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Deronectes tashk nov.sp. from the Fars Province (Iran) (Insecta: Coleoptera: Dytiscidae)

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A b s t r a c t: *Deronectes tashk* nov.sp. is described from the Lake Tashk region in the central eastern part of the Fars Province, Iran. With its distinctly cordiform pronotum, the new species belongs to the *D. longipes* subgroup of the *Deronectes parvicollis*-group as defined by FERY & HOSSEINIE (1998) and BRANCUCCI & FERY (1997), respectively. The new species is especially similar to *Deronectes longipes* Sharp, 1882, but can be distinguished from it by the shape of the aedeagus. The species has been recorded only in the type locality, although some other dytiscids have been collected in two nearby localities. The new species is described in detail; its habitus and male and female genitalia are illustrated and compared to those of *D. longipes*. A map showing the distribution of both species demonstrates the relatively isolated occurrence of the new species.

K e y w o r d s: Coleoptera, Dytiscidae, *Deronectes*, new species, description, Iran.

Introduction

The genus *Deronectes* SHARP, 1882, is widely distributed in the western and central Palearctic extending east to Pakistan, and extreme western China. Three main centres of distribution were described in FERY & HOSSEINIE (1998) and FERY (2003). The new species belongs to the region that includes Turkey, Syria, northern Iraq, Caucasia, and north-western and southern Iran. Together with *D. tashk* nov.sp., the genus now contains 58 species, four of which are bitypic (NILSSON 2014, NILSSON & HÁJEK 2014). The new species belongs to the *D. longipes*-subgroup (now 14 species) of the *D. parvicollis*-group (now 28 species). The holotype and the paratypes were found during a collecting trip in May 2013. An attempt to find more specimens in May 2014 was unsuccessful because at that time the watercourse in the type locality was totally dry.

Material and methods

Specimens were studied with an Olympus SZX16 stereomicroscope. The genitalia were studied wet for drawings. Photos were made with a Nikon Coolpix 995 camera attached to the stereomicroscope and subsequently treated with CombineZP Image Stacking software. Adobe Photoshop CS5 software was used to touch up the photos and ink drawings. Authors' remarks are given in square brackets. The map in Fig. 11 was made by using

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"Microsoft Encarta World Atlas 2000". The terminology to denote the orientation of the male genitalia follows MILLER & NILSSON (2003). Slashes indicate line breaks. The following abbreviations are used in the text: TL (total length), TL-h (total length without head), MW (maximum width), P_{max} (maximum width of pronotum), P_{min} (minimum width of pronotum). Collection codens used in the text are:

BMNH ..... British Museum of Natural History (C. Taylor, London, UK)
CHA ..... coll. H. Abbasipour (Tehran, Iran)
CHF ..... coll. H. Fery (Berlin, Germany, property of the NMW)
NMW ..... Naturhistorisches Museum Wien (M. Jäch, Vienna, Austria)

Taxonomy

Deronectes tashk nov.sp.

T y p e l o c a l i t y: Iran, Fars Province, Neyriz County, ca. 80 km E Marvdasht, 11 km WNW Abadeh-Tashk, ca. 2 km NE Tashk village, ca. 1630 m above sea level (29.8353N 53.6142E). The pool in which the specimens have been found is called "Emamzadeh spring"; the brooklet that drains the pool has the same name.

T y p e m a t e r i a l: H o l o t y p e: ♀, "1.5.2013 Iran, Fars, ca. 80 km E/Marvdasht, 11 km WNW Abadeh-/Tashk, ca. 2 km NE Tashk village/Emamzadeh spring, 1630 m/29.8353N 53.6142E/G. Hasanshahi leg. [111B1-3]" [printed], "Holotype/Deronectes *tashk* sp.n./Fery, Hasanshahi & Abbasipour det. 2014" [red, printed] (NMW). P a r a t y p e s: 12♀♀, 10♀♀, same label data as holotype, except red paratype label; one male paratype without head and pronotum; another male without both forelegs and right midleg; one female without both midlegs, right protibia, protarsus and right antenna (CHF, CHA).

D e s c r i p t i o n :

H a b i t u s elongate oval, rather flat; sides of elytra rounded (Fig. 1), maximum width behind midlength of elytra. Pronotum distinctly cordiform, thus body outline with conspicuous discontinuity at shoulders. Dorsal and ventral surfaces black to large extent, appendages brown. Upper surface silky, neither shiny nor matt.

