

## Two new species of *Erythraeus* (*Zaracarus*) Latreille, 1806 (Acari: Prostigmata: Erythraeidae) from Sicily

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**Abstract:** *Erythraeus* (*Zaracarus*) *adrianicus* sp. n. with fnBf 3-3-3, Ti III > 400 µm and *E. (Z.) monrealicus* sp. n. with fnBf 2-2-2, Ti III > 240 µm, both collected from herbaceous plants, are described from Sicily.

**Key words:** Acari; Erythraeidae; *Erythraeus* (*Zaracarus*); new species; larvae; Sicily

### Introduction

In the world, 23 species of larval *Erythraeus* (*Zaracarus*) have been known (Beron 2008; Mayoral & Barranco 2008; Kamran et. al. 2009; Khanjani et. al. 2010; Haitlinger 2011). From Europe the following species have been known: *E. (Z.) eleonora* Haitlinger, 1987 from Poland, *E. (Z.) budapestensis* Fain et Ripka, 1998 from Bosnia and Hercegovina, Croatia, Greece, Hungary, Montenegro and Turkey, *E. (Z.) lancifer* Southcott, 1995 from Spain, *E. (Z.) kastaniensis* Haitlinger, 2006 from Greece (Samos), *E. (Z.) passidonicus* Haitlinger, 2006, from Greece (Samos) and Turkey, *E. (Z.) preciosus* Goldarazena et Zhang, 1998 from Greece, Spain and Ukraine, *E. (Z.) sibuljinicus* Haitlinger, 2004 from Croatia and *E. (Z.) ruizporterae* Mayoral et Barranco, 2008 from Spain (Haitlinger 1987, 2004, 2006, 2010; Southcott 1995; Fain & Ripka 1998; Goldarazena & Zhang 1998; Mayoral & Barranco 2008). From Sicily, only two *Erythraeus* species based on adults, i.e., *E. acis* (Berlese, 1882) and *E. cinereus* (Dugès, 1834) have been known (Beron 2008). In this paper further two new *Erythraeus* (*Zaracarus*) species are described.

### Material and methods

The four examined specimens were obtained from herbaceous plants in Sicily. Mites were collected in May and June 2010. Specimens were preserved in 70% ethanol and mounted later in Berlese's medium. Holotypes of the new species and paratype of *E. (Z.) adrianicus* are deposited in the Museum of Natural History, Wrocław University (MN-HWU), Poland; paratype of *E. (Z.) monrealicus* is in author's collection.

Measurements are expressed in micrometers (µm). The terminology and abbreviations are adapted from Goldarazena & Zhang (1998) and Haitlinger (2006).

### Erythraeidae Robineau-Desvoidy, 1828

#### *Erythraeus* Latreille, 1806

*Erythraeus* (*Zaracarus*) *adrianicus* sp. n. (Figs 1–14)

