

INSECTA MUNDI

A Journal of World Insect Systematics

0041

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(Oedipodinae: Acrididae) from Libya

Mohammad Kamil Usmani
Section of Entomology, Department of Zoology
Aligarh Muslim University
Aligarh-202002, India

Date of Issue: August 22, 2008

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Insecta Mundi 0041: 1-14

Published in 2008 by

Center for Systematic Entomology, Inc.
P. O. Box 147100
Gainesville, FL 32614-7100 U. S. A.
<http://www.centerforsystematicentomology.org/>

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|--------------|----------------|
| Printed Copy | ISSN 0749-6737 |
| On-Line | ISSN 1942-1354 |
| CD-ROM | ISSN 1942-1362 |

A new species of the genus *Aiolopus* Fieber
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Mohammad Kamil Usmani

Section of Entomology, Department of Zoology

Aligarh Muslim University

Aligarh-202002, India

E-mail: usmanikamil@yahoo.com

Abstract. A new species, *Aiolopus obariensis* sp. n., is described and illustrated from Fezzan Province, Libya. Besides other differentiating characters, the new species is characterized by having a conspicuously short and club-shaped left antenna. A description and a key to Libyan species of *Aiolopus* Fieber is provided. Some additional characters of male and female genitalia have also been incorporated.

Key Words: Fezzan, Identification key

Introduction

The genus *Aiolopus* was proposed by Fieber (1853) with *Gryllus thalassinus* Fabricius (1781) as the type species. Later, two genera *Epacromia* Fischer and *Aeoloptilus* Bei-Bienko were synonymized with *Aiolopus* by Rehn (1902) and Hollis (1968) respectively. The genus was revised by Hollis (1968) who recognized seven species. Only three species have been described after Hollis (1968): *A. markamensis* Yin, 1984, *A. nigriritibis* Zheng and Wei, 2000 and *A. puissantii* Defaut, 2005. At present thirteen species of *Aiolopus* are known worldwide according to Eades and Otte (2008). Previously, three species of *Aiolopus* have been reported from Libya. The genus is now known to contain four species from Libya, including one newly described herein with remarkably abnormal antennae. A key for their separation is given below.

Materials and Methods

Adult male and female grasshoppers were collected from various important agricultural areas of Fezzan region during the period 1992-1996. Dry mounts were prepared for examining characters like size, color, texture, etc. For this purpose, the specimens were first relaxed, stretched and later, they were pinned and labeled.

For a detailed study of the various components of genitalia, the apical parts of male and female bodies were cut off and boiled in 10% potassium hydroxide solution for a variable period until the material became transparent (usually about 10 minutes), which removed unsclerotized and non-chitinous tissues. They were then thoroughly washed in tap water for complete removal of KOH and examined in 70% ethyl alcohol on a cavity slide. Later, every specimen was dissected under a binocular microscope with the help of fine needles to separate parts of the reproductive organs *i.e.*, supra-anal plate and cerci, subgenital plate, ovipositor and spermatheca of female, supra-anal plate and cerci, subgenital plate, epiphallus and aedeagus of male. The normal process of dehydration was adopted and clearing was done in clove oil. The genitalic structures were mounted separately on cavity slides in Canada balsam. A 22 mm square cover-glass over the cavity of the slide was normally used when examining the supra-anal plate and subgenital plate. This was done to prevent them from curling upwards and inwards at the edges. The ovipositor was mounted in Canada balsam on another cavity slide oriented to the required position without cover glass. The slides were kept in a slide dryer at a temperature of approximately 40° C for about one week to get them completely dry. The permanent slides were examined under the microscope in order to make a detailed study of genitalic structures. Drawings were made with the help of a camera lucida.

The material including holotype and paratypes is deposited in Zoology Museum, Sebha University, Brack, Libya.

Terminology of morphological and genitalic structures has been adopted from Dirsh (1965) and Hollis (1968).

Key to species of the genus *Aiolopus* Fieber recorded from Fezzan, Libya

(modified from Hollis 1968)

1. Hind femur not abnormally broad; hind tibia as long as or slightly shorter than hind femur, with at least nine to twelve outer and ten to thirteen inner spines **2**
 — Hind femur very broad; hind tibia considerably shorter than hind femur, with a maximum of nine outer and ten inner spines **3**
- 2(1). Antennae as long as head and pronotum together; fastigial foveolae about twice as long as wide; pronotum not flat dorsally, with prozonal constriction (Hollis 1968; Fig. 11, 12); hind femur narrow, four times longer than wide; hind tibia as long as or very slightly shorter than hind femur (Hollis 1968; Fig. 5), inner apical spurs about one and a half times as long as outer
 ***A. thalassinus* (Fabricius, 1781)**
 — Antennae shorter than head and pronotum together; fastigial foveolae about one and three quarter times as long as wide; pronotum almost flat dorsally, without prozonal constriction (Hollis 1968; Fig. 13, 14); hind femur broad, three times longer than wide; hind tibia as long as hind femur (Hollis 1968; Fig. 7), inner apical spurs slightly more than one and a half times as long as outer pair ***A. strepens* (Latreille, 1804)**
- 3(2). Fastigium of vertex pentagonal, moderately concave, slightly longer than wide, apex narrowly rounded; fastigial foveolae rectangular; inner apical spurs slightly less than twice as long as outer pair; arolium half length of claw; both antennae normal
 ***A. simulatrix* (Walker, 1870)**
 — Fastigium of vertex wide, convex, slightly depressed in middle, as long as wide, apex strongly narrowed; fastigial foveolae trapezoid; inner apical spurs slightly less than one and a half times as long as outer pair; arolium about one third length of claw; right antennae normal, left antennae short, 4-5 segmented, apical segment club-shaped ***A. obariensis* sp. n.**

***Aiolopus obariensis* sp. n.**

(Fig. 1, 2 A-H)

Description. Male holotype (Fig. 1). Size medium; integument strongly rugulose; right antennae 24-segmented, as long as head and pronotum together, left antennae 4-segmented; fastigium of vertex wide, convex, slightly depressed in middle, as long as wide, apex very narrow; fastigial foveolae trapezoid, shallow, coarsely pitted, situated more anterior to eyes; frontal ridge wide, coarsely tuberculate, with parallel margins depressed at ocellus, strongly narrowed towards apex; eyes oval, about one and a half times as long as wide; pronotum narrow, median carina distinct; prozona cylindrical above, constricted medially, metazona rather flat, one and a half times as long as prozona, posterior margin obtuse-angular; mesosternal interspace trapezoid, wider than long, mesosternal lobes rounded at its inner margins; tegmina exceeding apex of hind femur; hind wings hyaline, slightly opaque at apex; hind femur broad, three and a quarter times as long as wide; hind tibia shorter than hind femur with 9 outer and 10 inner spines, inner apical spurs slightly less than one and a half times as long as outer pair; arolium small, about one-third length of claw.

Genitalia. Supra-anal plate elongate-angular, longer than wide, lateral margins curved medially, apex obtuse-angular; cercus elongate, broad, slightly more than twice as long as wide, apex obtuse (Fig. 2G). Subgenital plate (Fig. 2H) broadly angular, one and a half times as wide as long, apex obtuse-angular. Epiphallus (Fig. 2E), bridge moderately narrow, undivided; ancorae moderately broad, curved and pointed at tips; lophi lobiform; lateral plates and their anterior projections well developed, posterior projections broadly angular. Aedeagus (Fig. 2F), apical valve upcurved, much narrower and shorter than basal valve, apex pointed.

