

## New Asian Species of Ant-Lions (Neuroptera, Myrmeleontidae)

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**Abstract**—Two new species of ant-lions are described, *Myrmeleon valentini* sp. n. from Tajikistan and *Myrmeleonus solaris* sp. n. with wide range in the west-Asian part of the Palaearctic Region. The first species is closely related to the common *M. hyalinus*, but differs in the absence of pilula axillaris in males. This is the second known pair of closely related *Myrmeleon* species differing in the presence of pilula axillaris. Another pair is constituted by *M. formicarius* L., lacking the pilula, and *M. bore* Tjed., in which it is present. The loss of pilula axillaris is regarded as convergence; thus, the subgenus *Morter* Navas, 1915 is suggested to be a polyphyletic group. The second new species, *Myrmeleonus solaris* sp. n., is very close to the common *M. trigrammus* (Pall.) and is distributed to the south of the distribution range of the latter species. Holotypes and most of the material examined is deposited at the Zoological Institute, Russian Academy of Sciences, St. Petersburg.

The genus *Myrmeleon* Linnaeus, 1767 includes more than 130 species distributed worldwide, except at high latitudes. Nearly half of all the known ant-lion species (more than 1000) have been described in the genus *Myrmeleon*. Revision of the genus in terms of the modern understanding of its diagnostic characters is very difficult, because many species have not been re-examined after description and should not be included in the genus *Myrmeleon* in its actual interpretation. Seven generic names have been synonymized with *Myrmeleon*; some of these, e.g. *Morter* Navas, 1915, are still used as subgeneric names.

The absence of pilula axillaris in males is considered to be the main difference of the subgenus *Morter* from the nominotypical one. I believe that the presence of pilula axillaris is a primary feature of the whole family, and its secondary absence, results from loss of plesiomorphic character, which occurred independently in different taxa, including those of higher rank.

New data based on examination of the new species, *Myrmeleon valentini* sp. n., allow me to treat the loss of pilula axillaris in species of a single genus as homoplasies caused by adaptation to mesophytic habitats.

*Myrmeleon valentini* Krivokhatsky, sp. n. (Figs. 1–6)

**Material.** Holotype: ♂, Tajikistan, Zeravshan Range, Savron near Novabad, 1600 m, 3–7.VII.1995 (V. Mikhailov). Paratypes: 3 ♀, label as in holotype; 1 ♂, 2 ♀, same locality, 10–15.VIII.1995 (V. Mikhailov); 1 ♂ (right fore wing broken), Vaksh River valley,

Aruktau Range, larva collected 28.III.1965, pupated (cocoon not preserved) 17.VI.1965, imago emerged 6.VII.1965 (Evdokimova); 1 ♀, Vaksh River, Tabakchi Mts, 37°06'N, 68°18'E, 17.VIII.2000 (collection of California Academy of Sciences, San Francisco; collector unknown).

