

Two new species of *Larinus* from Iran (Coleoptera: Curculionidae: Lixinae)

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Abstract. Two new species of the genus *Larinus* Dejan, 1821 (Coleoptera: Curculionidae: Lixinae), *Larinus iranicus* sp. nov. and *Larinus zagros* sp. nov., are described from Iran. The first species is classified in the subgenus *Larinus* s. str., the second species in *Phyllonomeus* Gistel, 1856. Both new species are compared with closely related species and illustrated.

Key words. Coleoptera, Curculionidae, Lixinae, *Larinus*, taxonomy, new species, Iran, Palaearctic Region

Introduction

The weevil genus *Larinus* Dejean, 1821 contains many species which are closely associated with the genera *Carduus* L., *Carlina* L., *Centaurea* L., *Cirsium* Miller, *Cynara* L., *Echinops* L., *Onopordum* L., *Scolymus* L., *Silybum* Adans., and few others belonging to the tribe Cardueae (Asteraceae) in the Palaearctic Region (TER-MINASSIAN 1967, ZWÖLFER et al. 1971). Genus *Larinus* belongs to the inflorescence inhabiting Lixini, whose females lay eggs in/on flower heads and cover them with varyingly abundant secretion. Larvae feed on flower organs, seeds and receptacle tissue. Pupal stage and emergence of adults of a new generation take place in flower heads (ZWÖLFER et al. 1971, GÜLTEKİN & KOROTYAEV 2005, GÜLTEKİN 2006a, GÜLTEKİN et al. 2008). There is an exception of four *Larinus* species constructing trehala, whose larvae make capsule in the stems of the plant genus *Echinops* (Asteraceae) (GÜLTEKİN 2008). The species of *Larinus* are important for biological control of thistle weeds in both native distribution areas (ABELA-HOFBAUEROVÁ et al. 2011, GÜLTEKİN 2006a, GÜLTEKİN et al. 2008, ZWÖLFER et al. 1971) and introduced regions (LANG et al. 1997, McCLAY 1990, SOBHIAN & FORNASARI 1994, WOODBURN & BRIESE 1996).

The genus *Larinus* is distributed in the Palaearctic, Afrotropical and Oriental Regions (ALONSO-ZARAZAGA & LYAL 1999, CSIKI 1934, WINKLER 1932), while it has only introduced

species in the Nearctic Region (LANG et al. 1996, O'BRIEN & WIBMER 1982, SOBHIAN & FORNASARI 1994), and the Australian Region (WOODBURN & BRIESE 1996). According to the catalogue recently prepared by GÜLTEKİN & FREMUTH (2012), *Larinus* comprises approximately 100 species in the Palearctic Region, with highest species richness in the Mediterranean. TER-MINASSIAN (1967) quoted about 75 species in the former Soviet Union, BORUMAND (1998), and LEGALOV et al. (2010) indicated about 30 species from Iran.

The knowledge of *Larinus* was recently improved by series of comprehensive taxonomic revisions by GÜLTEKİN (2006b, 2008, 2010) and GÜLTEKİN & PERRIN (2006, 2011). This paper focuses on description of two new species collected in Iran by the second author.

Material and methods

Measurements were taken using an ocular micrometer attached to Leica MZ75 stereomicroscope. Measurements used here are defined as follows: body length = from anterior margin of eye to posterior margin of elytra; rostrum length = from apex of rostrum to anterior margin of eye; prothorax length = from anterior to posterior margin of scutellar corner. For morphological study, dry adults were placed in mild clean water overnight and the genitalia were dissected. Parts with muscles and other tissues were stored in 10% KOH overnight, cleaned with distilled water and 70% ethanol. Genitalia were observed and photographed in glycerine under a stereomicroscope. Genitalia were kept in microvials or dry, glued on paper under the pinned specimens they were dissected from. Photographs were taken with Leica DFC 420 digital camera joining microscope using LeicaLAS software for montage. The digital images were then imported into Adobe Photoshop 8.0 and CorelDRAWX4 for labelling and plate composition.

The material examined is deposited in the following collections:

- EMET Entomology Museum, Erzurum, Turkey;
HNHM Hungarian Natural History Museum, Budapest, Hungary.

Taxonomy

Larinus iranicus sp. nov.

