

**Some new Neotropical species of *Frankliniella* KARNY in the Senckenberg collection,
Frankfurt am Main (Germany)
(Insecta, Thysanoptera, Thripidae)**

JACINTO BERZOSA

Abstract

Nine Neotropical species of *Frankliniella* KARNY 1910 are described as new to science, i.e. *F. torquis* sp. n. and *F. wedeliae* sp. n. from Belize; *F. cassiae* sp. n. from Costa Rica; *F. aliaepennae* sp. n., *F. espeletiae* sp. n., *F. paramorum* sp. n. and *F. regentis* sp. n. from Colombia; *F. incerta* sp. n. from Ecuador; and *F. gracilis* sp. n. from Argentina. The holotypes of these species are deposited in the Forschungsinstitut (Research Institute) Senckenberg, Frankfurt am Main (Germany).

Key words: new species, Neotropics, Central and South America.

Nuevas especies neotropicales del género *Frankliniella* KARNY en la colección Senckenberg, Frankfurt am Main (Alemania) (Insecta, Thysanoptera, Thripidae)

Resumen: En este trabajo se describen nueve especies nuevas para la ciencia del género *Frankliniella* KARNY 1910 colectadas, todas ellas, en diferentes países de Centro y Sudamérica: *F. torquis* sp. n. y *F. wedeliae* de Belice; *F. cassiae* sp. n. de Costa Rica; *F. aliaepennae* sp. n., *F. espeletiae* sp. n., *F. paramorum* sp. n. y *F. regentis* sp. n. de Colombia; *F. incerta* de Ecuador y *F. gracilis* de Argentina. Todos los ejemplares estudiados pertenecen al Instituto de Investigación y Museo Senckenberg de Frankfurt-Main (Alemania) y allí están depositados los holotipos.

Palabras clave: especies nuevas, Neotrópicos, América Central y del Sur.

Introduction

The thripid genus *Frankliniella* KARNY 1910 is widely distributed throughout the world, with the greatest diversity in Central America (MOUND & MARULLO 1996). Although more than 170 species have so far been described from this region, a considerable number of species are waiting to be studied and named. Many slides of still unidentified specimens are deposited in various collections. One of these depositories is the Senckenberg-Museum. The author of this contribution had the opportunity to study that material. Some of the samples dealt with were collected in the course of ecological or phytopathologi-

cal projects. Three of the species from Colombia have been taken in mountainous areas of more than 3000 m above sea level.

Materials and methods

Specimens in this study were collected on various expeditions from 1968 to 1987 in several Central and South American countries.

Drawings were made with the aid of a camera lucida on a Zeiss compound microscope equipped with a phase contrast 40× objective.

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Also, some of the specimens deposited in the SMF have been studied to compare similarities among different collections, including the Senckenberg Institute itself.

Abbreviations in the text for the different collections are the following:

BMNH	The Natural History Museum (formerly British Museum [Natural History]), London.
CSIRO	Commonwealth Scientific & Industrial Research Organisation, Canberra.

SMF [T]	Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, [Thysanoptera collection] (= Senckenberg-Museum, Frankfurt am Main).
UCME	Entomología, Departamento de Zoología, Facultad de Biología, Universidad Complutense, Madrid.
USDA	United States, Department of Agriculture, Beltsville, Maryland.
USNM	United States National Museum, Smithsonian Institution, Washington

Results

Frankliniella gracilis sp. n.

(Figs. 1–6)

Holotype ♀: Argentine: Montecarlo, río Paraná, province of Misiones, 13. XII. 1976, on flowers of Asteraceae, E. KLEIN leg. (SMF T 7599-1).

Paratypes: 4 ♀♀, 3 ♂♂ with the same data as holotype. 1 ♀ of the paratypes is deposited in UCME.

Derivatio nominis: The specific name is derived from its tall appearance. Latin language gracilis = slender. The name is herewith defined as a noun in apposition.

Description: ♀ (macropterous). Body colour brown to pale brown. Head, thorax and abdomen brown to pale brown; head and abdominal segments VII–X darker. Forewing light brown. Legs brown, femora and tibiae, at base, sometimes pale; fore tibia paler than others. Tarsi yellow. Antenna brown, antennal segment III pale brown with third basal lighter; segment IV with fourth basal clearer.

Head 102–116 (135–146) µm long (wide) (Fig. 2), cheeks easily convergent towards back; occiput with four to five sculptural lines, the pair of the interocellar setae 35–39 µm long located at position 2/3 (RETANA & MOUND 1994) and their interval 16–22 µm; pair IV of the postocular setae 19–23 µm long and pair I present. Antenna 257 µm long, antennal segment III (Fig. 1) with simple pedicel. Length (width) of the antennal segments, segment III with pedicel, in µm: I 16–19 (26–28), II 32–37 (23–26), III 41–46 (19–21), IV 35–42 (19–20), V 27–32 (16–17), VI 42–44 (19), VII 7–8 (7–8) and VIII 9–14 (5–6).

Pronotum 111–132 (158–179) µm long (wide) (Fig. 2), almost smooth with some sculptural lines; discal area with six to nine pairs of setae reaching 7–12 µm long, the longest pair is the most lateral one 14–16 µm; anteromarginal setae 35–41 µm, anteroangular setae 44–58 µm and two small setae between the anteromarginal pair reach 13 µm long; posteroangular internal setae 60–63 µm, posteroangular external setae 53–79 µm and pair II of posteromarginal setae 28–32 µm, respectively.

Mesonotum with transverse thin sculptural lines; two pairs of posteromarginal setae, the inner pair 12–13 µm

and the outer pair 16 µm long. Metanotum (Fig. 3) almost smooth in central area; two pairs of anteromarginal setae, the central pair 43–53 µm and the lateral pair 26–32 µm long; a pair of campaniform sensilla on posterior third.

Forewing 570–684 µm long, upper vein with 16–21 and lower vein with 11–16 setae, respectively, wing scale with 5 setae along border and 1 seta on discal area.

Abdomen, on tergite IV with a short ctenidium present ending pair S2; tergite VIII with a complete comb (Fig. 4) of twelve to fourteen microtrichia reaching 6–12 µm long (Fig. 4). Abdominal segment IX 72–86 µm long (Fig. 4), discal setae 23–28 µm; setae S1, S2 and S3 85–95, 100–104 and 100–109 µm long, respectively, with S1 < S2 < S3. Abdominal segment X 65–72 µm long (Fig. 4), setae S1 and S2 108–116 and 95–107 µm long.

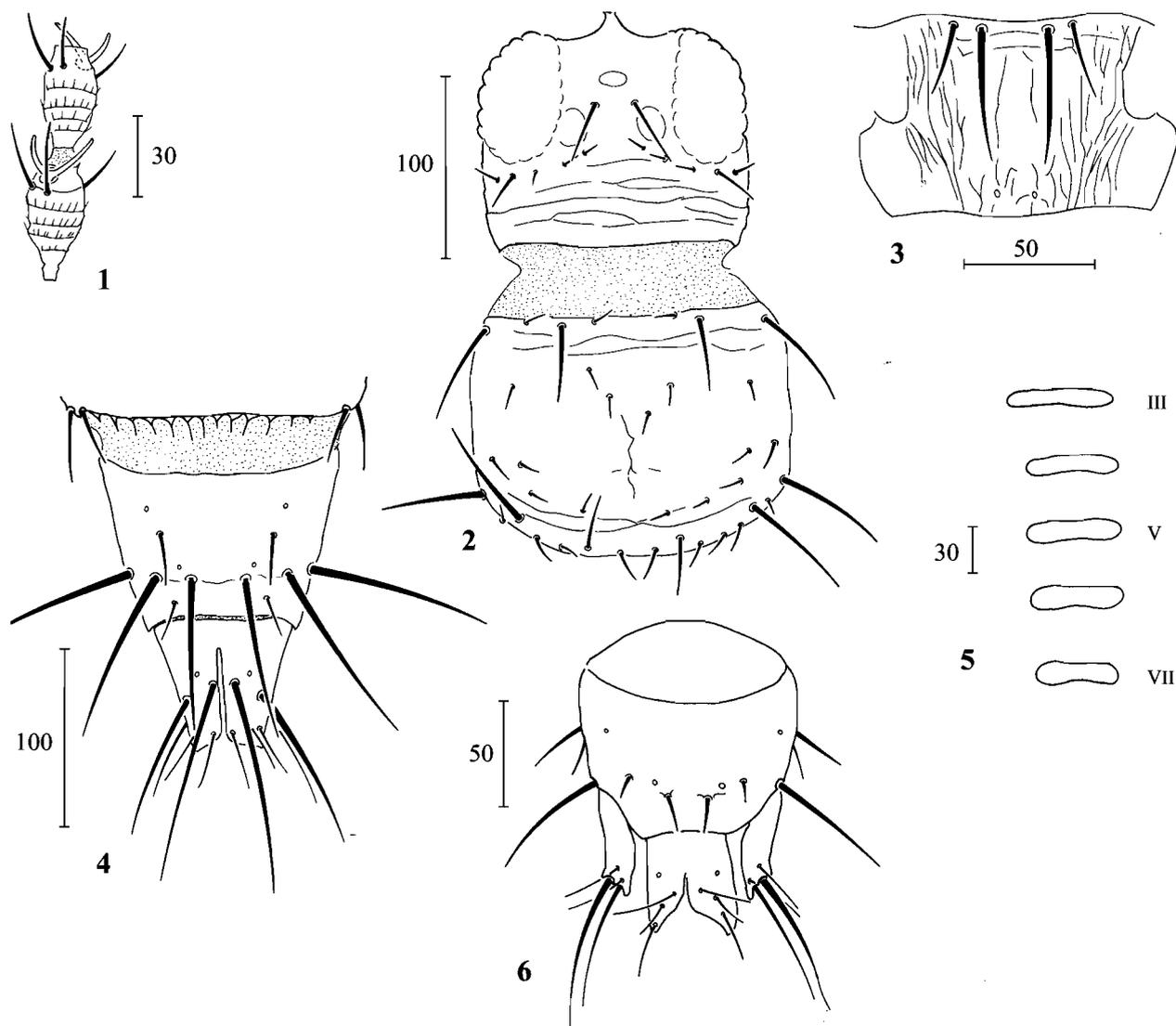
Total body length: 1.329–1.521 mm (distended).

♂: Body colour pale yellow, femora and tibiae with brown spots. Antenna with segments I–II, basal two-thirds of segment III, basal half of segment IV and basal third of segment V pale yellow; the rest of the segments pale brown. Forewing pale yellow.

Head 90–93 (118–130) µm long (wide); interocellar setae 26–36 µm and pair IV of the postocular setae 17–19 µm long, respectively. Antenna 227–233 µm long; length (width) of the antennal segments, segment III with pedicel, in µm: I 19 (24), II 30–32 (23), III 35–41 (19), IV 32–37 (16–17), V 27–32 (15–16), VI 37–42 (16–17), VII 6–7 (7–8) and VIII 10–12 (5–6).

Pronotum 102–116 (132–162) µm long (wide); anteromarginal setae 32–39 µm, anteroangular setae 39–51 µm, posteroangular internal setae 44–53 µm and external setae 36–46 µm and pair II of the posteromarginal setae 23–30 µm long, respectively. Forewing 470–560 µm long.

Abdominal sternites III–VII with transverse glandular areas (Fig. 5), length (width) in µm: III —, IV 14 (65), V 9 (58), VI 12 (64) and VII 12–14 (49–51). Tergite VIII without comb of microtrichia at the posterior margin. Abdominal segment IX 60 µm long (Fig. 6) with setae S1, S2 and S3 16 µm, 60–65 µm and 30–35 µm long,



Figs. 1–6. *Frankliniella gracilis* sp. n. — ♀: 1) Antennal segments III–IV dorsally, holotype. 2) Head dorsally and pronotum, paratype. 3) Metanotum, holotype. 4) VIII tergite (comb)–X tergite, holotype. — ♂: 5) Glandular areas, sternites III–VII. 6) Abdominal segments IX–X dorsally. — Scales in μm .