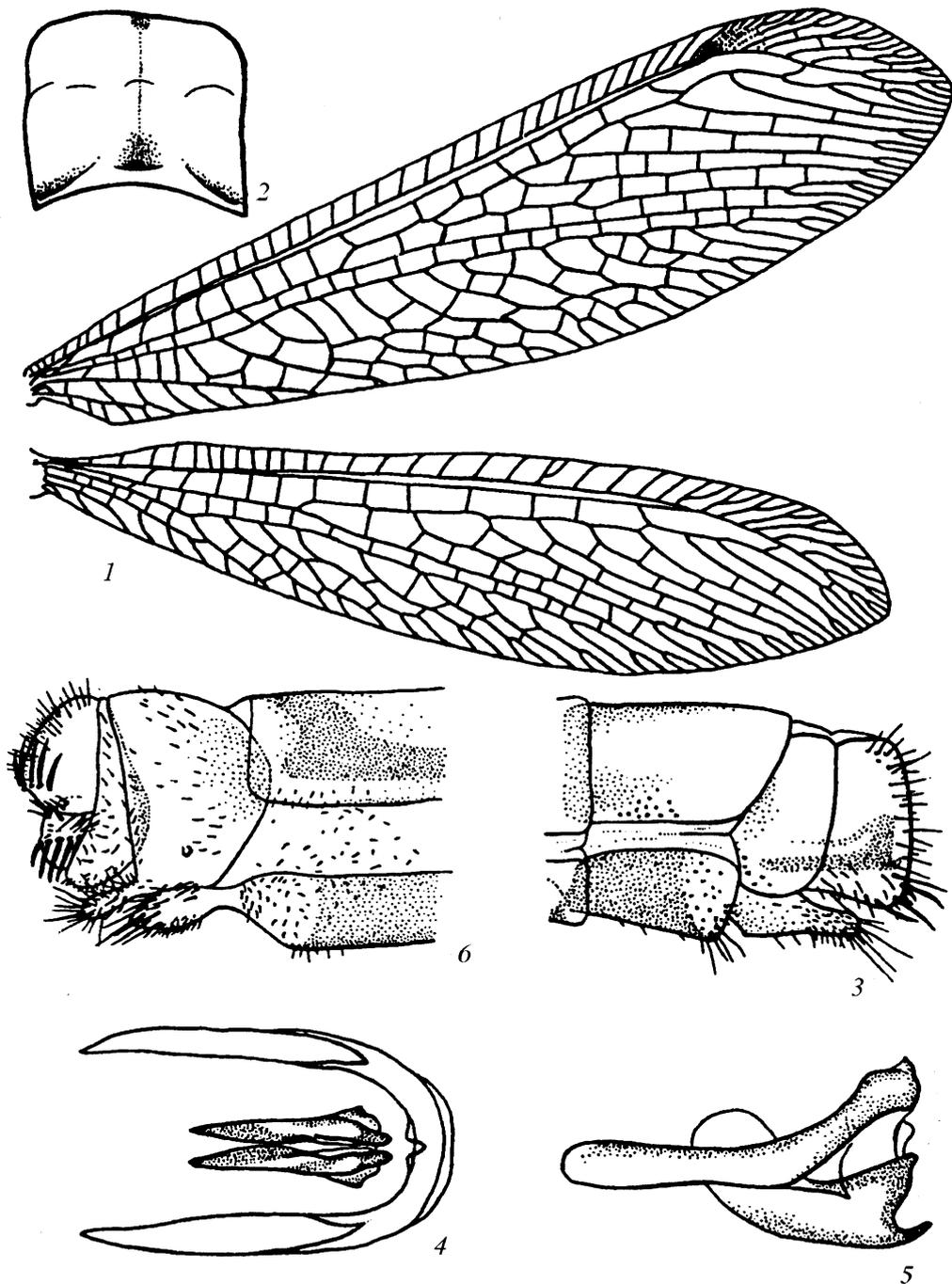
**Description.** Body straw-colored. Lengths (mm): fore wing in holotype 22 (paratypes: males 18–21, females 25–27); hind wing 19 (15–18, 22–23), abdomen 14 (13–15, 17–18).

**Holotype.** Head yellow, with large dark brown facial spot and small light brown spots across frons and vertex. Antenna with flattened clava, dark brown; scape light fuscous. Palpi pale; apical segment of labial palpi brown, spindle-shaped. Pronotum slightly longer than wide, with weakly marked, light fuscous median stripe (Fig. 2). Meso- and metathorax with brighter brown pattern.

Legs light yellow, with black hairs and bristles. Fore tibia with fuscous longitudinal stripe on outer side; hind tibia with similar stripe on inner side. Base of fore and middle femora each with one short sensory hair as long as neighboring bristles. Spurs red, weakly curved, as long as basal segment of fore and middle tarsi, almost half as long as that of hind tarsus.

Wing membrane (Fig. 1) hyaline, without pattern; all veins pale.

Fore wing. Presectoral area with 8 crossveins; apical area with ladderlike veins. Posterior Banksian line distinct; anterior Banksian line absent. Stigma white.



