Zootaxa 818: 1–8 (2005)
www.mapress.com/zootaxa/
Copyright © 2005 Magnolia Press

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

818

A new species of *Propebrevitrichia* Kelsey (Diptera: Scenopinidae: Scenopininae) from Botswana

SHAUN L. WINTERTON

California State Collection of Arthropods, California Department of Food & Agriculture, Plant Pest Diagnostics Branch, 3294 Meadowview Road, Sacramento, California 95832-1448, USA. swinterton@cdfa.ca.gov

Abstract

Propebrevitrichia Kelsey is an endemic southern African genus of window-flies with distinct Gondwanan origins. *Propebrevitrichia serowensis* sp. n. is described and figured from Botswana.

Key words: Scenopinidae, Botswana, *Propebrevitrichia*, systematics

Introduction

Window-flies (Scenopinidae) are a cosmopolitan group of lower brachyceran flies. Adults are typically small and dark with a body size rarely greater than 5.0 mm. Although found in a variety of habitats, by far the greatest diversity of this group is in arid regions where the dry sandy soils provide a suitable habitat for the larvae. As larvae, scenopinids are elongate, fossorial predators of arthropods in friable soils, but larvae have also been reared from a variety of habitats including boreholes of timber pests, birds-nests and stored products. Although some adults do not feed, most feed at flowers and are often collected sweeping flowers (Kelsey 1969). Since larvae are predators of pests associated with man's activities adults have been commonly collected at windows, hence leading to their common name as window-flies (Kelsey 1969, 1981).

Scenopinidae are placed in the superfamily Asiloidea, and are widely accepted as the sister group to the stiletto-flies (Therevidae) based on secondary segmentation of the larval abdomen (Woodley 1989, Yeates 2002), although larvae of the closely related Apsilocephalidae are not yet known. Worldwide, there are more than 420 currently valid species of Scenopinidae in 24 genera divided into three subfamilies- Scenopininae, Caenotinae and Proratinae (see Yeates 1992). Winterton & Metz (in press) recently described a new genus of window-fly from Namibia that exhibits characteristics of all three subfamilies, underlining the need for an extensive phylogenetic analysis of the family as a whole. Scenopinids

Accepted by N.L. Evenhuis: 4 Jan. 2005; published: 17 Jan. 2005

are distributed throughout all major biogeographical regions, but there is significant continental endemism at the genus level with very few genera found in more than one biogeographical region (Kelsey 1973).

The genus *Propebrevitrichia* was described by Kelsey (1969) originally for two species, *P. stuckenbergi* Kelsey and *P. turneri* Kelsey. Kelsey (1971, 1976) subsequently described another 12 species of *Propebrevitrichia* with a revision of the generic key in Kelsey (1976). *Propebrevitrichia* is placed in the subfamily Scenopininae and is diagnosed from other scenopinine genera by the presence of wing vein M_1 fusing with R_5 before the wing margin to form a closed and petiolate cell r5, head profile higher than long, male epandrium two lobed only, not secondarily emarginate to form additional lobes, female abdomen elongate with sternite 8 only slightly longer than tergite 8, sternite 8 rounded apically (not lobed) and distinctive spines (A1 setae) present on acanthophorites (Kelsey 1969). *Propebrevitrichia* is closely related to the New World genera *Irwiniana* Kelsey, *Heteromphrale* Kröber and *Brevitrichia* Hardy, and Australian genera *Riekiella* Paramonov and *Paramonova* Kelsey (Kelsey 1973, Winterton unpublished data). This group of genera represents a distinct Gondwanan radiation through Africa, Australia and South America, although *Brevitrichia* has subsequently extended northwards from South America into the Nearctic region.

Propebrevitrichia is endemic to southern Africa, with all species described from the Republic of South Africa and Namibia. *Propebrevitrichia serowensis* sp. n. is described and figured herein, and is the first species of this genus discovered from Botswana.

Materials and Methods

Whole specimens and genitalia were macerated in 10% KOH at room temperature for one day to remove soft tissue, then rinsed in distilled water and dilute acetic acid, and dissected in 80% ethanol. Female reproductive organs were stained with a saturated solution of Chlorazol Black in 40% ethanol. Preparations were then placed into glycerine and glycerine gel, with figures drawn with the aid of a camera lucida mounted on a stereomicroscope. Genitalia preparations were placed in glycerine in a genitalia vial mounted on the pin beneath the specimen. Types are deposited in the National Museum of Natural History, Smithsonian Institution, Washington D.C., USA (USNM) and California Department of Food & Agriculture, State Collection of Arthropods (CSCA).

