THYSANOPTERA FROM INDIA.

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I am indebted to Dr. Hem Singh Pruthi, Assistant Superintendent, Zoological Survey of India, Indian Museum, Calcutta, for the privilege of reviewing and classifying this series of Thysanoptera from India, some of which have been in the collection of the Museum for many years, and I wish to express my appreciation to Dr. Pruthi and to those others who have made the collections in the field. This paper includes a description of two new genera and five new species, together with a record of ten species already described.

TEREBRANTIA Haliday.

Family THRIPIDAE, Uzel.

Subfamily *THRIPINAE.*

1. **Frankliniella sulphurea** Schmutz.

Two specimens (♀♀) collected in flowers of *Datura fastuosa* at Barkuda Island, Chilka Lake, Ganjam District, Madras Presidency, 3-X-22 (*N. Annandale*). (Moulton No. 1997).

Genus **Monilothrips,** gen. nov.

(*Monilae*=collar.)

Head somewhat wider than long, with a conspicuous reticulated collar-like band along the posterior margin, but anterior to this the vertex is without conspicuous lines or markings. Prothorax much wider than long, without reticulation. There are two conspicuous closely-placed spines at each anterior angle, one directed forward, the other outward and backward, and a pair at each posterior angle the outer of which is about twice as long as the inner one. Mesonotal plate with net-like reticulation in front which changes gradually to cross striations behind, metanotum distinctly reticulate. Abdomen broadly ovate with tenth segment small and conical, with net-like reticulation on all segments except the first and the last two. Antenna 8-segmented, segments 3 and 4 vase-shaped and with forked trichomes. Style with 2 segments, the second is about three times longer than the first and together they are about twice as long as segment 6. Maxillary palpus with 3 segments. Fore tarsi unarmed. Wings long and pointed, with two longitudinal veins which, though distinct, are placed near the anterior and posterior margins and at first glance would appear to be fused with the marginal veins. All wing spines unusually long, those on costa being about twice as long as width of wing, spines on longitudinal veins evenly placed over their entire length.

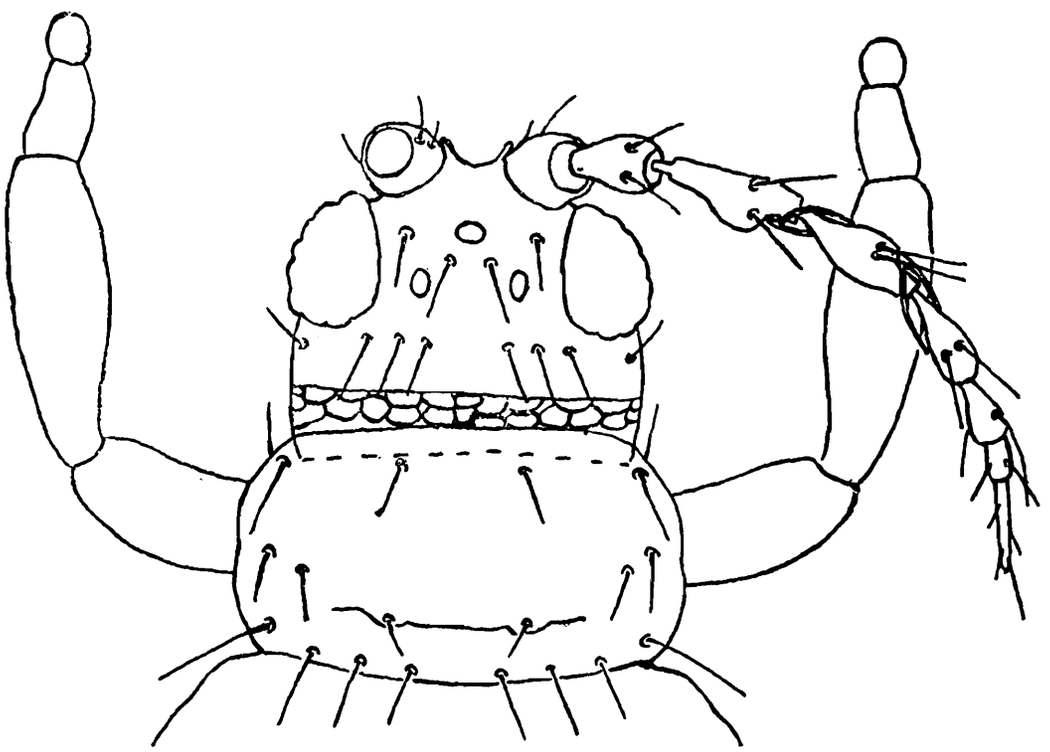
This genus would seem to be most closely related to *Ayyaria*, Karny, but is at once separated by the small sixth segment of antenna and unusually long style, also by its 3-segmented labial palpus. The chaetotaxy is much the same as in *Ayyaria*.

