Sclerocoelus and *Druciatus*, new genera of New World Sphaeroceridae (Diptera; Sphaeroceridae; Limosininae)

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Abstract: The new genus *Sclerocoelus* is described for a large group of New World species including *Sclerocoelus sordipes* (Adams) new combination, *Sclerocoelus regularis* (Malloch) new combination, *Sclerocoelus plumiseta* (Duda) new combination, and about 40 undescribed species. The widespread Nearctic species *Limosina sordipes* Adams is redescribed and designated as the type species of *Sclerocoelus*. Lectotypes are designated for *Limosina sordipes* Adams and *Limosina evanescens* Tucker. The new genus *Druciatus* is described for a group of 7 undescribed species from Central America, South America, and the Caribbean. The type species, *Druciatus ovisternus* n.sp., is described from Dominica and the Dominican Republic.

Introduction

The higher classification of New World Sphaeroceridae is poorly resolved, with several undescribed genera and many undescribed species which cannot currently be placed to genus. This paper defines two of the more distinctive unnamed monophyletic groups of New World Limosininae as the new genera *Sclerocoelus* and *Druciatus*. Both genera include several undescribed species which will be fully dealt with in subsequent papers. The purpose of this paper is to define the genera and make them available for current work on generic classification of the Sphaeroceridae.

Materials and Methods

Genital characters were examined on abdomens cleared in hot KOH, rinsed in water and acetic acid, then placed in glycerin. Terminology for genitalic morphology follows McAlpine (1981).

Sclerocoelus new genus

Diagnosis: A very broad alula (Fig. 8), broad lunule (Fig. 8), and an enlarged intraalar bristle just anterior to the prescutellar dorsocentral bristle (Fig. 8) are the most distinctive external characters of this genus. Combined with the tibial chaetotaxy (only the female with a mid ventral bristle, small posterior or posterodorsal proximal bristle) and wing venation (costa ending at end of R4+5), these features allow easy diagnosis of the genus using external characters. Several attributes of the male genitalia, especially the complicated genital pouch (Fig. 10) and subcerci, are both defining and diagnostic for this group. Females of *Sclerocoelus* superficially resemble females of the *Spelobia clunipes* species group, which also have a broad lunule and broad alula. Members of the latter group lack the proximal posterodorsal mid tibial bristle present in similar *Sclerocoelus*, and all *Spelobia* lack the enlarged intraalar bristle.

Description: Length 1.0-1.9mm; strongly pruinose; body colour brown to black. Postvertical bristles short, cruciate, slightly longer than divergent postocellar bristles. Inner occipital bristle large, similar in size to ocellar bristle. Lunule broad or very broad (Fig. 8), usually rounded; face concave. First flagellomere short, twice as high as long; arista dorsolateral, long-ciliate. Eye height 2.5-4.5X genal height; anterior genal bristle present; gena pruinose except for narrow, vertical posterior strip and small shining area at anteroventral corner of eye. Palpus with several weak ventral bristles and a strong apicoventral bristle.

Prosternum linear, often with small, bristle-bearing sclerites in membrane beside prosternum. Dorsocentral bristles in 2 pairs, anterior pair only slightly larger than acrostichal bristles; acrostichals in 4-9 rows between anterior dorsocentrals; prescutellar acrostichal bristles and posterior intraalar bristles enlarged.

Mid tibia of male curved, with row or patch of ventral bristles distally; apex also with smaller anterior and posterior bristles. Mid tibia of female with long apicoventral and mid ventral bristles.

Both sexes usually with two proximal and two distal anterodorsal bristles, a short proximal posterior or posterodorsal bristle, and one or more distal posterodorsal bristles. Male mid femur with stout ventral bristles at base. Mid basitarsus with an enlarged ventral bristle in proximal half. Hind tibia with a small apicoventral bristle; only first tarsomere of hind leg short and swollen.

Wing broad, membrane clear, alula very broad; R_{4+5} almost straight, slightly bent up before apex; costa ending at R_{4+5} or no more than a single vein-width beyond R_{4+5}; R_{2+3} weakly sinuate, strongly to very strongly bent towards costa at apex. Anal vein weakly to strongly S-shaped. Second costal sector usually subequal to third.

