



A new species of the genus *Acinopus* Dejean, 1821 from west of Iran (Coleoptera; Carabidae; Harpalini) with a key to species of Iran

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Abstract

A new species of the genus *Acinopus* Dejean, 1821, namely *Acinopus (Acinopus) zagrosensis* sp. n., is described on the basis of specimens collected from west Iran (type locality: Iran, Fars province, Zagros Mts., Sepidan env., 2060 m). The new species is compared with closely related species. A key for the identification of species of genus *Acinopus* in Iran is provided.

Key words: Carabidae, *Acinopus*, new species, key, Iran

Introduction

The genus *Acinopus* Dejean, 1821 comprises 25 species from the Palaearctic realm (Kataev & Wrase, 2015) and a further species from the Afro-Tropic realm (Cape Verde, see Kataev, 1995) belonging to six subgenera (beside *Acinopus* s. str. with 21 species, *Nesarpax* Alluaud, 1936 with one species, *Acmastes* Schaum 1863 and *Haplacinopus* Semenov, 1899 with one species each, and *Oedematicus* Bedel, 1897 with two species). Some of the species include subspecies. Several taxa need a revision, the taxonomy of some of them have already been clarified (Wrase, 2005; Kataev & Wrase, 2015). The species are middle-sized to large, black with appendages somewhat lighter, having the body glabrous, stout and cylindrical, in one case flat, and the head large, with long delicate antennae, and with mandibles asymmetrical in most species (right mandible with excision at upper edge in species of subgenus *Acinopus* and *Nesarpax*). The pronotum is strongly transverse and basally completely beaded, the posterior angles are widely rounded, setae are lacking. The elytra are cylindrical, more or less parallel-sided or somewhat longer or shorter oval (depending, if the species are macropterous or brachypterous), the interval 3 with one or without pore puncture (often variable within one species), the intervals 3 and 5 apically often with some pore punctures (for other important characters see chapter “Material and Methods”). The species are distributed from the Cape Verde Islands and the Mediterranean to Middle Asia, the West Himalayas, and north-western China. Two species of subgenus *Acinopus* are known from Iran, *A. laevigatus* Ménériés, 1832, widely distributed in northern, north-western, and western Iran, and *A. picipes* (Olivier, 1795) distributed in northern, western, central, and south-eastern Iran (Kataev et al. 2003; Azadbakhsh & Nozari, 2015).

In course of investigating material of newly collected *Acinopus* from Iran, we detected a species unknown to science, which description is object of this paper. Some further species of other origin will be separately described in a later paper (Wrase & Kataev, in preparation).

Material and methods

The following abbreviations are used for the depositories of the specimens examined:

MFNB Museum für Naturkunde Berlin, Germany

NME	Naturkundemuseum Erfurt, Germany
ZIN	Zoological Institut of the Russian Academy of Sciences, Saint Petersburg, Russia
ZMUT	Zoological Museum of Tehran University, Tehran, Iran
cAZ	Coll. Saeed Azadbakhsh, Bandar Abbas, Iran
cHZ	Coll. Walter Heinz, Schwanfeld, Germany
cMUIL	Coll. J. Muilwijk, De Bilt, Netherlands
cWR	Coll. D.W. Wrase, Berlin, Germany

Total body length (BL) is measured from the tip of the apical margin of labrum to the apex of the longer elytron; the width of the head (HW) as the maximum linear distance across the head, including the compound eyes; the length of the pronotum (PL) from the anterior to the posterior margin along the midline; the length of the elytra (EL) from the basal border next to the scutellum to the apex of the longer elytron; the width of the pronotum (PW) and elytra (EW) at their broadest point.

These measurements, made at a magnification of 7.1X (body length) and 12.5X, respectively, and using an ocular micrometer in a Leica MZ 16 stereobinocular microscope, were combined in ratios or added as follows:

PW/HW: width of pronotum /width of head;

PW/PL: width /length of pronotum;

EW/PW: width of elytra/width of pronotum;

EL/EW: length/width of elytra.

Microsculpture was examined at a magnification of 100X.

Line drawings were prepared by using an ocular grid (10X10 squares) attached to a Leica MZ 16 stereobinocular microscope. Dissections were made with standard techniques; genitalia were preserved in Euparal on acetate labels or glued to cards, and were pinned beneath the specimens from which they had been removed. Photographs of Figs 1 and 5 were taken with a Canon EOS 450d camera, and were assembled from a stack of about 20 individual photographs taken at different focal planes using the software package Helicon Focus. Post-processing was done in Adobe Photoshop 7.0.