General coloration. Resembles *A. simulatrix* (Walker), brown with ochraceous and blackish markings; pronotum uniformly brownish; tegmina with two ochraceous transverse fasciae, apex spotted; hind wings hyaline, base pale-yellow, slightly smoked apically; hind femur with blue dark spots on upper

carinae, with two dark fasciae on inner surface, hind knee dark; hind tibia black with two broad ochraceous rings basally and medially, spines pale yellowish with black apex.

Measurements (length in mm). Body 22.0; pronotum 5.0; tegmen 21.5; hind femur 13.0.

Female. Similar to male but larger, right antennae slender, 25-segmented; left antennae 5-segmented, apical segment club-shaped.

Genitalia. Supra-anal plate as long as wide, apex obtuse-angular, cercus broad, twice as long as wide, with obtuse apex (Fig. 2A). Subgenital plate (Fig. 2B) with posterior margin wavy, slightly convex in middle, setose marginally; Jannone's organs streaked; egg-guide tubular, of uniform width, about three times as long as wide; apex obtusely-conical. Spermatheca (Fig. 2C) with apical diverticulum short and tubercle-like, pre-apical diverticulum well developed and sac-like. Ovipositor (Fig. 2D) valves elongate, moderately robust, acute, curved and slightly shorter than lateral apodeme; dorsal valve moderately broad, more than three times as long as wide, apical tip elongate and sub-acute; external edge tuberculate, dorsal condyle prominent; ventral valve with slope slightly concave, apical tip subacute, mesial tooth distinct, basal sclerite broad; mesial valve dilated apically with apical tip down curved and pointed.



Figure 1. *Aiolopus obariensis* sp. n., male holotype.

Type Material. HOLOTYPE male, LIBYA: Fezzan province, Wadi Haya region, Altitude 470 m., Obari, on alfalfa, 30.v.95 (M. K. Usmani). Paratypes 2 male, 2 female (same data as for holotype). Depository: Zoology Museum, Sebha University, Brack, Libya.

Variation. Measurements of four males and four females gave the following ranges and means: Males. Body 22.0-23.0 mm (mean 22.4 mm); pronotum 5.0-5.6mm (mean 5.3); tegmen 21.5-22.3 mm (mean 21.8 mm); hind femur 13.0-14.3 mm (mean 13.7 mm). Females. Body 26.0-26.6 mm (mean 26.3 mm); pronotum 6.3-6.9 mm (mean 6.6 mm); tegmen 26.0-26.8 (mean 26.4 mm); hind femur 15.0-16.0 (mean 15.5.0).

Remarks. This new species is similar to *A. simulatrix* (Walker) but differs from it by the key characters outlined in the key to the species above.

Etymology. The species name is based on the city of Obari in Wadi Haya region of Fezzan Province in Libya.

***Aiolopus thalassinus* (Fabricius, 1781)**

(Fig. 3A-H)

Gryllus thalassinus Fabricius, 1781: 367.

Acridium grossuni Costa, 1836: 25 (Kirby 1910: 191).

Acridium laetum Brulle, 1840: 77 (Finot 1895: 423).

Aiolopus thalassinus (Fabricius); Fieber 1853: 100.

Epacromia angustifemur Ghiliani, 1869: 179 (Kirby 1910: 191).

Ochrophlebia savignyi Krauss, 1890: 261 (Storey 1919: 54).

Epacromia lurida Brancsik, 1895: 250 (Hollis 1968: 340).

Aiolopus thalassinus kivuensis Sjostedt, 1923: 18 (Sjostedt 1929: 24).

Aiolopus acutus Uvarov, 1953: 111 (Hollis 1968: 340).

Aiolopus thalassinus (Fabricius); Harz 1975: 554.

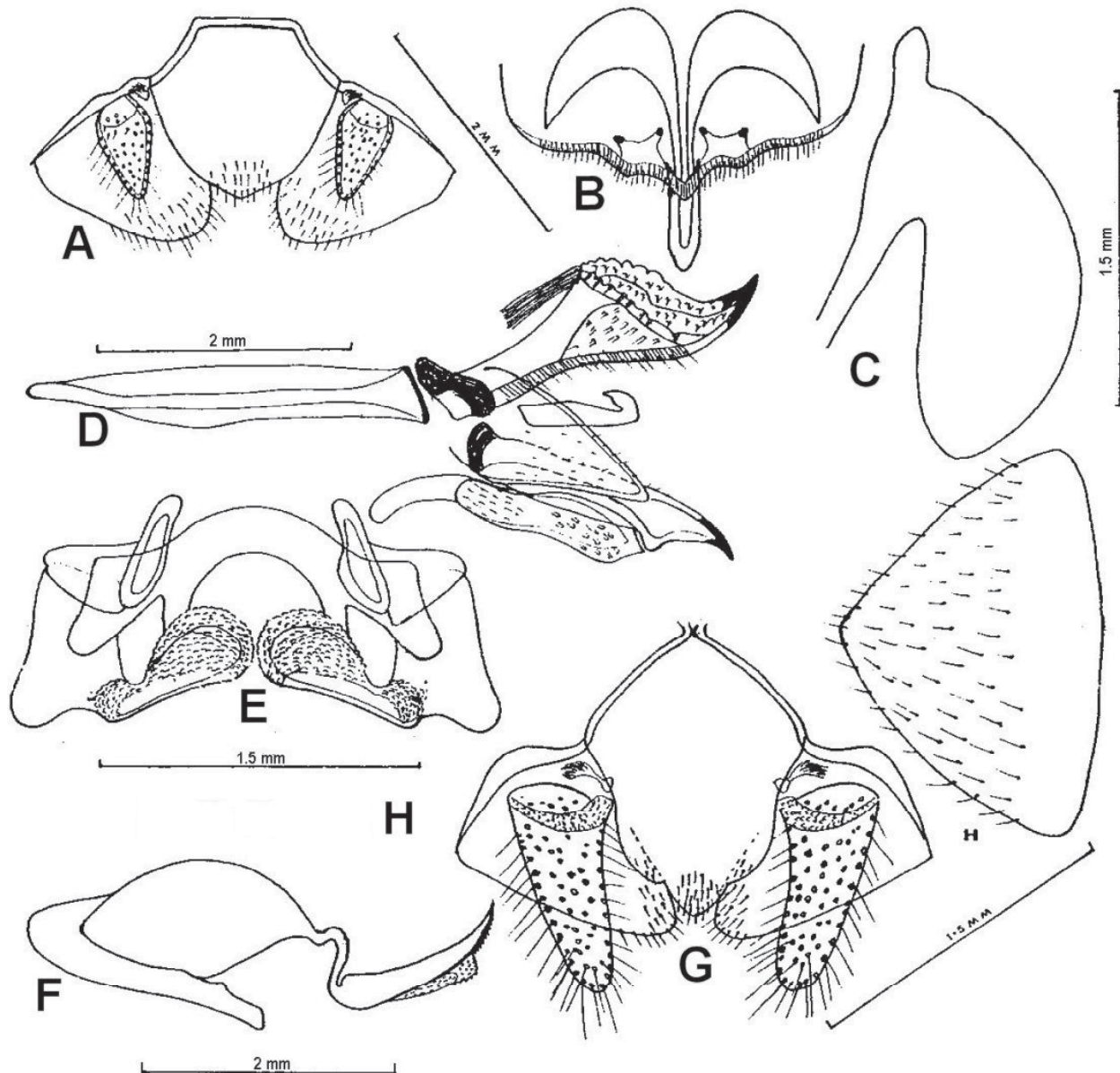


Figure 2. *Aiolopus obariensis* sp. n. A) Female supra-anal plate and cerci. B) Female subgenital plate. C) Spermatheca. D) Ovipositor. E) Epiphallus. F) Aedeagus. G) Male supra-anal plate and cerci. H) Male subgenital plate.

