

REVIEW OF THE GENUS *PERISSANA* METCALF, 1952
(HEMIPTERA, AUCHENORRHYNCHA, CALISCCELIDAE), WITH
THE DESCRIPTION OF A NEW SPECIES FROM SOUTHERN IRAN

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The caliscelid genus *Perissana* Metcalf, 1952 is reviewed, with a key to species provided. A new species of the genus, *P. ardua* **sp. n.**, is described from Fars Province in southern Iran. Habitual photos as well as distribution maps are provided for all species. *Ephedra* sp. is recorded as host plant for the species of the genus *Perissana*.

Key words: Adenissini, Adenissina, Middle East, new species, Ommatidiotinae, taxonomy.

INTRODUCTION

The planthopper genus *Perissana* Metcalf, 1952 belonging to the tribe Adenissini Dlabola of the subfamily Ommatidiotinae (Caliscelidae) currently comprises three species known from Iran, northern Iraq and Azerbaijan (Nakhichevan) – *P. bispinata* (Dlabola, 1980), *P. dlabolai* Gnezdilov et Wilson, 2006, and *P. jakowleffi* (Puton, 1890) (GNEZDILOV & WILSON 2006, GNEZDILOV 2013, 2017). Other two species treated in the genus *Perissana* previously (GNEZDILOV & WILSON 2006) are currently placed in the genus *Raunolina* Gnezdilov et Wilson, 2006 – *R. circularis* (Linnavuori, 1952) and *R. arabica* (Gnezdilov et Wilson, 2006) (GNEZDILOV 2017). These two genera clearly differ one from another by the shape of median carina of metope and the shape of gonopods (GNEZDILOV 2017).

During a field trip to southern Iran in middle of June 2019 in frame of collaborative project between the Zoological Institute of the Russian Academy of Sciences (St. Petersburg, Russia) and the Iranian Research Institute of Plant Protection (Tehran, Iran) a new species of the genus was collected. Below, a key to the species of the genus is given along with the description of a new species.

MATERIAL AND METHODS

Morphological terminology follows ANUFRIEV and EMELJANOV (1988) for head (metope – frons, coryphe – vertex) and GNEZDILOV and WILSON (2006) – for male genitalia.

Photographs were mainly taken using a Leica MZ9.5 stereomicroscope and a Leica DFC 490 camera and a Canon EOS 5D Mark IV camera with the lens Canon-MP-E 65mm f/2.8 1-5X Macro and a flash Canon Macro Twin Lite MT-26EX-RT. Images were produced using Helicon Focus v. 6.7.1 and Adobe Photoshop software. The maps were performed using ArMap 910.2.3348, based on the specimens examined and previously published data. The genital segments of examined specimen were macerated in 10% KOH and figured in glycerine jelly (Brunel Micro Ltd, UK) using the same stereomicroscope with camera lucida.

The type series of the species described was swept from grasses under *Ephedra* sp. (Ephedraceae) on dry steep slope near to highway to Shiraz (Fig. 1). The holotype is deposited in the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia (ZIN) and the paratype – in the Hayk Mirzayans Insect Museum, Iranian Research Institute of Plant Protection, Tehran, Iran (HMIM). Other specimens examined are from the Museum national d'Histoire naturelle, Paris, France (MNHN), the National Museum of Prague, Czech Republic (NMPC), and the Hungarian Museum of Natural History, Budapest, Hungary (HNHM).

TAXONOMY

Family Caliscelidae Amyot et Serville, 1843

Subfamily Ommatidiotinae Fieber, 1875

Tribe Adenissini Dlabola, 1980

Subtribe Adenissina Dlabola, 1980

Genus *Perissana* Metcalf, 1952

Perissana Metcalf 1952: 227. Type species: *Issus jakowleffi* Puton, 1890, by original designation by METCALF (1952).

Anissus Dlabola, 1980: 177, syn. fide GNEZDILOV & WILSON 2006: 10.

