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Description of a new *Nebria* (*Eunebria*) species from Iran (Coleoptera, Carabidae: Nebriini) and faunistic data for *Nebria* (*Eunebria*) *xanthacra xanthacra* CHAUDOIR, 1850

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Abstract: A new species of *Nebria* LATREILLE, 1802, subgenus *Eunebria* JEANNEL, 1937, is described from Iran, Kerman Province: *N. kazemii* nov.sp. (Type locality: waterfall at Darb-e Āstāb vill. nr. Kuhpayeh vill., N Kerman, 2600 m, N30°31'18.4"/E 57°09'44.6", Iran). Illustrations of the habitus of the new species and of *N. boiteli* ALLUAUD, 1932, the median lobe of the male genitalia of the new species and the spermatheca of the new species and of *N. xanthacra* CHAUDOIR, 1850 are presented, and comparisons with related species are made, completed with information about biotope and distribution, additionally faunistic data for *N. (Eunebria) xanthacra xanthacra* CHAUDOIR, 1850 are given.

Key words: Coleoptera, Carabidae, *Nebria*, *Eunebria*, new species, faunistic, Iran.

Introduction

The subgenus *Eunebria* JEANNEL, 1937 of the genus *Nebria* LATREILLE, 1802 contains currently 43 species and 15 subspecies (LEDOUX & ROUX 2005: 486), distributed over a vast area of the Palaearctic realm from West Europe and north Africa to Japan. There were only four species of subgenus *Eunebria*, partly with subspecies, known from Iran (LEDOUX & ROUX 2005): *N. davatchii* MORVAN, 1974 (Elburs mountains), *N. nigerrima nigerrima* CHAUDOIR, 1846 (Elburs mountains), *N. nigerrima testadilatata* MORVAN, 1974 (Kūh-e Sabalān massifs), *N. picicornis esfandiari* MORVAN, 1974 (Elburs mountains), *N. picicornis radjabii* MORVAN, 1973 (Zagros Mt. range), *N. picicornis luteipes* CHAUDOIR, 1850 (massifs of Sabalān and Kiamak), and *N. xanthacra xanthacra* CHAUDOIR, 1850 (mountains in the Kerman and Razavi-Chorasan provinces). New collections made in the mountains north of the city of Kerman yielded in the unexpected discovery of a species new to science, belonging to subgenus *Eunebria* and distinguished by numerous characters, defined by LEDOUX & ROUX 2005: penultimate article of labial palps with three setae, fourth antennomere without apical pilosity, antennomere 1 with only one seta, clypeus only with two setae, pronotum with one lateral seta and one seta at posterior angles each side, pronotal posterior angles acute-angled, metepisterna longer than wide, strongly punctured, hind wings fully developed, ventrites 3-5 medially with only one seta on each side. Its description is the subject of this short paper.

Material

The material examined is housed in the collections listed below:

MFNB Museum für Naturkunde Berlin, Germany
 NMBE Naturhistorisches Museum Bern, Switzerland
 cAZ Collection S. Azadbakhsh, Bandar Abbas, Iran
 cSCHN Collection P.H. Schnitter, Halle, Germany
 cORSZ Collection K. Orszulik, Frýdec-Místek, Czech Republik
 cROUX Collection Ph. Roux, Paris, France
 cWR Collection D.W. Wrase, Berlin, Germany (in Zoologische Staatssammlung München)

Methods

The total body length (BL) is measured from the anterior margin of the clypeus to the apex of the elytra as the maximum linear distance, measured along the suture; the length of the pronotum (PL) as linear distance from the anterior to the basal margin, measured along the midline; the width of the pronotum (PW) at its broadest point; the width of the pronotal base (PBaW) between the tip of the posterior angles; the width of the pronotal anterior margin (PAW) between the tip of the anterior angles; the length of the elytra (EL) as linear distance from the basal ridge at scutellum to the apex of the longer elytron, measured along the suture; the width of the elytra (EW) at its broadest point. These measurements, using an ocular micrometer in a Leica MZ 16 stereobinocular microscope, were combined as ratios as follows:

PW/PL: width /length of pronotum;

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

PW/PBaW: width of pronotum/width of the pronotal base;

PAW/PBaW: width of pronotal anterior margin/the pronotal base;

EL/EW: length/width of elytra;

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

Microsculpture was examined at a magnification of 100 times. Dissections were made using standard techniques; male and female genitalia were dissected and embedded in Euparal on separate cards pinned beneath the specimens from which they had been removed. Line drawings were prepared by using an ocular grid (10x10 squares) attached to a Leica MZ 16 stereobinocular microscope. The habitus photographs 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.

