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RESEARCH ARTICLE

Cylisticus ilamicus sp. nov., a new woodlouse species (Oniscidea: Cylisticidae) from Iran

Cylisticus ilamicus sp. nov. – новый вид мокриц (Oniscidea: Cylisticidae) из Ирана

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Abstract. The second species of the woodlouse genus *Cylisticus* Schnitzler, 1853 is described and illustrated from Iran. *Cylisticus ilamicus* **sp. nov**. was collected in Mazhareh Cave, Ilam Province, southwestern Iran, and considered a trogloxene species. The structure of the head with rounded median lobe and without longitudinal carina distinguishes it from all other congeners.

Резюме. Из Ирана описан и проиллюстрирован второй вид мокриц рода *Cylisticus* Schnitzler, 1853. *Cylisticus ilamicus* **sp. nov.** был собран в пещере Мажаре (юго-западный Иран, провинция Илам) и считается троглоксеном. Строение головы с округлой медиальной лопастью и без продольного киля отличает его от всех других видов этого рода.

Key words: woodlice, trogloxenes, Iran, Oniscidea, Cylisticidae, *Cylisticus*, new species

Ключевые слова: мокрицы, троглоксены, Иран, Oniscidea, Cylisticidae, *Cylisticus*, новый вид

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Introduction

The family Cylisticidae comprises 65 terrestrial isopod species in four genera (excluding *Cylisticoides* Schmalfuss, 2003, with two species) (Boyko et al., 2008 onwards), mainly distributed in the Western Palaearctic region (Schmalfuss 2003b). Schmidt (2003) considered pereopod VI basis in the male with numerous large and scattered scale-like setae on medial side, and the exoantennal conglobation ability as autapomorphies of the family. Schmalfuss (2003a) pointed out that the sexual dimorphism in the pereopod VI basis, bearing a brush of setae in the male, is limited only to the epigean pigmented species of the genus *Cylisticus* Schnitzler, 1853, and the exoantennal conglobation ability is prone to convergence, and that there are no reliable synapomorphies for the Cylisticidae.

The genus *Cylisticus* consists of 53 species in two geographically disjunct groups: the eastern (Eastern Europe, Turkey, Caucasus region, northern Iran) and the western (southern France, northern Italy, Corsica and Sardinia) groups (Vandel, 1962; Schmalfuss, 1992, 2003a). No unequivocal diagnostic character is common for all species included in the genus, except the exoantennal conglobation ability, which is a character liable to convergence (Schmalfuss, 2003a).

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Previously, three cylisticid species have been reported from Iran. Schmalfuss (1986) described *Cylisticus rotundifrons* Schmalfuss, 1986 (= *Cylisticoides rotundifrons*) from northern Iran. He also described *Cylisticus* sp. I and *Cylisticus* sp. II from the above-mentioned region. Schmalfuss (2003a) recognised *Cylisticus* sp. II (cf. Schmalfuss, 1986) as *Cylisticoides angulatus* Schmalfuss, 2003. Investigating the cylisticid species in Iran, Kashani (2016) described a new species, *Cylisticus masalicus* Kashani, 2016, from northern Iran and reported further localities for the previously described species in the region. He also recognised *Cylisticus* sp. I (cf. Schmalfuss, 1986) belonging to this species.

Accordingly, in the present paper, the second species of the genus *Cylisticus* is described from Iran, and its diagnostic characters are illustrated.

Material and methods

The specimens were collected by hand in Mazhareh Cave, located in the mountainous region near Abdanan, Ilam province, southwestern Iran. Body parts were slide mounted in Euparal (Carl Roth, Karlsruhe). Line drawings were made using a drawing tube, mounted on Zeiss Stemi SV11 stereomicroscope and on Olympus CH40 compound microscope.

The final illustrations were prepared using CorelDRAW software. Tescan Vega3 scanning electron microscope was used for taking SEM micrographs. The type material was deposited in the Zoological Museum, Collection of Biology Department, Shiraz University (ZM-CBSU), and in the personal collection of the second author (PCGMK).