**Figs. 1–6.** *Myrmeleon valentini* sp. n. [(1–5) holotype; (6) paratype]: (1) wings; (2) pronotum, dorsal view; (3) apex of male abdomen, lateral view; (4, 5) male genitalia, dorsal (4) and lateral (5) view; (6) apex of female abdomen, lateral view.

Hind wing. Venation simplified; apical area without gradate veins. Presectoral area with 5 crossveins. Costal area widened in its anterior third. In contrast to that on fore wing, vein *RS* originating from *MP-1*, rather than from *R*. Stigma indistinct; posterior Banksian line present. *Pilula axillaris* absent.

Abdominal sternites mainly dark fuscous; tergites pale. Tergites IV–VI with fuscous margins. Ectoprocts short (Fig. 3); male genitalia as in Figs. 4, 5.

**Paratypes** similar to holotype; some with almost completely lost pattern on pronotum. Number of crossveins in presectoral areas of fore and hind wings constant. Females somewhat larger than males; apex of female abdomen as in Fig. 6.

**Distribution.** Tien Shan in Tajikistan and, possibly, Kopet-Dagh in Turkmenistan. With some doubt I refer to this species 2 ♂ from Firyuza, 25.VI.1992 (Gy. Fabian, B. Herczig, A. Podlussány, Z. Varga). Both

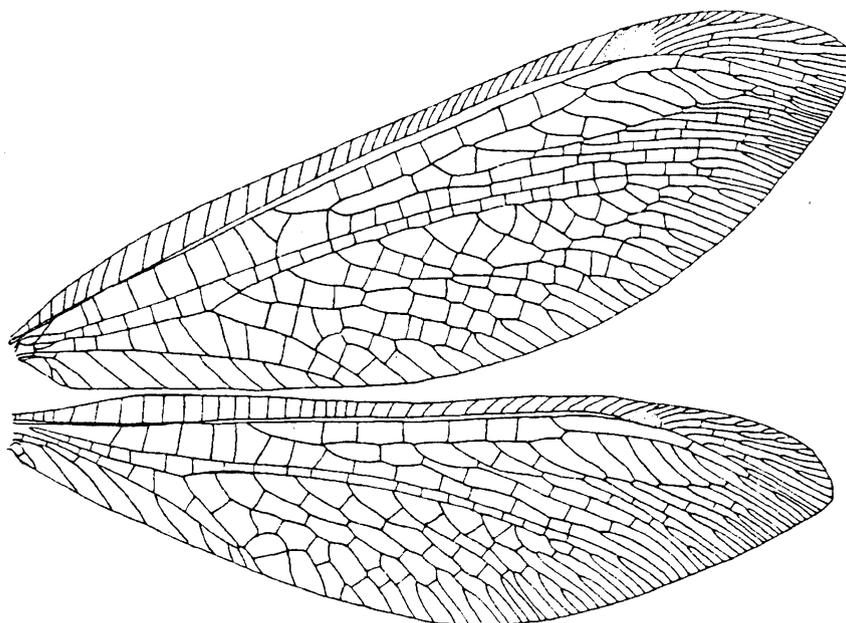


Fig. 7. *Myrmecaelurus solaris* sp. n., wings (paratype).

males deposited at the Museum of Natural History, Budapest, were collected using new methods with aerosols and turned entirely black; their coloration can be restored, only temporarily and partly, in a drop of alcohol or xylene. Shared morphological characters (not considering coloration), e.g., absence of pilula axillaris, allow me to refer these specimens to the species described.

**Etymology.** The species is named after the coleopterist Valentin Alekseevich Mikhailov, an outstanding expert in insects of Middle Asia, who much enriched the ant-lion collection of the Zoological Institute, Russian Academy of Sciences.