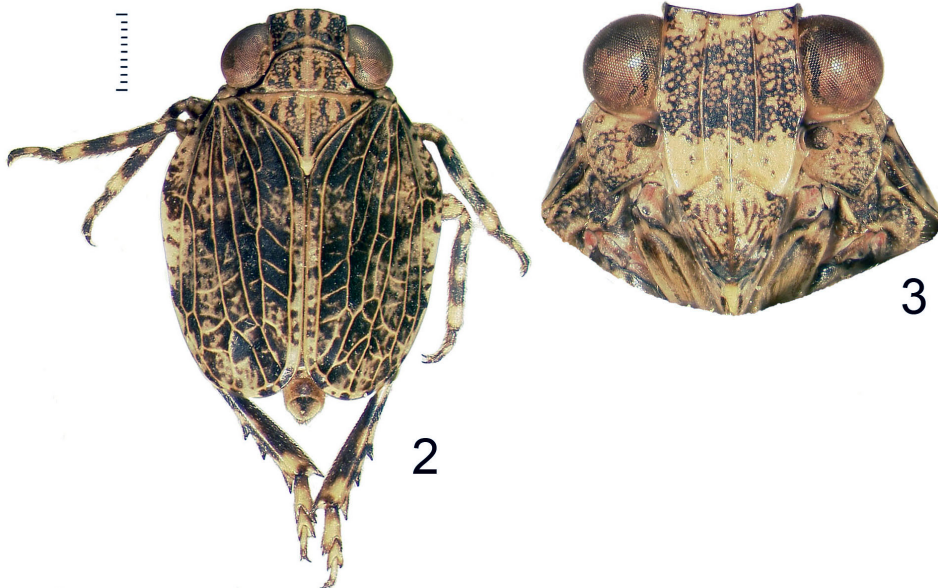
Denissus Dlabola, 1980: 186, syn. fide GNEZDILOV & WILSON 2006: 10.

Diagnosis – Metope elongate, weakly convex laterally, with median carina running from its upper margin or its middle to postclypeus via metopoclypeal suture and with sublateral carinae running from its upper margin to metopoclypeal suture. Coryphe transverse. Pronotum with convex anterior margin and straight posterior margin; paradiscal fields very narrow behind the eyes. Forewings oval or nearly rounded, without hypocostal plate; radius bifurcate, but often fused apically forming an elongate loop, median bifurcate apically, cubitus anterior simple or furcating apically, cubitus posterior distinct only in its proximal half, postcubitus simple. Cubitus posterior and postcubitus sometimes fused apically. Reticulate venation scarce or rich. Hind wings rudimentary. Hind tibia with 1–2 lateral spines. First metatarsomere nearly as long as second one or 1.5–2.0 times longer. Phallobase wide, weakly curved (in lateral view), with wide processes covering ventral aedeagal hooks. Aedeagus with a



Fig. 1. Type locality (Iran, Fars Province, Khanekhoreh, 2440 m, 12.VI.2019) of *Perissana ardua* sp. n.

pair of long ventral hooks directed basally. Connective with large cup. Styles with large plate and small bifurcating capitulum (in dorsal view). Gonoplasts rounded, with dorso-caudal angles in lateral view not protruding above the apex of anal tube.



Figs 2–3. *Perissana bispinata* (Dlabola, 1980), female, northern Iraq (after GNEZDILOV & WILSON 2006): 2 = dorsal view; 3 = front view. Scale bar = 1 mm

Perissana bispinata (Dlabola, 1980)
(Figs 2, 3, 24)

Anissus bispinatus Dlabola 1980: 179, figs 1–4.

Perissana (Perissana) bispinata Gnezdilov et Wilson 2006: 15, figs 1, 5, 22.

Emended description – *Coryphe* 3.0–3.5 times as wide as long medially, without median carina. Forewings nearly oval, with scarce transverse venation. Hind tibia with two lateral and seven apical spines. First metatarsomere wide, nearly as long as second one, with two latero-apical and six intermediate spines arranged in arc. Metope with wide light band above clypeus. Male anal tube not narrowing apically (in dorsal view). Female anal tube weakly narrowing apically (in dorsal view).

Total length – Males: 4.7 mm, females: 5.3–6.6 mm.

Material examined – Iran: 1 ♀, Fars Province, nr. Kavar, N29°11.890' E52°37.591', 1698 m, 17.VI.2019, V.M. Gnezdilov leg. (ZIN).



Figs 4–6. *Perissana dlabolai* Gnezdilov et Wilson, 2006, male, southern Iran (Kerman Province): 4 = dorsal view; 5 = lateral view; 6 = front view. Scale bar = 1 mm

Perissana dlabolai Gnezdilov et Wilson, 2006
(Figs 4–6, 25)

Perissana (*Perissana*) *dlabolai* Gnezdilov & Wilson 2006: 15 (nom. nov. pro *Adenissus circularis* Dlabola 1980), fig. 21.

