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SPILOMYIA FLOWER FLIES OF THE NEW WORLD (DIPTERA: SYRPHIDAE)

F. CHRISTIAN THOMPSON

Systematic Entomology Laboratory, ARS, USDA, NHB-168, Smithsonian Institution, Washington, D.C. 20560.

Abstract.—***Spilomyia wirthi,* new species,** is described. A key to the species of *Spilomyia* of the New World is given, along with tables of their diagnostic characters and the nomenclatural details for the various names which apply to them.

Key Words: key, Neotropical

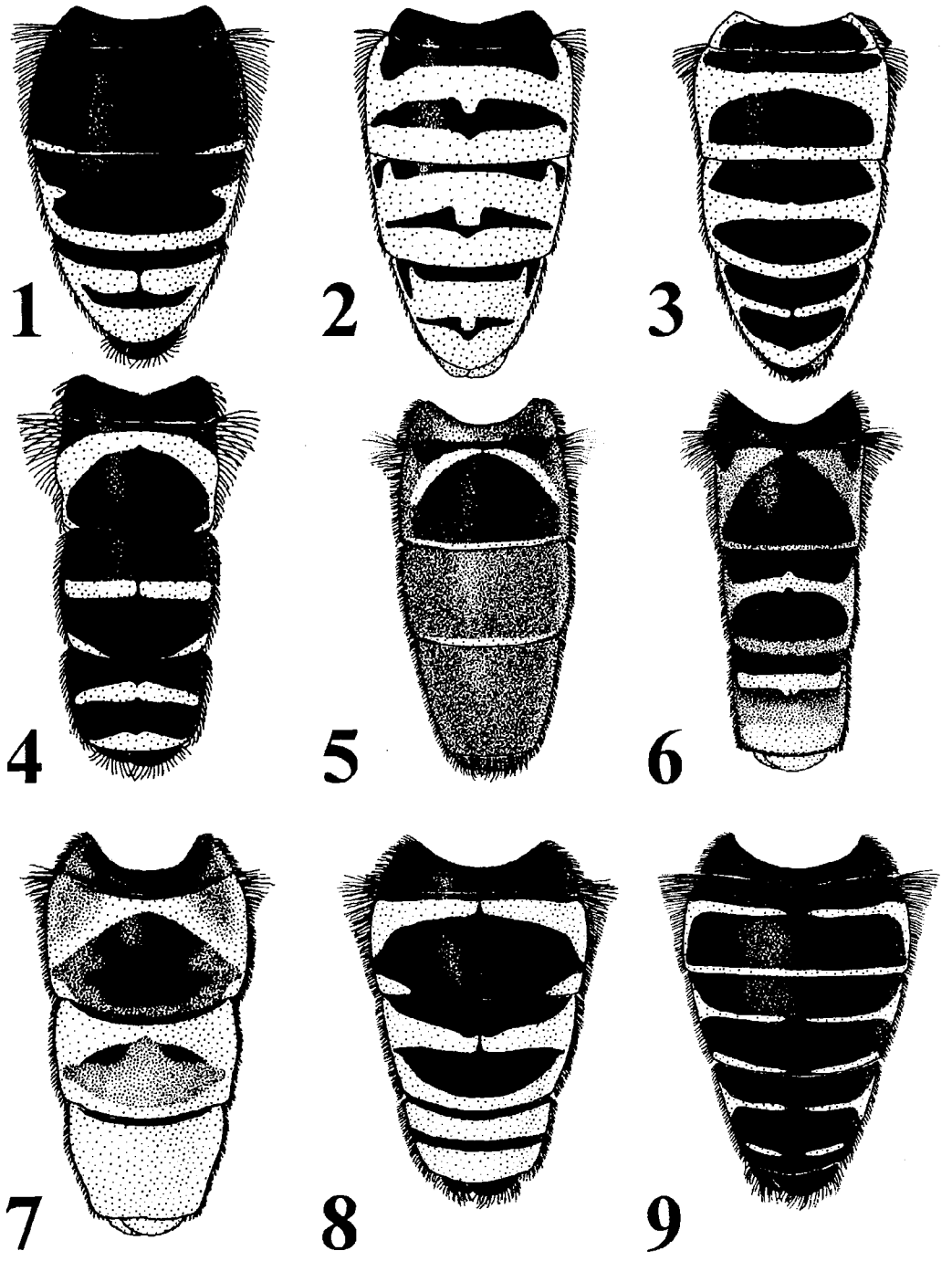
Biodiversity is now a global concern of high priority. Most nations have signed a biodiversity convention that proclaims this concern (Convention on Biological Diversity 1994). So, we now must understand our biodiversity, for only through understanding can we learn to use biodiversity in a sustainable manner. The first task is enumeration, or the listing of all components of biodiversity, from genes to populations (Solbrig 1990), with species being the central component. Enumeration requires that the components have names. Unfortunately, most species have none. To name a species scientifically requires more than just creating an epithet. A scientific name is a statement of relationship, a hypothesis of where the organism belongs in a classification. Our biological classification is a great edifice that includes millions of names in a hierarchical structure that expresses the relationships among the concepts and organisms represented by those names. All great edifices are built one brick at a time. So, it is with our classification and, hence, our knowledge of biodiversity. The first bricks are new species descriptions. Sometimes these bricks are produced in great batches, but more often they are produced one or two at a time. However, regardless of how they are produced, they are all critical to the edifice. So, with that knowledge, I add another brick to the edifice and our understanding of biodiversity. In doing so, I also honor a great mason, Willis Wagner Wirth: Bill Wirth was an enthusiastic contributor, who over the past half century contributed more to building our knowledge of Diptera than any of his contemporaries. While Bill understood the need for architects, like Willi Hennig, he preferred to produce the basic alpha taxonomic work from which great classifications are derived. Without the genera and species Bill described, the classifications created by dipterists would be nothing more than barren trees!

