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TAXONOMIC NOTES ON SOME NEOTROPICAL SKIPPERS (LEPIDOPTERA: HESPERIIDAE): *PYRGUS*, *HELIOPYRGUS*, AND *HELIOPETES* (PYRGINAE)

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ABSTRACT

The status of some Neotropical Pyrginae (Lepidoptera: Hesperiidae) is examined in relation to the taxonomy of Evans (1953). The identity of *Heliopyrgus* Herrera, 1957 as a genus distinct from *Heliopetes* Billberg, [1820] and *Pyrgus* Hübner, [1819] is confirmed. In addition, some taxa for which there has been a status change since Evans (1953) without documentation are discussed and evaluated. Revised statuses are proposed for *Pyrgus orcynoides* (Giacomelli, 1928); *Pyrgus brenda* Evans, 1942, and *Heliopetes nivella* (Mabille, 1883); new status is proposed for *Heliopetes marginata* Hayward, 1940; and a new combination is proposed for *Heliopyrgus sublinea* (Schaus, 1902). Genitalia of these and other related taxa are illustrated.

RESUMEN

Se examina el status taxonómico de algunos taxones de Pyrginae (Lepidoptera: Hesperiidae) en relación a la taxonomía de Evans (1953). Se confirma que *Heliopyrgus* Herrera, 1957 es un género independiente de *Heliopetes* Billberg, [1820] y *Pyrgus* Hübner, [1819]. También, se discute y evalúa la situación taxonómica de algunos taxones que han mostrado cambios nomenclaturales sin comentario alguno desde Evans (1953). Se proponen status revisados para *Pyrgus orcynoides* (Giacomelli, 1928); *Pyrgus brenda* Evans, 1942, y *Heliopetes nivella* (Mabille, 1883). Se proponen nuevos status para *Heliopetes marginata* Hayward, 1940; finalmente, se propone una combinación nueva para *Heliopyrgus sublinea* (Schaus, 1902). Se ilustran los genitales de estos taxones y otros afines.

Evans (1951, 1952, 1953, 1955) published a multi-volume treatise on the New World Hesperiidae. These volumes, despite their various problems (*e.g.*, Burns 1990, 1992, 1994a, 1994b, 1996), remain as the foundation for all subsequent investigations into the taxonomy of this family, especially those on the myriad Neotropical species. Several authors have noted that Evans' overall taxonomy was conservative as numerous of his subspecies and synonyms have proven to be species-

level taxa (*e.g.*, Burns and Kendall 1969; Steinhauser 1986, 1989; Mielke 1995; Austin and Steinhauser 1996; Burns 1996; Austin 1998; Warren in prep.). Many of these situations are obvious and a number of such taxa have been raised to species-level status in checklists, catalogues, and elsewhere over the years. Generally, these actions have been correct, but are often without proper documentation, justification, or even comment (*e.g.*, Miller and Brown 1981; Bridges 1988, 1993; Warren 2000) and many have been widely taken at face value in regional works.

During the course of our studies on Neotropical hesperiids, numerous instances were encountered where recent taxonomy differs from that presented by Evans (1951, 1952, 1953, 1955). The following includes observations on some taxa of Evans' (1953) "*Pyrgus*" group (Pyrginae) in the genera *Pyrgus* Hübner [1819], *Heliopyrgus* Herrera, 1957, and *Heliopetes* Billberg [1820]. The status of a taxon is considered to be previously changed if at least some statement was presented to that effect. Those for which there has been no documentation for their status change subsequent to Evans (1953, 1955) are here discussed and justified. Revised status refers to returning a taxon to the taxonomic level at which it was described and new status refers to a change in the taxonomic level from that at which a taxon was described. Complete synonymies are not presented; these are available in such works as Evans (1953), Miller and Brown (1981), Bridges (1988, 1993), and Warren (2000).

