

## Taxonomic Studies on the Miridae (Heteroptera) of Yemen and Iran

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**Abstract:** The following Miride species are described: *Campyloneuropsis rhianos* sp.n. (Dicyphinae) (Yemen, Iran), *Orthocephalus modarresi* sp.n. (Orthotyliinae, Halticini) (Iran), *Orthotylus (Melanotrichus) rudbaricus* sp.n. (Orthotyliinae, Orthotylini) (Iran), *Amblytylus peitho* sp.n. (Phylinae, Phylini) (Iran), *Atomophora atripes* sp.n. (Iran), *A. astraia* sp.n. (Phylinae, Phylini) (Iran), and *Tuponia (Tuponia) dehshorana* sp.n. (Phylinae, Phylini) (Iran). *Orthotylus (Melanotrichus) caviceps* Wagner, 1971, (Iran) and *O. (Melanotrichus) viridissimus* Linnavuori, 1961, (Orthotyliinae, Orthotylini) (Turkmenistan, Iran) are redescribed.

### INTRODUCTION

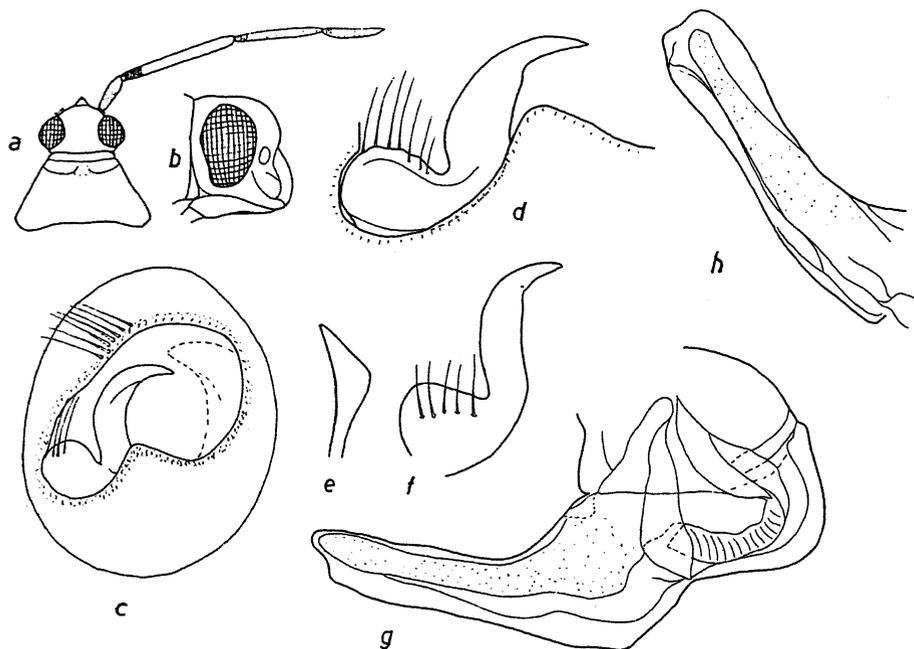
The present article is based on the author's recent expeditions to Yemen (1992) and the Khorasan, Gilan and Tehran provinces in Iran (1994 and 1995). The trips were made in cooperation with the Faculty of Sciences of the University of Sana'a, Faculty of Agriculture of Ferdowsi University in Mashhad, Faculty of Agriculture of Gilan University in Rasht, and the Insect Taxonomy Research Department, Ministry of Agriculture in Tehran. Financial support was given by the Finnish Society of Sciences and Letters and the Entomological Society of Helsinki, Finland.

### *Campyloneuropsis rhianos* sp.n. (Dicyphinae)

(Fig. 1)

**Material:** Yemen: Al Mukalla, male holotype, 7. 4. 1992; 30 km NE of Al Mukalla, male paratype, 20. 4. 1992; Maifa'ah, male paratype, 7. 4. 1992, Linnavuori. Iran: Baluchistan, Iranshar, alt. 800 m, male paratype (incorrectly identified as *Singhalesia indica* (Poppius, 1913) by Wagner), 1-10. 4. 1954, Richter & Schäuuffele, in coll. Linnavuori.

**Diagnosis:** Uniformly pale, only antennae with red markings.



**Fig. 1.** *Campyloneuropsis rhanos* sp.n.: (a) male head and pronotum in dorsal view; (b) male head in lateral view; (c) male genital segment in caudal view; (d) left style and the adjacent lobe of pygofer in slide mount; (e) right style; (f) left style; (g, h) aedeagus in lateral view (exx from Al Mukalla and Iranshar, respectively).

**Description:** Length 2.25-2.7 mm. Shiny. Uniformly pale yellow. Eyes gray to brown. Antennae pale yellow, 1st segment with faint reddish ring, base of 2nd segment sanguineous, joints 3 and 4 embrowned. Membranes of hemelytra smoky hyaline, veins pale. Legs uniformly pale.

Small and gracile, body 3.7-3.8 × as long as basal width of pronotum. Hair covering of upper surface longish, pale. Head 0.62 × as broad as basal width of pronotum; eyes relatively large, ocular index 1.63-1.85. Proportions between antennal segments 11:33:31:19, 2nd segment 1.30-1.38 × as long as diatone, 0.80-0.85 × as long as basal width of pronotum, 3rd segment 0.75-0.94 × as long as 2nd. Rostrum extending to hind coxae. Pronotum 2.10-2.24 × as broad as long in middle, calli weakly convex.

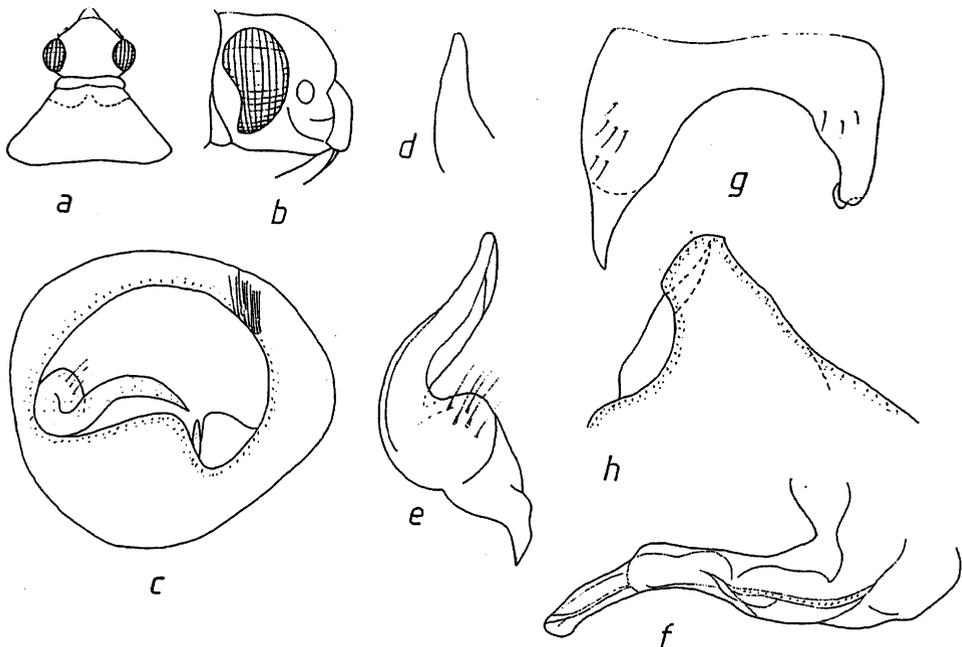
**Male genitalia** (Fig. 1 c-h): Ventral margin of genital opening of pygofer with bluntly angular expansion close to left style, dorsal margin with a group of stiff hairs. Right style very small. Left style with blade-like hypophysis. Aedeagus with weakly sclerified longitudinal band.