Taxonomy

Propebrevitrichia serowensis sp. n. (Figs 1–3)

Etymology. The specific epithet refers to the locality (Serowe) where this species was collected.

 © 2005 Magnolia Press

Type Material: Holotype male, BOTSWANA: [Central District:] Serowe: Farmer's Brigade, August 1986, Malaise trap, Per Forchhammer (USNM). Paratypes, BOTSWANA: 22 males, 3 females, same data as Holotype (USNM); 5 males 1 female, same data as Holotype (CSCA).

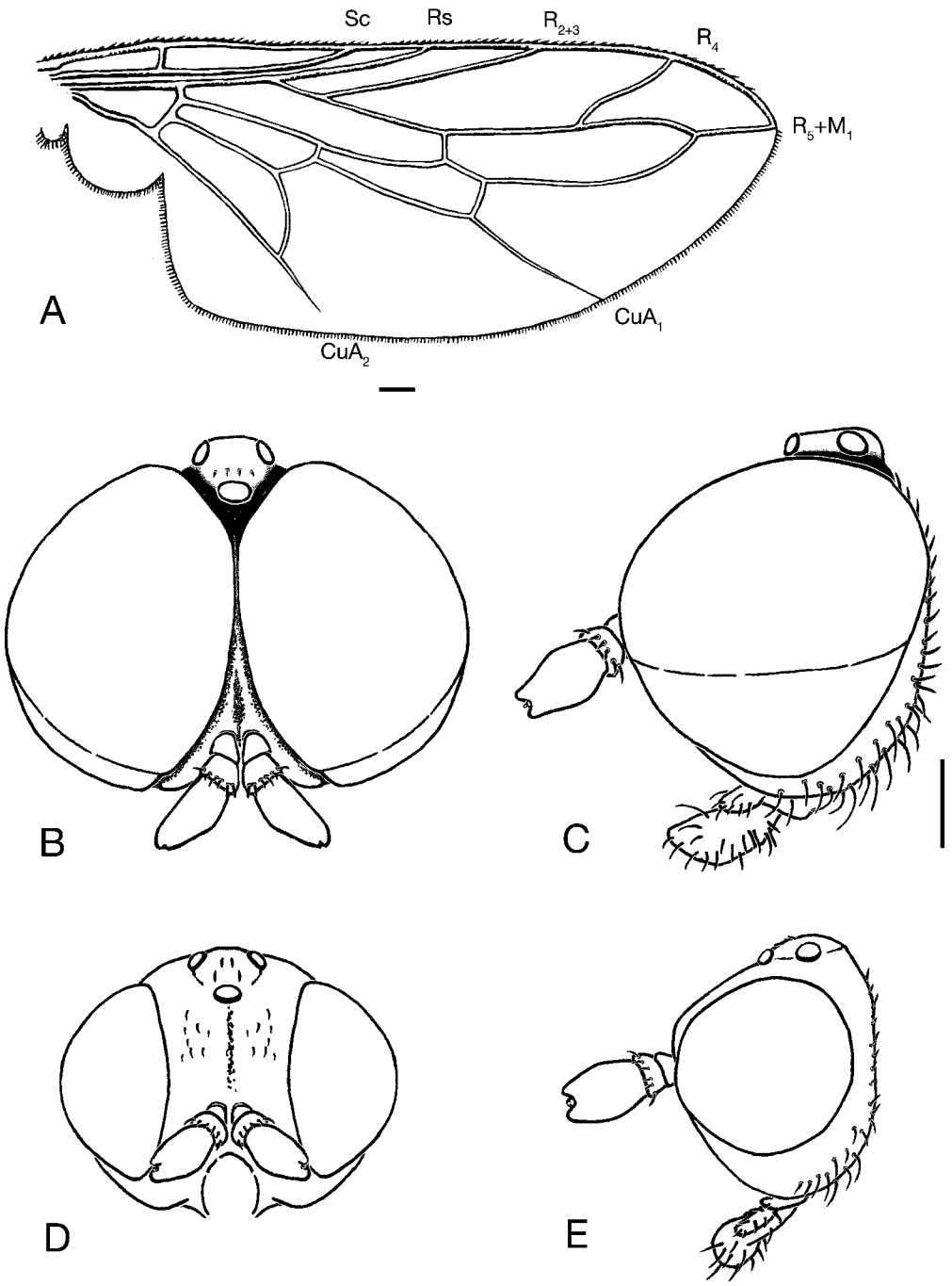

FIGURE 1. *Propebrevitrichia serowensis* sp. n. (A) Wing. (B) Male head, anterior view. (C) Same, lateral view. (D) Female head, anterior view. (E) Same, lateral view. Scale line: 0.1 mm.

