

A new species of *Alloxytropus Bezzi* (Diptera: Scenopinidae: Proratinae) from Israel

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Abstract

A new species of proratine window fly, *Alloxytropus elias* sp. nov., is described and figured from Israel. A key to species of *Alloxytropus Bezzi* is included.

Key words: Systematics, Scenopinidae, *Alloxytropus*, Israel

Introduction

Scenopinidae are a cosmopolitan group of very small, dark flies (body size rarely greater than 5.0 mm) closely related to asiloid families Therevidae and Apsilocephalidae (Yeates & Wiegmann 2005). The family is divided into three subfamilies, Scenopininae, Caenotinae and Proratinae, although most window flies are placed in the subfamily Scenopininae with the rest being divided unevenly between Caenotinae and Proratinae. Caenotinae comprises a single genus, *Caenotus* Cole, with five species from the southwestern United States and Mexico (Cole 1923, Melander 1950, Nagatomi *et al.* 1994, Metz 2003). The subfamily Proratinae contains five genera: *Prorates* Melander, *Caenotoides* Hall and *Acaenotus* Nagatomi & Yanagida from North America, *Jackhallia* Nagatomi & Liu from Argentina and *Alloxytropus Bezzi* from the Palaearctic region (Melander 1906, Bezzi 1925, Hall 1972, Nagatomi *et al.* 1994). Recently an additional proratine-like genus, *Cyrtosathe* Winterton & Metz, was described from Namibia, representing a possibly intermediate taxon between the existing subfamilies (Winterton & Metz 2005).

Prorates was originally described by Melander (1906) in Empididae and later placed in the subfamily Heterotropinae (Bombyliidae) (Melander 1928). *Alloxytropus* and *Prorates* are closely related, with *Alloxytropus* being considered by some authors as a

synonym of *Prorates* (Melander 1950, Hall 1972, Hull 1973, Bowden 1980), but distinct by others (Evenhuis 1991, Nagatomi *et al.* 1994). Evenhuis (1991) moved *Alloxytropus* along with other 'proratine'-like genera from Heterotropinae to the subfamily Proratinae, although retaining the group within Bombyliidae. Subsequently, Yeates (1992) moved *Prorates*, *Alloxytropus*, *Caenotoides* and *Caenotus* to Scenopinidae, separating *Caenotus* in its own subfamily Caenotinae. Following Yeates (1992) but including *Caenotus* in Proratinae, Nagatomi *et al.* (1994) described two additional genera, *Acaenotus* and *Jackhallia*.

Most proratine scenopinids are found in the New World, with only two genera, *Cyrtosathe* and *Alloxytropus*, found outside of this region. *Alloxytropus* is distributed throughout the Palaearctic and contains four described species: *A. anomalus* Bezzi and *A. bezzii* Paramonov from Egypt, *A. kerzhneri* Zaitzev from Kazakhstan and *A. lehri* Zaitzev from Mongolia (Bezzi 1925, Paramonov 1929, Efflatoun 1945, Zaitzev 1972a, b). In this present article, a new species of *Alloxytropus*, also from the Palaearctic region, is described and figured.

Material and methods

Terminology for wing venation follows Yeates (1992) and that for vestiture and genitalic morphology (including external genitalia and subterminal segments) follows Winterton *et al.* (1999a, b). 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 glacial acetic acid, and dissected in 80% ethanol. Female reproductive organs were stained with a saturated solution of Chlorazol Black in 40% ethanol. Genitalia preparations were placed in glycerine in a genitalia vial mounted on the pin beneath the specimen. Types are deposited in Tel Aviv University, Tel Aviv, Israel (TAUI), United States National Museum, Smithsonian Institution, Washington D.C., USA (USNM), California State Collection of Arthropods, Sacramento California (CSCA) and the M.E. Irwin collection (MEIC) for future deposition with the California Academy of Sciences, San Francisco, California, USA (CASC).

Taxonomy

Alloxytropus elias sp. nov.

(Figures 1–5)

Type material

Holotype male, ISRAEL: Negev: 4 km NE Sde Boqer, Malaise in dry wadi, 1–8.vi.2004, 570 m, M.E. Irwin, 30°53'N, 34°49'E (TAUI).