Measurements were made for all specimens of *N. kazemii* nov.sp. and for six males and four females of *N. xanthacra*, both species coming from the same locality. For examination of the female genitalia two specimens of the new species and three specimens of *N. xanthacra* were dissected.

Taxonomy

Nebria (Eunebria) kazemii nov.sp.

Type material: Holotype ♂, labelled: "IRAN (Kerman Prov.) / waterfall at Darb-e Āsiāb vill. / nr. Kuhpayeh vill. N Kerman / 2600 m / N 30°31'18.4"/E 57°09'44.6" (canyon, in gravel/under stones) / 7.VI.2014 D.W. Wrase & B. Laser [08BJ]" (cWR). **Paratypes:** 1 ♀ with same data (cWR). 1 ♀ with same data but: P.H. Schnitter (MFNB). 1 ♂, 1 ♀ with same data but: 2.VI.2014 (cSCHN). 2 ♀ ♀ with same data but S. Azadbakhsh (NMBE, cAZ).

Diagnosis: A medium-sized *Nebria* species, with BL 10.8-12.0 mm, with upper surface, abdomen, and appendages reddish-yellow, elytra behind middle with a transverse or roundly black fascia, pronotum cordate with strong sinuation before the acute posterior angles, elytra subparallel with apex acuminate and with 2-3 seta-bearing pore punctures in interval 3 in apical third, legs and antennae slender, and with fully developed hind wings. Habitus Fig. 1.

Etymology: The name is a patronym in honour of Dr. Shahrooz Kazemi, well-known acarologist and director of Research & Technology, Graduate University of Advanced Technology, Kerman, Iran, for his warm reception, hospitality, and help we could experience during our stay in Kerman, and who showed us also wonderful localities in the mountains around Kerman.

Description: BL 10.8-12.0 mm (11.6-12.6 mm measured from apex of mandibles to apex of elytra).

Colour: Upper surface and appendages testaceous-reddish, elytra behind middle with an about quadratic or irregularly rounded dark spot from stria 2 to 7; mesosternum, base of metasternum including their episterna, and meso- and metacoxae black, base of first visible sternum darkened.

Microsculpture: Head, pronotum and elytra with distinct isodiametric meshes.

Head: Narrower than pronotum (PW/HW 1.18-1.21, average 1.20), smooth, somewhat weakly wrinkled alongside the eyes, with frontal furrows shallow, wide, somewhat elongate. Labrum with anterior margin weakly semicircular or indistinctly bisinuate, clypeus with apical margin weakly semicircularly or angularly excavate, laterally with one seta. One supraorbital seta. Antennae long and slender, reaching more than the half of elytra. First antennomere subcylindrical, somewhat shorter than diameter of eye, with one dorsal seta, second antennomere with one seta, ventroapically inserted. Fourth antennomere except normal apical setae without pilosity. Penultimate labial palpomere trisetose. Mentum with bifid medial tooth, submentum with two setae each side.

Pronotum: Cordate, moderately convex on disc, wider than long (PW/PL 1.34-1.42, average 1.39), wider than head (PW/HW 1.18-1.21, average 1.20), anterior margin wider than basal margin (PAW/PBaW 1.09-1.14, average 1.11, PW/PBaW 1.44-1.51, average 1.47), widest somewhat before middle, laterally from anterior angles to posterior strongly rounded and behind the middle with strong sinuation before posterior angles. Anterior margin moderately emarginate with anterior angles somewhat rounded and protruding, base bisinuate, posterior angles acute-angled, acutely projected posteriorly and laterally. Sides bisetose, one seta at about widest place and one seta in posterior angles, lateral channel relatively wide. Basal fovea, apical and basal transverse impression deep, well defined, midline relatively deep, becoming finer and shallower toward apical and basal margin. Basal fovea, apical and basal transverse impressions strongly but



Figs 1, 2: *Nebria*, habitus. (1) *N. kazemii* nov.sp. (paratype). (2) *N. boiteli* ALL. (Moyen Atlas, Lac Sidi Ali).