 © 2005 Magnolia Press

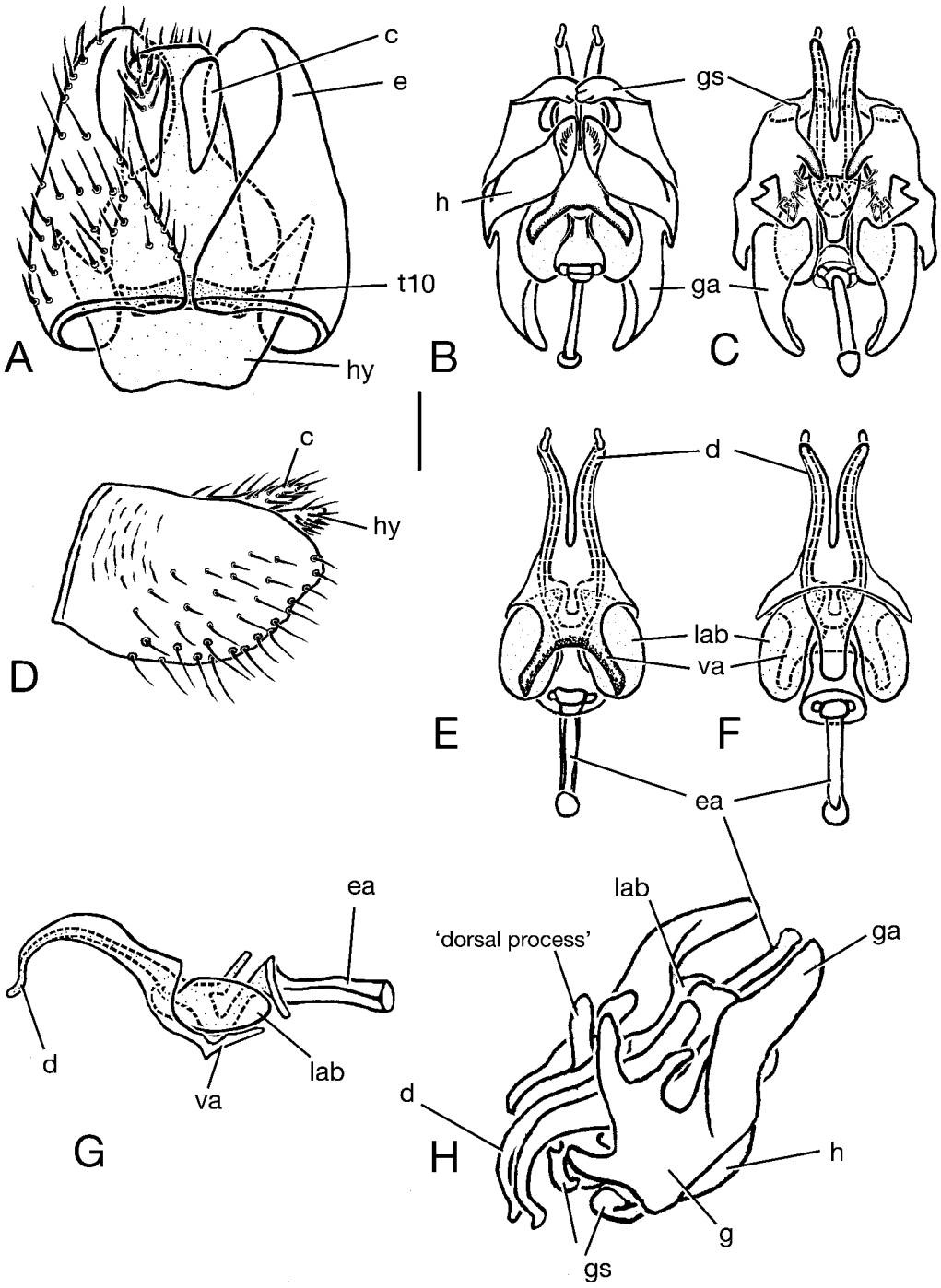

FIGURE 2. *Propebrevitrichia serowensis* sp. n. Male genitalia. (A) Epandrium, dorsal view. (B) Gonocoxites and aedeagus, ventral view. (C) Same, dorsal view. (D) Epandrium, lateral view. (E) Aedeagus, ventral view. (F) Same, dorsal view. (G) Same lateral view. (H) Gonocoxites and aedeagus, oblique view (epandrium removed). Scale line: 0.1 mm. Abbreviations: *c*, cercus; *d*, distiphallus; *e*, epandrium; *ea*, ejaculatory apodeme; *g*, gonocoxite; *ga*, gonocoxal apodeme; *gs*, gonostylus; *h*, hypandrium; *hy*, hypoproct; *lab*, lateral aedeagal bulb; *t10*, tergite 10; *va*, ventral apodeme of parameral sheath.

