

Revision of the Neotropical *Xanthandrus* Verral (Diptera, Syrphidae)

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ABSTRACT. The Neotropical genus *Xanthandrus* Verral, 1901 is revised. Six species are redescribed: *X. bucephalus* (Wiedemann, 1830), *X. cubanus* Fluke, 1936, *X. mellinoides* (Macquart, 1846), *X. mexicanus* Curran, 1930, *X. nitidulus* Fluke, 1937, and *X. plaumanni* Fluke, 1937. Three species are included based on original descriptions: *X. flavomaculatus* Shannon, 1927, *X. palliatus* (Fluke, 1945), and *X. simplex* (Loew, 1861). New synonyms proposed: *Argentinomyia longicornis* (Walker, 1837) = *Xanthandrus biguttatus* Hull, 1945 **syn. nov.**, and *Xanthandrus bucephalus* (Wiedemann, 1830) = *Melanostoma quadrinotata* Bigot, 1884 **syn. nov.** Description of terminalia, a key for Neotropical species, and illustrations are also presented.

KEYWORDS. Diptera; key; Neotropical *Xanthandrus*; revision; Syrphidae.

INTRODUCTION

Xanthandrus Verral, 1901 belongs to Bacchini (STUBBS & FALK 2000) that includes also *Melanostoma* Schiner, *Platycheirus* Lepelletier & Serville, *Pyrophaena* Schiner and *Baccha* Fabricius.

Xanthandrus occurs in all zoogeographical Regions and according to the catalog of THOMPSON *et al.* (1976), it is represented in the Neotropical Region by *X. biguttatus* Hull, 1945, *X. bucephalus* (Wiedemann, 1830), *X. cubanus* Fluke, 1936, *X. flavomaculatus* Shannon, 1927, *X. mellinoides* (Macquart, 1846), *X. mexicanus* Curran, 1930, *X. nitidulus* Fluke, 1937, *X. palliatus* (Fluke, 1945), *X. plaumanni* Fluke, 1937, *X. quadrinotatus* (Bigot, 1884), *X. simplex* (Loew, 1861), and *X. smithi* (Goot, 1964). Three of them (*X. bucephalus*, *X. nitidulus*, and *X. plaumanni*) are well represented in several collections in Brazil.

MATERIAL AND METHODS

The studied material (185 specimens) belongs to the institutions below (with the name of the responsible for the loans between parenthesis): AMNH - American Museum of Natural History, New York, USA (Dr. David Grimaldi); BMNH - The Natural History Museum, London, U.K. (Nigel Wyatt);

DZUP - Departamento de Zoologia, Universidade Federal do Paraná, Curitiba (Dr. Cláudio José Barros de Carvalho); MCZC - Museum of Comparative Zoology, Cambridge, USA (Dr. Michael S. Kelley); MNRJ - Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro (Dr. Denise M. Pamplona); MZSP - Museu de Zoologia, Universidade de São Paulo, São Paulo (Dr. Francisca do Val); UMO - Hope Entomological Collections, University Museum, Oxford, UK (Dr. Adrian C. Pont).

Type material examined. Three holotypes: *X. biguttatus* Hull, 1945, *X. mellinoides* (Macquart, 1846), *X. quadrinotatus* (Bigot, 1884); six paratypes: *X. cubanus* Fluke, 1936, *X. mexicanus* Curran, 1930, *X. nitidulus* Fluke, 1937 (four).

X. flavomaculatus Shannon, 1927, *X. palliatus* (Fluke, 1945) and *X. simplex* (Loew, 1861) are included based on the original descriptions, because no material was examined, and there are no records of them in the consulted museums.

The specimens identification was accomplished through the use of key and diagnoses of FLUKE (1937), original descriptions, and comparison with type material. The terms used in the redescrptions are based in THOMPSON (1999), and STUBBS & FALK (2000), the last one related only to the central prominence. Abdomen and terminalia were dissected, and treated with solution of potassium hydroxide 10%, cold, about twenty-four hours. The female terminalia was drawn in dorsal

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and ventral views. The following pieces of male terminalia were illustrated: epandrium+cercus+surstylus (dorsal and lateral views); phallic complex (lateral view). Sometimes the ejaculatory apodeme was not observed after the dissection of the phallic complex, for this reason it was not always represented in the illustrations. The following characters were also illustrated: male and female abdomen - for better observation of the spots, an important taxonomic character for identification of the species; wings - for distinction of the coloration and distribution of the microtrichia; antenna and other characters - to emphasize morphologic differences. The illustrations of the abdomen of *X. flavomaculatus* and *X. palliatus* and the antenna of *X. palliatus* were redrawn and enlarged from the original descriptions. The calypteres and meso and metathoracic pleura of *Xanthandrus* were illustrated schematically to show the piles.

RESULTS

As a result of this study, for the Neotropical Region, nine of the twelve species mentioned in the catalog (THOMPSON *et al.* 1976) are recognized as valid: *X. bucephalus*, *X. cubanus*, *X. flavomaculatus*, *X. mellinoides*, *X. mexicanus*, *X. nitidulus*, *X. palliatus*, *X. plaumanni* and *X. simplex*. Six species are redescribed: *X. bucephalus*, *X. cubanus*, *X. mellinoides*, *X. mexicanus*, *X. nitidulus* and *X. plaumanni*. Three species, based only on the diagnosis of the original descriptions, are included: *X. flavomaculatus*, *X. palliatus* and *X. simplex*. *X. biguttatus* Hull, 1945 is not included because it is considered here as a new junior synonym of *Argentinomyia longicornis* (Walker, 1837); it was based on the key of CURRAN (1937) and THOMPSON (1999), and on the exam of the holotype of *X. biguttatus* that presents antennal pit divergent, antenna with scape as long as flagellomere which are well elongated (Fig. 2), metathoracic pleuron without piles and abdomen narrow (Fig. 3). Also, *Melanostoma quadrinotata* Bigot, 1884 is a junior synonym of *X. bucephalus* (Wiedemann, 1830) based mainly on terminalia morphology, which is very similar, but it differs from most of the specimens of *X. bucephalus* by some characters as wings brownish with costal and subcostal cells with pigmentation (Fig. 4); abdomen narrow with spots on same terga, but with little difference on shape (Fig. 5). *X. smithi* was not found, and there are few data to characterize it. For the first time the male terminalia of *X. cubanus*, *X. mellinoides* and *X. plaumanni*, and the female one of *X. bucephalus*, *X. mellinoides*, *X. mexicanus*, *X. nitidulus* and *X. plaumanni* are described and illustrated. The species are very similar among themselves, and they can be segregated mainly by the pollinosity of face and pleura, color of calypteres and spiracle, as well as the distribution of the piles on the katepimeron and the location and shape of the spots on the abdomen. The geographical distribution of the following species is enlarged: *X. bucephalus* for Mexico, Bolivia and Brazil (Goiás, Mato Grosso, Rio de Janeiro and Rio Grande do Sul); *X. mellinoides* for Brazil (Amazonas); *X. nitidulus* for Brazil (Goiás, Mato Grosso, Rio de Janeiro, São Paulo and Paraná); *X. plaumanni* for Colombia and Brazil (Minas Gerais).

Xanthandrus Verral, 1901

Xanthandrus Verral, 1901:53, 316 (catalog and genus description); Bezzi & Stein, 1907:51 (catalog); Lundbeck, 1916:234 (redescription); Collado, 1930:122 (redescription); Shiraki, 1930:242, 331 (key, diagnosis and catalog); Fluke, 1936:62 (key); Curran, 1937:1 (key); Fluke, 1937:6 (key); Stone *et al.*, 1965:574 (catalog); Delfinado & Hardy, 1975:326 (catalog); Thompson *et al.*, 1976:44 (catalog); Crosskey, 1980:494 (catalog); Vockeroth & Thompson, 1987:721 (key); Peck, 1988:67 (catalog); Evenhuis, 1989:440 (catalog); Poole & Gentili, 1996:269 (catalog); Thompson, 1999:325 (key); Stubbs & Falk, 2000:46 (key).