**Diagnosis.** fd 28, fV 16, fnBf 3–3–3, Ta I 206–220, Ti III 470–484, IP 4118–4126.

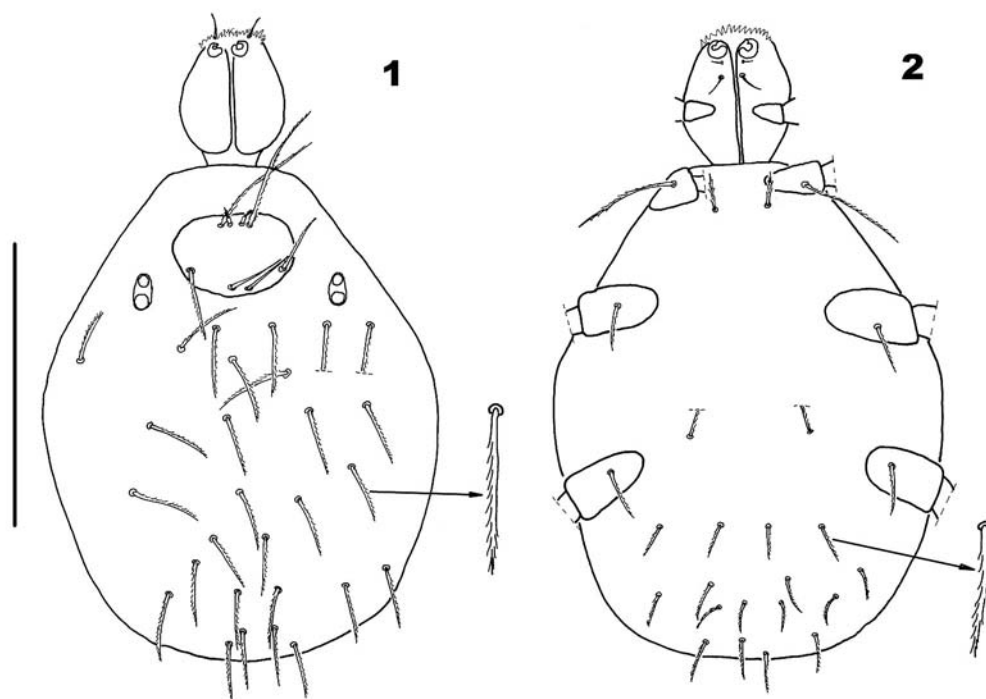
**Description.** **Holotype** – larva. Idiosoma dorsally with 28 barbed setae. Eye cornea 20 µm across, both on platelet (Fig. 1). Scutum as in Fig. 3 with two pairs of scutalae; anterior scutalae AL long with expanded bases and setules at base and in 1/2 distal part of setae. Posterior scutalae PL shorter, barbed. Anterior sensillary setae (AM) are very short with specific tube-shaped base and with setules. Posterior sensillary setae (S) longer, nude (Fig. 3).

Ventral surface with two sternalae 1a and two sternalae 3a, all weakly barbed. Behind coxae III 16 barbed setae. Coxalae I–III barbed, coxalae 1b over twice as long as coxalae 2b and 3b (Fig. 2). NDV = 44. Gnathosoma with nude hypostomalae aHy and pHy and galealae. Palpfemur and palpgenu, each with barbed seta. Palptibia with two nude and one barbed seta; tibial claw bifurcate (Fig. 4). Palptarsus with 7 setae (solenidion and eupathidium included), all nude; among them one long seta (Fig. 5).

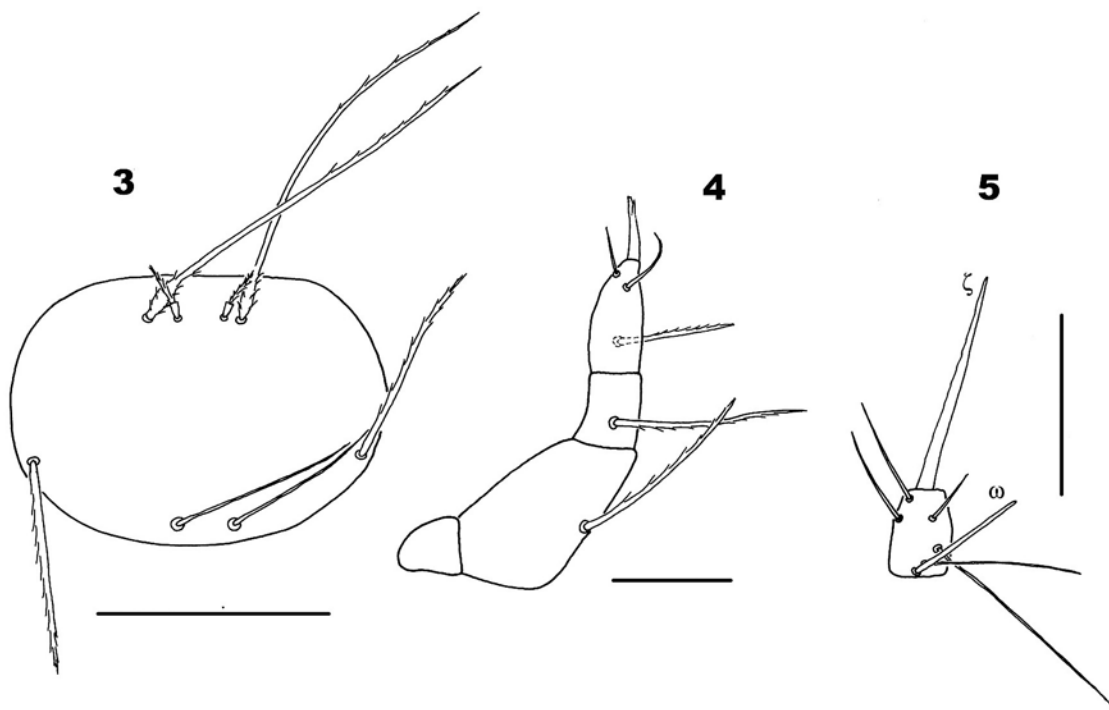
Leg lengths. I 1338, II 1220, III 1560 holotype; I 1356, II 1230, III 1540 paratype. IP = 4118 holotype, 4126 paratype.