Adenissus(*Denissus*) *circularis* Dlabola 1980: 186.

Adenissus(*Denissus*) *circularis*: Dlabola 1985: 239.

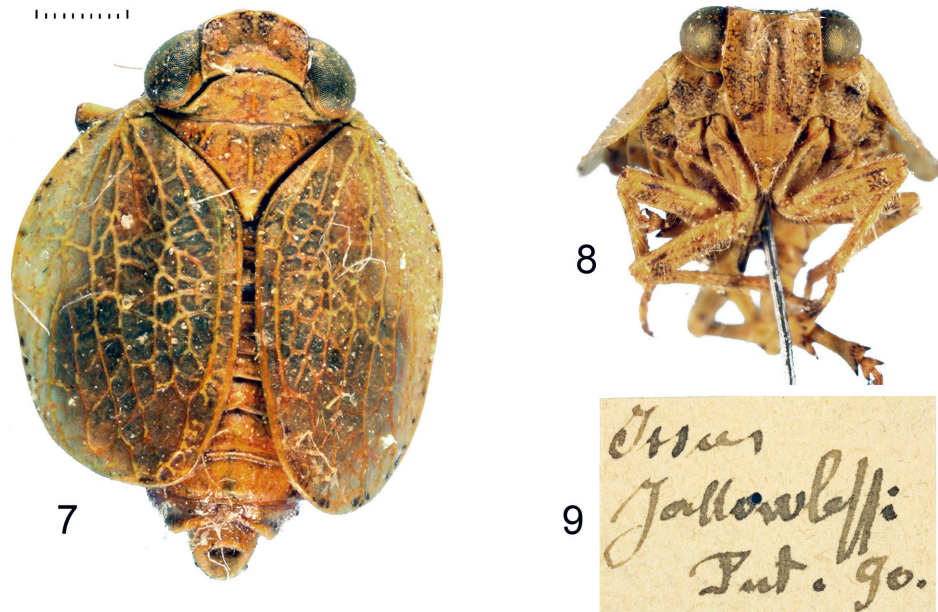
Emended description – Coryphe twice as wide as long medially, without median carina. Rostrum reaching hind coxae; 2nd and 3rd segments equal in length. Forewings widely oval, with scarce transverse venation. Hind tibia with a single lateral spine and six apical spines. First metatarsomere narrow, 1.5–2.0 times as long as second one, with two latero-apical and 4–5 intermediate spines.

General coloration dark brown to black, with yellow and white dots and spots on forewings and abdomen fusing somewhere in light areas. Metope with wide light yellow brownish to white band above clypeus.

Male anal tube almost round, not narrowing apically. Female anal tube wide, weakly narrowing apically (in dorsal view).

Total length – Males: 3.6–4.0 mm, females: 4.0–6.3 mm.

Material examined – Iran: 3 ♂, 2 ♀, Kerman Province, 80 km SE Kerman, N29°43.770' E57°33.902', 2392 m, 22.VI.2019, on *Ephedra* sp., V. M. Gnezdilov leg. (ZIN); 1 ♀, Rayen-Mahan Road, N29°43.959' E57°33.744', 2434 m, 22.VI.2019, Hagiesmaeilian leg. (HMIM).



Figs 7–9. *Perissana lakowleffi* (Puton, 1890), holotype: 7 = dorsal view; 8 = front view; 9 = label. Scale bar = 1 mm