H e a d: Largely black, behind anterior margin and on vertex brownish; entire surface distinctly reticulate, meshes polygonal; punctation double and rather sparse; smaller punctures distinctly smaller than meshes, present in intersections of meshes; larger punctures as large as meshes; punctation denser and somewhat coarser towards vertex; on vertex larger punctures lacking. Anterior margin of head weakly emarginated. Clypeal grooves very distinct and large; grooves and stripe beside inner margin of eyes with dense larger punctures and very short and indistinct setae, elsewhere setae absent.

P r o n o t u m: Maximum width before midlength; distinctly concavely sinuate before base; posterior angles more or less rectangular, but appearing acute, because of minimum width of pronotum short before these angles. Lateral margins with distinct and shiny rim, rather thin over entire length. Pronotum lacking distinct broad longitudinal sublateral impression parallel to lateral margins; slightly impressed behind anterior margin right and left of middle, strongly impressed before posterior margin; thus, disc of pronotum appearing bulged. Pronotum black, only middle of posterior margin shining through

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brownish; entire surface reticulate, meshes slightly less impressed than on head; near sides meshes even less distinct. Punctation double, but coarser punctures on disc very sparse, much denser near anterior and posterior margins and near sides; no distinct punctures line present behind anterior and before posterior margins. Centre of disc with one rather deep longitudinal puncture. Light yellowish setae present on entire surface, but very sparse on disc.

Figs 1-2: Habitus of (**1**) *Deronectes tashk* nov.sp. (holotype, male) and (**2**) *Deronectes longipes* SHARP, 1882 (lectotype, male; on original glue card with SHARP's gender symbol).

E l y t r a: Rounded shoulders very prominent; sides behind shoulders almost straight and slightly diverging, in posterior third rounded to apex; pre-apically elytra somewhat impressed. Margin of elytra over entire length with shiny rim, thinner than rim of pronotum. In perpendicular view on upper surface elytral margin only perceptible at shoulders and near apex, because sides of elytra projecting over margin and obscuring it. In lateral view side margin strongly ascending to shoulders; epipleuron visible until shoulders. Elytra black; entire surface densely punctate; punctures smaller than small punctures on head and pronotum; in pre-apical impressions especially dense. Two puncture lines present on disc of each elytron; diameter of these punctures more or less same as that of small punctures on pronotum; puncture lines shallowly impressed. More laterally elytra with indistinct and more irregular additional puncture lines; on disc between puncture lines with very few additional larger punctures, their diameter smaller than that of punctures in lines. Sutural puncture lines in anterior half not recognisable; behind anterior half very few punctures perceptible. Entire surface reticulate, but meshes mostly incomplete and often imperceptible because of dense punctation. Elytra covered completely with light yellowish setae, more distinct between first puncture line and sides.

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V e n t r a l s u r f a c e: Predominantly black; only mouthparts, gula, small parts of prosternum, propleuron, hypomeron, prosternal process, lobes of metaventral processes, and hind margins of third to sixth abdominal ventrites brownish. Underside of head distinctly reticulate and impunctate, but gula anteriorly and laterally with a few larger punctures. Setation on large parts of ventral surface present, but rather sparse and inconspicuous, only on parts of prosternum more distinct, particularly on prosternal process. Genae without crease behind eyes; some strong wrinkles present between eyes and mouthparts. Antennomeres 3 to 11 darkened in distal half. Last labial and maxillary palpomeres also darkened distally. Prosternum anteromedially vaulted and reticulated with narrow elongate transverse meshes, more laterally coarsely sculptured; narrow stripe before hypomeron posteriorly with transverse meshes, anteriorly with longitudinal wrinkles. Hypomeron densely and coarsely punctate; propleuron in posterior two thirds and inner part of anterior third also densely and coarsely punctate, in outer part of anterior third almost smooth and shiny, with very elongate meshes of reticulation; distally propleuron with some very coarse punctures. Prosternal column (declivitous part of prosternum between its base and prosternal process; sometimes also called "file") rather weakly ascending posteriad (as viewed in beetle turned upside down), between procoxae with indistinct protuberance near anterior part of procoxae and another even weaker protuberance near posterior part of procoxae. Prosternal process only weakly inclined; elongate lanceolate, weakly carinate longitudinally; sides with shiny rim, rather broad anteriorly, narrower more posteriorly; between rim and carina strongly sculptured/punctate. Tip of process narrowly rounded, reaching between mesocoxae and contacting anteromedial process of metaventrite.