Leg setal formula. Leg I. Ta 1ω, 2ζ, 20B; Ti 2φ, 1Cp, 1κ, 14B, Ge 1σ, 1κ, 8B; Tf 5B; Bf 3B; Tr 1B; Cx 1B (Figs 6–8).

Leg II. Ta 1ω, 2ζ, 17B; Ti 2φ, 14B; Ge 1κ, 8B; Tf 5B; Bf 3B; Tr 1B; Cx 1B (Figs 9, 10)



Figs 1, 2. *Erythraeus (Zaracarus) adrianicus* sp. n.: 1 – idiosoma and gnathosoma, dorsal view; 2 – idiosoma and gnathosoma, ventral view. Scale 400  $\mu$ m.



Figs 3–5. *Erythraeus (Zaracarus) adrianicus* sp. n.: 3 – scutum; 4 – palp; 5 – palptarsus. Scales 100  $\mu$ m (Fig. 3), 50  $\mu$ m (Fig. 4), 30  $\mu$ m (Fig. 5).

Leg III. Ta 19B; Ti 1 $\phi$ , 14B; Ge 8B; Tf 5B; Bf 3B; Tr 1B; Cx 1B (Figs 11–14). Measurements are given in Table 1.

n. Sciacca (37°41' N, 13°23' E), 31.V.2010, from herbaceous plants; leg. R. Haitlinger, MNHWU; one paratype, same data as in holotype.

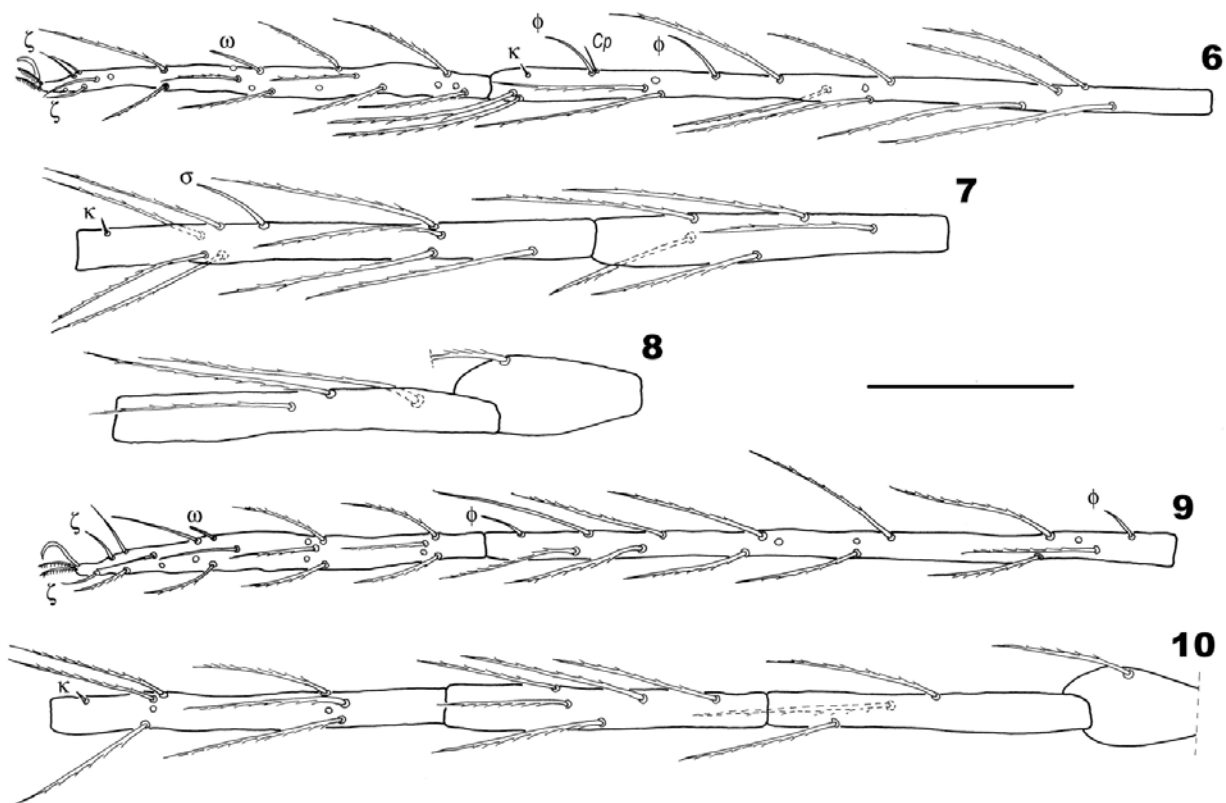
**Type material. Holotype:** larva, Sicily, Palazzo Adriano