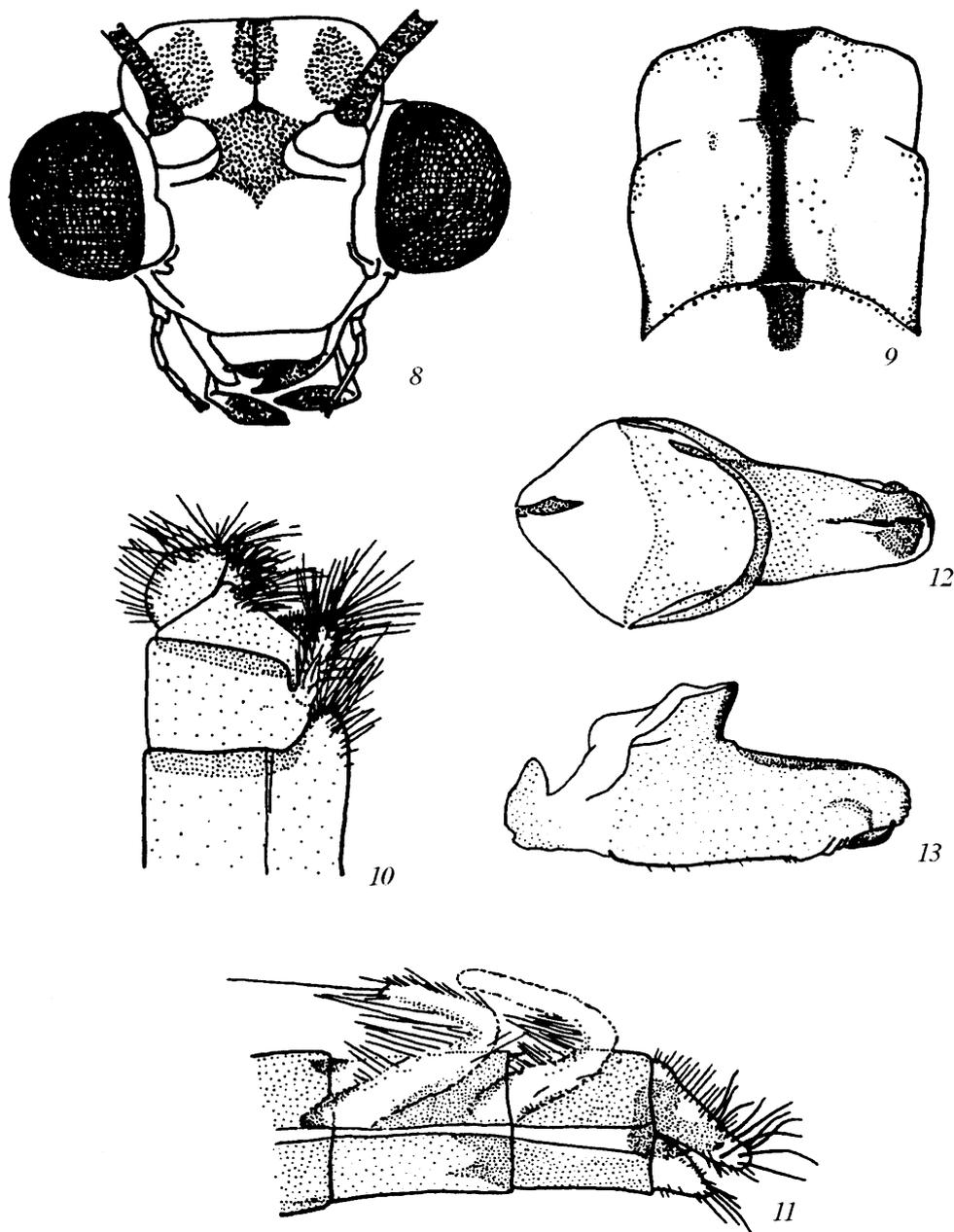
**Comparative analysis.** The new species is undoubtedly close to the Saharan-Turanian *M. hyalinus* Ol., differing from it in the paler body, reduced pattern on the pronotum, and absence of pilula axillaris in male. Pale forms of *M. hyalinus*, the most similar to the new species, have been described as a separate subspecies, *M. hyalinus afghanicus* by Hölzel (1987).