 © 2005 Magnolia Press

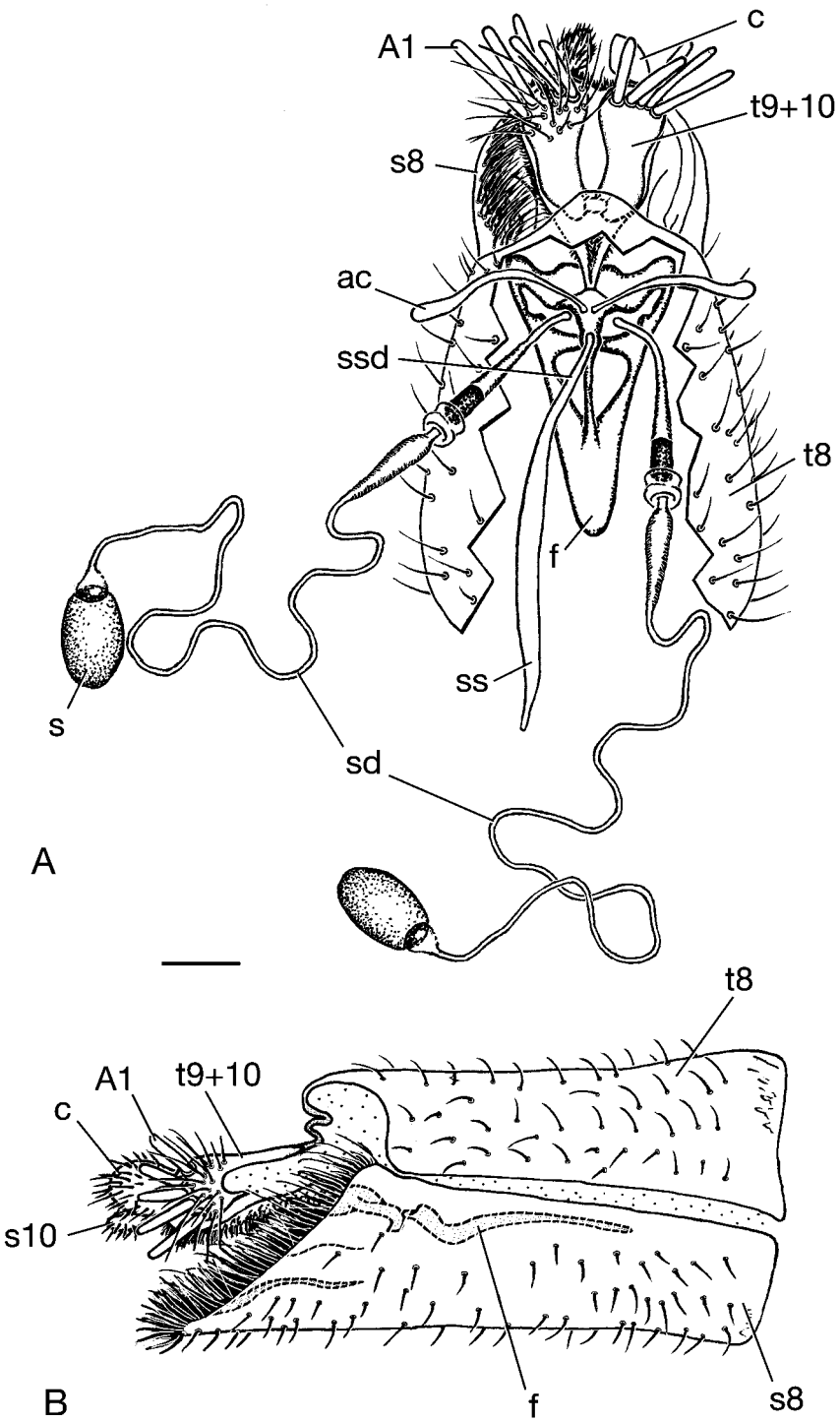

FIGURE 3. *Propebrevitrichia serowensis* sp. n. Female genitalia. (A) Dorsal view, tergite 8 cut away to show internal reproductive structures. (B) Same, lateral view. Scale line: 0.1 mm. Abbreviations: *A1*, acanthophorite spines; *ac*, accessory gland; *c*, cercus; *f*, furca; *s*, spermatheca; *sd*, spermathecal duct; *ss*, spermathecal sac; *ssd*, spermathecal sac duct; *s8*, sternite 8; *s10*, sternite 10; *t8*, tergite 8; *t9+10*, tergites 9 and 10.

 © 2005 Magnolia Press

Diagnosis. Wing translucent milky-white in colour, venation yellow anteriorly; haltere stem brown basally, white distally, knob brown with pale band; male sternite 9 without elongate setal comb; aedeagus with relatively short distiphallus; aedeagus with large lateral aedeagal bulbs; gonocoxite with paired dorsal projections.

Description. Body length: Male 2.4–2.8 mm; female 3.5–3.8 mm. Head (Figs 1B–E). Male frons narrowly contiguous (eyes rarely touching), separated by less than width of median ocellus, female frons much wider than ocellar tubercle; head black but densely overlain with grey to brown pruinescence (= microtrichia), male face, frons and ocellar tubercle with silver pruinescence, vertex around ocellar tubercle glabrous, black (barely evident as ocellar tubercle occupies most of area between eyes); female frons with brown pruinescence, frons with narrow dark medial stripe in both sexes; occiput with silver pruinescence in male, grey-brown pruinescence in female; female postocular ridge raised, both sexes with minute, sparse and pale coloured postocular setae; eye colour tan; antenna orange brown, flagellum deeply emarginate apically; mouthparts pale orange to cream.

Thorax. Base colouration dark, overlain with grey or brown pruinescence; male scutum grey pruinescent with two diffuse stripes of brown pruinescence, brown pruinescent laterally, posterior half of scutum and anterior portion of scutellum slightly darker, postpronotal lobe, postalar callus and posterior portion of scutellum