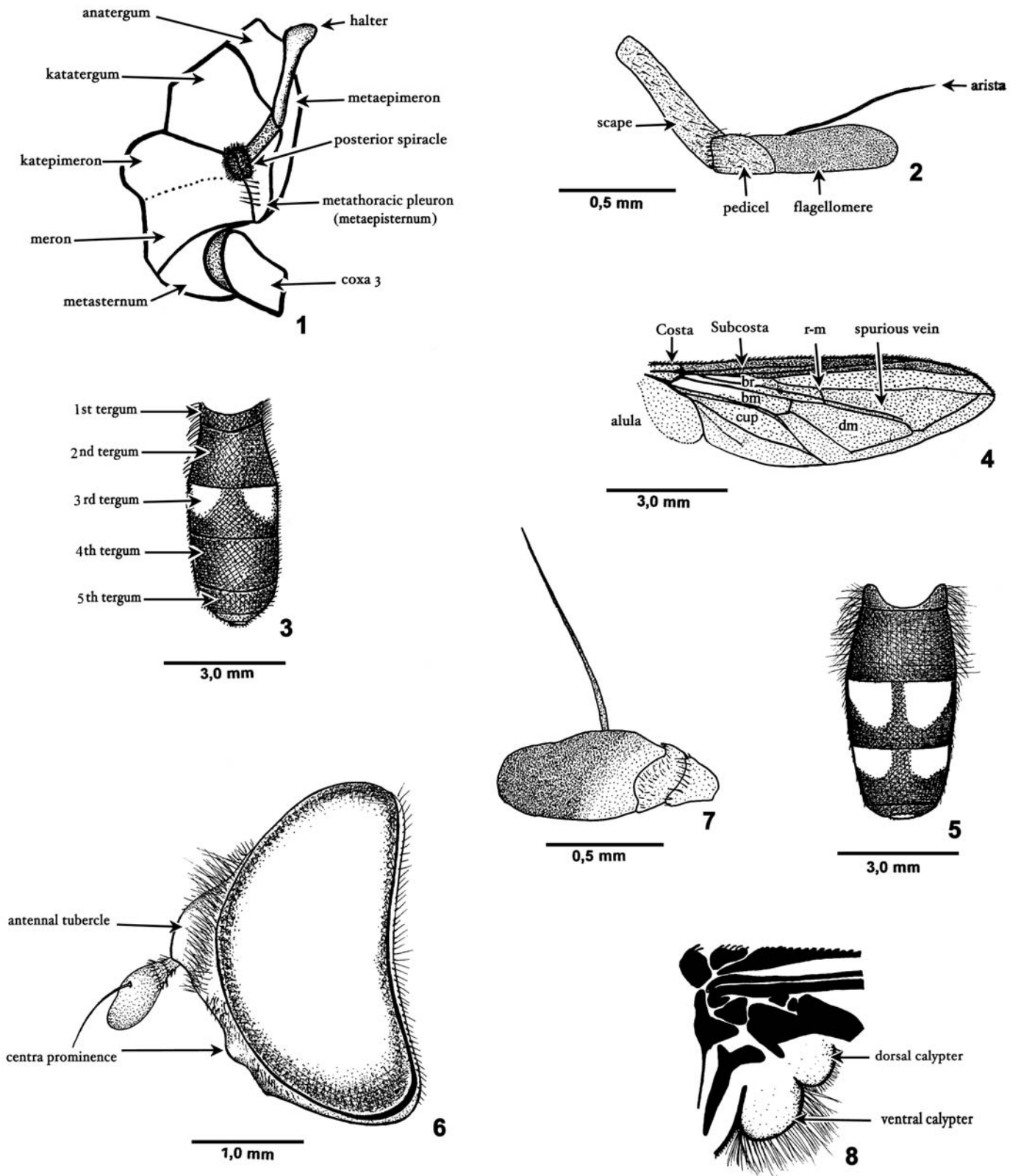
Type species: *Musca comptus* Harris (Coquillett, 1910:620)

Diagnosis. Female. Ocellar triangle without pollen and frons with two lateral pollinose areas next to the antennal tubercle. Male. Frontal triangle pollinose and covered by brown piles. Both sexes. Antennal tubercle glabrous and shiny with lateral and superior brown piles; antennal pits confluent; central prominence glabrous and shiny (Fig. 6); gena narrow with white pollen; occiput, laterally, with white pollen and short and dense white piles, superiorly, without pollen and with brown piles; eyes bare; antenna with scape and pedicel with apical bristles, the ones on the first larger than those of the second; arista bare (Fig. 7). Thorax pilose, longer piles on notopleura, around scutellum, on superior third of posterior anepisternum and on anterior anepimeron; anterior anepisternum micropubescent, postero-superior anepisternum prominent; katepisternum pilose; anterior anepimeron with long piles; meron bare; anatergum bare; metathoracic pleuron with fine piles ventrad spiracle (Fig. 1); calypteres with concolor piles, short on the margin of the dorsal calypter, and long, i.e., of equal length of the calypter, on the margin of the ventral calypter (Fig. 8); hind coxa with long piles; nails divergent, with basal half yellow and apical dark brown; pulvilli yellow. Abdomen elliptic, wide and flat, covered by piles, generally forming an angle between 2nd and 3rd terga, larger laterally on 1st and 2nd terga, with yellow or orange spots, that differ in form and position.

Comments. This genus is very close to *Melanostoma* Schiner, 1860, but it differs from this by possessing larger size of the body and the abdomen elliptic, wide and flat (VERRAL 1901), arista bare, central portion of the epistoma moderately prominent (LUNDBECK 1916), face narrow (CURRAN 1937) and longer and wider styles (FLUKE 1958). While *Melanostoma* has arista sometimes pubescent, not prominent epistoma (LUNDBECK 1916), terminalia with a style thin, straight and uniform (FLUKE 1958), reduced metasternum, legs of males narrow, without bristles, and without patterns of hair or modified piles (VOCKEROTH & THOMPSON 1987).

Key for the Neotropical species of *Xanthandrus*

1. Antenna with flagellomere circular (Fig. 47); pleura reddish *X. palliatus* (Fluke)
- Antenna with flagellomere not circular (Fig. 7); pleura black or brown 2



Figs. 1-8. *Xanthandrus* sp.: 1, part of meso and metapleura (lateral view), *sec.* THOMPSON 1999. *Xanthandrus biguttatus* Hull, 1945 (holotype): 2, right antenna (lateral view); 3, abdomen (dorsal view). *Melanostoma quadrinotata* Bigot, 1884 (holotype): 4, right wing (dorsal view); 5, abdomen (dorsal view). *Xanthandrus bucephalus* (Wiedemann, 1830): 6, head (lateral view); 7, left antenna (lateral view); 8, calypteres, *sec.* THOMPSON 1999 modified (without scale).