2. **Monilothrips kempi,** sp. n.

Female holotype.—Colour uniformly orange brown. Antennal segments 1 to 4 and base of 5 whitish-yellow, others coloured like the body. Legs yellow with slight shading of orange brown in middle of all femora and middle and hind tibia. Wings uniformly whitish-yellow.

Total body length 1·5 mm.; head length ·16 mm., width ·20 mm.; prothorax length ·116 mm., width ·25 mm.; mesothorax width ·36 mm.; abdomen width ·61 mm. Antennae: length (width) i, 15 (33); ii, 45 ? (36); iii, 90 (27); iv, 78 (27); v, 60 (27); vi, 36 (24); vii, 21 (13); viii, 54; total length 390 m. Length of spines: Interocellars 30 m., postoculars 39 m., the forward directed spines of pair at anterior angles of prothorax 45 m., the posteriorly directed ones 54 m., pair along anterior margin 30 m., median lateral 36 m., pair at posterior angles, outer 84, inner 36 m., at posterior angles and margin of ninth abdominal segment 150, on tenth 90 m.

Head one-fourth wider than long and projecting in front between basal segments of antenna, this projection with a distinct concave anterior margin; cheeks slightly arched. Two spines in front of and three behind each posterior ocellus. Back of head with a distinct transverse reticulated band near posterior margin. Eyes large with coarse facets.



TEXT-FIG 1.—*Monilothrips kempi*, gen. et sp. nov. Head and prothorax of ♀.

Ocelli small. Mouth-cone broad and strong, maxillary palpus with three segments. Antenna slender, 2·5 times as long as head, segment 1

short and broad, segments 3 and 4 vase-shaped, each conspicuously and abruptly narrowed at base of forked trichomes, 5 elongate-clavate, 6 short, style with second segment three times as long as first and together twice as long as segment 6.

Prothorax transverse, with spines as follows : a pair at each anterior angle, one of which is curved and directed forward, the second directed backward, the inner spine of the pair at posterior angle is not more than half as long as the outer one, and is of about equal length with the pair on either side along posterior margin. Prothorax without conspicuous markings or reticulations. Meso- and metanotum clearly reticulated. Legs moderately stout, fore tarsi unarmed. Wings long and strong with two longitudinal veins which are distinct but are placed close to the anterior and posterior margins. All spines unusually long and evenly placed as follows : costa 33, fore vein 16, hind vein 18. Microscopic setae covering surface of wing also unusually long.

Abdomen broadly ovate with terminal segment short and connate. Tergites two to eight inclusive clearly reticulated, second with a distinct dark brown line along anterior margin, which is placed away from the margin on segments two to eight, the surface anterior to these lines is without markings but is clearly reticulated behind them. The dark line on segment one is semi-circular in outline. The spines at the posterior angles and margin of segment 9 are long, extending far beyond the tip, those on segment 10 are short, segment 10 has a complete dorsal suture.

Type-material.—Female holotype taken from an unknown host plant on May 4, 1917 (*S. W Kemp*). Type deposited with Indian Museum. (Moulton No. 1998). Named in honour of the collector.

Type-locality.—Sureil, Nangphu, Darjiling District, East Himalayas, elevation 5,000 feet.

3. **Taeniothrips longistylus** Karny.