(Figs. 1–13)

Type material. HOLOTYPE: ♂, **IRAN: HAMADAN:** 'Prov., Hamadan, Zagros Mts. / 25 km W Khakadan / 34°02'53" N, 48°20'30" E, 2200 m / 21.vi.2000, leg. Fábíán Gy., Szécsényi L., Székely K.' (HNHM). PARATYPES: **IRAN: EAST AZERBAIJAN:** 'Prov., Azarbaygan-e, Sarqui, Sahand Mt. / 25 km E Khakadan, 37°27'19" N, 47°41'49" E, 1700 m / 10.vi.2000, leg. Fábíán Gy., Szécsényi L., Székely K.' 1 ♂ (HNHM). **IRAN: WEST AZERBAIJAN:** 'Prov. Urmia, 29 km SE of Urmia / Shirü Kandi, Qasemlü Valley / 37°18' N, 45°07' E, 1420 m / 02.viii.2010, leg. Y. Karimpour', 1 ♂ 1 ♀ (EMET).

Description. *Measurements* (n = 4). Body length: 7.40–9.00 mm. Rostrum: length 1.30–1.80 mm, width 0.80–0.90 mm. Prothorax: length 2.30–2.50 mm, width 3.10–3.70 mm. Elytra: length 4.00–6.20 mm, width 3.40–4.30 mm.

Vestiture. Ventral and lateral surface of head densely covered with short bifurcate whitish-grey scales; bifurcate scales on coxae shorter; ventral surface of body and legs with hair-like scales; dorsal surface of body with sparse pubescence, sparser and shorter on disc



Figs. 1–5. *Larinus iranicus* sp. nov.. 1 – holotype, male; 2 – paratype, female; 3–4 – rostrum, dorsal view: 3 – male, 4 – female; 5 – fore tibia, female.



Figs. 6–13. Male and female genitalia of *Larinus iranicus* sp. nov. 6 – dorsal view of aedeagus, 7 – lateral view of aedeagus, 8 – apical part of aedeagus in dorsal view, 9 – tegmen, 10 – tergite VIII, 11 – sternite VIII, 12 – coxite, 13 – spermatheca.

of prothorax; slightly longer and thicker whitish scales constitute a band on lateral margins of prothorax and a thin median stripe on pronotum at apical third; scales scattered as small rounded patches on elytra (Figs. 1–2).

Structure. Body elongate oval. Head spherical, ventral surface with V-shaped thin transverse sulcus and ridges immediately preceding prosternum. Vertex invisible; frons flat, frontal pit small, rounded and superficial. Eyes elliptical, weakly convex, inferior margin narrower than dorsal one, slightly continuing to ventral part of the head. Rostrum sub-conical (Figs. 3–4), weakly curved, parallel-sided at basal half, gradually narrowed from base to antennal insertion, cylindrical after antennal insertion and weakly widening in female; dorsum of rostrum with two deep longitudinal sulci on basal half in female (Fig. 4) and somewhat shorter

in male (Fig. 3); between these two sulci a raised narrow triangular process is developed in both sexes, dorso-lateral margins of rostrum obtusely raised; rostral pit invisible; surface of rostrum and frons with dense, minute to coarse punctures, coarse punctures elongate and partly confluent, being smaller on apical half and larger on lateral surface. Postocular lobes weakly developed; ventral margin of scrobes partly visible dorsally. Antenna inserted at about 0.40 of total rostrum length measured from apex of rostrum in both sexes. Scape shorter than funicle, dorso-ventrally depressed and weakly curved at basal third, abruptly widened at apex, slightly wider than antennomere I, antennomeres I and II subconical, antennomere I about $1.50\times$ as long as antennomere II, antennomere III short, about $0.50\times$ as long as antennomere II, subequal in length and width, antennomeres IV–VII gradually widened, antennomere VII the widest; club elongate with acuminate apex, about $2.30\times$ as long as wide at widest part.

Prothorax trapezoidal (Figs. 1–2), base moderately and triangularly arched towards elytra; basal margin sinuate; lateral margins gradually narrowed from base to apex, constricted at apical sixth like short collar; apical margin very shortly protruding over head, slightly emarginated toward postocular area; pronotum convex, a thin interrupted median carina present on disc in anterior half in male, a short rectilinear depression anteriorly and a thin carina at base in female; surface with dense, rounded moderate-sized punctures on disc, smaller and sparser on anterior declivity, micropunctuation on interspaces very sparse; lateral surface of prothorax with 3–4 obtuse, shining granules. Proscutellum moderate in size, protruding towards mesoscutellum and weakly raised. Anterior margin of prosternum moderately emarginated. Mesoscutellum small.