Taxa of genus and subgenus *Acinopus* show as general characters: body glabrous, antennae long but fine, genae with preocular sulcus for reception of first antennomere, notch on anterior margin of mentum with lateral edges strongly widened anteriorly, paraglossae setose, ligula with two distal setae, penultimate segments of labial palpi relatively long, pronotum completely bordered basally, posterior angles without setae, stria 8 removed from lateral margin in the middle and hence interval 9 widened there, anal sternite in females distinctly swollen apically, femora with long numerous bristles, hind coxa with 1 posteromedial additional setigerous pore puncture (see also Kataev, 1995). These characters are not repeated in the description, that only includes characters important for discrimination.

In type specimens the label text is cited as originally given, using a forward slash for separating different lines.

10 males and 7 females of *Acinopus zagrosensis* sp. n. from SE Ardakan (near Shul) were used for measurements to yield the above-mentioned ratios.

Results

Acinopus (Acinopus) zagrosensis sp. n.

Type material: Holotype: male, "S-Iran, Prov. Fars, vic. / Sepidan env., 2060 m, / S. Azadbakhsh leg. 12.IV.2016" (ZMUT). Paratypes: 1 male, 2 females (cAZ), same data as holotype; 1 male and 1 female, same label as holotype but: 10.V. 2015, 1600 m (cAZ); 1 male: "S-Iran, Prov. Fars, vic. / Qualat, 2000–2150 m, / Bachtal/Trockenhang / 29.48.13N, 52.19.11E / 28.IV.10, leg. D. Frenzel" (NME); 13 males, 8 females: "IR (Fars): Pass 2200 m / SE Ardakan (b. Shul) / Heinz leg. 25.IV.2014" (MFNB, ZIN, cHZ, cWR); 1 male: "IR Fars 20 km / N Kafer / 1-5-2006 / Muilwijk J." (cMUILW).

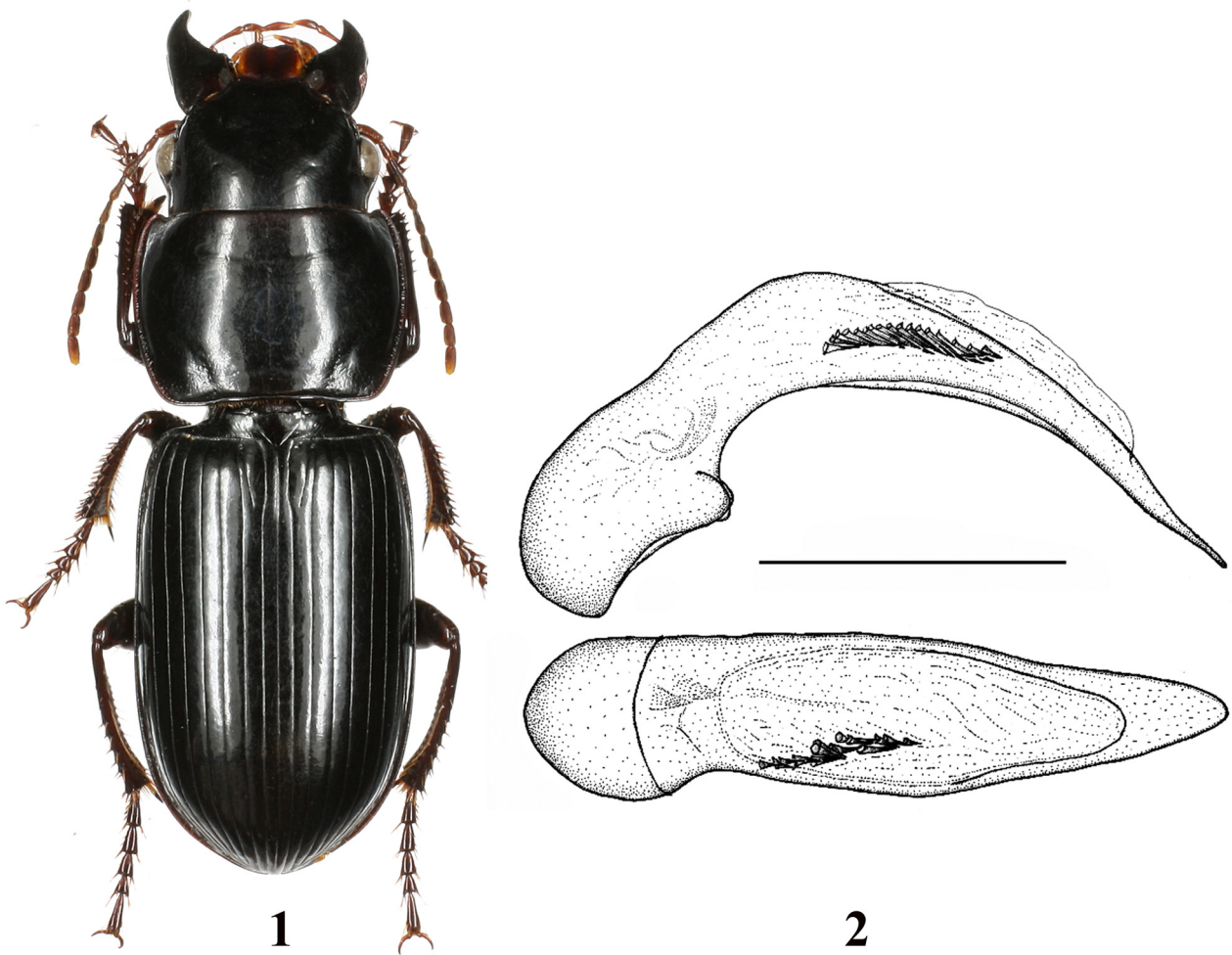
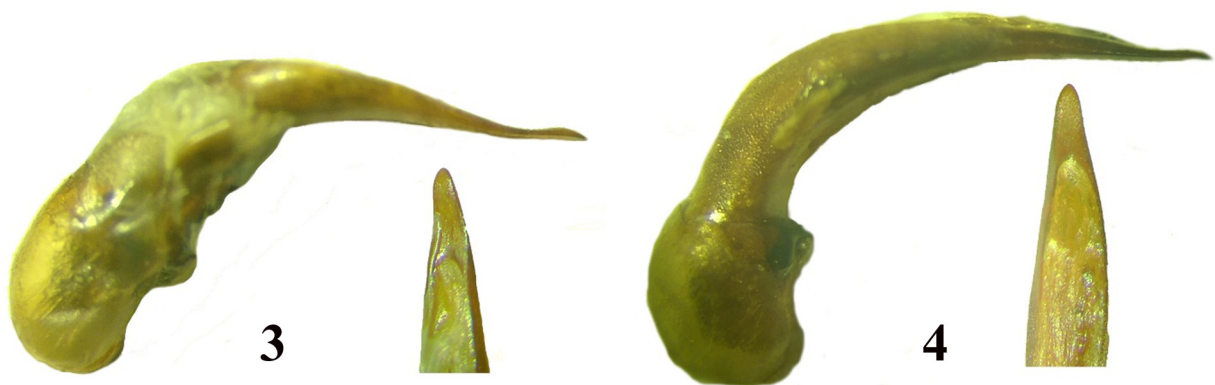