Distinction of the subgenus *Morter*, at least, on the basis of the present diagnosis (absence of pilula axillaris in males), is disputable. Now, we know at least two unrelated pairs of closely related species, which could be referred to different subgenera: *M. formicarius*–*M. bore* and *M. hyalinus*–*M. valentini*. In addition, the known species that lack pilula axillaris in males belong to species groups with most of species possessing pilula axillaris. It is noteworthy that species

without pilula axillaris are distributed either in the northern parts of distribution ranges of the corresponding species groups or locally, in more mesophytic habitats than those occupied by widespread species of these species groups. For example, both *M. formicarius* and *M. bore* inhabit Northern Europe, but the former species is distributed more or less widely and uniformly, whereas the latter (without pilula axillaris) inhabits only coastal strips of seas and large lakes. *M. hyalinus* is widely distributed in Middle Asia both in mountains and in desert plains, whereas *M. valentini* sp. n. is only recorded from mountain oases with large rivers. As the pilula axillaris is used by ant-lions for active dispersion of pheromones from metathoracic glands, it may be suggested with high confidence that, under conditions of excess humidity, the loss of function by these glands and of the glands themselves is convergent in different groups.

***Myrmecaelurus solaris* Krivokhatsky, sp. n.**  
(Figs. 7–13)

**Material.** Holotype: ♀, Turkmenistan, Badghyz, Akarcheshme, 5.VII.1991, V. Krivokhatsky. Paratypes. Turkmenistan: 2 ♀, label as in holotype; 1 ♂, 1 ♀, same locality, 10.VIII.1973, M. Falkovitch; 1 ♂, Kopet-Dagh, Ai-Dere, 30.VI.1974, V. Gorbatovskii; 2 ♀, Kopet-Dagh, 120 km W of Kara-Kala, 26–29.VII.1991, V. Zolotukhin; 1 ♀, Kopet-Dagh, Miemli, 6.VIII.1935, K. Arnoldi; 1 ♀, Guven-Dere Ravine near Yarty-Kala, 17.VIII.1934, V. Popov. Uz-



**Figs. 8–13.** *Myrmecaelurus solaris* sp. n. [(8–10) holotype; (11–13) paratype]: (8) head, front view; (9) pronotum, dorsal view; (10) apex of female abdomen, lateral view; (11) apex of male abdomen, lateral view; (12) gonarcus and parameres, dorsal view; (13) same, lateral view.

bekistan: 1 ♂, 1 ♀, Termez, 26–27.V.1910, N. Zarudnyi; 2 ♂, [Kugitangtau, Khatak], Tangi-Duvan, 14.V.1910, N. Zarudnyi; 1 ♂, Takhry-Kuduk, 24.VI.1910, N. Zarudnyi; 1 ♀, Kyzyl-Su-Chubek, 21–22.VI.1910, N. Zarudnyi. Tajikistan: 1 ♀, Nature Reserve “Tigrovaya Balka,” 22.V.1979, V. Mikhailov. Armenia: 1 ♀, Yerevan, 4.VIII.1936, M. Ter-Minasyan; 1 ♀, Vedi, 23.VII.1951, I. Darevskii; 1 ♂, Migry, without date, from N. Filippov’s collection (Zoological Museum, Moscow State University); 1 ♂, Chi-

mankend, 8.VII.1960, E. Antonova (Zoological Museum, Moscow State University). Azerbaijan: 1 ♂, Gosmolyany, Lerik, 28.VIII.1981, A. Zakharenko; 1 ♂, “Mugan’, Alpaut, near Iran, 12.VII.1910, K. Satunin.” Iran: 1 ♀, Teheran, 1903, E. Walter; 2 ♀, Kurdistan, Valley of Lahijan, Hane Village, 26.VII.1914, N. Nesterov; 1 ♂, southern slope of Elburs N of Teheran, VII.1996 V. Malikov; 1 ♂, Mirabaylo, Golestan Nat. Park, 4.VIII.1997, A. Mirmoayedi (Mirmoayedi’s alcohol collection, Kermanshah, Iran).

**Description.** Body large, light yellow. Lengths (mm): fore wing in holotype 37.5 (paratypes: females 32–41, males 29–38); hind wing 34 (31–39, 27.5–36), abdomen 25 (22–30, 22–29).