Elytra gradually narrowing from base to apex (Figs. 1–2), weakly constricted before mid-length of elytra; humeral prominences moderately developed, located at base of intervals VI–IX; preapical prominences distinct and located at the end of intervals IV–VII. Intervals flat, subequal and wide on disc, narrowed towards apex, about $5\times$ as wide as stria on disc, intervals VIII and IX narrower, interval X wider than the others in basal half, interval XI sinuate, weakly protruded towards metepisternum. Striae formed by ovate and separated punctures from declivity to apex, then punctures partly or completely confluent, constituting thin sulciform striae, stria X sinuate and deeply sulciform. Abdomen typical of the genus.

Legs typical for this genus. Femora mutic, swollen medially, slightly thinner than rostrum width. Outer margin of protibia nearly straight, inner margin sinuate with denticles – male with 7–8 sharp denticles, female with 11–12 denticles, the one nearest to uncus larger and sharper on female (Fig. 5), obtuse on male, and bearing a tuft of setae projecting over the uncus; apical fringe not continuing to the lateral outer margin. Meso- and metatibia straight, inner margins with 4–5 small obtuse denticles in male, 8–9 sharp denticles in female; apical fringe longer and denser than protibia. Tarsi narrow, tarsomere III $1.20\times$ as wide as tarsomere II, lobes of tarsomere III subquadrate. Spongy pads covering completely the surface of ventral lobes of tarsomere III partly present on underside of tarsomeres I–II and located near their outer sides. Tarsomere V stout, curved, gradually widened from base to apex, slightly shorter than total length of tarsomeres I–III; claws connate at basal $1/4$, moderately divergent at apical half, apex slightly curved.

Male genitalia. Aedeagus in dorsal view elongate, nearly parallel-sided, ventral plate ending roundly with short, obtuse apex (Figs. 6, 8). Aedeagus in lateral view distinctly curved



Figs. 14–19. *Larinus modestus* Gyllenhal, 1835 (14–16) and *Larinus fucatus* Faust, 1891 (17–19). 14, 17 – female, dorsal view; 15, 18 – fore tibia, female; 16, 19 – aedeagus, dorsal view.

(Fig. 7). Tegmen forming a ring (Fig. 9), ring weakly emarginate before apodeme. Spiculum gastrale thin, stick-shaped, curved, slightly shorter than aedeagus.

Female genitalia. Tergite VIII as typical of the genus, posterior margin well sclerotized and bears short, dense hairs (Fig. 10). Apodeme of sternite VIII thin, somewhat curved and 3× as long as lateral arms (Fig. 11). Lateral arms of tergite VIII narrow, angularly-arched on outer side; vertical arms too short and turning angularly inner-upright. Anterior margins of vertical arms sclerotized and bearing a range of short setae. Coxite narrowed to apex constituting a cylindrical basement for stylus, moderately sclerotized throughout (Fig. 12). Stylus cylindrical, shorter than basement, brownish color, anteriorly tapering and bear 3–4 short erect setae on apex (Fig. 12). Spermatheca C-shaped, gland lobe moderately developed, ductal lobe distinctly smaller than gland lobe, and apex of pump obtuse (Fig. 13).

Sexual dimorphism. Rostrum of female is slightly longer than in male and widened apically. First and second visible ventrites of abdomen are weakly depressed medially in male. Protibia bears 7–8 sharp denticles in male and 11–12 denticles in female (Fig. 5). Subuncus is larger and sharper in female, obtuse in male. Inner margins of meso- and metatibia bear 4–5 small obtuse denticles in male, 8–9 sharp denticles in female.

Variation. Size variation is summarized in the above measurements.