Paratypes: ISRAEL: Negev: 5 males, 6 females, same data as Holotype (MEIC/CASC); 5 males, 5 females, same data as Holotype (USNM); 4 males, 5 females, same data as Holotype (CSCA).

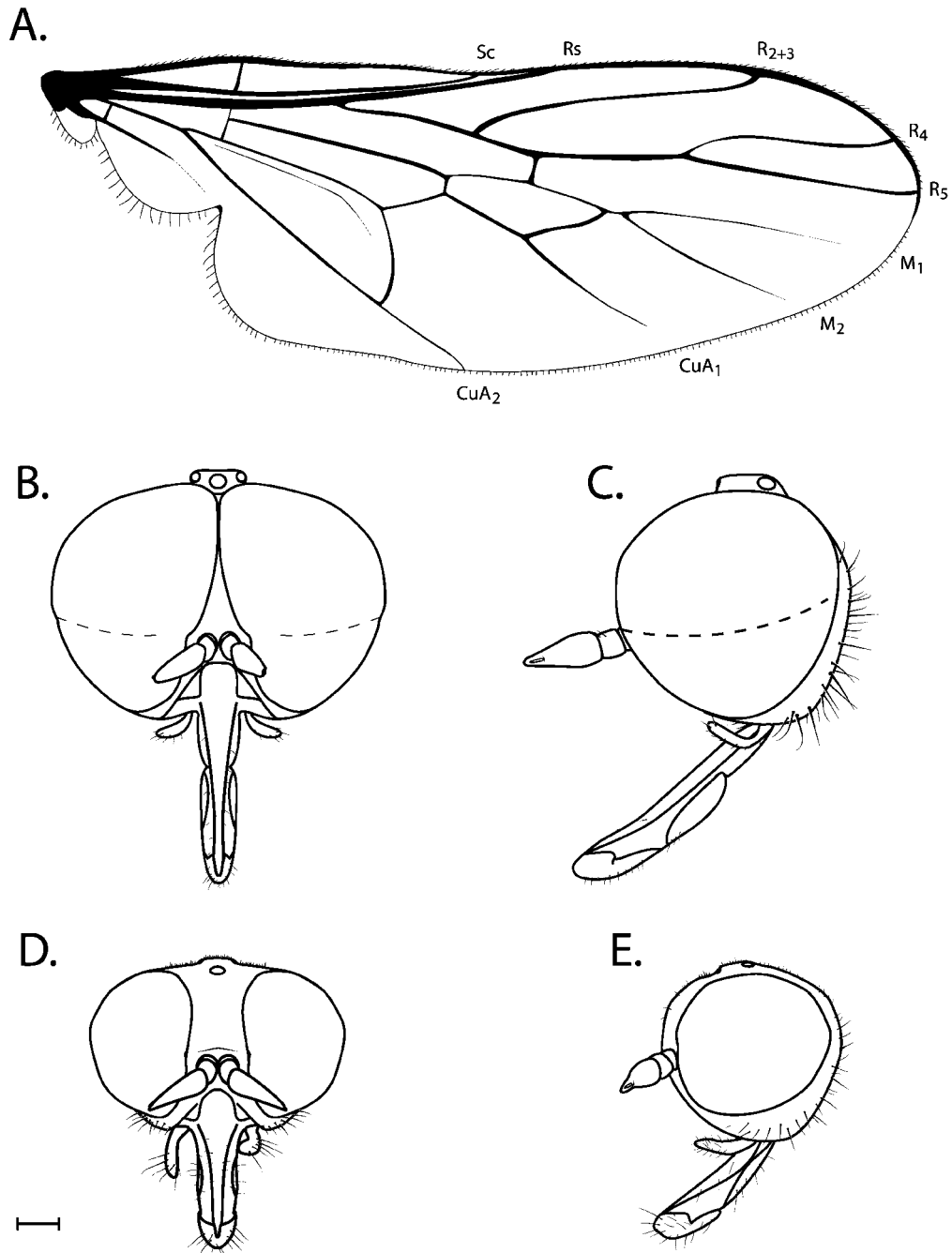


FIGURE 1. *Alloxytropus elias* sp. nov. A, wing; B, male head, frontal view; C, male head, lateral view; D, female head, frontal view; E, female head, lateral view. Scale bar = 0.1mm.