FIGURE 1. *A. zagrosensis* sp. n., habitus (paratype, E Ardakan).

FIGURE 2. *A. zagrosensis* sp. n., median lobe of aedeagus, lateral und dorsal view including internal sac structure (paratype, E Ardakan). Scale bar 1.6 mm.



FIGURES 3–4. *Acinopus*. Median lobe, lateral und dorsal view. 3, *A. laevigatus* Mén. (Sepidan), 4, *A. picipes* (Oliv.) (Mazandaran prov., Marzan-Abad).



FIGURES 5–7. *Acinopus*. Excision of right mandible. 5, *A. zagrosensis* sp. n. (paratype, Sepidan), 6, *A. laevigatus* Mén. (source: Kirill Makarov, 2010a), 7, *A. picipes* (Oliv.) (source: Kirill Makarov, 2010b).

Diagnosis. A brachypterous species of small to medium size for *Acinopus*, with excision of dorsal edge of right mandible (subgenus *Acinopus*), black (in mature condition), with appendages somewhat lighter, pronotum transverse with anterior angles somewhat acutely protruding, and with posterior angles widely rounded (habitus see Fig. 1), elytra longer cylindrical, fused at suture, hindwings reduced to small scales, metepisterna relatively short, pro- and mesotarsi in males only indistinctly widened, apical lamella of median lobe short, about somewhat elongate-triangular (dorsal view).

Description. Body length 13.0–17.1 mm.

Colour. Black (in mature condition), appendages somewhat lighter.