Diagnosis and discussion. *Larinus iranicus* sp. nov. is recognizable by the ovate body, bisulcate subconical short rostrum, small rounded scattered patches of vestiture on elytra and parallel-sided aedeagus with ventral plate rounded at apex and short and obtuse apically. The new species is related to *Larinus modestus* Gyllenhal, 1835 (Fig. 14) and *L. fucatus* Faust, 1891 (Fig. 17). They share similar shape of aedeagus, rostrum and tibia. However, the new species clearly differs from both by lacking greyish-white stripes on pronotum and elytral intervals III, and IX–X. The sulci on dorsal surface of rostrum of the new species are deeper and longer than those of both other species. The aedeagus is moderately constricted in *L. modestus* (Fig. 16) and slightly constricted before apex in *L. fucatus* (Fig. 19). The lateral constriction of elytra is more distinct in *L. modestus* (Fig. 14); uncus and subuncus of female on fore tibia (Fig. 15) are larger than in the new species. The body size of *L. fucatus* is smaller than that of both *L. modestus* and *L. iranicus* sp. nov., its uncus on fore tibia is sharper and longer (Fig. 18). *Larinus iranicus* sp. nov. is sympatric with *L. modestus* described from Iran. *Larinus fucatus* is more widely distributed in Azerbaijan, Armenia, Iran, Iraq and Turkey.

Etymology. The new species name originates from the country of Iran where all available type specimens were collected.

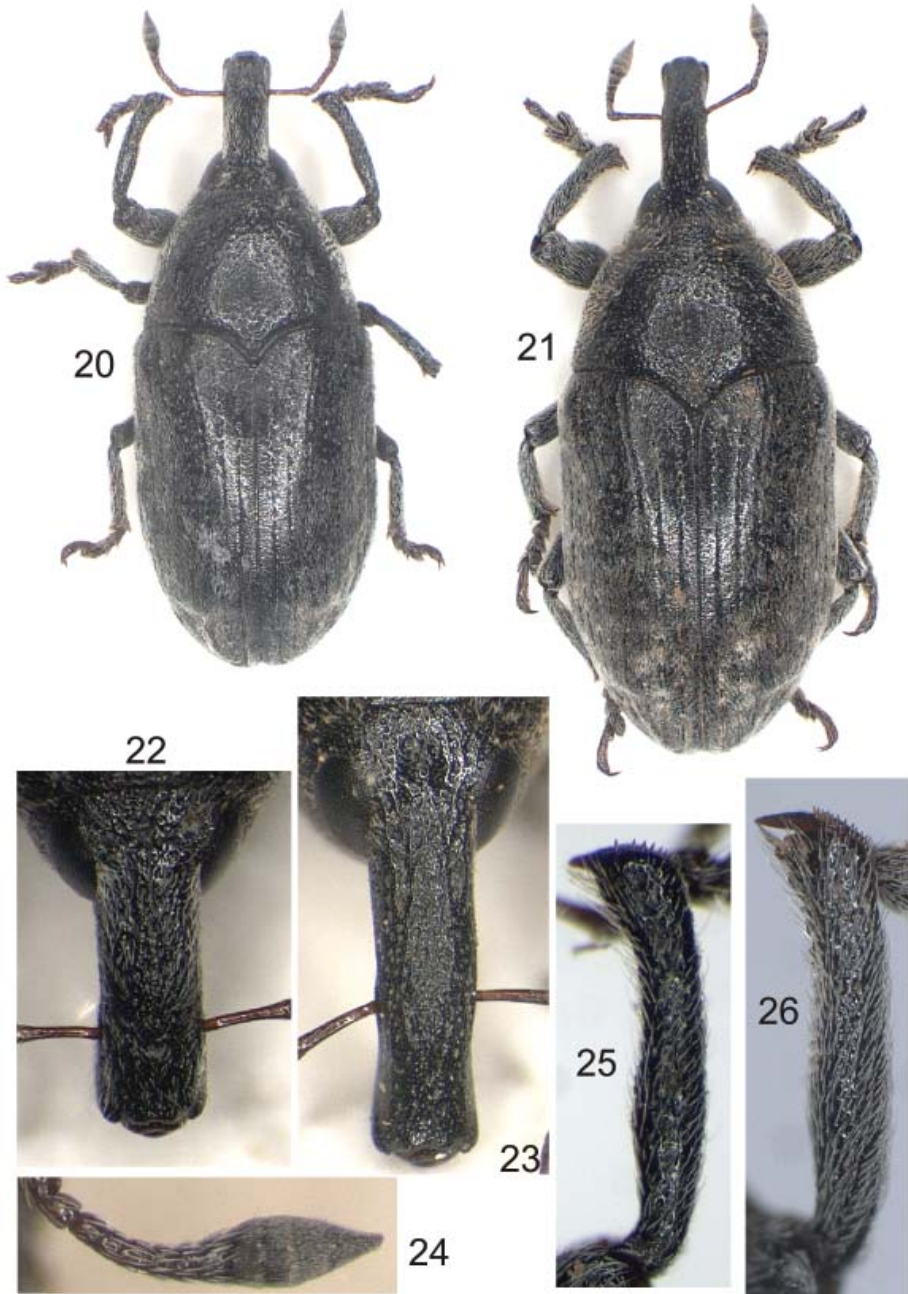
Larinus zagros sp. nov.