Two specimens (♀♀) taken at Buldana, Berar, Central Provinces, in February, 1923 (*H. S. Rao*). Host-plant unknown. (Moulton No. 1992).

4. **Taeniothrips lefroyi** Bagnall.

One specimen (♀) taken at Sitong, Darjiling District, East Himalayas, elevation about 2,500 feet, 28-X-17 (*N. Annandale* and *F H. Gravely*). Host-plant unknown. (Moulton No. 1994).

5. **Taeniothrips flavidulus** Bagnall.

One specimen (♀) taken on Pine trees at Phagu, Simla Hills, East Himalayas, elevation 9,000 feet, 21-X-16 (*N. Annandale* and *S. W Kemp*). (Moulton No. 1995).

Projectothrips, gen. nov.

(*Projectus*=projection.)

With many characters of the genus *Taeniothrips*. Antennae inserted on the anterior ventral side of the head so that the first segments are

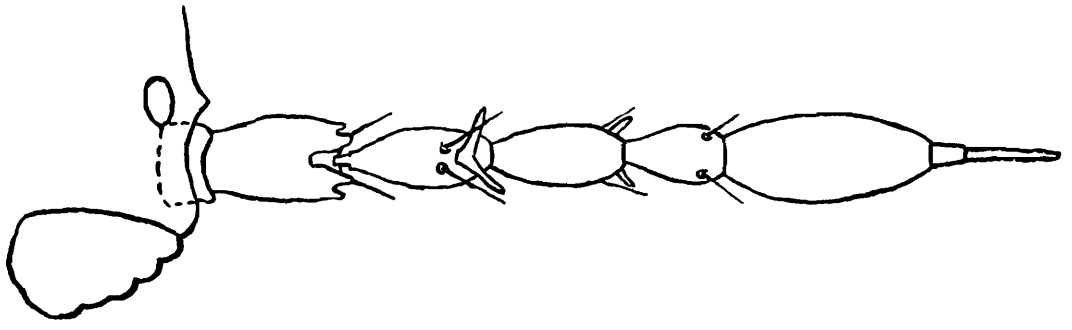
largely obscured, second segment with two blunt lobe-like projections on dorsal end at tip, each of which bears a short spine, sixth segment largest of all, elongate-ovate, style with first segment short and end segment very long and cylindrical in shape, six times as long as preceding segment. Chaetotaxy mostly as in *Taeniothrips*. Comb arrangement of spines on posterior margin of eighth abdominal segment complete, but there is a similar arrangement of spines on the posterior margin of abdominal segments beyond the second, these are present but short on the seventh segment, less conspicuous on the sixth and gradually disappear in the centre of other more anterior segments. Wings broad at the base and reduced gradually to a pointed tip. Fore vein with a broken series of spines, those on hind vein regularly placed.

6. **Projectothrips pruthi,** sp. n.

Female holotype.—Body colour uniformly orange brown, legs light yellowish-brown, wings uniformly brown, lighter at the base. Antennal segments 1 and 2 concolorous with head, 3 and 4 clear yellow, 5 to 8 uniformly light brown. Crescents of ocelli orange-red.

Total body length (specimen contracted) 83 mm.; head length ·09 mm., width ·15 mm.; prothorax length ·15 mm., width ·189 mm.; pterothorax width ·24 mm.; abdomen width ·31 mm. Antennae: length (width) i, 12 (30); ii, 30 (27); iii, 36 (?); iv, 36 (21); v, 30 (16); vi, 45 (24); vii, 6; viii, 36; total length 225 m. Length of spines: at posterior angles of prothorax, outer 36 m., inner 18 m., on posterior angles and margin of ninth abdominal segment 120 m., on tenth 135 m., interocellar spines 21 microns.