Head. Wide (as normal in *Acinopus*), only somewhat narrower than pronotum (PW/HW 1.18–1.25 in males, average 1.21, 1.18–1.27 in females, average 1.23). Eyes small, weakly to moderately protruding, tempora oblique, about half as long as diameter of eye or somewhat longer (dorsally seen), rectilinearly or weakly convexly converging to neck. Frontal fovae mostly small and shallow, sometimes elongately prolonged backwards. Disc with sparse, fine, and shallow puncturation, hardly visible, sometimes between frontal fovae more or less strongly wrinkled. Excision of dorsal edge of right mandible (Figs 5–7) somewhat variable in size and strength, moderately strong to shallow, basal angle of excision as a rule situated somewhat anterior to level of apical margin of clypeus (with mandibles closed). Outer edge of left mandible not enlarged basally. Labrum moderately strongly incised at anterior margin, clypeus moderately and semicircularly incised, anterior angles with one setiferous pore puncture each (in one specimen from SE Ardakan except the strong, long seta with one additional short, fine setae at left side). Mental tooth small, submentum with one pair of long setae.

Pronotum (Fig. 1). Transverse (PW/PL 1.39–1.48, average 1.43, in males; 1.39–1.47, average 1.43, in females), widest at about end of anterior third, there lateral seta inserted. Disc convex, anterior and posterior transverse impression weak, sometimes not distinctly visible, median line weakly impressed, terminated at anterior transverse impression, and hardly reaching base. Anterior margin somewhat wider than posterior margin, only weakly excavate, anterior angles moderately and somewhat acutely projecting forward, narrowly rounded at tip in most specimens. Lateral gutter narrow, finely punctured. Sides moderately curved apicad, from widest point weakly convexly narrowed toward base. Posterior angles widely rounded at apex, weakly extended posteriad by a very weak, almost parallel or weakly concave excision of the base between the basal fovae in most specimens. Basal fovae mostly shallow, elongate, somewhat converging towards base, somewhat punctured or almost glabrous. Area of posterior angles with convexity toward lateral margin, very seldom with a suggested flattening.

Elytra (Fig. 1). Cylindrical, elongate (EL/EW 1.60–1.67, average 1.62, in males; 1.62–1.69, average 1.65, in females), in middle part parallel or subparallel, as wide or only somewhat wider than pronotum (EW/PW 1.00–

1.08, average 1.03, in males; 1.01–1.08, average 1.04, in females), widest somewhat behind middle. On disc strongly convex, fused at suture. Humeri distinctly developed, widely rounded at tip, without humeral tooth; Basal bead rectilinear or weakly sinuate, arcuately curving inside humerus and round or weakly angled towards lateral margin. Scutellar pore puncture present, scutellar stria long. Striae fine, smooth or only weakly punctured, intervals flat or weakly convex, with a fine, often relict-like pore puncture in interval 3 at about beginning of apical fourth at or close to stria 2 in most specimens, sometimes lacking on one or both elytra. Interval 5 and 7 as a rule without preapical pore punctures, sometimes with 1–3 punctures in irregular number in both intervals. Preapical situation only suggested.

Hind wings: Strongly reduced to small scales.

Sterna: Prosternum wrinkled and with sparse and irregular setose pore punctures, pro- and mesepisternum almost impunctate, metepisternum with relatively coarse pore punctures, prosternal process with long setae apically. Metepisternum relatively short, ratio of anterior margin/ventral margin (visible parts) about 0.72, moderately narrowed behind. Abdominal sternites 3–5 with scattered setae of unequal length, some of them arranged in suggested transverse rows about at middle of sternites. Last sternite, beside some fine scattered setae with two pore punctures bearing a long seta on each side at apical margin in both sexes.

Legs. Normal for *Acinopus* species. Pro- and mesotarsi indistinctly dilated in males (only somewhat wider than in females), with pro- and mesotarsomere 2 to 4 with biseriate adhesive vestiture. Ventroapical tubercle of protibia with about four to six spines at apex, arranged in a transverse row. Spines of lower surface of protibia arranged in one row of about eight to ten spines. Outer distal margin of protibia with about seven to nine spines. Tarsi smooth on superior surface except obligatory setae.

Microsculpture of surface. Head and pronotum in males with weakly engraved, somewhat irregular isodiametric meshes, pronotum with irregular transverse meshes, and elytra with meshes irregular isodiametric to somewhat transverse, surface very shiny, in females with the same kind of meshes but somewhat stronger engraved, surface less shiny.

Median lobe of aedeagus (Fig. 2). Of normal construction for *Acinopus* species: apical orifice in dorsal position, terminal lamella flat, without apical capitulum, relatively short, somewhat elongate-triangular (dorsal view), and somewhat reflexed apically (lateral view), internal sac with an elongate group of about ten to eighteen middle-sized to small spines.