**Biotope:** Swept from dense vegetation in wadis.

**E t y m o l o g y :** Rhianos, a Cretan poet about 300 B.C.

**D i s c u s s i o n :** Most species of the genus *Campyloneuropsis* Poppius have a red or dark pattern on the upper surface, at least the apex of the cuneus and apical part of the membranal veins are sanguineous. Besides *C. rhianos* only *C. impicta* (Linnavuori, 1961) and *C. pochalla* (Linnavuori, 1975) are uniformly pale. These species can be distinguished as follows:

- 1 1st antennal segment with faint reddish ring, base of 2nd segment sanguineous .....  
 ..... *C. rhianos* sp.n.
- Antennae totally pale, immaculate ..... 2
- 2 Shiny, very small species, length 1.75-2.0 mm. Eyes larger, ocular index 1.84-2.2. Male genitalia (Fig. 2 g-h) distinctive: caudolateral angles of 8th abdominal segment strongly produced, asymmetric, process of left side sharp-tipped, horn-like, the right process shorter and blunter. Caudoventral margin of pygofer close to left style strongly produced, broadly ligulate. Distribution: the Sudan .... *C. pochalla* (Linnavuori, 1975)



**Fig. 2.** *Campyloneuropsis impicta* (Linnavuori): (a) male head and pronotum in dorsal view; (b) male head in lateral view; (c) male genital segment in caudal view; (d) right style; (e) left style; (f) aedeagus in lateral view. *C. pochalla* (Linnavuori): (g) male 8th abdominal segment in dorsal view; (h) ventral lobe of pygofer and left style in ventral view.

- Subopaque. Length 2.25-2.5 mm. Eyes very small (Fig. 2 a-b), ocular index ( $\sigma$ ) 2.55-2.8. Caudolateral margin of pygofer (Fig. 2 c) close to left style with bluntly angular expansion. Styles and aedeagus shown in Fig. 2 d-f. On *Abutilon pannosum*. Distribution: Palestine, Sudan, Somalia, and Yemen ... *C. impecta* (Linnavuori, 1961)

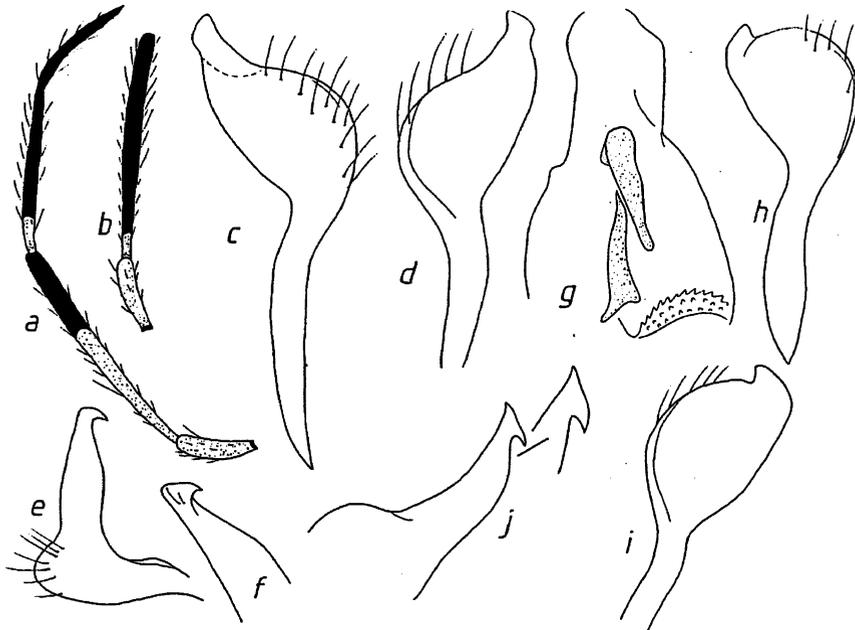
***Orthocephalus modarresi* sp.n. (Orthotylinae, Halticini)**

(Fig. 3 a-g)

**Material:** Iran: Khorasan, 70 km W of Darreh Gaz, male holotype, female paratype, 14. 6. 1994; Khargh, 70 km SW of Qouchan, female paratype, 8-9. 6. 1994, Linnavuori; Tehran, Kandovan, alt. 2 550 m, male and two female paratypes, 3-4. 7. 1995, Linnavuori, in coll. Linnavuori.

**Diagnosis:** Shiny black. 1st antennal segment and basal part of 2nd yellow-brown. Femora and tibiae bright reddish,

**Description:** Length  $\sigma$  4.75mm,  $\text{♀}$  4.0-4.25 mm. Shiny black. Vertex with small obscure pale spot near each eye. Eyes reddish. 1st antennal segment, except extreme base, and base ( $\sigma$ ) or basal two thirds ( $\text{♀}$ ) of 2nd yellow-brown, rest of antennae black, in  $\text{♀}$  base of 3rd segment pale. Hemelytra black, membranes uniformly blackish brown.



**Fig. 3.** *Orthocephalus modarresi* sp.n.: (a) female antenna; (b) male 1st and 2nd antennal segments; (c, d) right style; (e) left style; (f) hypophysis of left style; (g) spiculi of vesica in ventral view. *O. bivittatus* Fieber: (h, i) right style; (j) left style.

Femora and tibiae bright reddish, extreme tips of tibiae dark, tarsi black. Tibial spines black.

♂. Macropterous. Body parallel-sided, 3.3 × as long as broad at base of pronotum. Upper surface with erect black bristles and appressed silvery pubescence. Head 0.73 × as broad as basal width of pronotum, in apical view 1.2 × as broad as high, basal margin of vertex carinate; ocular index 2.13. Antennae gracile, with relatively short erect black bristles, proportions between segments 19:66:32:23, 2nd segment gracile, as long as diatone, 0.73 × as long as basal width of pronotum, 3rd segment 0.5 × as long as 2nd. Rostrum extending to middle of mesosternum. Pronotum 2.14 × as broad as long in middle, lateral margins straight. Legs short and incrassate, hind tibia about 1.6 × as long as basal width of pronotum.