Head clearly transverse, roundly flattened in front; cheeks slightly arched, interocellar spines moderately short and placed in front of posterior ocelli and mid-way on a line connecting each of them with anterior ocellus. Back of head with numerous transverse wavy lines. Eyes large. Ocelli well developed. Mouth-cone short and narrow, maxillary palpus 3-segmented, labial palpus with one segment, if with two segments the first is so small that it cannot be observed. The apparent single segment is long and finger-like. Antenna arising from the anterior



TEXT-FIG. 2.—*Projectothrips pruthi*, gen. et sp. nov. Right antenna.

lower surface of the head so that the first segments are hardly visible, 2·5 times longer than head. Second antennal segment with two prominent dorsal lobes at tip, each of which bears a spine at the end, segment 5 small, segment 6 large with sides evenly rounded from the base to tip. The two segments of style are of even width but the first is

very small and the second long, approximately six times longer than the first. Forked sense-cones on segments 3 and 4 reasonably short and stout.

Prothorax slightly wider than long, without spines on anterior angles, the outer spine at the posterior angles is approximately twice as long as the inner one, a series of three on either side along posterior margin. Legs normal. Wings fully developed, broad at base, gradually narrowed to a pointed tip with two longitudinal veins. Spines as follows : costa 28, fore vein 3—10 in basal two-thirds and 1—2 at tip, hind vein 12.

Abdominal segments 1 to 8 broadly ovate, 9 and 10 triangularly connate. Normal spines on ninth and tenth segments long and strong, tenth segment with a complete dorsal suture. Comb-like arrangement of hairs on posterior margin of eighth segment complete and rather long. Posterior side margins of segments 3 to 7 also with a similar arrangement, these are wanting in the middle of the first segments but their development gradually increasing to almost a complete comb on the seventh segment.

Characters as specified of antennal segments 2 and 6 to 8 and the comb-like arrangement of spines on posterior margins of abdominal segments are so distinct that I cannot place this species within the genus *Taeniothrips*. These characters also set it apart from any species in that genus.

Type-material.—Female holotype, six ♀ paratypes taken on *Pandanus*, 1-I-22 (*H. S. Rao*). Holotype and five paratypes deposited in Indian Museum, Calcutta. (Moulton No. 1996). This species is named in honor of Dr. Hem Singh Pruthi of the Indian Museum.

Type-locality.—Sibpore near Calcutta, Bengal.

7. **Thrips setosus,** sp. n.

Female holotype.—Colour whitish-yellow, first antennal segment colourless, 2 shading to pale yellow, 3 pale yellow at base shading to light greyish-brown, 4 and 5 pale yellow at base shading to greyish-brown in distal half, 6 and 7 grey-brown, with 6 somewhat lighter at base. Wings almost colourless. Crescents of ocelli deep orange.

Total body length ·92 mm. ; head length ·075 mm., width ·114 mm. ; prothorax length ·105 mm., width ·135 mm. ; pterothorax width ·19 mm. Antennae beyond second segment : iii, 36 (16) ; iv, 33 (16) ; v, 30 (15) ; vi, 39 (15) ; vii, 9 ; total length 180 m. Length of spines : on posterior angles of prothorax 21 m., on posterior angles and margin of ninth abdominal segment 60 m. and 51 m. respectively, on tenth 60 m.

Head transverse, with numerous transverse striations ; cheeks arched, interocellar and other spines small. Eyes prominent, somewhat protruding. Ocelli small, each the size of a single eye facet. Antenna 2·4 times longer than head.

Prothorax clearly wider than long and densely covered with short (15 m.) conspicuous setae. A pair of spines at posterior angles also very short, inward from these a series of four short setae on either side. Median pair of spines on metanotum placed approximately 12 m. back from anterior margin. Legs normal. Wings fully developed, with spines

as follows: costa 31, fore vein 4-3 at base, 1 (or 2) in the middle, 2 at tip, hind vein 15.

Abdomen normal.

Type-material.—Female holotype taken from an unknown host plant, 16—20-VIII-11 (*N. Annandale* and *F H. Gravely*). Type deposited in Indian Museum. (Moulton No. 2002).

Type-locality.—Balighai near Puri, Orissa.