(Figs. 20–34)

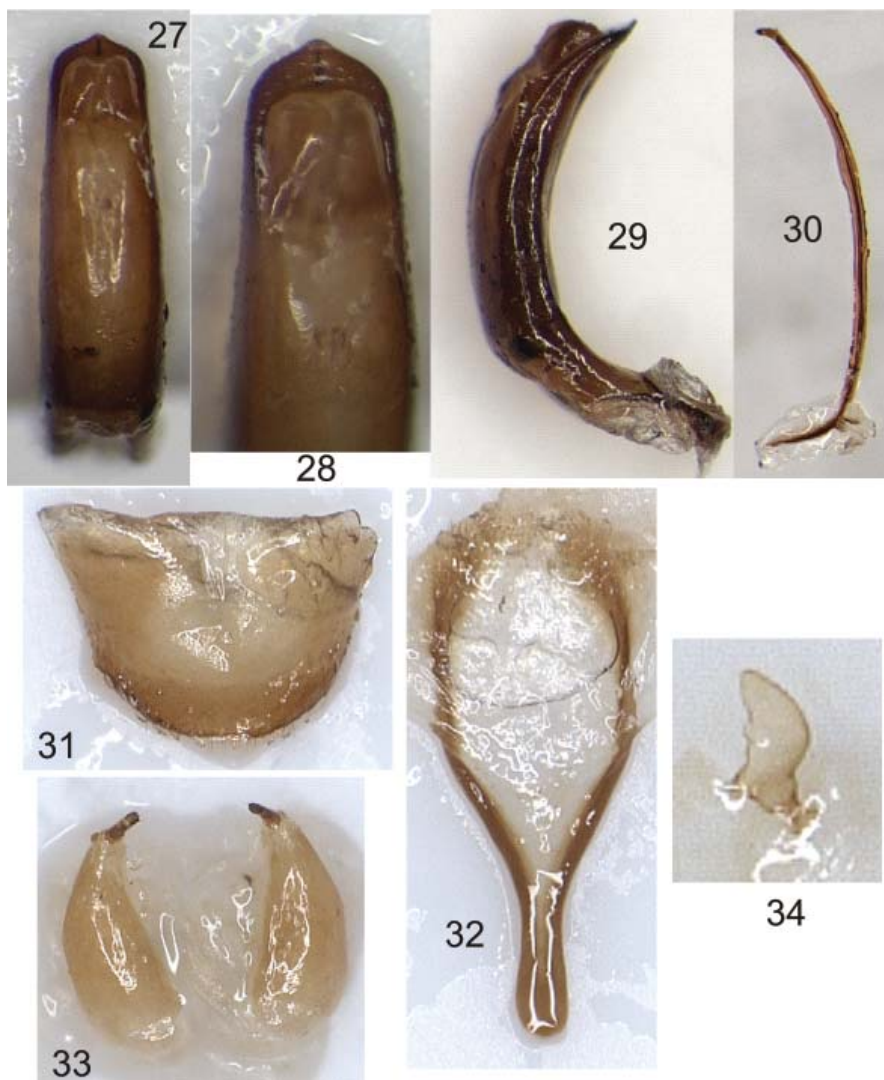
Type material. HOLOTYPE: ♂, IRAN: ISFAHAN: ‘Prov., Isfahan, Sibak, Kuhhâ-ya-Zagros / 32°52′285″ N, 50°02′291″ E, 2500 m / 11.vi.2007, leg. Nadai L. (HNHM). PARATYPES: IRAN: ISFAHAN: ‘Prov., Isfahan, Sibak, Kuhhâ-ya-Zagros / 32°52′285″ N, 50°02′291″ E, 2500 m / 11.vi.2007, leg. Nadai L., 3 ♀♀ (2 ♀♀ in HNHM, 1 ♀ in EMET).