Pyrgus adepta Plötz, 1884
Pyrgus albescens Plötz, 1884
Pyrgus orcynoides (Giacomelli, 1928), **revised status**
(Figs. 1-7)

Evans (1953) considered there to be six subspecific taxa within *Pyrgus communis* (Grote, 1872). There has been no consensus on the relationship of *P. communis* and *P. albescens* until Burns (2000) convincingly showed these to be separate species (see also Tilden 1965; Austin 1986). The genitalia of males are readily distinguishable (Burns 2000, also Figs. 1,4 herein) and those of females tend to be different (Figs. 5, 6). The lamella of the female genitalia is often deeply indented on *P. communis* and much less so on *P. albescens*. Large series of females of both species from throughout their ranges need to be carefully examined to determine the reliability of this difference.

Pyrgus adepta also has been variously treated as a subspecies of *P. communis* (*e.g.*, Steinhauser 1975; de la Maza and de la Maza 1985, 1993; Bridges 1988, 1993; de la Maza and White 1990; de la Maza *et al.* 1991; de la Maza and Gutiérrez 1992; Austin *et al.* 1996) or as a full species (Monroe and Miller 1967, Llorente-Bousquets *et al.* 1990, Austin *et al.* 1998, Warren *et al.* 1998, Burns 2000; Warren 2000). Possible intergradation with *P. albescens* was noted in Jalisco (Vargas *et al.* 1996), in a small sample of dissected males. The male genitalia of *P. adepta* are most similar to those of *P. albescens*, but are less robust (Fig. 2). The valva, particularly, is different with no or just a slight indication of a dorsal tooth on the harpe and a proportionally much shorter anterior process from the inside of the harpe. The female genitalia, again, are similar to those of *P. albescens*, but tend to lack the central indentation on the posterior edge of the lamella postvaginalis (Fig. 7). *Pyrgus adepta* does not have a costal fold. Because of the distinctness in the genitalia of *P. adepta*,

its lack of a costal fold, and its actual or potential sympatry with *P. albescens* and possibly *P. communis* (Evans 1953), a revised species-level status is accorded to the taxon as informally indicated by Warren (2000). A detailed study of the genitalic morphology *of P. albescens* and *P. adepta* where they occur together in parts of México would be useful to further elucidate their taxonomic status and delimit the range of variation typical of both species.

Pyrgus orcynoides is a small species similar to *P. adepta* and likewise does not have a costal fold. It was treated as a subspecies of *P. communis* by Evans (1953) and retained there by Herrera *et al.* (1957). The male genitalia are similar to those of *P. adepta* but are less massive, having a proportionally narrower tegumen (dorsal view) and a much narrower valva (Fig. 3). The anterior process from the harpe is vaguely shagreened (prominently so on *P. adepta*) and the aedeagus is proportionally longer than it is on *P. adepta*. Although the presently known distribution of *P. orcynoides* does not overlap that of *P. adepta* (Evans 1953), there is that potential in northern South America once distributions in the area become better known. We here reestablish this taxon as a species, but note that because of the genitalic variation seen among *P. communis* and *P. albescens*, large series should be carefully examined in the future. Herrera *et al.* (1957) noted that the genitalia of *Pyrgus communis chloe* Evans, 1942, differed from those of both *P. c. communis* and *P. c. orcynoides*, yet retained it as a subspecies of the former. While it is likely that *P. chloe* represents a species-level taxon, its relationship to *P. orcynoides* and *Hesperia titicaca* Reverdin, 1921, treated by Evans (1953) as a subspecies of *P. communis*, remains to be clarified; we have not examined specimens of these two taxa in our study.

Pyrgus orcus (Stoll, 1780)
Pyrgus brenda Evans, 1942, **revised status**
(Figs. 8-15)

Four subspecies were recognized within *Pyrgus oileus* (Linnaeus, 1767) by Evans (1953). These are generally similar in their color and markings, but differ in the structure of their genitalia. Although there is a general geographic replacement of taxa, there is considerable actual or potential sympatry. One of these, *Pyrgus philetas* W. H. Edwards, 1881, with distinctive genitalia (Figs. 10, 15) and areas of sympatry with *P. oileus* in México and Texas, has already been raised to species level status (MacNeill 1962; see also Burns and Kendall 1969; MacNeill 1975).