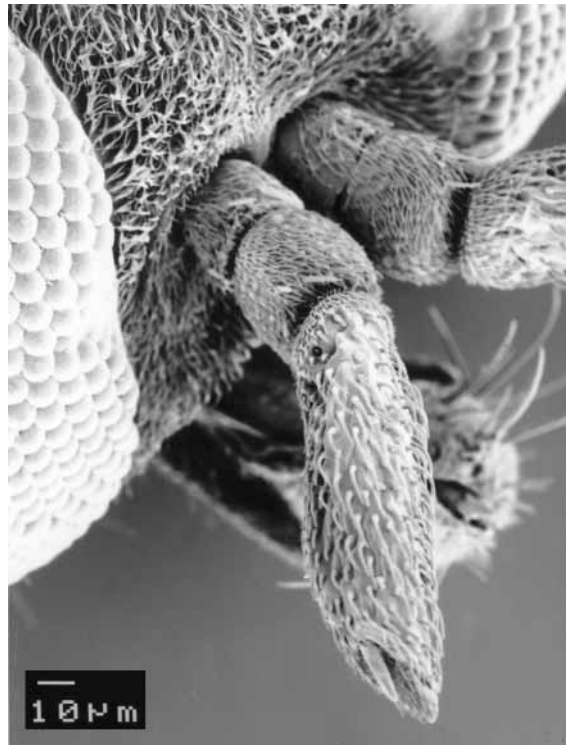


FIGURE 2. Scanning electron micrograph of female antenna.

Diagnosis

Head and thorax grey to brown, overlain with grey pruinescence; male abdomen mostly vivid white; legs dark yellow to light brown; wing milky translucent, venation pale; haltere mostly white; gonocoxite with distinctive notch along dorsal margin immediately anterior to attachment of gonocoxal apodeme; style subterminal on flagellum.

Description

Body length: 2.5–3.5 mm.

Head (Fig. 1). Spherical, male (Figs 1B–C) eyes contiguous along most of length, separated by less than width of median ocellus immediately above antennae, female (Figs 1D–E) frons flat or slightly rounded, much wider than ocellar tubercle; head dark but densely overlain with pale grey pruinescence (=microtrichia); occiput flat to convex, both sexes with minute, sparse and pale coloured postocular setae, single row in male, multiple rows in female; eye colour red-brown, ommatidia larger in dorsal half of eye in male, uniform size in female; gena with pale setae; antenna and mouthparts yellow; antenna shorter than head length, flagellum tapered, longer than combined length of scape and pedicel; small pale setae on scape and pedicel, flagellum overlain with dense pale pruinescence; style subterminal (Fig. 2).