Description. *Measurements* (n = 4). Body length: 6.70–9.10 mm. Rostrum: length 1.60–2.60 mm, width 0.65–0.75 mm. Prothorax: length 2.00–2.70 mm, width 2.80–3.90 mm. Elytra: length 4.70–6.10 mm, width 3.20–4.30 mm.

Vestiture. Ventral and lateral surface of head with sparse short bifurcate whitish-grey scales, bifurcate scales on ventral surface of body dense and longer, ventral surface of rostrum with



Figs. 20–26. *Larinus zagros* sp. nov. 20 – holotype, male; 21 – paratype, female; 22 – dorsal view of rostrum, male; 23 – dorsal view of rostrum, female; 24 – funicle and club of antenna; 25 – fore tibia, male; 26 – fore tibia, female.



Figs. 27–34. Male and female genitalia of *Larinus zagros* sp. nov. 27 – dorsal view of aedeagus, 28 – apical part of aedeagus in dorsal view, 29 – lateral view of aedeagus, 30 – spiculum gastrale, 31 – tergite VIII, 32 – sternite VIII, 33 – coxite, 34 – spermatheca.

long semi-erect hair-like scales; dorsal surface of body with very sparse hair-like pubescence, denser and longer on lateral margins of prothorax and legs.

Structure. Body elongate oval (Figs. 20–21). Head spherical, vertex partly visible, frons weakly depressed, frontal pit small and superficial. Eyes elliptical, convex, ventral side narrower than the dorsal one and slightly continuing towards the ventral side of head. Rostrum elongate, subcylindrical, slightly curved in male (Fig. 22), distinctly curved in female (Fig.

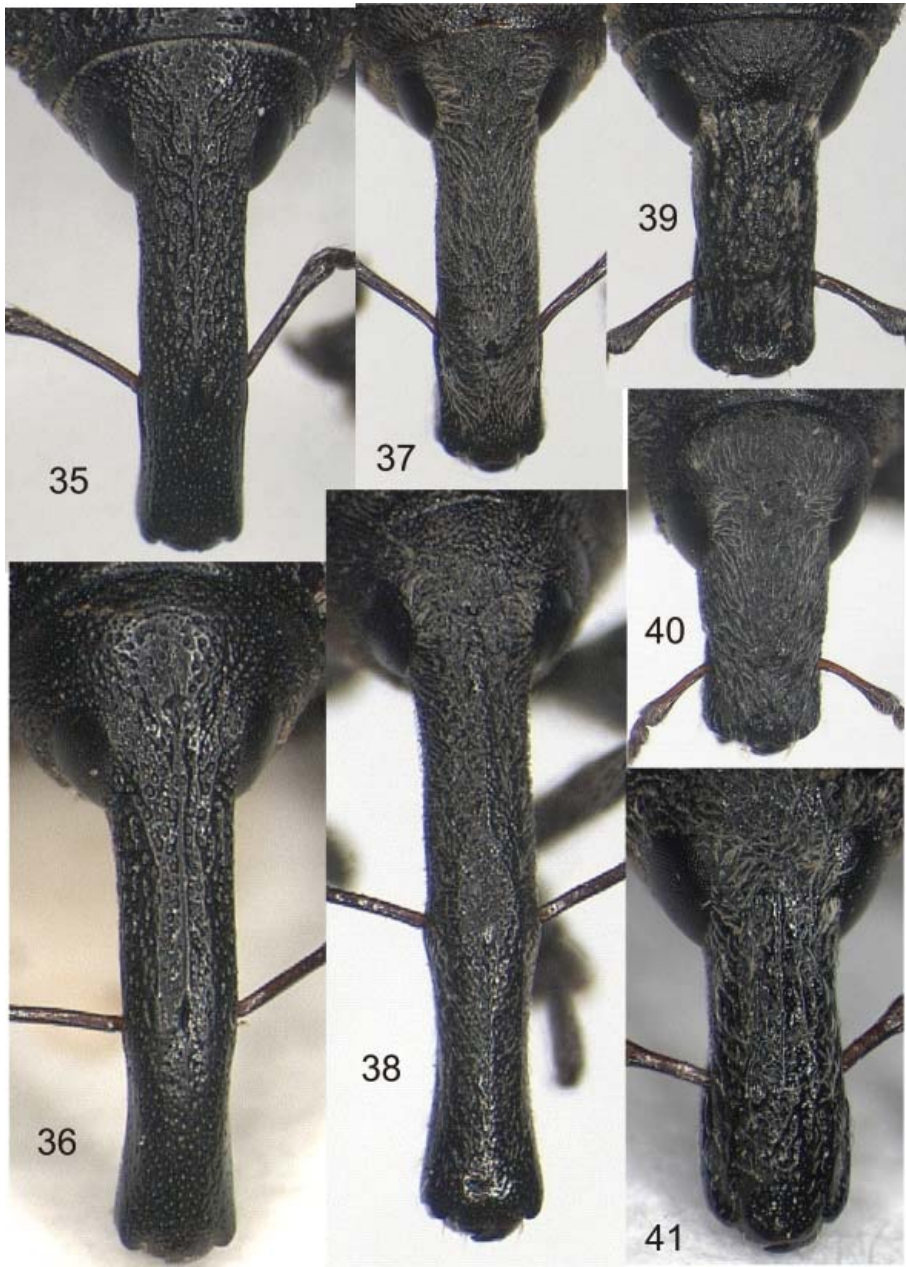
23), parallel-sided in basal half in both sexes, constricted after antennal insertion in female (Fig. 23); dorsally with two longitudinal shallow depressions on basal third in female, within this area obtusely raised; rostral pit invisible; epistomal area transversely depressed; surface of rostrum including frons coarsely and densely punctured, punctures partly confluent, smaller on apical half and larger on lateral surface of rostrum; interspaces with dense microreticulation. Ventral margin of scrobes partly visible dorsally. Antenna inserted at about 0.35 of the total rostrum length measured from the apex in male and 0.45 of rostrum length in female. Scape shorter than funicle, gradually widened towards apex, slightly wider than antennomere I, antennomere I slightly wider and longer than antennomere II, antennomere III subquadrate, antennomeres IV–VII gradually widened, antennomere VII being the widest; club elongate with acuminate apex, $2.10\times$ as long as wide at widest part (Fig. 24).