Intraspecific variability. All external characters have great variability (as normal in *Acinopus*), this concerns mainly the excision of the dorsal edge of the right mandible and its position, the excision is somewhat variable in size and strength, moderately strong to shallow, basal angle of excision as a rule situated somewhat anterior to level of clypeus to almost on the same level, the pronotum with a variability in formation of anterior and posterior transverse impression, in puncturation of basal foveae and in formation of area of posterior angles, in the form of the elytra (longer or shorter elongate), and its puncturation of elytral 3, 5, and 7 (for the latter four characters see above).

Comparisons. In habitus and colour of the body similar to *A. laevigatus* Ménétrés (recorded as syntopic with the new species) and *A. picipes*, both species widely distributed in Iran. The new species is easily distinguished from the former by the strongly rounded posterior pronotal angles (in *A. laevigatus* more or less distinctly angulate, widely rounded only at tip, lateral margin anterior to pronotal angles only weakly convex, rectilinear, or even somewhat sinuate), by a different position of the excision of the dorsal edge of the right mandible (basal angle of excision as a rule situated somewhat anterior to level of apical margin of clypeus, Fig. 5), in *A. laevigatus* basal angle of excision somewhat to distinctly behind (Fig. 6). *A. zagrosensis* sp. n. differs from *A. picipes* (which can have also strongly rounded posterior pronotal angles) by possession of anterior angles of clypeus with one setiferous pore puncture each only (in *A. picipes* as a rule with two pore punctures ones each), the excision of the dorsal edge of the right mandible is close to base (Fig. 7).

In the construction of the median lobe of the male genital (Figs. 2–4) the new species is similar to *A. picipes* (but apical lamella somewhat wider), but distinctly different to *A. laevigatus* (apical lamella long and slender in dorsal view, and distinctly reflexed in lateral view, Fig. 3). The structure of the internal sac with an elongate group of middle-sized to small spines is in the three species dealt with here similar and cannot be used for discrimination. Finally, while both species in comparison are macropterous, *A. zagrosensis* sp.n. is brachypterous with the elytra fused at the suture.

Etymology. The specific epithet refers to the Zagros Mountains where the type locality is situated.

Habitat/bionomy. Living in altitudinal ranges of about 2000–2200 m of the southern part of the Zagros mountain range, located in the south-west of Iran, an area characterized by moderate summers and cold and snowy winters, that is mostly covered by oak forests. The specimens were found in open, moist, grassy places under stones.

Distribution. Currently, the species is only known from some localities in the southern part of the Zagros Mountains, mostly not far away from each other. Due to its inability to flight most likely a wider occurrence outside of the Zagros Mountains can be excluded.

Key to species of genus *Acinopus* Dejean, 1821 of Iran

- 1 Right mandible with excision at dorsal edge (subgenus *Acinopus*)2
- Right mandible without excision at dorsal edge 4
- 2 Excision of dorsal edge of right mandible situated close to base (Fig. 7). Anterior angles of clypeus as a rule with two setiferous pore punctures each. 10–17 mm. W Europe to Near East and Iran *A. (s.str.) picipes* (Olivier, 1795)
- Basal angle of excision distinctly distant from base (Figs 5, 6). Anterior angles of clypeus with one setiferous pore puncture each 3
- 3 Basal angle somewhat to distinctly behind level of apical margin of clypeus (Fig. 6). Macropterous species. 11–17 mm. From Greece to north-western China and Kashmir *A. (s.str.) laevigatus* Ménétriés, 1832
- Basal angle somewhat anterior to level of apical margin of clypeus (Fig. 5). Brachypterous species, elytra fused at suture. 13–17.1 mm. Southern Zagros Mts. *A. (s.str.) zagrosensis* **sp. n.**
- 4 Clypeus not strongly emarginate, tarsi smooth above 5
- Clypeus strongly emarginate. Tarsi densely covered with hairs above, 12–17 mm. From Greece to north-western China and Kashmir *A. (Oedematicus) megacephalus* (A. Rossi, 1794)
- 5 Right mandible at dorsal edge basally slightly incurved and strongly crenulate in apical half, surface of mandibles distinctly coarsely furrowed. Elytra with deepened striae, interval 3 without pore puncture, surface matt by strong reticulation. Body wide and slightly flattened, larger, 18–28 mm. Distributed from Italy to Middle Asia *A. (Osimum) ammophilus* Dejean, 1829
- Right mandible at dorsal edge not incurved and not crenulate in apical half, surface of mandibles finely furrowed. Elytra with very fine striae, interval 3 as a rule with pore puncture in apical third, surface shiny by very weak reticulation. Body short-oval, convex, and smaller, 14–19 mm. From Armenia, Azerbaidjan, and Iran to Middle Asia, Afghanistan und north-western China *A. (Haplacinopus) striolatus* Zoubkoff, 1833

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