STUDIES ON INDIAN THYSANOPTERA. II.*

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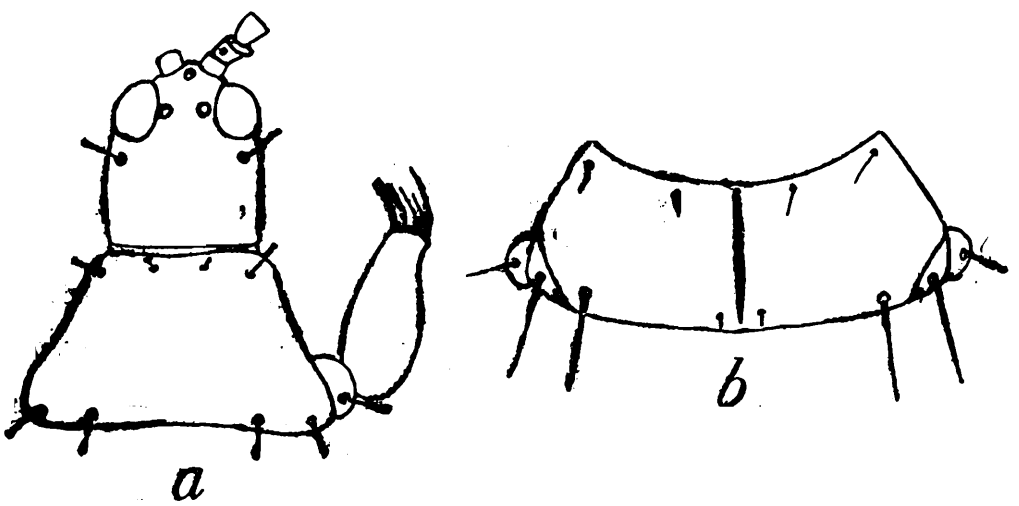
My recent study of the collection of the Zoological Survey of India, Benares Cantonment, and the Imperial Pusa Collection, Indian Agricultural Research Institute, New Delhi, has enabled me, among other things, to record new food plants of some species or additional information on their geographic distribution ; to discuss the systematic position of some species and to redescribe two species, wrongly or inadequately described previously.

I express my thanks to Dr. B. N. Chopra and Dr. H. A. Hafiz of the Zoological Survey of India and to Dr. Taskhir Ahmad of the Indian Agricultural Research Institute, New Delhi, for facilities to study the collections.

The species dealt with in the paper are :—*Thrips bambusae* Shumsher, *Hindsiana apicalis* Bagn., *Neoheegeria citripes* Bagn., *Podothrips aegypticus* Pr., *Chiridothrips indicus* (Ramk. & Marga), *Dichaetothrips gloveri* (Ramk. & Marga.), *Mallothrips indica* Ramk. and *Liothrips bosei* Moulton.



TEXT-FIG. 1.

a. Chiridothrips indicus Ramk. & Marga. Head and prothorax-dorsal view.
b. Dichaetothrips gloveri (Ramk. & Marga.). Pronotum-dorsal view.

Thrips bambusae Shumsher

1945. *Thrips bambusae*, Shumsher, *Indian J. Ent.*, VII, pp. 182-184.

Originally described from bamboo leaves, Mandalay (Burma) 26th November 1941. Now found on the same host, Coimbatore (S. India) 1st August 1944 (Shumsher Coll:) along with *Limothrips* (*Neolimothrips*) *brachycephalus* Shumsher.

Hindsiana apicalis Bagn.

1915. *Hindsiana apicalis*, Bagnall, *Ann. Mag. Nat. Hist.* (8), XV, p. 323.
1928. *Hindsiana apicalis*, Ramakrishna, *Mem. Dep. Agric. India* (Ent. ser.), X (7), p. 290.
1928. *Haplothrips ceylonicus* var. *veroniae*, Ramakrishna, *Mem. Dep. Agric. India* (Ent. ser.), X(7), p. 291 (*nec* Priesner).
1940. *Hindsiana apicalis*, Ramakrishna & Margabandhu, Catalogue of Indian Insects, Pt. 25, p. 35.

*Part I in *Proc. R Ent. Soc. London* (B), XIII, 1944, pp. 139-144.