The *Spilomyia* species found in the New World have never been revised as a whole. Williston (1886) published a treatment of the North American species he knew; Curran (1951) provided a synopsis; Vockeroth (1958) revised a species, adding two new ones; Nayar (1968) figured the male genitalia of some species; Nayar and Cole (1968) redescribed two species under new names; Maier, Waldbauer and associates (Maier 1982; Maier and Waldbauer 1979 a and b; Waldbauer 1970, 1983; Waldbauer

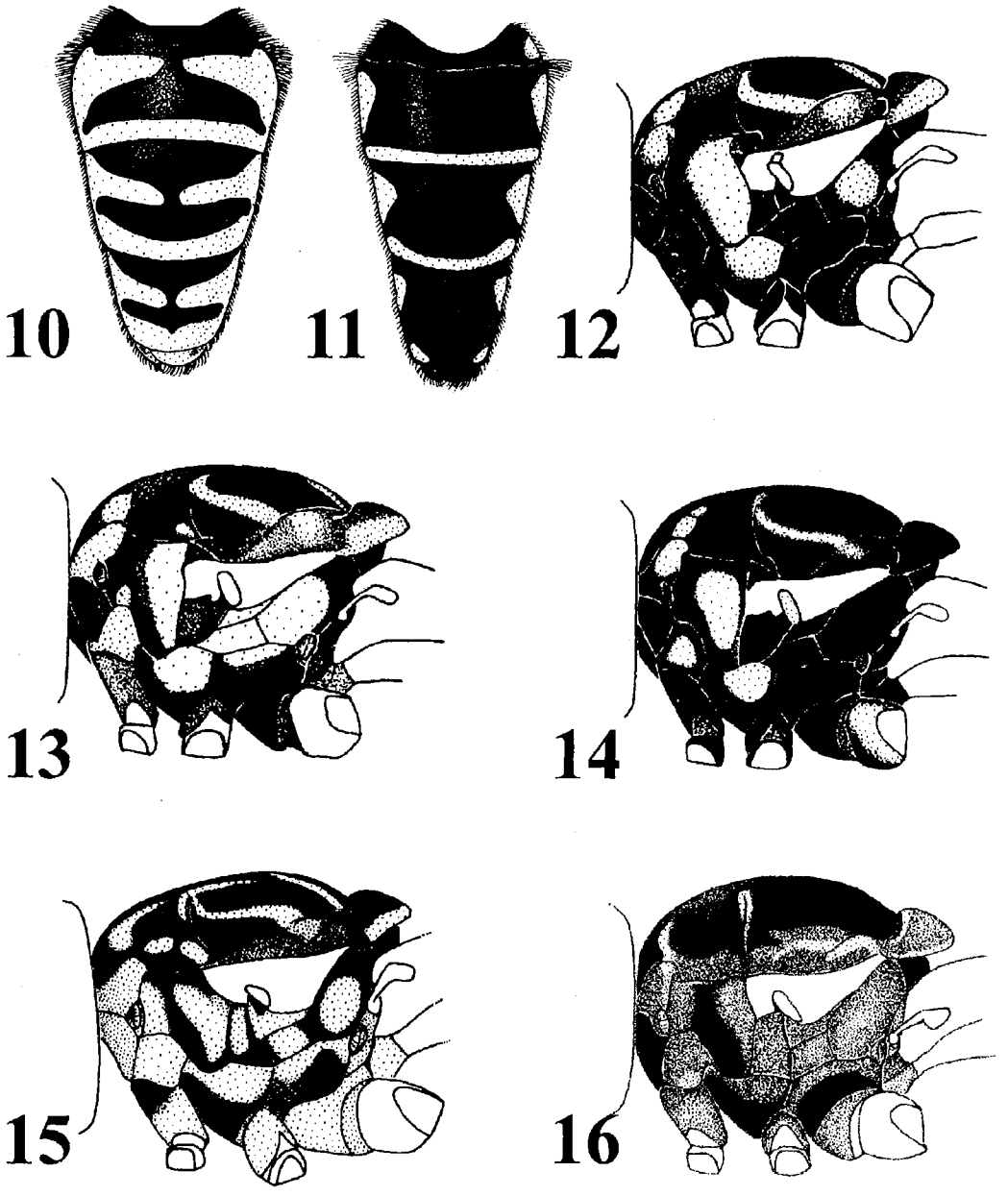
and Sheldon 1971; Waldbauer and Ghent 1984; Waldbauer and LaBerge 1985; Waldbauer et al. 1977) provided data on biology, flower visiting, mate-seeking, and mimicry; Thompson (1972) redescribed the genus and discussed its phylogenetic relationships (as did Hippa (1978)); and Hippa (1986) included one species in his study of female genitalia. Hence, the New World *Spilomyia* are ready for a monographic treatment, but this is postponed until the more comprehensive taxon, Syrphidae, can be treated as a whole. Instead, all the essential information necessary to know the New World species of *Spilomyia* is presented in a slightly nontraditional, but highly compact format. Diagnoses of previously described species have been reduced to tables of diagnostic characters and taxa. Likewise, the critical nomenclatorial data are summarized in a table.