This species is rather closely related to *T pallidulus* Bagnall, but is easily separated from this species as follows: the fore wings of *pallidulus* are brownish except at base, costa of fore wings has 15—18 and hind vein 7—9 spines, and spines at posterior angles of prothorax are about ·5 as long as median length of pronotum. In this new species the wings are almost colourless, wing spines more numerous and those at the posterior angles of prothorax are much shorter, not more than ·25 median length of pronotum, also pronotum is densely covered with small setae.

8. **Thrips florum** Schmutz.

Four specimens (♀♀) taken at Buldana, Berar, Central Provinces, in February, 1923 (*H. S. Rao*). Host-plant unknown. (Moulton No. 1992).

9. **Selenothrips rubrocinctus** Giard.

One specimen (♀) taken on *Aporosa roxburghii* at Durgapurs, Salt Lakes, near Calcutta, Bengal, 8-III-14 (Moulton No. 2000), and six females, two males and two larvae taken in *Gardinia* flowers at Museum Compound, Calcutta, 8-VII-14 (*F. H. Gravely*). (Moulton No. 2001).

TUBULIFERA.

Family PHLOEOTHRIPIDAE Hood.

Subfamily *PHLOEOTHRIPINAE* Priesner.

10. **Haplothrips ceylonicus** Schmutz.

One specimen (♀) taken at Buldana, Berar, Central Provinces, February, 1923 (*H. S. Rao*). Host-plant unknown. (Moulton No. 1992).

11. **Gynaikothrips flaviantennatus,** sp. n.

Female holotype.—Colour deep chestnut brown. Antennal segments 1 and 2 concolorous with head, 2 shading lighter toward the tip, 3 to 8 uniformly clear yellow. All femora, middle and hind tibia dark brown, fore tibia light yellowish-brown shading to clear yellow at tip, all tarsi clear yellow. Prominent body spines brown. Fore wings light grey-brown with a darker streak in the center, hind wings almost clear but with a darker median line.

Total body length 2·25 mm.; head length ·28 mm., width ·19 mm.; prothorax length ·183 mm., width including coxae ·36 mm.; pterothorax width ·40 mm.; tube length ·20 mm., width at base ·083 mm. Antennae: length (width) i, 36 (42); ii, 57 (33); iii, 69 (33); iv, 69 (36); v, 69 (33); vi, 72 (30); vii, 51 (27); viii, 33; total length 465 m. Length of spines:

postoculars 78 m., median dorsal inward from postoculars 21 m., on anterior angles of prothorax 57 m., anterior margin 45 m., mid-laterals 31 m., pair on posterior angles subequal, 120 m., on ninth abdominal segment 155 m., at tip of tube 165 m.

Head 1·5 times longer than wide; cheeks straight and almost parallel with a constriction at the base which is hardly noticeable. Back of head with numerous closely placed wavy lines. Postocular spines long and strong with dilated tips. Eyes normal with small facets. Ocelli large. Mouth-cone short and broadly rounded at the tip. Antenna 1·65 times longer than head, intermediate segments elongate clavate.

Prothorax, including coxae, twice as long as median dorsal length of pronotum and ·66 as long as head. All normal spines strong and with dilated tips. Pterothorax subquadrate. Fore femora somewhat enlarged, each fore tibia armed with a stout broad-seated tooth. Wings fully developed, with 7—8 double fringe hairs along posterior margin, 3 basal wing spines arranged in a straight line along anterior margin, stout with dilated tips.

Abdomen with all normal spines strongly developed, dark brown in colour except only those on segment 9 and tube which are yellowish.

Male allotype.—Shaped and coloured like the female but smaller in size, 1·63 mm., and with spines at posterior angles of ninth abdominal segment reduced to spurs which are 45 m. long.

Type-material.—Female holotype, male allotype and 13 female paratypes taken from an unknown host plant, 16—20-VIII-11 (*N. Annandale* and *F H. Gravely*). Holotype, allotype and 9 paratypes deposited in Indian Museum, Calcutta. (Moulton No. 2002).

Type-locality.—Balighai, near Puri, Orissa.

This species would seem to approach *G. heptapleuri* Karny from Java, but is distinguished from it by the clearly shorter tube.

12. **Gynaikothrips flavitibia,** sp. n.