- 2(1). Wing with basal half hyaline and apical grayish; abdomen shiny metallic *X. simplex* (Loew)
Wing different from above; abdomen not shiny metallic 3
- 3(2). Length of the body at most 8,5 mm; abdomen with a pair of big and triangular spots on 2nd tergum and subsquared on 3rd and 4th terga (Fig. 23)
..... *X. flavomaculatus* Shannon
Length of the body at least 9 mm; abdomen with spots of different pattern from above 4
- 4(3). Face, in the middle golden pollinose and lateral margin white, pollinose 5
Face entirely white pollinose 6
- 5(4). Face with antennal tubercle light brown; scutellum brown; abdomen with contiguous spots on 3rd tergum or also on 4th tergum (Fig. 18); male: hypandrium and aedeagal apodeme enlarged (Fig. 22) *X. cubanus* Fluke
Face with antennal tubercle black; scutellum black; abdomen without contiguous spots on 3rd and 4th terga (Figs. 38, 39); male: hypandrium and aedeagal apodeme narrow (Fig. 43) *X. nitidulus* Fluke
- 6(4). Abdomen with circular spots on 2nd tergum (Figs. 24 and 25); male: surstylus narrow apically (Figs. 27, 28) and ejaculatory apodeme enlarged apically (Fig. 29)
..... *X. mellinoides* Macquart
Abdomen without circular spots on 2nd tergum; male: surstylus and ejaculatory apodeme different from above 7
- 7(6). Thorax with hind spiracle white; calypteres white; female: 8th tergum with a "V" shape pigmented area (Fig. 30)
..... *X. mexicanus* Curran
Thorax with hind spiracle yellow; calypteres yellow or golden; female: 8th tergum with a "M" shape pigmented area (Figs. 15, 56) 8
- 8(7). Antenna orangish yellow with at least part of flagellomere brown; male: pleura golden pollinose; female: abdomen with spots on 2nd tergum (Fig. 10); spermathecae with granulations (Fig. 17)
..... *X. bucephalus* (Wiedemann)
Antenna brown with flagellomere black to grayish brown; male: pleura white pollinose; female: abdomen without spots on the 2nd tergum (Fig. 49); spermathecae without granulations (Fig. 58) *X. plaumanni* Fluke

***Xanthandrus bucephalus* (Wiedemann, 1830)**
(Figs. 6-17)

Syrphus bucephalus Wiedemann, 1830:126 (description).

Xanthandrus bucephalus; Verrall, 1901:317; Shannon, 1927:7 (citation); Curran, 1930:9 (citation); Fluke, 1936:62, 63 (key and citation); Fluke, 1937:6 (key); Fluke, 1958:279 (terminalia); Thompson *et*

al., 1976:44 (catalog).

Melanostoma? quadrinotata Bigot, 1884:77 (description). **Syn. nov.**
Xanthandrus quadrinotatus; Verrall, 1901:317; Thompson *et al.*, 1976:45 (catalog).

Diagnosis. Face with white pollen and piles; thorax with postalar callus light brown to dark brown; male with pleura golden pollinose and female white pollinose. Abdomen: male with yellow spots on 3rd and 4th terga; and female on 2nd to 5th terga (Figs. 9, 10). Female similar to *X. nitidulus*.

Male. Length: body 10-12 mm. Wing 9-10 mm.

Head. Vertical triangle shiny black with brown piles; frontal triangle black with little white pollen; antennal tubercle black; lunule brown, yellowish laterally; central prominence black to brown; face black with white pollen and piles; gena black. Antenna with scape, pedicel and basal third of the flagellomere orangish yellow, two remaining thirds of the flagellomere brown or, antenna brown with the basal half of the intern surface of the flagellomere orange; arista yellowish.

Thorax. Mesonotum shiny black with golden pollen, covered with golden piles; postalar callus light brown to brown; pleura black with golden pollen; dorsomedial anepimeron shortly pubescent and posterior anepimeron bare; katepimeron on all extension pilose; katatergum pubescent to pilose; calypteres yellowish to golden; halter entirely yellow or darker on capitulum; posterior spiracle yellow surrounded by concolor piles. Legs, in general, light brown to dark brown; basal half of the fore and mid tibiae and femur-tibial articulations yellow, with brown ground-cover piles; fore coxa with brown piles surrounding the apical margin; mesocoxa with row of black and short piles on anterior surface and hind coxa with long yellow piles. Wing with microtrichias except part of br and bm cells; subcostal and sometimes costal cell with yellow pigmentation (Fig. 11).

Abdomen. Brown with yellow piles and with a pair of yellow spots, disc rectangular on 3rd tergum and, lateral triangular on 4th tergum (Fig. 9).

Terminalia. Surstylus curved with apical concavity on internal surface; cercus large (Figs. 12, 13); aedeagus apodeme narrow (Fig. 14).

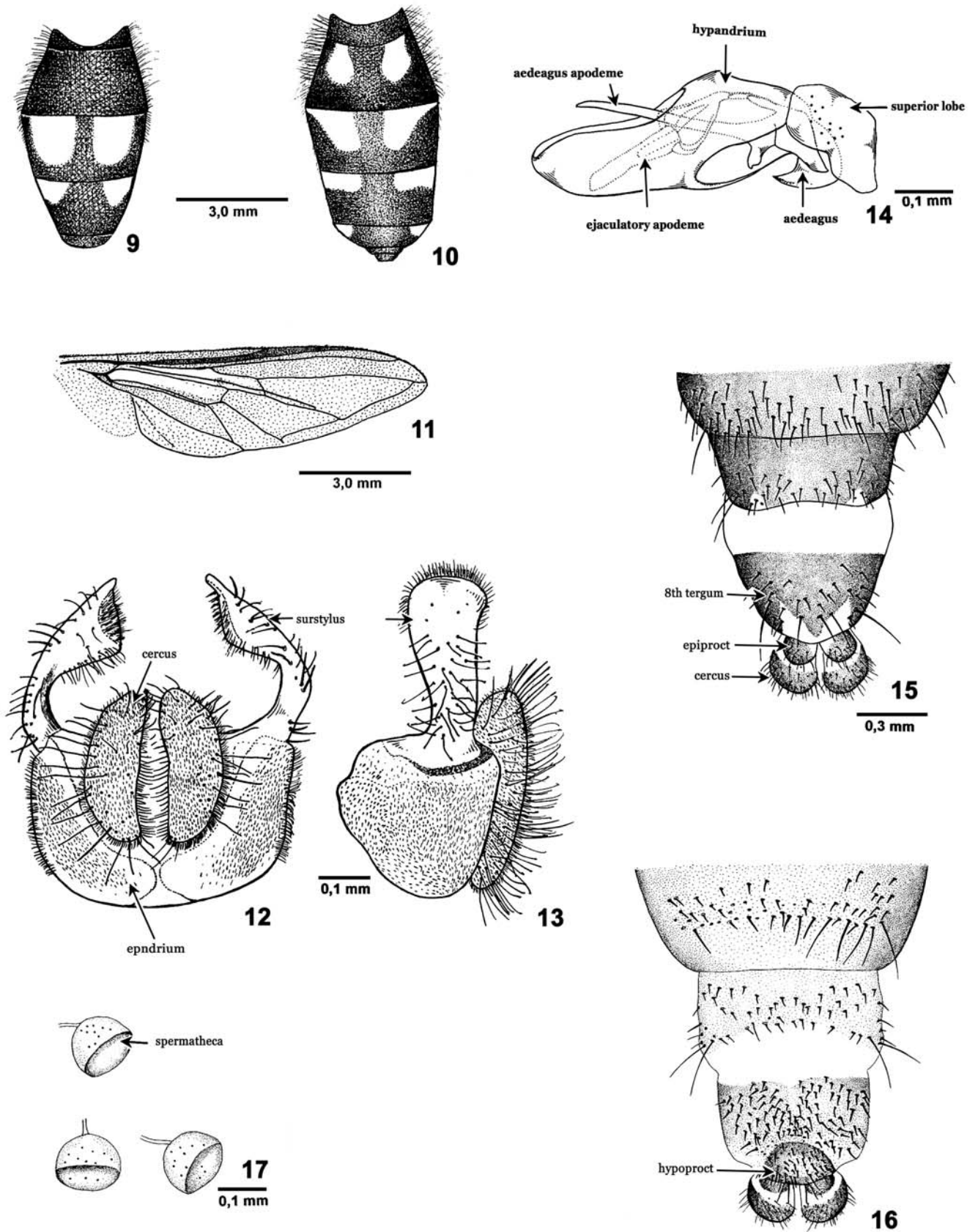
Female. Length: body 11 to 12mm. Wing 10 mm.