Along with many apterous males, females and nymphs collected by W. Kerr on *Cyancdon dactylon* in Ajmer on 29-9-1941, are found one male and two females with fully developed wings. The wings are rather feebly constricted in the middle, provided with a sparse fringe and no duplicate cilia. Wing lamina is transparent, colorless; scale brown. The three basal setae on costa of fore-wing are hyaline and clavate.

It is interesting that the absence of wings in either sex is not accompanied by any other modification, not even absence of or diminution in size of ocelli.

Hitherto recorded by Ramakrishna on grass and some wild flowers in Coimbatore and on a jungle plant in Almora (N. India). Now recorded from within leafsheath of *Zea mays* in Delhi 25th August 1940 (Shumsher Coll.) along with *Anaphothrips flavicinctus* Karny; on *dub* grass (*Cyanodon dactylon*) at Ajmer 29th September 1941 (W. Kerr Coll.) along with *Chirothrips manicatus* Haliday; and on grass in Karnal (Punjab) 11th August 1942 (Shumsher Coll.). Also collected in Delhi in very small numbers on *Tephrosia purpurea* flowers and *Capsicum annuum* flowers and leaves, 11th September 1940 (Shumsher Coll.): and on flowers of *Phaseolus radiatus* 14th September 1940 (Niranjan Singh Coll.). Probably a graminivorous species wandering to these non-graminaceous plants from the surrounding grass.

Neoheegeria citripes Bagn.

1921. *Neoheegeria citripes*, Bagnall, *Ann. Mag. Nat. Hist.* (9), VII, pp. 360-361.
1928. *Neoheegeria citripes*, Ramakrishna, *Mem. Dept. Agric. India* (Ent. ser.), X(7), p. 288.

Recorded previously on *Abutilon indicum* in Pusa, Behar (C. S. Misra Coll.) and Coimbatore (Y. R. Rao Coll.). Now found on the same plant near Rupar, Punjab 12th October 1940 (Shumsher Coll.). Apparently a widely distributed monophagus species.

Podothrips aegypticus Pr.

1929. *Podothrips aegypticus*, Priesner, *Bull. Soc. Roy. Ent. Egypte* (New ser.), XIII, pp. 59-61.

In the above publication Priesner also provides a key for separating six species of *Podothrips* Hood, including *aegypticus*.

Originally described from millet in Gezirah (Egypt) F. C. Willcock Coll. Now recorded from bamboo leafsheath in Mandalay, Burma 26th November 1941 (Shumsher Coll.): apparently a subtropical graminivorous species.

Chiridothrips Ramk. & Marga.

1939. *Chiridothrips*, Ramakrishna & Margabandhu, *Rec. Ind. Mus.* XLI, p. 32.

On examination of the holotype in the collection of the Zoological Survey of India, the original characterisation of the genus is found inadequate. Hence it is recharacterised below:

Head longer than broad, dome-shaped. Vertex produced in front of eyes a little (as in *Leeuwenia* Karny). Cheeks faintly arched, without

seta bearing tubercles, smooth. Eyes small. Front ocellus on cephalic projection, hind ocelli contiguous to middle of eyes. Postocular seta swollen at tip. Antennae 8-segmented[1] : *2nd segment with an external beak-like process at tip* as in *Chirothrips* Haliday ; segments 2-7 almost of equal length, segment 8 longer than 7 Mouth-cone roundly pointed at tip, just surpassing middle of prosternum.

Prothorax shorter than head, trapezoidal with front margin shorter and nearly straight and hind margin longer and concave, sides constricted in the middle. Fore femora strongly incrassate. Fore wings constricted in the middle. Tube about as long as head.

The " tooth-like projections " or " 1 or 2 teeth " on the legs, emphasised by the protologists, were not seen.

The type species is redescribed below from the holotype as the original description is neither adequate nor free from ambiguity in many points.

Chiridothrips indicus Ramk. & Marga.

1939. *Chiridothrips indicus*, Ramakrishna & Margabandhu, *Rec. Ind. Mus.*, XLI, pp. 32, 33.

Female holotype. (Text-fig. 1*a*)

General color yellowish brown. Thorax and abdomen with some pink hypodermal coagulations. The 1st antennal segment, base of 2nd, fore femora externally and mid and hind legs concolorous with body. Tip of antenna, fore femora (specially internally) and fore tibiae brownish yellow. Tip of abdomen blackish. All body setae slightly swollen at tip, those at tip of abdomen pointed.