Pyrgus oileus and *P. orcus* were recognized as different (*e.g.*, Williams and Bell 1930), but *P. orcus* was treated as a subspecies of *P. oileus* by Evans (1953) and subsequently (*e.g.*, Herrera *et al.* 1957; Brown and Mielke 1967, 1968; Bridges 1988, 1993; Llorente-Bousquets *et al.* 1990; Emmel and Austin 1990; Lamas 1994; Robbins *et al.* 1996, Austin *et al.* 1998), except for Brown and Heineman (1972) and Warren (2000). De Jong (1983) commented that real sympatry of *P. orcus* and *P. oileus* had not been established and treated the former as a subspecies of the latter. These, although very similar in their wing phenotype, apparently may be universally determined by the pattern along the costa of the ventral hindwing (Williams and Bell 1930, Evans 1953). Their genitalia differ (genitalia of *P. oileus* illustrated by Godman and Salvin 1879-1901, Williams and Bell 1930, Lindsey *et al.* 1931, Hayward 1933 as *Erynnis syrichtus*, Evans 1953, Burns and Kendall

1969; Figs. 8, 12 herein; genitalia of *P. orcus* illustrated by Williams and Bell 1930, Hayward 1948, Evans 1953, Herrera *et al.* 1957; Figs. 9, 13 herein) and there is apparent broad sympatry from southern México to Costa Rica (Williams and Bell 1930, Evans 1953, Warren 2000). In Costa Rica, *P. oileus* is widespread, being recorded at more than 50 locations, and common, especially on the west slope, from sea level to well into the mountains (Austin and Warren, unpubl. data). *Pyrgus orcus* is less widespread (20 locations) and common and has been recorded about equally on both slopes at sites mostly at low elevations. The two species have been taken together at six sites in Costa Rica. *Pyrgus orcus* is here formally raised to species-level status following Warren (2000).

Pyrgus brenda was originally described as a species before being sunk as a subspecific taxon by Evans (1953). The genitalia are distinct (Williams and Bell 1930, Evans 1953, Figs. 11, 14 herein) and there is the potential for sympatry with *P. orcus* in Peru and Ecuador (Evans 1953, this study). We thus return this taxon to the status of a full species.

Heliopyrgus domicella (Erichson, 1848)
(Figs. 18, 25)

Evans (1953) stated that *Heliopetes* was "structurally inseparable from *Pyrgus*" and noted that *Syrichtus americanus* Blanchard, 1852, and *Syrichtus domicella* Erichson, 1848, were "connecting links with very similar genitalia" between *Pyrgus* and *Heliopetes*. Herrera (*in* Herrera *et al.* 1957) erected a new genus, *Heliopyrgus*, for the southern South American species *Syrichtus americanus*, which had been included as a species of *Pyrgus* by Evans (1953); he also included *Syrichtus domicella* and *Heliopetes purgia* Schaus, 1902 (see also Mielke 1971 for comments on *H. purgia*). Despite this, these three species have subsequently been retained in *Pyrgus* and *Heliopetes*, and Miller and Brown (1981) synonymized *Heliopyrgus* with *Pyrgus*. We here further emphasize the similarity of the genitalia of *H. domicella* and *H. americanus* (Figs. 16, 18, 23, 25) and reaffirm their placement in a genus separate from *Pyrgus* and *Heliopetes*. We have not examined either *Pyrgus willi* Plötz, 1884, or *Pyrgus domicella margarita* Bell, 1937, both included as subspecies of *H. domicella* by Evans (1953). The male genitalia of the former, illustrated by Hayward (1948), certainly indicates that this is also a *Heliopyrgus*, but its taxonomic level in relation to *H. domicella* remains to be investigated. It is quite possible that *H. d. willi* is a distinct species, since its valvae reportedly differ from those of *H. domicella* (*fide* C. D. MacNeill). Similarly, the status of *Pyrgus bellatrix* Plötz, 1884, generally treated as a subspecies of *H. americanus* has not been investigated. Its male genitalia seem quite similar to those of *H. americanus* (Hayward 1948, Herrera *et al.* 1957), although Evans (1953) described and illustrated differences in the male valvae between the two taxa.