Similar to male, differing as follows. Vertical triangle and ocellar triangle with small brown piles. Thorax with yellow piles; pleura, anepisternum, anterior anepimeron and superior third of the katepisternum with a lot of white pollen, the other 2/3 with discret pollen. Abdomen with two spots triangular to oval on 2nd tergum, trapezoid on 3rd tergum, triangular on 4th tergum and, when present, triangular and lateral on 5th tergum (Fig. 10).

Terminalia. Hipoproct semicircular with a little pigmented central area; cercus large; 8th tergum with a "M" shape pigmented area; spermathecae with granulations (Figs. 15-17).

Type material examined. MEXICO. Holotype male (OXUM) Mexico [manuscript] HOLO / TYPE [label round, white surrounded of red]; *M. quadrinotata* Ex coll. Bigot.

Material examined. BOLIVIA. El Carmem, 5 males, 4 females, II /



Figs. 9-17. *Xanthandrus bucephalus* (Wiedemann, 1830): **9**, male abdomen (dorsal view); **10**, female abdomen (dorsal view); **11**, right wing (dorsal view); **12**, epandrium, cercus and surstylus (dorsal view); **13**, epandrium, cercus and surstylus (lateral view); **14**, phallic complex (lateral view); **15**, female terminalia (dorsal view); **16**, female terminalia (ventral view); **17**, spermathecae (frontal view).

1955, comissão I. O. Cruz (MNRJ). BRAZIL. *Mato Grosso*: Chapada, 7 males, 4 females, XI / 1885, S. W. Williston Collection (AMNH). *Mato Grosso do Sul*: Corumbá, 1 male 14-23 / XII, C. H. Curran det. (AMNH); Maracaju, 3 males, 3 females, V-VII / 1937, Serviço Febre Amarela, M.E.S., John Lane det. (MZSP); Dourados, 1 female, IV / 1937 (MZSP). *Goiás*: Campinas, 1 male, T. Borgmeier 1934, EMBRAPA (MNRJ). *Rio de Janeiro*: Itatiaia, 1 female, Lagoa Azul 26 / IX / 54, Trav. Barth, Albuquerque Barros (MNRJ). *São Paulo*: Araçatuba, 8 males, 5 females, Cidade Azul, II / 1946, M. P. Barreto col., 2 males and 2 females, Córrego Azul, III / 1947, M. P. Barreto col. (MZSP); Ribeirão Preto, 1 male, 1 female, X / 1953, 1 male 1954, Rio Tamandua, M. P. Barreto col. (MZSP); Cajuru, 1 male, Cássia dos coqueiros, IX / 1954, M. P. Barreto col. (MZSP); Avanhandava, 2 females, II / 1946, M. P. Barreto col. (MZSP); Salesópolis, 1 male, Est. Biol. Boracéia, 850m, III / 1949, M. P. Barreto col. (MZSP); Presidente Epitácio, 4 males, 3 females, Pto. Albano, Rio Paraná, X / 54, C.L. Fluke det. (MZSP); Porto Cabral, 9 males, 1 female, Rio Paraná, 15-30 / X / 1941, L. Travassos Filho col., C.L. Fluke det. (MZSP); São Paulo, 3 females, Pompéia, XI / 39, Barreto col. 1 male, Ipiranga, I / 1948, det. Fluke 1950 (MZSP); Barueri, 1 female, 5 / VII / 1955, C. L. Fluke det. (MZSP); *Rio Grande do Sul*: 2 females, Exp. Brasil, 12nd 31'S 51st 46'W, 433, R.A. Beaver 407, 12 / IX / 1968, J. R. Vockeroth det. (BMNH).

Geographical distribution. BOLIVIA, PERU, BRAZIL.

***Xanthandrus cubanus* Fluke, 1936**
(Figs. 18-22)

Xanthandrus cubanus Fluke, 1936:63 (description and key); Fluke, 1937:6 (key); Thompson *et al.*, 1976:44 (catalog).

Diagnosis. Head with vertical triangle brown with golden pollen; antennal tubercle, central prominence and face light brown; face, in the middle golden pollinose and lateral margin white pollinose. Thorax with scutellum brown; pleura golden pollinose. Abdomen with yellow spots on 2nd to 4th terga (Fig. 18).

Male. Length: body 9-11 mm. Wing 8 mm.

Head. Vertical triangle shiny brown with golden pollen and brown piles; frontal triangle white pollinose on superior half and golden pollinose on inferior half; antennal tubercle light brown; lunule brown, yellowish laterally; central prominence light brown; face, in the middle golden pollinose and lateral margin white pollinose, both with golden piles; gena brown. Antenna brown except base of flagellomere on external surface and a larger area on internal surface orangish yellow; arista brown.

Thorax. Mesonotum shiny black with golden pollen, postalar callus light brown; scutellum brown; notopleura golden pollinose; pleura black with golden pollen, more evident on anepisternum, katepisternum and anepimeron; dorsomedial anepimeron shortly pubescent and posterior anepimeron bare; katepimeron anteriorly pilose and posteriorly bare; katatergum shortly pubescent; calypteres yellowish; halter yellow; posterior spiracle light yellow surrounded by concolor piles. Legs light brown with basal and apical thirds of fore and mesotibiae and femur-tibial articulations yellow, covered with brown and golden ground-cover piles; fore coxa with brown piles surrounding the apical margin; mesocoxa with a row of black and short piles on anterior surface; hind coxa with long

and yellow piles. Wing with microtrichia except on basal half of br, bm, cup cells and alula; subcostal cell with yellow pigmentation (Fig. 19).

Abdomen. Brown with yellow piles and with pair of yellow spots, lateral semicircular spots on 2nd tergum contiguous spot on 3rd tergum, and contiguous on 4th tergum, and if not so, with a pair of square spots (Fig. 18).

Terminalia. Surstylus well setulose in all extension, and with internal margin little concave (Figs. 20, 21); hypandrium large; aedeagus apodeme well large in apical half (Fig. 22).

Type material examined. PORTO RICO. Paratype male (AMNH) Las Mesas / Porto Rico / 12-22-29 H. PARATYPE [yellow label]; *Xanthandrus cubana* / C.L. Fluke det.

Geographical distribution. CUBA and PORTO RICO.

***Xanthandrus flavomaculatus* Shannon, 1927**
(Fig. 23)

Xanthandrus flavomaculatus Shannon, 1927:6 (description); Fluke, 1936:63 (key); Fluke, 1937:7 (key and note); Thompson *et al.*, 1976:44 (catalog).

As no material of this species has been examined, a diagnosis based on the original description of SHANNON (1927) is presented.

Diagnosis. Length: body 8.5 mm. Wing 8 mm.

Male. Face pale pollinose and pilose. Antenna fairly large, dark brown; arista reddish brown. Mesonotum bronzy; halter yellow. Legs black, the apex of femura and bases of tibiae yellowish brown. Abdomen black with a pair of large, subquadrate, yellow spots on 2nd, 3rd and 4th terga (SHANNON 1927).

According to the illustrations, they can be described as follows: abdomen with a pair of large yellow spots, triangular on 2nd tergum and subsquared on 3rd and 4th terga (Fig 23).

Geographical distribution. BOLIVIA.

