

## DESCRIPTIONS OF FOUR NEW THRIPS IN JAPAN.

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The present paper consists of the descriptions of four new species of Japanese thrips. For much of the material upon which these descriptions are based, I am indebted to several of my seniors and friends, among whom may be mentioned Late Dr. I. Kuwana, Dr. T. Ishii, Mr. K. Tanaka, Mr. N. Mori, Mr. H. Kuwabara and Mr. T. Shiraga.

I wish to express my thanks to Mr. A. Kariya, the director of our section, for his kind advice given to this paper.

The type specimens are deposited in the writer's collection, and in the entomological collection of the Imperial Plant Quarantine Service, Yokohama Custom House.

*Haplothrips (Hindsiana) odonaspicola* spec. nov. (Pl. I, 4; fig. 1.)

*Female* (Macropterous):—Head and prothorax dark brown; pterothorax dark brown on the sides and on mesonotum, the rest yellowish brown;

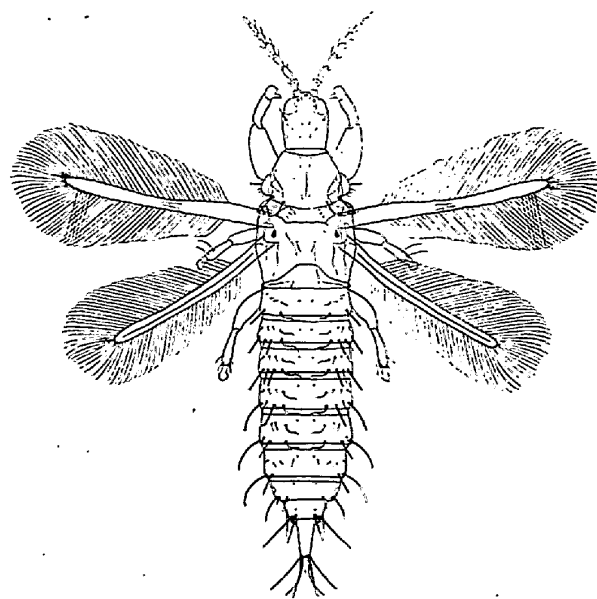


Fig. 1. *Haplothrips (Hindsiana) odonaspicola* sp. nov., ♀.

abdomen light yellowish brown except the distal third of the abdomen which is dark brown. Tube paler at both ends. Tergum of the abdominal segments from the third to the sixth with a brown transverse line near the anterior margin. Antennal segments dark brown in I and the basal half of II, concolorous with the head, II shading to yellowish in the distal half; yellow from III to VI; V, VI shaded with light brown in the distal one-third; VII, VIII brown; sense

cones transparent. Eyes dark red. Ocellus yellow with a red crescent patch. All coxae and fore femora dark brown, concolorous with the head; femora shading to yellowish at the tip; fore tibiae and tarsi lemon yellow; middle and hind legs lemon yellow except the coxae. Wings almost transparent. All bristles on the body transparent except these on the tube which are light brown.

*Measurements of holotype* (♀) in mm.: Total body length 1.882; head length from the eyes to the posterior margin of vertex 0.213 (including interantennal projection 0.231), width 0.189; prothorax length 0.217, width including coxae 0.340; pterothorax width 0.352; fore femur length 0.224, width 0.103; fore tibia length including tarsus 0.168, width 0.042; middle femur length 0.132, width 0.060; middle tibia length including tarsus 0.182, width 0.040; hind femur length 0.196, width 0.070; hind tibia length including tarsus 0.238, width 0.047; fore wing length 0.819, width at middle 0.086; abdomen width 0.340, Antenna 0.392 in total length.

Segments	I	II	III	IV	V	VI	VII	VIII
length in $\mu$	32	52	64	60	60	48	56	36
width in $\mu$	40	32	30	30	28	24	20	12

Tube length 0.151, width 0.070 at the base and 0.030 at the tip. Length of bristles: postoculars 0.032; on the posterior angles of the prothorax 0.040; on the prominent coxae 0.040; on the posterior margin of the ninth abdominal segment, inner pair 0.112, outer pair 0.168; at the tip of the tube, inner pair 0.195, outer pair 0.253.