Key to New World Species of *Spilomyia*

1. Scutellum entirely black (Fig. 20) . . *S. obscura*
– Scutellum yellow at least on apical rim (Figs. 19, 21) 2
2. 2nd abdominal tergum entirely black, rarely with apicolateral margin narrowly yellow, but never continuous (Fig. 1) . . . . . *S. fusca*
– 2nd tergum with at least a narrow continuous yellow fascia (Figs. 2–11) 3
3. Scutum dark anterior to scutellum (Fig. 21) . . . . . *S. ephippium*
– Scutum with yellow prescutellar macula (Figs. 19–20) 4
4. 2nd and 3rd abdominal terga with basal fascia reduced to triangular mediolateral maculae; 4th tergum without apicolateral fascia (Fig. 11) . . . . . *S. pleuralis*
– 2nd tergum with basal fascia elongate, continuous or narrowly interrupted medially, not reduced to lateral triangles (Figs. 2–10) 5
5. 2nd and 3rd terga with 2 yellow fasciae 8
– 2nd tergum with a single basal yellow fascia 6
6. 4th tergum entirely reddish yellow to yellow in ground color, yellow pollinose (Fig. 7); foreleg entirely pale orange . . . . . *S. kahli*
– 4th tergum dark with a single medial yellow fascia (Figs. 4, 6); foreleg yellow basally, dark on apex of tibia and on tarsus 7
7. Pleuron extensively black, only small supraprocoxal yellow macula and yellow maculae on anepisternum and katepisternum; hind femur black on apical ⅔ . . . . . *S. sayi*
– Pleuron extensively yellow, only black ventrally on katepisternum and katepimeron and anteriorly on laterotergite (Fig. 15); hind femur yellow . . . . . *S. gratiosa*
8. Abdomen with yellow fasciae narrow, with black areas extensive, not reduced to fascia, with yellow fasciae narrower than black areas (Figs. 3, 9, 10) 10
– Abdomen with yellow fasciae very broad, with black areas reduced to narrow fascia, with these black fasciae narrower than yellow ones (Fig. 2) 9
9. Propleuron yellow above coxa; discal cell completely microtrichose; anal cell almost completely microtrichose . . . . . *S. texana*
– Propleuron black (Fig. 12); discal cell bare on basal ⅔ or more; anal cell completely bare . . . . . *S. alcimus*
10. Abdomen with some yellow fasciae discontinuous, with basal fasciae on 2nd, 3rd and 4th terga interrupted medially (Figs. 9, 10) 13
– Abdomen with yellow fasciae always continuous on 2nd tergum, usually on 3rd tergum, frequently on 4th tergum also (Fig. 3) 11
11. Metasternum yellow . . . . . *S.* sp. CR-3
– Metasternum black 12
12. Pleuron with yellow areas extending continuously from katepisternum to laterotergite . . . . . *S. longicornis*
– Pleuron with yellow areas broadly interrupted along suture at junction of epimeron and laterotergite . . . . . *S. crandalli*
13. Anepimeron and katepimeron black (as in Fig. 14) . . . . . *S. liturata*
– Anepimeron at least partially yellow (Fig. 13) 14
14. Hind femur entirely yellow on anterior face; abdomen with yellow basal and apical fasciae continuous laterally, so lateral margin entirely yellow; 4th tergum with yellow apical fascia 15
– Hind femur black on apical ⅔; abdomen with yellow fasciae isolated laterally, so lateral margin alternating black and yellow; 4th tergum without apical yellow fascia . . . . *S. wirthi*
15. Face without tubercle, not produced ventrally, so ventral margin of head horizontal (see Vockeroth 1958: 285, Fig. 3); pleuron with yellow on anepimeron extending on katepimeron (as in Fig. 13) . . . . . *S. foxleei*
– Face with weak, but distinct tubercle, produced ventrally so ventral margin of head angular (see Vockeroth 1958: 285, Fig. 4); katepimeron entirely black (as in Fig. 12) 16
16. Pleuron with yellow maculae on anepimeron and laterotergite narrowly separated by thin