Heliopyrgus sublinea (Schaus, 1902), **new combination**
(Figs. 17, 24)

Evans (1953) questioned his placement of *Heliopetes sublinea* as a synonym of *Heliopetes macaira macaira* (Mabille, 1883) and later (Evans 1955) retreated from this on the suggestion of E. L. Bell and considered it a species allied to *H. domicella* (see also dos Passos 1960). Freeman (1967) reiterated the distinctness of *H. sublinea*. The genitalia of both sexes are illustrated here for the first

time (Figs. 17, 24). These indicate that Bell (*in* Evans 1955) was correct in his assessment of this species since it indeed is a *Heliopyrgus*.

The recognition of *Heliopyrgus* and the addition of a fourth species to the genus serves to make species of *Heliopetes* a more compact (and probably monophyletic) group in both their genital morphology and their wing patterns. *Heliopyrgus* species are readily recognized by the "hairy muff" which encompasses a large portion of the uncus of the male genitalia (Figs. 16-18, see also figures in Lindsey *et al.* 1931; Hayward 1933, 1948; Evans 1944, 1953; Herrera *et al.* 1957). In addition, *Heliopyrgus* has a broad uncus in lateral view (narrow and sharply pointed caudad on *Heliopetes*); the ampulla of the valva is broad, nearly rectangular, exceeds or nearly so the caudal end of the harpe, and is heavily haired on its inner surface. *Heliopyrgus* also have prominent dorsal and lateral flange-like projections of the caudal portions of the tegumen. The genitalia of females (Figs. 23-25) also differ in having a broader sterigma with a pair of detached caudal lobes and longer and more robust signa.

Heliopetes marginata Hayward, 1940, **new status**
(Figs. 20, 26)

Hayward (1940) named this northwestern South American taxon as a form of *Heliopetes arsalte* (Linnaeus, 1758) and it was retained as a subspecies of that by Evans (1953). The broadly dark-margined wings of *H. marginata* are distinctive and the genitalia of males (Figs. 19, 20) and females (Figs. 26, 27) differ from those of *H. arsalte*. Males of *H. marginata* have a shorter uncas, less massive tegumen, and narrower valvae with a rounded ampulla as compared to *H. arsalte*. Females of *H. marginata* tend to have a narrower lamella than *H. arsalte*. *Heliopetes marginata* is here raised to a species-level status.

Heliopetes nivella (Mabille, 1883), **revised status**
(Fig. 22)

Evans (1953) treated *Leucochitonea nivella* as a subspecies of *Heliopetes macaira* (Reakirt, [1867]) all the while describing and illustrating differences in the valva of the male genitalia. The harpe is especially different with that of the former terminating in a single long projection and that of the latter terminating with several shorter tooth-like projections (Figs. 21, 22). Other differences exist including *H. nivella* having a shorter uncus than does *H. macaira*, a more triangular (ventral view) and longer saccus, and a narrower tegumen (dorsal view). For these reasons, *H. nivella* is again considered a full species. We have not examined *Leucochitonea orbigera* Mabille, 1888, included as a subspecies of *H. macaira* by Evans (1953); however the differences in the male valvae between *H. m. macaira*, *H. m. nivella*, and *H. m. orbigera* as illustrated and discussed by Evans (1953) suggest that *H. orbigera* may also represent a species-level taxon.