Head a little longer than wide. Cheeks considerably widened behind the eyes, subparallel, and slightly narrowed at the base. Eyes small and about one-third as long as the head, and about one-half as wide as their interval. Postocular bristles about one-half as long as the eyes, pointed at the tip. Ocelli three, small; hind ocelli situated in front of a line drawn across the middle of the eyes. Mouth cone rounded at the tip, extending to the anterior third of the prosternum. Labium broadly rounded; labrum conical, not attaining to the tip of the labium.

Antennae eight-segmented, about 1.8 times as long as the head, shape of segments as illustrated (Pl. I, 4.); sense cones weak and transparent; formula<sup>1)</sup>: III, 1-1; IV, 1-1; V, 1-1<sup>+</sup>; VI, 0<sup>+</sup>-0<sup>+</sup>; VII with one on the dorsum near the apex. Bristles on the antennae short and slender.

Prothorax as long as the head, about 1.5 times as wide as long;

1) In the formula for the antennal sense cones, the number of the antennal segment is followed first by the number of sense cones on its inner surface and then by the number on its outer surface, rudimentary cones being expressed by an exponent preceded by a plus sign. Thus V, 1-1<sup>+</sup> means that on the fifth antennal segment there is one fully developed sense cone on either side, with an additional rudimentary one on the outer surface.

pronotum with a median longitudinal thickening, which is about one-third of the pronotum; all the usual bristles present, and stout, dilated at the tip. Fore wing slightly constricted in the middle where is a slight folding of the surface, with 5 double fringe hairs along the posterior margin near the tip; three short slender bristles arranged on the vestigial basal portion of the fore vein. Hind wing normal, with a longitudinal fold. Legs normal; fore femur stout; fore tarsus armed with a strong curved tooth arising on the inner distal margin; middle and hind legs slender.

Abdomen rather elongate oval, tapering backwards from the eighth segment. Abdominal segments: I and II each with one knobbed bristle at posterior corner; III to VIII bear two long knobbed bristles on each side of the posterior margin, the outer bristles longer than the inner: II to VI with two long, twice-curved bristles on each side of the middle line; IX with six long, brown bristles encircling the posterior margin, these bristles about as long as the tube. Tube about 0.7 times as long as the head and more than twice as long as the basal width of the tube, and the tube bears six long terminal bristles at the tip which are longer than the tube itself.

*Female* (apterous):—Colour and structure essentially as in macropterous female.

*Measurements of paratype* (♀) in mm.:—Length 1.826; head length from the eyes to the posterior margin of vertex 0.224 (including interantennal projection 0.240), width 0.210; prothorax length 0.234, width including coxae 0.356; pterothorax width 0.333; abdomen width 0.410; tube length 0.147, width at base 0.074 and 0.039 at the tip; total length of antenna 0.392.

*Male* (macropterous):—Smaller than female, but practically identical with female in coloration, form and details of structure.

*Measurements of allotype* (♂) in mm.:—Total length 1.462; head length from the eyes to the posterior margin of vertex 0.180 (including interantennal projection 0.195), width 0.174; prothorax length 0.182, width including coxae 0.294; pterothorax width 0.315; fore femur length 0.182, width 0.091; fore tibia length including tarsus 0.140, width 0.038; middle femur length 0.126, width 0.052; middle tibia length including tarsus 0.140, width 0.038; hind femur length 0.168, width 0.060; hind tibia length including tarsus 0.182, width 0.035; fore wing length 0.625, width at middle 0.029; abdomen width 0.305. Total length of antenna 0.375.

Segments	I	II	III	IV	V	VI	VII	VIII
length in $\mu$	25	46	60	56	52	46	49	35
width in $\mu$	35	28	28	28	25	21	16	11

Tube length 0.133, width 0.056 at the base and 0.028 at the tip; length of bristles: postoculars 0.030; on postero-angular of the prothorax 0.033; on the coxa 0.033; on the posterior margin of the IX abdominal segment, inner pair 0.075, outer pair 0.160; at the tip of the tube 0.234.

Described from 25 mounted females and 15 males. Localities and dates as follows: Tokyo, 15-X-1931, by H. Kuwabara, 3 ♀♀, 1 ♂; Iwate, 10-XII-1931, by I. Kuwana, 3 ♀♀; Tokyo, 1-VI-1932, by the author, 5 ♀♀, 5 ♂♂ (including one apterous); Gora, Hakone, 19-V-1934, by the author, 6 ♀♀, 6 ♂♂, Yokohama, 5-V-1934, by the author, 3 ♀♀, 1 ♂; Yakeyama, Kanagawa, 15-V-1936, by T. Shiraga, 5 ♀♀, 2 ♂♂.