Taxonomy

Order **Isopoda** Latreille, 1817

Suborder **Oniscidea** Latreille, 1802

Family **Cylisticidae** Verhoeff, 1949

Genus ***Cylisticus*** Schnitzler, 1853

***Cylisticus ilamicus* sp. nov.**
(Figs 1–4)

Holotype: Male, 14 mm, **Iran**, *Ilam Province,* Mazhareh Cave, 32°53′N 47°41′E, elev. 953 m, 7.V.2016, H. Darvishnia & Y. Bakhshi leg., Iso-1043 (ZM-CBSU).

Paratypes: Two males and three females, same data as for holotype (ZM-CBSU, Iso-1044); two males and one female, same data as for holotype (PCGMK, 2659).

Diagnosis. Head with well-developed, broadly rounded median lobe and with prominent lateral lobes; male pereopod VII ischium club-like, merus with slightly concave ventral margin, proximal part equipped with two to three spiny setae.

Description. Maximum length of male 14 mm, of female 15 mm. Colour brown–grey with pale yellowish muscle spots. Dorsal surface of head, pereon and pleon smooth, covered with small triangular scale-setae (Fig. 3C, D).

Head with broadly rounded median lobe, without longitudinal carina and dorsal edge slightly bent downwards (Fig. 2A, B); lateral lobes well-developed (Figs 1B, 2A); eyes with ca. 20 ommatidia. First antenna with three articles, distal one bearing ca. 30 aesthetascs on inner margin (Fig. 3B). Second antenna long; fifth article of peduncle as long as flagellum, with length to width ratio of 10; flagellum of two articles, distal article slightly longer than proximal one (Fig. 1D).

Pereon-epimeron I with concave posterolateral margin, hind corner with acute angle (Fig. 1A). Noduli laterales on pereonite IV almost twice farther from lateral margin than those on epimeron III (Fig. 1A). Pereopod I ischium triangular, carpus with longitudinal rows of slender scales on rostral surface, dactylus with one dactylar and one ungual seta (Fig. 1E).

Pleon outline continuous with pereon; pleon-epimeron V with parallel or slightly diverging inner margins (Fig. 1B). Telson triangular, as long as wide, with concave lateral margins and rounded apex, surpassing uropod protopodites (Fig. 3A). Uropod-exopodites short, 0.5 times as long as telson (Fig. 3A). Pleopod exopodites I–V with partly covered lungs (Fig. 4A–F).

Male. Pereopods I–VII merus and carpus with brushes of setae, denser in anterior ones (Fig. 1E–G). Pereopod VI basis with concave ventral side, bearing field of long and dense setae on distal half; ischium with one median and one distal spiny seta on sternal margin (Fig. 1F, 2C). Pereopod VII ischium elongated, ventrally slightly concave and equipped with hairy brush of small setae and five to six long spiny setae; merus with slight projection