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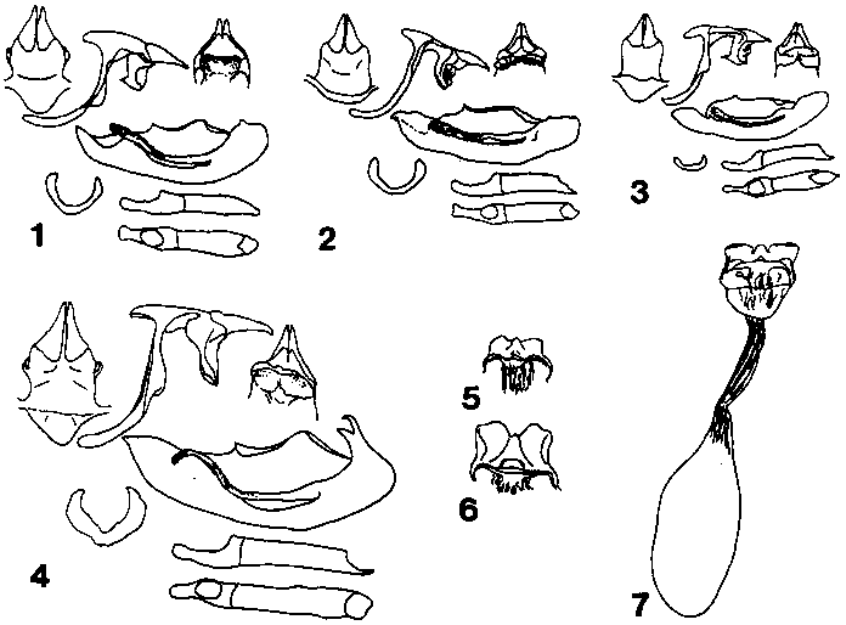
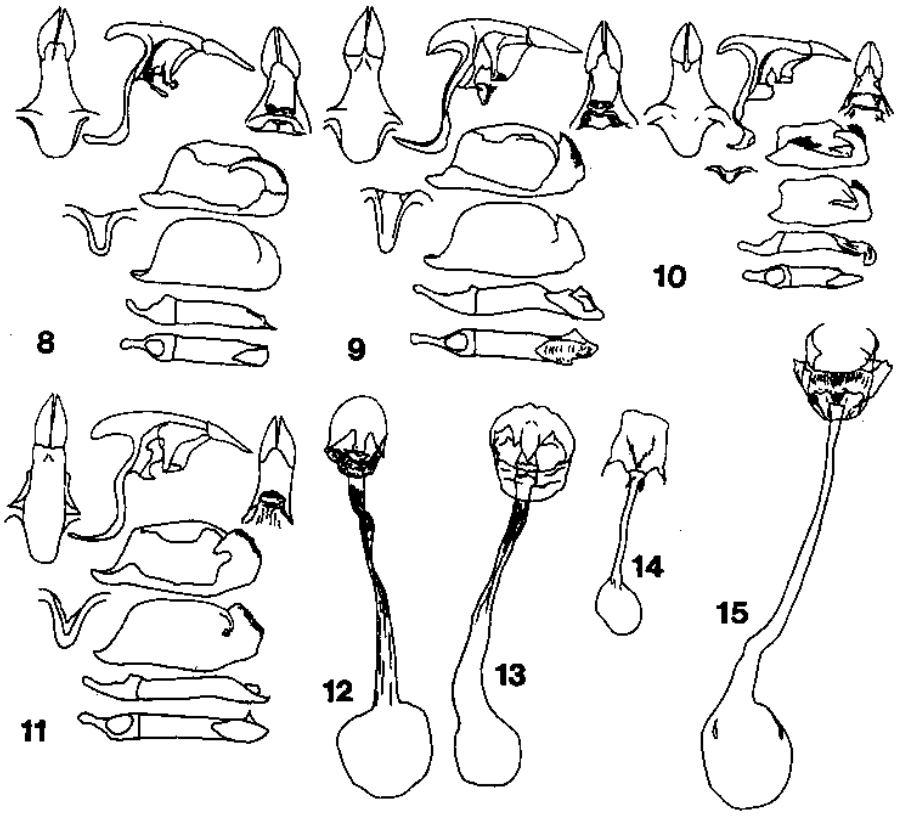
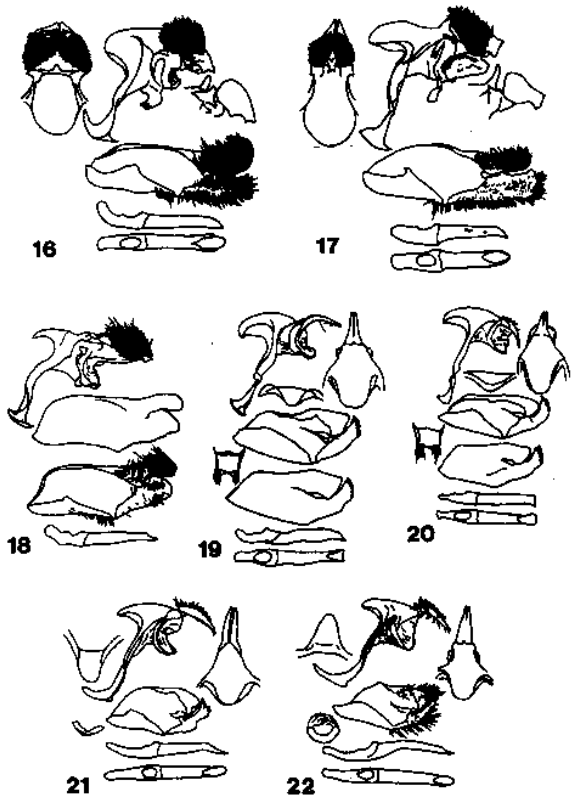