Type locality:—Tokyo, Japan.

This species was found abundantly under the sheath of bamboo in association with *Odonaspis secretatus* COCKERELL.

It is closely related to *Hindsiana melaleuca* BAGNALL from Denmark and to *H. brevitubus* KARNY from Japan, but it may be easily distinguished from the former by the different coloration of antennal segments, as well as by having a head as long as the prothorax, the shape of the tube, and from *H. brevitubus* by the different coloration of legs, as well as by having a strong tooth on the fore tarsus.

*Frankliniella lilivora* spec. nov. (Pl. I, 8; fig. 2.)

*Female* (macropterous):—Length about 1.3 mm. General colour nearly pale grayish yellow; head, thorax and the outer margin of legs shaded with brown; eyes deep red to blackish; ocelli with a crimson red; 10th abdominal segment light yellowish; antennal segments dark brown, I paler; III white in its basal fourth, fore wings uniform pale grey; hind wings similar with the former, with a pale brownish median longitudinal line.

*Measurements of holotype* (♀) in mm.:—Body length 1.310; head length from the eyes to the posterior margin of vertex 0.133 (including inter-antennal projection 0.138), width 0.182; prothorax length 0.140, width 0.224; pterothorax width 0.294; abdomen 0.322 across at the broadest part; fore wing length 0.616, width at the middle 0.056. Antennae 0.273 in total length.

Segments	I	II	III	IV	V	VI	VII	VIII
length in $\mu$	24	36	52	42	36	48	9	16
width in $\mu$	38	39	24	24	20	23	8	6

Head about 1.3 times as wide as long, sides almost straight and widened posteriorly; interocellar bristles and one pair of postoculars prominent, slender, yellowish; other setae slender, paler, inconspicuous. Eyes somewhat less than half as long as the head, the width about  $42\ \mu$  and their interval about  $70\ \mu$ . Ocelli present, the posterior ones situated behind a line passing the middle of eyes; interocellars about  $60\ \mu$  in length and distinctly less than half as long as the pronotum; a row of four postoculars behind the eye, the longest about  $44\ \mu$  in length.

Antennae composed of eight segments, about twice as long as the head, form and structures as in the figure (Pl. I, 8.); segment III the longest and about twice as long as wide; IV slightly shorter, about 1.7 times as

long as wide; V still shorter, about 1.8 times as long as wide; VI a little shorter than III, about twice as long as wide; VII and VIII small, cylindrical; VIII slightly longer and narrower than VII. Sense cones: III with one forked cone on the dorsum, IV with a similar cone on the ventral aspect; V with a rudimentary cone on the outside; VI with two inconspicuous cones, one on the outside and the other on the inner side. Mouth cone normal; maxillary palpi about  $45\ \mu$  in length, the second segment about twice as long as the first; labial palpi about  $18\ \mu$  in length, segments subequal, labrum rounded.

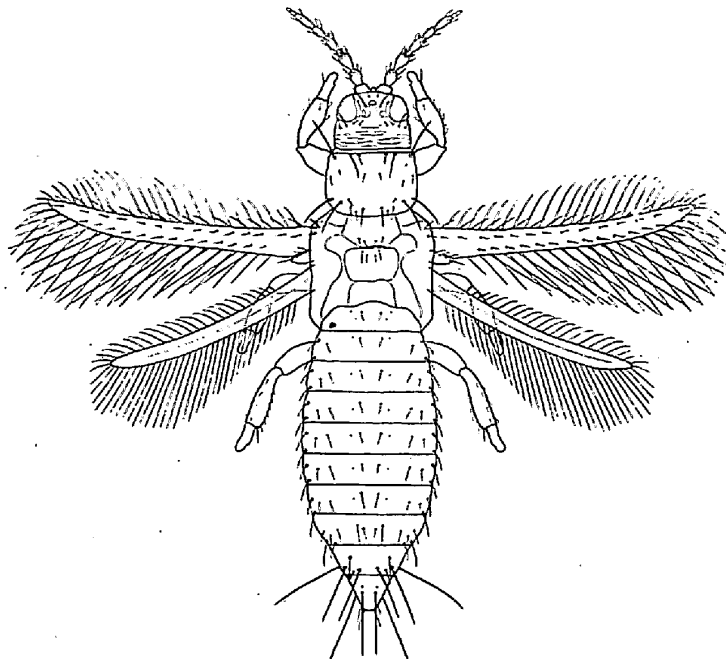


Fig. 2. *Frankliniella lilivora* sp. nov., ♀.