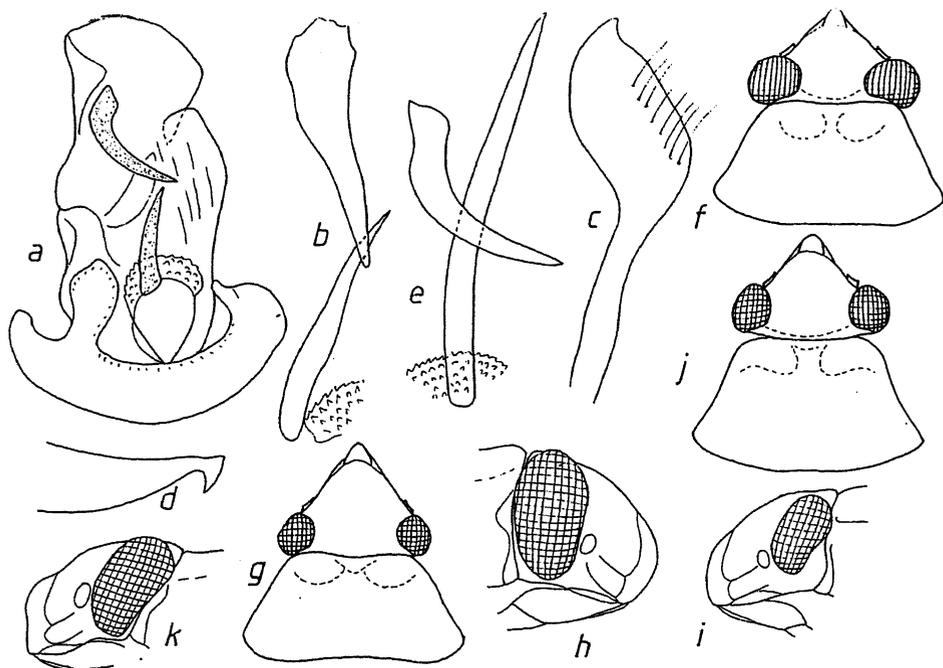
♀. Brachypterous. Body pyriform, broadest at apex of hemelytra, 2.6 × as long as broad at base of pronotum. Vestiture as in ♂. Head 0.33-0.86 × as broad as basal width of pronotum, in apical view 1.12 × as broad as high, basal margin of vertex bluntly keeled; ocular index 2.46-2.52. Antennae gracile, with relatively short black setae, proportions between segments 23:70:47:31, 2nd segment slender, 0.87-0.90 × as long as diatone, 0.72-0.77 × as long as basal width of pronotum, 3rd segment about 0.67 × as long as 2nd. Rostrum extending to middle of mesosternum. Pronotum 2.3 × as broad as long in middle, lateral margins slightly insinuated, disk convex, sloping laterad. Hemelytra extending to 7th tergite, with small membrane rudiments. Legs relatively short and incrassate, hind tibia about 1.6 × as long as basal width of pronotum.

Male genitalia shown in Fig. 3 c-g. Vesica with two short spiculi.

Biotope: The species occurs in mountain meadows with *Astragalus*, *Phlomis*, *Thymus*, *Verbascum* and *Euphorbia*.

Etymology: The species is dedicated to Dr. Mehdi Modarres of the Faculty of Agriculture, Ferdowsi University, Mashhad, Iran.

Discussion: The closest relative of *O. modarresi* is *O. bivittatus* Fieber, 1864 (Pontomediterranean, also in Iran), which has a similar structure of the aedeagus (two short spiculi). *O. bivittatus* is easily distinguished by the coloring: Antennae black, in females 1st segment and basal half of 2nd sometimes ± pale. Mesocorium in males pale. Legs darker, with femora dark brown and tibiae dark yellow-brown with black setigerous spots. Moreover, the antennae and legs are longer, with the 2nd antennal segment about 1.12 (♂) or 1.0 (♀) × as long as diatone, and hind tibia (♂♀) about twice as long as basal width of the pronotum. The apical part of the right style is broader and shorter. Male genitalia of *O. bivittatus* in Figs 3 h-j and 4 a-b. *O. tenuicornis* (Mulsant & Rey, 1852) (Holomediterranean) resembles *O. modarresi* in the coloring of the antennae, but differs



**Fig. 4.** *Orthocephalus bivittatus* Fieber: (a) vesica (ex from Iran, Roubat Sharaf); (b) spiculi of vesica (ex from Sarepta). *O. tenuicornis* (Mulsant & Rey) (ex from Palestine, Kiriath Anavim): (c) right style; (d) hypophysis of left style; (e) spiculi of vesica. *Orthotylus rudbaricus* sp.n.: (f,g) male and female head and pronotum in dorsal view; (h, i) male and female head in lateral view. *O. turcmenorum* Puchkov: (j) male head and pronotum in dorsal view; (k) male head in lateral view.

in the dark femora and yellow-brown tibiae. The antennae and legs are considerably longer, and the basal spiculum of the vesica (Fig. 4 e, styles in Fig. 4 c-d) is much longer than the apical one. *O. rhyaropus* Fieber, 1864 (southern Russia) with similarly colored antennae and pale legs is readily distinguished by the very long erect bristles of the body and extremities.

#### THREE SPECIES OF THE SUBGENUS *MELANOTRICHUS* REUTER OF *ORTHOTYLUS* FIEBER (ORTHOTYLINAE, ORTHOTYLINI) FROM IRAN

The species of *Melanotrichus* in Middle and Central Asia were revised by Muminov (1989), while those inhabiting Iraq, Palestine, the Arabian Peninsula, and North-east Africa were treated by Linnavuori (1986, 1992, 1994). An examination of material from Iran revealed a new species, *O. rudbaricus*, which is described below. Additional notes are given for two formerly little-known species, *O. caviceps* Wagner and *O. viridissimus* Linnavuori.



**Fig. 5.** *Orthotylus rudbaricus* sp.n.: (a) pygofer in dorsal view; (b-f) right style in different views (b in slide mount, c, d in glycerine, e, f in dry mount); (g-i) left style in different views (g in slide mount, h in dry mount, i in glycerine). *O. turcmenorum* Puchkov: (j) female head in lateral view; (k, l) right style in different views (k in glycerine, l in dry mount equalling figure e).

***Orthotylus (Melanotrichus) rudbaricus* sp.n.**

(Figs 4 f-i, 5 a-i, 6 a)

**Material:** Iran: Gilan, Tutkabon-Rudbar, male holotype, 4 female paratypes, 29. 5 – 28. 6. 1995; Manjil, male paratype, 16. 5. – 14. 6. 1995, Linnavuori, in coll. Linnavuori.

**Diagnosis:** Different from *O. turcmenorum* Puchkov in robuster body, larger eyes in male, shorter antennae, and much broader right style.

**Description:** Length 3.75-4.25 mm. Green. Head, anterior part of pronotum and base of scutellum yellowish. Eyes grayish brown. Antennae yellowish. Membranes of hemelytra pale brownish smoky, veins green. Under surface brownish yellow. Legs yellow, tibial spines pale.

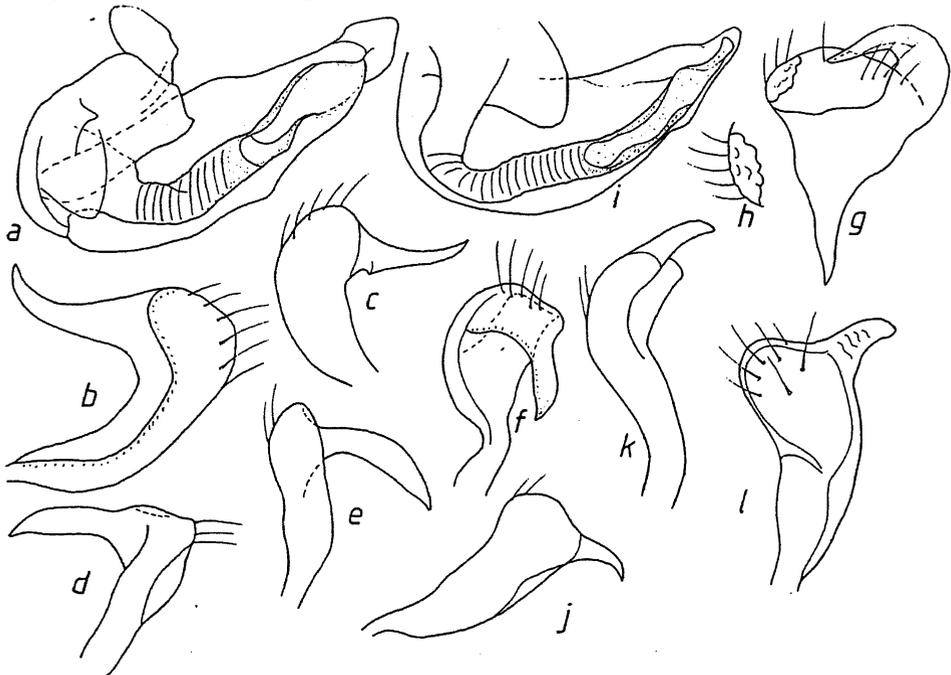
♂ parallel-sided, ♀ elongately ovate. Body relatively robust, 3.4 (♂) or 3.0 (♀) × as long as broad at base of pronotum. Upper surface with semierect black hairs and appressed silvery pubescence, Head about 0.72 × as broad as basal width of pronotum,