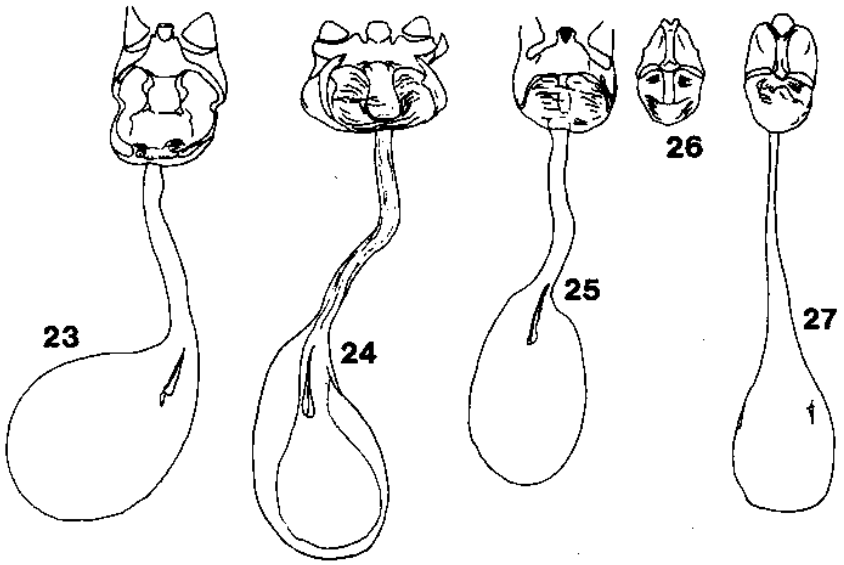
Figures 1-7. Male and female genitalia of *Pyrgus*. 1. *Pyrgus albescens* male - NV: Clark Co.; HiddenValley, 9 Oct. 1977 (GTA #7025); 2. *Pyrgus adepta* male - COSTA RICA: San José Prov.; Desamparados, 18 Apr. 1986 (GTA #9983); 3. *Pyrgus orcynoides* male - BRAZIL: Rondônia; 62 km S of Ariquemes, linha C-20, 7 km E of B-65, Fazenda Rancho Grande, 12 Nov. 1995 (GTA #6248); 4. *Pyrgus communis* male - NV: Elko Co.; Owyhee River Valley, Wildhorse Crossing Campground, 3 July 1980 (GTA #7027); 5. *Pyrgus albescens* female - NV: Clark Co.; Newberry Mts., Nv. 160, 6.0 mi. E of US 95, 29 Sept. 1984 (GTA #7032); 6. *Pyrgus communis* female - NV: Elko Co.; Charleston, 26 June 1987 (GTA #7034); 7. *Pyrgus adepta* female - COSTA RICA: Guanacaste Prov.; La Pacifica, near Cañas, 16 Dec. 1984 (GTA #10018).



