Manual of Central American Diptera

Volume 2

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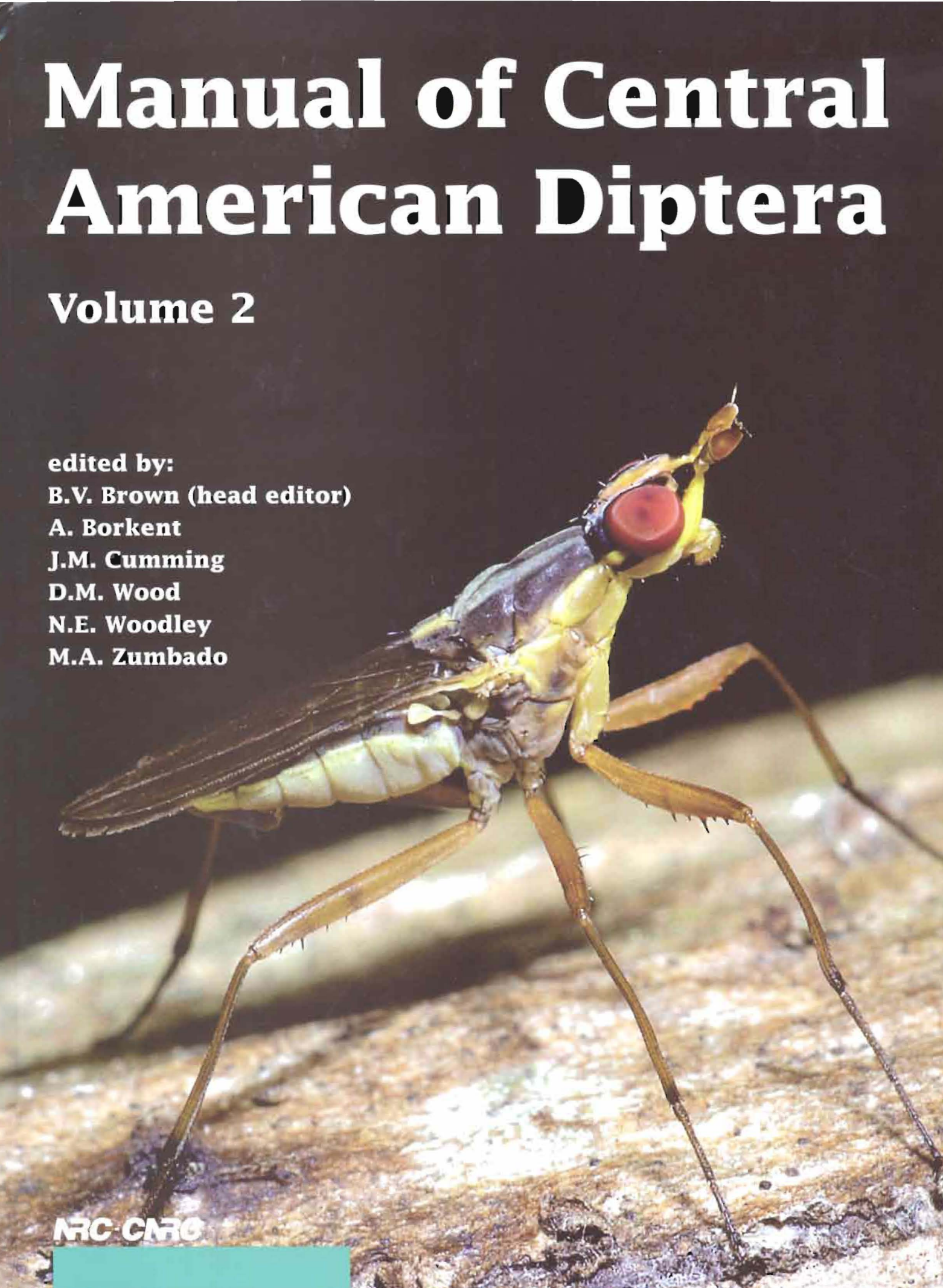

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PYRGOTIDAE (PYRGOTID FLIES) 69