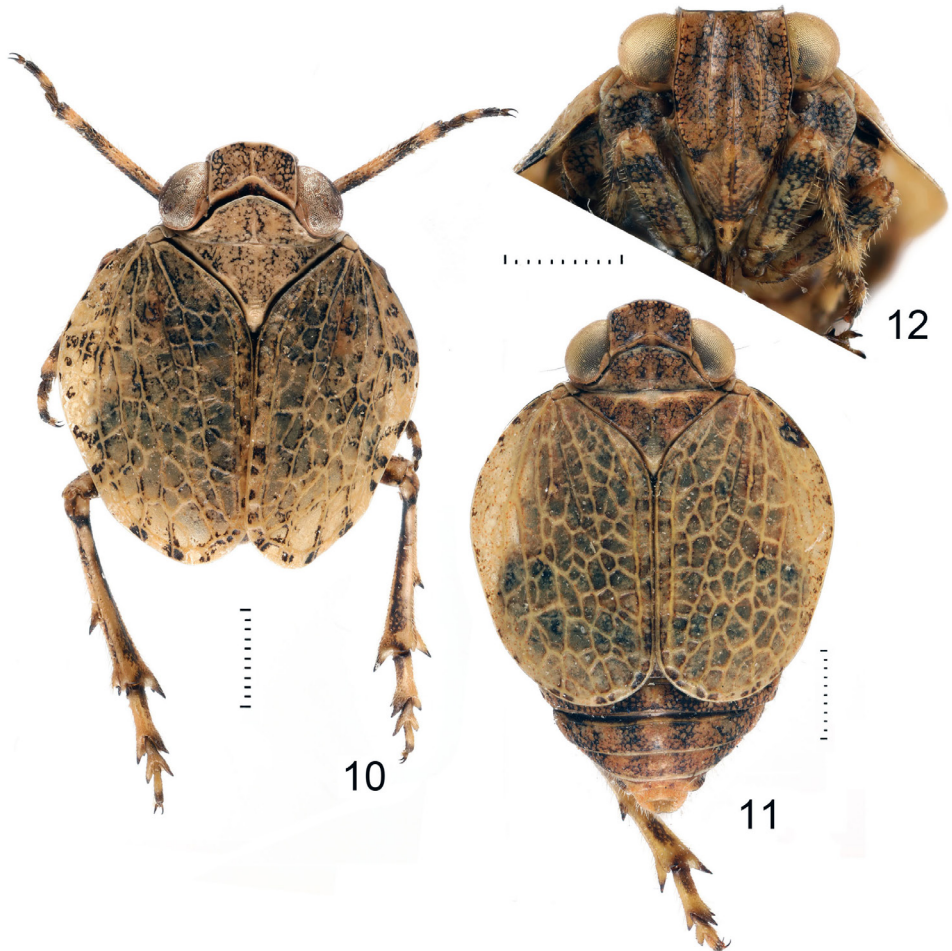
Perissana jakowleffi (Puton, 1890)
(Figs 7–12, 26)

Issus jakowleffi Puton 1890: 233.

Perissana jakowleffi Metcalf, 1958: 193.

Perissana (Perissana) jakowleffi Gnezdilov & Wilson 2006: 13, fig. 20.

Emended description – Coryphe 2.0–2.5 times as wide as long medially, with distinct median carina running from its posterior margin, but not reaching its anterior margin. Rostrum reaching hind coxae; 2nd and 3rd segments are equal in length; 3rd segment



Figs 10–12. *Perissana jakowleffi* (Puton, 1890): 10 = male, central Iran (Zanjan Province), dorsal view; 11 = female, northeastern Iran (W Azarbaijan Province), dorsal view; 12 = same, front view. Scale bar = 1 mm

weakly narrowing apically. Forewings wide, nearly circular, with rich reticulate venation, not covering the abdomen in some female specimens (Figs 7, 11). Hind tibia with a single lateral and seven apical spines. First metatarsomere narrow, 1.5–2.0 times as long as second one, with two latero-apical and 6–7 intermediate spines.

Metope evenly colored – black, with very dense light yellow dots sometimes fused in yellow area in its upper part. Forewings with dense light yellow dots fused somewhere in light areas or sometimes mostly brown, with yellow costal margins.

Male anal tube narrowing apically (in dorsal view). Female anal tube wide, narrowing apically.

Total length – Males: 4.3–4.7 mm, females: 4.9–6.0 mm.

Type material examined – Holotype, female, Perse, Charoud (MNHN).

Other material examined – Iran: 1 ♂, Zanjan Province, 7 km E Sa'id Abad, N36°23.3' E48°11.7', 1635 m, 11–12.V.2006, steppe, stream, at light, J. Hájek & P. Chvojka leg. (NMPC); 1 ♀, W. Azarbaijan Province, 25 km E Bostanabad, N37°32'20'' E47°2'10'', 1700 m, 30.IV.1999, K. Székely leg. (HNHM). 1 ♂, 3 ♀, Esfahan Province, 58 km S Delijan, 1958 m, 12.V.1985, Mirzayans & Hashemi leg. (HMIM); 4 ♂ Kashan, 1070 m, 21.IV.1986, Mirzayans & Borumand leg. (HMIM).