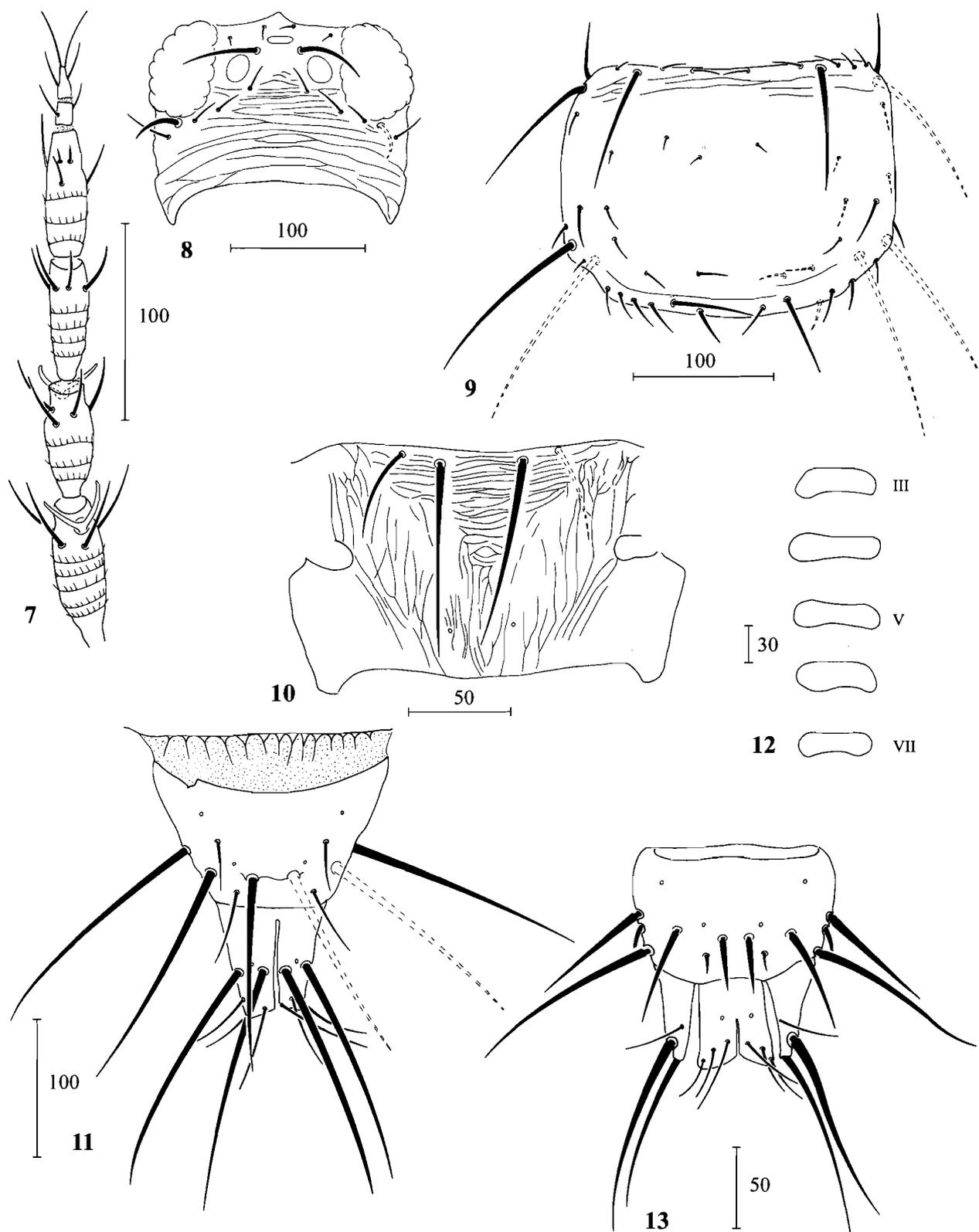
respectively. Abdominal segment X with falciform setae 67–79 μm long (Fig. 6). Abdominal segment IX with setae S2 and segment X with the falciform setae somewhat thick.

Total body length: 1.004–1.182 mm (distended).

Discussion: *F. gracilis* sp. n. is similar to *F. schultzei* (TRYBOM 1910) with a cosmopolitan distribution and is a serious plague for several crops (NAKAHARA 1997: 374). Comparison establishes a clear difference between the dark colour specimens of *F. schultzei* and the brightly coloured specimens. Despite the great variability of *F. schultzei* we have managed to detect the following differences in specimens from several countries (Argentina, Colombia, Nigeria, Ivory Coast, Cape Verde and Bangladesh) deposited in the SMF: interocellar setae clearly anterior to the hind ocelli in *F. gracilis*

sp. n. (in line with the hind ocelli or amongst them in *F. schultzei*); metanotum with campaniform sensilla and lack of central sculpture (without campaniform sensilla and with visible cells in the centre); forewing shadowed, clear-brown (pale, without coloration); tergite VIII with a comb of 12–14 microtrichia (comb with 1–3 microtrichia just laterally located).

F. gracilis sp. n. seems related to *F. simplex* PRIESNER 1924, as described by PRIESNER (1924) from Mexico on *Senecio* sp. We could find differences in: body and wing colour brown to light-brown in *F. gracilis* sp. n. (body and wing brown to dark-brown in *F. simplex*); metanotum smooth in the middle (with central cells); abdominal segment IX longer than segment X (segment IX as long as segment X); setae S1 of the abdominal segment IX 0.8–0.9 times as long as setae S2 = S3 (setae S1 0.6–0.65 times as long as S2 = S3); ♂ with transverse glandular



Figs. 7-13. *Frankliniella incertus* sp. n. — ♀, holotype: 7) Antennal segments III-VIII dorsally. 8) Head dorsally. 9) Pronotum. 10) Metanotum. 11) VIII tergite (comb)-X tergite. — ♂: 12) Glandular areas, sternites III-VII. 13) Abdominal segments IX-X dorsally. — Scales in μm .

areas, 4-6 times wider than long (almost circular, under 2 times wider than long).

Finally, *F. gracilis* sp. n. is similar to *F. spinosissima* JOHANSEN & MOJICA 1989 as described by JOHANSEN &

МОЛСА (1989) in Mexico from *Cirsium* sp., though differences in the quite long pairs of the ocellar setae I and II in this species, as well as other characteristics, differentiate it from *F. gracilis* sp. n.

***Frankliniella incerta* sp. n.**

Figs. 7–13

Holotype ♀: Ecuador, 9. III. 1985, on culture of *Vicia faba* LINNAEUS, H. SCHMUTTERER leg. (SMF T 13521-1).

Paratype: 1 ♂, with the same data as holotype.

Derivatio nominis: The species is named for the difficulty of its diagnosis. Latin language *incerta* = dubious. The name is herewith defined as a noun in apposition.

Description: ♀ (macropterous). Body colour brown. Head, thorax, abdomen and femora brown; tibiae and tarsi yellow; forewing brown and basal fourth pale. Bicoloured antenna, antennal segments I–II and VI–VIII brown; segments III–V with the basal half yellow and the distal half brown.

Head 128 (186) µm long (wide) (Fig. 8) with convergent cheeks towards back; occiput with some deep striae; interocellar setae 54 µm long and interval 30 µm long, respectively, located at position 2/3 according to RETANA & MOUND (1994); pair I of the postocular setae present and pair IV, the longest, 35 µm. Antenna 370 µm long (Fig. 7), antennal segment III with simple pedicel, segments III and IV with a distal collar. Length (width) of the antennal segments in µm, segment III with pedicel: I 30 (37), II 44 (32), III 70 (23), IV 63 (23), V 60 (19), VI 65 (21), VII 12 (9) and VIII 16 (5).

Pronotum 183 (251) µm long (wide) (Fig. 9), almost smooth, discal area with eight pairs of setae reaching 7–21 µm long and longest pair of lateral position 35 µm long; anteromarginal setae 95 µm and anteroangular setae 102 µm and two pairs of small setae between the anteromarginal setae reaching 19–21 µm long, respectively; posteroangular external setae 130 µm long, pair II of the posteromarginal setae 61 µm long.

Mesonotum with large sculptural lines; posteromarginal internal setae 23 µm and external setae 30 µm long, respectively. Metanotum (Fig. 10) with manifest sculpture, with transverse lines on forward half and reticulate on posterior half, medially; the central pair of the anteromarginal setae 97 µm and the lateral pair 46 µm long, respectively; a pair of campaniform sensilla at posterior third.

Forewing 1300 µm long, upper vein with 22–23 setae and lower vein with 18 setae; scale with 5 veinal setae and 1 discal seta.

Abdomen with ctenidia on tergite IV up to pair S2; tergite VIII with a comb of 16 long microtrichia reaching 19–23 µm (Fig. 11). Abdominal segment IX 86 µm long (Fig. 11), discal setae 39 µm, setae S1, S2 and S3 142 µm, 169 µm and 183 µm long, respectively with $S1 < S2 < S3$. Abdominal segment X 79 µm long (Fig. 11), setae S1 and S2 186 µm and 179 µm long.

Total body length: 2.216 mm (distended).

♂. Body colour yellow. Forewing pale. Legs yellow. Bicolour antenna, antennal segments I–III, basal halves of segments IV–V yellow; the remaining segments pale brown.

Head 116 (144) µm long (wide), interocellar setae 74 µm and pair IV of the postocular setae 51 µm long, respectively. Antenna 314 µm long; length (width) of the antennal segments, segment III with pedicel, in µm: I 26 (30), III 67 (21), IV 57 (19), V 42 (19), VI 49 (20), VII 7 (9) and VIII 14 (7).

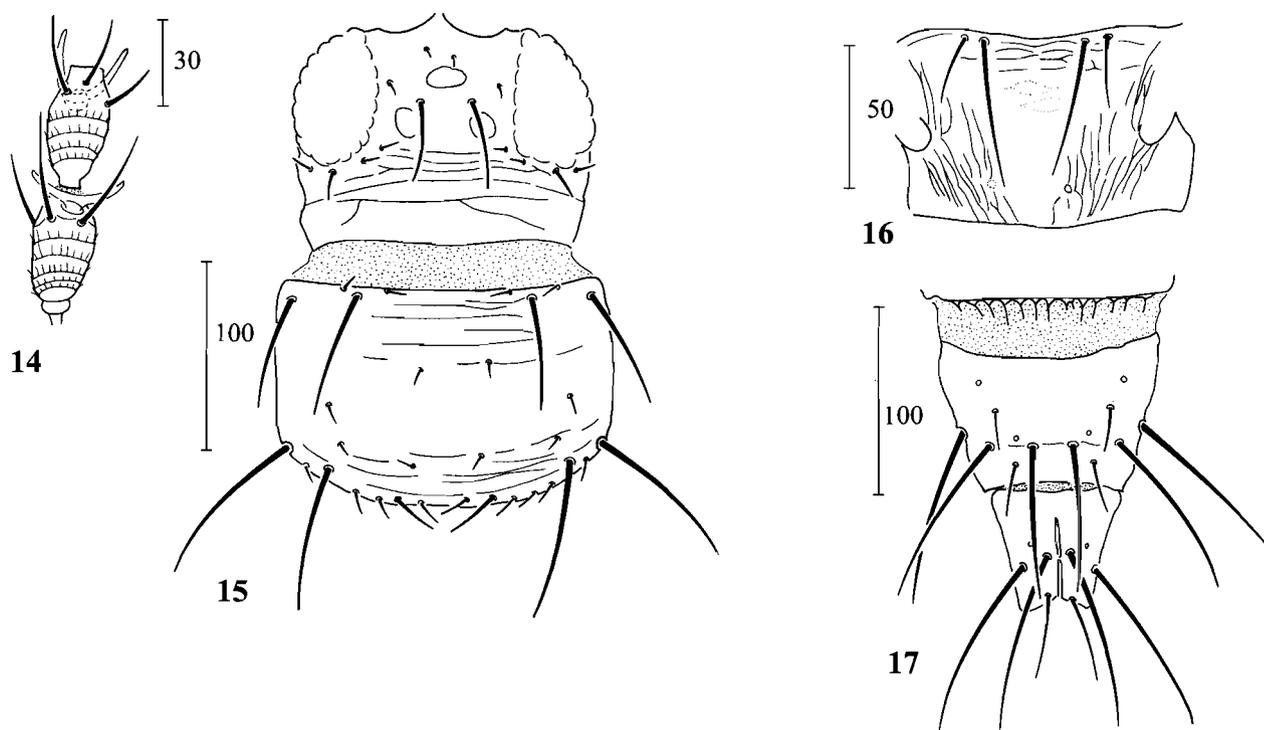
Pronotum 137 (197) µm long (wide); anteromarginal setae 82 µm, anteroangular setae 97 µm, posteroangular internal setae 100 µm, posteroangular external setae 107 µm and pair II of the posteromarginal setae 63 µm long, respectively. Forewing 874 µm long.

Abdominal sternites III–VII with transverse glandular areas (Fig. 12), length (width) in µm: III 19 (77), IV 16 (84), V 19 (79), VI 19 (72) and VII 12–14 (49–51). Tergite VIII with a comb of 14 microtrichia, on the posterior margin, reaching 12–14 µm in length. Abdominal segment IX 58 µm long (Fig. 13), discal setae 63 µm, setae S1, S2 and S3 37 µm, 116 µm and 77 µm, long, respectively. Abdominal segment X 63 µm long and falciform setae 123 µm long (Fig. 13). The major setae of the abdominal segment IX and the falciform setae of the segment X are somewhat thick.

Total body length: 1.477 mm (distended).

