAKRISHNA & MARGABANDHU, *Journ. Bombay Nat. Hist. Mus.*, p. 1040 (1931). — India.  
*Gynaikothrips orchidis* MOULTON, *Bull. Brooklyn Ent. Soc.*, 22, p. 200 (1927). — Philippines, on *Orchidaceae* sp.  
+ *Liothrips (Liothrips) piperinus* PRIESNER, *Philipp. Journ. Sci.*, 57, p. 361 (1935); Takahashi, *ibidem*, 60, p. 445 (1936); idem, *Tenthredo*, I, p. 349 (1937). — Taiwan, on *Piper* sp.  
*Liothrips praelongus* MOULTON, *Bishop Mus. Honolulu*, 15, p. 259 (1940). — New Guinea, on *Ficus* sp. — Doubtful, may even belong to *Cryptothripina*.  
*Gynaikothrips sodalis* BAGNALL, *Ann. Mag. Nat. Hist.* (10), III, p. 603 (1929). — Malaysia, on *Mesua ferrea*.

*Gynaikothrips tenuicornis* MOULTON, Bishop Mus. Honolulu, 17, p. 276,  
fig. 1 f. (1944). — Fiji.

- + *Liothrips (Liothrips) tibialis* PRIESNER, Ind. Journ. Ent., 13, p. 194  
(1952). — India, on *Piper* sp.
- + *Liothrips (Liothrips) vaneeckei* PRIESNER, Zool. Meded. V, p. 211  
(1920). — North America, Europe, Japan, on lily bulbs.
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## APPENDIX.

## Isotrichothrips gen. nov.

Antennae 8-segmented, with normal sense-cones, joint 8 parallel-sided at base. Head elongate, smooth, eyes normal. Mouth-cone sharply pointed or almost so. Maxillary stylets inserted orad, far apart from each other. Major body bristles very long, pointed (pencil-tipped). Anteromarginal and lateral prothoracic bristles distant from each other; one pair of epimerals present. Wings as in *Liothrips*, interlocated cilia few. Legs simple, fore tarsi unarmed in both sexes. Abdominal bristles *long*, male with

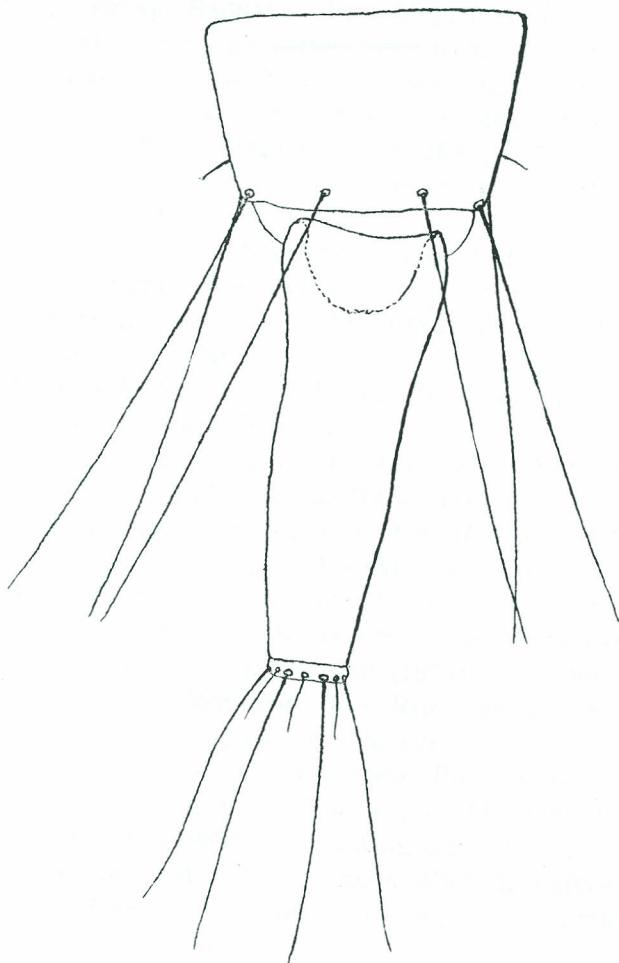


Fig. 1 — *Isotrichothrips longirostris* (KARNY) — Tube and IXth abdominal segment of male.

b. 1 - 3 of segment IX long, pointed and of equal lengths (fig.), as in the female. Tube short, about conical, with indistinct concavity beyond base, and slightly more strongly narrowed apical third.