Figs. 1–9. *Spilomyia* abdominal pattern, dorsal view. 1, *S. fusca.* 2, *S. alcimus.* 3, *S. longicornis.* 4, *S. sayi.* 5, *S. ephippium.* 6, *S. gratiosa.* 7, *S. kahli.* 8, *S. obscura.* 9, *S. wirthi.*



Figs. 10–16. Figs. 10–11, *Spilomyia* abdominal pattern, dorsal view. 10, *S. interrupta.* 11, *S. pleuralis.* Figs. 12–16, *Spilomyia* thoracic pattern, lateral view. 12, *S. alcimus.* 13, *S. longicornis.* 14, *S. obscura.* 15, *S. gratiosa.* 16, *S. ephippium.*

black vitta; male surstylus with apex blunt; female 5th tergum with yellow medial fascia expanded laterally and continuous with apical yellow fascia, so that entire lateral margin is yellow ..... *S. interrupta*

– Pleuron with yellow maculae on anepimeron and laterotergite broadly separated by a wide black vitta; male surstylus with apex distinctly notched; female 5th tergum with yellow medial fascia isolated from lateral margin and apical fasciae, so that lateral margin black on basal ⅔ ..... *S. citima*

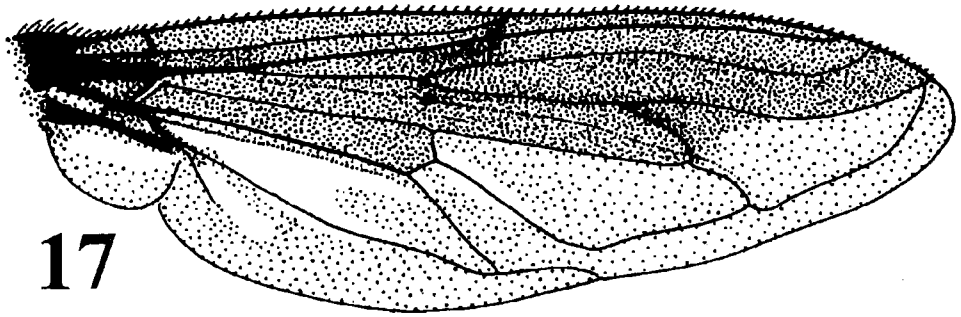
Spilomyia wirthi Thompson, New Species

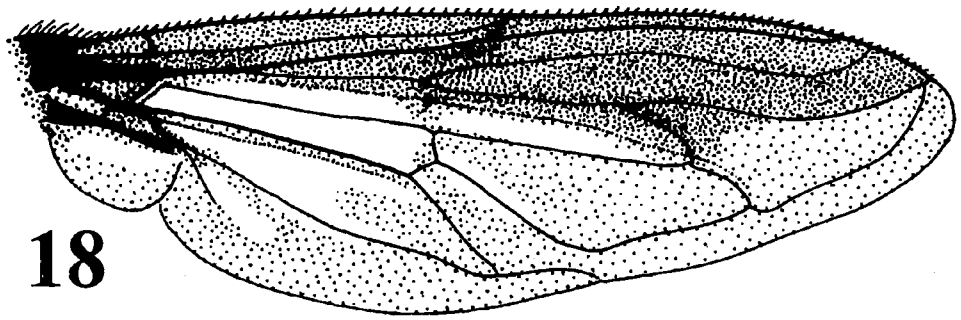
Male.—*Head:* Face yellow except broad black medial vitta which is narrowly separated from antennal pits and black laterally along juncture with gena, sparsely white pollinose on yellow areas, shiny on black areas, white pilose; gena yellow except black at juncture with face, shiny anteroventrally, white pollinose and pilose dorsoposteriorly; occiput black except yellow ventral 1/6, silvery pollinose, white pilose except black on dorsal 1/3; frontal triangle black, shiny, bare; frontal lunule black; vertical triangle black, black pilose, yellow pollinose anterior to anterior ocellus; eye contiguity long, about as long as scape; antenna black, black pilose; basoflagellomere with elongate mesial sensory pit; arista yellow becoming white apically.