**Etymology.** Named after the type locality.

Table 1. Metric data (in  $\mu\text{m}$ ) for larvae: *Erythraeus* (*Zaracarus*) *adrianicus* sp. n. (1) and *E. (Z.) monrealicus* sp. n. (2).

|      | 1      | 1     | 2     | 2     |        | 1    | 1    | 2    | 2    |
|------|--------|-------|-------|-------|--------|------|------|------|------|
|      | H      | P     | H     | P     |        | H    | P    | H    | P    |
| IL   | 667    | 762   | 522   | 489   | Ta I   | 220  | 206  | 112  | 118  |
| IW   | 508    | 590   | 495   | 317   | Ti I   | 354  | 368  | 148  | 162  |
| AW   | 42     | 44    | 58    | 52    | Ge I   | 254  | 256  | 120  | 120  |
| PW   | 124    | 140   | 120   | 122   | Tf I   | 172  | 182  | 78   | 84   |
| AM   | 24     |       | 32    | 30    | Bf I   | 184  | 186  | 100  | 92   |
| AL   | 180    | 182   | 168   | 182   | Tr I   | 72   | 74   | 50   | 60   |
| PL   | 90     | 82    | 70    | 70    | Cx I   | 82   | 84   | 70   | 74   |
| AA   | 20     | 20    | 38    | 38    | Ta II  | 200  | 200  | 104  | 108  |
| SB   | 22     | 20    | 20    | 22    | Ti II  | 340  | 340  | 152  | 160  |
| L    | 112    | 114   | 74    | 90    | Ge II  | 192  | 200  | 110  | 110  |
| W    | 160    | 188   | 150   | 156   | Tf II  | 152  | 160  | 82   | 80   |
| S    | 100    | 72    | 82    | 74    | Bf II  | 162  | 160  | 82   | 84   |
| AP   | 70     |       | 58    | 58    | Tr II  | 74   | 80   | 62   | 68   |
| GL   | 180    | 184   | 140   | 156   | Cx II  | 100  | 90   | 84   | 82   |
| DS   | 66–100 | 64–88 | 60–68 | 62–74 | Ta III | 230  | 228  | 112  | 134  |
| 1a   | 50     | 50    | 82    | 98    | Ti III | 484  | 470  | 256  | 268  |
| 1b   | 140    | 130   | 80    | 88    | Ge III | 50   | 244  | 130  | 140  |
| 2b   | 56     | 52    | 38    | 34    | Tf III | 204  | 206  | 106  | 110  |
| 3b   | 62     | 52    | 40    | 40    | Bf III | 200  | 202  | 98   | 112  |
| PsFd | 84     | 84    | 50    | 46    | Tr III | 82   | 84   | 64   | 62   |
| PsGd | 80     | 82    | 66    | 62    | Cx III | 110  | 106  | 90   | 98   |
| ISD  | 80     | 86    | 44    | 52    | IP     | 4118 | 4126 | 2210 | 2326 |