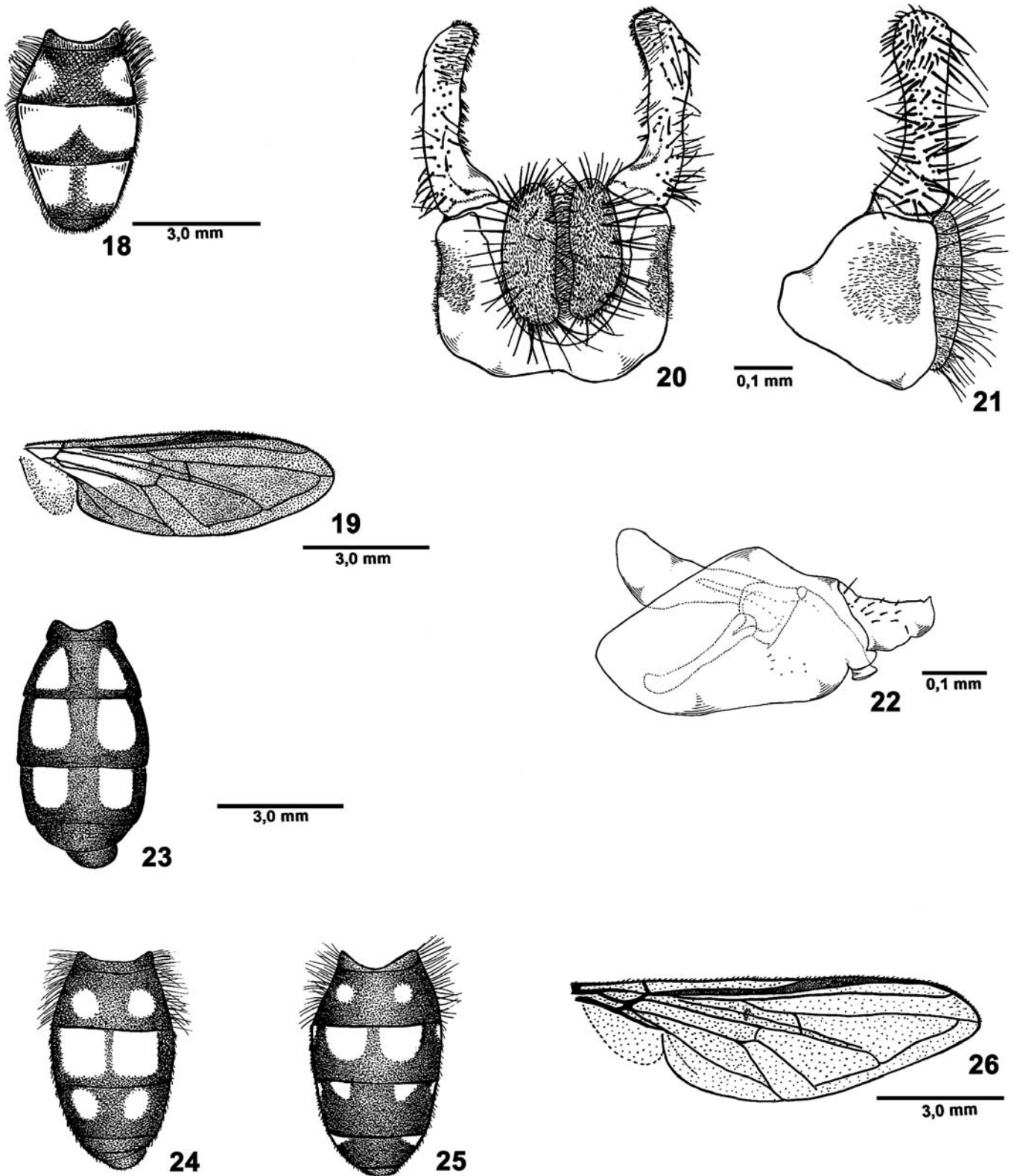
***Xanthandrus mellinoides* (Macquart, 1846)**
(Figs. 24-32)

Syrphus mellinoides Macquart, 1846:137 (description).
Melanostoma? euceratus Bigot, 1884:82 (description).
Xanthandrus mellinoides; Thompson *et al.*, 1976:45 (catalog).

Diagnosis. Face with white pollen and piles; pleura golden pollinose. Male and female abdomen with similar yellow spots, on 2nd to 4th terga on male, and on 2nd to 5th terga on female (Figs. 24, 25).

Male. Length: body 10 mm. Wing 9 mm.

Head. Vertical triangle shiny black with brown piles; frontal triangle black white pollinose; antennal tubercle black; lunule brown, yellowish laterally; central prominence black; face black with white pollen and piles; gena black. Antenna with scape, pedicel and basal third of the flagellomere orangish yellow,



Figs. 18-26. *Xanthandrus cubanus* Fluke, 1936: 18, male abdomen (dorsal view); 19, right wing (dorsal view); 20, epandrium, cercus and surstylus (dorsal view); 21, epandrium, cercus and surstylus (lateral view); 22, phallic complex (lateral view). *Xanthandrus flavomaculatus* Shannon, 1927: 23, male abdomen (dorsal view). *Xanthandrus mellinoides* (Macquart, 1846): 24, male abdomen (dorsal view); 25, female abdomen (dorsal view); 26, right wing (dorsal view).

remaining 2/3 of the flagellomere brown; arista yellow on basal half and brown on apical half.

Thorax. Mesonotum shiny black covered with golden piles; postalar callus light brown; pleura with anepisternum, katepisternum and anepimeron black with golden pollen; katepimeron, katatergum, anatergum and meron dark brown with little golden pollen; dorsomedial anepimeron shortly pubescent and posterior anepimeron bare; katepimeron on all extension pilose; katatergum pilose; calypteres light yellow; halter yellow with dark brown spots on capitulum; posterior spiracle yellow surrounded by concolor piles. Legs brown, articulations femur-tibial yellow, covered with brown and golden ground-cover piles; mesocoxa with a row of black and short piles on anterior surface; hind coxa with piles long and yellow. Wing with microtrichias except, on part of br and bm cells; subcostal cell with yellow pigmentation (Fig. 26).

Abdomen. Brown with yellow piles and with a pair of yellow spots, round on 2nd tergum, square on 3rd tergum and oval on 4th tergum (Fig. 24).

Terminalia. Epandrium well large; surstylus narrow apically (Figs. 27, 28); hypandrium long in relation to the size of the specimen; ejaculatory apodeme large and long apically (Fig. 29).

Female. Length: body 10 mm. Wing 9 mm.

Similar to the male, differing as follows. Abdomen. Brown with two round yellow spots on 2nd tergum, subsquared on 3rd tergum, triangular on 4th tergum and triangular lateral on 5th tergum (Fig. 25).

Terminalia. Hypoproct small and flattened posteriorly; 8th tergum with an "Y" shape pigmented area; spermathecae with granulations (Figs. 30, 31 and 32).

Type material examined. Holotype male (UMO) Colombia [manuscript] HOLO / TYPE [white round label and surrounded with red]; *Syrphus mellinoides* / Former coll. Bigot [specimen without abdomen].

Material examined. BRAZIL. *Amazonas*: 1 male, 1 female (BMNH).

Geographical distribution. MEXICO, COLOMBIA, VENEZUELA and BRAZIL.

Xanthandrus mexicanus Curran, 1930
(Figs. 33-37)

Xanthandrus mexicanus Curran, 1930:9 (description); Fluke, 1936:63 (key); Fluke, 1937:7 (key); Thompson *et al.*, 1976:45 (catalog).

Diagnosis. Head with antennal tubercle surrounded by few piles; central prominence brown; face with white pollen and piles. Thorax with postalar callus dark brown; pleura white pollinose; katepimeron pilose on superior half; calypteres and posterior spiracle white. Abdomen with yellow spots on 2nd to 4th terga (Fig. 33).

Female. Length: body 10-11 mm. Wing 8 mm.

Head. Vertical triangle shiny black; frons black; antennal tubercle black surrounded by few brown piles; lunule brown, yellowish laterally; central prominence brown; face black with

white pollen and piles; gena black. Antenna orangish yellow, except on superior half of the internal surface and superior two thirds of the external surface of the flagellomere brown.