***Perissana ardua* sp. n.**

<http://zoobank.org/077F0D56-466E-41DB-B6D0-AF45DEAE6B4F>

(Figs 13–23, 27)

Description – Morphology. Metope elongate, with median carina running from its upper margin to the middle of postclypeus. Coryphe nearly hexagonal, depressed, 2.3 times as wide as long medially, with median carina running from its posterior margin, which is deeply angularly concave, but not reaching its anterior margin (Fig. 13). Ocelli absent. Rostrum reaching hind coxae. Pronotum depressed medially. Mesonotum slightly longer than pronotum, with distinct lateral carinae and smooth median carina. Forewings wide, almost circular, with richly reticulate venation, slightly surpassing tergite VI. Forewing vein sequence: R 2; M 2; CuA 2; CuP 1; Pcu 1; A₁ 1. Hind tibia with a single lateral spine medially and with 7–8 apical spines. First metatarsomere narrow, 1.5–2.0 times as long as second one, covered with long setae, with two latero-apical and six intermediate spines. Second metatarsomere covered with short setae ventrally, with two latero-apical spines. Arolium short.

Colouration. Head, pro- and mesonotum, and legs black, with uniform light yellowish brown punctuation. Metope and pronotum with brown light yellowish carinae. Anteclypeus light yellow, with four elongate dark brown spots. Pedicel brown yellowish. Rostrum with 2nd and 3rd segments light yellow dorsally and dark brown ventrally, with black apex. Forewings brown light yellowish, with dark brown to black spots and dots fused in cells on corium and clavus and brown light yellowish veins. Tegulae and basal cells light yellow. Coxae light yellow, with dark brown areas. Apices of fore and middle tibiae light yellow. Leg spines black apically. Tarsomeres light yellowish brown. Apices of third metatarsomeres and claws dark brown to black. Abdominal sternites dark brown to black, with light yellow hind margins. Sternite VII with wide yellow stripe along hind margin. Abdominal tergites black, with brown yellowish sparse punctuation. Anal tube light yellow dorsally, dark brown ventrally, and black inside. Pygofer with light yellow hind margins. Styles light yellow, with dark brown hind margins and brown caudo-dorsal angles.

Male genitalia (Figs 16–23). Pygofer elongate vertically, narrow, with hind margins deeply concave basally (in lateral view) (Fig. 16). Anal tube wide, 1.6 times as long as wide, with deeply concave posterior margin (in dorsal view) (Fig. 17). Anal tube narrowing apically (in lateral view) (Fig. 18). Anal column short and wide. Phallobase elongate, with two latero-apical lobes narrowing apically and weakly serrate (Fig. 19, *lap*) and one elongate and truncate apically dorsal lobe (Fig. 20, *dl*). Phallobase strongly convex ventrally below the aedeagal hooks, with wide processes covering the hooks (Figs 19, 21, *phbp*). Phallobase covered by denticles inside. Ventral phallobase lobe large, with two lateral narrow processes at upper corners (Fig. 19, 21, *vl*). Aedeagus well visible above upper phallobase margin, covered with denticles, with four long and narrow processes (Fig. 21, *aedp*). Connective large, with elongate cup (Fig. 19, *cc*). Styles with wide plate covered by hair-like setae, with small capitulum bifurcated into two processes one of which bearing two teeth (in dorsal view) (Figs 22, 23).

Total body length – 5.0 mm.