Prothorax (Figs. 20–21) trapezoidal, base moderately and triangularly arched towards elytra, basal margin sinuate, proscutellum moderate in size, a little lower than pronotum, protruded towards mesoscutellum; lateral margins of prothorax gradually narrowing anteriorly, constricted at anterior sixth like short collar; anterior margin evenly curved ventrally, postocular lobes moderately developed, anterior margin of prosternum very weakly emarginate. Pronotum convex, surface with rounded moderately sized punctuation, dense on posterior half of disc, smaller and sparser on anterior declivity, micropunctuation on interspace dense and regular. Mesoscutellum small and visible.

Elytra (Figs. 20–21) parallel-sided at basal $2/3$, weakly constricted before their mid-length, posterior third roundly narrowed towards apex; humeral prominences moderately developed, located at base of intervals VII–IX; preapical prominences distinct and located at the end of intervals IV–VII. Intervals flat, subequally wide on disc, narrower towards apex, about $5\times$ as wide as striae on disc, surface with transverse microwrinkles and micropunctuation, intervals XI sinuate, protruding towards metepisternum, interval X wider at basal third; striae formed by ovate and separate punctures up to apical declivity, then punctures partly or completely confluent in the form of thin sulciform striae. Venter typical for the genus.

Legs typical for this genus. Femora mutic, swollen medially, slightly thinner than rostral width. Outer margin of protibia nearly straight, inner margin sinuate in both sexes and serrate in female. Unci well developed in both sexes and bearing a tuft of setae projecting from the uncus; subunci missing in male (Fig. 25), subunci with an obtuse triangular plate in female (Fig. 26); apical fringe not continuing to the lateral outer margin. Meso- and metatibia straight, inner margin without denticles; apical fringe on meso- and metatibia longer and denser than on protibia. Tarsi wide, tarsomere III $1.20\times$ as wide as tarsomere II, lobes of tarsomere III almost as long as wide. Spongy pads cover ventral lobes of tarsomere III, and are in the form of a tuft on underside of tarsomeres I–II placed at their apical corner. Tarsomere V stout, curved, gradually widened from base to apex, slightly shorter than the total length of tarsomeres I–III; claws connate at basal fourth, moderately divergent at apical half.

Male genitalia. Aedeagus in dorsal view (Figs. 27–28) elongate, gradually narrowed from base to apical $1/5$, weakly constricted at this part and parallel-sided, ventral plate ending upside-down, U-shaped with short, obtuse apex. Aedeagus in lateral view (Fig. 29) distinctly curved, its outer margin swollen medially. Tegmen forming a ring, ring distinctly emarginated before apodeme. Spiculum gastrale thin, stick-shaped, curved (Fig. 30), slightly shorter than aedeagus.