Thorax. Mesonotum shiny black covered with white piles; postalar callus dark brown; pleura black with white pollen; dorsomedial anepimeron shortly pubescent and posterior anepimeron bare; katepimeron pilose on superior half; katatergum pilose; calypteres white; halter yellow; posterior spiracle white surrounded by concolor piles. Legs brown, fore and mid femur-tibial articulations yellowish and anterior surface of the tarsi dark brown, covered with brown and golden ground-cover piles; hind coxa with long and white piles. Wing with microtrichia, except on br and bm cells; subcostal cell with yellow pigmentation (Fig. 34).

Abdomen. Brown with white piles and with a pair of lateral yellow spots and triangular on 3rd and 4th terga (Fig. 33).

Terminalia. Ovipositor small; hypoproct semicircular; 8th tergum with a "V" shape pigmented area; spermathecae with granulations (Figs. 35-37).

Type material examined. MEXICO. *Yucatán*: Paratype female (MCZC) Chichen Itza / Yucatan / Mexico / VI-29 / Type 16243. HOLOTYPE [label red]; *Xanthandrus mexicanus* C. H. Curran / C. H. Curran det.

Geographical distribution. MEXICO and COSTA RICA.

Xanthandrus nitidulus Fluke, 1937
(Figs. 38 - 46)

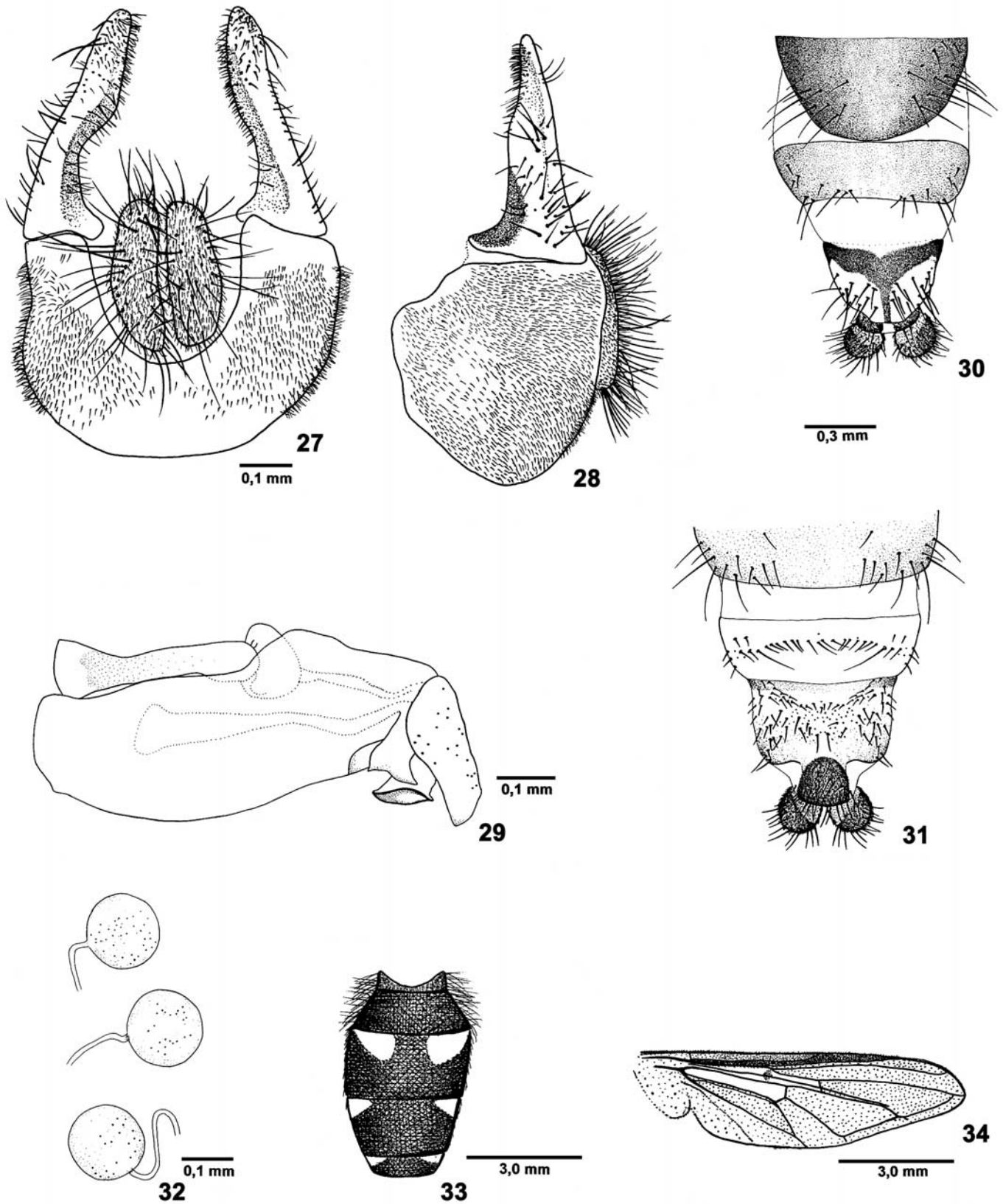
Xanthandrus nitidulus Fluke, 1937:7 (description and key); Fluke, 1958:279 (terminalia); Thompson *et al.*, 1976:45 (catalog).

Diagnosis. Face, in the middle, golden pollinose and lateral margin white pollinose; pleura golden pollinose; wings with costal and subcostal cell pigmented. Abdomen of the male and female with similar yellow spots on 2nd to 4th terga, or also on 5th tergum (Figs. 38, 39).

Male. Length: body 11-12 mm. Wing 10 mm.

Head. Vertical triangle shiny black with brown piles; ocellar triangle golden pollinose; frontal triangle white pollinose; antennal tubercle black; lunule brown, reddish laterally; central prominence black to brown; face, in the middle, golden pollinose and lateral margin white pollinose, both with brown and golden piles; gena brown. Antenna with scape, pedicel and basal and inferior third of the flagellomere reddish brown, 2/3 remaining of the flagellomere brown to black; arista brown.

Thorax. Mesonotum shiny black with golden pollen, covered with golden piles; postalar callus brown; pleura black with golden pollen; dorsomedial anepimeron and posterior shortly pubescent; katepimeron on all extension pilose; katatergum pubescent to pilose; calypteres light yellow with golden piles; halter entirely yellow, or darker on capitulum; posterior spiracle yellow surrounded by concolor piles. Legs, in general, light brown, basal and apical third of the tibiae and femur-tibial articulations yellow, covered with brown ground-



Figs. 27-34. *Xanthandrus mellinoides* (Macquart, 1846): 27, epandrium, cercus and surstylus (dorsal view); 28, epandrium, cercus and surstylus (lateral view); 29, phallic complex (lateral view). 30, female terminalia (dorsal view); 31, female terminalia (ventral view); 32, spermathecae (frontal view). *Xanthandrus mexicanus* Curran, 1930: 33, female abdomen (dorsal view); 34, right wing (dorsal view).

cover piles; fore coxa with brown piles surrounding the apical margin; mid coxa with row of brown piles on anterior surface and hind coxa with long yellow piles. Wing with microtrichia except on basal half of the br, bm and cup cell; costal and subcostal cell with yellow pigmentation (Fig. 40).

Abdomen. Brown with yellow piles and with a pair of yellow spots, semicircular on 2nd tergum, trapezoid on 3rd tergum and triangular on 4th tergum, or also small lateral triangular spots on 5th tergum (Fig. 38)

Terminalia. Surstylus curved with apical concavity on internal surface (Figs. 41, 42); aedeagus apodeme narrow broadening at apex and almost not overtaken the hypandrium (Fig. 43).

Female. Length: body 11-12 mm. Wing 10 mm.

Similar to the male, differing as follows. Abdomen differing on shape of the spot of the 3rd tergum that is approximately rectangular (Fig. 39).

Terminalia. Hypoproct round and with two discal lack of pigmented areas; epiproct with bristles in the intern surface of each plate; 8th tergum with a "M" shape pigmented area; spermathecae with granulations (Figs. 44 - 46).