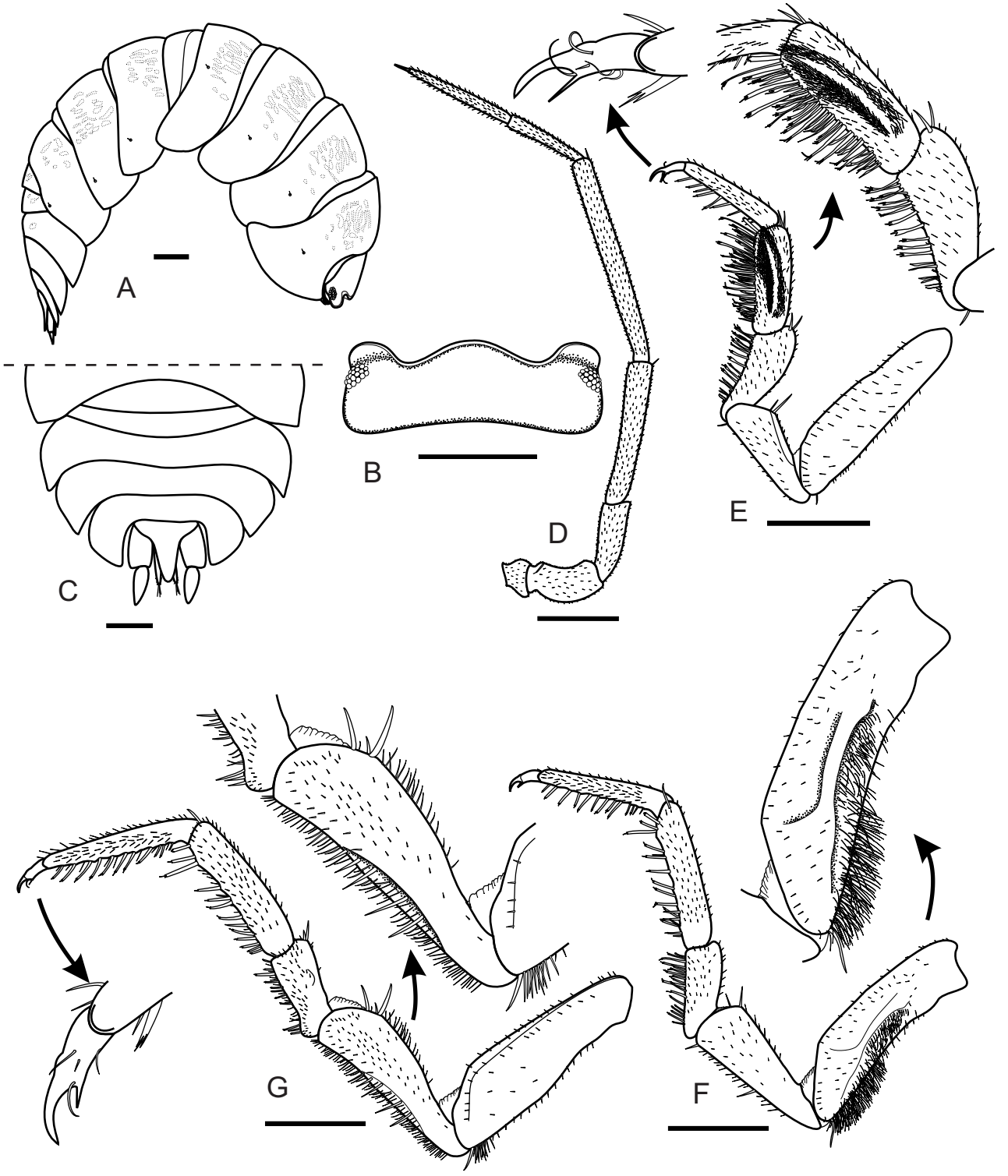

Fig. 1. *Cylisticus ilamicus* **sp. nov.**, male paratype **A**, habitus, lateral view; **B**, head, dorsal view; **C**, pleon, dorsal view; **D**, antenna; **E**, pereopod I and enlarged merus, carpus and dactylus; **F**, pereopod VI and enlarged basis; **G**, pereopod VII and enlarged ischium and dactylus. Scale bars: 1 mm.