Description. Male. Size medium; integument moderately rugose; antennae 22-24 segmented, about as long as head and pronotum together; fastigium of vertex pentagonal, moderately concave, slightly longer than wide; fastigial foveolae trapezoidal, about twice as long as wide, frontal ridge flattened or slightly convex, sparsely punctured; eyes oval, nearly one and a half times as long as wide; pronotum slightly saddle-shaped, constricted in middle; metazona more than one and a half times as long as prozona, posterior margin obtuse-angular; mesosternal interspace almost square; tegmina long, extending beyond apex of hind femur, apex slightly rounded; hind wings hyaline, slightly opaque at apex; hind femur narrow, about four times as long as wide; hind tibia as long as or slightly shorter than hind femur, with 10 outer and 11 inner spines, inner apical spurs about one and a half times as long as outer spurs; arolium half length of claw.

Genitalia. Supra-anal plate elongate-angular, sculptured in middle, lateral margins straight, diverging posteriorly, apex obtusely rounded; cercus narrow-conical with obtuse apex (Fig. 3G). Subgenital

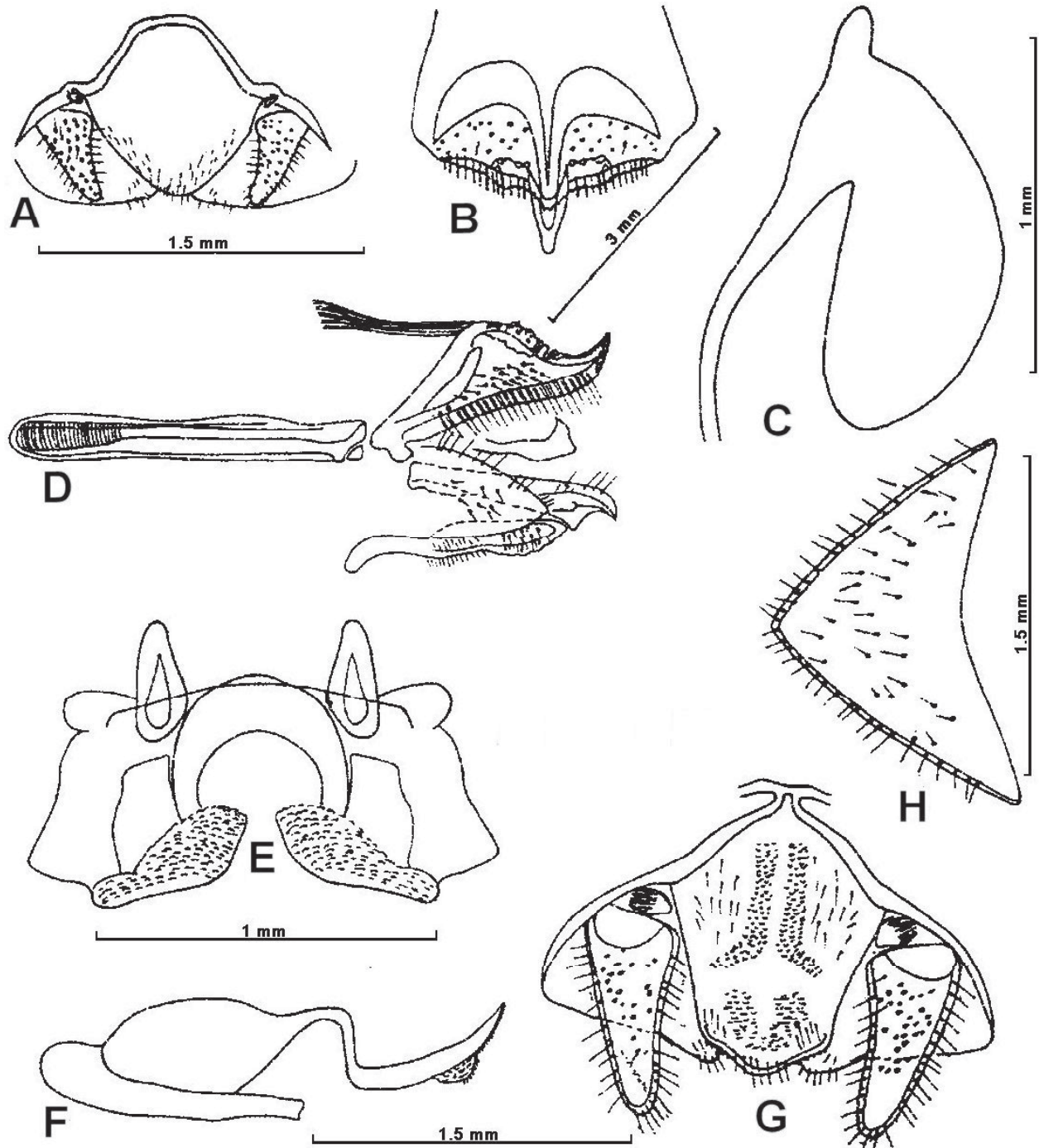


Figure 3. *Aiolopus thalassinus* (Fabricius). **A)** Female supra-anal plate and cerci. **B)** Female subgenital plate. **C)** Spermatheca. **D)** Ovipositor. **E)** Epiphallus. **F)** Aedeagus. **G)** Male supra-anal plate and cerci. **H)** Male subgenital plate

plate (Fig. 3H) short, sub-conical, with obtuse apex. Epiphallus (Fig. 3E), bridge moderately narrow, undivided medially; ancora broad, curved with broadly rounded tips, lophi lobiform; lateral plates and their anterior projections prominent, posterior projections prominent and angular. Aedeagus (Fig. 3F), apical valve curved upward, much narrower and shorter than basal valve, apex slightly blunt.

General coloration. Variable, green or brown with ochraceous and black markings; pronotum with or without median longitudinal ochraceous stripe and criss-cross pattern on dorsum; tegmina with costal

area generally mottled and without clearly defined darkened bands; hind wing hyaline, bases sometimes weakly yellowish green, with apex darkened; upper surface of hind femur with two triangular black spots, green externally, reddish internally, apex blackish; hind tibia black basally, with broader ochraceous ring, reddish at apical two third.

Female. Similar to male but larger and more robust.