Discussion: *F. incerta* sp. n. is similar to *Frankliniella fulvipes* BAGNALL 1919 as well as to *F. citripes* HOOD 1916. The differences between *F. incerta* sp. n. and the first species described from Argentina (BAGNALL 1919) are: antennal segments III–V with the basal half yellow and the distal half brown in *F. incerta* sp. n. (antennal segments III–V whitish-yellow in *F. fulvipes*); pair I of the postocular setae present (absent); tergite VIII with a complete comb of 16 microtrichia (comb with 2–4 microtrichia laterally disposed). In a paratype of *F. fulvipes* from SMF it has been observed that the abdominal segment IX is shorter than the segment X whereas the abdominal segment IX from the new species is longer than segment X.

The differences with *F. citripes* described from Cuba on *Citrus* sp. (HOOD 1916) are mainly: antennal segments III–V bicolourous in *F. incerta* sp. n. (segment III, two-third basal of segment IV and basal half of segment V pale yellow in *F. citripes*); brown shadowed wing with the fourth basal pale (wing with the basal and distal thirds pale and the central third pale brown); metanotum with lines of sculpture clearly visible in the middle area (almost smooth in the posterior half). In light of measurements from a paratype of *F. citripes* and a specimen from Cuba, forming part of the HOOD collection in the USNM, we can say that generally the Cuban species is larger than the new one, for example: setae S1, S2 and S3 of the abdominal segment IX 142 µm, 169 µm and



Figs. 14–17. *Frankliniella torquis* sp. n. — ♀: 14) Antennal segments III–IV dorsally, paratype. 15) Head dorsally and pronotum, paratype. 16) Metanotum, holotype. 17) VIII tergite (comb)–X tergite, holotype. — Scales in μm .

183 μm in *F. incerta* sp. n. (167–181 μm , 186–190 μm and 202–204 μm in *F. citripes*).

For ♂♂, despite the fact that they are not described in the catalogue by JACOT-GUILLARMOD (1974: 771), we were able to study a specimen collected in 1939 in Cuba on *Clerodendron*, ex HOOD's collection, in which we observed that abdominal segment IX is longer than segment X, and discal setae are thick and short, 36 μm long, whereas in the new species the abdominal segment IX is smaller than segment X and discal setae are slender, reaching 63 μm in length.

***Frankliniella torquis* sp. n.**

Figs. 14–17

Holotype ♀: Belize (British Honduras): Gales Point (Belize Distr.), 9. III. 1978, on flowers from ?Rutaceae, E. KLEIN leg. (SMF T 7722-1).

Paratypes: 3 ♀♀, with the same data as holotype.

Derivatio nominis: The name refers to the "necklace" of the antennal segment III. Latin language torquis = necklace, chain. The name is a noun in apposition.

Description: ♀ (macropterous). Body colour, together with the antennae and the forewings, brown. Tibiae with the distal third paler than body, tarsi yellow.

Head 97–111 (144–148) μm long (wide) (Fig. 15) with convergent cheeks towards back; occiput with many sculptural lines, some of them deep and others shallow; interocellar setae 32–46 μm long, located at position 2 (RETANA & MOUND 1994), and their interval 22–24 μm ;

pair I of the postocular setae absent and pair III, longest one, reaches 16 μm in length. Antennae 238–247 μm long; antennal segment III with simple pedicel and above it a collar, wider than long, with convex sides (Fig. 14). Length (width) of the antennal segments, segment III with pedicel, in μm : I 19–23 (28), II 32 (26), III 44–46 (21), IV 44 (21), V 32 (16–17), VI 44–46 (17–19), VII 9 (7–9) and VIII 12–14 (5–7).

Pronotum 111–118 (160–174) μm long (wide) (Fig. 15), with shallow sculptural lines at pronotal area; discal area with 4–5 pairs of setae reaching 7–12 μm in length; anteromarginal setae 58–72 μm , anteroangular setae 65–72 μm and one pair of small setae between the anteromarginal pair 12–14 μm long, respectively; posteroangular internal setae 77–93 μm , posteroangular external setae 86–95 μm and pair II of the posteromarginal setae 26–32 μm long.

Mesonotum with transverse sculptural lines, slender lines in fore middle and deep lines in hind middle; posteromarginal internal setae 9–12 μm and external 12–14 μm long, respectively. Metanotum (Fig. 16) smooth medially and 2–3 transverse lines on anterior third; anteromarginal inner setae 51–53 μm and outer 30–32 μm long; a pair of campaniform sensilla, at posterior third. Forewing 584–608 μm long, upper vein with 14–17 setae and lower vein with 10–12 setae; scale with 5 setae on border and 1 seta on discal area.

Abdomen without ctenidia on tergite IV; tergite VIII with a complete comb of 12–14 microtrichia, at posterior margin, reaching 7–14 μm in length (Fig. 17). Abdomi-

nal segment IX 63–65 μm long (Fig. 17); discal setae 26–28 μm , setae S1, S2 and S3 70–81 μm , 86–93 μm and 81–93 μm long, respectively, with $S1 < S2 = S3$. Abdominal segment X 56–63 μm long (Fig. 17), setae S1 and S2 95–102 μm and 88–97 μm long.

Total body length: 1.241–1.300 mm (distended)

Discussion: *Frankliniella torquis* sp. n. is quite similar to *F. standleyana* HOOD 1935 and *F. pulchella* HOOD 1935, as described by HOOD (1935) in Panama from several plants, and to *F. pineticola* HOOD 1942 due to the collar of the antennal segment III and short and simple pedicel. Differences are:

For *F. standleyana*: brown tibiae on most of their surface in *F. torquis* sp. n. (yellow tibiae in *F. standleyana*); antennal segments III–V brown (orange-yellow); pedicel at its distal end with a collar, wider than long, with convex sides (pedicel with a collar with inverted-cone shape); antennal segment III shorter 44–46 μm (61 μm) and the major setae of the pronotum longer in the new species.

For *F. pulchella*: legs brown in *F. torquis* sp. n. (legs pale yellow and hind femora brown in *F. pulchella*); antennal segment IV as long as segment III or VI (segment IV clearly shorter than segment III or VI); pedicel of the antennal segment III with a collar at its distal end with convex sides (collar of the antennal segment III of parallel sides); pair I of the posteromarginal setae of the pronotum present (absent); interocellar setae shorter 32–46 μm (longer 70 μm); anteromarginal setae of the pronotum and the large setae of the abdominal segments IX and X are shorter in the new species than in *F. pulchella*.

The differences when compared with *F. pineticola* are: body colour brown in the new species (body colour dark brown and the last abdominal segments black in *F. pineticola*); antennal segments III–V brown (most of them yellow); pedicel, over its distal end, with a collar with convex sides (pedicel with a collar with shape of the trunk of a cone); anteromarginal and anteromarginal setae of the pronotum longer in the new species (58–72 μm and 65–72 μm) than in *F. pineticola* (46–54 μm and 56 μm , respectively).

Frankliniella wedeliae sp. n.

Figs. 18–23

Holotype ♀: Belize (British Honduras), Belize City, 25. VII. 1975, on flowers of *Wedelia trilobata* HIT., N. L. H. KRAUSS leg. (SMF T 6874-3).

Paratypes: 10 ♀♀, 3 ♂♂ with the same data as holotype. 1 ♀ of the paratypes is deposited in UCME.

Derivatio nominis: Named after the plant from which it was collected. The name is a noun in apposition.

Description: ♀ (macropterous). Body colour brown-yellow to light-brown. Head, thorax and abdomen brown-yellow to light-brown. Abdominal segments IX and X darker. Forewing pale or somewhat shaded. Legs

colour like body and tarsi lighter. Bicolour antenna, antennal segment I, basal half of the segment III and base of the segments IV and V brown-yellow and the rest of the antennal segments brown.

Head 86–107 (128) μm long (wide) (Fig. 19) with convergent cheeks toward back; occiput with four to five sculptural lines; pair III of the ocellar setae 35–39 μm long, located at position 2 or 2/3 (RETANA & MOUND 1994) and their interval 22–23 μm ; pair I of the postocular setae present and pair IV 22–26 μm long. Antennae 238–256 μm long (Fig. 18), antennal segment III with simple pedicel. Length (width) of the antennal segments, segment III with pedicel, in μm : I 21–23 (23–26), II 30–32 (23–24), III 42–44 (19–22), IV 37–42 (16–19), V 30–32 (16), VI 42–44 (16–17), VII 7 (7–8) and VIII 12–14 (5–7).

Pronotum 104–114 (155–160) μm long (wide) (Fig. 19), discal area smooth with 8–9 pairs of setae reaching 9–14 μm long and the longest pair 14–16 μm , at lateral position; anteromarginal setae 37–45 μm , anteromarginal setae 46–53 μm and 2 small setae between the anteromarginal pair 12–14 μm long, respectively; posteroangular internal setae 51–67 μm , posteroangular external setae 46–53 μm and pair II of the posteromarginal setae 26–32 μm long, respectively.

Mesonotum with shallow sculptured lines, inner pair of the posteromarginal setae 12–14 μm and outer pair 14–16 μm long. Metanotum (Fig. 20) smooth medially; a pair of campaniform sensilla at posterior third; two pairs of anteromarginal setae, inner pair 46–53 μm and outer pair 26–28 μm long.

Forewing 570–608 μm long, upper vein with 17–20 setae and lower vein with 11–15 setae; scale with 5 venal setae and 1 discal seta.

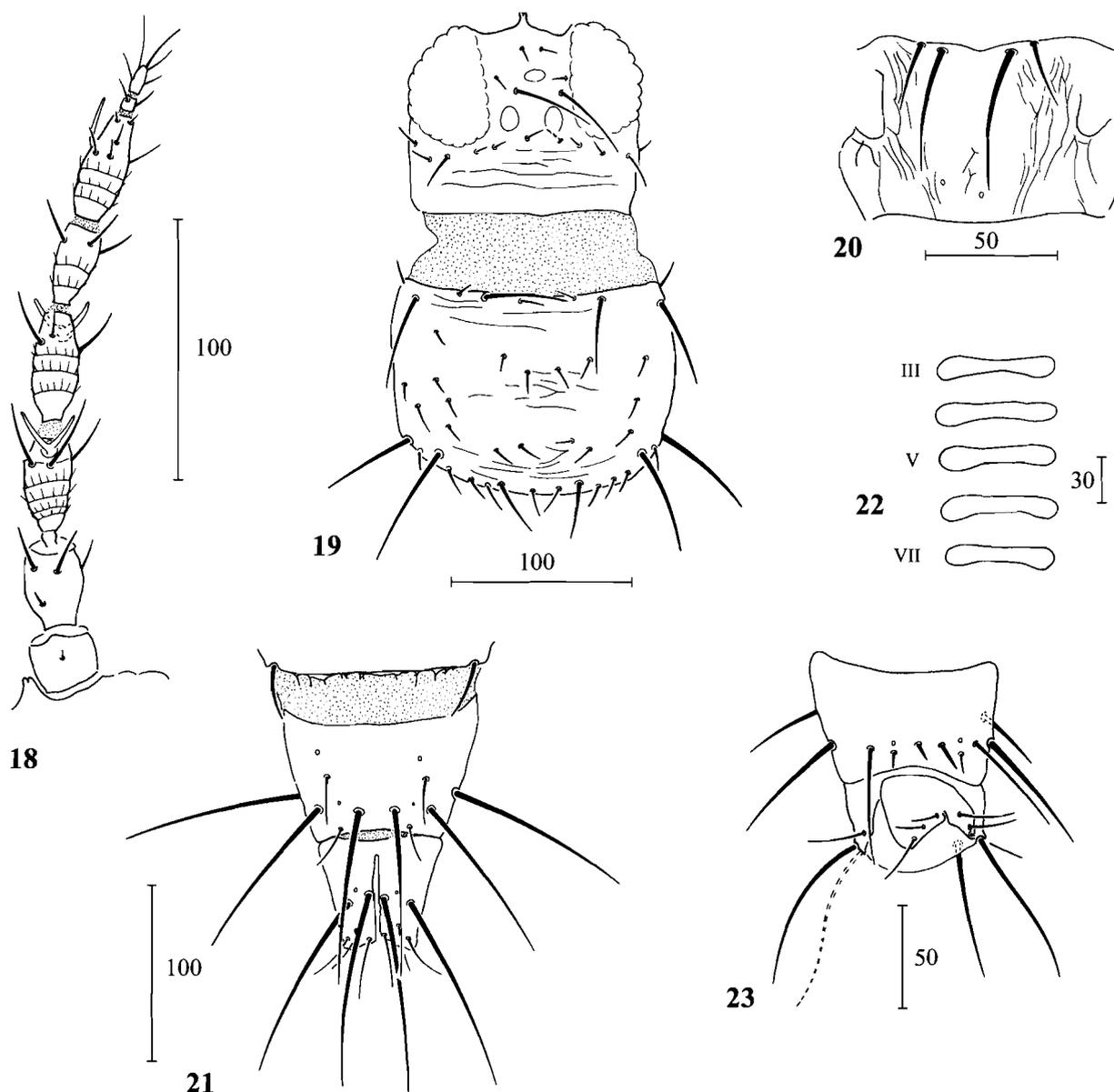
Abdomen without ctenidia on tergite IV, tergite VIII with a irregular comb on the posterior margin, 3–5 microtrichia reaching 7 μm in length laterally, and 4–6 microtrichia of 2 μm length in the middle (Fig. 21). Abdominal segment IX 60–65 μm long (Fig. 21), discal setae 26–29 μm ; setae S1, S2 and S3 93–104 μm , 95–111 μm , and 97–114 μm long, respectively, with $S1 < S3 < S2$ or $S1 < S2 < S3$. Abdominal segment X 58–63 μm long (Fig. 21), setae S1 and S2 107–121 μm and 95–114 μm long.