Vicente Hernández-Ortiz

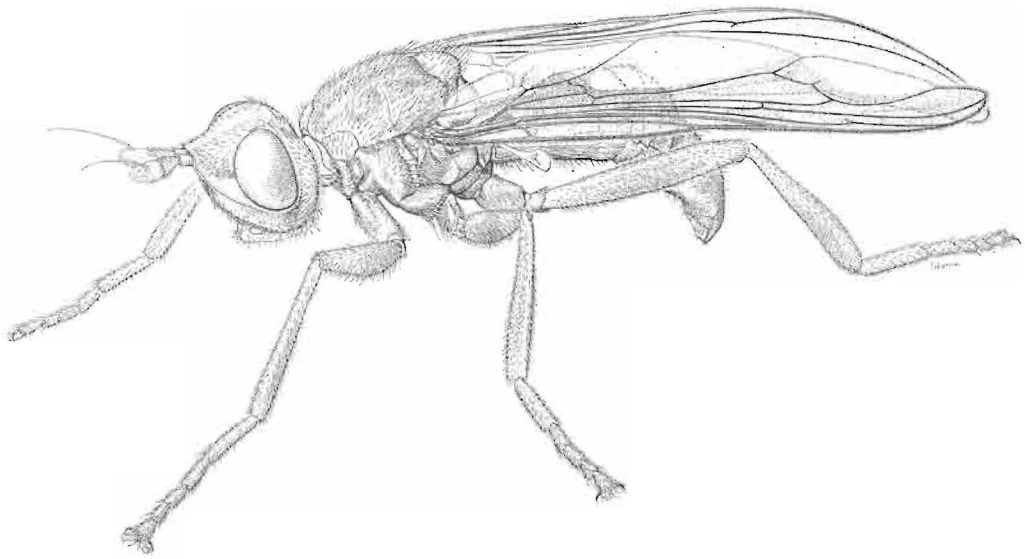


Fig. 69.1. Female of *Pyrgota undata* Wiedemann, (Nearctic, MND, fig. 65.1).

Diagnosis

Medium to large-sized flies (body length 5–30 mm), body usually robust with long legs, wing pattern often spotted, banded, or reticulated, rarely hyaline (Fig. 1). Head (Figs. 2–7) spherical with frons large, antennal bases projected anteriorly, pedicel elongate; arista setiform; ocelli usually lacking in American species (except in *Descoleia* Aczél); frons weakly depressed, frontal bristles and vibrissa absent, face broad, with deep antennal grooves; mouthparts of moderate size. Scutum mostly bare, setulose, or distinctly haired, sometimes black spotted, major bristles usually shorter than in Tephritidae; scutellum short and broad with one to four pairs of marginal bristles. Legs (Figs. 13–15) long in both sexes, frequently without strong bristles, but covered by short setulae; hind tibia tapering to base or with strong constriction in basal third or near midlength. Wing (Figs. 16–23) with or without subcostal break, C weakening after vein R_{4+5}; Sc complete to C or disappearing close to C; R_1 dorsally setulose; R_{2+3} sometimes with stump vein at apical third; cell cu*p* closed by CuA_2 usually forming acute angle in lower apical corner, sometimes short. Preabdomen elongate, robust, more or less petiolate; lateral membrane broad; syntergite 1+2 elongate, usually with several long hairs on lateral sides near base. Female terminalia (Figs. 8–12) with syntergosternite 7 robust and strong basally forming conical tube turned ventrally, sometimes longer than rest of abdominal length. Apical margin of syntergosternite 7 sometimes provided with ventral hooklike sclerite, or two apicolateral clawlike sclerites (according to Steyskal, 1972, probably derived from tergum and sternum 8); aculeus usually shorter than length of syntergosternite 7. Male terminalia similar to Tephritidae and Platystomatidae; epandrium globose, curved ventrally; lateral surstyli usually short and robust basally, medial surstyli without prensisetae developed; aedeagus coiled and elongated; glans more or less developed and partially sclerotized in some species.