Genitalia. Supra-anal plate short, as long as wide, apex broadly rounded; cercus elongate-conical, incurved, twice as long as wide with obtuse apex (Fig. 3A). Subgenital plate (Fig. 3B), posterior margin wavy, slightly convex in middle, setose marginally; Jannone's organs streaked; egg-guide elongate-narrow, almost three times as long as wide. Spermatheca (Fig. 3C), apical diverticulum short and tubercle-like, pre-apical diverticulum broad and sac-like. Ovipositor (Fig. 3D) valves elongate, moderately robust, acute, curved and slightly shorter than lateral apodeme; dorsal valve moderately broad, three times as long as wide, apical tip elongate-narrow and acute, external edge tuberculate; ventral valve with slope deeply concave, apical tip pointed, mesial tooth distinct, basal sclerite narrow and punctate; mesial valve dilated apically.

Variation. Measurements (length in mm): Body, male 15.2-21.2, female 19.8-29.3; pronotum, male 2.8-4.0, female 3.8-5.5; tegmina, male 14.2-20.5, female 17.0-26.3; hind femur, male 9.5-12.2, female 10.9-16.5.

Material examined. Material deposited in Zoology Museum, Sebha University, Brack. **Libya:** Al Shati Region: Ashkidah, 2 male, 4 female, on alfalfa, 21.xi.1992; Brack Agric. Project, 3 male, 3 female, on alfalfa, 3 male, 6 female, on vegetable field, 18.ii.1993; Brack, 2 male, 1 female, on grass, 15.vi.93; Idri, 2 male, 1 female, on alfalfa, 13.iv.1993; Mahruqah, 1 male, 1 female, on alfalfa, 6.viii.1992; Mansurah, 1 male, 1 female, on alfalfa, 13.iv.93; Qardah, 1 female, on barley, 15.xii.1992; Ququm, 10 male, 3 female, on alfalfa, 9 male, 6 female, on mint, 29.x.1992; Tamzawah, 5 female, on alfalfa, 2male, 3 female, on grape, 4.xi.1992; Tarut, 2 female, on alfalfa, 6.viii.1992; Zahra, 4 male, 2 female, on grass, 15.xii.1992; Zalwaz, 4 male, 5 female, on alfalfa, 15.v.1993; Zuwayyah, 1 female, on grass, 7.iv.1993; Wanzarik, 1 male, 2 female, on barley, 13.iv.1993. Ghat Region: Al Awaynat, 2 male, 2 female, on vegetable, 20.vii.1995; Al Barkat, 2 male, 3 female, on alfalfa & grass, 19.vii.1995; Ghat, 5 male, 6 female, on barley/alfalfa, 6.xi.1994. Murzuk region: Agar-Atabah, 1 male, on grass, 23.vi.1993; Bani-Hilal, 13 female, on grass, 27.iv.1993; Hammera, 1 female, on alfalfa, 8.i.1994; Makhatin, 4 male, 1 female, on grass & dry millet, 27.v.1993; Marhaba, 23 male, 23 female, on alfalfa, 11.xii.1993; Misquwin, 13 female, on grass, 8.i.1994; Murzuq, 30 male, 20 female, on water melon & melon, 5.v.1993; Tegrutin, 1 male, on alfalfa, 11.xii.1993; Traghan, 22 male, 9 female, on vegetable, 13.iv.1993 and 27.v.1993; Tsawah, 5 male, 23 female, on grass, 11.xii.1993; Um-Al Aranib, 1 male, on vegetable, 8.i.1994; Zuwaylah, 4 male, 1 female, on alfalfa & grass, 8.i.1994. Sebha Region: Al Zighan, 3 male, 2 female, on millet, 18.v.1994; Ghodwa, 2 male, 2 female, on vegetable, 13.iv.1993; Samnu, 4 male, 5 female, on alfalfa & vegetable, 18.v.1994; Sebha, 10 male, 13 female, on barley & grass, 17.vi.1994; Tamanhent, 2 male, 2 female, on grass, 18.v.1994. Wadi Haya Region: Al Abyad, 7 male, 7 female, on garlic and onion, 2.xi.1992; Al Hamarah, 1 male, 2 female, on alfalfa, 2.xi.1992; Khalayf, 8 male, 2 female, on millet and groundnut, 16.xi.1992; Ben Hareth, 9 male, 12 female, on grass and tomato, 16.xi.1992; Bint Bayyah, 8 male, 3 female, on alfalfa & grass, 16.xi.1992; Garagra, 10 male, 6 female, on millet, 27.xi.1992; Sidi Ali, 7 male 10 female, on alfalfa/grass, 7.xii.1992; Tkerkibah, 2 male, on groundnut, 7.xii.1992; Al Garaya, 48 male, 19 female, on alfalfa/egg plant, 7.xi.1992; Jarmah, 1 female, on swede, 15.xii.1992; Al Breek, 14 male, 7 female, on alfalfa, wild grass, 15.xii.1992; Arragabah, 15 male, 3 female, on alfalfa and egg plant, 15.xi.1992; Awbari, 9 male, 5 female, on alfalfa & barley, 30.i.1993; Ed Disah, 5 male, 4 female, on alfalfa, 15.ii.1993; Al Hatiyah, 4 male, 3 female, on carrot and swede, 15.ii.1993; Al Gharayfah, 20 male, 14 female, on barley and wheat, 15.ii.1993.

Material from Libya preserved in Italian Museums recorded by Massa (1998): Homs VII-VIII.13, AA (0/1); Brach VII.31, EZ (0/1); Cufra VII.31 (0/2); El Giof VII.31 (0/1); Buema VII.31 (0/1); Agedabia VII.31 (0/1); Murzuk XI.32, LC (0/1) (MSNG); Derna 15.VII.24, GK (2/2); Bengasi 25.VII.23, GK (1/0) (MZUR); Tagiura 4.VIII.37 (0/2) (DEZAP); Leptis Magna 5.IV.98, BM (3/3); 25 Km N Bengasi 7.IV.98, BM (3/5); At Tmimi 12.IV.98, BM (1 nina); Sabrata 15.IV.98, BM (0/1) (CMUP).

Libyan localities. CYRENAICA: Barca, Bengasi, Derna, Fueihat, Marmarica, Porto Bardia. TRIPOLITANIA: Ain Zara, Mizda, Taguira, Tripoli. FEZZAN: Agar Atabah, Al Abyad, Al Awayynat, Al Barkat, Al Breek, Al Garaya, Al Ghraeayfah, Al Hamarah, Al Hatiyah, Al Zighan, Arragabah, Ashkidah, Awbari, Bani Hilal, Ben Hareth, Bint Bayyah, Brack, Ed Disah, Gragara, Ghat, Ghodwa, Hammera, Idri, Jarmah, Khalayf, Mahrugah, Makhaten, Mansurah, Misquwin, Murzuk, Qardah, Ququm, Samnu, Sebha, Sidi Ali, Tamanhant, Tamzawah, Tarut, Tegrutin, Tkerkibah, Traghen, Tsawah, Um Al Aranib, Wanzarik, Zahra, Zalwaz, Zuwaylah, Zuwayyah.