Total body length: 1.300–1.374 mm (distended).

♂: Body colour similar to ♀. Antennal segments I–III and base of segment IV brown-yellow; two-third distal of segment IV and segment V darker than I–III; segments VI–VIII brown. Forewing pale.

Head 86–93 μm long; interocellar setae 35–37 μm and pair IV of the postocular setae 21 μm long, respectively. Antennae 219–228 μm long; length (width) of the antennal segments, segment III with pedicel, in μm : III 39–42 (17–21), IV 36–39 (16–19), V 28–30 (15–16), VI 37–44 (16), VII 6–7 (7) and VIII 12–13 (5–6).

Pronotum 97–104 μm long; anteromarginal setae 35–42 μm , anteromarginal setae 40–49 μm , posteroangular



Figs. 18–23. *Frankliniella wedeliae* sp. n. — ♀, Paratypes: 18) Right antenna dorsally. 19) Head dorsally and pronotum. 20) Metanotum. 21) VIII tergite (comb)—X tergite. — ♂: 22) glandular areas, sternites III–VII. 23) abdominal segments IX–X dorsally. — Scales in µm.

internal setae 49–51 µm and external 43–46 µm, pair II of the posteromarginal setae 23–26 µm long. Forewing 499–532 µm long.

Abdominal sternites III–VII with clearly transverse glandular areas (Fig. 22), length (width) in µm: III 7–12 (70–93), IV 9 (79–84), V 9–12 (77–79), VI 8–12 (72–79) and VII 9–12 (65–74). Tergite VIII with a comb of 8–9 microtrichia reaching 2 µm in length. Abdominal segment IX 46–49 µm long (Fig. 23), discal setae 56–58 µm, setae S1, S2 and S3 14–16 µm, 60–70 µm and 37–44 µm, respectively. Falciform setae of the abdominal segment X 77–84 µm long (Fig. 23). The major setae of the abdominal segment IX and falciform setae of the segment X are normal, not thickened.

Total body length: 0.945–1.034 mm (not distended).

Discussion: This species shares the light colour of the body, the dark setae and the simple pedicel inside the “*intonsa*” group with *F. crotalariae* and *F. bruneri*.

It is similar to *F. crotalariae* MOUND & MARULLO 1996, described from Costa Rica in *Crotalaria* sp. flowers by MOUND & MARULLO (1996). The new species is distinguished by: abdominal segments IX and X darker than the rest of the body in *F. wedeliae* sp. n. (segments IX and X with the same colour as the rest of the body in *F. crotalariae*); antennal segment II dark (pale); 2 small anteromarginal setae in the pronotum (4 setae); and measurements, in general, shorter in the new species, for ex-

ample: interocellar setae 35–39 μm in *F. wedeliae* sp. n. (51–53 μm in *F. crotalariae*); pair IV of the postocular setae 22–26 μm (35–39 μm). Related to ♂♂, antennal segment VI brown (segment VI bicoloured).

Moreover, according to the observations in the paratypes of *F. crotalariae* from BMNH, the glandular areas in the abdominal sternites are more transverse in the new species, for example, length (width) of the glandular area is IV 9 μm (79–84 μm) in *F. wedeliae* sp. n. and 9 μm (58 μm) in *F. crotalariae*. The major setae of the abdominal segment IX and the falciform setae in segment X are thin and slender in the new species but in *F. crotalariae* are thick and have the appearance of thorns.

The new species differs from *F. bruneri* WATSON 1926, described by WATSON (1926) from Cuba on mangos, avocados, *Hibiscus* sp. and *Moringa* sp., in: abdominal segments IX and X darker than the rest of the body in *F. wedeliae* sp. n. (segments IX and X with the same colour as the rest of the body in *F. bruneri*); antennal segment II dark (segment II lighter); two small setae between the anteromarginal setae (four small setae); metanotum smooth in the middle (metanotum with a central reticulation). SAKIMURA (1981) redescribed *F. bruneri*, and we noticed that, in general terms, the measures are larger in this species than in *F. wedeliae* sp. n. For example, interocellar setae 35–39 μm in *F. wedeliae* sp. n. (53 μm in *F. bruneri*) and pair IV of the postocular setae 22–26 μm (35 μm).

Regarding ♂♂, SAKIMURA (1981) commented for *F. bruneri* that setae S2 and S3 of the abdominal segment IX and the falciform setae of the segment X are thick and thorn-shaped; also the glandular areas of the abdominal sternites are described as subcircular. Two years later, SAKIMURA (1983) checked the description related to the glandular areas and redescribed them as stick-shaped, similar to ones from *F. occidentalis*. For both characters the new species shows transverse glandular areas and fine and slender setae in the abdominal segments IX and X.

Frankliniella cassiae sp. n.

Figs. 24–30

Holotype ♀: Costa Rica, Prov. Alajuela, Chachaguas de Peñas Blancas. 21. VIII. 1974, aus Blüten von *Cassia* sp., E. KLEIN leg. (SMF T 6586-2).

Paratypes: 10 ♀♀, 4 ♂♂ with the same data as holotype. 2 of the paratypes (1 ♂, 1 ♀) are deposited in UCME.

Derivatio nominis: The name refers to plant sampled. The name is a noun in apposition.

Description: ♀ (macropterous). Body bicoloured. Head, thorax and legs light-brown yellow, the thorax darker toward back. Abdomen brown. Forewing like the abdomen but with a lighter base. Femora with dorsal area somewhat shadowed. Antennae with the segments I, III and base of segment IV yellow; antennal segments II, the rest of segment IV and segments V–VIII light-brown.

Head 81–107 (146–153) μm long (wide) (Fig. 26) with somewhat convergent cheeks toward back, occiput with 4–5 sculptural lines, interocellar setae being located at position 2 or 2/3 (RETANA & MOUND 1994), reaching 51–60 μm in length and their interval 26–28 μm ; 5 or 6 pairs of postocular setae, pair I present or absent (50% in each case), the longest pair (III or IV) reaching 28–35 μm in length. Antennae 276–295 μm long (Fig. 24), antennal segments III–IV with the distal ends conspicuously narrowed (Figs. 24, 25), segment III with simple pedicel and two big setae in the middle as the sense cone. Length (width) of the antennal segments, segment III with pedicel, in μm : I 19–21 (28–30), II 34–35 (26), III 51–56 (23–28), IV 51–55 (19–23), V 37–39 (14–17), VI 49–53 (16–19), VII 9–12 (7) and VIII 14–15 (5).

Pronotum 123–135 (162–186) μm long (wide) (Fig. 26) smooth, area pronotal with 4–5 pairs of discal setae reaching 7–16 μm long and the longest pair 21–23 μm , at the lateral position; anteromarginal setae 58–71 μm , anteroangular setae 70–77 μm and a pair of small setae between the anteromarginal pair 7–13 μm long, respectively; posteroangular internal setae 72–79 μm , posteroangular external setae 67–77 μm and pair II of the posteromarginal setae 31–37 μm long, respectively.

Mesonotum with thin sculptural lines, posteromarginal internal setae 14–19 μm and external pair 16–21 μm long. Metanotum (Fig. 27) with few sculptural lines with some cells, medially; the lines are deep on the anterior margin and the sides; a pair of campaniform sensilla at the posterior third; the central pair of anteromarginal setae 51–63 μm and the lateral pair 26–30 μm long.

Forewing 627–684 μm long, upper vein with 16–18 setae and lower vein with 12–15 setae, scale with 5 setae on border and 1 seta on discal area.

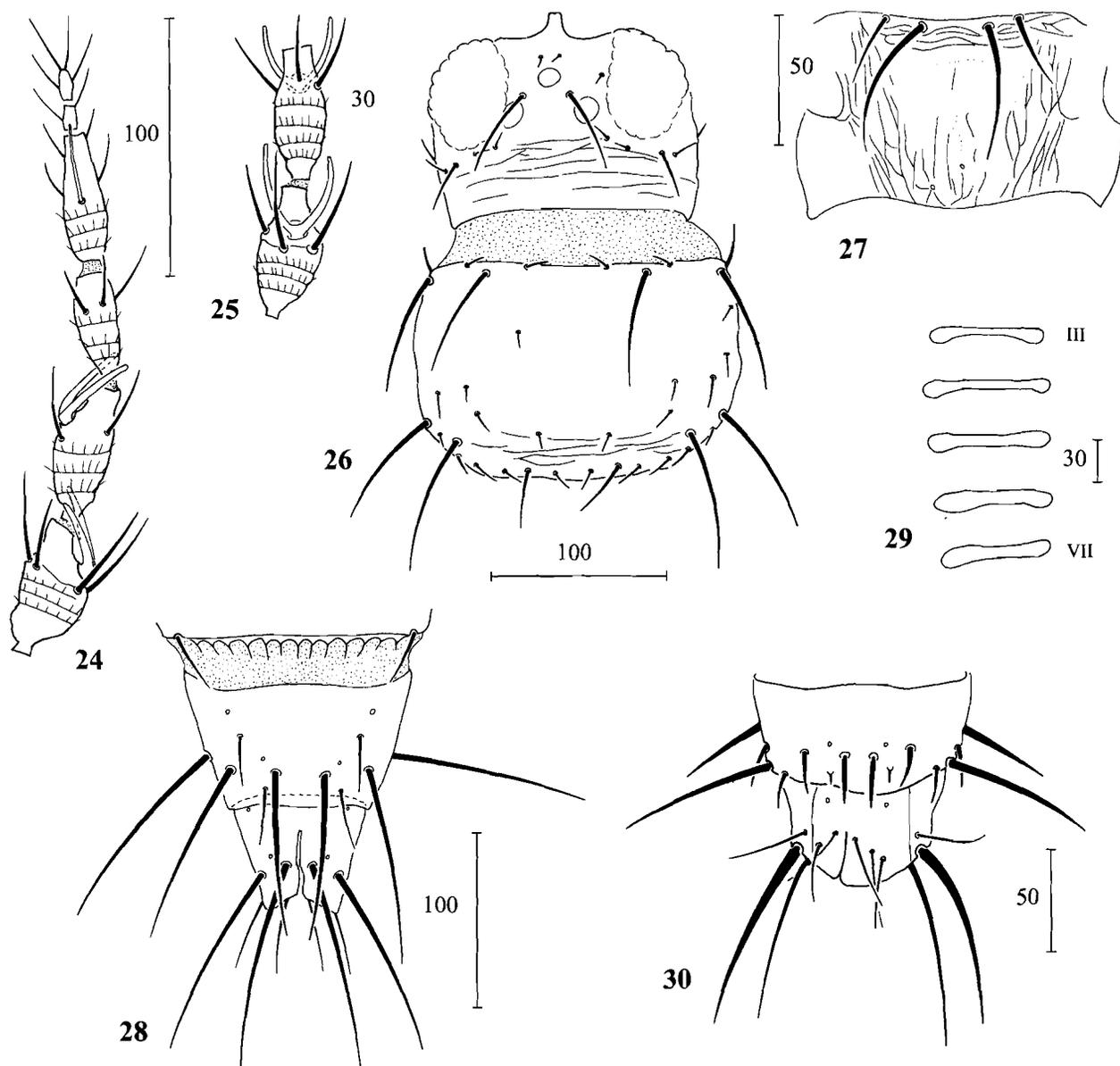
Abdomen on tergite IV without ctenidium; tergite VIII with a complete comb, at posterior margin, with 11–13 microtrichia reaching 9–13 μm in length (Fig. 28). Abdominal segment IX 53–72 μm long (Fig. 28), discal setae 30–35 μm ; setae S1, S2 and S3 86–104 μm , 107–118 μm and 109–122 μm long, respectively, with S1 < S2 < S3. Abdominal segment X 58–74 μm long (Fig. 28), setae S1 and S2 100–123 μm and 88–119 μm long.

Total body length: 1.270–1.447 mm (not distended).

♂: Head, thorax and legs yellow. Antennae similar to ♀ but lighter; forewing shaded and with base lighter. Abdominal tergites I–VIII with two-thirds central brown and the lateral thirds whitish, the brown colour increase to the distal tergites; abdominal segments IX and X yellow.