basal margin of vertex bluntly keeled; eyes in ♂ large, ocular index 1.67-1.92 (♂), 2.55-2.61 (♀). Antennae long, proportions between segments 17:70:60:23 (♂) 16:67:57:24 (♀), 2nd segment 1.43-1.45 (♂) or 1.34 (♀) × as long as diatone, 1.04-1.11 (♂) or 0.96 (♀) × as long as basal width of pronotum. Rostrum extending to middle coxae. Pronotum about 2.2 × as broad as long in middle. Hind tibia 1.72 (♂) or 1.64 (♀) × as long as basal width of pronotum. Proportions between hind tarsomeres 10:18:18.

**Male genitalia** (Figs 5 a-i, 6 a): Pygofer apically conical. Right style distinctive, remarkably broad, in broad aspect nearly rectangular in outline, apically truncate, hypophysis short, claw-like. Left style: narrow and elongate, hypophysis very long, falcate, sensory lobe rounded, edentate. Aedeagus simple.

**Biotope:** On *Chenopodium* sp. in a little brook on slopes of a sunny hill.

**Discussion:** Closely related to *O. turcmenorum* Puchkov, 1976 (Middle Asia), which also has a similarly shaped left style. The left style in the other species is broadly triangular in outline as in Fig. 6 g. *O. turcmenorum* (Figs 4 j-k, 5 j-l, 6 b-c) is paler green



**Fig. 6.** *Orthotylus rudbaricus* sp.n.: (a) aedeagus. *O. turcmenorum* Puchkov: (b, c) left style in dry mount and glycerine. *O. caviceps* Wagner: (d-f) right style in different views (d, e in glycerine, f in slide mount); (g) left style in slide mount; (h) sensory lobe of left style; (i) aedeagus. *O. viridissimus* Linnavuori: (j-i) right style (j, k in glycerine, l in slide mount).

and more elongate, body 4.0 ( $\sigma$ ) or 3.6 ( $\varphi$ )  $\times$  as long as broad at base of pronotum. The eyes in  $\sigma$  smaller, ocular index 2.0 ( $\sigma$ ), 2.52-2.60 ( $\varphi$ ). The antennae are somewhat longer, with the 2nd segment 1.6 ( $\sigma$ ) or 1.40-1.42 ( $\varphi$ )  $\times$  as long as the diatone. In addition, the right style (Fig. 5 k-l) is much narrower, elongately ovate in outline with a rounded apical margin and somewhat stronger apical spine.

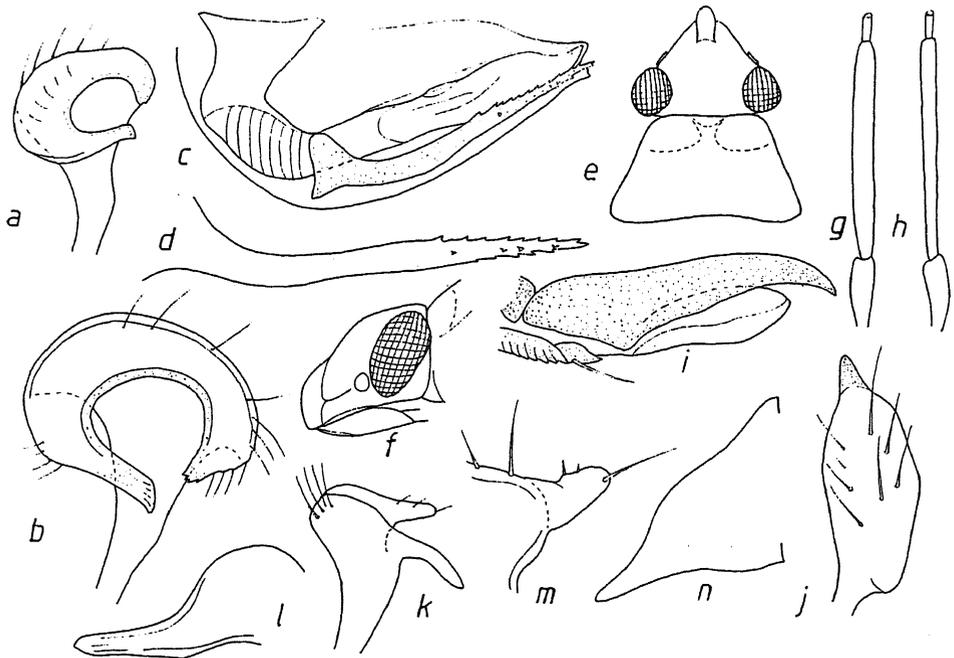
**Material of *O. turcmenorum*:** Middle Asia: Peski Muyun-Kum, ob. Kargaly-kul, 3 exx, 24. V. 1910, Kiritshenko; Turkmenskaya SSR, Akhcha-Kuima, 2 exx 1976, Puchkov, in coll, Linnavuori.

***Orthotylus (Melanotrichus) caviceps* Wagner, 1971**

(Fig. 6 d-h)

**Material:** Iran: Tehran, 10 km E of Tehran (the type locality), male and female, 19. 5. 1969, Eckerlein, in coll. Linnavuori.

**Diagnosis:** Easily recognized from the other species by the shape of the right style.



**Fig. 7.** *Orthotylus viridissimus* Linnavuori: (a, b) left style in glycerine and slide mount; (c) aedeagus; (d) spiculum. *Amblytylus peitho* sp.n.: (e) male head and pronotum in dorsal view; (f) male head in lateral view; (g, h) male and female 1st and 2nd antennal segments; (i) claw; (j) right style; (k) left style; (l, m) hypophysis and sensory lobe of left style; (n) theca.

Description: Length ♂ 4.2-4.5 mm, ♀ 3,75 mm. Green. Head, anterior part of pronotum and base of scutellum with yellowish tinge. Eyes grayish. Antennae yellow. Membranes of hemelytra dark smoky, veins green. Under surface yellowish green. Legs yellowish, tarsi embrowned, tibial spines pale.