tan to dark yellow, minute pale setae on scutum with longer pale setae on notopleuron and postpronotal lobe; pleuron dark brown to dark yellow, overlain with grey pruinescence, meron with dark area; legs dark yellow, femora brown in male, pale setae on femora longer in male; wing (Fig. 1A) translucent milky white, venation dark yellow, posterior veins pale yellow to white in male; haltere stem brown basally, white distally, knob brown to orange with a pale cream to white band.

Abdomen. Brown with segment one and posterior margin of other segments cream coloured, sparse pale setae in male, brown in female; modified setal patches on T2 rounded, setae projecting medially; male terminalia rotated 180 degrees, (ventral surface appearing dorsal) terminalia pale cream coloured in male, dark yellow in female; some males with paired, heavily sclerotised gonads in segments 4–5 (described as a "spermatocyst" in Yeates *et al.* (2003)).

Male genitalia (Fig 2). Epandrium split medially and widely separated, lobes truncate anteriorly, ovate posteriorly; cerci and hypoproct elongate with small apical setae, tergite 10 small, thin, located anterior to hypoproct; gonocoxite irregularly shaped with microtrichia on ventral surface, ventral lobe with fine transverse ridges, dark sclerotised dorsal projection with anterodorsal flange, flange covered with setae; gonostylus with microtrichia on outer surface, margin toothed, dark sclerotised on lower tooth; gonocoxal apodeme elongate and dark sclerotised, curved inwards along length; hypandrium medially emarginate with raised medial ridges, ventral setal comb absent; aedeagus shape and internal structure complex, distiphallus relatively short, bifid, curved ventrally and recurved posteriorly near apex, pair of large, sclerotised lateral aedeagal bulbs flanking aedeagus, bulbs

 © 2005 Magnolia Press

ovate, projecting anteriorly just beyond base of ejaculatory apodeme, lateral aedeagal bulbs connect to aedeagus ventrally at point of bifurcation of aedeagus, aedeagus with blunt anterodorsal projection.