Head 72–90 (142–144) μm long (wide); interocellar setae 51–58 μm and pair III or IV of postocular setae 26–30 μm long, pair I of postocular setae present or absent. Antenna 257–266 μm long; length (width) of the antennal segments, segment III with pedicel, in μm : I 20 (27), III 49–51 (23–26), IV 46–50 (19–21), V 35–37 (14–16), VI 46 (15–16), VII 9 (7) and VIII 12 (5).

Pronotum 109–118 (151–174) μm long (wide); anteromarginal setae 58–65 μm , anteroangular setae 60–



Figs. 24–30. *Frankliniella cassiae* sp. n. — ♀: 24) Antennal segments III–VIII laterally, paratype. 25) Antennal segments III–IV dorsally, paratype. 26) Head dorsally and pronotum, holotype. 27) Metanotum, paratype. 28) VIII tergite (comb)–X tergite, paratype. — ♂: 29) Glandular areas, sternites III–VII. 30) Abdominal segments IX–X dorsally. — Scales in μm .

72 μm , posteroangular internal setae 70–72 μm , posteroangular external setae 63–72 μm and pair II of posteroangular setae 32 μm long, respectively.

Forewing 546–589 μm long.

Abdominal sternites III–VII with a slightly transverse glandular area (Fig. 29), length (width) in μm : III 6–7 (79–81), IV 5–9 (79–84), V 6–9 (79–86), VI 9 (79–88) and VII 7–12 (72–84). Tergite VIII with a irregular comb on the posterior margin, with 8–11 very small and hardly visible microtrichia. Abdominal segment IX 44 μm long (Fig. 30), discal setae 21–23 μm , setae S1, S2 and S3 28 μm , 72–79 μm and 46–53 μm long, respectively. Abdominal segment X 44 μm long, falciform setae 93–97 μm long (Fig. 30). The major setae of the abdominal

segment IX and the falciform setae of segment X are thick.

Total body length: 0.916–1.152 mm (not distended).

Discussion: General body colour dark, simple pedicel of the antennal segment III (slightly swollen in *F. brunnea*) and the position of the interocellar setae make *F. cassiae* sp. n. similar to *F. brunnea* PRIESNER 1932 as described by PRIESNER (1932) from Mexico on *Tithonia tubiformis* CASS. and to *F. panamensis* HOOD 1925 as discovered by HOOD (1925) in Panama on flowers.

The new species could be differentiated from *F. brunnea* and from *F. panamensis* by the swollen shape of antennal segment III and the wide neck of the antennal

segments III and IV (Fig. 25). Furthermore, *F. cassiae* sp. n. can be distinguished from *F. brunnea* by the light-brownish yellow colour of head, thorax and legs (brown in *F. brunnea*); antennal segment I pale (brown); comb of the abdominal segment VIII with longer and more numerous microtrichia (small and separated); major setae of the abdominal segment IX and X shorter, segment IX S1 86–104 μm , S2 107–118 μm , S3 109–122 μm and segment X S1 100–123 μm , S2 88–109 μm (segment IX S1 126 μm , S2 134 μm , S3 132 μm and segment X S1 154 μm , S2 134 μm). In $\sigma\sigma$ we can appreciate the bicoloured abdomen in *F. cassiae* sp. n. (brown in *F. brunnea*) and in the abdominal segment IX with S1/dorsal setae 1.2–1.3 μm (0.35 μm in *F. brunnea*).

For *F. panamensis* we could distinguish: antennal segment I clear in *F. cassiae* sp. n. (brown in *F. panamensis*); pronotum with 2 small setae between the anteromarginal pair (4 small setae); tergite IV without ctenidia (with ctenidia), and the major setae of the abdominal segments IX and X are shorter in the new species. Regarding $\sigma\sigma$, comparison with a specimen from the USNM showed: bicoloured abdomen in *F. cassiae* sp. n. (abdomen yellow in *F. panamensis*); antennal segment V brown (segment V with pale base); 2 small setae between the anteromarginal pair in the pronotum (4 small setae) and abdominal segment IX with S1/dorsal setae 1.2–1.3 μm (0.38 μm in *F. panamensis*). With respect to the glandular areas of the sternites we could see in the specimen of the USNM that they are narrower (width of the glandular area V: 58 μm) than in *F. cassiae* sp. n. (glandular area V: 79–86 μm), but MOUND & MARULLO (1996) found an increase in the width of the glandular areas in *F. panamensis* of up to 90 μm in some $\sigma\sigma$.

Finally, some patterns of coloration in *F. occidentalis* (PERGANDE 1895) could be confused with the new species but the antennal colour in ♀♀ and the relationship of setae S1/discal setae in the abdominal segment IX in $\sigma\sigma$ divide them clearly. Moreover in both $\sigma\sigma$ and ♀♀ there are 2 small setae between the anteromarginal setae in pronotum in *F. cassiae* sp. n., and the antennal segments III–IV present a very marked neck; whereas there are 4 small setae between the anteromarginal pair and the antennal segments III–IV have a less marked neck in *F. occidentalis*.

Frankliniella aliaepennae sp. n.

Figs. 31–36

Holotype ♀ br.: Colombia, Paramo de Monserrate (near Bogota), 3000 m, 10. I. 1969, aus Blüten von *Espeletia grandiflora* H. & B., H. STURM leg. (SMF T 4353-5).

Paratypes (in total 38 ♀♀ [30 ♀♀ br. + 8 ♀♀ m.], 2 ♂♂ br.): 9 ♀♀ (7 ♀♀ br. + 2 ♀♀ m.), 2 ♂♂ br., with the same data as holotype. — 18 ♀♀ (12 ♀♀ br. + 6 ♀♀ m.). Colombia, Cruz Verde (near Bogota), Monserrate, 3150 m, 30. VIII. 1968, aus Röhrenblüten von *Espeletia grandiflora* H. & B., H. STURM leg., (SMF T 3797). — 6 ♀♀ br., Colombia, Paramo El Palacio (östl. Bogotá), 3400 m, 4. I. 1968, von *Espeletia*-Pflanzen, H.

STURM leg. (SMF T 4327) (1 ♀ of these paratypes is deposited in UCME). — 5 ♀♀ br., Colombia, Paramo de Monserrate (near Bogotá), 3200 m, 7. II. 1969, durch Berlese-Trichter, *Espeletia grandiflora* H. & B., H. STURM leg. (SMF T 4358).

Derivatio nominis: This species is named after the two models of wing. Latin language alius, -a, -um = different; pennae = wings. The name is a noun in apposition.

Description: ♀ (brachypterous). Body colour pale yellow or light brown yellow. Head, thorax and abdomen from pale yellow to light-brownish yellow; the third distal of the mouth cone and the distal half of the abdominal segment X reddish brown. Legs and forewing pale yellow. Bicolourous antennae, antennal segments I–IV pale yellow or hyaline, some time segment IV with a distal fringe light-brown; antennal segment V with the basal half or two-thirds basal pale yellow or hyaline, the rest of segment light-brown; segments VI–VIII light brown.

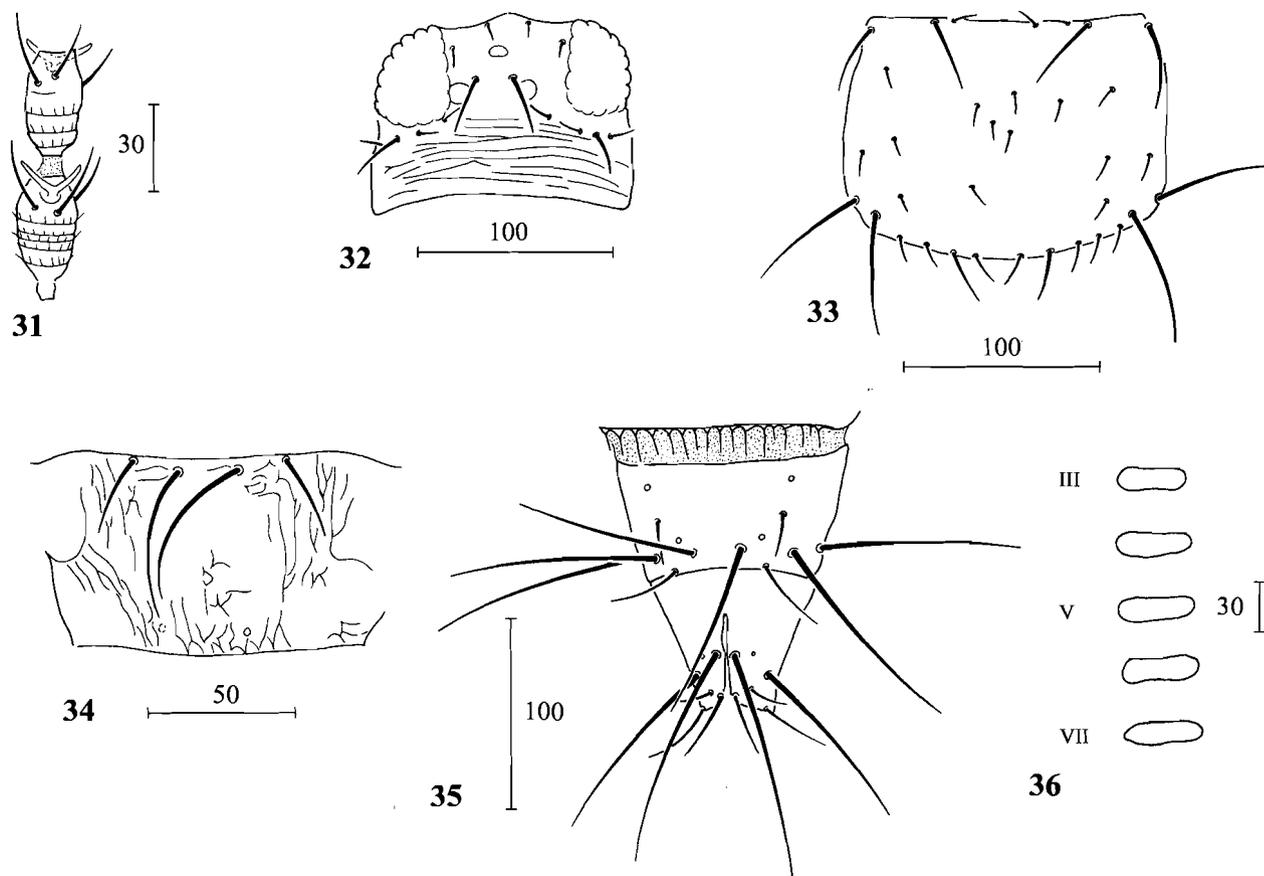
Head 51–100 (118–146) μm long (wide) (Fig. 32) with the variable cheeks towards back, occiput with 4–6 sculptural lines; pair III of the ocellar setae 23–30 μm long and their interval 14–21 μm long, being located at position 2 or 3 (MOULTON 1948), or 2/3 or 3 (RETANA & MOUND 1994); pair IV of the postocular setae 26–32 μm long, pair I present or absent (also in the same specimen). Antennae 247–271 μm long, antennal segment III (Fig. 31) with simple pedicel and segment VI with the base somewhat pedicellate. Length (width) of the antennal segments, segment III with pedicel, in μm : I 21–23 (27–30), II 32–37 (23–26), III 42–49 (19–23), IV 36–44 (19–23), V 31–37 (19–21), VI 42–49 (17–21), VII 7–9 (7–8) and VIII 13–16 (5–7). Mouth cone long and sometimes surpassing the prosternum.

Pronotum 111–142 (148–183) μm long (wide) (Fig. 33) with 10–13 sculptural lines; 7–9 pairs of discal setae reaching 6–14 μm long and the longest pair, at lateral position, 14–26 μm long; anteromarginal setae 28–42 μm , anteroangular setae 39–56 μm and 2 or 4 small setae between anteromarginal pair 9–15 μm long, respectively; posteroangular internal setae 42–74 μm , posteroangular external setae 46–65 μm and pair II of the posteromarginal setae 26–32 μm long, respectively.

Mesonotum with transverse sculptural lines; inner pair of the posteromarginal setae 9–14 μm and outer pair 12–14 μm long. Metanotum (Fig. 34) almost smooth in the middle; a pair of campaniform sensilla at posterior third; inner pair of the anteromarginal setae 42–56 μm and outer pair 23–42 μm long.

Forewing brachyptera, with some specimens macropterous (20%), forewing (macropterous) reaching 637–888 μm in length, upper vein with 17–23 setae and lower vein with 14–21 setae; scale with 5 setae on border and 1 seta on discal area.

Abdomen on tergite IV with ctenidia of variable development situated between setae S2 and S3; tergite VIII with a comb of 13–18 microtrichia reaching 12–20 μm in length, at posterior margin (Fig. 35). Abdominal segment IX 42–74 μm long (Fig. 35), discal setae 21–30 μm ;



Figs. 31–36. *Frankliniella aliaepennae* sp. n. — ♀, Paratypes: 31) Antennal segments III–IV dorsally. 32) Head dorsally. 33) Pronotum. 34) Metanotum. 35) VIII tergite (comb)–X tergite. — ♂: 36) glandular areas, sternites III–VII. — Scales in μm .

setae S1, S2 and S3 74–118 μm , 102–130 μm and 93–121 μm long, respectively, with $S2 > S3 > S1$. Abdominal segment X 63–74 μm long (Fig. 35), setae S1 and S2 93–122 μm and 88–111 μm long. The major setae of the body are fine and slender, darker than body colour.