Pyrgotidae are most similar to certain members of the family Conopidae by the similar shape of the body, and particularly the head shape, in addition to the absence of ocelli (subfamily Conopinae). However, the Pyrgotidae possess a normally developed, sponging proboscis, and veins R_{4+5} and M_{1+2} are not convergent, ending well separated at the wing margin. In contrast, Conopidae possess a long (usually geniculate) proboscis, and veins R_{4+5} and M_{1+2} are strongly convergent apically, and sometimes fused distally.

Biology

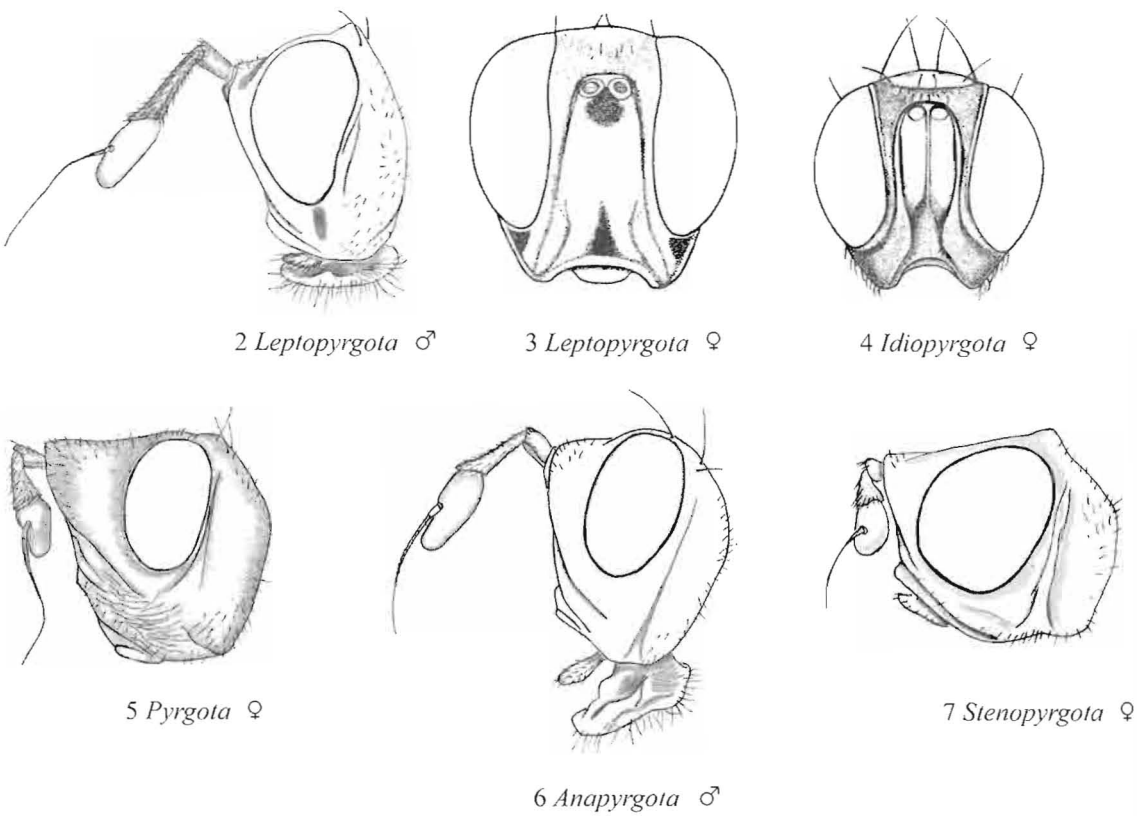
Little information is available on the biology of the Pyrgotidae, although it is well known that larvae are endoparasitic on adult scarabaeid beetles (Coleoptera: Scarabaeidae). The highly specialized morphology of the female terminalia suggests that all pyrgotid species are parasites.

Forbes (1908) described the oviposition behavior of *Pyrgota undata* Wiedemann females. He observed the flies waiting on the body of *Phyllophaga* adults until the beetles opened their elytra before flying. The female deposited an egg (or larva?) into the abdomen of the host while both were in flight. The life cycle of *P. undata* was described by Davis (1919), who found that female beetles are more frequently used as hosts. Parasitized beetles live 10–14 days, with only one larva developing in each host. The fly pupates within the host body, and developmental time from oviposition to pupation is about three weeks.