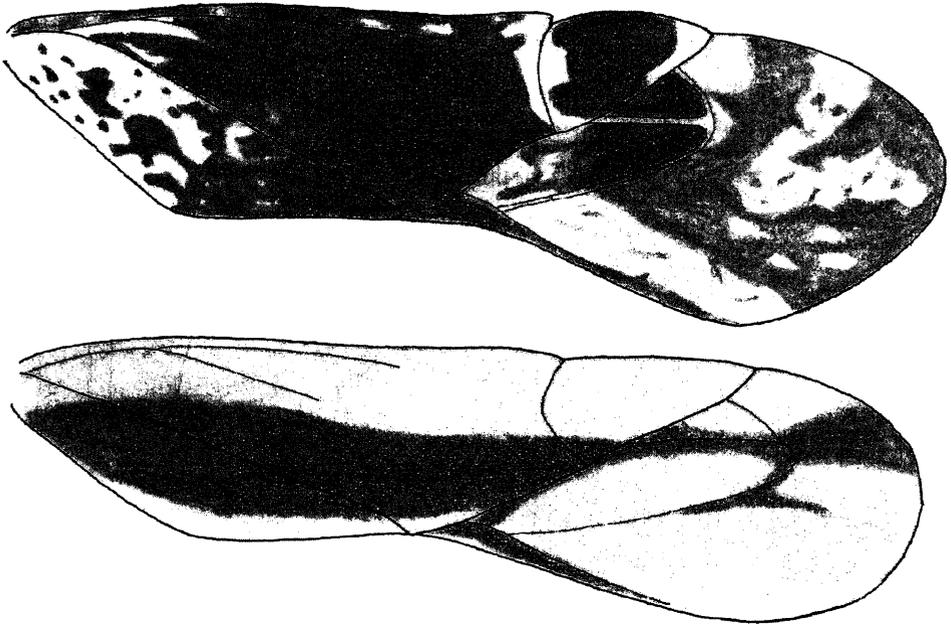


Fig. 8. Elytron of *Amblytulus peitho* sp.n. left, *Atomophora atripes* sp.n. right.

♂ parallel-sided, ♀ elongately ovate. Body 4.1 (♂) or 3.2 (♀) × as long, as broad at base of pronotum. Upper surface with black semierect hairs and pale appressed pubescence. Head 0.7 × as broad as basal width of pronotum, basal margin of vertex distinctly keeled; ocular index 1.54 (♂), 2.25 (♀). Antennae gracile, proportions between segments 21:81:51:21 (♂), 21:80:55:20 (♀), 2nd segment 1.76 (♂) or 1.57 (♀) × as long as diatone, 1.23 (♂) or 1.11 (♀) × as long as basal width of pronotum. Rostrum extending to middle coxae.

**Male genitalia** (Fig. 6 d-h): Pygofer short, broadly rounded apically. Right style distinctive, with remarkably long blade-like hypophysis. Left style triangular, hypophysis claw-like, sensory lobe with dentate rounded process. Aedeagus simple.

**Distribution:** Known only from the type locality.

**Discussion:** Wagner's description (1971: 31-37) includes the following inaccuracies: No blackish pattern on the head was observed. A central cavity on the vertex is apparently caused by shrinking of specimens, which were originally preserved in alcohol. The record of a claw-like process on the sensory lobe of the left style is incorrect.

***Orthotylus (Melanotrichus) viridissimus* Linnavuori, 1961**  
(Figs 6 j-l, 7 a-d)

**Material:** Iran: Khorasan, Lotfabad, alt. 500 m, several exx, 15. 6. 1994, Linnavuori, in coll. Linnavuori.

**Diagnosis:** Readily distinguished from the other species by the long dentate spiculum of the vesica.

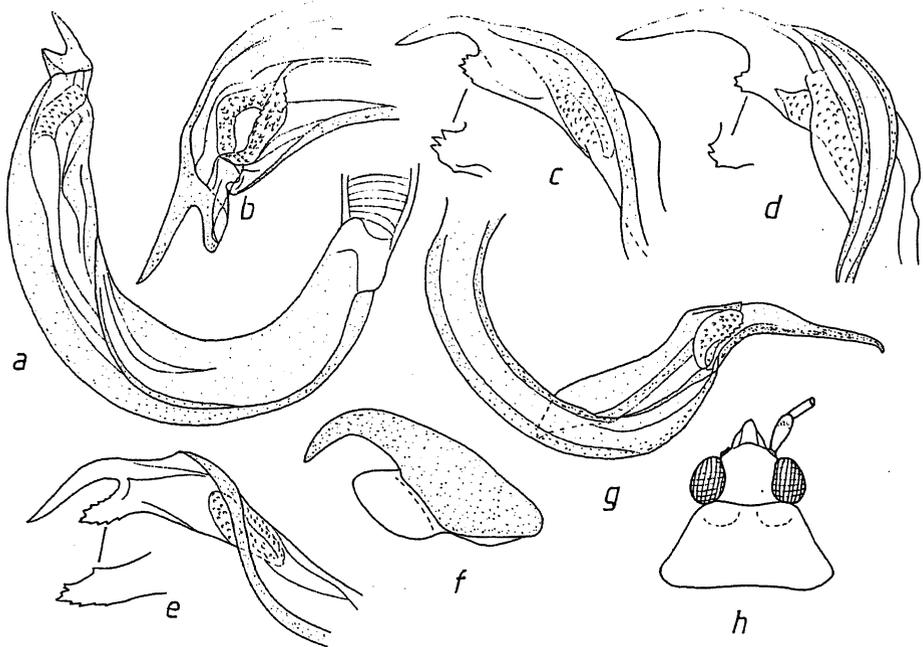
**Description:** Length 3.4-3.75 mm (♂), 3.2 mm (♀). Bright green, head and anterior part of pronotum somewhat paler. Eyes pale gray. Antennae pale ochraceous. Membranes of hemelytra pale smoky, veins green. Under surface greenish. Legs greenish yellow.

♂ gracile, parallel-sided, ♀ elongately ovate. Body in ♂ 4 ×, in ♀ 3.2 × as long as broad at base of pronotum. Head 0.7 × as broad as basal width of pronotum; ocular index 1.83-2.1 (♂), 2.75-2.80 (♀). Proportions between antennal segments 7:32:25:9 (♂) or 7:30:25:11 (♀); 2nd segment 1.81-1.87 (♂) or 1.3-1.5 (♀) × as long as diatone, 1.3-1.6 (♂) or 1.1-1.4 (♀) × as long as basal width of pronotum. Rostrum extending to middle coxae. Pronotum about 2.5 × as broad as long in middle.

**Male genitalia** shown in Figs 6 j-l, 7 a-d. Aedeagus distinctive: vesica provided with a long slender, dentate spiculum.

**Biology:** Collected at a light in a moist depression at Lotfabad.

**Distribution:** Apparently restricted to the depression (alt. 300-600 m) in the border between Khorasan and Turkmenistan. Previously known from Kopet Dag and Aschabad in Turkmenistan.



**Fig. 9.** *Amblytylus peitho* sp.n.: (a) vesica; (b) apex of vesica. *A. albidus* (Hahn) (ex from the Netherlands, Helden): (c) apex of vesica. *A. glaucicollis* Kerzhner (ex from Armenia, Salgi): (d) apex of vesica. *A. vittiger* Reuter (ex from Libya, Djebel Nefoussa): (e) apex of vesica. *Atomophora atripes* sp.n.: (f) claw; (g) vesica. *A. astraia* sp.n.: (h) male head and pronotum in dorsal view.

***Amblytylus peitho* sp.n. (Phylinae, Phylini)**

(Figs 7 e-n, 8, 9 a-b)

**Material:** Iran: Khorasan, Sarakhs, alt. 300 m. male holotype, 3 male and 2 female paratypes, 29-30. 4. 1994; Roubat Sharaf, female paratype, 30. 4. 1994; Shourlogh, 2 female paratypes, 30. 4. 1994 Linnavuori, in coll. Linnavuori.