Prothorax nearly as long as the head, about 1.6 times as wide as long, with long prothoracic bristles and scattered setae; antero-angular bristles about  $88\ \mu$  in length, about twice as long as the antero-marginals, two pairs of the postero-angulars about  $92\ \mu$  in length. Pterothorax slightly wider than long; fore wings about 11 times as long as their width at the middle; bristles brownish yellow; about 18 on costa, 15 on the anterior vein, 13 on the posterior vein. Legs moderately short and stout. Abdomen slender, abdominal tergites from II to VIII with very faint gradation; segment X with a faint longitudinal furrow at the middle; bristles on segment IX about  $136\text{--}160\ \mu$  in length, on X about  $156\ \mu$  long.

*Male* (brachyptera):—General colour and structure differing but slightly from that of the female. Antennal segment dark brown; II paler in the basal, III transparent in its basal half. Ninth tergite at mid-dorsal with two pairs

of short, stout, bristles and disposed on an arcuate line; tenth tergite with two long, arcuate bristles on its terminal end. Bristles on wing all transparent; 10 on costa, 6 on the anterior vein, scale with 3 and 2 long hairs.

*Measurements of allotype* (♂) in mm.:—Body length 0.956; head length from the eyes to the hind margin of vertex 0.114 (including antennal projection 0.126), width 0.156; prothorax length 0.126, width 0.196; pterothorax width 0.231; abdomen width 0.266; fore wing length 0.154, width 0.060. Antennae 0.231 in total length.

Segments	I	II	III	IV	V	VI	VII	VIII
length in $\mu$	21	31	42	36	30	42	8	15
width in $\mu$	33	26	21	21	18	18	9	6

Length of bristles: interocellars  $54\mu$ ; the longest postoculars  $36\mu$ ; thoracic antero-angulars  $33\mu$ ; thoracic post-angulars  $66\mu$ ; on the mid-dorsal of 9th tergite  $36\mu$ ; curved bristles on 10th tergite  $90\mu$ .

Described from 37 females and 16 males. Localities and dates as follows:—By K. Tanaka taken in quarantine materials at Nagasaki from Shanghai, China, 23-VII-1929, 2 ♀♀; by A. Kariya taken in quarantine at Yokohama from Dairen 28-IX-1932, 17 ♀♀, 6 ♂♂ (brachypterous); by the author in shipping material from Corea at Yokohama, 8 ♀♀, 4 ♂♂; by N. Mori at Kanagawa-Ken, 19-IX-1932, 10 ♀♀, 6 ♂♂ (brachypterous).

Type locality: Kanagawa, Japan.

Host plant: Lily bulb.

Distribution: Japan (Honshu), Korea, Manchuria, China.

This species belongs to Hood's groups III and it most closely related to *Frankliniella williamsi* Hood from North America, but it may be distinguished from this by the different coloration and the relative length of the antennal segments as well as the form of the antenna.

*Parafrankliniella fasciatus* spec. nov. (Pl. I, 1, 2, 3)

*Female* (macropterous):—Length about 1.4 mm. Colour chestnut brown, head dark brown, yellowish between eyes; eyes dark black, surrounded by yellowish margin; ocellus yellow with a red crescent patch. Segments I and II of antennae dark brown; III pale yellow, with the pedicel and the distal third shaded light brown; IV and V pale yellow, in the basal half and shaded light brown in the distal; VI pale yellow in the basal third and light brown in the distal; VII and VIII light brown. Prothorax concolorous with the head, with scattered red pigmentation; pterothorax blackish brown on the sides and on the metascutum, light brown on the mesoscutum. Abdomen blackish brown; the first and the last three segments lighter. Fore wings almost transparent white with two brown cross bands. All femora dark brown; fore tibia yellowish brown with the distal third lighter; middle tibia pale yellowish brown; hind tibia light yellow; all tarsi light yellow. All bristles on the body brown.