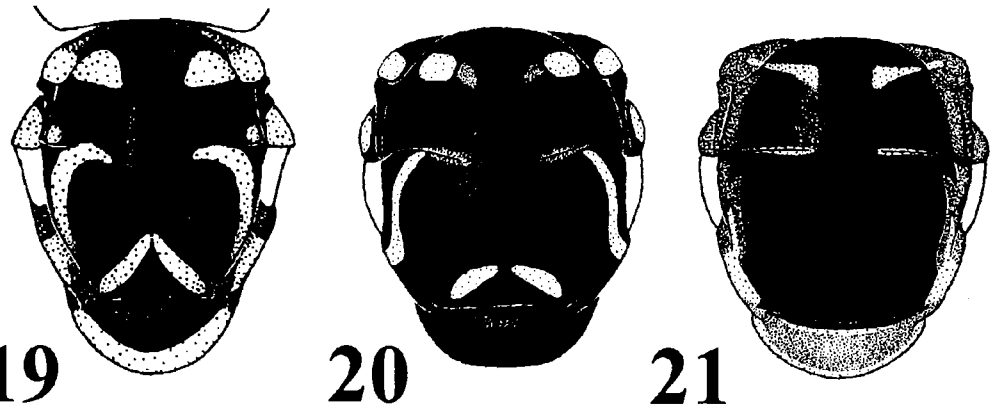
Thorax: Black with yellow maculae; postpronotum yellow except black medially, black pilose. Mesonotum black pilose, black pollinose except for broad medial silvery pollinose vitta on anterior 2/3 and shiny dorsad to wing, black except yellow as follows: submedial anterior macula mesiad to postpronotum, notopleuron, vitta running anteriorly from postalar callus obliquely to transverse suture, and oblique vitta anterior to scutellum. Scutellum black except yellow apical margin, black pilose. Pleuron yellow pilose except black pilose dorsally on anepisternum and anterior anepimeron, sparsely black pollinose except densely silvery pollinose on katepisternum, black except yellow as follows: proepimeron, large maculae on posterior anepisternum, dorsal katepisternum, posterior anepimeron including dorsal triangular portion, laterotergite, dorsal katepimeron and apicolaterally on metasternum. Halter yellow; calypter with dorsal lobe black, ventral lobe yellow. Legs: fore coxa black laterally, yellow medially, silvery pollinose, white pilose; mid and hind coxae black basomedially, yellow apically, silvery pollinose, yellow and black pilose; trochanters black, black pilose, shiny; fore and mid femora black ventrally and dorsally, yellow laterally, black pilose; hind femur black except yellow anterobasal 1/3 and posterobasal 1/4, black pilose; fore tibia yellow except black on anteroapical 1/5 and posteroapical 2/3, yellow pilose except brown pilose on posteroapical 2/3; mid tibia yellow, yellow pilose; hind tibia yellow except brownish apical 1/4; fore tarsus black except orange apical tarsomere, dark pilose; mid and hind tarsi orange, pale pilose. Wing: brownish black anteriorly, hyaline posteriorly, with dark color extending posteriorly to vein R, Rs and R_{4+5} and slightly beyond vein R_{4+5} in apical 1/3 of cell R and in fork between crossvein r-m and vein R_{4+5}, microtrichose except bare alula, cell BM, cell R posterior to spurious vein, cell CuP except microtrichose apicomedially, cell CuA_1 laterally and anterior to vein A_2.

Abdomen: Black with narrow yellow fasciae; sterna black except narrow yellow apical margins on 1st, 2nd and 3rd, shiny, long yellow pilose except with short appressed black pile intermixed apically on 4th; 1st tergum black, black pollinose and pilose; 2nd tergum black except narrow subbasal and apical yellow fasciae black pollinose and pilose; 3rd tergum black except narrow submedial and apical yellow fasciae black pollinose and pilose; 4th tergum black except for narrow subbasal and subapical yellow fasciae, shiny, black pilose; male genitalia black, shiny, black pilose.