Total body length: 0.945–1.551 mm (not distended/distended).

♂: Body colour similar to ♀, antennae and mouth cone clearer. Abdominal segment X pale yellow.

Head 88–95 (121–123) μm de long (wide); interocular setae 28–32 μm and pair IV of the postocular setae 30–31 μm long, respectively. Antenna 237–247 μm long; length (width) of the antennal segments, segment III with pedicel, in μm : I 19 (27), II 29 (23), III 41 (19), IV 37–39 (19), V 34–35 (19), VI 44 (17), VII 8 (7) and VIII 12–14 (5).

Pronotum 104–111 (146–148) μm long (wide), anteromarginal setae 42–46 μm , anteroangular setae 56–58 μm , posteroangular internal setae 56–65 μm and external 51–60 μm , pair II of the posteromarginal setae 28 μm long, respectively. Forewings brachypterous.

Abdominal sternites III–VII with transverse glandular areas (Fig. 36), length (width) in μm : III 12 (42), IV 14 (46), V 12–14 (46–51), VI 13 (49) and VII 14 (49). Tergite VIII with a posteromarginal comb of fifteen

to seventeen microtrichia reaching 7–14 μm in length. Abdominal segment IX with setae S2 and S3 88 and 44–46 μm long, respectively. Abdominal segment X with falciform setae 104 μm long. The major setae of the body like in ♀♀.

Total body length: 1.034–1.300 mm (not distended/distended).

Discussion: *Frankliniella aliaepennae* sp. n. belongs to the group of species consisting of *F. rostrata* PRIESNER 1932 as described by PRIESNER (1932) from Mexico on *Senecio praecox* DC., *F. gossypiana* HOOD 1936 as described by HOOD (1936) from U.S.A. on cotton, using specimens collected by MORGAN (1913), and *F. williamsi* HOOD 1915 as described by HOOD (1915) from the U.S.A. on Indian corn. They all present a simple pedicel in the antennal segment III without important swelling, body colour yellow and long mouth cone that could surpass the prosternum.

Frankliniella aliaepennae sp. n. could be differentiated from all others by the bicoulorous abdominal segment X (segment X with the same colour as the body in *F. rostrata*, *F. gossypiana* and *F. williamsi*); abdominal sternite II without discal setae (sternite II with discal setae) and wing, generally brachypterous (macropterous).

Additionally, antennal segment VI is brown in the new species (segment VI with pale base in *F. rostrata* and *F. williamsi*) and antennal segments II–III yellow or hyaline (segments II–III distally darkened in *F. gossypiana*). The intercellular setae as well as the anteromarginal setae in the pronotum are clearly shorter in *F. aliaepennae* sp. n.: 23–30 μm and 28–42 μm , respectively (42 μm and 50 μm in *F. rostrata*, 47–48 μm and 60 μm in *F. gossypiana*, 41–48 μm and 30–50 μm in *F. williamsi*).

For $\sigma\sigma$, the brown colour of the antennal segment VI and the setae S1 of the abdominal segment IX half of the length of the discal setae in *F. aliaepennae* sp. n., differentiate the new species from *F. williamsi* which has antennal segment VI bicoloured and discal setae of the abdominal segment IX at least three times longer than setae S1. On the other hand, the antennal segments III–IV which are yellow or hyaline in the new species, as well as the transverse glandular areas on the abdominal sternites distinguish it from *F. rostrata* with bicolourous antennal segments III–IV and small and elliptic glandular areas on the sternites.

Frankliniella espeletiae sp. n.

Figs. 37–43

Holotype ♀: Colombia, Cruz Verde (near Bogotá), Monserrate, 3150 m, 30. VIII. 1968, von Röhrenblüten von *Espeletia grandiflora* H. & B., H. STURM leg. (SMF T 3798-3).

Paratypes (in total 28 ♀♀, 12 ♂♂): 12 ♀♀, 2 ♂♂ with the same data as holotype (1 ♀ of these paratypes is deposited in UCME). — 8 ♀♀, 6 ♂♂. Colombia, Paramo de Monserrate (near Bogotá), 3200 m, 24. V. 1968, aus Blüten von *Espeletia grandiflora* H. & B., H. STURM leg. (SMF T 4343a + SMF T 4344) (1 ♂ of SMF T 4344 is deposited in UCME). — 5 ♀♀, 4 ♂♂, Colombia, Páramo de Monserrate (near Bogotá), 14. VI. 1968, 3200 m, aus Blüten von *Espeletia grandiflora* H. & B., H. STURM leg. (SMF T 4347). — 3 ♀♀, Colombia, Páramo de Monserrate (near Bogotá), 10. I. 1969, 3200 m, aus Blüten von *Espeletia grandiflora* H. & B., H. STURM leg. (SMF T 4354).

Derivatio nominis: Named after the plant from which it was collected. The name is a noun in apposition.

Description: ♀ (macropterous). Body colour brown. Head, thorax and abdomen brown. Forewing shaded with base pale. Legs brown, fore tibiae and tarsi light-brown yellow and middle and hind tarsi darker to brown. Antenna with segments I–II and IV–VIII brown, antennal segment III light-brown yellow, with base clearer; sometimes the antennal segments IV–VIII are clearer than segments I–II, but darker than segment III.

Head 95–135 (153–179) μm long (wide) (Fig. 38) with convergent cheeks toward back; occiput with 4–6 sculptural lines; intercellular setae 24–37 μm long, located at position 3 (MOULTON 1948) or 3/4 (RETANA & MOUND 1994) with an interval of 21–27 μm ; postocular setae IV 30–46 μm long, postocular setae pair I present. Antenna 304–342 μm long (Fig. 37), antennal segment III with simple pedicel. Length (width) of the anten-

nal segments, segment III with pedicel, in μm : I 26–30 (30–35), II 37–44 (28–32), III 60–67 (26–28), IV 50–59 (23–28), V 42–46 (21–23), VI 51–60 (21–23), VII 8–12 (9–12) and VIII 14–19 (7–8).

Pronotum 130–172 (193–247) μm long (wide) (Fig. 39) with 16–22 thin sculptural lines; 7–10 pairs of the discal setae reaching 7–19 μm long and the longest pair, at lateral position, 21–30 μm long; anteromarginal setae 51–70 μm , anteroangular setae 72–100 μm and two small setae between the anteromarginal pair 14–21 μm long, respectively; posteroangular internal setae 84–120 μm , posteroangular external setae 74–100 μm and pair II of the posteromarginal setae 39–56 μm long, respectively.

Mesonotum with transverse sculptural lines, inner pair of the posteromarginal setae 14–23 μm and outer pair 19–26 μm long. Metanotum (Fig. 40) with reticulated central area; a pair of campaniform sensilla on the posterior third; two pairs of the anteromarginal setae, central pair 63–97 μm and lateral pair 39–53 μm long, respectively.

Forewing 0.960–1.255 mm long, upper vein with 22–29 setae and lower vein with 18–27 setae; scale with 5 setae on border and 1 seta on discal area.

Abdomen with ctenidia on tergite IV up to pair setae S2 or before; tergite VIII with a comb of 16–19 long microtrichia, at posterior margin, reaching 19–28 μm in length (Fig. 41). Abdominal segment IX 60–93 μm long (Fig. 41), discal setae 28–37 μm ; setae S1, S2 and S3 90–130 μm , 109–153 μm and 116–153 μm long, respectively, with S1 < S2 < S3. Abdominal segment X 79–100 μm long (Fig. 41), setae S1 and S2 121–165 μm and 116–151 μm long.

Total body length: 1.507–1.964 mm (not distended).

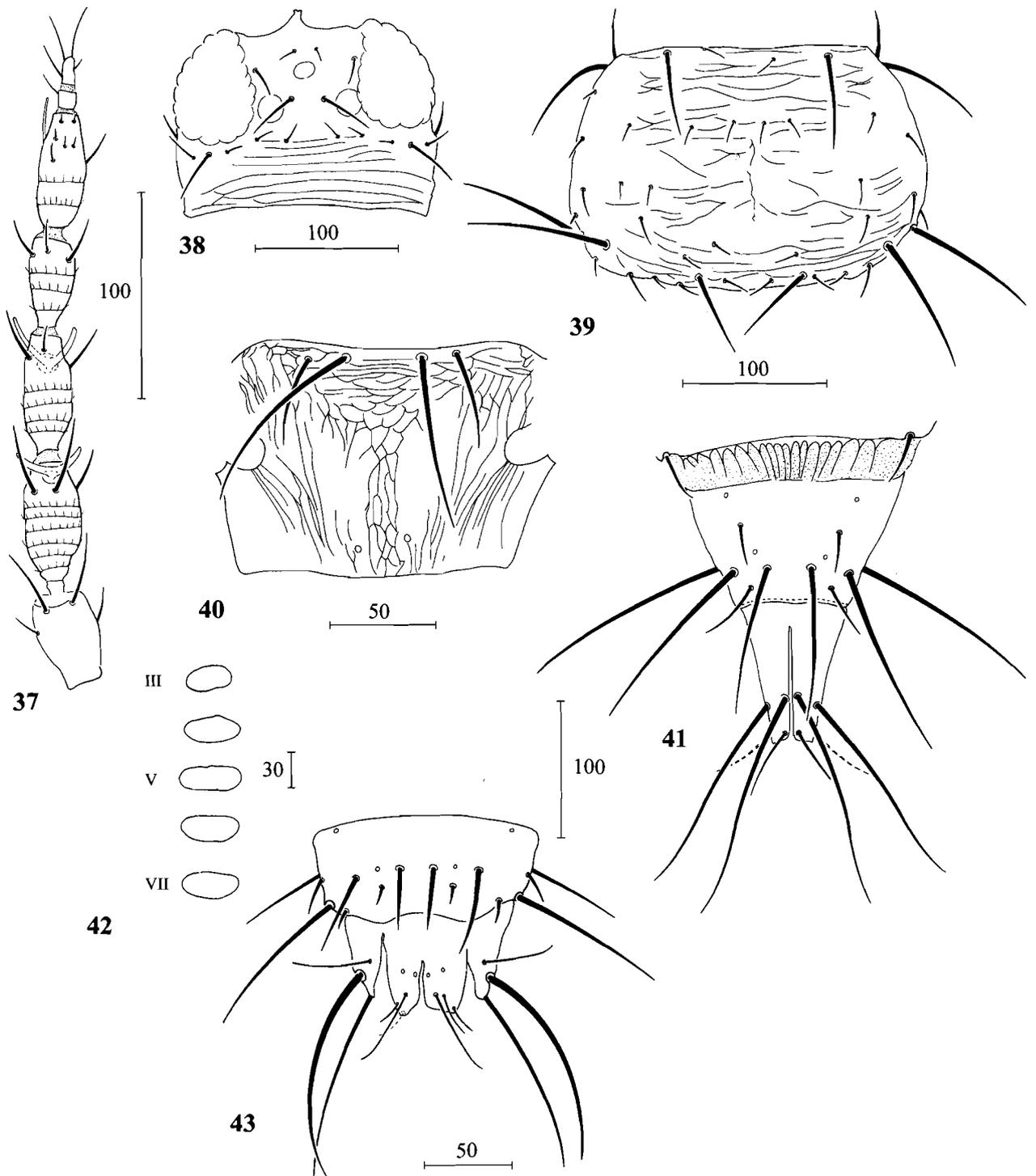
♂: Body colour similar to ♀ but lighter. Forewing with basal third or more pale. Antenna with segment III and basal half of the segment IV golden.

Head 95–130 (148–155) μm long (wide); intercellular setae 32–39 μm and pair IV of the postocular setae 35–41 μm long, respectively. Antenna 299–314 μm long; length (width) of the antennal segments, segment III with pedicel, in μm : I 23–28 (28–30), II 35–42 (27–28), III 56–63 (21–26), IV 48–53 (21–24), V 32–42 (19–21), VI 51–60 (21), VII 8–9 (9) and VIII 14–16 (7).

Pronotum 121–139 (181–200) μm long (wide), anteromarginal setae 46–67 μm , anteroangular setae 74–88 μm , posteroangular internal setae 72–93 μm and external setae 65–88 μm , pair II of the posteromarginal setae 42–52 μm long, respectively.