Although both males and females are attracted to light, adult Pyrgotidae are uncommon in collections, because of their crepuscular or nocturnal habits that are similar to those of most of their hosts. Some other species, such as the Australian beetle *Anoplognathus olivieri* (Dalman) and its pyrgotid parasite *Maenomenus ensifer* Bezzi (with ocelli developed), have diurnal habits (Aczél, 1956a). Probably nocturnal or diurnal activity explains the presence or absence of ocelli throughout the family.

For Central and South America, there is no biological information on this family. Most life history data are for some North American species, such as *Pyrgota undata*.

Some work has be done on the value of pyrgotids as control agents of pest scarabaeids in the New World. *Pyrgota undata* was introduced in Puerto Rico as a potential control of some injurious *Phyllophaga* species (Wolcott, 1923); *Peltodasia flaviseta* (Aldrich), a pyrgotid native to the Oriental Region, was introduced into the USA for the control of the Japanese beetle, *Popillia japonica* (Gardner & Parker, 1942). In both cases results were not satisfactory. More recently, Crocker et al. (1996) conducted an evaluation of the flight period and egg production of *P. undata*, with respect to seasonal occurrence of pest *Phyllophaga* species in Texas.

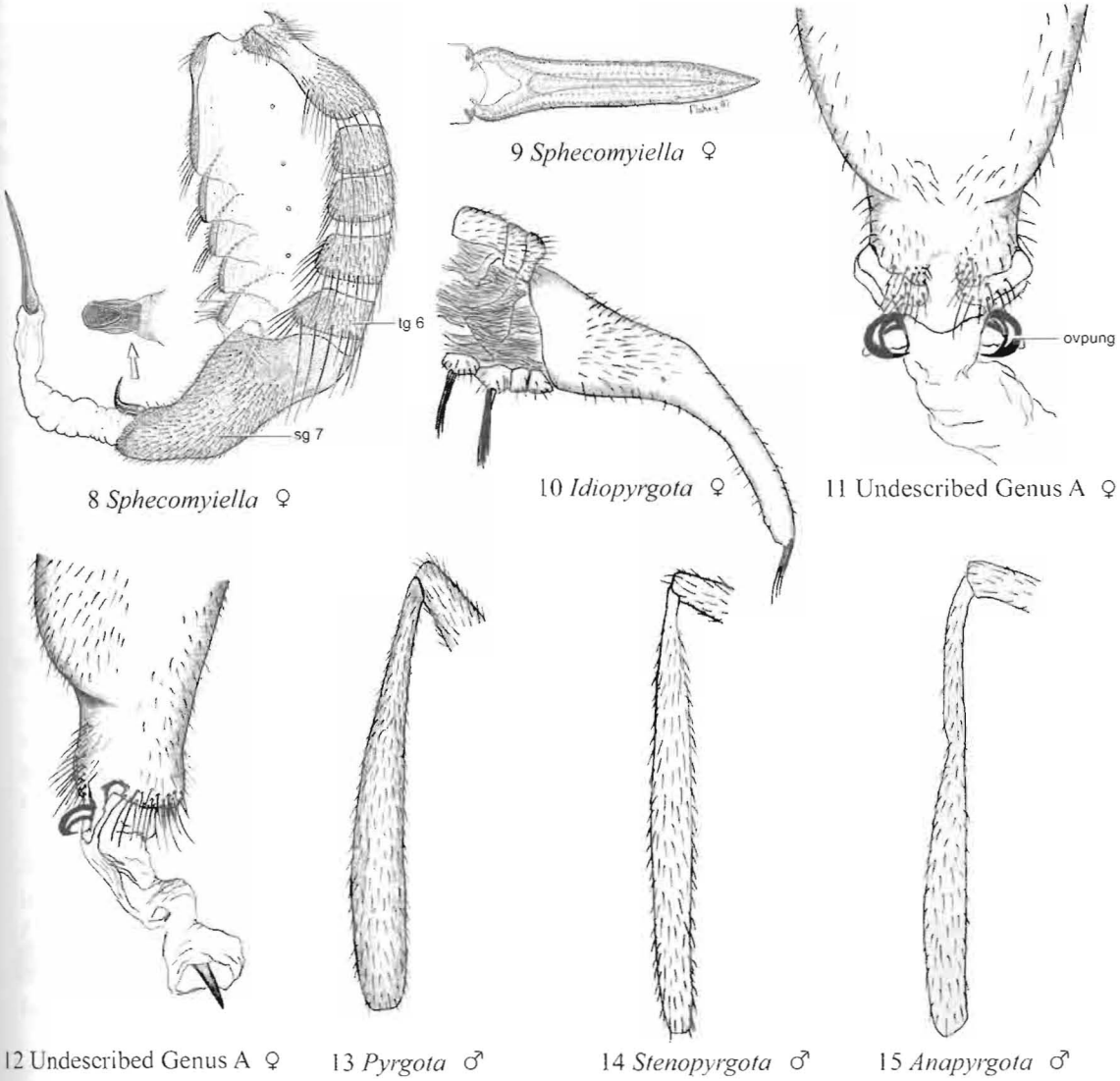


Figs. 69.2–7. Heads: lateral view of (2) *Leptopyrgota undulata* Becker; anterior view (antennae omitted) of (3) *L. albitarsis* Aczél, (South America, Aczél, 1956b, fig. 29); and (4) *Idiopyrgota setiventris* Aczél, (South America, Aczél, 1956c, fig. 78); lateral view of (5) *Pyrgota lugens* Wulp; (6) *Anapyrgota* sp.; and (7) *Stenopyrgota* sp. Figures 2 and 5–7 illustrated by V. Hernández-Ortiz.

Classification