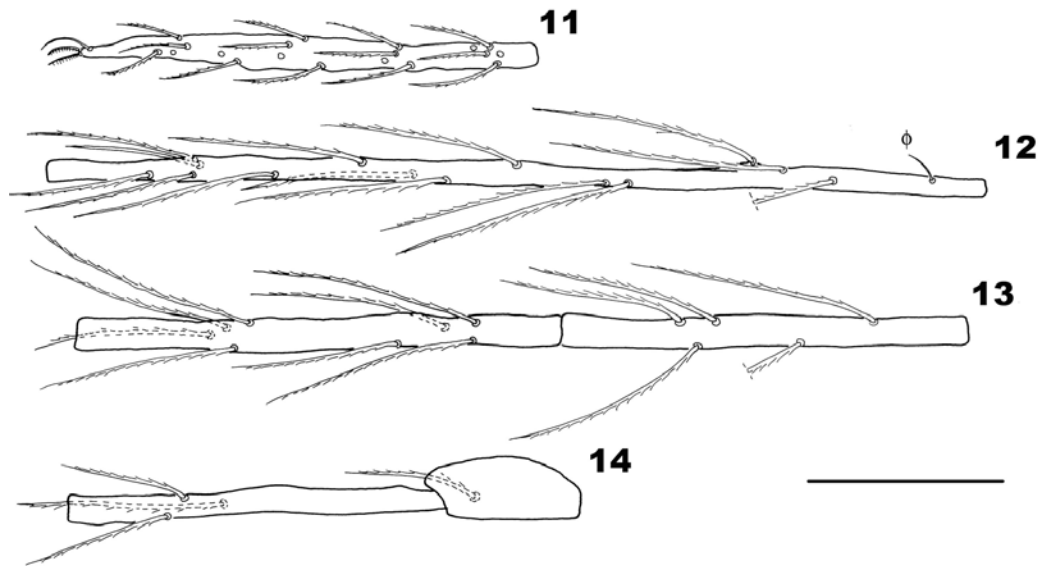
Explanations: H – holotype; P – paratype.



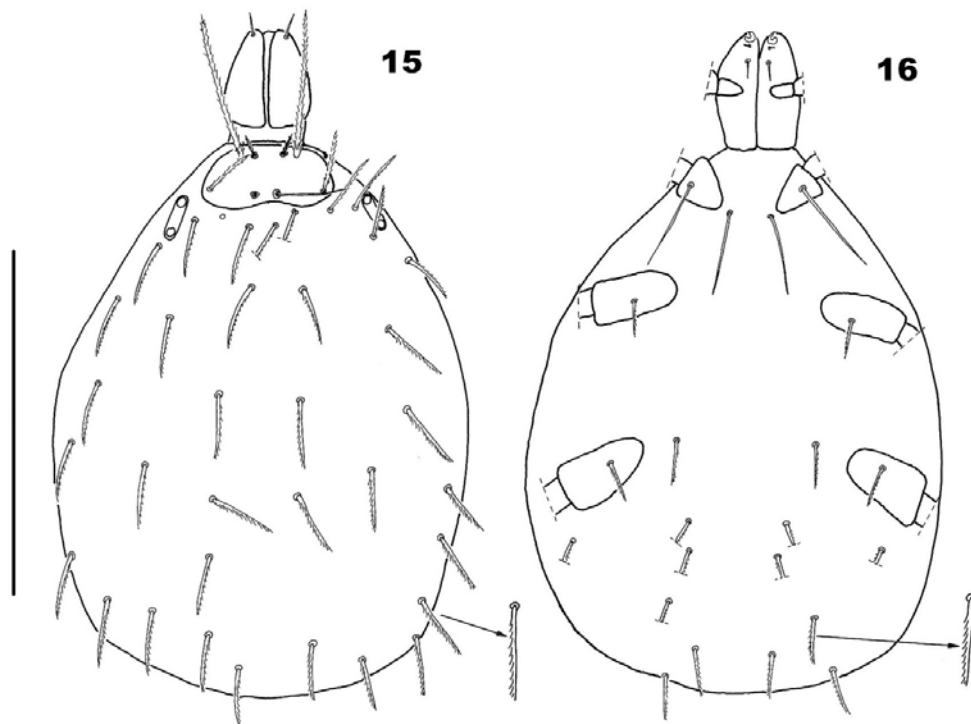
Figs 6–10. *Erythraeus* (*Zaracarus*) *adrianicus* sp. n.: 6 – leg I, tarsus – tibia; 7 – leg I, genu – telofemur; 8 – leg I, basidemur – trochanter; 9 – leg II, tarsus – tibia; 10 – leg II, genu – trochanter. Scale 100  $\mu\text{m}$ .