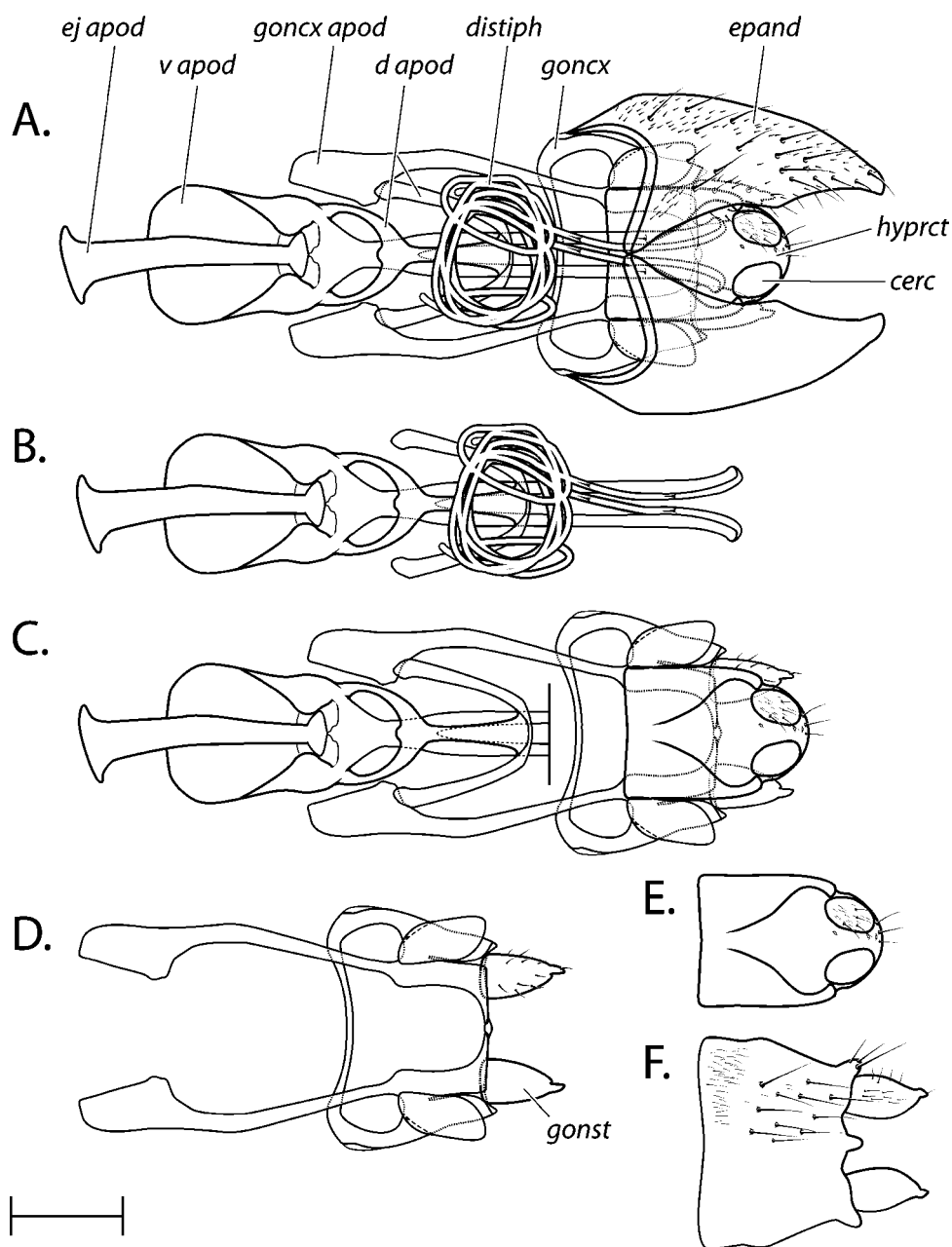


FIGURE 3. *Alloxytropus elias* sp. nov. Male genitalia. A, entire structure *in situ*, dorsal view; B, aedeagus, dorsal view; C, epandrium removed to show gonocoxites, hypoproct and aedeagus (apical half of distiphallus removed), dorsal view; D, gonocoxites, dorsal view; E, hypoproct with epandrium removed, dorsal view; F, gonocoxites with gonocoxal apodemes removed, ventral view. Abbreviations: *cerc*, cercus; *d apod*, dorsal apodeme; *distiph*, distiphallus; *ej apod*, ejaculatory apodeme; *epand*, epandrium; *goncx*, gonocoxite; *goncx apod*, gonocoxal apodeme; *goncx lat process*, membranous lateral gonocoxal process; *gonst*, gonostylus; *hyprct*, hypoproct; *v apod*, ventral apodeme. Scale bar = 0.1mm.