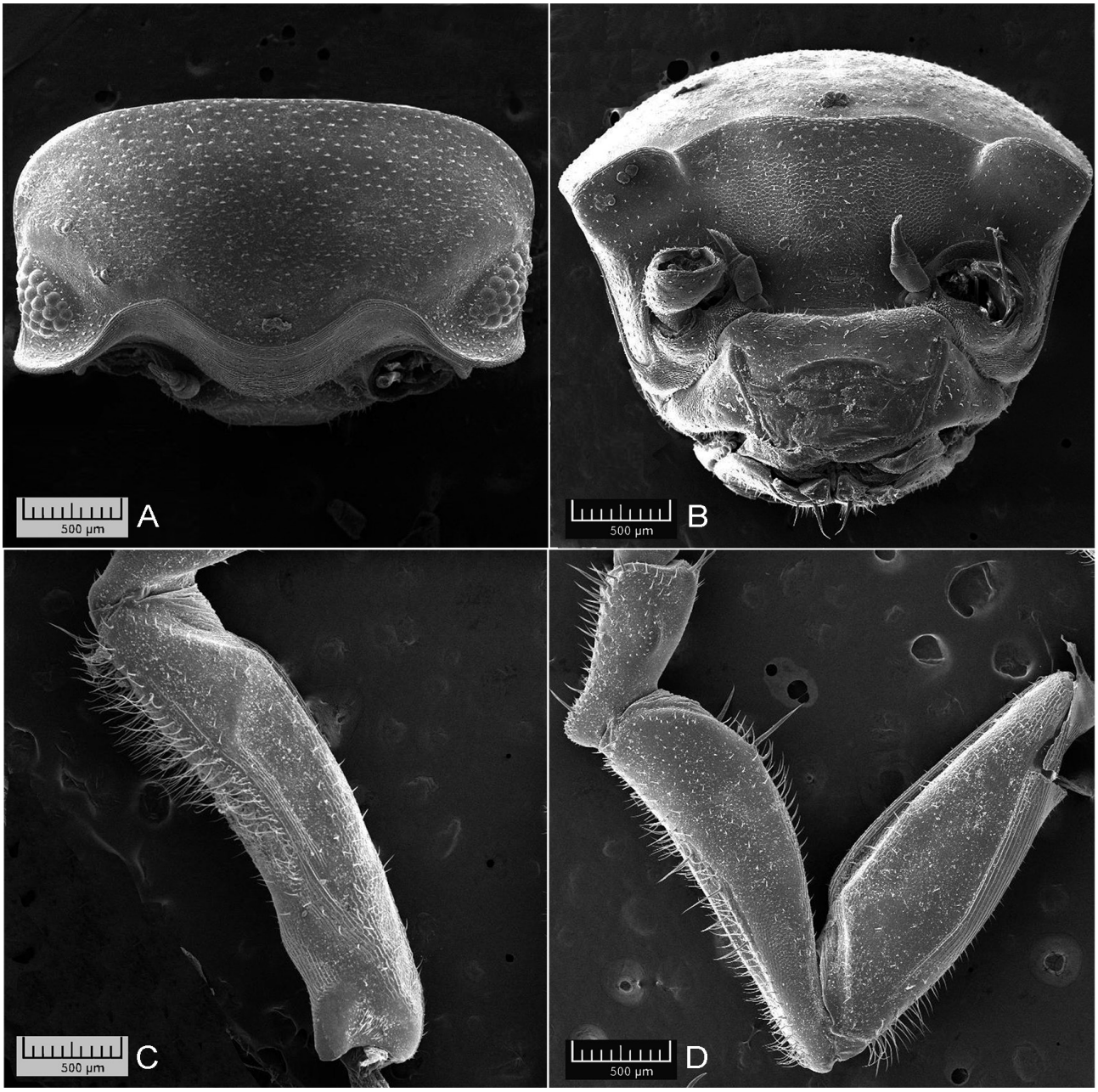

Fig. 2. *Cylisticus ilamicus* **sp. nov.**, male paratype. **A**, head, dorsal view; **B**, head, frontal view; **C**, pereopod VI basis; **D**, pereopod VII basis, ischium and merus.

in proximal part equipped with two to three spiny setae (Fig. 1G, 2D). Pleopod exopodite I with short hind-lobe, outer margin sinuous with a row of small setae (Fig. 4A); endopodite I straight with apical part slightly bent outwards, equipped with some short setae and a small lobe-like extension (Fig. 4B). Pleopod endopodite II longer than exopodite; exopodite triangular with a row of setae on outer margin (Fig. 4C). Pleopod exopodites III and IV triangular, outer margin concave bearing a line of setae (Fig. 4D, E); pleopod exopodite V triangular with a row of setae on outer margin (Fig. 4F).

Comparison. Unlike the other species of the genus *Cylisticus* having a longitudinal carina, *C. ilamicus* **sp. nov.** possesses a broadly rounded frons (Fig. 2A), distinguishing the species from other congeners. However, the new species shows all the other characteristics of the genus, namely smooth