**Holotype.** Face flattened, yellow, with small brown hexagonal spot between antennae (Fig. 8); facial hairs sparse, dark; bristles above clypeus sparse, long, black. Frons convex. Head with short, dark, recumbent hairs, yellow, with two large brown drop-shaped spots above antennae and brown longitudinal stripe narrowed toward vertex and crossed there by short band. Vertex with small brown dot on each side lateral to the band. Antenna light brown; scape yellow. Labial palpi small; last segment slightly spindle-shaped, cleft apically, yellow, with brown sensory pit and apex.

Pronotum (Fig. 9) longer than wide, light yellow, with pale hairs, with complete, narrow, brown median stripe, without lateral stripes, but with slight brown limbus in basal part of lateral margin. Meso- and metathorax yellow with 3 interrupted brown stripes, covered with pale hairs.

Legs yellow, only apices of all 5th tarsal segments brown. Femora with pale and black hairs and spines; bases of fore and middle femora each with one sensory hair. Tibiae with pale and black hairs and only black short spines; fore tibia with two brushes of golden hairs: long brush in the middle of inner side and short apical one on outer side. Spurs red-brown, weakly curved, on fore and middle tibiae longer, and on hind tibia slightly shorter than 1st tarsal segment.

Wings wide (Fig. 7). Membrane and all longitudinal and cross-veins unicolorous, golden, light yellow. Venation dense. Presectoral area of fore wing with 6, and that of hind wing with 5 crossveins. Anterior and posterior Banksian lines distinct on both pairs of wings. Stigmata lemon yellow, weakly distinguishable in hind wings.

Abdomen shorter than wings, yellow, with indistinct, narrow, brown dorsal stripe on tergites and similar lateral stripes on sternites; abdominal hairs long,

pale. Apex of female abdomen (Fig. 10) with dark hairs.

**Paratypes** similar to holotype, but exhibiting variability series in some characters. Presectoral area of fore wing with 6–8 crossveins, that of hind wing with 3–5 cross-veins. Some of these crossveins occasionally connected by additional longitudinal veins, and crossveins of inner medial area of fore wing frequently connected by additional veins. Lengths of spurs in all tibiae varying between one and two tarsal segment lengths. Pronotum (in addition to distinct median stripe) occasionally with two weakly marked, diffuse curved narrow stripes along median one; pattern of three well marked longitudinal stripes as that in *M. trigrammus* (Pall.), never observed.

Males markedly smaller than females. Abdomen shorter than wings; abdominal segments VI and VII with two pairs of hairs pencils consisting of silky, silvery hairs. Ectoprocts and male genitalia as in Figs. 11–13.

**Comparative diagnosis.** *M. solaris* sp. n. is close to *M. trigrammus* (Pallas), with which it has been repeatedly confused (e.g., some paratypes have been identified by E. Luppova and A. Zakharenko as *M. trigrammus*). The new species differs from the latter in the larger size and simpler pattern of the pronotum (one, instead of three wide longitudinal stripe).

**Distribution.** Armenia, Azerbaijan, Turkmenistan, Uzbekistan, Tajikistan, Iran. The distribution range of the species is confined to mountain provinces of the Iranian-Turanian subregion of the Sethian desert region (Kuraaraxian, Hyrcanian, Khorasanian, and Afghanian Mountain Provinces). The species does not occur together with the more northern *M. trigrammus* in a strip along the northern border of distribution range of *M. solaris*; forms intermediate between them have not been found, either.

**Etymology.** The species is named “sunny” (*solaris* in Latin) for the golden, “sunny” coloration of the body and wings and diurnal activity unusual for antlions of the arid zone; the holotype and paratypes collected by me in Badkhyz were active while the sun was at zenith.

# Bibliography of the Neuropterida

*Bibliography of the Neuropterida Reference number* (r#):  
11585

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***Notes:***

English translation (title varies slightly): 2002. Entomological Review 82(5):558-562. 13 figures. Notes: Figure 7 is incorrectly proportioned (laterally compressed) in the separate, but correctly proportioned in the English translation.

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