Head as described for the genus. Eyes black, small, not protruding. Ocelli equidistant from one another. Postocular seta removed by about half the length of the eye from the front end of cheek. Antennae as described for the genus : 2nd segment asymmetrical due to the externodistal beak, the remaining segments symmetrical : 1st segment short and broad like the base of a cone ; 3rd obconical with a narrow basal style ; 4th pear shaped with a shorter and broader style ; 5th and 6th slightly elongate-pear shaped with a similar style ; 7th narrow at base, gradually widening to middle then parallel sided, slightly constricted near the tip ; 8th pointed at tip, parallel sided near middle and constricted basally. Segments 3-6 with a pair of stout, short, simple sense-cones.

Prothorax as described for the genus. A seta at each front angle, two long ones at each hind angle, one on each fore coxa. Fore femora strongly incrassate slightly pointed in a beak like manner externo-distally. Pterothorax very broad. Wings well developed reaching the 8th abdominal segment ; constricted in the middle.

[1]Antennae in the type asymmetrical. The right antenna apparently 7-segmented the left one clearly 8-segmented : in the right antenna the 6th segment appearing altogether abbreviated in the form of a " ring joint " at the base of the 7th, there being no corresponding ring joint on the left. Hence the 8-segmented left antenna is taken as normal for the species.

Abdomen with short, wide segments: 1-8 with long lateral spines directed backwards and curved inwards, those of 9th segment not thickened at tip. Tube as long as head, about a third as wide at base as long.

Measurements.

Antennal segments	..	I	II	III	IV	V	VI	VII	VIII
Length in microns	..	20	36	36	36	36	36	36	48
Width in microns	..	36	36	28	30	26	20	17	12

Length of head 176 μ; width 160 μ. Length of pronotum 168 μ; width 290 μ. Length of pterothorax 240 μ; width 330 μ. Length of tube 176 μ; width at tip 30 μ, width at base 60 μ; width at one-sixth length from tip 42 μ. Width of interocular dorsal space 56 μ. Width of eyes 40 μ; length 60 μ. Length of cephalic projection in front of eyes 22 μ. Length of cheeks about 100 μ. Length of wing lamina 330 μ. Length of postocular seta 40 μ. Length of setae at tip of abdomen about 80 μ; on 9th abdominal segment 48 μ; on hind angles of pronotum 64 μ; on front angles of pronotum 30 μ. Length of body 1·229 mm.

Dichaetothrips gloveri (Ramk. & Marga.) (Text-fig. 1*b*)

1939. *Neosmerithothrips gloveri*, Ramakrishna & Margabandhu, *Rec. Ind. Mus.*, XLI, pp. 31, 32.

The species is redescribed from holotype in the collection of the Zoological Survey of India, in view of the inadequate original description.

Female.

General color dark grey-brown, with portions here and there brownish yellow. Isolated patches of reddish hypodermal coagulations in thorax and abdomen. Tube black; abdomen paler basally. Antennal segments 1 and 5-8 concolorous with head, 3rd yellow, very faintly brownish infuscate; 2 and 4 paler than 1 but more brownish than 3. 1st segment of maxillary palpi yellow, 2nd dark brown. All setae of body hyaline yellow. Eyes velvety red in reflected light and black by transmitted light. Fore femora and mid and hind legs concolorous with thorax; the margins of fore tibiae and the 2nd tarsal segment of a similar color, but the remaining part of the fore tarsi and fore tibiae yellow. Wings colorless, with faintly yellow margins and grey-brown fringes.

Head longer than broad; cheeks almost parallel, *very slightly* converging at base, smooth, with two small spines one behind the other just a little behind the eyes. Eyes small, even less than a third as long as cheeks and about a third as wide as head, triangular in shape, with angles rounded. A conspicuously long dorsal seta arises about $\frac{1}{3}$ length of eye behind each eye. Due to split along vertex, ocelli and post-ocellar setae not clear. Mouth-cone rounded; much shorter than wide at base. Maxillary palpi very stout, 2-segmented, basal segment slightly tapering towards base. Antennae arising from frontal pits; 8-segmented: 1st segment cylindrical, slightly tapering apically; 2nd gradually widening towards the tip, provided with a raised rim projecting forwards from the tip; segments 3-6 similar but elongate and narrowed in distal quarter; 7th roughly barrel-shaped; 8th conical.