Mesepisternum and mesepimeron largely with rugose sculpture, reticulation only recognisable on sides of mesepimeron; epipleura, metaventrite and metacoxal plates very densely covered with punctures; only middle of metaventrite less densely punctate; here reticulation distinct, elsewhere very indistinct due to dense punctation. Metacoxal plates with a few shallow wrinkles. Metacoxal processes less densely punctate than metacoxal plates, thus with reticulation somewhat more distinct; lobes of processes almost impunctate, with reticulation distinct. Metacoxal lines more or less parallel, anteriad becoming indistinct before hind margin of metaventrite. Metacoxal processes incised, obliquely cut; interlaminary bridge fully exposed, gradually transformed without step into a more or less triangular (or wing-likely shaped) elevation on second ventrite.

Abdominal ventrites largely densely punctate, only on second ventrite medially and on third ventrite anteriorly punctation less dense; punctation on last ventrite especially dense. Apex with more or less triangular incision (notch). Third to fifth ventrite centrally with some coarser punctures and with setae slightly denser than elswhere. Reticulation on ventrites only perceptible in areas of less dense punctation.

L e g s: Reddish-brown; profemora in proximal two-thirds and mesofemora in proximal half somewhat darkened; metafemora darkened only in proximal third and rather indistinctly. Metafemora sparsely punctate, without punctures along imaginary longitudinal midline, but rather densely punctate before posterior margin. Legs more or less simple; protibiae not conspicuously broadened distally. Protarsomeres distinctly broadened; protarsomere 2 almost four times as broad as long; protarsomere 3 more or less as broad as long. Mesotarsomeres also broadened, but less so than protarsomeres. Pro- and mesotarsal claws simple, evenly curved over entire length.

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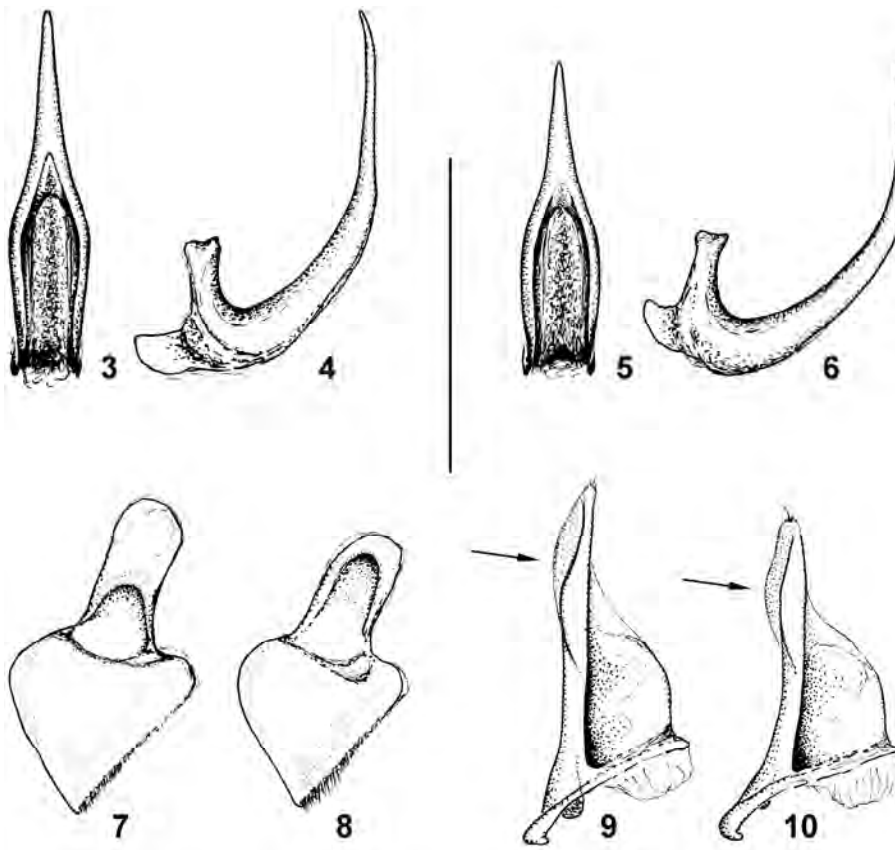

Figs 3-10: *Deronectes tashk* nov.sp. (male holotype and female paratype): median lobe in ventral (**3**) and lateral (**4**) view, gonocoxosternum (**7**), left paramere (**9**); *Deronectes longipes* (SHARP, 1882) (male lectotype and female paralectotype): median lobe in ventral (**5**) and lateral (**6**) view, gonocoxosternum (**8**), left paramere (**10**). The arrows indicate the frontal view on the parameres.