**Remarks.** *Erythraeus* (*Zaracarus*) *adrianicus* sp. n. belongs to the species group with 3 basifemorales and  $\text{Ti III} > 400 \mu\text{m}$ . This group includes *E. (Z.) fabiolae* Haitlinger, 1997, *E. (Z.) lobgipedus* Saboori et Nowzari,

2001 and *E. (Z.) soleimanii* Khanjani, Mirmoayedi, Nahad & Fayaz, 2010 (Ti III 375–475) (Haitlinger 1997; Saboori & Nowzari 2001; Khanjani et al. 2010). It differs from *E. (Z.) fabiolae* in the longer ISD (80–86



Figs 11–14. *Erythraeus (Zaracarus) adrianicus* sp. n.: 11 – leg III, tarsus; 12 – leg III, tibia; 13 – leg III, genu – telofemur; 14 – leg III, basifemur – coxa. Scale 100  $\mu$ m.



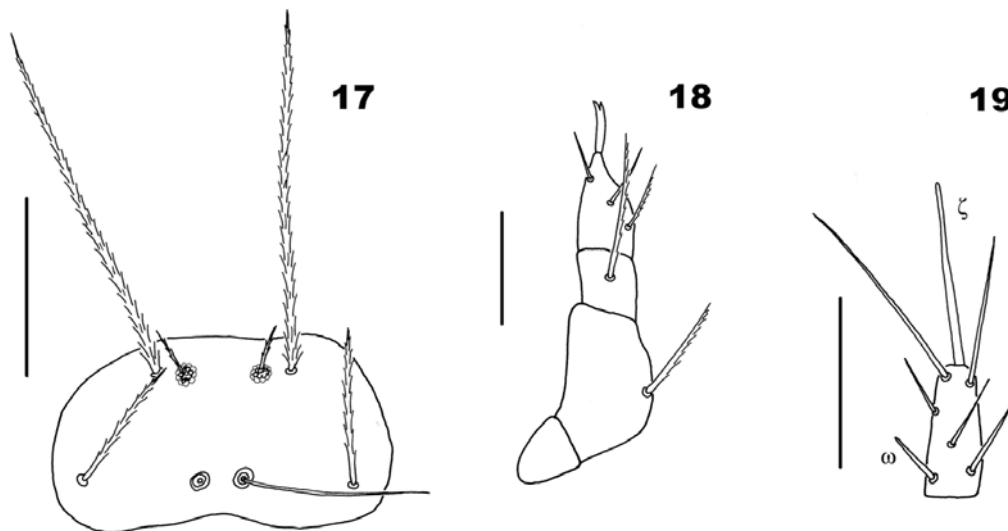
Figs 15, 16. *Erythraeus (Zaracarus) monrealicus* sp. n.: 15 – idiosoma and gnathosoma, dorsal view; 16 – idiosoma and gnathosoma, ventral view. Scale 400  $\mu$ m.