Type material examined. BRAZIL. Santa Catarina: Paratypes, 1 male (MUSP) and 3 males (AMNH), Nova Teutônia / Brasilien / 27 ° 11' B, 52 ° 23' 1 / 17.07.1936 / Fritz Plaumann. PARATYPE [yellow label]; *Xanthandrus nitidulus* / Fluke.

Material examined. BRAZIL. *Mato Grosso*: Maracajú, 1 male, 1 female, VI / 1937, Serviço Febre Amarela, M.E.S. (MZSP); Pouso Grande, 1 female, Werner col. (MZSP). *Goiás*: Leopoldo Bulhões, 1 female, XII / 1933, Spitz (MZSP). *Rio de Janeiro*: Rio de Janeiro, 1 male, IV / 1938, Serviço Febre Amarela, M.E.S. (MUSP). *São Paulo*: Porto Cabral, Rio Paraná, 1 male, 6-15 / X / 1941, L. Travassos Filho col., 1 female, 1-25 / IV / 1944 (MZSP); Campos do Jordão, 1 male, 21 / I / 1936, F. Lane coll. (MZSP); Rio Claro, 1 male, 11 / IV / 1946 (MZSP); Barueri, 1 male, 30 / III / 1957, John Lane det. (MZSP); Embu, 1 female, F. Lane (MZSP). *Paraná*: Curitiba, 1 female, XII / 1944, 1 female, XII / 1936, C.C. Westorman, 1 male, Fluke 1950 Fl. (MZSP). *Santa Catarina*: Seara (Nova Teutonia), 1 male, 1 female, 27th 11'B. 52nd 23'L, Fritz Plaumann, II / 1939, C.H. Curran det. (BMNH), 6 males, 7 females, 27th 11'B. 52nd 23'L, Fritz Plaumann, 1939 (AMNH), 2 males, 27th 11'B. 52nd 23'L, Fritz Plaumann, 193? (MNRJ), 2 females, 1948, 33 males, 32 females, 1970, Fritz Plaumann col. (MZSP); Cauna, 3 males XII / 1945, A.Maller Coll. (AMNH).

Geographical distribution. ARGENTINA and BRAZIL.

Xanthandrus palliatus (Fluke, 1945)
(Figs. 47 - 49)

Melanostoma palliatum Fluke, 1945:22 (description and key).
Xanthandrus palliatus; Thompson *et al.*, 1976:45 (catalog).

As no material of this species has been examined, a diagnosis based on the original description of FLUKE (1945) is presented.

Diagnosis. Length: body 9 to 10 mm.

Female. Face and lower half of the front except the central prominence and antennal tubercle cover with brownish pollen and black piles; cheeks yellowish pollinose and yellow pilose.

Antenna reddish with scape black and flagellomere circular, blackened on superior third; arista short, reddish black (Fig. 47). Thorax with mesonotum shining coppery reflections; notopleura with prominent tubercle; pleura reddish with white pollen and piles; halter yellow with black capitulum; calypteres white. Wing hyaline; stigma brownish. Legs reddish darker tarsi. Abdomen oval, semi-shining black with four pairs of yellowish spots, which are located in the basal corners of the 2nd to 5th terga, coated with white pollen.

Geographical distribution. ECUADOR

Xanthandrus plaumanni Fluke, 1937
(Figs. 50-58)

Xanthandrus plaumanni Fluke, 1937:8 (description and key); Thompson *et al.*, 1976:45 (catalog).

Diagnosis. Face white pollinose; antenna with flagellomere black to grayish brown; pleura white pollinose. Abdomen of the male with yellow spots on 3rd tergum and female on 3rd and 4th terga (Figs. 50 and 51).

Male. Length: body 11-12,5 mm. Wing 10 mm.

Head. Vertical triangle shiny black; frontal triangle black with white pollen; antennal tubercle black; lunule brown or yellow laterally; central prominence black; face black with white pollen and piles; gena black. Antenna with the scape and pedicel brown and flagellomere black to grayish brown; arista yellowish on basal third and grayish on apical two thirds.

Thorax. Mesonotum shiny black covered with yellow to brown piles; postalar callus brown; pleura black with white pollen; posterior anepisternum with long piles, longer on postero-superior prominence; dorsomedial anepimeron shortly pubescent and posterior anepimeron bare; katapimeron on all extension pilose; katatergum pilose; calypteres yellow with darker board; halter yellow; posterior spiracle yellow surrounded by concolor piles. Legs brown, tarsi dark brown on anterior surface and the femur-tibial articulations yellowish, covered with brown ground-cover piles; hind coxa with long and yellow piles. Wing with microtrichia except on basal third of the br and part of the bm cell, subcostal cell with yellow pigmentation (Fig. 52).

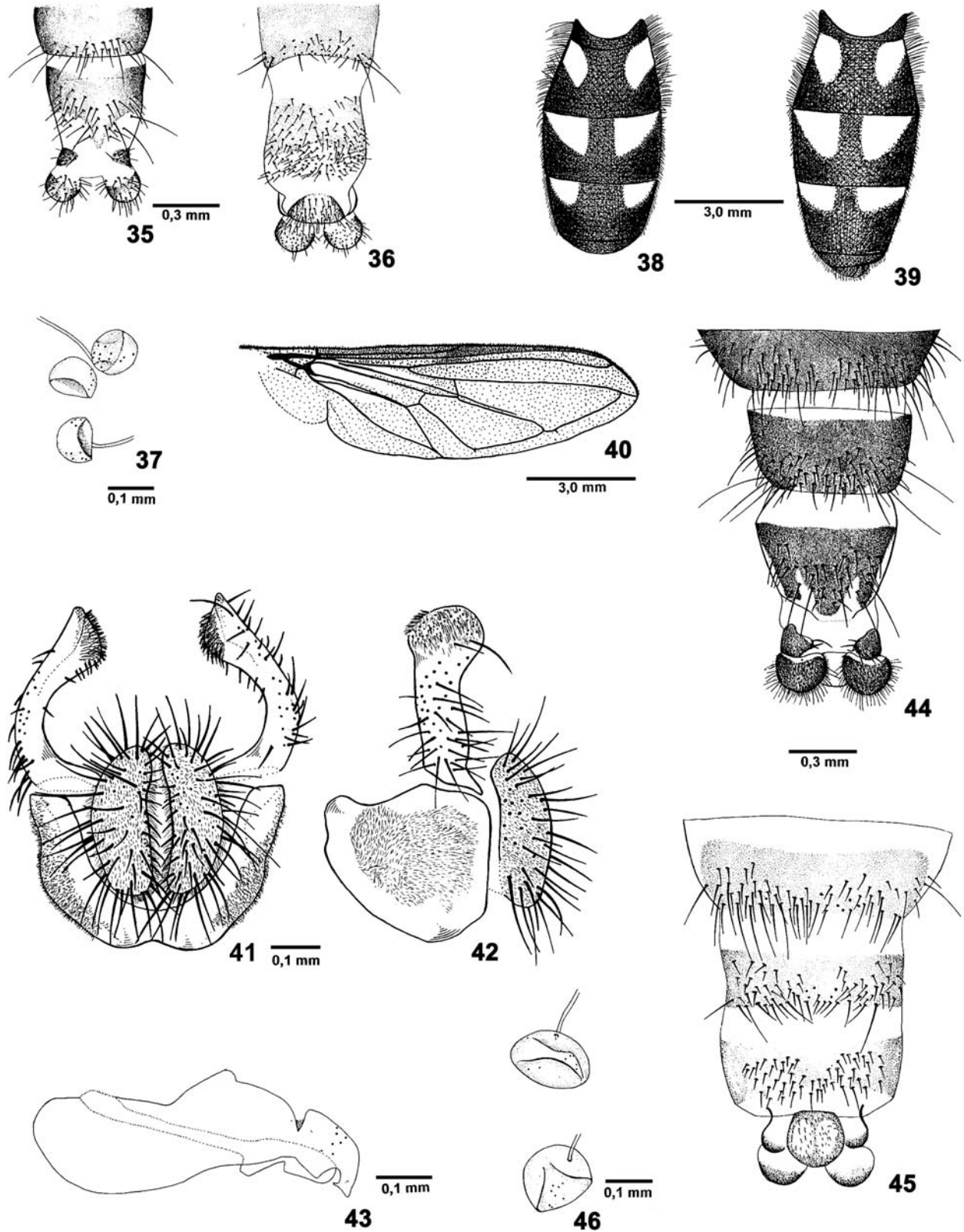
Abdomen. Brown with yellow piles and with a pair of yellow to orange spots, triangular on 3rd tergum (Fig. 50).