Distribution. Afghanistan, Albania, Algeria, Angola, Austria, Bahrain, Botswana, Cape Verde Is., Comoro Is., Cyprus, the former Czechoslovakia, Egypt, Ethiopia, France, Gambia, Ghana, Greece, Guinea, Hungary, India, Iran, Iraq, Israel, Italy (Sardinia), Jordan, Kenya, Lebanon, Libya, Madagascar, Malawi, Morocco, Mozambique, Namibia, Nigeria, Oman, Pakistan, Portugal (Madeira), Rwanda, Saudi Arabia, Senegal, Sierra Leone, Somalia, South Africa (Cape Province, Natal, Transvaal), Spain (Canary Is.), Sudan, Swaziland, Switzerland, Syria, Tanzania, Togo, Tunisia, Turkey, Uganda, Uzbekistan, Yemen, the former Yugoslavia, Zaire, Zambia, Zimbabwe (COPR 1982).

Remarks. This species is distributed throughout Africa and Europe. It is a common and widely distributed species in the grasslands of Libya. It was previously recorded from Tripolitania and Cyrenaica by Werner (1908), Ghigi (1913), Giglio-Tos (1923), Salfi (1925, 1927a), Jannone (1938), Mellini (1955), La Greca (1957) and Hollis (1968). This is reported as the most widespread species of *Aiolopus* in Al-Shati, Fezzan by Ajaili et al. (1989).

***Aiolopus strepens* (Latreille, 1804)**

(Fig. 4)

Acrydium strepens Latreille, 1804: 154.

Gryllus prasinus Thunberg, 1815: 239 (Hollis 1968: 327).

Acridium vittatum Brulle, 1840: 78 (Finot 1895: 422).

Aiolopus strepens (Latreille, 1804); Fieber 1853: 100.

Aiolopus strepens (Latreille, 1804); Hollis 1968: 327.

Description. Male: Size medium; integument moderately rugose; antennae 22-24 segmented, shorter than head and pronotum together; fastigium of vertex pentagonal, slightly concave, hardly longer than wide; fastigial foveolae trapezoidal, very shallow; frontal ridge flat or convex, sparsely punctured, gradually narrowing upwards; eyes ellipsoid, almost twice as long as wide; pronotum subtectiform, rather flat, prozona not constricted medially; metazona less than twice as long as prozona, posterior margin narrowly obtuse-angular; mesosternal interspace rectangular, slightly broader than long; tegmina relatively short and broad, exceeding apex of hind femur; hind wings hyaline, smoked towards apex; hind femur broad, less than three and a half times as long as wide; hind tibia as long as hind femur, with 10 outer and 11 inner spines, inner apical spurs slightly more than one and a half times as long as outer half; arolium about half length of claw.

Genitalia. Supra-anal plate elongate-angular, lateral margins curved in the middle, apex obtusely conical; cercus broad, with broadly rounded apex (Fig. 4G). Subgenital plate (Fig. 4H) short, sub- with apex bluntly rounded. Epiphallus (Fig. 4E), bridge narrow and undivided; ancorae broad and curved with slightly blunt tips; in the form of lobes; lateral plates and their anterior projections prominent and well developed, posterior projections elongate-angular. Aedeagus (Fig. 4F), apical valve curved upward, much narrower and shorter than basal valve, apex pointed.

General coloration. Uniformly brown or green to uniformly green; pronotum usually unicolorous, disc brown but sometimes with median longitudinal stripes which may extend upto vertex; tegmina with pale basal transverse fascia which extends either as far as medial vein or as far as first vannal vein; hind wings hyaline, base often green bluish, darkened apically; hind femur brown with testaceous spots, blackish at upper surface, reddish on inner surface; hind tibia red with light brown condyle, with basal one-fourth ochraceous or pinkish, apical three-fourths red, separated by a narrow, incomplete black band.

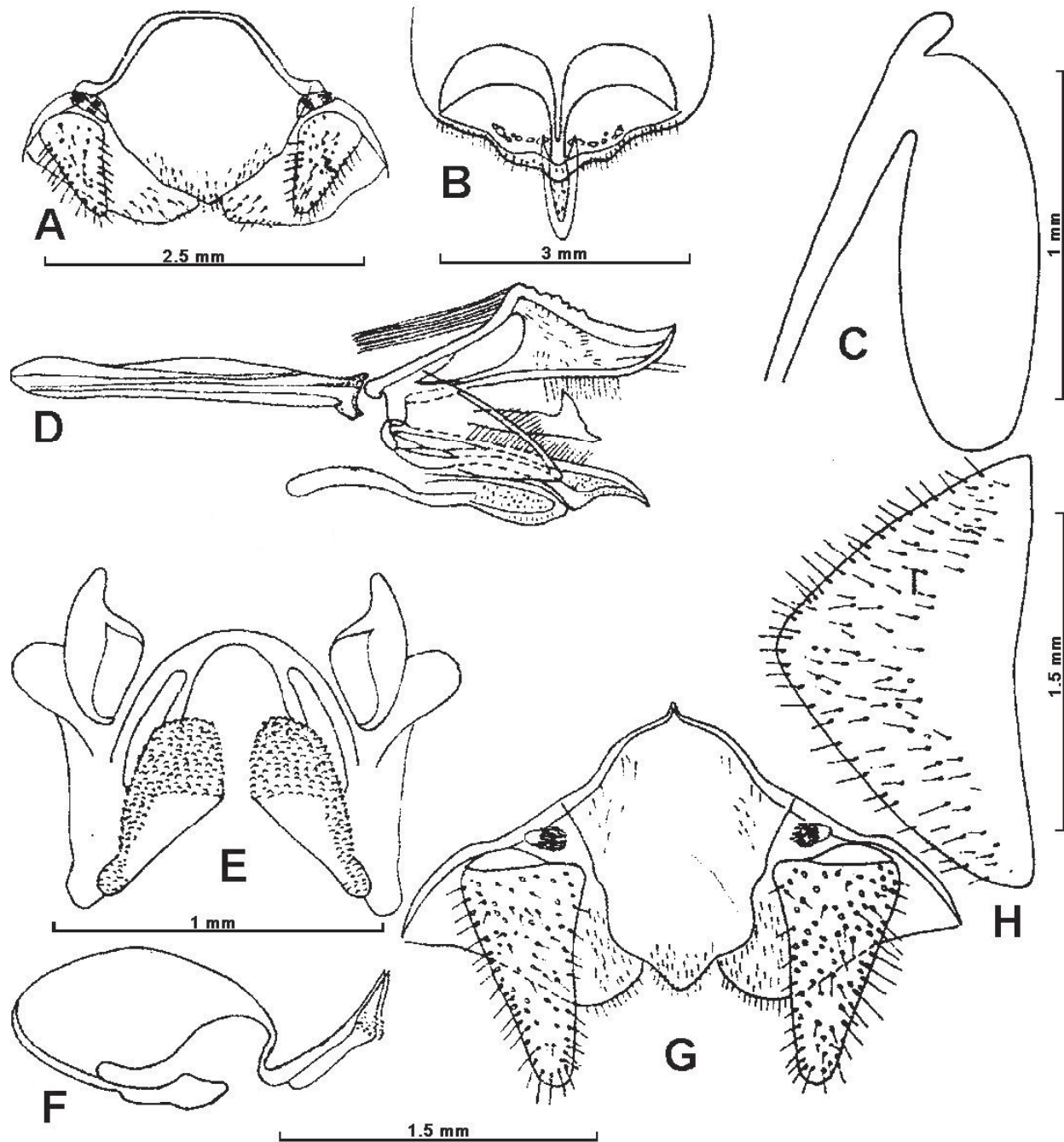


Figure 4. *Aiolopus strepens* (Latreille). **A)** Female supra-anal plate and cerci. **B)** Female subgenital plate. **C)** Spermatheca. **D)** Ovipositor. **E)** Epiphallus. **F)** Aedeagus. **G)** Male supra-anal plate and cerci. **H)** Male subgenital plate

Female. Similar to male but larger and more robust, frequently green.