vs. 72), PsFd (84 vs. 68), TaI (206–220 vs. 180), Ti I (354–368 vs. 310), Ta II (200 vs. 164), Ti II (340 vs. 304), Ta III (228–230 vs. 180), Ti III (470–484 vs. 420), IP (4118–4126 vs. 3852) and shape of scutum, from *E. (Z.) longipedus* in the longer PW (124–140 vs. 109), ISD (80–86 vs. 63), DS (64–100 vs. 53–65), PsFd (84 vs. 68), Ta I (206–220 vs. 187), Ti I (354–368 vs. 272), Ta II (206–220 vs. 170), Ti II (340 vs. 262), Ta III (228–230 vs. 187), Ti III (470–484 vs. 424), IP (4118–4126 vs. 3403) and the shorter AL (180–182 vs. 199) and from *E. (Z.) soleimanii* in the longer

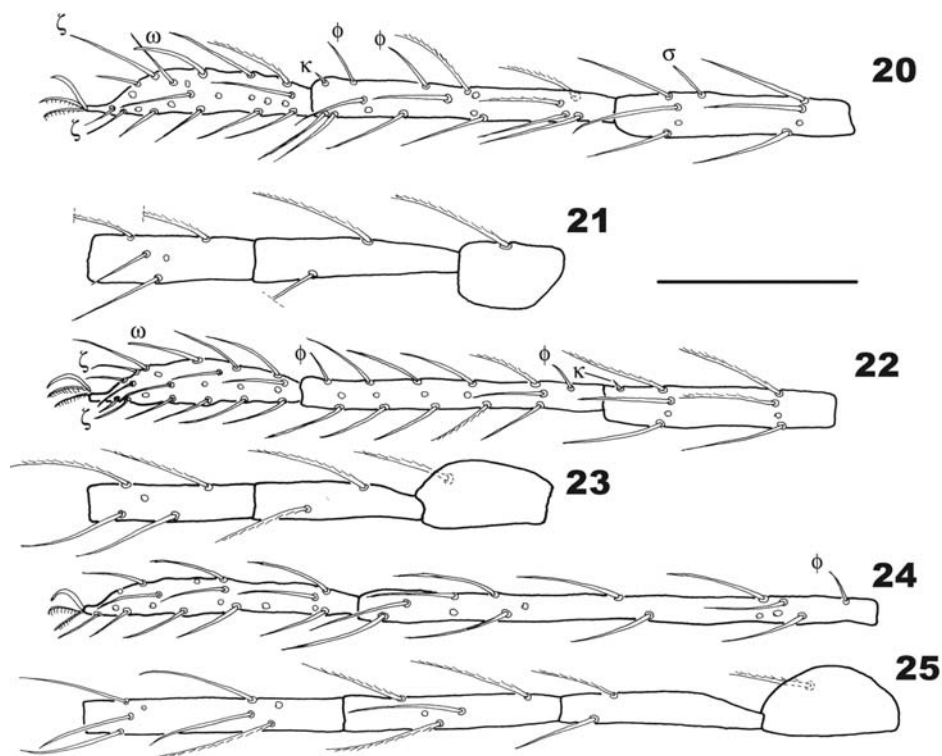
AL (180–192 vs. 100–120), 1b (130–140 vs. 108–130), shorter AW (40–44 vs. 53–58), NDV (42 vs. 47), fn Ta I–III (20, 17, 19 vs. 25, 22, 23), fn Ti I–III (14–14–14 vs. 14–15–14) and setae on palptibia (2N, 1B vs. 3B).

***Erythraeus (Zaracarus) monrealicus* sp. n.** (Figs 15–25)

**Diagnosis.** fd 36, fV 12, fnBf 2–2–2, Ta 112–118, Ti III 256–268, IP = 2210–2326.



Figs 17–19. *Erythraeus* (*Zaracarus*) *monrealicus* sp. n.: 17 – scutum; 18 – palp; 19 – palptarsus. Scales 80  $\mu\text{m}$  (Fig. 17), 50  $\mu\text{m}$  (Fig. 18), 30  $\mu\text{m}$  (Fig. 19).



Figs 20–25. *Erythraeus* (*Zaracarus*) *monrealicus* sp. n.: 20 – leg I, tarsus – genu; 21 – leg I, basifemur – trochanter; 22 – leg II, tarsus – genu; 23 leg II, basifemur – trochanter; 24 – leg III, tarsus – tibia; 25 – leg III, genu – trochanter. Scale 100  $\mu\text{m}$ .