Formerly this family was classified in three subfamilies: Lochmostyliinae, Pyrgotinae, and Toxurinae (Aczél, 1956a; 1958; McAlpine, 1978; Steyskal, 1987), all of them represented in the New World. In a recent treatment, however, McAlpine (1989) proposed a different subfamily arrangement. The Ctenostylinae (=Lochmostyliinae) was removed from the Pyrgotidae as the family Ctenostylidae, suggesting that further studies could support its exclusion from the Tephritoidea. This was based on the well-developed sternum and tergum 6 in males, synsternite 7 + 8 absent, phallus extremely short, female sternum 1 largely desclerotized, aculeus short and blunt, and two rudimentary cerci bearing setae.

I distinguish two subfamilies in Pyrgotidae: Teretrurinae (formerly Teretrurini), characterized by sternites 1 and 2 fully developed and free, and Pyrgotinae (including Toxurini) with sternites 1 and 2 fused into one synsternite. The subfamily Teretrurinae has an exclusively southern Neotropical distribution with the genera *Pyrgotosoma* Malloch and *Teretrura* Bigot recorded from Argentina and Chile.



8 *Sphecomyiella* ♀ 9 *Sphecomyiella* ♀ 10 *Idiopyrgota* ♀ 11 Undescribed Genus A ♀

12 Undescribed Genus A ♀ 13 *Pyrgota* ♂ 14 *Stenopyrgota* ♂ 15 *Anapyrgota* ♂

Figs. 69.8–15. Female abdomen, terminalia, and legs: lateral view of abdomen, ovipositor extended, with offset of hooked apex of sternite 7 in ventral view (8), and dorsal view of aculeus, or sclerotized apical portion of ovipositor (9) of *Sphecomyiella valida* (Harris), (MND, figs. 65.8–9); lateral view of apex of abdomen and syntergosternite 7 of (10) *Idiopyrgota* sp.; ventral (11) and lateral (12) view of apex of syntergosternite 7 of Undescribed Genus A; posterior view of left hind tibia of (13) *Pyrgota lugens* Wulp; (14) *Stenopyrgota* sp.; and (15) *Anapyrgota* sp. Figures 10–15 illustrated by V. Hernández-Ortiz.

Abbreviations: ovpung, ovipositunguis; sg, segment; tg, tergite.