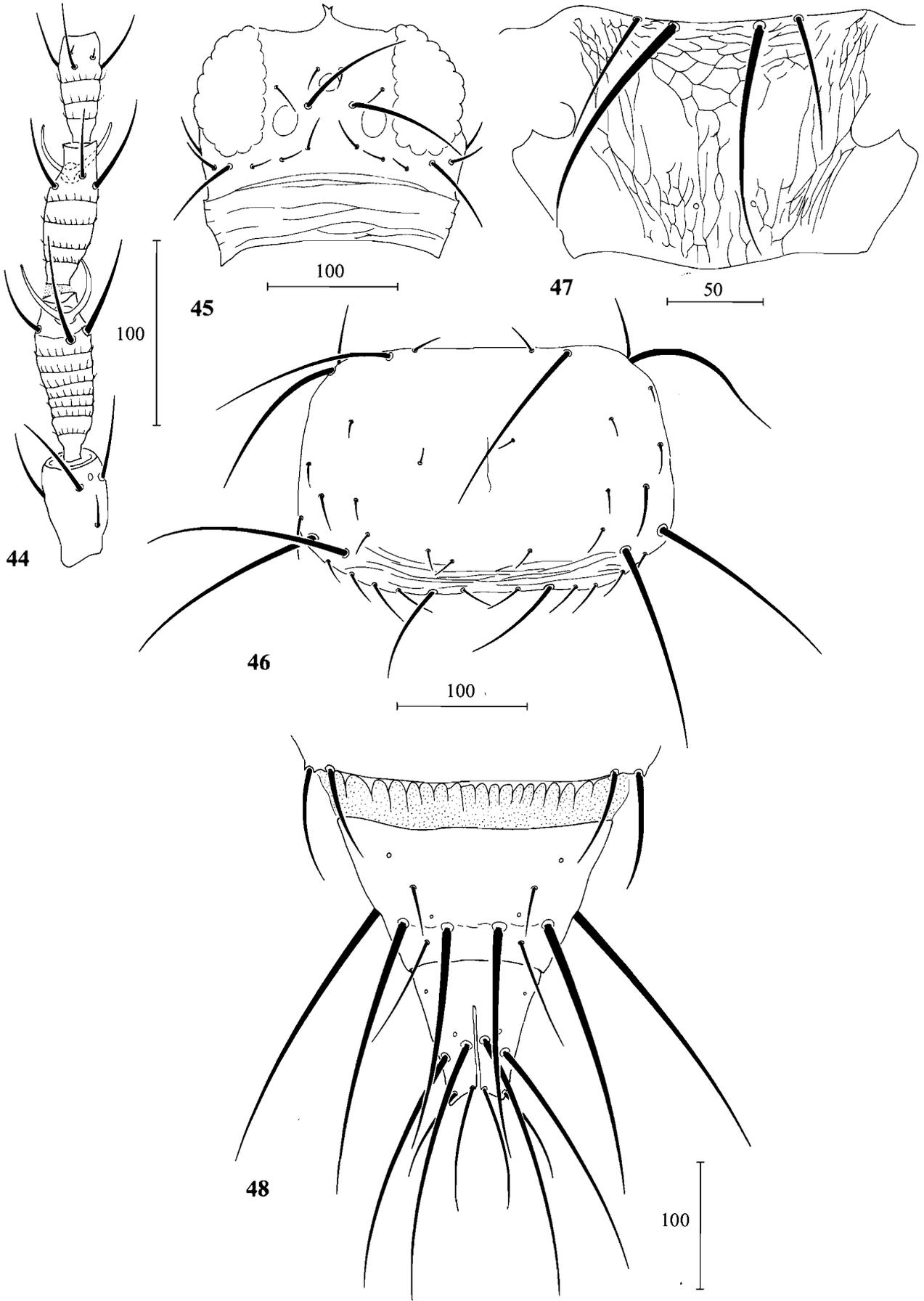
Forewing 846–990 μm long.

Abdominal sternites III–VII with elliptical glandular areas (Fig. 42), length (width) in μm : III 16–23 (35–60), IV 19–23 (40–67), V 19–24 (43–65), VI 14–24 (44–63) and VII 16–23 (40–58). Tergite VIII with a comb of 9–15 microtrichia reaching 14–19 μm in length, at the posterior margin. Abdominal segment IX 56–74 μm long (Fig. 43), discal setae 46–58 μm , setae S1, S2 and S3 35–49 μm , 95–102 μm and 51–60 μm long, respectively.



Figs. 37-43. *Frankliniella espeletiae* sp. n. — ♀, Paratypes: 37) Antennal segments II-VIII dorsally. 38) Head dorsally. 39) Pronotum. 40) Metanotum. 41) VIII tergite-X tergite. — ♂: 42) Glandular areas, sternites III-VII. 43) Abdominal segments IX-X dorsally. — Scales in μm .

Figs. 44-48. *Frankliniella regentis* sp. n. — ♀: 44) Antennal segments II-V dorsally, paratype. 45) Head dorsally, paratype. 46) Pronotum, holotype. 47) Metanotum, holotype. 48) VIII tergite (comb)-X tergite, holotype. — Scales in μm .



Abdominal segment X 53–65 μm long, falciform setae 87–132 μm long (Fig. 43). The major setae of abdominal segment IX and X normal, not thickened.

Total body length: 1.196–1.507 mm (not distended).

Discussion: *F. espeletiae* sp. n. belongs to the “*minuta*” group as the interocellar setae are 2 times the diameter of the shorter hind ocellus; in these specimens this relationship varies from 1.5–1.8 times. This criterium used by RETANA & MOUND (1994) was already commented by HOOD (1925).

Accordingly, *F. espeletiae* sp. n., due to the general dark colour of the body, the interocellar setae and their position, the size of the body and the anteroangular setae of the pronotum bigger than 35 μm , is similar to *F. amigoi* BERZOSA & MAROTO 2003, as described from Argentina on *Mutisia ilicifolia* CAV.; to *F. otites* BERZOSA & MAROTO 2003 as described from Chile on *Senecio otites* KUNZE ex DC. (see BERZOSA & MAROTO 2003); and to *F. vargasi* RETANA & MOUND 1994 from Costa Rica in flowers of *Senecio* sp. (RETANA & MOUND 1994).

From all them, *F. espeletiae* sp. n. is distinguished by a longer antennal segment III 56–67 μm (48–53 μm in *F. amigoi*, 44–46 μm in *F. otites*, and 52 μm in *F. vargasi*); tergite IV with well developed ctenidia (vestigial or slightly developed) and comb of the tergite VIII with longer and more numerous microtrichia (comb of the tergite VIII with less numerous and shorter microtrichia).

Moreover *F. espeletiae* sp. n. differs from *F. amigoi* in: antennal segment III lighter than the other segments (segment III dark like the rest of the segments in *F. amigoi*); wing with a pale base (dark base like the rest of the wing) and metanotum with central cells (metanotum almost smooth, medially). The body measurements are bigger in the new species than in *F. amigoi*; for example, interocellar setae 28–35 μm (26–28 μm in *F. amigoi*); pair IV of the postocular setae 32–39 μm (16–23 μm); anteromarginal setae and anteroangular setae of the pronotum 51–70 μm and 72–95 μm (21–32 μm and 41–58 μm). For ♂♂, the glandular areas of the abdominal sternites are less transverse in the new species than in *F. amigoi*, and the major setae of the abdominal segments IX and X are longer and more slender in *F. espeletiae* sp. n., for example, falciform setae of the segment X 87–123 μm (70–86 μm in *F. amigoi*).

With respect to *F. otites*, the sculpture of the metanotum with few lines in the middle and the presence of two glandular areas on the sternite III of the ♀♀ separate it from *F. espeletiae* sp. n. with a net of central cells in the metanotum and absence of glandular areas on the sternites of the ♀♀. The body measurements are longer in the new species, and in ♂♂ the comb of the abdominal tergite VIII shows longer and more numerous microtrichia (14–16 μm in *F. espeletiae* sp. n., 5–9 μm in *F. otites*).

Finally, *F. vargasi* with the middle and posterior tibiae bicolourous in ♀♀ and absence of comb on the posterior margin of the tergite VIII of ♂♂, clearly differs from *F.*

espeletiae sp. n., which has single-coloured middle and posterior tibiae and a comb in tergite VIII.

Frankliniella regentis sp. n.

Figs. 44–48

Holotype ♀: Colombia, Departamento de Cundinamarca, Neusa (near Talsperre), 21. XII. 1987, von teilw. blüh. Krautschicht vom Ufer von Gewässern, W. Joost leg. (SMF T 16023-1).

Paratypes: 2 ♀♀ with the same data as the holotype.

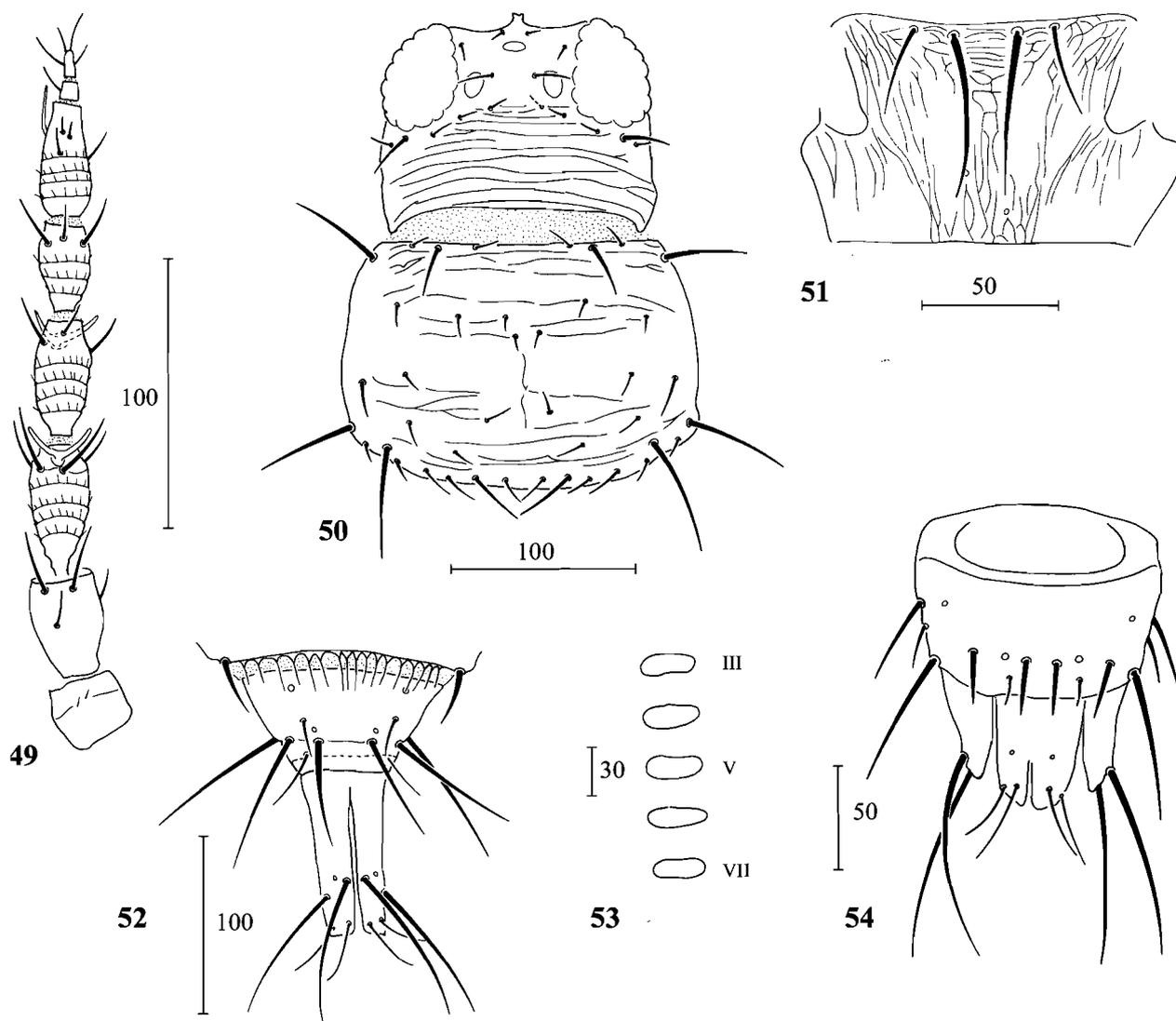
Derivatio nominis: The specific name is derived from the species-group (gigant-species) to which it belongs. Latin language *regentis* = regent. The name is a noun in apposition.

Description: ♀ (macropterous). Body colour light-brown. Head and thorax light-brown; Tergites IV–VIII with the anterior margin and the anterior lateral angles whitish, the rest of the abdominal segments light-brown. Forewing like the body colour and the basal third pale. Legs light-brown, fore tibiae and tarsi grey-yellow, femora and middle and posterior tibiae with the base pale. Antennae light-brown, antennal segments I–II light-brown, segment III yellow and darker toward the distal end, antennal segment IV with the base yellow, segments IV with two-thirds distal and segments V–VIII brown.