Terminalia. Surstylus with round base and apex with discret concavity and lateral margem with more setae than inner margem; cercus robust (Figs. 53 and 54); aedeagus apodeme a little broadened at apex and overtake the hypandrium (Fig. 55).

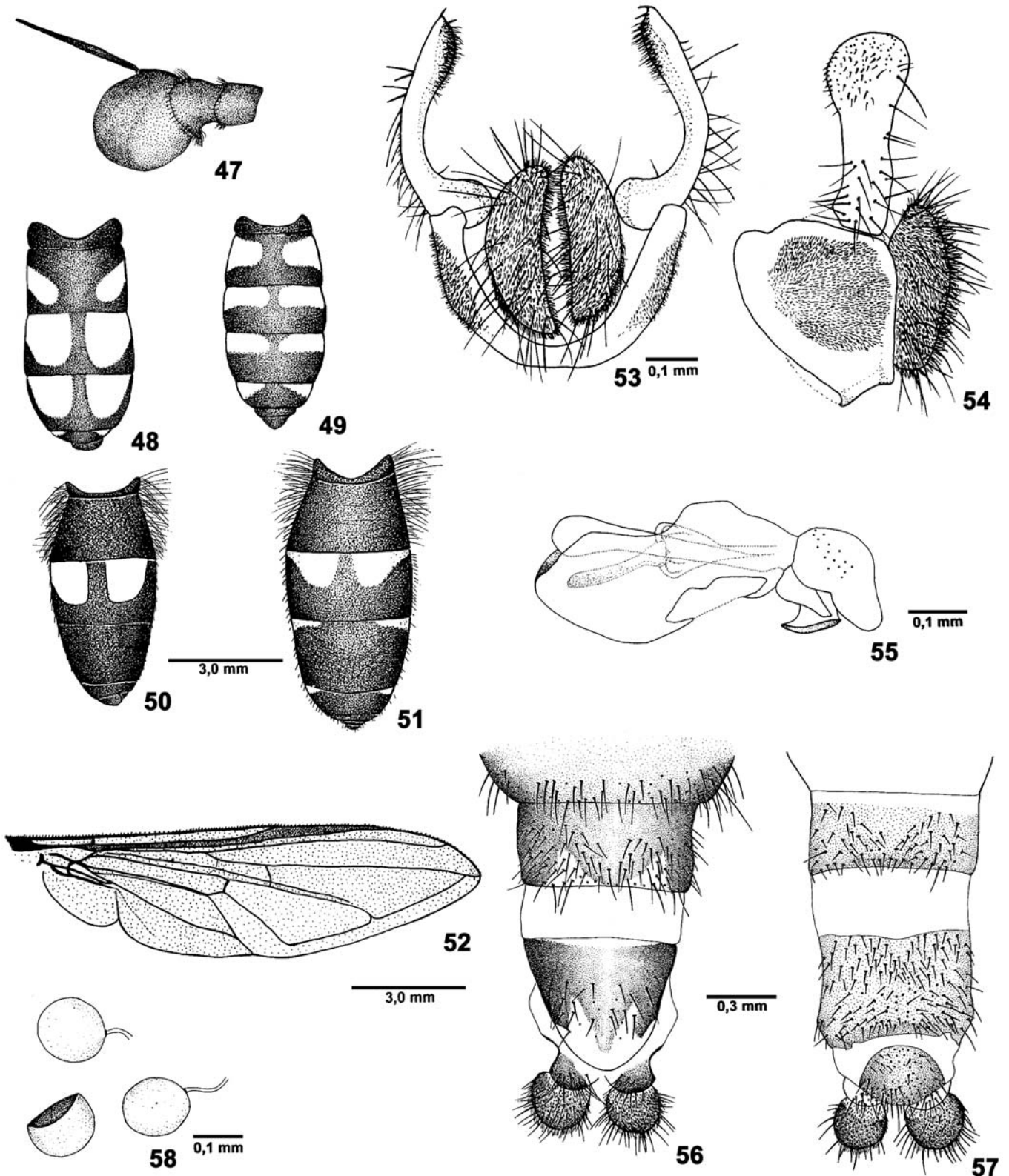
Female. Length: body 11-12,5 mm. Wing 10 mm.

Similar to the male, differing as follows. Abdomen with white piles and with a pair of yellow to orange spots, triangular on 3rd tergum and lateral rectangular triangle on 4th tergum (Fig. 51).

Terminália. Hypoproct semicircular; cercus longer; 8th tergum with a "M" shape pigmented area; spermathecae without granulations (Figs. 56, 57 and 58).



Figs. 35-46. *Xanthandrus mexicanus* Curran, 1930: 35, female terminalia (dorsal view); 36, female terminalia (ventral view); 37, spermathecae (frontal view). *Xanthandrus nitidulus* Fluke, 1937: 38, male abdomen (dorsal view); 39, female abdomen (dorsal view); 40, right wing (dorsal view); 41, epandrium, cercus and surstylus (dorsal view); 42, epandrium, cercus and surstylus (lateral view); 43, phallic complex (lateral view); 44, female terminalia (dorsal view); 45, female terminalia (ventral view); 46, spermathecae (frontal view).



Figs. 47-58. *Xanthandrus palliatus* (Fluke, 1945): 47, antenna (vista lateral); 48, male abdomen (dorsal view); 49, female abdomen (dorsal view). *Xanthandrus plaumanni* Fluke, 1937: 50, male abdomen (dorsal view); 51, female abdomen (dorsal view); 52, right wing (dorsal view); 53, epandrium, cercus and surstylus (dorsal view); 54, epandrium, cercus and surstylus (lateral view); 55, phallic complex (lateral view); 56, female terminalia (dorsal view); 57, female terminalia (ventral view); 58, spermathecae (frontal view).

Material examined. COLOMBIA. Vila Elvira, 1 male, 1 female, 20 / VII / 08, 1800m, N.P. Wyatt det. 1984 (BMNH); BRAZIL. *Minas Gerais*: Alpinópolis, 1 male, II / 1961, F.C. Thompson det. (DZUP). *Santa Catarina*: Nova Teutônia, 1 female, 27° 11' B. 52° 23. L., 17 / XI / 1938, Fritz Plaumann (AMNH).

Geographical distribution. COLOMBIA and BRAZIL.

Xanthandrus simplex (Loew, 1861)

Syrphus simplex Loew, 1861:40 (description).

Xanthandrus simplex; Thompson *et al.*, 1976:45 (catalog).

As no material of this species has been examined, a diagnosis based on the original description of LOEW (1861) is presented.

Diagnosis. Length: body 9 mm. Wing 7,5 mm.

Female. Head shiny metallic; frons narrow black pilose; face white pollinose. Antenna black; flagellomere oval. Thorax and scutellum black with metallic shine covered of white piles; halter spotted of yellow. Wing in the basal half totally hyaline and apical grayish to black. Legs with black tarsi. Abdomen with shiny metallic and white pubescent; posterior portion of each segment dark and opaque.

Geographical distribution. CUBA

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