**Diagnosis:** Recognized by the small size, longitudinal dark bands on hemelytra and shape of vesica.

**Description:** Length 4 mm. Pale grayish or whitish yellow. Eyes gray. 1st and 2nd antennal segments dark (♂) or pale yellow (♀), segments 3 and 4 darkened. Mesonotum in ♂ with 4 longitudinal dark spots, which are seen through the uniformly pale pronotum. Hemelytra whitish with longitudinal fuscous band extending from base of clavus and the adjacent corium to base of cuneus and apex of membrane; membranes otherwise brownish smoky, veins embrowned. Legs yellow, the third tarsomeres dark. Tibial spines short, blackish.

♂ parallel-sided, ♀ elongately ovate. Hair covering on upper surface pale, on the fuscous bands somewhat darker. Head about 0.8 × as broad as basal width of pronotum, relatively short, in apical view 1.6 (♂) or 1.3 (♀) × as broad as high, in lateral view 1.3-1.4 (♂♀) × as long as high, tylus prominent; eyes large, ocular index 2.0 (♂), 3.0-3.2 (♀). 1st and 2nd antennal segments in ♂ incrassate, in ♀ gracile; proportions between segments 20:70:50:29 (♂), 20:62:40:20 (♀), 1st segment 0.4 (♂) or 0.38-0.42 (♀) × as long as diatone, 2nd 1.52 (♂) or 1.2-1.31 (♀) × as long as diaton 1.2 (♂) or 0.91-0.94 (♀) × as long as basal width of pronotum. Rostrum extending to hind coxae. Pronotum about 2.15 × as broad as long in middle, lateral margins straight, carinate. Hemelytra (♂♀) extending beyond apex of abdomen. Claw as in Fig. 7 i.

Male genitalia in Figs 7 j-n and 9 a-b. Apex of vesica bifid with a short straight claw-like process and an edentate blunt lobe.

**Biotope:** Together with *Amblytylus concolor* Jakovlev, 1877, on *Hordeum* sp. and other grasses in steppes around Sarakhs in the north-eastern corner of Iran.

**Etymology:** Peitho, goddess of persuasion in ancient Greece.

**Discussion:** A revision of the genus *Amblytylus* Fieber has been published by Kerzhner (1977) and Wagner (1975: 297-313). *A. peitho* belongs to a group of species in which the apex of the vesica has one claw-like process and a blunt lobe as in Fig. 9 a-e. Species of this group are distinguished according to the following key:

- 1 Upper surface without distinct dark pattern, only hemelytra with faint longitudinal infuscations. Length 4.4-6.2 mm. Ocular index 1.9-2.0 (♂), 2.56 (♀). Apex of vesica in Fig. 9 d. Pontomediterranean ..... ***A. glaucicollis*** Kerzhner, 1977
- At least hemelytra with distinct longitudinal dark band ..... 2
- 2 Small, length 4 mm. Head and pronotum immaculate. Vesica as in Fig. 9 a-b, apical lobe edentate ..... ***A. peitho*** sp.n.
- Larger species. Head and pronotum also with longitudinal dark bands. Apical lobe of vesica dentate ..... 3
- 3 Large, length 5.0-6.0 mm. Ocular index about 2.4 (♂), 2.8 (♀). Vesica as in Fig. 9 c. Holomediterranean ..... ***A. albidus*** (Hahn, 1834).
- Smaller, length 4.6-4.75 mm (♂), 4.1-4.4 mm (♀). Ocular index about 2.0 (♂), 2.5 (♀). Vesica as in Fig. 9 e. Eremian, extending from North Africa to Palestine ..... ***A. vittiger*** Reuter, 1900

TWO NEW SPECIES OF THE GENUS *ATOMOPHORA* REUTER  
(PHYLINAE, PHYLINI) FROM IRAN

The genus *Atomophora* was revised by Linnavuori (1990). Later on, Linnavuori & Al-Safadi (1993: 189-190) described the species *A. sabaea* from Yemen. During my recent trip to Iran two previously unknown species were found in the deserts of the Khorasan province.

***Atomophora atripes* sp.n.**

(Figs 8, 9 f-g)

**Material:** Iran: Khorasan, near Parvand, 70-80 km W of Sabzevar, male holotype, 2 male and 4 female paratypes, 31. 5 – 1. 6. 1994, Linnavuori, in coll. Linnavuori.

**Diagnosis:** Easily recognized by the blackish legs and large dark brown area on hemelytra.

**Description:** Length 3.0-3.5 mm. Ground color whitish ochraceous. Sides of tylus, stripes on lora and transverse lateral arcs on frons and vertex, dark brown; eyes grayish brown. 1st and 2nd antennal segments blackish brown, 2nd sometimes apically somewhat paler, other segments orangish, extreme base of 3rd dark. Pronotum with abundant, more or less confluent dark brown mottling, and with a faint irregular pale midline. Scutellum blackish brown, apex and sides of apical part whitish with a few brown dots. Hemelytra dark brown, basal part of clavus and the very base of mesocorium whitish brown with dark dots, costal margins with a few faint pale dashes, apical margin of corium and basal margin and apex of cuneus whitish; membranes brown smoky, with pale irroration and spots, veins pale, with minute dark irroration. Under surface of head and thorax reddish, abdomen dark brown. Legs uniformly blackish brown, femora basally somewhat paler.

Elongately ovate, body about 3.6 (♂) or 3.1 (♀) × as long as broad at base of pronotum. Hair covering longish, pale. Head 0.70-0.75 × as broad as basal width of pronotum; ocular index 1.56-1.58 (♂), 2.1 (♀). Proportions between antennal segments 15: 52:40:25 (♂), 16:52:39:23 (♀), 2nd segment incrassate, 1.30-1.34 (♂) or 1.27 (♀) × as long as diatone, 0.90-0.95 (♂♀) × as long as basal width of pronotum. Rostrum extending to middle coxae. Claw shown in Fig. 9 f.

Male genitalia of the usual type of the genus. Vesica as in Fig. 9 g, with broad, weakly sclerified subapical lamella.

**Biotope:** On *Calligonum comosum* in dunes West of Sabzevar.

**Discussion:** A key to the genus *Atomophora* was published by Linnavuori (1990: 46-47). Of the previously known species only *A. pantherina* Reuter, 1879, and *A. nut*

Linnavuori, 1971, share the combination of black 1st antennal segment, dark femora and largely dark brown cuneus. *A. atripes* is readily distinguished from them by the uniformly blackish legs and largely blackish brown hemelytra.