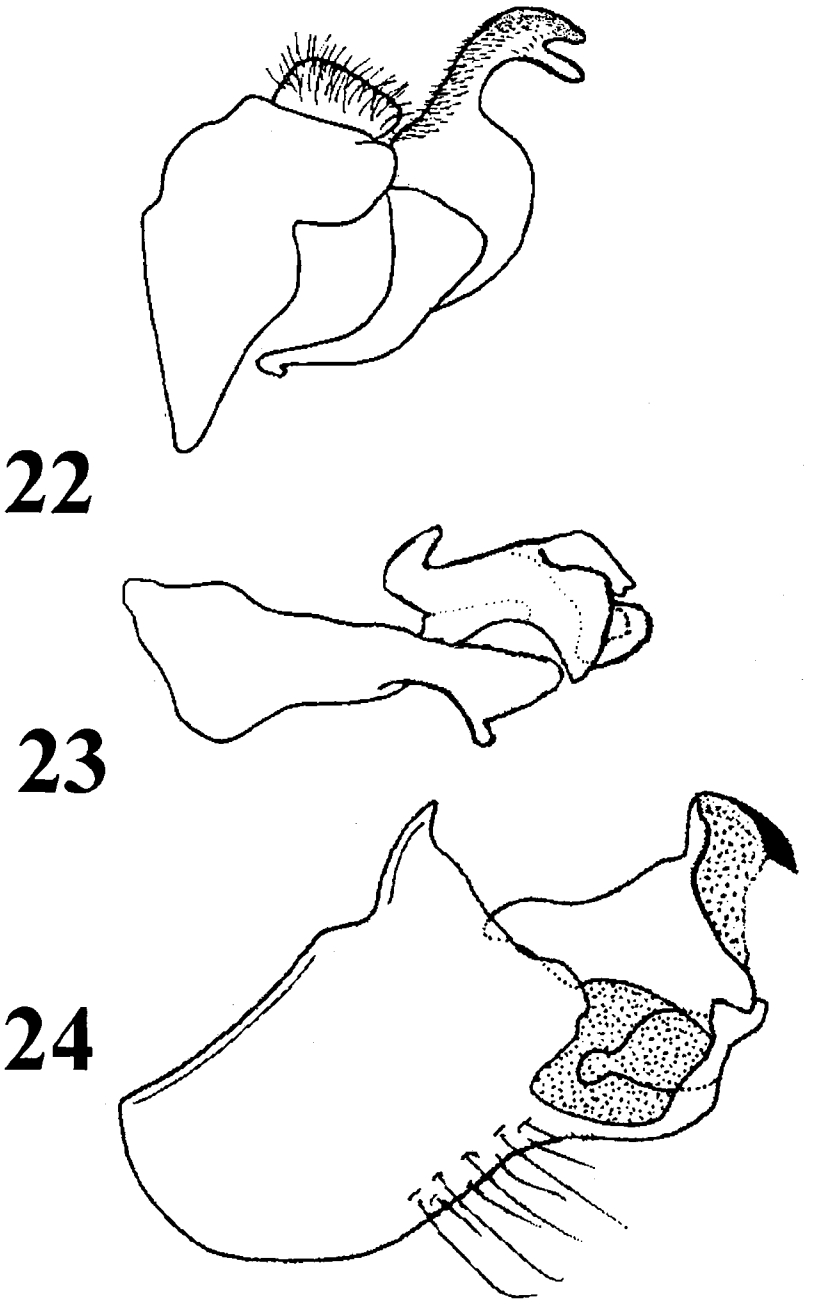
Holotype male.—COSTA RICA, San Jose, San Gerardo de Dota, 2000–2500 m, lambert coordinates 387400 482700, 22–26 February 1992, Curso Tachnidae y Syrphidae, net-collected, INBIOCRI000406886, deposited in Instituto Nacional de Biodiversidad, Santo Domingo. Paratypes: COSTA RICA, San Jose, San Gerardo de Dota, Finca Zacatales, 2300 m, LN 387000-483250, 26 February 1992, F. C. Thompson, USNM ENT 00022134 (♂ USNM); 27 March 1992, M. A. Zumbado, H. Vagas, F.







Figs. 17–21. Figs. 17–18, *Spilomyia* wing color and microtrichia pattern, dorsal view. 17, *S. ephippium*. 18, *S. wirthi*. Figs. 19–21, *Spilomyia* thoracic pattern, dorsal view. 19, *S. longicornis*: 20, *S. obscura*. 21, *S. ephippium*.



Figs. 22–24. Male genitalia of *Spilomyia wirthi*. 22, 9th tergum and associated structure, lateral view. 23, Aedeagus, lateral view. 24, 9th sternum and associated structures, lateral view.

G. Zumbado, INBIOCRI000409035 (♂ INBio), INBIOCRI000409036 (♀ INBio). Chirripo National Park, F. Cementario de la Maquina, 2100–2500 m, LS 378700_512500, M. A. Zumbado, INBIOCRI001305812 (♂ INBio).

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Table 1. Taxa and names of New World *Spilomyia* with nomenclatural details. Format used: valid species group name given in bold and left justified, followed by the author of the name (in parens if proposed in combination with another genus). The range is given next. The original combinations (genus and species group names) followed by the author of name, year and page of the publication of the name, the sex (sexes) described, the type-locality, with the kind of type, sex of type and type-depository given in parens. Abbreviations used are: AMNH = American Museum of Natural History; ANSP = Academy of Natural Sciences, Philadelphia; BMNH = British Museum (Natural History); CAS = California Academy of Sciences; CNC = Canadian National Collection; HT = holotype; Instituto Nacional de Biodiversidad; LT = lectotype; MCZ = Museum of Comparative Zoology; ST = syntype(s); UKaL = University of Kansas, Lawrence; USNM = United States National Museum.