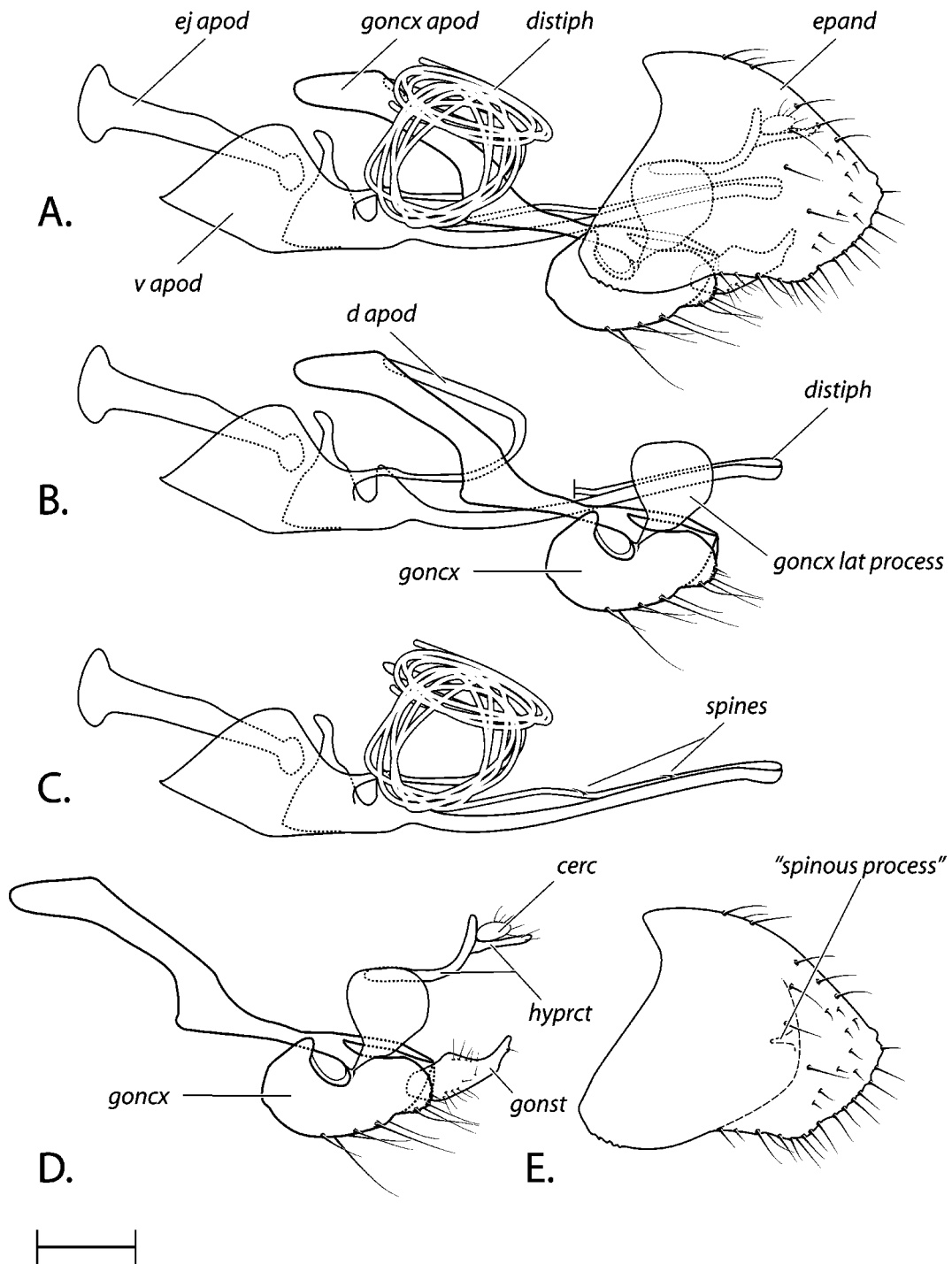


FIGURE 4. *Alloxytropus elias* sp. nov. Male genitalia, A, entire structure *in situ*, lateral view; B, same lateral view (epandrium, hypoproct, gonostylus and apical half of distiphallus removed); C, aedeagus, lateral view; D, gonocoxites with hypoproct attached via membrane lateral processes; E, epandrium, lateral view. Scale bar = 0.1mm.