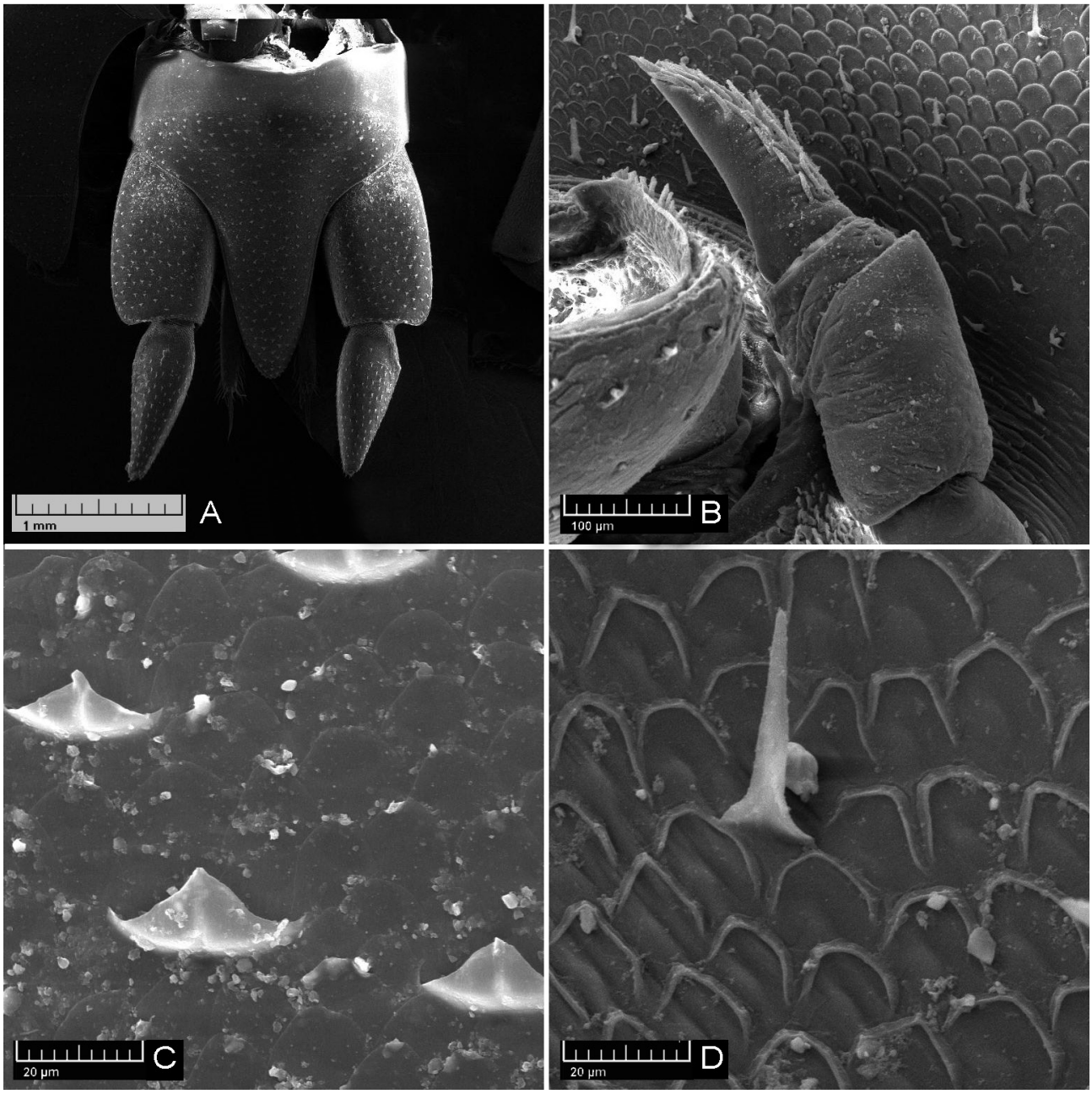

Fig. 3. *Cylisticus ilamicus* **sp. nov.**, male paratype. **A**, telson and uropods; **B**, first antenna; **C**, scale setae on vertex; **D**, scale setae on frons.

dorsal surface, short uropod exopodites and the eccentric position of noduli laterales on pereonites IV and VII (though the latter feature is present only in the eastern group; see Schmalfuss, 2003a). The new species is readily distinguished from *C. masalicus*, the only other known *Cylisticus* species from Iran, by lacking epistomal carina and by pleopod endopodite I of the male with apex bent outwards.

Etymology. The new species is named after Ilam Province, where Mazhareh Cave, from which the type material was collected, is located.

Habitat. Although the samples examined in this study were collected in completely dark parts of Mazhareh Cave, the species should be considered as a trogloxene, because it does not have the features of the troglophile or troglobite species (reduction or loss of eyes and pigmentation, etc.).