alcimus (Walker). Wisconsin to Newfoundland, south to Mississippi and Florida.
Milesia Alcimus Walker 1849: 563 ♂ Unknown (LT ♂ BMNH).
Spilomyia hamifera Loew 1864a: 66 ♂ Pennsylvania (LT ♂ MCZ).
citima Vockeroth. British Columbia to Idaho, south to California.
Spilomyia citima Vockeroth 1958: 287 British Columbia, Oliver (HT ♂ CNC).
Spilomyia oregonensis Nayar and Cole 1968: 213 Oregon, Mary's River (HT CAS).
crandalli Curran. Arizona; Mexico.
Spilomyia crandalli Curran 1951: 7 Arizona, Mt. Lemon (HT ♂ AMNH)
ephippium (Osten & Sacken). Mexico to Costa Rica.
Mixtemyia ephippium Osten Sacken 1875: 70 Mexico (HT ♂ MCZ)
foxleei Vockeroth. British Columbia, Oregon, California.
Spilomyia foxleei Vockeroth 1958: 284 British Columbia, Chilliwack (HT ♂ CNC)
fusca Loew. Minnesota to Nova Scotia, south to Georgia.
Spilomyia fusca Loew 1864a: 67 Pennsylvania (LT ♂ MCZ)
Milesia analis Say in Harris 1835: 598 *nomen nudum*
gratiosa Wulp. Colombia to northern Argentina.
Spilomyia gratiosa Wulp 1888: 372 Argentina, Tucuman Proc. (T ♂ lost?)
interrupta Williston. British Columbia to California and Colorado.
Spilomyia interrupta Williston 1882: 327 Washington Territory (LT ♂ USNM)
kahli Snow. Arizona to Texas; Mexico.
Spilomyia kahli Snow 1895: 245 New Mexico, Magdalena Mts., near summit of Little Baldy, more 9,000 ft. (HT ♂ UKaL)
Spilomyia xanthocauda Curran 1935: 6 Arizona, Globe (HT ♂ AMNH)
liturata Williston. Washington to Idaho, south to Arizona and New Mexico.
Spilomyia liturata Williston 1887: 245 New Mexico (HT ♂ USNM)
longicornis Loew. Minnesota to Quebec, south to Texas and Florida.
Spilomyia longicornis Loew 1872a: 82 Pennsylvania and Massachusetts (LT ♂ MCZ)
Spilomyia banksi Nayar and Cole 1968: 211 Virginia, Great Falls (HT ♂ CAS)
obscura Coquillett. Mexico (Chihuahua).
Spilomyia obscura Coquillett 1902: 195 Mexico, Chihuahua, Sierra Madre, Head of Rio Piedras Verdes, 7300 ft. (LT ♂ USNM)
pleuralis Williston. Mexico to Costa Rica.
Spilomyia pleuralis Williston 1887b: 247 Mexico (HT ♂ MCZ)
sayi Goot. Alberta to New Brunswick, south to Kansas and New Jersey.
Paragus quadrifasciatus Say 1824: 377 (preoccupied by Meigen 1822) U.S.A, Northwest Territory (T ? ANSP lost)
Spilomyia sayi Goot 1964: 219 new name for *quadrifasciatus* Say.
texana Johnson. Oklahoma, Texas.
Spilomyia texana Johnson 1921: 57 Texas, Blanco County, Round Mountain (HT ♂ MCZ).
wirthi Thompson. Costa Rica.
Spilomyia wirthi Thompson, new species. Costa Rica (HT ♂ 1NB1O) CR-3 Thompson. Costa Rica.
A codc for what may be 2 undescribed specics known only from Costa Rica from a few poorly preserved females collected in Malaise traps.

Table 2. Diagnostic characters of new world *Spilomyia* species.

Head

1. Face:
   a. entirely yellow;
   b. with tubercle dark;
   c. with narrow dark medial vitta; or
   d. with broad dark medial vitta.
2. Gena:
   a. entirely yellow (brownish orange in *kahli*);
   b. with black vitta or partially black); or
   c. entirely black.
3. Frontal triangle (♂):
   a. entirely yellow;
   b. yellow laterally, black medially; or
   c. entirely black.
4. Scape:
   a. short, about as long as basoflagellomere; or
   b. elongate, at least 1.5 (2.5 *ephippium*) timcs as long as basoflagellomere.
5. Scape:
   a. about as long as broad; or
   b. at least twice (3 times *ephippium*) as long as broad.

Thorax

6. Notopleuron:
   a. entirely dark and concolorous with mesonotal disc;
   b. entirely brownish red (*ephippium*) to orange (*kahli*), contrasting with color of mesonotal disc; or
   c. with yellow macula.
7. Mesonotum:
   a. with yellow prescutellar triangular macula; or
   b. without prescutellar macula.
8. Scutellum:
   a. entirely black;
   b. entirely yellow (orange in *kahli,* brownish red in *ephippium*);
   c. black with narrow yellow apical margin; or
   d. black with broad yellow apical margin.
9. Proanepimeron:
   a. entirely dark (rarely diffusely pale medially (*alcimus, kahli. sayi*); or
   b. yellow (brownish red in *ephippium*) or with large yellow macula.
10. Anepimeron:
   a. entirely black; or
   b. at least partially pale, yellow (brownish red in *ephippium*).

10.1 Anepimeron, anterior portion:
   a. cntirely black; or
   b. yellow (brownish red in *ephippium*) or with large yellow macula.

10.2 Anepimeron, posterior portion:
   a. entirely black (rarely diffusely pale medially (*sayi*); or
   b. yellow (brownish red in *ephippium*) or with large yellow macula.

10.3 Anepimeron, dorsomedial portion:
   a. entirely black; or
   b. yellow (brownish red in *ephippium*) or with large yellow macula.