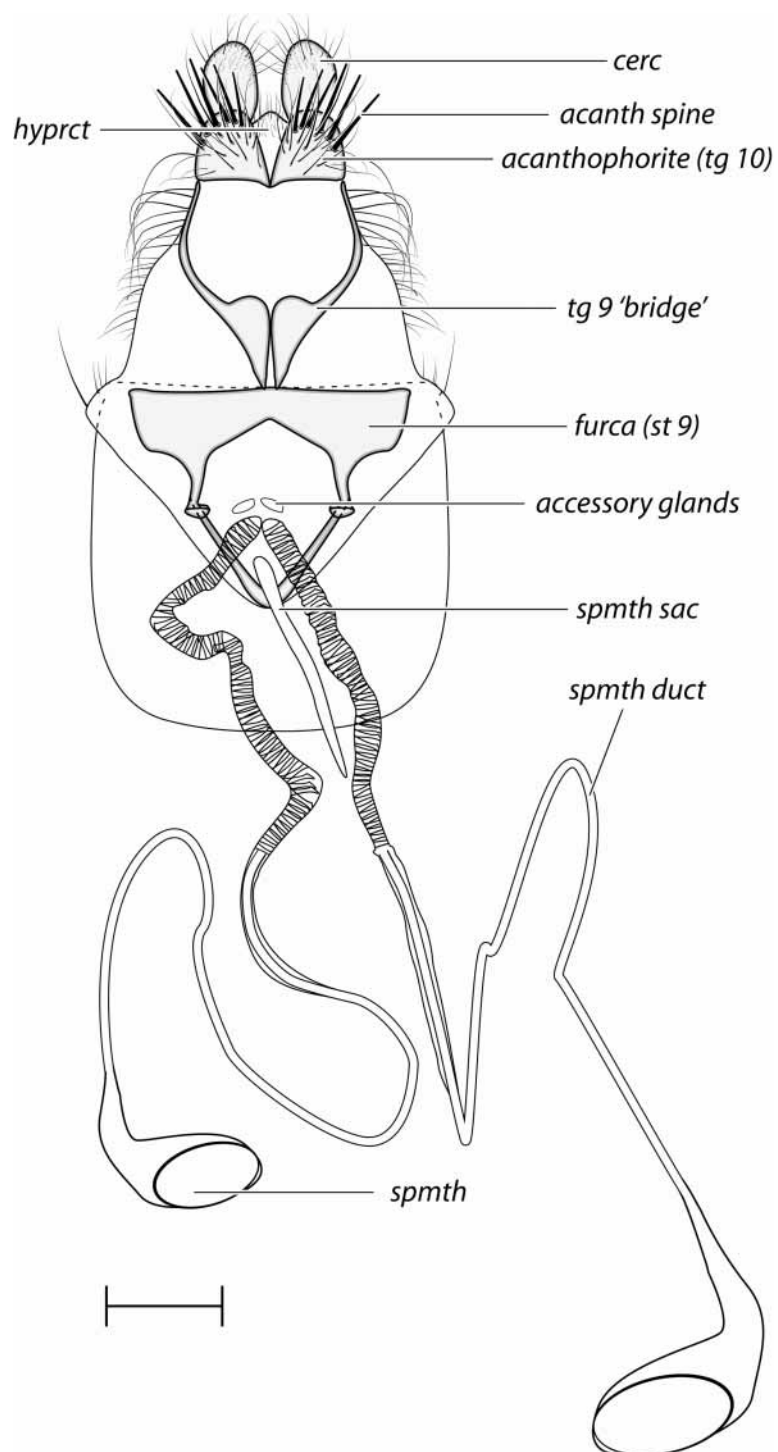


FIGURE 5. *Alloxytropus elias* sp. nov. Female genitalia, dorsal view. Abbreviations: *acanth spine*, acanthophorite spine; *cerc*, cercus; *hypct*, hypoproct; *spnth*, spermatheca; *spnth duct*, spermathecal duct; *spnth sac*, spermathecal sac; *st*, sternite; *tg*, tergite. Scale bar = 0.1mm.

Thorax. Ground colouration dark brown in male, dark yellow to brown in female, overlain in both sexes with dense grey pruinescence; male postpronotal lobe and postalar callus tan to dark yellow; minute pale setae on scutum with longer pale setae on notopleuron and postpronotal lobe; postalar callus with single pale macroseta; scutellum with two pairs of pale macrosetae; legs dark to pale yellow, femora with brown suffusion in male, pale setae on femora longer than on remaining leg segments; wing (Fig. 1A) translucent milky-white, venation very pale, except anterior veins in female dark yellow, posterior veins pale yellow to white in male; haltere stem light tan basally, white distally, knob white.

Abdomen. Vivid white in male; tergite 2 setal patch and lateral areas of tergites dark brown; sternites white with brown medial patch, all segments with sparse pale setae in both sexes; female abdomen light brown, entire segment 1 and posterior margins of other segments white; male and female terminalia white basally, brown along posterior margin.