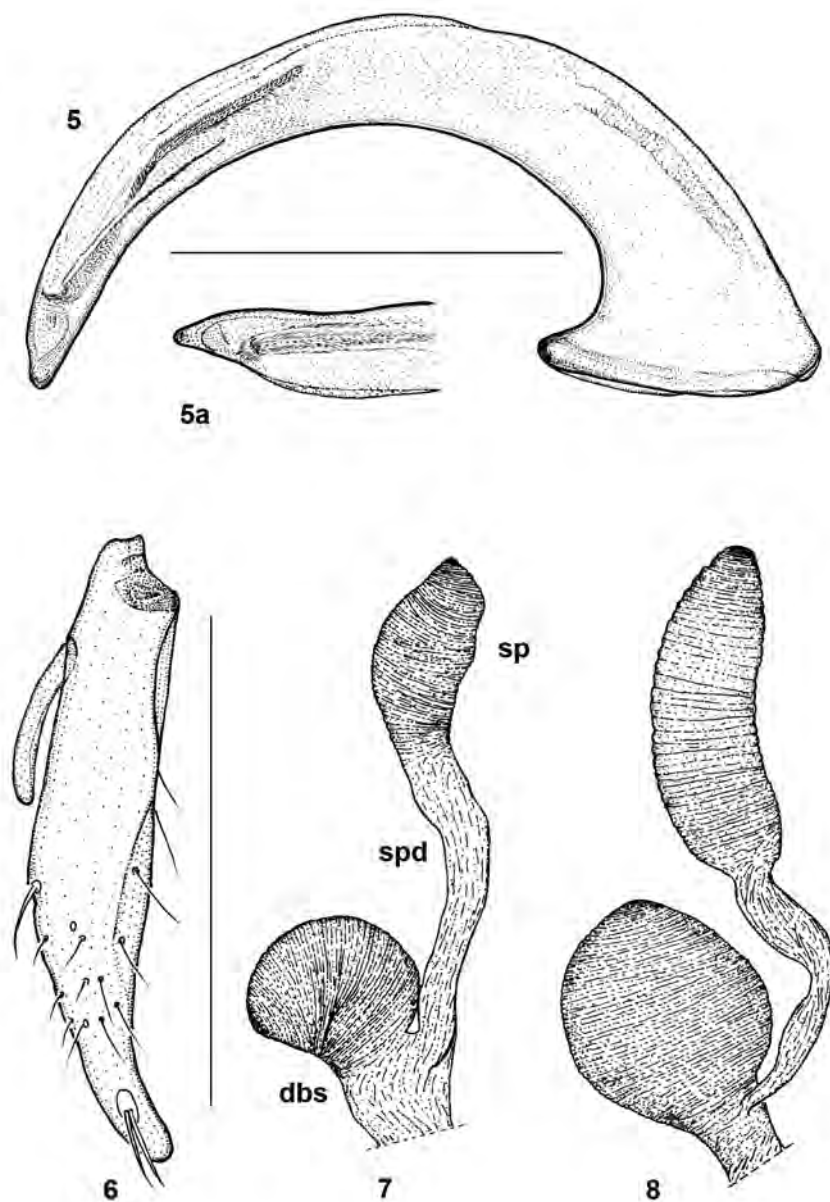
spaciously and shallowly punctured, lateral channel with similar punctuation. Apical margination widely interrupted at middle, base without margination.

Sterna: Proepisterna almost smooth, prosternum spaciously and shallowly punctured, prosternal process about triangular, apically rounded, completely margined.

Elytra: Elongate (EL/EW 1.62-1.70, average 1.66), subparallel, wider than pronotum (EW/PW 1.46-1.149, average 1.48), widest distinctly behind middle, with apex acuminate,



Fig. 3-4: waterfall at Darb-e Āstāb vill. (3) canyon above type locality. (4) type locality (photograph: D.W.W.).



Figs 5-8: *Nebria*, **5, 6, 8:** *N. kazemii* nov.sp. **7:** *N. xanthacra xanthacra* CHAUDOIR. **5, 5a:** median lobe of aedeagus. **(5)** lateral view (holotype). **(5a)** dorsal view (median lobe without base, paratype) (scale bar 1 mm). **6-8:** female genitalia. **(6)** left apical gonocoxite of ovipositor, ventral view (paratype). **7, 8:** female genital tract. **(7)** *N. xanthacra xanthacra* CHAUDOIR (waterfall at Darb-e Asīāb vill.). **(8)** *N. kazemii* nov.sp. (paratype). **dbs:** dorsal bursal sclerite; **sp:** spermatheca; **spd:** spermathecal duct (scale bar 1 mm).

elytra weakly gaping, subapical sinuation only suggested, disc convex. Basal margin weakly curved and more or less roundly merging with lateral margin, humeri distinctly developed, without humeral tooth. Humeral carina only suggested, subapical carina weakly developed. Striae deep and distinctly punctured, reaching the basal margin, becoming somewhat shallower laterad and apicad. Intervals somewhat convex, laterad and apicad flatter, interval 3 with two to three seta-bearing pore punctures in apical third. Scutellar pore puncture present. Hindwings fully developed. Mesepisterna strongly punctured, metepisterna about 1.7 times as long as wide, strongly, somewhat shallowly punctured. Metacoxa basally with one apical seta.