Male abdomen: Preabdominal sternites heavily sclerotized, usually with long marginal bristles; segments 3, 4 and 5 with setose membrane. Sternite 5 modified; posteromedial part densely setose or, rarely, with a small patch of stout bristles. Anterior part of sternite often pale and striate where it is overlapped by sternite 4. Synsternite 6+7 large and usually complex; anteriorly with a broad lobe projecting inside sternite 5 on left side (sinistral flange); left side usually at least dorsally fused with sternite 8; ventral part divided into several sclerites forming genital pouch (Fig. 10). Right side of abdomen with sixth right spiracle usually in a separate sclerite (spiracular sclerite); a ring-shaped sclerite present in membrane anterior to lower right corner of epandrium (Fig. 10). Sternite 8 free from epandrium or fused at lower right corner only. Posteroventral corners of epandrium widely separated, usually projecting medially as narrow lobes. Sternite 10 (subepandrial sclerite) well developed, fused with anterodorsal part of surstylus, often incomplete medially and articulating with subcercus (Fig. 4). Subcercus (structure of uncertain homology below the normal position of the cercus) invariably present, large, often complex, separate from epandrium. Pseudocercus (structure of uncertain homology at inner ventral corner of epandrium; use of this term is after Rohá ek, 1982) usually present between subcercus and epandrium, sometimes fused with subcercus or epandrium, often with 3 bristles (Fig. 1). Surstylus broad, setose at least posteriorly, concave medially, with inner lobes or ridges; usually without stout setae. Hypandrium well developed; arms broad, separate from hypandrial apodeme and from epandrium. Paramere highly variable. Basiphallus variable, with or without epiphallus; ejaculatory apodeme present, small. Distiphallus variable, usually short and broad with paired dorsal and ventral sclerites.

Female abdomen: Abdomen short, broad; tergite 8 usually divided medially; epiproct usually weakly sclerotized, with 2 bristles. Cerci variable by species group, usually short with weak bristles, with a stout apical bristle in one clade only. Sternite 7 large, sternite 8 variable, but often reduced to two dark sclerites. Three or (rarely) 2 spermathecae, usually with prominent invaginations and short ducts.

Type species: *Limosina sordipes* Adams

Other included species: *Sclerocoelus* includes about 40 undescribed species, mostly Neotropical and including some of the most common insects of New World cloud forests. The described species which belong in *Sclerocoelus* are as follows: *Sclerocoelus sordipes* Adams, *Sclerocoelus regularis* (Duda) and *Sclerocoelus plumiseta* (Duda), all new combinations.

Comments: Members of this genus can usually be collected in large numbers by sweeping over wet leaves, especially in cloud forest habitats where *Sclerocoelus* is invariably abundant. The type species is a nearctic species usually associated with deciduous forests. Nearctic members of this genus would key to *Opalimosina* in Marshall and Richards (1987).

Etymology: The generic name refers to the genital pouch lined by sclerites derived from sternite 6.

Sclerocoelus sordipes Adams
New Combination

Limosina sordipes Adams 1904: 455.
Limosina evanescens Tucker 1907: 102.
Leptocera (*Scotophilella*) *evanescens*: Spuler 1925:160; Richards 1965: 724.
Leptocera (*Limosina*) *sordipes*: Richards 1965: 724.

Description: Length *ca.* 1.9mm; body brown; legs and halter pale brown; face, gena and lower frons luteous. Interfrontal area broad, flat and tapered, width at top equal to height; 3 equal interfrontal bristles, sometimes additional small upper or lower interfrontal setulae. Lunule rounded, minimum interantennal distance 1.6X width of ocellar trian-

gle. Eye height 3.0X genal height; anterior genal bristle as long as genal height. Membrane surrounding prosternum bare. Dorsocentral bristles in 2 pairs, anterior pair slightly larger than acrostichals, prescutellar acrostichal bristles twice as long as anterior dorsocentrals, posterior intraalar bristles slightly longer than anterior dorsocentral bristles. Katepisternum with a well developed posterodorsal bristle and a small anterodorsal setula. Dorsal surface of mid tibia with 2 anterodorsal bristles and a small posterodorsal bristle proximally; large anterodorsal and posterodorsal bristles distally, posterodorsal bristle above level of anterodorsal; a small anterodorsal bristle and a very small dorsal bristle above distal bristles. Mid tibia of male slightly curved, ventral surface of with preapical cluster of slightly enlarged preapical bristles and a large apicoventral bristle; apex also with small anterior and posterior bristles. Mid femur with *ca.* 7 slightly enlarged posteroventral bristles near base. Mid basitarsus with an enlarged ventral bristle in proximal half; basitarsus 0.6X length of tibia.