Head 169–172 μm long (201–209 μm wide at the eyes, 195–197 μm wide at the occiput, 165–167 μm wide at the base, respectively) (Fig. 45) with clearer convergent cheeks toward back and a constriction at occipital level. Occiput with 5 thin sculptural lines, interocellar setae 88–93 μm long and interval 32–35 μm located at position 3 (MOULTON 1948, RETANA & MOUND 1994); pair IV of the postocular setae 60–63 μm long, pair I present. Antenna 423 μm long (Fig. 44), antennal segment III with simple pedicel, segments III and IV with an evident narrowing at the distal end. Length (width) of the antennal segments, segment III with pedicel, in μm : I 28 (39), II 51 (32), III 86–87 (29–32), IV 74–79 (26–30), V 58–60 (26–28), VI 73–74 (26–28), VII 12–14 (10–12) and VIII 19–22 (8–9).

Pronotum 190–211 (295) μm long (wide) (Fig. 46), almost smooth with eight pairs of discal setae reaching 9–23 μm in length and the longest pair, at the lateral position, 37 μm long; anteromarginal setae 144–151 μm , anteroangular setae 128–135 μm and 2 small setae between the anteromarginal pair 23–26 μm long, respectively; posteroangular internal setae 158–162 μm , posteroangular external setae 159–162 μm and pair II of the posteromarginal setae 77–79 μm long, respectively.

Mesonotum with very thin and transverse sculptural lines; inner pair of the posteromarginal setae 28–30 μm long and outer pair 35 μm long. Metanotum (Fig. 47) with a central and lateral reticulation very thin; a pair of campaniform sensilla at posterior third; 2 pairs of setae on the anterior margin, central pair 123 μm long and lateral pair 70–77 μm long.



hobotype
 Figs. 49–53. *Frankliniella paramorum* sp. n. — ♀: 49) Right antenna dorsally, paratype. 50) Head dorsally and pronotum, paratype. 51) metanotum, paratype. 52) VIII tergite (comb)–X tergite, paratype. — ♂: 53) Glandular areas, sternites III–VII. 54) Abdominal segments IX–X dorsally. — Scales in µm.

Forewing 1.388–1.418 mm long, upper vein with 21–22 setae and lower vein with 17–19 setae; scale with 5 setae on border and 1 seta on discal area.

Abdomen on tergite IV with a very long ctenidium reaching to S2; tergite VIII with a comb of 16–17 microtrichia, at posterior margin, reaching 23–25 µm long (Fig. 48). Abdominal segment IX 109–111 µm long (Fig. 48), discal setae 39–42 µm, setae S1, S2 and S3 179–183 µm, 211–215 µm, and 218–225 µm long, respectively, with $S1 < S2 < S3$. Abdominal segment X 107–116 µm long (Fig. 48), setae S1 and S2 209–230 µm and 195 µm long

Total body length: 2.127–2.156 mm (not distended).

Discussion: *F. regentis* sp. n., due to its size, simple pedicel in the antennal segment III and convergent

cheeks toward back, belongs to the group of the “gigant” species of this genus mentioned by ORTIZ (1977). Due to the dark colour of the antennal segment II and its smaller body size than the other two gigant species of the group, comparison places it close to *Frankliniella regia* HOOD 1942 as described from Peru on *Delostoma dentatum* DON by HOOD (1942) and *Frankliniella regia* HOOD 1937 also described by HOOD (1937) from Peru on flowers of a plant not identified.

The new species differs from *F. regia* and *F. regina* in the clear-brown colour of the body and the big setae (black in both species *F. regia* and *F. regina*); tergites IV–VIII with little white areas in the anterior angles (tergites IV–VIII with the anterior angles coloured like the rest of the tergum); the length of the head clearly shorter in *F. regentis* sp. n. 169–172 µm (193 µm in *F.*

regia, 210 µm in *F. regia*) and the relationship of the setae S2/S1 in the tergite VIII is 1.9–2.1 in *F. regentis* sp. n. (1.4–1.6 in *F. regia* and 1.3 in *F. regia*).

On the other hand, the head and the prothorax of *F. regia* are of similar length and the abdominal segment IX and its setae S1 reach 86 µm and 157 µm, respectively. In *F. regentis* sp. n. the abdominal segment IX and setae S1 reach 109–111 µm and 179–183 µm, and the prothorax is clearly longer than the head.

Finally, *F. regia* shows, in general terms, larger measurements than the new species, for example, antennal segment III 101–112 µm in *F. regia* (86–87 µm in *F. regentis* sp. n.) and pair IV of the postocular setae 76 µm (60–63 µm).

Frankliniella paramorum sp. n.

Figs. 49–54

Holotype ♀: Colombia, Paramo de Monserrate (near Bogotá), 24. v. 1968, 3200 m, aus Blüten von *Espeletia grandiflora* H. & B., H. STURM leg. (SMF T 4343b-1).

Paratypes (in total 5 ♀♀, 4 ♂♂): 3 ♀♀, 3 ♂♂ with the same data as holotype (1 ♂, 1 ♀ of these paratypes are deposited in UCME). — 2 ♀♀, 1 ♂, Colombia, Cruz Verde (near Bogotá), Paramo, 30. iv. 1968, 3175 m, aus aufgestellten Formol-Fangschalen, H. STURM leg. (SMF T 3793).

Derivatio nominis: The new species is named after the landscape (páramo) where it was collected. Latin language paramus = wilderness; paramorum = genitive plural. The name is defined as a noun in apposition.

Description: ♀ (macropterous). Body colour light-brown to dark-brown. Head, thorax and abdomen light-brown to dark-brown. Forewing lightly shaded with base pale. Legs like the body colour; fore tibiae and tarsi greyish-yellow to golden-brown, middle and hind tibiae like the body colour, some times the posterior tibia with base clearer. Antenna with segments I–II and IV–VIII similar to the body colour, segment IV with clearer base; antennal segment III light-brown to dark-brown, always darker to distal end.

Head 88–104 (144–148) µm long (wide) (Fig. 50) with slightly transverse cheeks towards back, occiput with 5–6 sculptural lines; pair III of the ocellar setae, at position 2 or 3 (MOULTON 1948) reaching 21 µm long and interval 21–23 µm long; pair IV of the postocular setae 21–26 µm long and pair I present. Antenna 266 µm long (Fig. 49), antennal segment III with simple pedicel. Length (width) of the antennal segments (segment III with pedicel) in µm: I 21–23 (26–28), II 34–37 (26), III 45–49 (21–23), IV 42–44 (21–23), V 30–35 (19–21), VI 44–46 (19–20), VII 7 (8) and VIII 12–14 (6).

Pronotum 118–135 (174–196) µm long (wide) (Fig. 50), with 5–8 thin sculptural lines on the anterior half; in the posterior half almost smooth or with few lines, very thin, on the posterior margin; eight to ten pairs of the discal setae reaching 5–12 µm long and the longest pair, at lateral position, 16–23 µm long; anteromarginal setae

26–30 µm, anteroangular setae 43–53 µm and two small setae between the anteromarginal setae 13–14 µm long, respectively; posteroangular internal setae 53–65 µm, posteroangular external setae 53–58 µm and pair II of the posteromarginal setae 31–37 µm long, respectively.

Mesonotum with transverse sculptural lines, inner pair of the posteromarginal setae 12–16 µm long and inner pair 16–19 µm long. Metanotum (Fig. 51) with cells medially; a pair of campaniform sensilla at the posterior third, central pair of the anteromarginal setae 58–67 µm and lateral pair 35–42 µm long.

Forewing 808–922 µm long, upper vein with 20–25 setae and lower vein with 16–22 setae; scale with 5 setae on border and 1 seta on discal area.

Abdomen with ctenidia on tergite IV up to pair S2; tergite VIII with a comb of 15–16 microtrichia, at the posterior margin, reaching 12–19 µm in length (Fig. 52). Abdominal segment IX 40–46 µm long (Fig. 52), discal setae 16–20 µm; setae S1, S2 and S3 58–65 µm, 81–86 µm and 65–79 µm long, respectively, with S2 > S3 > S1. Abdominal segment X 81–99 µm long (Fig. 52), setae S1 and S2 84–97 µm and 77–84 µm long.

Total body length: 1.093–1.403 mm (not distended).

♂: Bicolourous body. Head greyish-yellow, prothorax pale yellow and pterothorax and abdomen brown. Forewing like the female or pale. Legs brown, fore tibiae and tarsi grey-yellow, femora, at the distal end, and bases of the middle and hind tibiae whitish. Antennal segments I–III grey-yellow, segment IV at base yellow-brown and darker to distal end; segments VI–VIII brown.

Head 90–97 (139) µm long (wide); interocellar setae 16–19 µm long. Antenna 228–247 µm long; length (width) of the antennal segments, segment III with pedicel, in µm: I 21–23 (23–26), II 32–34 (23–26), III 43–44 (21), IV 37–41 (19–21), V 32–35 (16–19), VI 44 (17–19), VII 7–8 (7–8) and VIII 14 (6).

Pronotum 95–104 (162–193) µm long (wide), anteromarginal setae 30 µm, posteroangular internal setae 50–58 µm and pair II of the posteromarginal setae 31–35 µm long, respectively. Forewing 713–770 µm long.

Abdominal sternites III–VII with elliptical glandular areas (Fig. 53), length (width) in µm: III 12–13 (24–35), IV 15–16 (21–38), V 16–17 (27–42), VI 15 (28–44) and VII 14–15 (23–42). Tergite VIII with a comb, at posterior margin, with 11–12 microtrichia reaching 9–12 µm in length. Abdominal segment IX 49–53 µm long (Fig. 54), discal setae 26–30 µm, setae S1, S2 and S3 23–30 µm, 63–70 µm and 39–41 µm, respectively. Abdominal segment X 49–55 µm long (Fig. 54), falciform setae 84–100 µm long. The major setae of the abdominal segment IX and the falciform setae of segment X are slightly thickened.

Total body length: 0.846–1.034 mm (not distended).

Discussion: *F. paramorum* sp. n. belongs to the group of *F. minuta* according to RETANA & MOUND (1994)

due to the dark colour of the body, abdominal tergum X longer than the tergum IX and setae S1 of the abdominal segment IX shorter than tergum X. Within this group it is similar to *F. trisetosa* HOOD 1942 as described from Peru on *Liabum verbascifolia* (HBK.) LESS. (HOOD 1942); *F. bagnalliana* HOOD 1925 as described from Panama on an unknown plant (HOOD 1925) and *F. montanosa* RETANA & MOUND 1994 described from Costa Rica on flowers of *Mirandella* sp. (RETANA & MOUND 1994).

Some ♀♀ of the new species are difficult to separate from *F. trisetosa*; when comparing the specimens with some paratypes of *F. trisetosa* we notice that the characteristics derived from the coloration are sometimes quite similar. Examples are the dark colour of the middle and posterior tibiae in the new species, the sometimes lighter base of the posterior tibiae (middle and posterior tibiae with both, distal and basal extremes cleared in *F. trisetosa*), as well as the brown colour of the antennal segment IV with a clearer base in *F. paramorum* sp. n. (antennal segment IV yellow in *F. trisetosa*). Nevertheless, setae S3 of the abdominal segment IX are always shorter than setae S2 in *F. paramorum* sp. n. (setae S3 larger than S2 in *F. trisetosa*) and the ratio length tergum X/length tergum IX is 2.0–2.3 in the new species (X/IX 1.5–1.7 in *F. trisetosa*).

As far as *F. bagnalliana* is concerned we can appreciate the differences in the antennal segments III and IV yellow, middle discal setae of the pronotum 12–17 µm long and the ratio tergite X/tergite IX 0.89–1.09 in ♀♀; and in the ♂♂ body colour clear yellow, tergite VIII without comb in the posterior margin and setae S1 of the abdominal segment IX twice as long as the discal setae. Whereas in *F. paramorum* sp. n. we notice that, in ♀♀, the antennal segments III and IV vary from light-brown to dark-brown, the middle discal setae of the pronotum

reach 8–12 µm in length and the ratio tergite X/tergite IX is 2.02–2.32. In ♂♂ the body is bicolourous, tergite VIII with a comb in the posterior margin and setae S1 and discal setae of the abdominal segment IX are similar in length.

Finally, *F. paramorum* sp. n. could be separated from *F. montanosa* by exhibiting brown middle and hind tibiae and femora (middle and hind tibiae clearer than their brown femora in *F. montanosa*), postocular setae I present (absent), tergite X 2.02–2.32 µm, just as long as tergite IX (tergite X 0.95–1.11 µm, just as long as tergite IX) and setae S2 and S3 of the abdominal segment IX clearly shorter in the new species than in *F. montanosa*. For ♂♂, a brown body colour with head and prothorax brown-yellow in *F. paramorum* sp. n. (body colour dark-brown in *F. montanosa*), bicoloured middle and hind tibiae similar to their femora (middle and hind tibiae lighter than the brown femora), tergite VIII with a comb in the posterior margin (tergite VIII without comb) and setae S1 and discal setae of the tergite IX similar in length (setae S1 twice longer than discal setae in the tergite IX).

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