Abdominal sternum 2 (sternum 3 sensu LEDOUX & ROUX 2005) without setae, sterna 3-5 (sterna 4-6 sensu LEDOUX & ROUX) at each side with one posterior paramedial seta, anal sternum with two paramedial setae in male, with four paramedial setae in female, sternum 1 basally strongly punctured, the remaining ones unpunctured.

Legs: Long and slender. Tarsi dorsally without pubescence. Protarsomeres 1-3 in male weakly dilated (only a little wider than in female) and with adhesive vestiture ventrally. Apex of metatarsomere 4 dorsally rectangular, somewhat projected ventrally.

Male genitalia: Median lobe of aedeagus (Figs 5, 5a) with basal part wide, mid-shaft almost evenly curved, and almost rectangular from beginning of apical fourth to apex (lateral view). Apical lamella short-triangular, narrowly rounded at apex (dorsal view). Internal sac (in not-everted condition) in apical half with an elongate field of short, fine setae.

Female genitalia: Apical gonocoxites of ovipositor as in Fig. 6, dorsal bursal sclerite, spermathecal duct, and spermatheca as in Fig. 8.

C o m p a r i s o n s : The key to the species of subgenus *Eunebria* in LEDOUX & ROUX (2005: 488-496) easily leads to couplet 8: *N. xanthacra* CHAUDOIR, 1850, a species widely distributed from Iran and Afghanistan to Nepal and north India, and obviously the next relative of the new species. In external characters and in the construction of the median lobe of the male genital including its internal sac we could not detect any differences, except the striking difference in the colour of the elytra (in *N. xanthacra* blackish brown with only margin, interval 9, and apical part yellowish, see Figs 644, 418, 419 in LEDOUX & ROUX 2005). The species was found in a large number together with the new species in the same locality without any transition form concerning the elytral colouration. Morphometric measurements in both species combined in ratios do not show significant differences, averages differ only minimally (in *N. canthacra*: PW/PL: 1.34-1.44, average 1.38; PW/HW: 1.14-1.21, average 1.18; PW/PBaW: 1.44-1.53, average 1.48; PAW/PBaW: 1.08-1.17, average 1.12; EL/EW: 1.58-1.73, average 1.65; EW/PW: 1.42-1.56, average 1.49; according to these values *N. xanthacra* seems a little more variable). But the examination of the female genitalia of both species revealed differences. Though the apical gonocoxites of the ovipositor are of the same construction in both species, the spermathecal duct and spermatheca are somewhat different. While in *N. xanthacra* the spermathecal duct is somewhat longer and the spermatheca smaller, the spermathecal duct is shorter and the spermatheca is of about the double size in the new species (compare Figs 7 and 8). Additionally, the species seem to differ in their ecological preferences. *N. xanthacra* could be found in a relatively wide ecological range around the locality, from the banks of the brook up to sunny places, mostly in rough gravel along the brook, in one case even under a small stone on a dry, inclined rocky wall. The new

species was exclusively collected from under large stones situated at the water line or even laying partly in water, in dark, shady areas, obviously a stenohygrophilic species to a greater degree than *N. xanthacra*. We could observe a further difference in behaviour of the two species. After its detection specimens of the new species tried to escape by an extremely fast running (distinctly faster than in *N. xanthacra*), and hence were very difficult to catch.