Wing membrane clear; second costal sector subequal in length to third costal sector.

Abdomen: Syntergite 1+2 with broad, short, anterior pale area with a narrow posterior extension. Posterior bristles of male tergite 5 subequal to tergite length.

Male terminalia: Sternite 5 twice as long as sternite 4; anterior portion very dark, normally overlapped by sternite 4; posterior part characteristically pigmented, with a densely setulose posteromedial patch about twice as long as wide flanked by pale areas each with a setose posterior swelling (Fig. 9). Sinistral flange of sternite 6 as long as wide; genital pouch with 5 characteristically shaped sclerites between setose part of synsternite 6+7 on left and spiracular sclerite on right (Fig. 10). Ring sclerite distinct. Right side of sternite 7 with a blunt anteroventral lobe articulating with well developed spiracular sclerite. Anal fissure parallel sided, perianal pads weakly developed. Pseudocercus narrowly joined to epandrium, with 3 long bristles (Figs. 1, 2). Each half of sternite 10 (subepandrial sclerite) a narrow arch articulating with posterodorsal lobe of subcercus and anterodorsal part of surstylus (Figs. 3, 4). Halves of sternite 10 (subepandrial sclerite) of uniform width, narrowly separated medially. Subcercus with a narrow, tapered, posteriorly projecting part and a broad, bilobed anterior part. Surstylus slightly deeper than wide in lateral view, ventral part with long-setose posterior lobe and shorter, short-setose anterior lobe. Paramere broad basally, narrow and weakly arched distally, apex blunt with a shallow notch (Fig. 5). Basiphallus simple, without epiphallus. Distiphallus short and broad, dorsal part comprising a pair of basally fused, narrow bars which curve towards each other distally; ventral part with a broad, distally bifurcate, darkened area.

Female abdomen: Tergite 7 dark, posteromedially concave. Tergite 8 divided into a very pale dorsal sclerite and dark lateroventral sclerites; posteroventral corners rounded. Epiproct small, medially pale, almost entirely setulose. Cerci short, blunt, with long apical and dorsal bristles. Sternite 7 with posteromedial portion strongly convex, pale, and densely covered with larger setulae than anterior part of sternite (Fig. 6). Sternite 8 reduced to 2 minute, pale, widely separated sclerites, each with 2 minute setulae. Hypoproct deeply emarginate anteromedially, posteriorly densely setulose. Three spermathecae, ducts inserted near darkened rim of narrow, deep invagination, surface finely striate (Fig. 7).

Type material: Adams (1904) described this species, as *Limosina sordipes*, on the basis of "numerous specimens; Brookings, S. Dak.". Four cotypes from this locality were examined (SNOW), two of which also bear a date label "6-11-91". One of the undated specimens is *Phthitia plumosula* (Rondani); one of the dated specimens is here designated as the lectotype of *Limosina sordipes* Adams. Richards (1965) synonymized *Limosina evanescens* Tucker 1907 with *Limosina sordipes* Adams 1904 , but did not designate a lectotype from Tucker's cotype series. Four cotypes from the Snow Museum were examined, two apparently from the same Brookings series as the *sordipes* types, one from Douglas Co., Kansas, and one from Lawrence, Kansas. The latter specimen is *Opalimosina mirabilis* Collin. One of the Brookings specimens is here designated lectotype of *Limosina evanescens* Tucker, confirming its synonymy with *Limosina sordipes* Adams.

Other material examined: Over 1,000 specimens from the following localities: CANADA. Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Quebec. UNITED STATES. Arizona, Arkansas, California, Colorado,

Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Missouri, Massachusetts, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Maryland, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, Washington, West Virginia, Wisconsin, Wyoming.