♀♀: Median lobe in ventral and lateral view as in Figs 3-4; left parameres as in Fig. 9.

♀♀: Similar to males, but maximum width of pronotum on average somewhat smaller and pro- and mesotarsomeres less broadened. Protarsal claws slightly shorter than in males. Gonocoxosternum as in Fig. 7.

M e a s u r e m e n t s: Sequence of data: holotype/males (n = 10) mean (min-max)/females (n = 8) mean (min-max): TL = 4.25 mm/4.39 (4.1-4.5) mm/4.29 (4.0-4.5) mm; TL-h = 3.8 mm/3.96 (3.8-4.0) mm/3.89 (3.65-4.1) mm; MW = 2.0 mm/2.03 (1.9-2.1) mm/2.04 (1.9-2.15) mm; P_{max} = 1.45 mm/1.50 (1.4-1.55) mm/1.46 (1.35-1.55) mm; P_{min} = 1.25 mm/1.30 (1.25-1.35) mm/1.29 (1.25-1.35) mm; TL/MW = 2.13/2.16 (2.12-2.20)/2.10 (2.05-2.15); TL-h/MW = 1.90/1.95 (1.88-2.00)/1.91 (1.88-1.95); P_{max}/P_{min} = 1.16/1.15 (1.12-1.18)/1.13 (1.08-1.15); MW/P_{max} = 1.38/1.35 (1.33-1.40)/1.40 (1.39-1.43). To support the comparison with *D. longipes* (see below), we give already here the measurements of the male lectotype/female paralectotype of this species: TL = 4.1 mm/4.15 mm; TL-h = 3.8 mm/3.8 mm; MW = 2.0 mm/1.9 mm; P_{max} = 1.5 mm/1.4 mm;

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P_{min} = 1.45 mm/1.25 mm; TL/MW = 2.05/2.18; TL-h/MW = 1.90/2.00; P_{max}/P_{min} = 1.05/1.12; MW/P_{max} = 1.33/1.36.

V a r i a b i l i t y: The specimens show no remarkable variability of any external morphological feature. The tip of the anteromedial metaventral process is in some specimens rather pointed, in others slightly broader and rounded. So as not to destroy the holotype and most paratypes, we have studied the mesocoxal cavities of only one specimen – its cavities are open. We assume that the other specimens have also open cavities, because in all of them the mesocoxae are quite closely situated, no matter how the anteromedial metaventral process is shaped. The shape of the protarsomeres is in some males less broadened, more or less only slightly more than three times as broad as long. The straight distal half of the median lobe of aedeagus (in lateral view) is in some males slightly shorter than illustrated in Fig. 4.

D i s t r i b u t i o n: Known so far only from the type locality at the southern border of the Kuh-e Kum mountain range, central eastern Fars Province (Fig. 11). The Kuh-e Kum is part of the huge Zagros mountain range, but geographically isolated from the more south-western parts of the Zagros mountains by a large plane where *Deronectes* species with their invariable preference for mountain springs and brooks undoubtedly cannot exist. This plane (altitude ca. 1500-1600 m) spreads more or less from Marvdasht in the northwest to Neiriz in the southeast (length ca. 250 km) and includes Lake Tashk and Lake Bakhtegan (both salty; together known as the "Neyriz Lakes"). The map (Fig. 11) shows also the distribution of *D. longipes*. The relevant data for the collecting sites of the latter species are as follows: B u y e r A h m a d o K u h g i l u y e P r o v i n c e: (1) ca. 15 km N Gachsaran, (2) ca. 20 km NW Yasuj, (3) ca. 10 km S Yasuj; F a r s P r o v i n c e: (4) ca. 20 km N Nurabad, (5) ca. 20 km E Farrashband, (6) Chesmeh Darrehbidi, ca. 15 km W Shiraz, (7) Bamoo National Park, ca. 20 km NE Shiraz, (8) ca. 50 km N Firuz Abad, (9) ca. 45 km W Ghir, (10) ca. 15 km W Ghir, (11) ca. 160 km W Lar, (12) ca. 40 km E Jahrom, (13) ca. 10 km S Juyom, (14) ca. 50 km S Juyom, (15) ca. 30 km E Juyom, (16) N Lar, Mahmood Abad. All records have already been provided in FERY & HOSSEINIE (1998), except the first one; this is why we give for collecting site (1) the full data set: 3♀♀, 24.3.1999, Iran, Kohkiluye & Boyer Ahmad Prov.,16 km N Gachsaran, stream, 730 m, Elmi leg. (CHF). N o t e s: Several additional records for *D. longipes*, situated in more northern regions of the Zagros mountains than in Fig. 11, are given in FERY & HOSSEINIE (1998, fig. 149).