11. Katepimeron:
   a. entirely dark;
   b. yellow (brownish red in *ephippium*) dorsally; or
   c. cntirely yellow.
12. Katatergum:
   a. entirely dark; or
   b. yellow (brownish red in *ephippium*) or with yellow macula.
13. Metasternum:
   a. entirely dark;
   b. partially yellow; or
   c. entirely yellow (brownish red in *ephippium*).
14. Metepimeron:
   a. entirely dark; or
   b. yellow at least dorsally.
15. Wing cell BM:
   a. hyaline; or
   b. dark.
16. Foreleg:
   a. entirely pale; or
   b. dark apically.
17. Hind femur:
   a. entirely yellow;
   b. anterior face entirely yellow (orange in *kahli*), elsewhere partially black;
   c. black at least 1/2 or more; or
   d. entirely dark.

Abdomen

18. 1st tergum:
   a. entirely black (brownish reddish in *ephippium*);
   b. yellow laterally; or
   c. entirely pale.
19. 2nd tergum:
   a. entirely dark;
   b. with two continuous yellow fasciae;
   c. with interrupted subbasal yellow fascia and continuous apical yellow fascia;
   d. with basolateral yellow fascia and broadly interrupted apical yellow fascia;
   e. yellow basolaterally or with yellow basolateral fascia, with no apical fascia; or

Table 2. Continued.

x. with a yellow basolateral triangular macula and narrow yellow apical fascia.

20. 3rd tergum:
    a. entirely dark;
    b. with two (subbasal and apical) continuous yellow fasciae;
    c. with interrupted subbasal yellow fascia and continuous apical yellow fascia;
    d. with only narrow medial discontinuous yellow fascia;
    e. with a narrow apical yellow fascia;
    f. yellow basolaterally, with narrow yellow apical fascia; or
    x. with a yellow medial triangular macula and narrow yellow apical fascia.

21. 4th tergum:
    a. entirely dark;
    b. with two (subbasal and apical) continuous yellow fasciae;
    c. with interrupted subbasal yellow fascia and continuous apical yellow fascia;
    d. entirely pale; or
    x. with a yellow medial and subapical triangular maculae.

22. 5th (♀) tergum:
    a. entirely dark;
    b. with two (subbasal and apical) continuous yellow fasciae;
    c. yellow except black basomedially (or basally in *obscura*); or
    d. entirely pale,

23. ♂ terminalia
    a. entirely black;
    b. partially yellow; or
    c. entirely yellow.

24. Abdominal margins from 2nd to 4th (♂) or 5th (♀) terga:
    a. entirely pale; or
    b. alternating dark and pale.

Table 3. Distribution of diagnostic character states among New World *Spilomyia* species.

Species	1	2	3	4	5	6	7	8	9	10	10.1	10.2	10.3	11	12	13	14	15	16	17	18	19	20	21	22	23	24
alcimus	b	b	a	a	a	a	a	b	a	a	a	a	a	a	b	a	b	a	b	b	a	b	b	a	b	c	a
citima	c	b	b	b	b	c	a	d	b	b	a	b	a	a	b	a	b	a	b	b	b	c	c	c	b	c	a
CR-3	c	b	b	b	b	c	a	d	b	b	a	b	b	b	b	c	b	a	b	b	b	b	b	b	d	c	a
crandalli	c	b	b	b	b	c	a	d	b	b	a	b	b	b	b	a	b	a	b	b	b	b	b	b	d	c	a
epitippium	c	b	c	b	b	b	b	b	b	b	b	b	b	c	c	a	b	b	d	a	e	e	a	a	a	b
foxleei	c	a	b	b	b	c	a	d	b	b	a	b	b	b	b	a	b	a	b	b	b	c	c	c	b	c	a
fusca	b	a	b	a	a	a	a	c	b	a	a	a	a	c	b	c	b	a	b	a	c	e	b	b	c	c	b
gratiosa	c	b	b	a	a	c	a	d	b	b	b	b	b	c	b	c	b	a	b	a	c	e	b	b	c	c	b
interrupta	c	b	b	b	b	c	a	d	b	b	a	b	a	a	b	a	b	a	b	b	b	c	c	c	b	c	a
kahli	a	a	a	b	b	bc	a	b	a	a	a	a	a	a	b	a	b	b	a	b	b	e	f	d	d	c	a
liturata	c	b	b	b	b	a	b	d	b	a	a	a	a	a	b	a	b	a	b	b	b	c	c	c	b	c	a
longicornis	c	b	b	a	b	c	a	d	b	b	a	b	b	b	b	a	b	a	b	b	b	b	b(c)	b(c)	d	c	a
obscura	a	c	a	b	b	a	a	a	b	a	a	a	a	a	a	a	b	a	b	b	a	d	b	b	c	a	b
pleuralis	c	b	b	b	b	c	a	d	b	b	b	b	b	b	b	c	b	a	b	b	b	x	x	x	a	a	b
sayi	c	c	b	b	b	a	a	c	a	a	a	a	a	a	a	a	a	a	b	c	a	e	d	c	a	a	b
texana	b	b	a	a	a	a	a	b	b	a	a	a	a	a	b	a	b	a	b	b	a	b	b	a	b	c	a
wirthi	d	b	c	a	a	c	a	d	b	b	a	b	b	b	b	b	b	a	b	c	a	c	c	c	?	a	b