Comments: This widespread and common species is frequently abundant in large deposits of decaying vegetation, especially in forested areas. Specimens were taken from June till November, with most specimens taken in the late summer and fall months.

Druciatus new genus

Diagnosis: The combination of strongly cruciate middle interfrontal bristles, minute katepisternal bristles, and a costa extending far beyond the apex of R_{4+5} (Fig. 19) provides a reliable diagnosis of this genus. The most important character of the male abdomen, both for purposes of diagnosis and definition, is the highly visible and characteristic flat cercus which bears a row of long bristles (Figs. 12, 13). Several other features of the male and female terminalia, such as the posteromedial modifications of the male fifth sternite and the fused epiproct and cercus, are also distinctive features of this genus.

Description: Small (*ca.* 1.7-2.1mm) brown Limosininae; interfrontal area narrow, margined by 3 pairs of interfrontal bristles, middle pair cruciate, upper and lower pairs less than half as long. Ocellar triangle small, distance between posterior ocelli slightly greater than ocellar width. Postvertical bristles cruciate, as long as interocellar distance; postocellar bristles absent. Face broadly carinate. Antennae separated by width of scape; first flagellomere markedly truncate, densely setulose dorsally; arista dorsal, more than twice as long as head height; aristal hairs long, *ca.* 3X width of first aristomere. Palpus with several small ventral bristles and a small preapical ventral bristle. Eye height 3.0 - 4.0X genal height. Prosternum linear, membrane bare. Two postsutural dorsocentral bristles, posterior pair longest. Acrostichal setulae in 4-6 irregular rows between anterior dorsocentral bristles, no setulae between prescutellar acrostichal and dorsocentral bristles. Scutellum with 4 marginal bristles; apical scutellar bristles 1.5X as long as scutellum. Posterodorsal katepisternal bristle very small, less than one third as long as distance between bristle base and wing base, anterodorsal katepisternal bristle minute.

Mid tibia with a single, small, anterodorsal proximal bristle and four distal bristles inserted in the following order: small anterodorsal, large anterodorsal, small posterodorsal, large dorsal (Fig. 7). Mid tibia of both sexes with an apicoventral bristle, other ventral setae small but sometimes one slightly enlarged seta near middle (this varies within species). Only first tarsomere of hind leg short and swollen.

Wing membrane clear; veins brown; R_{4+5} turned up to costa before wing tip, costa extending far beyond tip of R_{4+5} (Fig. 9); alula narrow; anal vein indistinct, weakly sinuate.

Male abdomen: Preabdominal sclerites well developed, with weak marginal bristles except for sternite 5; segments 3, 4 and 5 with weakly setose membrane. Sternite 5 concave posteromedially, with species-specific pigmentation and chaetotaxy in concavity. Synsternite 6+7 simple, left side fused dorsally with tergite 8, ventral part extending along posterior margin of sternite 5 narrow and tapered. Sixth right spiracle in membrane with no associated sclerites; ring sclerite weakly developed. Sternite 8 separate from epandrium. Cercus flat, strongly demarcated from epandrium, with a row of long bristles. Surstylus bilobed, posterior lobe broad, setose, with a single inner bristle; anterior lobe narrow. Sternite 10 (subepandrial sclerite) a narrow strip running between surstyli, weakly developed and normally not visible in posterior view. Basiphallus short, without epiphallus, with broad, spinulose or striate posteroventral part. Distiphallus simple, narrow, mostly unsclerotized, with a long, basally forked functionally dorsal part tapering to a single distal part subtended by a separate U-shaped sclerite. Hypandrial arms very long and thin, fused with anterior apodeme but not fused to epandrium.

Female genitalia: Tergite 8 dark, narrowed but complete medially. Epiproct lightly pigmented, fused with cerci, with 2-6 small bristles. Cerci with 2 outer lateral bristles, 1 apical bristle, 1 inner lateral bristle, and one much smaller distal ventral bristle. Sternite 7 large, sternite 8 reduced to a very small, sometimes transverse, sclerite with 4 bristles. Hypoproct band-like, very short in medial part. Three spermathecae, tire-shaped to barrel-shaped, with deep apical invaginations and short ducts.