*Measurements of holotype (♀) in mm.*:—Total length 1.4; head length from the eyes to the posterior margin of vertex 0.126 (including interantennal projection 0.138), width 0.176; prothorax length 0.127, width 0.225; pterothorax width 0.303; fore femur length 0.136, width 0.056; fore tibia length including tarsus 0.234, width 0.043; middle femur length 0.156, width 0.048; middle tibia length including tarsus 0.254, width 0.039; hind femur length 0.195, width 0.048; hind tibia length including tarsus 0.376, width 0.039. Antenna 0.380 in total length.

Segments	I	II	III	VI	V	VI	VII	VIII
length in $\mu$	24	48	48	64	56	68	16	20
width in $\mu$	38	30	20	20	18	17	8	6

Length of bristles: antenna posteriors 0.028; interocellars 0.068; on the anterior margin of prothorax, inner pair 0.076, outer pair 0.030; thoracic postero-angulars 0.084–0.088.

Head about 1.2 times as wide as long, about as long as the prothorax. Eyes large, occupying about 0.6 as long as the head, their width 60  $\mu$ , their interval about 72  $\mu$ . Occiput feebly transversely striated. Ocelli situated as on figure (Pl. I, 2.); postocellar bristles much shorter.

Antennae eighth-segmented, about 2.7 times as long as the head, shape of segment as illustrated; bristles on the antennae stout, longer and concolorous with the head; Prothorax somewhat rectangular, slightly more than twice as wide as long, with two pairs of moderately long bristles on the anterior margin, the inner pair of the bristles about twice as long as the outer pair; 2 thoracic postero-angulars about 84–88  $\mu$  in length, and six small spines at the posterior margin.

Length of fore wing about 1.8 times the width at the middle, reaching VIII or IX abdominal segment; fore wing with two brown broad cross bands, one at the basal third and the other at the distal fourth of the wing; costa with 23 to 24 long bristles; fore vein with 7 basal and 3 distal; hind vein with 3 at the middle; these bristles dark brown except the whitish bristles on the transparent portion of the fore wing.

Abdomen normal, somewhat wider than thorax; segment VIII with fine long complete comb; segment IX about 138  $\mu$  long, with 2 pairs stout long bristles on the posterior margin, outer pair 152  $\mu$ , inner pair 88  $\mu$  long; segment X about 99  $\mu$  long, with 2 long stout bristles at the middle of the posterior margin, 136  $\mu$  long. Legs slender; all femora and tibiae set with numerous spines.

Holotype, 1 ♀ by Dr. T. Ishii at Isahaya, Nagasaki, 17–VIII–1926; paratype 4 ♀♀ as same as holotype.

Host plant: Unknown.

Type locality: Nagasaki, Japan.

This species is closely related to *Parafrankliniella verbasciae* PRIESNER.

from Austria, but it may be easily distinguished from this by the different colouration and having two brown cross bands on the fore wing.

*Taeniothrips rohdeae* spec. nov. (Pl. I, 5, 6, 8.)

*Female* (macropterous):—Body dark brown; segments I and II of antennae dark brown, suffused with red hypodermal pigmentation; III to VIII greyish brown except the pedicel of III and IV lighter, the distal third of III and the circle at the base of trichome on IV, which are whitish or pale brownish-yellow; head lighter between the eyes. All femora concolorous with body except for lighter area at the extreme base; fore tibia brownish yellow, lighter towards the tip; mid and hind tibia dark brown; all tarsi yellow. Fore wing shaded brown but lighter at the base. Crescents of ocelli dark red. All bristles on body and wing dark brown.

*Measurements of holotype* (♀) in mm.:—Total body length 1.45; head length from the eyes to the posterior margin of vertex 0.147 (including interantennal projection 0.144), width 0.158; prothorax length 0.136, width 0.226; pterothorax width 0.306, abdomen length 0.894, width 0.339; wings length 0.792, width 0.056 at the middle; antenna 0.350 in total length.

Segments	I	II	III	IV	V	VI	VII	VIII
length in $\mu$	24	33	63	63	42	69	12	18
width in $\mu$	36	27	27	24	18	18	9	6

Length of bristles: interocellars 66  $\mu$ ; prothoracic antero-marginals 42  $\mu$ ; prothoracic postero-angulars, outer 84  $\mu$ , inner 102–105  $\mu$ ; on segment IX of abdomen 168  $\mu$ ; on segment X of abdomen 152  $\mu$ .