Figures 8-15. Male and female genitalia of *Pyrgus*. 8. *Pyrgus oileus* male - COSTA RICA: San José Prov.; Paso Ancho, 1985-1986 (GTA #9985); 9. *Pyrgus orcus* male - COSTA RICA: Limon Prov.; Playa Bananito, 13 Sept. 1986 (GTA #9987); 10. *Pyrgus philetas* male - AZ: Santa Cruz Co.; vic. Peña Blanca Lake, 1 Aug. 1991 (GTA #10081); 11. *Pyrgus brenda* male - ECUADOR: Guayas Prov.; Chongon, 6 Mar. 1977 (GTA #10084); 12. *Pyrgus oileus* female - COSTA RICA: Limon Prov.; Ruta 32, Rio Blanco, 5.9 km W of Guapiles, 12 Sept. 1986 (GTA #10073); 13. *Pyrgus orcus* female - COSTA RICA: Limon Prov.; Puerto Viejo, 9 Mar. 1986 (GTA #10074); 14. *Pyrgus brenda* female - ECUADOR: Guayas Prov.; Chongon, 6 Mar. 1977 (GTA #10085); 15. *Pyrgus philetas* female - AZ: Pima Co.; Santa Rita Mts., Florida Wash, 23 Oct. 1977 (GTA #10080).



Figures 16-22. Male genitalia of *Heliopyrgus* and *Heliopetes*. 16. *Heliopyrgus americanus* - CHILE: Linares; Liepo, Jan. 1988 (GTA #10761); 17. *Heliopyrgus sublinea* - MÉXICO: San Luis Potosí; La Mara Ceiba, 11 July 1988 (GTA #10802); 18. *Heliopyrgus domicella* - COSTA RICA: Guanacaste Prov.; Cerro Ceibo, S of El Coco, 23 Sept. 1987 (GTA #10727); 19. *Heliopetes arsalte* - BRAZIL: Rondônia; 62 km S of Ariquemes, linha C-20, 7 km E of B-65, Fazenda Rancho Grande, 30 Oct. 1990 (GTA #1186); 20. *Heliopetes marginata* - ECUADOR; Guayas Prov.; ca. 10 km W of Guayaquil on rd. to Salinas, 8 Mar. 1977 (GTA #10429); 21. *Heliopetes macaira* - TX: Hidalgo Co.; Santa Ana NWR, 7 Apr. 1979 (GTA #10772); 22. *Heliopetes nivella* - COLOMBIA: Magdalena Dept.; 8 km SE of Santa Marta Minca Rd., 13 Mar. 1977 (GTA #10433).



Figures 23-27. Female genitalia of *Heliopyrgus* and *Heliopetes*. 23. *Heliopyrgus americanus* - CHILE: Linares, Liepo, 28 Mar. 1988 (GTA #10763); 24. *Heliopyrgus sublinea* - MÉXICO: Veracruz; Paso de la Oychas, 20 Aug. 1962 (GTA #10803); 25. *Heliopyrgus domicella* MÉXICO: Oaxaca; Hwy. 190, El Cuyul, 2700', 21 Aug. 1990 (GTA #10728); 26. *Heliopetes marginata* - ECUADOR: Guayas Prov.; ca. 10 km W of Guayaquil on rd. to Salinas, 8 Mar. 1977 (GTA #10430); 27. *Heliopetes arsalte* - BRAZIL: Rondônia; 62 km S of Ariquemes, linha C-20, 7 km E of B-65, Fazenda Rancho Grande, 11 Nov. 1992 (GTA #10432).