Female genitalia (Fig 3). Acanthophorite with five A1 setae, furca elongate, complex, tapered anteriorly and triangular in overall shape with narrow longitudinal bridge, connected to tergite 10 posteriorly; sternite 8 projecting posteriorly beyond tergite 8, posterior margin with dense elongate setae, two sclerotised lateral ridges internally; spermathecal ducts thickened basally with large valve structures, narrow distally, two sclerotised spermathecae, rounded to ovoid, membranous basally; accessory glands narrow, bulbous distally, accessory gland ducts joined to bursa copulatrix on longitudinal bridge anteromedially of spermathecal ducts, just posterior of spermathecal sac duct; spermathecal sac small, tapered distally.

Comments. *Propebrevitrichia serowensis* sp. n. is known from a single series from Serowe, Botswana. This species is clearly placed in the species group defined by a relatively short distiphallus and the setal comb being absent on sternite 9 (hypandrium) (including species such as *P. bonnieana* Kelsey, *P. botterkloofensis* Kelsey, *P. canuta* Kelsey, and *P. patersonensis* Kelsey) (see Kelsey 1976). In the dichotomous key to *Propebrevitrichia* species in Kelsey (1976), *P. serowensis* keys out to *P. canuta* Kelsey, but can be differentiated by the presence of sclerotised dorsal processes on the gonocoxites and straight gonocoxal apodemes in *P. serowensis* while *P. canuta* lacks pronounced sclerotised dorsal processes and has upward turned gonocoxal apodemes. *Propebrevitrichia serowensis* sp. n. is closely related to *P. patersonsensis* as both species have similar shaped male genitalia but can be easily separated based on body colouration. Yeates (1992, 1994) used specimens from this series as *Propebrevitrichia* sp. in his phylogenetic studies on Bombyliidae and Scenopinidae.

Acknowledgements

I thank Dr Norman Woodley (USNM) for bringing the specimens to my attention and to Drs Steve Gaimari, Eric Fisher and Peter Kerr for reviewing the draft manuscript. Thank you also to Dr David Barraclough and Catherine Conway (Natal Museum) for loan of type material of other *Propebrevitrichia* species.

References

Kelsey, L.P. (1969) A revision of the Scenopinidae (Diptera) of the world. *Bulletin of the United States National Museum*, 277, 1–336.

Kelsey, L.P. (1971) A review of the Scenopinidae (Diptera) of Africa south of the Equator and neighboring islands, with descriptions of two new species. *Annals of the Natal Museum*, 21, 135–181.

 © 2005 Magnolia Press

Kelsey, L.P. (1973) The zoogeographic distribution of known Scenopinidae (Diptera). *Entomological News*, 84, 329–332.

Kelsey, L.P. (1976) New African Scenopinidae (Diptera) from south of the Equator. *Annals of the Natal Museum*, 22, 951–977.

Kelsey, L.P. (1981) New Scenopinidae (Diptera) from the Palearctic. *Folia Entomologica Hungarica*, 2, 85–93.

Winterton, S.L. & Metz, M.A. (2005) The first non-scenopinine window-fly from sub-Saharan Africa (Diptera: Scenopinidae). *Cimbebasia*, in press.

Woodley, N.E. (1989) Phylogeny and classification of the "Orthorrhaphous" Brachycera. *In*: J.F. McAlpine & D.M. Wood (Eds), *Manual of Nearctic Diptera* vol. 3. Research Branch Agriculture Monograph No. 32. Canadian Government Publishing Centre, Hall, pp. 1371–1395.

Yeates, D.K. (1992) Towards a monophyletic Bombyliidae (Diptera): the removal of the Proratinae (Diptera: Scenopinidae). *American Museum Novitates*, 3051, 1–30.

Yeates, D.K. (1994) The cladistics and classification of the Bombyliidae (Diptera: Asiloidea). *Bulletin of the American Museum of Natural History*, 219, 1–191.

Yeates, D.K. (2002) Relationships of extant lower Brachycera (Diptera): A quantitative synthesis of morphological characters. *Zoologica Scripta*, 31, 105–121.

Yeates, D.K., Irwin, M.E. & Wiegmann, B.M. (2003) Ocoidae, a new family of asiloid flies (Diptera: Brachycera: Asiloidea), based on *Ocoa chilensis* gen. and sp.n. from Chile, South America. *Systematic Entomology*, 28, 417–431.

 © 2005 Magnolia Press