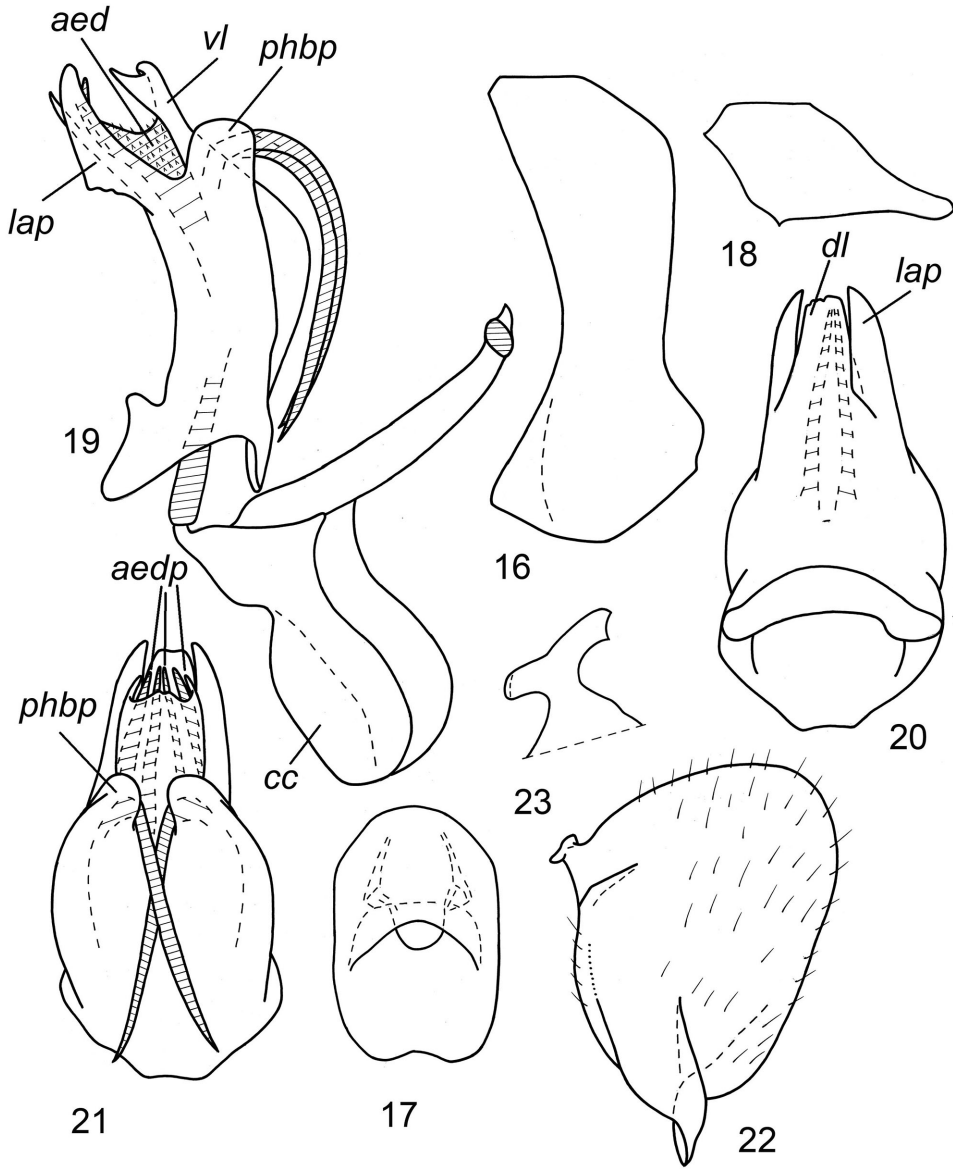
Etymology – Species name is derived from Latin adjective “*ardua*” – steep referring to the steep slope (Fig. 1) where the type series was collected.

Type material – Holotype, male, Iran, Fars Province, SE Abadeh, Khanekhoreh, 2440 m, N30°47.226' E53°10.282', 12.VI.2019, on *Ephedra* sp., V. M. Gnezdilov leg. (ZIN). Total body length: 5.0 mm.

Paratype, male, Iran, Fars Province, SE Abadeh, Khanekhoreh, 2440 m, N30°47.226' E53°10.282', 12.VI.2019, on *Ephedra* sp., V. M. Gnezdilov leg. (HMIM).