Typ. gen.: *Liothrips longirostris* KARNY (*Marcellia*, XI, p. 154 - 1912). Further species: — *Gynaikothrips consanguineus* KARNY (*Zeit. wiss. Ins.-Biol.*, p. 325, 330 — 1915).

Close to *Liothrips* but different from this and other allied genera by the chaetotaxy of the IXth abdominal segment of the male, which is similar to that of the subfamily *Megathripinae*. *Homorothrips* Hood is distinguished by the closely approximated antero-marginal and lateral prothoracic bristles, the glandular areas of the male abdomen and the broadly rounded mouth-cone. The genus *Aliothrips* PR. has bristle 2 of segment IX fine and *short*, has enlarged fore femora of the male, slenderer legs, and has the fore tarsi dentate.

Another unknown form, though not belonging to this fauna, has to be dealt with here, owing to its close affinity with *Homorothrips* and *Isotrichothrips*, namely:

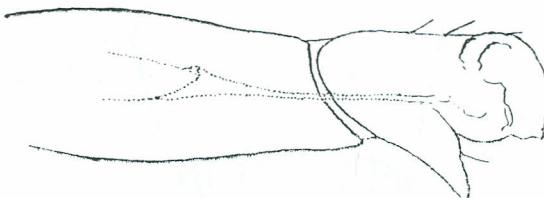


Fig. 2 — *Plagiothrips eugeniae* (DA COSTA LIMA) — Fore tibia and tarsus of female.

**Plagiothrips** gen. nov.

(Figs. 2 and 3)

Antennae 8-segmented, moderately long, terminal joints elongate, joint 8 slender, slightly narrowed to base; sense-cones moderately long, slender, not pointed, joint 3 with *three* of them. Head about as long as broad, about as long as the pronotum, smooth. One pair of conspicuous postocular setae present. Mouth-cone very broadly rounded, rather short, maxillary stylets inserted near hind margin of vertex, rather broadly separated. Prothorax heavy, epimera separated, anteroangular setae developed, separated from laterals, these and posteromarginals long, narrowly clubbed; only one pair of epimerals present. Fore femora slightly enlarged, fore tarsi with conspicuous *tooth* which is obliquely directed forward in both sexes (fig. 2), like in *Karnyothrips* or *Boloplothrips*. Metanotum longitudinally striate. Wings moderately long and broad, evenly

wide, double-fringe present, basal setae blunt, in one row. Sides of abdomen with long bristles, on segment IX of ♂ all bristles are long and equal (fig. 3), as in the ♀. Tube normal, conical, not longer than head.

Typ. gen.: — *Gynaikothrips eugeniae* DA COSTA LIMA (O Campo, p. 28, figs. — 1935).

The author had formerly (*in litt.*) placed this form in the genus *Eugynothrips*. The sense-cones, the 8th antennal joint, the forwardly directed tarsal tooth, and the chaetotaxy of abdominal segment IX are quite a peculiar combination of characters and require the separation of this form as a proper genus.

