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New host and the second record of *Erythraeus* (*Zaracarus*) *lancifer* (Trombidiformes: Erythraeidae)

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The larvae of the Erythraeidae are parasites of various arthropods, including insects and spiders whereas post-larval erythraeids are predators (Gerson *et al*. 2003). *Erythraeus* larvae are divided into two subgenera on the basis of the ASens which inserted in sclerotized and angled socket in *Zaracarus* and without sclerotized and angled socket in *Erythraeus* (Xu *et al*. 2019). There are 28 larval species of *Zaracarus* which are distributed in different countries of Asia (Indonesia, Iran, Pakistan, China), Europe (Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Greece, Hungary, Italy, Montenegro, Poland, Spain, Turkey, Taiwan, Ukraine) and Africa (Ethiopia). There is not any record of this subgenus from Nearctic, Neotropical and Australian regions. Among them, *E.* (*Z.*) *budapestensis* Fain & Ripka, 1998 [syns. *E.* (*Z.*) *hamedanicus* Khanjani, Mirmoayedi, Nahad & Fayaz, 2010; *E.* (*Z.*) *preciosus* Goldarazena & Zhang, 1998 were collected from 10 countries (Mąkol and Wohltmann 2012, 2013; Xu *et al*. 2019).

Erythraeus (*Z.*) *lancifer* was described based on larvae ectoparasitic on an undetermined fly (Diptera: Dolichopodidae) from Pina, Ruerta de Pina, Zaragoza province, Spain (Southcott 1995). In this paper, two larvae (ARS-20211215-1a and 1b) ectoparasitic on an unknown species of *Tetramorium* (Hym.: Formicidae) were collected on 5 August 2018 in Anguran Protected Area (36° 33′ 08.41″ N, 47° 36′ 44.93″ E, 5283 m a.s.l.), Mahneshan city, Zanjan province and additional biometric data are provided. The family Formicidae is recorded as a new host taxon for the subgenus.

Mites were detached and preserved in 75% ethanol and cleared in Nesbitt's fluid and mounted using Faure liquid (Walter and Krantz 2009). Measurements (given in micrometers) were made using BX51 Olympus microscope equipped with a drawing tube and magnification changer. The terminology and abbreviations follow Wohltmann *et al*. (2006) and Saboori *et al*. (2009). They are deposited in the Acarological Collection, Jalal Afshar Zoological Museum, Faculty of Agriculture,

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Superfamily Erythraeoidea
Family Erythraeidae
Subfamily Erythraeinae

Erythraeus (*Zaracarus*) *lancifer* Southcott, 1995

Diagnosis (based on original description and new larval materials)

fn BFe I-III 3-3-3; fn Ti I-III 14-15-15; AL swollen near bases; AL ~120–279 (in holotype and one paratype 120–145, in two other paratypes 260–279 and in Iranian specimens 260–272; Ti III > 300, ASens < 30. Additional biometric data are provided in Table 1.

Table 1. Biometric data of *Erythraeus* (*Zaracarus*) *lancifer* larvae from Iran and Spain.

Character	Iran	Spain (Southcott 1995)		Iran	Spain (Southcott 1995)
	n = 2	n = 4	Character	n = 2	n = 4
SD	94–104	91–110	**Ti I**	252–255	205–269
W	136–161	136–182	**Ge I**	156–173	153–189
AW	42–47	40–55	**TFe I**	106–124	-
PW	126	95–145	**BFe I**	119–136	-
MA	20	-	**Tr I**	62	-
AA	25	22–35	**Cx I**	52–64	-
SB	17–22	15–21	**Leg I**	920–968	-
ISD	59–82	60–77	**Ta II (L)**	129–148	128–144
AP	55–60	44–68	**Ti II**	230–250	200–253
AL	260–272	(?120)–279	**Ge II**	110–144	129–156
PL	72–77	64–74	**TFe II**	112–124	-
ASens	27	22–27	**BFe II**	106–116	-
PSens	72–76	60–66	**Tr II**	67–72	-
DS	57–82	47–66	**Cx II**	74–94	-
1a	39–40	34–45	**Leg II**	848–928	-
1b	99–106	91–105	**Ta III (L)**	161–181	140–164
2b	37–42	36–39	**Ti III**	353–366	304–355
3a	32–33	30–38	**Ge III**	141–171	157–182
3b	49–50	39–42	**TFe III**	136–137	-
as	13–14	-	**BFe III**	141–143	-
bs	34	27 (in Holotype)	**Tr III**	62–64	-
cs	32–33	25 (in Holotype)	**Cx III**	87–94	-
fD	38	32	**Leg III**	1095–1142	-
fV	10	12	**IP**	2863–3038	-
Ta I (L)	161–166	144–164			

Corrected data compared with original description

Leg setal formulae are not stated in original description; here they are provided as follows: Leg setal formula: Leg I: Ta- 1ω, 1ε, 2ζ, 1*z*, 26n; Ti- 2φ, 1*z*, 1κ, 14n; Ge- 1σ, 1κ, 8n; TFe- 5n; BFe- 3n; Tr- 1n; Cx- 1n. Leg II: Ta- 1ω, 1ε, 2ζ, 1*z*, 23n; Ti- 2φ, 15n; Ge- 1κ, 8n; TFe- 5n; BFe- 3n; Tr- 1n; Cx- 1n. Leg III: Ta- 1ζ, 24n; Ti- 1φ, 15n; Ge- 8n; TFe- 5n; BFe- 3n; Tr- 1n; Cx- 1n.

Gnathosoma with two hypostomalae but in original paper cited one hypostomala. Number of palptarsal setae including solenidion and eupathidium 8 (fPp = 0-B-B-BBB$_2$-NNNNNωzζ) but in original paper stated 7.

The result of this study showed that *Erythraeus* (*Zaracarus*) species are distributed in different regions of the world. Most species were collected from aphids and other Hemiptera. Hence, we consider it important to further study this subgenus across other regions to gain a better understanding on host spectrum and their geographic distribution. *Erythraeus* (*Z.*) *lancifer* surely can be found in additional regions, as it has already been collected from Spain, and here from Iran. The family Formicidae is recorded as a new host for this species. It is interesting to note that neither host species belong to Hemiptera; this is the second record of *E.* (*Z.*) *lancifer* to the world, so it is expected to uncover more records of this species in at least the Palearctic region. Also, comparison of *E.* (*Z.*) *lancifer* and *E.* (*Z.*) *hainanensis* Xu, Yi, Guo & Jin, 2019 shows that differential diagnosis between them is not enough to distinguish these two species. Differences cited in Xu *et al*. (2019) are interpreted as within the range of species variations so we suggest re-examination of the type species of *E.* (*Z.*) *hainanensis*.

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