Pronotum (Text fig. 1*b*) much broader than long, less than half as long as head, much broader behind. Front margin deeply concave,

hind margin convex; front angles acute, hind angles rounded. Two long setae at each hind angle, a minute seta mesad to the outer postangular; two long anteromarginals; one long mid-lateral and one minute seta near the middle of posterior margin on each side. One long seta on each fore coxa. A thin black mid-dorsal streak not reaching the front and hind margins of pronotum.

Pterothorax broader than prothorax, shorter than broad, longer than head. Sides strongly arched in front, very weakly behind.

Fore femora strongly incrassate; fore tibiae slender; fore tarsi armed with a very powerful tooth. Mid and hind legs simple; hind legs the longer, about as long as the fore legs. Mid and hind tibiae on the outside at about $\frac{1}{3}$ their length from the tip provided with a long seta; fore tibiae with a slender short seta in similar position.

Wings well developed. Fore wings almost parallel-sided, slightly expanded apically; 15 duplicate cilia.

Abdomen elongate, almost uniformly broad upto the 6th segment, thence gradually tapering. Wing retaining spines on segments 3-7 and two long setae on each side outside the wing retaining spines. Sides of tube feebly arched. Setae on 9th abdominal segment longer than the tube, those at the tip of the tube shorter than it. Two setae on each side of the 9th segment very stout.

Measurements.

Antennal segments	..	I	II	III	IV	V	VI	VII	VIII
Length in microns	..	52	64	92	88	76	68	48	40
Width in microns	..	44	44	34	36	33	30	28	14

Length of antenna 530 μ. Head 340 μ long 280 μ wide. Cheeks 260 μ long. Eyes 80 μ long 92 μ wide. Postocular seta 120 μ long. Pronotum along mid-dorsum 140 μ, (along side) 160 μ long; (across fore coxae) 420 μ, (across front margin) 280 μ wide. Fore femora 300 μ long, 160 μ wide. Pronotal setae : inner postangular 100 μ, outer postangular 100 μ, coxal 48 μ, mid-lateral 60 μ, anteromarginal 25 μ long. Pterothorax 440 μ long, 540 μ wide. Abdomen 0·6 mm. wide. Tube 320 μ long; (at base) 152 μ, (at apex) 62 μ wide. 9th abdominal segment 120 μ long, 8th 120 μ long. Long setae of 9th segment 360 μ long, those of tube 220 μ long. Maxillary palpal segment I : 20 μ long and 16 μ wide, II : 44 μ long and 12 μ wide. Total body length 2.933 mm.

This insect differs from *Neosmerinthothrips* Schmutz, in which genu- its protologists placed it, in (1) not having a short head, strongly converging posteriorly, (2) not having a pointed mouthcone, (3) not having the wings narrow in the apical half but rather wider, and (4) having very long antennae.

Dichaetothrips beesoni Moulton (1928. *Indian For. Rec.* (Ent. ser.) XIII, p. 289) appears a very close ally of this species differing only in small details like measurements; *gloveri* Ramk & Marga. is the larger and has 15 duplicate cilia (*beesoni* Moulton has 13).

Mallothrips indica Ramk.

1928. *Mallothrips indica,* Ramakrishna, *Mem. Dep. Agric. India* (Ent. ser.), X(7), pp. 308-310.
1934. *Mallothrips indica,* Ramakrishna, *Rec. Ind. Mus.*, XXXVI, p. 498.

So far recorded in leaf galls of *Eugenia jambolana* in Marudamalai Hills, Coimbatore and from fruit of the same tree in Cawnpore. Now recorded from Cawnpore on garden flowers and cucurbitaceous flowers (Coll ?) date ?.

Liothrips bosei Moulton

1928. *Liothrips bosei,* Moulton, *Indian For. Rec.* (Ent. ser.), XIII, pp. 286, 287.

Originally recorded from leaf galls of *Mallotus philippinensis* in Dehra Dun. Now recorded as occuring in large numbers on under-surface of leaves of a wild plant in Tangmarg, Kashmir, 7,500 ft. (A.P. Kapur Coll.) 6th October 1940.