E c o l o g y: All specimens of the new species have been collected in the pool. The water of the spring drains the pool at its eastern margin via the Emamzadeh brooklet (Fig. 12), in which, however, no beetles have been found. The pool has an oval shape with a diameter of about 6 to 8 m and a maximum depth of about 2 m; the bottom is covered with sand and gravel. The pool and the brooklet exist only temporarily, during two to four months per year in springtime. Outside the pool, three different plants grow: the wild almond (*Amygdalus scoparia*), the Arjan tree (*Amygdalus reuteri*) and the Baneh tree (*Pistacia atlantica*), the residues of which were found in the water. The beetles were found near the border at a little depth on the rocks and on algae or within accumulations of algae; they were continually swimming with rather high velocity in the almost stagnant water. The water temperature was moderate (not measured). The only other beetles collected in the same pool were four *Agabus biguttatus* (OLIVIER, 1795). No vegetation was present in the pool except some algae. A few frogs were observed in the

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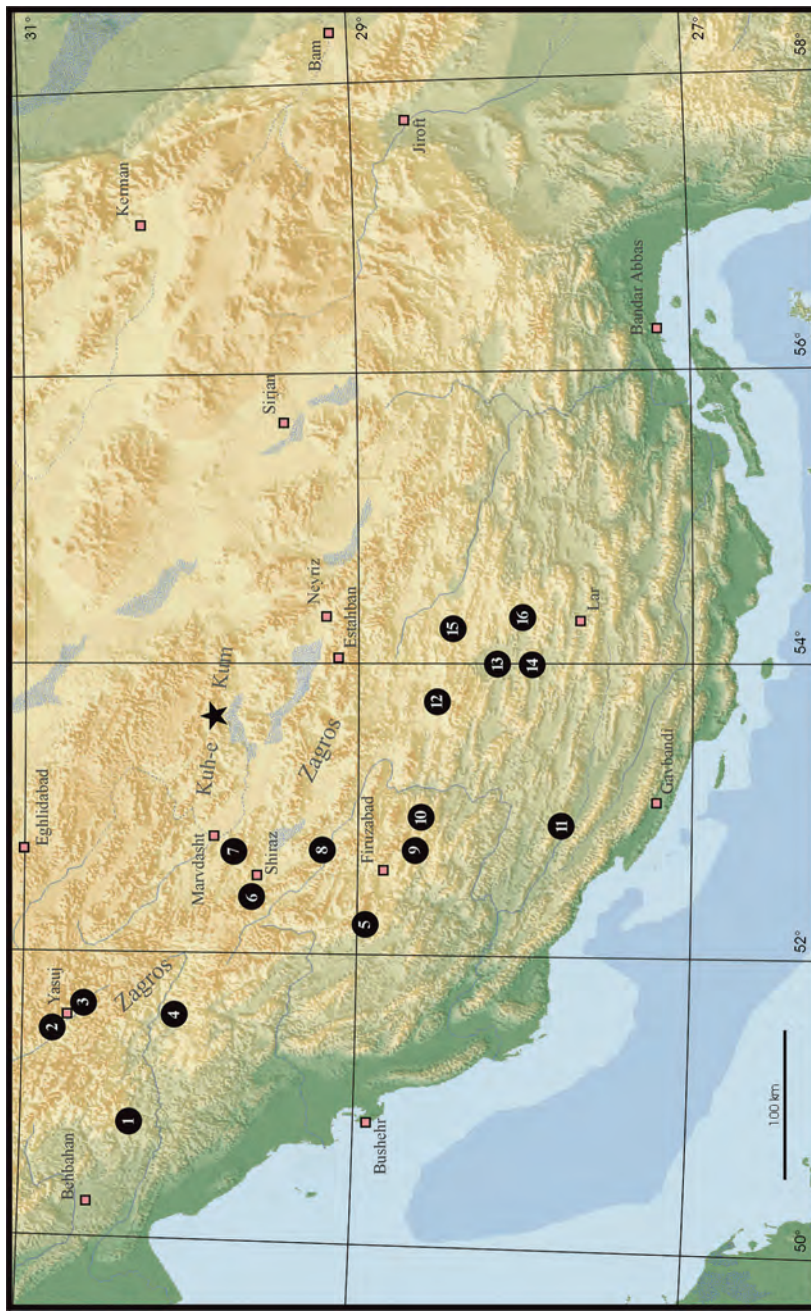