**Description. Holotype:** larva. Dorsum with 36 weakly barbed setae. Eyes present on both sides of idiosoma (Fig. 15). Scutum with posterior border concave. Anterior scutalae (AL) long and barbed. Posterior scutalae (PL) barbed, over twice shorter than setae AL. Anterior sensillary setae (AM) very short, setulose. Posterior sensillary setae (S) relatively long, nude (Fig. 17).

Ventral surface bears two pairs of sternalae setae, 1a are nude, setae 3a are barbed; setae 1a relatively long. 12 weakly barbed setae beyond coxae III. Coxalae 1b nude, coxalae 2b and 3b barbed; coxalae 1b over

twice as long as coxalae 2b and 3b (Fig. 16). NDV =  $36 + 12 = 48$ . Gnathosoma with smooth hypostomalae aHy and pHy and galealae. Palpfemur and palpgenu, each with barbed seta; PsGd > PsFd. Palptibia with two nude and one weakly barbed seta; palp tibial claw bifurcate (Fig. 18). Palptarsus with 7 nude setae (solenidion and eupathidium included) (Fig. 19).

Leg lengths. I 678, II 676, III 856 holotype, I 710, II 692, III 924 paratype. IP = 2210 holotype, 2326 paratype.

Leg setal formula. Leg I. Ta 1 $\omega$ , 2 $\zeta$ , 19; Ti 2 $\phi$ , 1 $\kappa$ ,

14N; Ge 1 $\sigma$ , 8N; Tf 5N; Bf 2N; Tr 1N; Cx 1N (Figs 20, 21).

Leg II. Ta 1 $\omega$ , 2 $\zeta$ , 17; Ti 2 $\phi$ , 14N; Ge 1 $\kappa$ , 8N; Tf 5N; Bf 2N; Tr 1N; Cx 1N (Figs 22, 23).

Leg III. Ta 19; Ti 1 $\phi$ , 14N; Ge 8N; Tf 5N; Bf 2N; Tr 1N; Cx 1N (Figs 24–25). Tarsi I–III with some setae (2–3) barbed (badly visible).

Metric data are given in Table 1.

**Type material. Holotype:** larva, Sicily, Monreale n. Palermo (38°05' N, 13°17' E), 12.V.2010, from herbaceous plants; leg. R. Haitlinger, MNHWU; one paratype, Piana degli Albanesi n. Palermo (38°00' N, 13°17' E), 6.VI.2010, from herbaceous plants.

**Etymology.** Named after the locality where holotype was collected.

**Remarks.** *Erythraeus (Zaracarus) monrealicus* sp. n. belongs to the species group with 2 basifemoralae and Ti III > 240. This group includes: *E. (Z.) eleonora* Haitlinger, 1987, *E. (Z.) didonae* Haitlinger, 2000 and *E. (Z.) kurdistanensis* Khanjani et Ueckermann, 2005 (Haitlinger 1987, 2000; Khanjani & Ueckermann 2005). It differs from *E. (Z.) eleonora* in the shorter AW (52–58 vs. 62–75), PW (120–122 vs. 140–167), AL (168–182 vs. 200–242), PL (70 vs. 92–102), ISD (44–52 vs. 66–80) and Ta I (112–118 vs. 120–154); from *E. (Z.) didonae* in the longer AL (168–182 vs. 150), Ti III (256–268 vs. 244), shorter ISD (44–52 vs. 60), L (74–90 vs. 112), ratio W/L (1.73–2.03 vs. 1.30), fD (36 vs. 26) and NDV (48 vs. 38) and from *E. (Z.) kurdistanensis* in the shorter PW (120–122 vs. 140–150), L (74–90 vs. 106–115), PL (70 vs. 81–84), ISD (44–52 vs. 57–58), DS (60–74 vs. 78–92), Ti I (148–162 vs. 192–194), Ti III (256–268 vs. 280–297) and longer AL (168–182 vs. 138–150).

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