The subfamily Pyrgotinae includes two tribes: Toxurini with a mainly Australian distribution, but also represented in the Americas by the genus *Descoleia*, with one species, *D. teretrura* Aczél from Argentina; and Pyrgotini, which is well represented in the Neotropical Region. In my study of the fauna of Central America, I found the genera *Anapyrgota*, *Boreothrinax*, *Idiopyrgota*, *Leptopyrgota*, *Neopyrgota*, *Pyrgota*, *Sphecomyiella*, and *Stenopyrgota* to be present, in addition to three undescribed genera.

Recently, Bernardi (1990) proposed the synonymy of *Anapyrgota* with *Carrerapyrgota* Aczél mainly based on the absence of the subscutellum. However, his proposal does not discuss characters supporting the segregation of *Carrerapyrgota* by Aczél (1956), which are missing in *Anapyrgota*. Such characters include the costal vein ending almost at the level of vein R_{4+5} and the last section of vein M being barely evident after vein dm-cu, disappearing before the wing margin. In addition, the discal cell is shorter and its lower apical corner ends distant from the wing margin, and there are other outstanding differences in wing pattern. Therefore, in the present study this synonymy is not accepted.

Differences between *Stirothrinax* Enderlein and *Sphecomyiella* could not be established based on currently known species, as well as additional studied specimens that represent undescribed species. For this reason, *Stirothrinax* will eventually be considered a synonym of *Sphecomyiella*, as also noted by Kondratieff & Fitzgerald (1993). Much work is necessary to gain a better understanding of the relationships among pyrgotid genera.

Identification

The most comprehensive works for the recognition of Neotropical taxa were published by Aczél (1956a, 1956b, 1956c). He described, illustrated, and keyed most of the species, except those in the genera *Sphecomyiella* and *Boreothrinax*, which are treated by Steyskal (1978, 1987).

Some genera cannot be presently recognized in the male sex (see couplet 7). Further study of male terminalia is necessary to remedy this situation.

Key to the genera of Pyrgotidae of Central America

1. Face without median keel, or antennal grooves completely joined (Fig. 3); if present, median keel weak or poorly differentiated; alula indistinct to well developed 2
– Face with antennal grooves separated by strongly developed median keel (Fig. 4); alula well developed 6

2. Alula well developed (Figs. 16, 18–21); several pairs of scutellar bristles usually present 3
– Alula greatly reduced or absent (Figs. 17, 22); scutellar bristles usually absent, or sometimes with only short pair of slender apical bristles present 5

3. Subscutellum indistinct or absent; wings with brownish bands well differentiated by hyaline areas; legs normally developed; female ovipositor sheath with neither apicolateral ovipositungues nor apicoventral unguis; stump vein in R_{2+3} present (Fig. 21) ..... *Anapyrgota* Steyskal
– Subscutellum well developed; wings mostly hyaline, with diffuse pattern, or hyaline spotted; legs various; female ovipositor sheath with two apicolateral ungues or one apicoventral unguis; stump vein in R_{2+3} usually absent 4

4. Wing broadly hyaline or with slightly infuscate pattern (Fig. 18); legs elongated and slender with hind tibia constricted near basal half; female ovipositor sheath with two claw-shaped apicolateral ungues (Figs. 11–12) ..... Undescribed Genus A
– Wing brownish, hyaline spotted; legs normally developed with hind tibia tapering gradually to base; female usually with hook-shaped apicoventral unguis (as in Fig. 8) ... *Neopyrgota* Hendel

5. Vein R_{2+3} straight throughout length, becoming parallel with respect to R_{4+5}; alula completely absent; wing pattern irrorate, with small hyaline spots throughout surface (Fig. 22); pedicel usually shorter than flagellum; head strongly depressed anteriorly, triangular shaped in lateral view (Fig. 7) ..... *Stenopyrgota* Malloch
– Vein R_{2+3} strongly sinuate on apical one-third, becoming convergent with R_{4+5}; alula greatly reduced; wing mostly hyaline usually with large anteroapical dark spot (Fig. 17); pedicel elongate, usually longer than flagellum; head not as above (Fig. 2) ..... *Leptopyrgota* Hendel