### Key to the species of the *A. pantherina*-group

- 1 Legs, except extreme bases of femora, uniformly blackish. Corium and clavus, except base and apical margin of corium, uniformly blackish brown ..... *A. atripes* sp.n.
- Tibiae whitish ochraceous with dark spots. Clavus and corium whitish with ± confluent dark mottling ..... 2
- 2 Body narrow, parallel-sided, about 3 × as long as broad. Hemelytra with very large confluent dark brown spots, cuneus apically and basally broadly pale. 2nd antennal segment dark brown. Middle Asia ..... *A. pantherina* Reuter, 1879
- Body robuster, ovate, about 2.5 × as long as broad. Hemelytra with smaller and relatively few confluent dark brown spots, only extreme tip of cuneus pale. 2nd antennal segment pale with base blackish brown. Eremian (Algeria-Iran) .....  
..... *A. nut* Linnavuori, 1971

### *Atomophora astraia* sp.n.

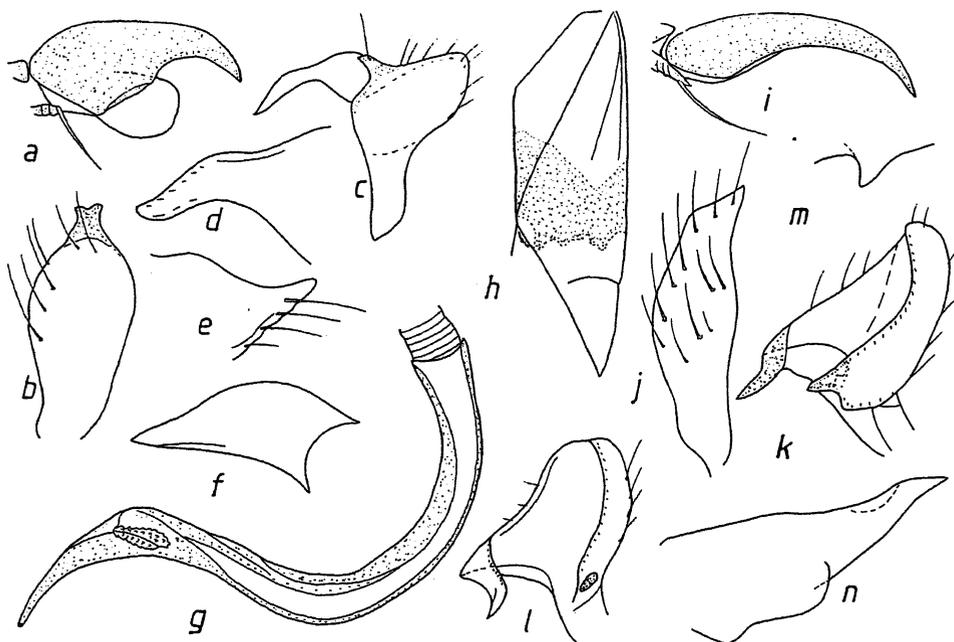
(Figs 9 h, 10 a-g)

**Material:** Iran: Khorasan, Tabas, male holotype, male paratype, 16.-18. 5. 1994, Linnavuori, in coll. Linnavuori.

**Diagnosis:** Uniformly whitish yellow with only minute brownish markings. Legs also uniformly pale.

**Description:** Length 2.5 mm. Uniformly whitish yellow. Frons with faint traces of pale brownish lateral arcs; eyes grayish brown. Antennae pale yellow, 1st segment with indistinct pinkish subapical spot. Pronotum and scutellum with traces of very small pale brownish dots. Hemelytra with very faint pale brownish spots, even inner apical angle of mesocorium without a large dark spot, only the very apical margin of mesocorium darkened; membrane with faint brownish mottling. Under surface and legs uniformly whitish yellow, tibial spines pale.

Small, body about 0.72 × as long as broad at base of pronotum. Hair covering on upper surface longish, yellow. Head 0.72 × as broad as basal width of pronotum; eyes relatively small, ocular index 1.38-1.44. Proportions between antennal segments 12:49:30:21. 1st segment 0.27 × as long as diatone, 2nd 1.11-1.16 × as long as diatone, 0.8 × as long as basal width of pronotum. Length of 2nd segment 0.74 mm. Rostrum



**Fig. 10.** *Atomophora astraia* sp.n.: (a) claw; (b) right style; (c) left style; (d, e) hypophysis and sensory lobe of left style in slide mount; (f) theca; (g) vesica. *Tuponia dehshorana* sp.n.: (h) elytron; (i) claw; (j) right style; (k, l) left style in different views; (m) lateral tubercle of pygofer in dorsolateral view; (n) theca in dorsal view.

extending to middle coxae. Pronotum  $2.44 \times$  as broad as long in middle. Claw as in Fig. 10 a.

Male genitalia shown in Fig. 10 b-g. Vesica long and shallowly curved.

**Biotope:** Collected at a light in a salt marsh. The main vegetation consisted of *Calligonum comosum*, *Haloxylon persicum* and *Suaeda dendroides*.

**Etymology:** *Astraia*, goddess of justice, daughter of Zeus and Themis.

**Discussion:** Most species of *Atomophora* have a conspicuous dark pattern. Besides *A. astraia* only *A. basipunctata* Wagner, 1974, (Algeria), *A. subpallida* Wagner, 1965, (Algeria) and *A. sabaea* Linnavuori & Al-Safadi, 1993, (Yemen) are similarly pale. All of the previously known species have a conspicuous dark spot on inner apical angle of mesocorium and the tibiae are ornamented with small dark setigerous dots. The eyes in *A. basipunctata* and *A. subpallida* are much smaller; ocular index in the former 2.2-2.3 ( $\sigma$ ), in the latter 1.6-2.0 ( $\sigma$ ) or 2.5-2.6 ( $\rho$ ). In *A. sabaea* the eyes are larger, ocular

index 0.92-1.0 (♂), 1.8 (♀). The antennae are relatively shorter; length of 2nd segment is about 0.63 mm (♂♀).

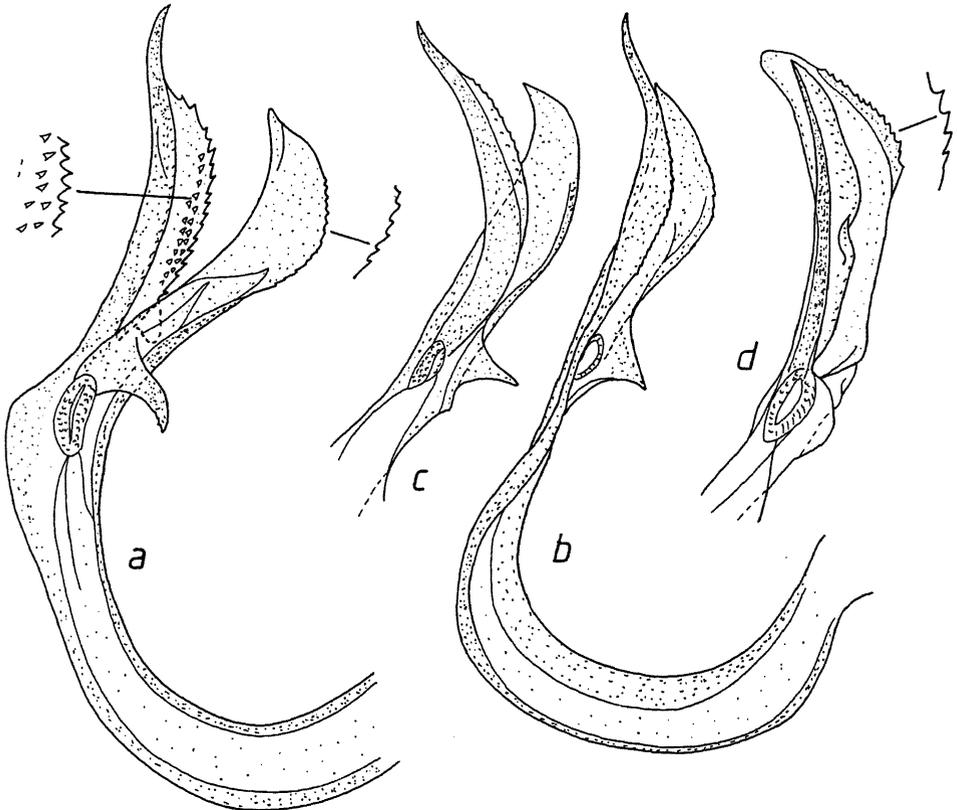
***Tuponia (Tuponia) dehshorana* sp.n.**

(Figs 10 h-n, 11 a-b)

**Material:** Iran: Khorasan, Deh Shor, male holotype, 16. V. 1994; Darreh Gaz, 3 male and 13 female paratypes, 15. VI. 1994, Linnavuori, in coll. Linnavuori.