Head a little longer than wide, and about 0.7 times as long as the prothorax; cheek rather swollen, slightly notched behind the eyes. Eyes weakly protruding, more than about half of the length of head; and about 0.8 times as wide as their interval. Occiput with numerous cross wrinkles. Ocelli situated as on figure (Pl. I, 6.), interocellar bristles very long, about as long as the eyes, and placed on a line between the posterior margin, a row of postoculars behind the eye, the longest of them about 16  $\mu$ . Antennae 8-segmented, about 2 times as long as the head, shape of segments as illustrated (Pl. I, 5.); sense cone: long and slender, III with one forked cone on dorsum, IV with a similar cone on the ventral aspect. Prothorax normal; postero-angulars about twice as long as the median line, six small bristles along the posterior margin, inner ones longest, 42  $\mu$  in length.

Pterothorax normal, about 1.3 times as wide as the prothorax, metanotum plate with 4 long bristles along the anterior margin, inner pair about twice as long as the outer ones. Fore wing stout at base, tapering gradually toward the tip, bristles as follow; costa with 21–22, fore vein with 8 at base, one just beyond the middle and 2 near the tip, hind vein with 10, scale with 5; hind wing with a median long vein.

Abdomen elongate, ovate, cylindrical but tapering backwards from the



VII segment: along the posterior margin, IX and X segments with very long bristles.

*Male* (macropterous):—Body, antennae, legs and wings shaped as in the female, except the body is more slender and the six antennal segment is five times as long as wide. Fore wing about 13 times as long as wide at the middle, extending to the VII abdominal segment. Bristles on left fore wing as follows: costa 20, fore vein 6 at base 1 beyond the center and 2 near the tip, hind vein with 8; right fore wing with 20 on costa, fore vein with 7 at base, one at middle, 2 near tip, hind vein with 9. Ventral impression on sternites III to VII large and well defined constricted in the middle, in each case occupying nearly the entire width of the sternite plate.

*Measurements of allotype* (♂):—Total body length 1.222; head length 0.132, width 0.141; Prothorax length 0.117, width 0.192; pterothorax 0.246; abdomen width 0.228; wing length 0.635, width 0.049 at the middle. Antennae 0.310 in total length.

Segments	I	II	III	IV	V	VI	VII	VIII
length in $\mu$	24	30	54	57	42	75	9	15
width in $\mu$	30	27	24	21	15	13	6	4

Length of bristles: interocellars 60  $\mu$ ; prothoracic postero-angulars, outer 60–63  $\mu$ , inner 84  $\mu$ ; innermost pair along the posterior margin of the prothorax 30  $\mu$ ; on the anterior margin of the metanotal plate, outer 24  $\mu$ , inner 52  $\mu$ ; the longest bristles on the sides of the 9-th abdominal segment 135  $\mu$ ; median dorsal bristles, outer 54  $\mu$ , inner 77  $\mu$ ; curved bristles at the sides of the 10th abdominal segment 126  $\mu$ .

Holotype 1 ♀, allotype 1 ♂, 3 ♀♀ paratype taken on *Rohdea japonica* ROTH. 28–VIII–1935, by the author at Tokyo; 4 ♀♀, 6 ♂♂ taken on same host plant, 5–VIII–1934, by H. Kuwabara at Yokohama.

Type locality: Tokyo, Japan.

This species is closely related to *Taeniothrips gracilis* MOULTON from Japan, but it may be easily distinguished from this by the different colouration of antennae and legs as well as by the length of bristles along the anterior margin of metanotum plate unequally.

#### Explanation of Plate I.

- Fig. 1. *Parafrankliniella fasciatus* sp. nov., right fore wing of female.
- Fig. 2. *Parafrankliniella fasciatus*, head and prothorax of female.
- Fig. 3. *Parafrankliniella fasciatus*, right antenna of female.
- Fig. 4. *Haplothrips* (*Hindsiana*) *odonaspicola* sp. nov., left antenna of female.
- Fig. 5. *Taeniothrips rohdeae* sp. nov. right antenna of female.
- Fig. 6. *Taeniothrips rohdeae*, head and prothorax of female.
- Fig. 7. *Taeniothrips rohdeae*, right fore wing of female.
- Fig. 8. *Frankliniella lilivora* sp. nov., left antenna of female.