Type Species: *Druciatus ovisternus* new species.

Other included species: Another 7 species of *Druciatus* occur in the New World tropics (Marshall and Totten, this volume).

Etymology: The generic name is to be treated as an arbitrary combination of letters. Specimens in this group were previously labelled "DR-cruciate", referring to their cruciate interfrontals and their relationship to the Dominican Republic species of the genus, described below as *D. ovisternus*.

Druciatus ovisternus new species
Figs. 1-9

Body length *ca.* 1.8mm, colour dark brown, antennae and legs light brown. Interfrontal area narrow, raised, height 1.3X width; lunule almost flat, interantennal distance slightly greater than width of ocellar triangle. Eye height 2.5-2.8X genal height. Acrostichal setulae in 5-6 rows between anterior dorsocentral bristles. Mid tibia of both sexes usually with only minute bristles in midventral region, but some individuals with a slightly enlarged anteroventral bristle just below middle. Anteroventral surface of hind basitarsus with sparse, brown setulae, some short dark setulae along ventral surface.

Abdomen: Syntergite 1+2 with a large anteromedial pale area. Posterior bristles of tergite 5 weak, shorter than tergite.

Male terminalia: Sternite 5 with strong bristles along posterior margin, middle part strongly concave, with a separate, pale, setulose sclerite in the concavity, sclerite with 2 posterior bristles (Fig. 11). Epandrium sparsely setose, setae increasing in length towards posteroventral margin; cercus flat, strongly demarcated from epandrium, with an outer row of 6 very long bristles and an inner ventral patch of several smaller bristles (Figs. 12, 13). Surstylus with a long, thin anterior lobe ending in a weakly demarcated spur, and a broad, setose posterior lobe with a large interior bristle (Fig. 13). Paramere large, narrowed apically, with broad anterior lobe (Fig. 15). Basiphallus ridged on posteroventral surface, diagonal ridges converging at midline (Fig. 14); distiphallus weakly sclerotized.
Female terminalia: Tergite 8 narrowed but complete, with broad lateral ventral part; epiproct fused with cerci, setulose, desclerotized medially, with 2-4 bristles (Fig. 16). Sternite 7 large, strongly convex posteriorly. Sternite 8 small, broadly oval, with 4 bristles; hypoproct narrow (Fig. 18). Spermathecae tire-shaped.

Holotype (male) **and Paratypes (20 males, 19 females).** DOMINICAN REPUBLIC. La Cienaga, 11-12.i.1989, Malaise and flight intercept traps, S.A. Marshall and J.E. Swann. OTHER PARATYPES. DOMINICAN REPUBLIC. Cabo Rojo, Alcoa Road km.26, pan traps, 17-20.1989, S.A. Marshall and J.E. Swann (1♀). DOMINICA. S. Chiltern Est., 20.ii.1965, W.W. Wirth (1♂). The holotype is deposited at the Canadian National Collection in Ottawa, paratypes of the Dominican Republic specimens are retained at Guelph, and the paratype from Dominica belongs to the United States National Museum.

Comments: As the name *ovisternus* suggests, the oval posteromedial structure on the male fifth sternite is diagnostic for this species.