6. Hind tibia tapering to base (as in Fig. 13). 7

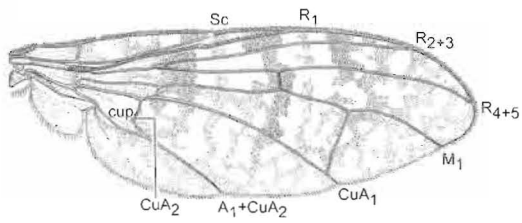
– Hind tibia strongly constricted near basal one-third (as in Fig. 15). 10

7. Abdominal sternites 3 and 4 in females each with comb-shaped row of strong long bristles; syntergosternite 7 lacking apicoventral unguis (Fig. 10); ocellar and postocellar bristles usually well differentiated (Fig. 4). . . . . *Idiopyrgota* Aczél

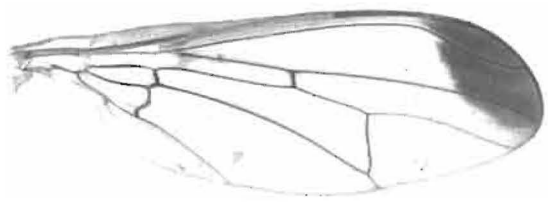
– Abdominal sternites in females without any distinct strong bristles; other characters various . . 8

8. Syntergosternite 7 without apicoventral hook-shaped unguis; body dark brown to black; wing pattern brown with extensive irregular hyaline spots . . . . . Undescribed Genus B

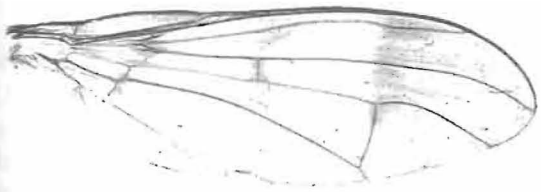
– Syntergosternite 7 with strong apicoventral hook-shaped unguis (as in Fig. 8); body yellow, reddish or brownish, rarely black; wing pattern uniformly darkened, or pale brown and hyaline spotted on most of surface 9



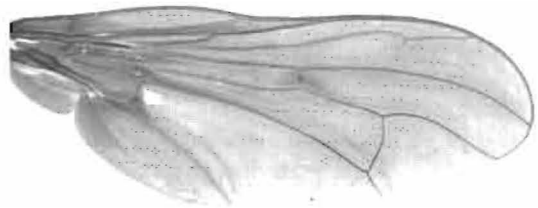
16 *Sphecomyiella* ♀



17 *Leptopyrgota* ♂



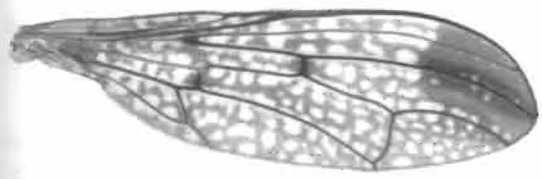
18 Undescribed Genus A ♀



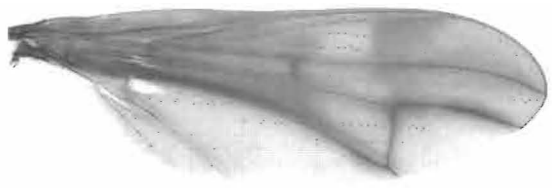
19 *Pyrgota* ♀

20 *Idiopyrgota* ♂

21 *Anapyrgota* ♂



22 *Stenopyrgota* ♀



23 Undescribed Genus C ♂

Figs. 69.16–23. Wings: dorsal view of (16) *Sphecomyiella valida* (Harris), (MND, fig. 65.2); (17) *Leptopyrgota undulata* Becker; (18) Undescribed Genus A; (19) *Pyrgota lugens* Wulp; (20) *Idiopyrgota* sp.; (21) *Anapyrgota* sp.; (22) *Stenopyrgota* sp.; and (23) Undescribed Genus C. Figures 17–23 illustrated by V. Hernández-Ortiz.