Genitalia: Supra-anal plate short, wide, as long as wide, apex obtusely-conical; cercus broad, about twice as long as wide, with obtuse apex (Fig. 4A). Subgenital plate (Fig. 4B), posterior margin wavy, slightly convex in middle, setose marginally, Jannone's organs streaked; egg-guide uniformly broad, two and a half times as long as wide. Spermatheca (Fig. 4C), apical diverticulum short, not developed, pre-apical diverticulum broad and sac-like. Ovipositor (Fig. 4D), valves elongate, moderately robust, acute,

curved and slightly shorter than lateral apodeme; dorsal valve moderately broad, three times as long as wide, apical tip elongate-narrow and pointed, external edge tuberculate, dorsal condyle much prominent; ventral valve with slope moderately concave, apical tip long, curved and pointed, mesial tooth distinct, basal sclerite narrow and punctate, setose apically; mesial valve with apical tip blunt.

Variation. Measurements (length in mm): Body, male 17.7-23.7, female 22.7-32.0; pronotum, male 3.9-5.0, female 4.5-7.0; tegmina, male 16.7-23.6, female 19.6-30.9; hind femur, male 11.3-14.8; female 13.4-19.2.

Material examined. Material deposited in Zoology Museum, Sebha University, Brack, **Libya**: Al Shati Region: Ashkidah, 2 female, on alfalfa, 21.xi.1992; Agar, 1 female, on wild grass, 29.x.1992; Brack H.I.T., 1 female, on cotton, 24.xi.1992; Mahruqah, 1 female, on alfalfa, 2.xii.1992; Qardah, 1 female, on barley, 15.xii.1992; Ququm, 2 male, 3 female, on alfalfa, 1 female, on millet, 29.x.1993; Tamzawah, 1 female, on alfalfa, 4.xi.1992; Tarut, 1 male, 7 female, on alfalfa, 6.xii.1992; Zahra, 2 female, on grass, 15.xii.1992; Zalwaz, 2 male, on alfalfa, 15.v.1993. Ghat Region: Al Barkat, 2 male, 3 female, on millet, 19.vii.1995; Ghat, 3 male, 4 female, on grass/grape, 18.vii.1993. Murzuk region: Al Qatrun, 4 male, on vegetable, 15.v.1993; Al Sbitat, 1 male, 1 female, on bean, 23.vi.1993; Bani-Hilal, 1 female, on alfalfa, 17.vi.1993; Edlem, 3 female, on vegetable, 27.vi.1993; Majdul, 1 male, on vegetable, 15.v.1993; Makhaten, 2 male, 1 female, on grass & dry millet, 27.vi.1993; Marhaba, 5 male, 2 female, on alfalafa, 11.xii.1993; Misquwin, 2 male, 1 female, on grass, 8.i.1994; Murzuq, 23 male, 14 female, on water melon, 5.v.1993; Tsawah, 4 male, 1 female, on grass, 11.xii.1993; Zuwaylah, 3 male, 2 female, on alfalfa & grass, 8.i.1994; Haj-Hujeil, 2 male, 2 female, on alfalfa, 27.iv.1993. Sebha Region: Al Zighan, 2 male, 5 female, on cotton and wild grass, 18.v.1994; Ghodwa, 2 male, 1 female, on wild grass, 13.iv.1993; Samnu, 2 male, 3 female, on millet, 18.v.1994; Sebha, 3 male, 8 female, on alfalfa/grass, 18.vi.1995; Tamanhent, 2 male, 3 female, on alfalfa/barley, 18.v.1994. Wadi Haya Region: Al Abyad, 11 male, 9 female, on grass/vegetable, 2.xi.1992; Al Garaya, 3 male, 10 female, on barley and wild grass 7.xi.1992; Al Hamarah, 3 female, on alfalfa, 2.xi.1992; Khalayf, 4 male, 11 female, on groundnut, 16.xi.1992; Ben Hareth, 3 male, 6 female, on grape & onion, 16.xi.1992; Bint Bayyah, 1 female, on carrot, 16.xi.1992; Gragara, 2 female, on onion, 27.xi.1992; Tkerkibah, 1 male, 2 female, on groundnut, 7.xii.1992; Jarmah, 2 male, 4 female, on vegetable, 15.xi.92; Al Breek, 1 female, on wild grass, 15.xii.92; Arragabah, 1 male, 3 female, on barley, 15.xi.1992; Awbari, 2 male, 2 female, on alfalfa/barley, 30.i.1993; Al Hatiyah, 1 female, on broad bean, 15.ii.1993.

Material from Libya preserved in Italian Museums listed by Massa (1998): Gatrún XII.32, LC (0/1); Brach IX.32, LC (0/1); Murzuk 16.VIII.33, EZ (0/1); Ubari X.32, LC(1/0); Um el Araneb XII.32, LC (0/1); Buema VI.31 (0/1); Bengasi, EF (0/1) (MSNG); Bengasi 27.VIII.23, GK (0/1); Derna 15.VII.24, GK (0/1) (MZUR).

Libyan localities. CYRENAICA: Ain Mara, Barca, Bardia, Bengasi, Cufra, Derna, Gialo, Marada, Marmarica, Merg, Tolmetta, Wadi Derna, Wadi Kuf. TRIPOLITANIA: Ain Zara, Endschilla (Engila), Mellaha, Tripoli. FEZZAN: Al Abyad, Al Barkat, Al Breek, Al Garaya, Al Hamarah, Al Hatiyah, Al Qatrun, Al Sbitat, Al Zighan, Agar, Arragabah, Ashkidah, Awbari, Bani Hilal, Ben Hareth, Brak, Gragara, Haj Hujeil, Jarmah, Khalayf, Mahruqah, Majdul, Makhten, Marhaba, Misquwin, Murzuq, Qardah, Ququm, Samnu, Sebha, Tamanhant, Tamzawah, Tarut, Tkerkibah, Traghan, Tsawah, Zahra, Zalwaz, Zuwaylah.

Distribution: Albania, Algeria, Austria, Azerbaijan, Bulgaria, Cyprus, Egypt, France, Greece, Hungary, Iran, Iraq, Israel, Italy (Sardinia, Sicily), Jordan, Lebanon, Libya, Malta, Morocco, Pakistan, Portugal, Romania, Saudi Arabia, Spain (Canary Is., Madeira), Sudan, Switzerland, Syria, Tunisia, Turkey, the former Yugoslavia (COPR 1982).

Remarks. The range of this species covers most of the Mediterranean region and it is distributed widely in Libya and in the neighboring North African countries, and Europe. It was previously recorded from Libya by Werner (1908), Ghigi (1913), Giglio-Tos (1923), Salfi (1925, 1927a, b, 1935a, b) and Hollis (1968). It is reported from Fezzan by Salfi (1935a) and Ajaili et al. (1989).