Female holotype.—Colour orange brown, including all femora, first antennal segment and basal half of second. All tibia, tarsi and antennal segments 2 to 8 clear yellow. Wings transparent. Prominent body spines clear to yellowish.

Total body length 2·5 mm.; head length ·28 mm., width ·25 mm.; prothorax length ·19 mm., width including coxae ·38 mm.; pterothorax width ·43 mm.; tube length ·31 mm., width at base ·08 mm. Antennae: length (width) i, 30 (36); ii, 51 (34); iii, 78 (30); iv, 75 (36); v, 75 (33); vi, 78 (31); vii, 60 (24); viii, 39; total length 495 microns. Length of spines: postoculars 54 m., a second pair inward from these and in almost a straight line between them 66 m. On anterior angles of prothorax and anterior margins 54—60 m., mid-laterals 60, pair on posterior angle, outer 114, inner 84 m., on ninth abdominal segment 280—300 m., at tip of tube 240 m.

Head subquadrate, 1·2 times longer than wide; cheeks straight and parallel. Frons arched and bearing forward directed anterior ocellus at tip. Back of head sculptured with numerous wavy confluent lines. Eyes large with small facets. Ocelli well developed, fully three times larger than facets of eyes. Postocular spines well developed, with

dilated tips and a second pair of similar spines but somewhat longer are placed in an almost straight line between the postoculars, all four are separated by equal distances. Mouth-cone broadly rounded, labrum more or less angular and pointed. Antenna 1·75 longer than head, moderately slender.

Prothorax transverse, pronotum sculptured like the back of the head. All normal spines well developed and with dilated tips. Pterothorax with even sides, slightly converging towards the posterior. Legs normal, each fore tarsus armed with a broad seated tooth. Wings normal, with 15 double fringe hairs along posterior margin. Abdomen long and slender, reduced gradually from second to eighth segment. Tube slender, almost four times longer than width at base and about 1·1 times longer than head. Spines on ninth abdominal segment almost as long as tube.

Male allotype.—Coloured as in the female but somewhat lighter, shaped as in the female but with the abdominal segments reduced more gradually toward the end. Fore tarsi armed as in female. Total body length 2·2 mm.; head length ·25 mm., width ·21 mm.; tube length ·25 mm. Spines on posterior angles of ninth abdominal segment greatly reduced, only 30 m. long as compared with those along the posterior margin which are 225 m.

Type-material.—Female holotype, male allotype, nine female and six male paratypes collected 8-VIII-14 (*E. Rose*). Holotype, allotype and paratypes deposited with Indian Museum. (Moulton No. 2004).

Type-locality.—Calcutta, Bengal.

This species can be compared with *G. interlocatus* Karny from India, but is easily separated from that species which has the terminal antennal segments brown, postocular spines short and black and fore tarsi unarmed. This species also resembles *G. uzeli* Zimmermann somewhat closely, but is easily distinguished from it by the clear colour of the middle and hind tibia and the chaetotaxy of the prothorax.

13. **Gynaikothrips uzeli** Zimmermann.

Six female and two male specimens taken on leaves of *Ficus obtusa* on Barkuda Island, Chilka Lake, Ganjam District, Madras Presidency, 3-X-22 (*N. Annandale*). (Moulton No. 2003).

14. **Gigantothrips elegans** Zimmermann.

Numerous specimens (♂♂, ♀♀, larva) taken on *Ficus glomarata* at Pusa, Bihar, 5—10-XI-15 (*F H. Gravely*). (Moulton No. 1999). One specimen (♀) taken on leaves of *Ficus obtusa* on Barkuda Island, Chilka Lake, Ganjam District, Madras Presidency, 3-X-22 (*N. Annandale*). (Moulton No. 2003).

Subfamily *MEGATHRIPINAE.*

15. **Dinothrips sumatrensis** Bagnall.

Twelve specimens, (eight ♀♀, one ♂ and three larvae) taken at Port Blair, Andaman Islands, 15-II—III-15 (*S. W Kemp*). Host-plant unknown. (Moulton No. 1993).