Finally, a third new genus may be described here, namely:

**Acaciothrips gen. nov.**

(Fig. 4)

Antennae 8-segmented, joint 8 not constricted at base, little narrower than 7 at apex, joint 3 slightly concave exteriorly; sense-cones short, slender. Head somewhat, but little, longer than broad, ocelli situated on

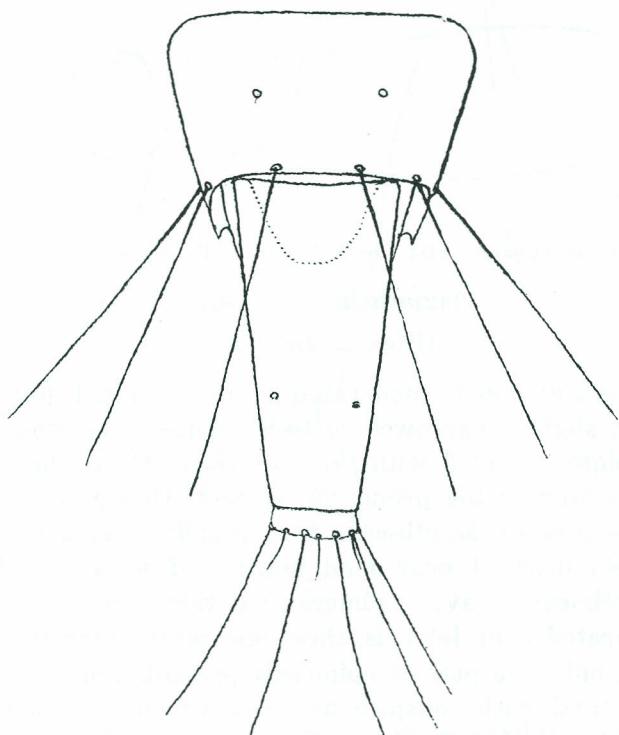


Fig. 3 — *Plagiothrips eugeniae* (DA COSTA LIMA) — Tip of abdomen of male.

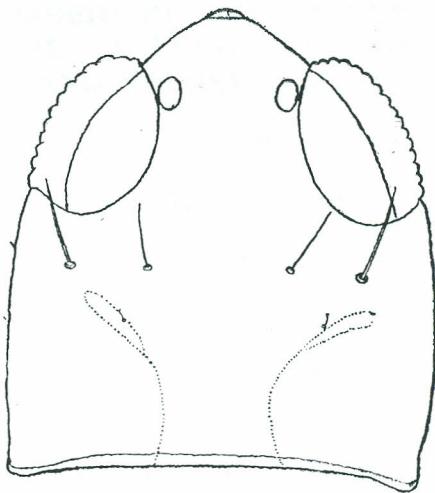


Fig. 4 — *Acaciothrips ebneri* (KARNY) — Head of male, dorsal.

a broad hump occupying the space between the eyes, anterior ocellus attaining interantennal projection, but not surpassing it, directed forward. Vertex with two pairs of moderately long *postocular setae*, in a transverse row (fig. 4), transversely striate; cheeks set with inconspicuous setae. Mouth-cone rounded, maxillary stylets inserted far behind eyes, not lateral, moderately separated behind. Prothorax very short, much shorter than head; lateral, posteromarginal and epimeral (one pair) bristles long, blunt, anteroangulars short. Wings short and broad, evenly wide, without, or with at most three, double-fringe cilia; basal wing setae rather long, in one row. Legs moderately long, slender, fore femora not incrassate in both sexes, and tarsi unarmed in both sexes. Abdomen as in *Liothrips*.

Typ. gen.: — *Gynaikothrips ebneri* KARNY (*Denkschr. Akad. Wiss. Wien*, p. 19, figs. 12 - 23 — 1921). Synonym: *Gynaikothrips obscuripes* BAGNALL (*Ann. Mag. Nat. Hist.* (9), VII, p. 362 — 1921). Possible synonym: *Rhynchothrips bedfordi* MOULTON (*Ann. Mag. Nat. Hist.* (12), XI, p. 482 — 1949).

Coming close to *Liothrips* the new genus differs by the presence of two pairs of postocular setae (instead of one) and by the lacking or very poor double-fringe.