9. Robust flies; wing pattern with extensive large brownish dark areas, not mottled; vein R_{2+3} usually with stump vein in apical one-third (Fig. 19); parafacial and genal groove broad and usually wrinkled (Fig. 5) ..... *Pyrgota* Wiedemann

– Slender flies; wing pattern pale brown and hyaline spotted throughout surface; vein R_{2+3} without stump veins (Fig. 16); parafacial and genal groove short and smooth (including *Stirothrinax* Enderlein) ..... *Sphecomyiella* Hendel

10. Female ovipositor sheath without apicoventral unguis; wing pattern with numerous hyaline spots; legs of normal length ..... *Boreothrinax* Steyskal

– Female ovipositor sheath with apicoventral hook-shaped unguis well developed; wing pattern mostly pale brown (Fig. 23); legs long and slender ..... Undescribed Genus C

Synopsis of the fauna

The pyrgotid fauna south of the United States includes around 59 known species (Aczél 1956a, 1956b, 1956c; Steyskal 1967, 1978; Kondratieff & Fitzgerald 1993; Bernardi 1991), but only 11 species have been recorded for Central America. The present study revealed that approximately 22 other undescribed species and three undescribed genera are present in the region.

Most of the genera occurring in the Americas were found in Central America. Only the North American genus *Pyrgotella* Curran, and the tropical genera *Lopadops* Enderlein (Argentina), *Tropidothrinax* Enderlein (Bolivia), and *Carrerapyrgota* Aczél (Brazil, Paraguay, and Argentina) were not recorded. Most Central American genera were found in Mexico (10) and Costa Rica (8). Despite the great number of undescribed species so far uncovered in the family, I expect that further collecting will show that the pyrgotids are even more diverse in the region.

***Anapyrgota* Steyskal.** Only one species, *A. persona* (Lutz & Lima), from Brazil has been recognized in this genus. Several specimens examined in this study represent a second undescribed species from Panama.

***Boreothrinax* Steyskal.** Three species have been recorded from the USA, of which *B. dichaetus* Steyskal is also present in Mexico (Durango). In addition, two undescribed Mexican species were examined from Querétaro, Guerrero, and Oaxaca.

***Idiopyrgota* Aczél.** This is a monotypic genus represented by *I. setiventris* Aczél from Brazil, but at least three other species occur in Mexico, Guatemala, Costa Rica, Panama, the Bahamas, and Ecuador.

***Leptopyrgota* Hendel.** In the catalog of the Pyrgotidae south of the USA, Steyskal (1967) recognized 12 species, and more recently Bernardi (1991) described 21 Brazilian species, most of them on the basis of only one specimen. In Central America, two species were previously recorded from Costa Rica, *L. amplipennis* Hendel and *L. undulata* Becker, but the present study added three undescribed species from Costa Rica and Mexico.

***Neopyrgota* Hendel.** Two species of this genus are known to occur in Costa Rica, *N. major* Hennig and *N. picea* Hennig. An additional undescribed species from that country was also encountered.

***Pyrgota* Wiedemann.** Five species are known in this genus, including two found in Central America. *Pyrgota lugens* Wulp was originally described from Guatemala, but there is additional material from southern Mexico, and *P. longipes* Hendel is known from Guatemala and Brazil.

***Sphecomyiella* Hendel.** This genus includes two known species that occur in the USA, *S. valida* Harris and *S. nelsoni* Kondratieff & Fitzgerald. The specimens examined in this study revealed the presence of *S. valida* in central Mexico. Within *Sphecomyiella*, the following species of *Stirothrinax* Enderlein should also be included: *S. cribratus* Enderlein, recorded from Mexico and Nicaragua, and *S. knudseni* Mayer from Costa Rica. Additional specimens examined suggest the presence of three undescribed species: one from Mexico and two others from Costa Rica.

***Stenopyrgota* Malloch.** The genus currently comprises two species, *S. mexicana* Malloch from Mexico and *S. crassitibia* Aczél known from Argentina. Studied specimens indicate that three other unnamed species occur in Costa Rica and Mexico.

Undescribed Genus A. This genus comprises at least two new species, one represented by specimens from Mexico and Guatemala, and the other from Costa Rica.

Undescribed Genus B. This genus is represented by three undescribed species all occurring in Costa Rica, but two of which are also present in Mexico.

Undescribed Genus C. One undescribed species is included in this genus, represented by a large series of specimens from Mexico, Costa Rica, and Panama.

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