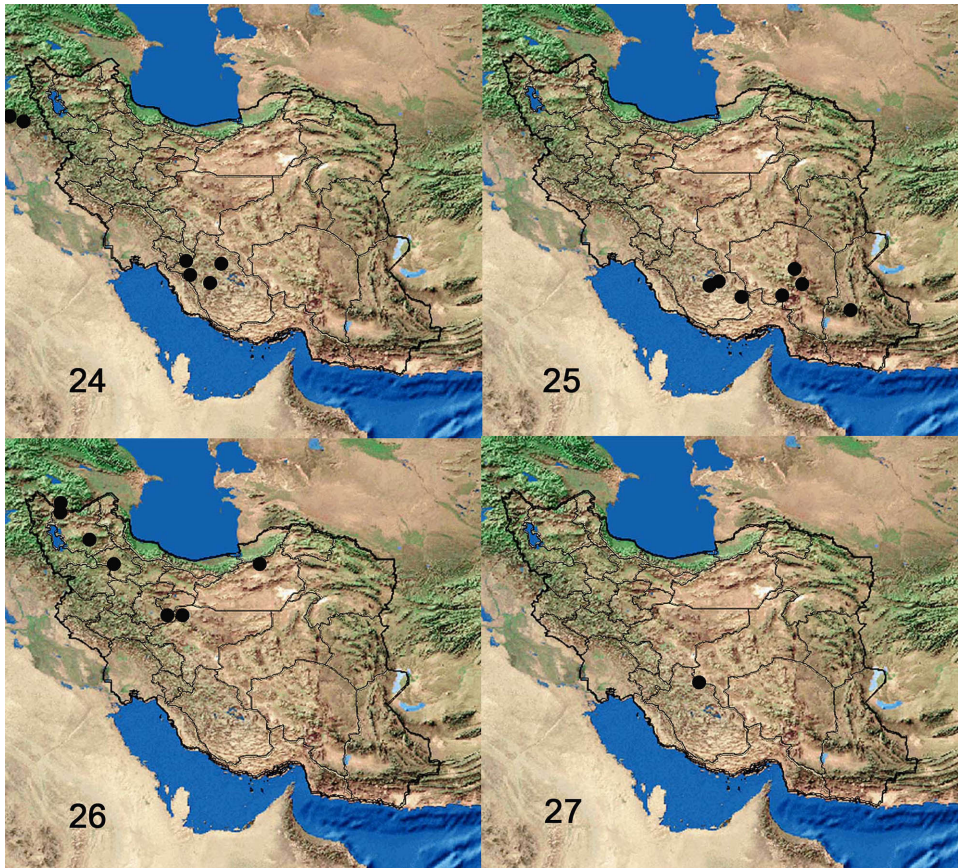
Figs 13–15. *Perissana ardua* sp. n., holotype: 13 = dorsal view; 14 = lateral view; 15 = front view. Scale bar = 1 mm



Figs 16–23. *Perissana ardua* sp. n., holotype, male genitalia: 16 = pygofer, lateral view; 17 = anal tube, dorsal view; 18 = anal tube, lateral view; 19 = penis (phallobase and aedeagus) and connective, lateral view; 20 = penis, dorsal view; 21 = penis, ventral view; 22 = style, lateral view; 23 = capitulum of style, dorsal view. Abbreviations: aed = aedeagus; aedp = processes of aedeagus; cc = connective cup; dl = dorsal phallobase lobe; lap = latero-apical phallobase lobe; phbp = phallobase processes covering ventral aedeagal hooks; vl = ventral phallobase lobe. Not to scale

Key to *Perissana* species

1. Metope with wide light band above clypeus. Forewings nearly oval, with scarce transverse venation 2
 - Metope black, with uniform light yellow brownish punctuation. Forewings nearly circular, with reticulate venation 3
2. Coryphe 3.0–3.5 times as wide as long medially. Hind tibia with two lateral spines. First metatarsomere wide, nearly as long as second one. Male anal tube not narrowing apically (in dorsal view) (GNEZDILOV & WILSON 2006, fig. 22c). Males: 4.7 mm, females: 5.3–6.6 mm. Southern Iran, northern Iraq *P. bispinata* (Dlabola, 1980)



Figs 24–27. Distribution of *Perissana* species: 24 = *P. bispinata* (Dlabola, 1980); 25 = *P. dlabolai* Gnezdilov et Wilson, 2006; 26 = *P. jakowleffi* (Puton, 1890); 27 = *P. ardua* **sp. n.**

- Coryphe nearly twice as wide as long medially. Hind tibia with a single lateral spine. First metatarsomere narrow, 1.5–2.0 times as long as second one. Male anal tube weakly narrowing apically (in dorsal view) (GNEZDILOV & WILSON 2006, fig. 21c). Males: 3.6–4.0 mm. Females: 4.0–6.3 mm. Southern Iran *P. dlabolai* Gnezdilov et Wilson, 2006
- 3. Male anal tube distinctly narrowing to truncate apex (in dorsal view). Phallobase not convex below ventral aedeagal hooks (GNEZDILOV & WILSON 2006, figs 20a, 20e). Azerbaijan (Nakhichevan), northeastern and central Iran *P. jakowleffi* (Puton, 1890)
- Male anal tube not narrowing apically, anterior margin deeply concave (in dorsal view) (Fig. 17). Phallobase strongly convex below ventral aedeagal hooks (Fig. 19). Southern Iran *P. ardua* **sp. n.**

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