***Aiolopus simulatrix* (Walker, 1870)**

(Fig. 5)

Epacromia simulatrix Walker, 1870: 773.*Heteropternis savignyi* Krauss, 1890: 262 (Hollis 1968: 320).*Epacromia affinis* Bolivar, 1902: 600 (Hollis 1968: 320).*Aeolopus laticosta*. Bolivar, 1912: 270 (Hollis 1968: 320).*Aeolopus strepens deserticola* Uvarov 1922: 358 (Hollis 1968: 320).*Aiolopus savignyi* (Krauss); Damiano 1969: 130.*Aiolopus simulatrix* (Walker); Harz 1975: 555.

Description. Male. Size medium; integument more strongly rugulose; antennae 22- 24 segmented, as long as head and pronotum together; fastigium of vertex pentagonal, moderately concave, slightly longer than wide, apex narrowly rounded; fastigial foveolae rectangular, shallow; frontal ridge wide, coarsely tuberculate, with parallel margins, strongly narrowed below fastigium; eyes oval, about one and a half times as long as wide; pronotum relatively narrow, median carina strong in prozona, prozona cylindrical above, very slightly constricted medially, metazona rather fiat, posterior margin obtuse- angular; mesosternal interspace trapezoid, wider than long; tegmina relatively long, far exceeding apex of hind femur; hind wings hyaline, slightly smoked at apex; hind femur broad, three and a half times as long as wide; hind tibia shorter than hind femur with 9 outer and 10 inner spines, inner apical spurs slightly less than twice as long as outer pair; arolium half length of claw.

Genitalia. Male Supra-anal plate elongate-angular, finely sculptured, lateral margins curved medially, apex elongately conical; cercus elongate-conical, with obtuse apex (Fig. 5G). Subgenital plate (Fig. 5H) broadly angular, apex broadly rounded. Epiphallus (Fig. 5E), bridge moderately narrow, undivided; ancorae moderately broad, curved and pointed at tip; lophi lobiform; lateral plates and their anterior projections well developed, posterior projections small, angular. Aedeagus (Fig. 5F), apical valve curved upward, much narrower and shorter than basal valves.

General coloration. Brown with ochraceous or green and blackish markings; pronotum often uniformly brown or sometimes greenish, rarely with weak ochraceous X-shaped pattern on dorsum; tegmina with two ochraceous transverse fasciae which extend from anterior margin to first vannal vein, apex of tegmina mottled spotted; hind wing hyaline, sometimes base pale-yellow, slightly darkened apically; hind femur with two dark spots at upper surface, with two incomplete dark fasciae on inner surface, hind knee dark; hind tibia black basally with a broad ochraceous ring and with a broad blackish or grey ring medially, reddish at apical third.

Female. Similar to male but more robust and larger.

Genitalia. Supra-anal plate short, as long as wide, apex obtusely rounded; cercus broad, slightly less than twice as long as wide, with blunt apex (Fig. 5A). Subgenital plate (Fig. 5B), posterior margin wavy, slightly convex in middle, setose marginally, Jannone's organs streaked; egg-guide broad basally and narrowing apically, two and half times as long as wide. Spermatheca (Fig. 5C), apical diverticulum short and tubercle-like; preapical diverticulum well developed and sac-like, ovipositor (Fig. 5D) valves elongate, moderately robust, acute, curved and slightly shorter than lateral apodeme; dorsal valve moderately broad, three times as long as wide, apical tip elongate-narrow, subacute; external edge tuberculate, dorsal condyle prominent; ventral valve with slope slightly concave, apical tip long and pointed, mesial tooth distinct, basal sclerite narrow and punctate; mesial valve with apical tip elongate-conical.

Variation. Measurements (length in mm): Body, male 16.9-26.0, female 21.0-30.8; pronotum, male 3.2-4.5, female 3.9-5.2; tegmina, male 16.1-21.9, female 18.5-26.6; hind femur, male 9.0-11.8, female 11.0-14.6.

Material examined. Material deposited in Zoology Museum, Sebha University, Brack. **Libya:** Al Shati Region: Ashkidah, 2 male, 4 female, on alfalfa, 21 .xi.1992; Brack Agric. Project, 3 male 3 female, on alfalfa, 3 male, 6 female in vegetable field, 18.ii.1993; Brack, 2 male 1 female, on grass, 15.vi.93; Idri, 2

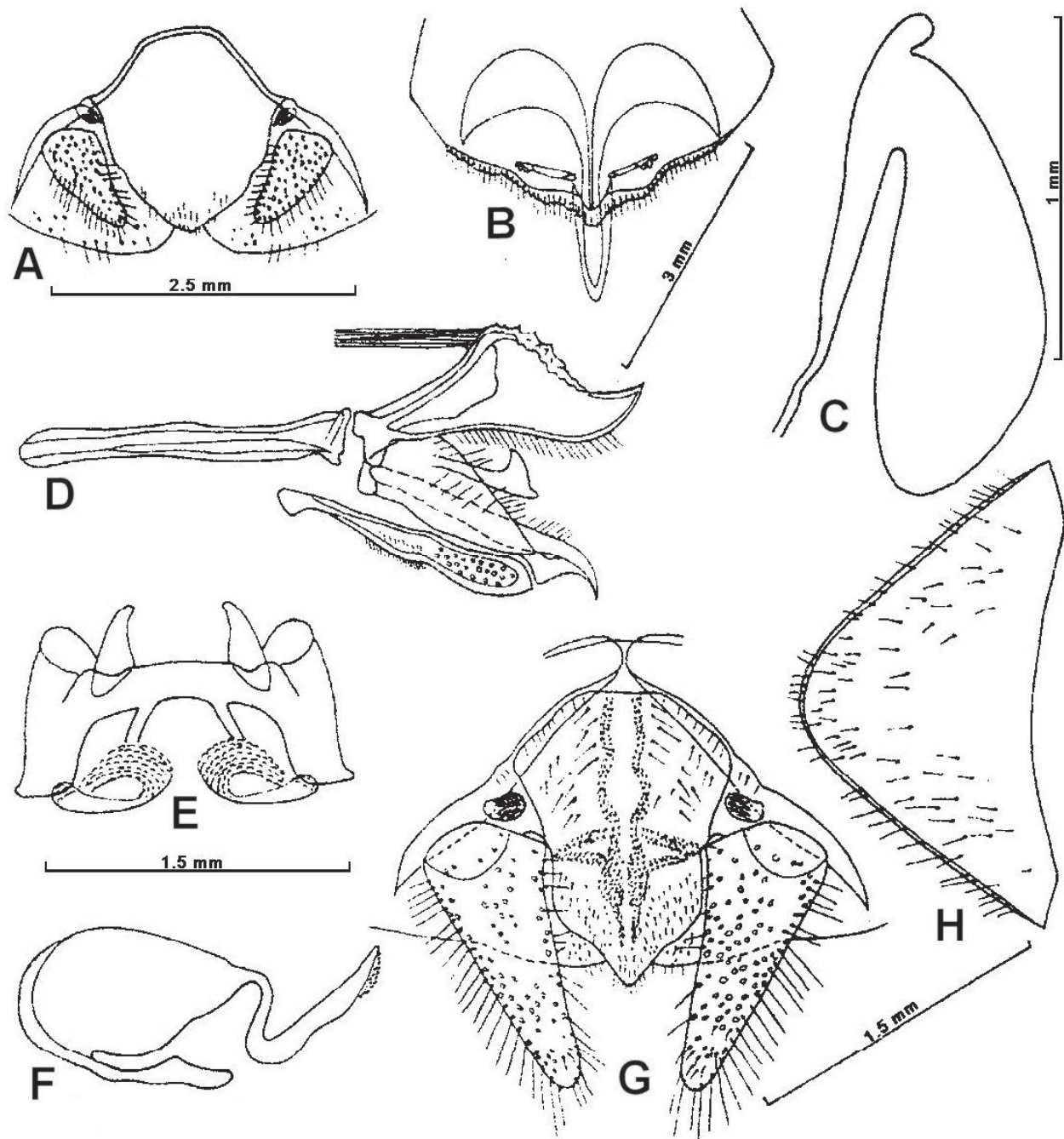


Figure 5. *Aiolopus simulatrix* (Walker). **A)** Female supra-anal plate and cerci. **B)** Female subgenital plate. **C)** Spermatheca. **D)** Ovipositor. **E)** Epiphallus. **F)** Aedeagus. **G)** Male supra-anal plate and cerci. **H)** Male subgenital plate