In its coloration *N. kazemii* nov.sp. is very similar to *N. boiteli* ALLUAUD, 1932, a species from Morocco, living in the subalpine zone of the Moyen and Haute Atlas. We could compare with one male and two female specimens of this species in cWR (Moyen Atlas, Lac Sidi Ali, 2000 m, 14.IV.1989, G. Sama leg.). The new species is very similar to *N. boiteli* by having many characters in common (pronotum laterally only with one seta except the seta in the posterior angles, the same coloration of the body and appendices, tarsi dorsally without setae, metepisterna distinctly longer than wide, hindwings fully developed, abdominal sterna 3-5 each with one posterior paramedial setae, anal sternum with two paramedial setae in male, with four paramedial setae in female) but differs distinctly by having the antennae and legs finer and somewhat longer, the legs longer with tarsi more slender, the protarsomeres in male somewhat less widened, the pronotum less wide (in *boiteli* distinctly wider, ratio PW/PL about 1.49), and only somewhat wider than the head (in *N. boiteli* distinctly wider, ratio PW/HW about 1.33), with posterior angles acute-angled, acutely projected posteriorly and laterally (in *N. boiteli* about rectangular or weakly acute-angled, hardly or only weakly projecting posteriorly and laterally), the pronotal base strongly bisinuate (in *N. boiteli* somewhat less strongly bisinuate, compare Figs 1 and 2), the elytra more slender and more distinctly subparallel, and with apex acuminate (in *N. boiteli* wider, ratio EL/EW about 1.59, with apex rounded), elytral interval 3 with two to three seta-bearing pore punctures in apical third (in *N. boiteli* lacking), and by the dark macula of the elytra mostly more or less quadratic (in *N. boiteli* more or less round, see Fig. 600 in LEDOUX & ROUX 2005: 508, and Figs 1, 2). The new species is easily to distinguish from the other species of *Eunebria*, occurring in Iran, which have the coloration of the surface dark or partly dark, by its peculiar coloration of the elytra with a dark spot. There are five further species of *Eunebria* with a similar coloration and with dark spots on the elytra: *N. cameroni* ANDREWES, 1925 (North India and Nepal), *N. fongondi* LEDOUX, 1981 (Pakistan and Afghanistan), *N. oberthuri* LEDOUX & ROUX, 1991 (Sichuan), *N. pulcherrima* BATES, 1873 (Japan, Sichuan, Yunnan), and *N. pulchrior* MAINDRON, 1906 (Yunnan). For habitus and coloration of these species see Figs 362, 370, 392, 407, 409, and Figs 639, 640, 670, 673 in LEDOUX & ROUX 2005. These species differ in several characters from the new species. Contrary to the new species, above mentioned five species have tarsi with pubescence on the upper surface, moreover, in *N. fongondi* (mostly), in *N. oberthuri*, *N. pulcherrima*, and *N. pulchrior* elytral pore punctures are lacking, in *N. oberthuri* also scutellar pore punctures are not present (according to LEDOUX & ROUX 2005). Hence none of these names can be referred to *N. kazemii* nov.sp.

Distribution: Known so far only from the type locality. The species has fully developed hind wings, thus a wider distribution, at least in similar biotops in mountainous areas of the Kerman province, can be expected.

Habitat/ecology: A stenohygrophilic species, found on banks of a brook (Fig. 4), coming as a waterfall from a deep and steep canyon (Fig. 3), from under stones very close to water, exclusively in shady zones, in other zones of the same locality *N. xanthacra* was found (see also above under Comparisons).

Faunistic note

Nebria (Eunebria) xanthacra xanthacra CHAUDOIR, 1850

Material investigated: IRAN: Razavi Khorasan Province: Mashad env., Shāndīz, 16.V.2003, K. Orszulik leg. (ca. 25 specimens, cROUX, cORSZ, cWR, identification confirmed by Ledoux & Roux).

The species was reported from Iran by AZADBAKSH & NOZARI (2015: 28) only from the Kerman Province, whereas it was also, beside this region, additionally recorded by LEDOUX & ROUX (2005: 541) "...depuis les monts Kopet-dag dans le nord de l'Iran...".

Acknowledgements

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Zusammenfassung

Aus dem Iran, Provinz Kerman, wird eine neue Art der Gattung *Nebria* LATREILLE, 1802, Unter-gattung *Eunebria* JEANNEL, 1937 beschrieben: *N. kazemii* nov.sp. (loc. typ.: waterfall at Darb-e Āstāb vill. nr. Kuhpayeh vill., N Kerman, 2600 m, N 30°31'18.4"/E 57°09'44.6", Iran). Ihr Habitus wird abgebildet, dazu auch der Habitus von *N. boiteli* ALLUAUD, 1932, außerdem werden Abbildungen der männlichen und weiblichen Genitalien der neuen Art und der Spermatheka von *N. xanthacra xanthacra* CHAUDOIR, 1850 präsentiert. Die neue Art wird mit ähnlichen Arten verglichen, es werden weiterhin Angaben zum Biotop, zur Ökologie und zur Verbreitung gemacht, dazu auch faunistische Daten zu *N. (Eunebria) xanthacra xanthacra* CHAUDOIR, 1850.

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