**Diagnosis:** Distinguished from the related species by the shape of vesica.

**Description:** Length 3.25-3.75 mm. Whitish ochraceous. Eyes pale or dark brownish. Antennae pale yellow. Head and anterior part of pronotum sometimes with yellowish tinge. Base of pronotum orangish or reddish. Apical part of hemelytra with red or pale orangish transverse band as indicated in Fig. 10 h; cuneus pale; membrane

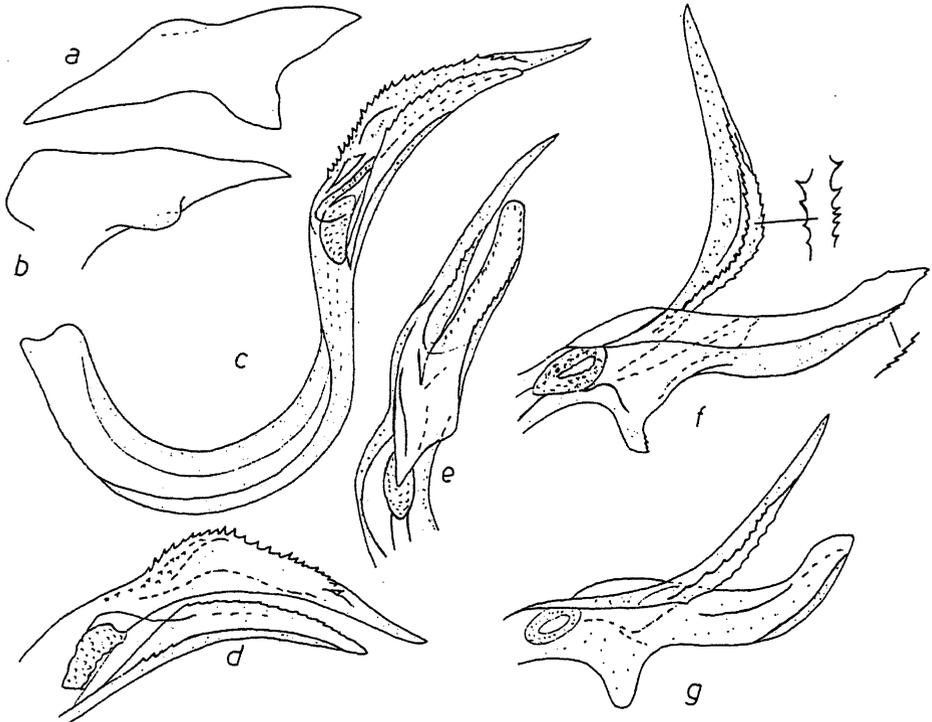


**Fig. 11.** *Tuponia dehshorana* sp.n.: (a, b) vesica in slide and dry mount; (c) apex of vesica in dry mount. *T. soongorica* Drapolyuk: (d) apex of vesica in slide mount.

brownish smoky, veins pale. Legs pale ochraceous, hind femora often embrowned apically, tibial spines long and black, 3rd tarsomeres dark.

Body elongately ovate, about  $2.8 \times$  as long as broad at base of pronotum. Hair covering on upper surface pale, on the transverse red bands on hemelytra dark. Head about  $0.7 \times$  as broad as basal width of pronotum; ocular index 1.21-1.33 ( $\sigma$ ), 1.48-1.71 ( $\text{f}$ ). Antennae long and gracile, proportions between segments 12: 70:50:26 ( $\sigma$ ), 14-75:55:25 ( $\text{f}$ ), 2nd segment 1.27-1.38 ( $\sigma$ ) or 1.35-1.43 ( $\text{f}$ )  $\times$  as long as diatone, and 0.86-0.97 ( $\sigma$ ) or 0.91-0.97 ( $\text{f}$ )  $\times$  as long as basal width of pronotum. Rostrum extending to hind coxae. Pronotum 2.0 ( $\sigma$ ) or 2.25 ( $\text{f}$ )  $\times$  as broad as long in middle. Claws (Fig. 10 i) with tiny remnants of pulvilli.

Male genitalia (Figs 10 j-n, 11 a-b). Pygofer truncate apically, provided with a blunt tubercle on left side of base of genital opening. Vesica robust and with two long apical processes: the longer process is falcate, with inner margin coarsely dentate; the shorter



**Fig. 12.** *Tuponia semele* Linnavuori: (a,b) theca; (c) vesica in slide mount; (d,e) apex of vesica in slide and dry mount. *T. bifasciata* Wagner: (f,g) apex of vesica in slide and dry mount. After Linnavuori (1995).

process is scoop-like, with outer margin finely dentate, a sharply triangular lobe is located close to the base of the process.

**Biotope:** On *Tamarix* in saline habitats.

**Discussion:** *T. dehshorana* belongs to a group of species in which the pygofer is truncate apically and provided with a tubercle on the left side of the genital opening (Fig. 13 d) (Linnavuori 1995). The closest relatives are *T. bifasciata* Wagner, 1965, (Cyprus) and *T. macedonica* Wagner, 1957, (Pontomediterranean) in which the scoop-like process of the vesica is broad with a conspicuous, protruding lateral lobe near the gonopore. In *T. bifasciata* the red pattern on the hemelytra is more intense and includes a distinct red spot on the cuneus. The eyes are smaller, ocular index 1.4-1.5 (♂), 1.85-1.90 (♀). The vesica is illustrated in Fig. 12 f-g. In *T. macedonica* the hemelytra are



**Fig. 13.** *Tuponia macedonica* Wagner: (a,b) apex of vesica (slide mount) in two aspects (a ex from Bulgaria, Burgas, b ex from Cyprus, Ayios Amvrosius). *T. roseipennis* Reuter (ex from Turkestan): (c) apex of vesica in slide mount. *T. pungens* Linnavuori: (d) pygofer in dorsal view; (e) lateral tubercle of pygofer; (f) vesica in slide mount. After Linnavuori (1995).

ornamented only with a faint brownish transverse apical band, and the eyes are smaller, ocular index about 1.7 ( $\sigma$ ), 2.2 ( $\text{♀}$ ). The falcate process of the vesica (Fig. 13 a-b) is edentate and much shorter than the scoop-like process. In the other species of the group *T. semele* Linnavuori, 1995 (Palestine, genitalia in Fig. 12 a-e), *T. pungens* Linnavuori, 1986 (Saudi Arabia, genitalia in Fig. 13 d-f), *T. roseipennis* Reuter, 1878 (Middle Asia, vesica in Fig. 13 c), and *T. soongorica* Drapolyuk, 1980 (Middle and Central Asia, vesica in Fig. 11 d) the scoop-like process of the vesica lacks a distinct basal lobe.

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