Male Genitalia (Figs 3, 4). Genitalia not rotated on axis, complex in structure; epandrium (Figs 3A, 4A, E) arched, covering terminalia, divided medially almost completely, posterior margins rounded, short spinous process on inner margin directed anteriorly; cerci short, rounded, not extending beyond end of epandrium; gonocoxites quadrangular in dorsal view (Figs 3C–D, F), posterior corners angular, fused medially, hypandrium absent, large setae ventrally, tapered projection posteromedially; gonostylus (Figs 3D, F, 4D) triangular, tapered and upturned apically, gonocoxite with distinctive dorsal notch slightly anterior to attachment of gonocoxal apodeme; gonocoxite connected dorsolaterally to hypoproct by billowed membranous processes (Figs 3D, 4B); gonocoxal apodeme elongate, broadly spatulate distally and recurved dorsally along length, articulating with dorsal apodeme of parameral sheath; distiphallus (Figs 3B, 4C) bifid basally, narrow, elongate, reflexed midway (at end of terminalia) so that the apical portion of the distiphallus is highly coiled inside the genitalic cavity along side the base of the aedeagus, distiphallus with two pairs of small spines (Figs 3B, 4C); dorsal apodeme of parameral sheath split basally and then fused into single apodeme which is reflexed dorsally before splitting again into two processes that articulate with apices of gonocoxal apodemes (Figs 3C, 4B); ventral apodeme of parameral process distinctively shaped, not forked, cradling the base of the ejaculatory apodeme; lateral ejaculatory apodemes not evident; ejaculatory apodeme narrow with trumpet shaped apex posteriorly.

Female Genitalia (Fig. 5). Tergite 8 covered with sparse, pale setae; tergite 9+10 joined to furca internally by a bridge formed by tergite 9; acanthophorites with five to six stout A1 setae; furca angular, sclerotised, closed anteriorly, lateral wings posteriorly; sternite 8 bowl shaped with posterior marginal fringe of elongate setae; two spermathecae present; spermathecal ducts thickened basally with irregularly annulated tissue patterning, ducts narrowed distally; spermathecae membranous, truncated distally with thickened marginal band; spermathecal sac small, elongate, arising from roof of bursa near posterior margin of furca; spermathecae join to roof of bursa separately from and posterior to

spermathecal sac duct; accessory glands very short, thickened, joining to bursa just posterior to spermathecal ducts.

Comments

Alloxytropus elias sp. nov. is known only from a series of specimens collected from Israel where it co-occurs with *A. anomalus* (unpublished data). This species is readily distinguished from all other *Alloxytropus* based on body colouration, particularly the vivid white abdomen colour of the male, which is not found in any other species. The body of *A. anomalus* is completely yellow to light brown in both sexes while in *A. bezzii* it is shiny black. The head and thorax of *A. elias* sp. nov. is dark with a dense covering of grey pruinescence. The haltere knob of *A. elias* sp. nov. and *A. kerzhneri* is white, while in *A. bezzii*, *A. anomalus*, and *A. lehri* it is yellowish. Like species of *Prorates*, females of *Alloxytropus* are difficult to identify to species confidently due to colour variation. Males vary less in colouration and are more reliably identified to species.

Etymology

The specific epithet is named after Elias Otto Smith Baer, born October 5, 2005. In the Christian Bible, Eli was the high priest of Israel who helped raise Samuel.

Key to *Alloxytropus* species

1. Abdomen colouration pale brownish-orange or white 2
- Abdomen colouration darker 3
2. Abdomen mostly vivid white (especially in male); thorax and head dark, overlain with grey pruinescence (Israel) *A. elias* sp. nov.
- Abdomen colouration darker, mostly pale brownish-orange (Egypt, Israel)
..... *A. anomalus* Bezzi
3. Haltere knob white (Mongolia) *A. kerzhneri* Zaitzev
- Haltere knob yellow 4
4. Body almost completely shiny black; wing clear transparent (Egypt).....
..... *A. bezzii* Paramonov
- Body dull coloured, overlain with grey pruinescence; wing milky transparent (Kazakhstan) *A. lehri* Zaitzev

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