Fig. 11: Map of southern Iran with collecting sites of *Deronectes tashk* nov.sp. (asterisk) and *Deronectes longipes* (SHARP, 1882) (circles 1-16; explanations in the text).

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pool. Several other springheads exist near the type locality within a radius of about 4 km, but no aquatic beetles have been found; thus, the new species seems to be present only in the type locality. In two more distant localities, however, have been found some dytiscids: (a) ca. 20 km ENE of the Emamzadeh spring, ca. 7 km NNW Khaje Jamali village, Khales river, 29.8740N 53.8178E, 2170 m: *A. biguttatus*, *Agabus conspersus* (MARSHAM, 1802), *Bidessus calabricus* GUIGNOT, 1957, *Laccophilus hyalinus* (DEGEER, 1774), and *Nebrioporus sagartus* TOLEDO, 2009; (b) ca. 23 km ENE of the Emamzadeh spring, ca. 6 km N Khaje Jamali village, Chaghool brooklet, 29.8715N 53.8468E, 2260 m: *A. biguttatus*. Unfortunately, the type locality was not photographed when the specimens were collected in May 2013. When we tried to make such a photo in the spring of 2014, the pool was totally dry (Fig. 12).

N o t e s: Indistinct, but perceptible traces of the pool and of the brooklet can be found in Google-Earth (accessed in September 2014).

E t y m o l o g y: The specific epithet relates to the salty Lake Tashk and two villages (Tashk and Abadeh Tashk) situated near the pool in which all type specimens have been collected. It is a noun in the nominative singular standing in apposition.

Fig. 12: Collecting site of *Deronectes tashk* nov.sp., Emamzadeh spring (pool) and Emamzadeh brooklet (in the background), both totally drained in April 2014; G. HASANSHAHI in the middle of the pool.

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Comparison with the lecto- and paralectotype of *Deronectes longipes* SHARP

All species of the *D. longipes*-subgroup are externally very similar, and only males can be safely determined by studying the shape of the median lobe (cf. key to species in FERY & HOSSEINIE 1998: 247-248, figs 59-65, 77-80, 105, 108A in the same work, and figs 3-4 in HÁJEK et al. 2011). The parameres and gonocoxosterna are mostly less distinctive.

Of all members of the *D. longipes*-subgroup, *D. longipes* has the median lobe of the aedeagus most similar in shape to that of the new species. Furthermore, the single known collecting site of *D. tashk* nov.sp. is relatively close to the known distribution area of *D. longipes*, although both are well separated by a large plane where mountain species like *Deronectes* cannot exist (see above). This is why we compare below only these two species. In particular, we compare the holotype of the new species with the lectotype of *D. longipes*, stored in the BMNH (for label data of the lecto- and paralectotype see FERY & HOSSEINIE 1998).

The upper surface of *D. tashk* nov.sp. is more or less black; that of the lectotype of *D. longipes* tends to be a little more brownish (cf. Figs 1 and 2). The pro- and mesofemora are not darkened proximally in *D. longipes*, but darkened in the new species. As can be seen under M e a s u r e m e n t s , the lecto- and paralectotype of *D. longipes* are somewhat smaller than average specimens of *D. tashk* nov.sp., and the pronotum of the latter is slightly more cordiform (P_{max}/P_{min} is greater in the new species). All these differences, however, do not hold if a greater number of *D. longipes* from all known localities are studied, and thus cannot serve to separate both species.