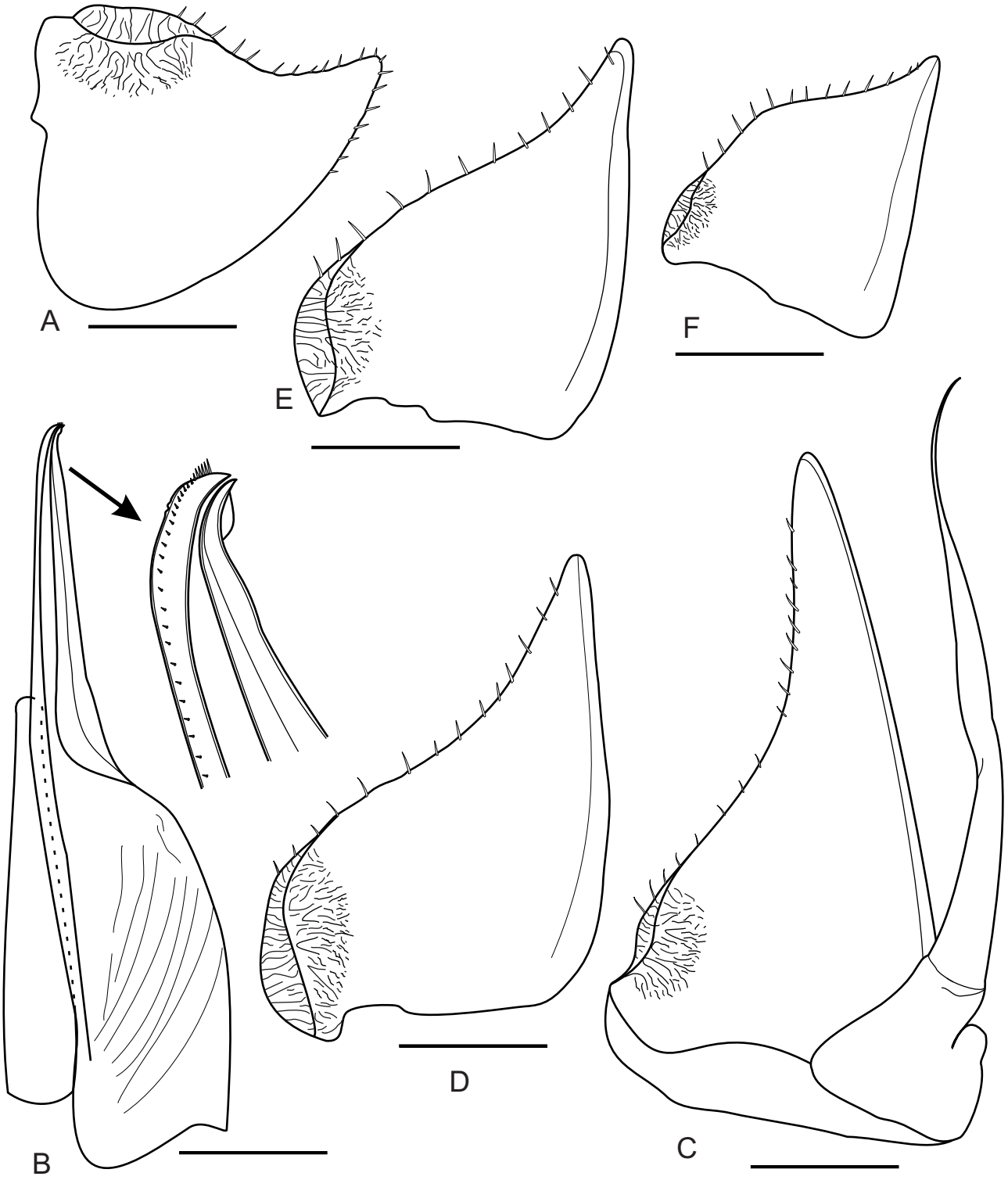

Fig. 4. *Cylisticus ilamicus* **sp. nov.**, male paratype. **A**, pleopod exopodite I; **B**, pleopod endopodite I; **C**, pleopod II; **D**, pleopod exopodite III; **E**, pleopod exopodite IV; **F**, pleopod exopodite V. Scale bars: 0.5 mm.

Therefore, further surveys outside the cave are necessary to confirm this hypothesis.

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