Figs. 35–41. Dorsal view of rostrum. 35–36 – *Larinus afer* Gyllenhal, 1835: 35 – male, 36 – female; 37–38 – *L. tenuicarpus* Ter-Minassian, 1962: 37 – male, 38 – female; 39 – *L. bardus* Gyllenhal, 1835, male; 40 – *L. darsi* Capiomont, 1874, male; 41 – *L. syriacus* Gyllenhal, 1835, male.



Figs. 42–46. Aedeagus, dorsal view. 42 – *Larinus bardus* Gyllenhal, 1835; 43 – *L. darsi* Capiomont, 1874; 44 – *L. tenuicorpus* Ter-Minassian, 1962; 45 – *L. afer* Gyllenhal, 1835; 46 – *L. syriacus* Gyllenhal, 1835.

Female genitalia. Tergite VIII as typical of the genus, posterior margin well sclerotized and bearing short, sparse hairs (Fig. 31). Apodeme of sternite VIII stout, slightly shorter than lateral arms (Fig. 32). Lateral arms of tergite VIII narrow, angularly-arched on outer side; subequal in length with vertical arms which are turning angularly inner-upright. Anterior margins of vertical arms sclerotized and bearing 5–6 short setae. Coxite narrowed to apex constituting a wide basement for stylus, well sclerotized throughout (Fig. 33). Stylus cylindrical, gradually tapering anteriorly and bearing 4–5 short erect setae on apex (Fig. 33). Spermatheca uncompleted C-shaped, gland lobe moderately developed, ductal lobe extremely small, apex of pump too obtuse (Fig. 34).

Sexual dimorphism. Rostrum of female is distinctly longer than in male, more curved, constricted after antennal insertion and dorsally with two longitudinal shallow depressions at basal third. Inner margin of protibia without denticles in male but serrate in female. Subunci missing in male, triangularly shaped in female protibiae. First and second visible abdominal ventrites weakly depressed medially in male and flat in female.

Variation. Size variation is summarized above under measurements. The male is distinctly smaller than the females.

Diagnosis and discussion. *Larinus zagros* sp. nov. is recognizable by elongate oval body, long, curved and apically constricted rostrum of female, and stout, slightly and gradually tapering aedeagus with obtuse apex. The new species shares the similar prothorax, elytra and tibiae

with *Larinus syriacus* Gyllenhal, 1835, *L. darsi* Capiomont, 1874 and *L. bardus* Gyllenhal, 1835; the similar rostrum with *L. afer* Gyllenhal, 1835 (Figs. 35–36) and *L. tenuicorpus* Ter-Minassian, 1962 (Figs. 37–38); the shape of aedeagus with *L. bardus* (Fig. 42) and *L. darsi* (Fig. 43). The rostrum of *L. zagros* sp. nov., *L. afer* and *L. tenuicorpus* is subcylindrical, thinner than the fore femur, whereas the rostrum of *L. bardus* (Fig. 39) and *L. darsi* (Fig. 40) is thicker than the fore femur, parallel-sided in *L. bardus* (Fig. 39), and subconical in *L. darsi* (Fig. 40). The dorsum of rostrum is unicarinate on basal half in *L. afer* (Figs. 35–36), tricarinate in *L. syriacus* (Fig. 41). The aedeagus of the new species (Fig. 27) is more similar to that of *L. bardus* (Fig. 42) and *L. darsi* (Fig. 43) than to that of *L. tenuicorpus* (Fig. 44), *L. afer* (Fig. 45), and *L. syriacus* (Fig. 46). The new species is allopatric in distribution with *L. afer* which occurs in Iberian Peninsula and northwestern corner of Africa. However, it is sympatric with *L. bardus* and *L. darsi* which were described from Iran; the latter is also to be found in Transcaucasia and Anatolia, and the former occurs in Caucasus, Transcaucasia, Anatolia, Afghanistan and Central Asia too. One of the other related species, *L. syriacus*, is distributed in the Middle East, Caucasus, Transcaucasia, Anatolia and southern Europe. *Larinus tenuicorpus* is only known from Armenia.

Etymology. The name is given after the type locality, the Zagros Mountains in Iran, and is a noun in apposition.

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