The median lobe of the aedeagus in *D. tashk* nov.sp. in ventral view is more elongate and in distal half less converging to the apex than in *D. longipes* (cf. Figs 3 and 5). The differences in lateral view (cf. Figs 4 and 6) are even more distinct: in the new species the lobe is much more bent near its base, the distal half is more or less straight over a rather long distance, and the apex is more curved dorsally (for the term "dorsally" see MILLER & NILSSON 2003). The lobe of *D. longipes* is much more evenly curved at the transition between the strongly curved proximal and the (almost) straight distal half, whereas in the new species this transition is more abrupt. In the former species the lobe is curved almost over its entire length, except a short section before apex; the tip is only indistinctly curved dorsally. The parameres of the new species are longer and relatively more slender (cf. Figs. 9 and 10). In frontal view (indicated by the arrows in Figs 9 and 10) the distal third of the parameres is considerably broader in *D. longipes*. Finally, we want to mention that, despite a certain variability of the shapes of the male genitalia, none of the numerous other *D. longipes* specimens studied comes close to those of *D. tashk* nov.sp.

Notes on the locus typicus of *Deronectes biltoni* FERY & HOSSEINIE, 1998

We take the opportunity to reproduce a correction of the type locality of *Deronectes biltoni* FERY & HOSSEINIE, 1998, which has already been published in HÁJEK et al. (2011: 472), but may remain unknown to some Hydradephaga specialists. The type locality of that species is not "Ziarat in Khorasan Razni [= Razvi or Razavi] province, ca. 10 km NW of Shirvan" [ca. 37°30'N 57°50'E], as incorrectly assumed by FERY & HOSSEINIE (1998), but "Ziarat-e Khaseh Rud (ca. 36°43′N 54°29′E), which is situated ca.

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14 km SSE from Gorgan, in Golestan province". HÁJEK et al. (2011) assumed "that the distribution of the species is eastern Elburs Mts., instead of western Kopet Dag where it is replaced by *D. nilssoni* FERY & WEWALKA, 1992".

Acknowledgments

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Zusammenfassung

Deronectes tashk nov.sp. gehört mit seinem herzförmigem Halsschild in die von BRANCUCCI & FERY (1997) definierte *parvicollis*-Gruppe der Gattung, und innerhalb dieser in die *D. longipes*-Untergruppe (FERY & HOSSEINIE 1998). Die neue Art ist dem *Deronectes longipes* SHARP, 1882 besonders ähnlich, kann von diesem aber anhand der Form des Aedeagus unterschieden werden. Es wird eine detaillierte Beschreibung des *D. tashk* nov.sp. gegeben; der Habitus sowie die männlichen und weiblichen Genitale (Gonocoxosterna) werden illustriert und mit denen des *D. longipes* verglichen. Die in der westlichen und zentralen Paläarktis weit verbreitete Gattung *Deronectes* SHARP, 1882 enthält mit der neuen Art insgesamt 58 Arten, von denen vier in je zwei Unterarten aufgespalten sind. Die *Deronectes parvicollis*-Gruppe enthält nun 28, die *D. longipes*-Untergruppe 14 Arten.

Der locus typicus der neuen Art liegt im Süden des Iran und zwar im zentralen Osten der Provinz Fars, am südlichen Rand des Kuh-e Kum (Gebirge), einem kleinen Teil des großen Zagros-Gebirges, und zwar nördlich des Tashk-Salzsees. Dieser See und ein etwas weiter südlich gelegener noch größerer Salzsee, der Bakhtegan-See, liegen in einer etwa 1500-1600 m hoch gelegenen Ebene die sich von Marvdašt im Nordwesten bis Neyrīz im Südosten über etwa 250 km erstreckt und den Fundort der neuen Art von den bekannten Fundorten des *D. longipes* geografisch trennt. Eine Verbreitungskarte (Fig. 11) macht das relativ isolierte Auftreten der neuen Art deutlich. Die neue Art konnte bisher nur vom locus typicus nachgewiesen werden, obwohl in mehreren nahe gelegenen weiteren Gewässern intensiv gesammelt wurde.

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