Acknowledgements

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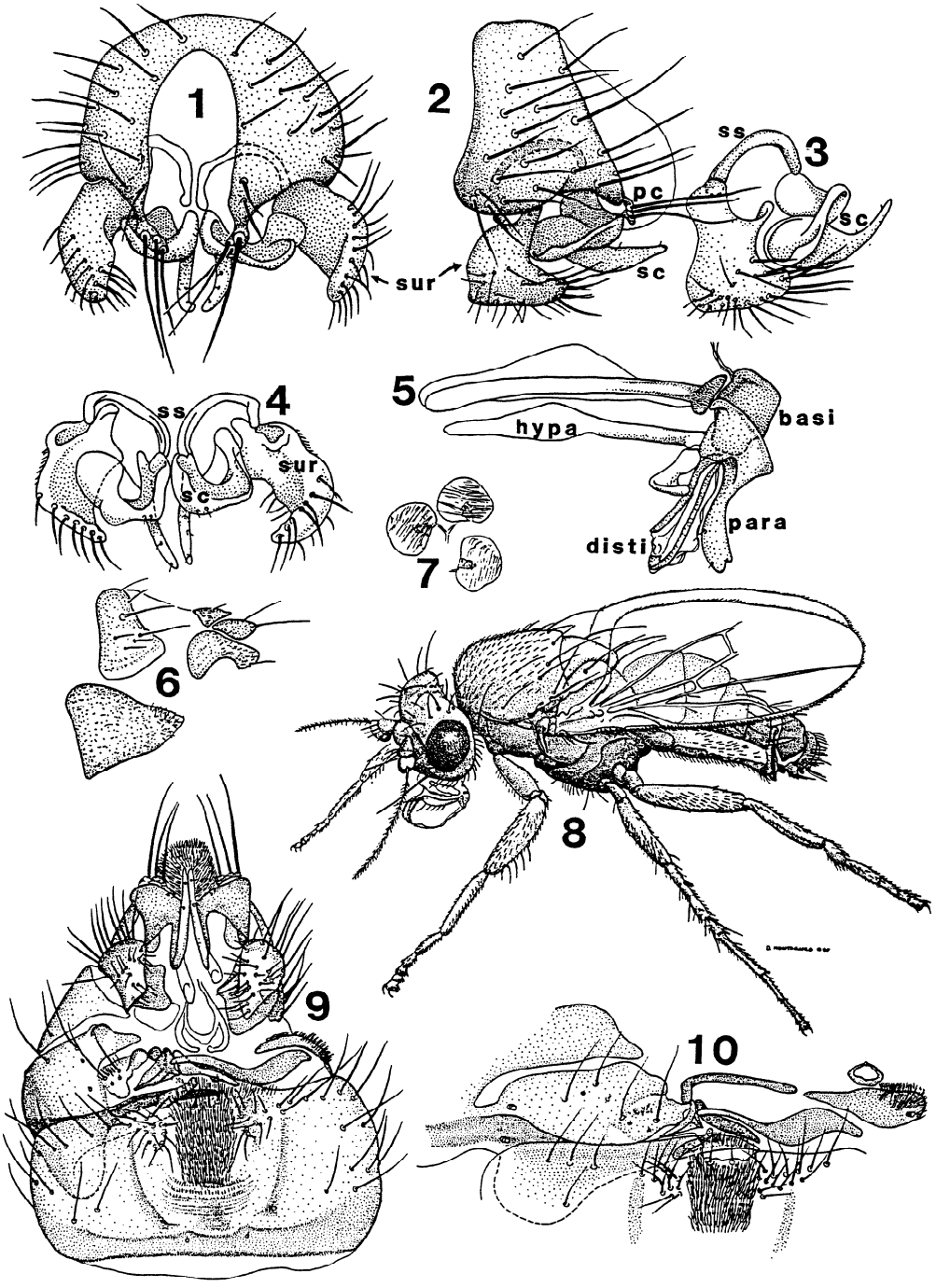
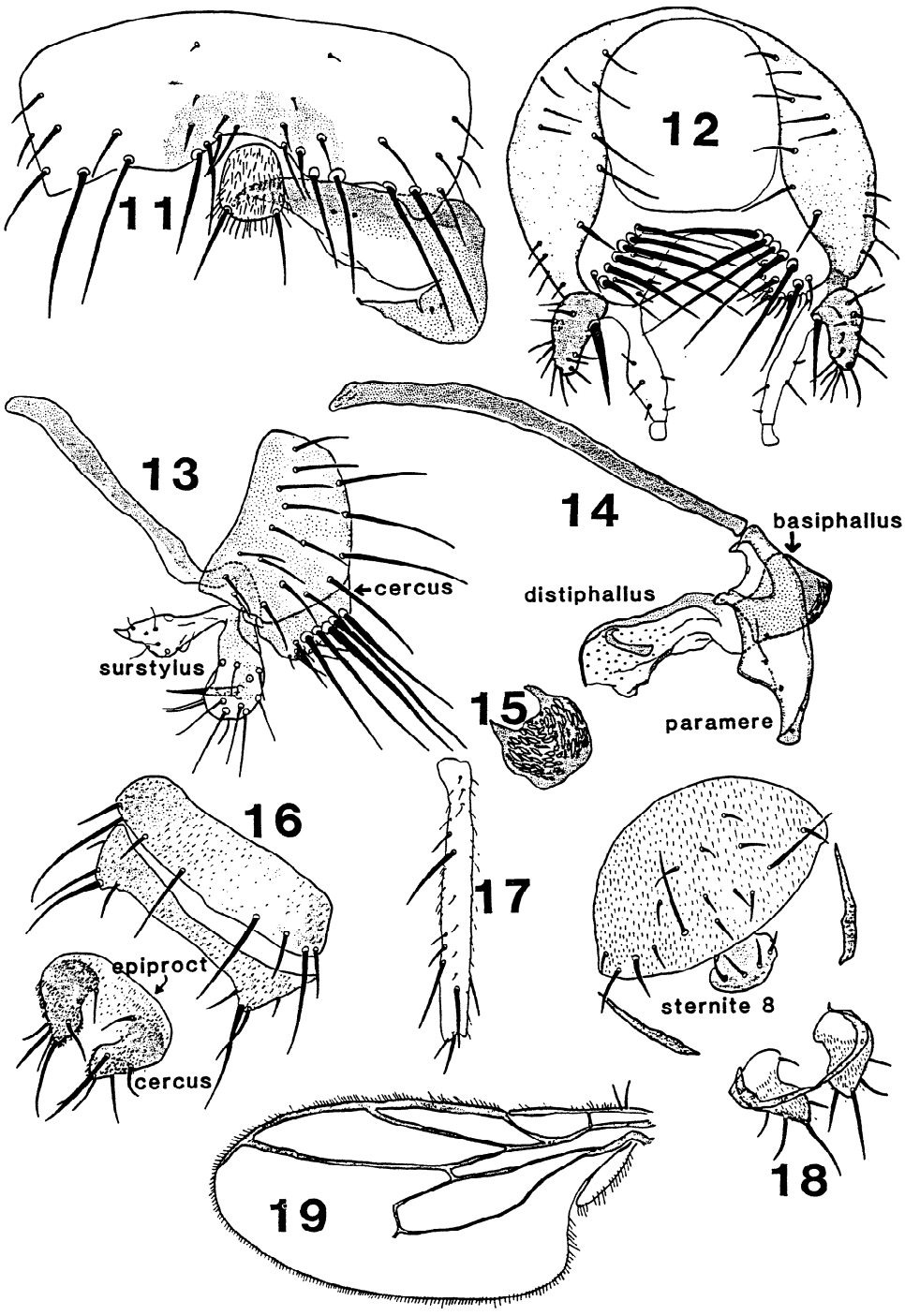


Figs. 1-10: *Sclerocoelus sordipes* (Adams). **1**, Male terminalia, posterior. **2**, Male terminalia, left lateral. **3**, Surstylus, sternite 10 (subepandrial sclerite) and subcercus, left lateral. **4**, Surstylus, sternite 10 (subepandrial sclerite) and subcercus, posterior. **5**, Aedeagus and associated structures, left lateral. **6**, Female terminalia, left lateral. **7**, Spermathecae. **8**, Habitus, male. **9**, Sternite 5 of male and parts posterior, ventral. **10**, Male genital pouch and posterior part of sternite 5. **Abbreviations:** ss, sternite 10 (subepandrial sclerite); pc, pseudocercus; sc, subcercus; sur, surstylus; hypa, hypandrium; basi, basiphallus; para, paramere; disti, distiphallus.



Figs. 11-19: *Druciatus ovisternus* Marshall. **11**, Male sternite 5 and synsternite 6+7, ventral. **12**, Male terminalia, posterior. **13**, Male terminalia, left lateral. **14**, Aedeagus and associated structures, left lateral. **15**, Posterior surface of basiphallus. **16**, Female terminalia, dorsal. **17**, Middle tibia, dorsal. **18**, Female terminalia, ventral. **19**, Left wing.