male, 1 female, on alfalfa, 13.iv.1993; Mahruqah, 1 male, 1 female, on alfalfa, 6.viii.1992; Mansurah, 1 male, 1 female, on alfalfa, 13.iv.93; Qardah, 1 female, on barley, 15.xii.1992; Ququm, 10 male, 3 female, on alfalfa, 9 male, 6 female, on mint, 29.x.1992; Tamzawah, 5 female, on alfalfa, 2male, 3 female, on grape, 4.xi.1992; Tarut, 2 female, on alfalfa, 6.viii.1992; Zahra, 4 male, 2 female, on grass, 15.xii.1992; Zalwaz, 4 male, 5 female, on alfalfa, 15.v.1993; Zuwayyah, 1 female, on grass, 7.iv.1993; Wanzarik, 1 male, 2 female, on barley, 13.iv.1993. Ghat Region: Al Awaynat, 2 male, 2 female, on vegetable, 20.vii.1995; Al Barkat, 2 male, 3 female, on alfalfa & grass, 19.vii.1995; Ghat, 5 male, 6 female, on barley/alfalfa, 6.xi.1994. Murzuk region: Agar-Atabah, 1 male, on grass, 23.vi.1993; Bani-Hilal, 13 female, on grass,

27.iv.1993; Hammera, 1 female, on alfalfa, 8.i.1994; Makhatin, 4 male, 1 female, on grass & dry millet, 27.v.1993; Marhaba, 23 male, 23 female, on alfalfa, 11.xii.1993; Misquwin, 13 female, on grass, 8.i.1994; Murzuq, 30 male, 20 female, on water melon & melon, 5.v.1993; Tegrutin, 1 male, on alfalfa, 11.xii.1993; Traghan, 22 male, 9 female, on vegetable, 13.iv.1993 and 27.v.1993; Tsawah, 5 male, 23 female, on grass, 11.xii.1993; Urn-Al Aranib, 1 male, on vegetable, 8.i.1994; Zuwaylah, 4 male, 1 female, on alfalfa & grass, 8.i.1994. Sebha Region: Al Zighan, 3 male, 2 female, on millet, 18.v.1994; Ghodwa, 2 male, 2 female, on vegetable, 13.iv.1993; Samnu, 4 male, 5 female, on alfalfa & vegetable, 18.v.1994; Sebha, 10 male, 13 female, on barley & grass, 17.vi.1994; Tamanhent, 2 male, 2 female, on grass, 18.v.1994. Wadi Haya Region: Al Abyad, 7 male, 7 female, on garlic and onion, 2.xi.1992; Al Hamarah, 1 male, 2 female, on alfalfa, 2.xi.1992; Khalayf, 8 male, 2 female, on millet and ground nut, 16.xi.1992; Ben Hareth, 9 male, 12 female, on grass and tomato, 16.xi.1992; Bint Bayyah, 8 male, 3 female, on alfalfa & grass, 16.xi.1992; Garagra, 10 male, 6 female, on millet, 27.xi.1992; Sidi Au, 7 male, 10 female, on alfalfa/grass, 7.xii.1992; Tkerkibah, 2 male, on groundnut, 7.xii.1992; Al Garaya, 48 male, 19 female, on alfalfa-egg plant, 7.xi.1992; Jarmah, 1 female, on swede, 15.xii.1992; Al Breek, 14 male, 7 female, on alfalfa, wild grass, 15.xii.1992; Arragabah, 15 male, 3 female, on alfalfa and egg plant, 15.xi.1992; Awbari, 9 male, 5 female, on alfalfa & barley, 30.i.1993; Ed Disah, 5 male, 4 female, on alfalfa, 15.ii.1993; Al Hatiyah, 4 male, 3 female, on carrot and swede, 15.ii.1993; Al Gharayfah, 20 male, 14 female, on barley and wheat, 15.ii.1993.

Libyan localities. CYRENAICA: Barca, Bengasi, Derna, Fueihat, Marmarica, Porto Bardia. TRIPOLITANIA: Ain Zara, Mizda, Taguira, Tripoli. FEZZAN: Agar Atabah, Al Abyad, Al Awayynat, Al Barkat, Al Breek, Al Garaya, Al Ghraeyfah, Al Hamarah, Al Hatiyah, Al Zighan, Arragabah, Ashkidah, Awbari, Bani Hilal, Ben Hareth, Bint Bayyah, Brack, Ed Disah, Gragara, Ghat, Ghodwa, Hammera, Idri, Jarmah, Khalayf, Mahrugah, Makhaten, Mansurah, Misquwin, Murzuk, Qardah, Ququm, Samnu, Sebha, Sidi Ali, Tamanhant, Tamzawah, Tarut, Tegrutin, Tkerkibah, Traghen, Tsawah, Um Al Aranib, Wanzarik, Zahra, Zalwaz, Zuwaylah, Zuwayyah.

Distribution: Afghanistan, Albania, Austria, Bangladesh, Cameroon, Cyprus, the former Czechoslovakia, Egypt, Ethiopia, France, Greece, India, Iran, Iraq, Israel, Italy (Sardinia), Jordan, Kenya, Laccadive Is., Lebanon, Libya, Maldive Is., Mali, Myanmar, Nigeria, Pakistan, Portugal, Saudi Arabia, Senegal, Seychelles, Somalia, Spain (Canary Is.), Sudan, Switzerland, Syria, Tadzhikistan, Turkey, Turkmenistan, Yemen, the former Yugoslavia (COPR 1982).

Remarks. This species is distributed throughout Africa, and was recorded earlier from Libya by Damiano (1969) and Popov (1974). This is reported as most widespread species of *Aiolopus* in Al-Shati, Fezzan by Ajaili et. al. (1989).

Acknowledgments

I thank the Arab Centre for Research and Development of Saharian Communities, Murzuk, Libya for providing financial assistance during the tenure of a major research project carried out as principal investigator in the Fezzan region of Libya. I also thank Prof. Dr. Bruno Massa, Department of Entomological Sciences, University of Palermo, Palermo, Italy, and Prof. Dr. J. J. Presa, Department of Biology, University of Murcia, Murcia, Spain, for their peer review and useful suggestions.

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Received January 25, 2008; Accepted July 10, 2008