

Two new larval ectoparasitic *Charletonia* OUDEMANS (Acari: Prostigmata: Erythraeidae) found on Orthoptera (Insecta), and the first record of *Charletonia krendowskyi* (FEIDER) in Iran

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ABSTRACT. *Charletonia mehranensis* sp. n. and *C. ahwazensis* sp. n. are described and illustrated basing on ectoparasitic larvae of Orthoptera from Iran. *C. krendowskyi* (FEIDER) is reported for the first time from Iran.

KEY WORDS: Acari, Prostigmata, Erythraeidae, *Charletonia*, new species, insect parasites, Iran

INTRODUCTION

From Iran three larval *Charletonia* were described hitherto: *C. saboori* IRAVANLOU, KAMALI, TALEBI, 2002, *C. nazaleae* IRAVANLOU, KAMALI, TALEBI 2002 and *C. damavandica* IRAVANLOU, KAMALI, TALEBI, 2002. From Minor Asia and Central Asia no other species of *Charletonia* were known, excluding *C. jaegerskjoeldi* (TRÄGÅRDH, 1904) from Sinai (TRÄGÅRDH, 1904, IRAVANLOU et al., 2002). In this paper two new species of larval *Charletonia* collected from *Anacridium aegyptium* and an undetermined Orthoptera from Iran are described, as well as *C. krendowskyi* is reported for the first time from Iran.

Material and methods

Some Orthoptera were collected in Mehran, July 1993, Tabriz, July 1993, Ahwaz, May 1995, Varamin, August 1996 and Karaj, August 1996 and July 1997; 7 specimens of larval *Charletonia* (OUDEMANS.), representing two new species described below, was found on *A. aegyptium* and undetermined Orthoptera.

The four specimens (*C. krendowskyi*) were found on undetermined Orthoptera and *Chrysops* sp. (Diptera: Simuliidae). All specimens were preserved in ethanol and then mounted in the Berlese's medium. The terminology of structures and setal notation follows SOUTHCOFF (1961) and HAITLINGER (1999). All tarsi (Ta) were measured excluding pads. All measurements are given in micrometers. The type material is deposited at the Museum of Natural History, Wrocław University, Poland (MNHU).

DESCRIPTION

Charletonia mehranensis sp. n

(Figs 1-12)

Diagnosis

Four setae between coxae II and III; fnBf 4-4-2, TaIII 375-386, TaI 206-234, AW 90-96, PW 122-132.

Description

Dorsum with 102 weakly barbed setae. One eye on each side (Fig. 1). Scutum widest at the level of bases of PL, its posterior border is rounded. All scutalae weakly barbed, AL and ML subequal in length, both longer than PL. Sensillae AM and S both nude (Fig. 3).

Ventral side of idiosoma: two sternalae 1a and 2a and four sternalae 3a, all with small barbs. Behind coxalae III 36 slightly barbed setae. All coxalae with setules. Seta 1b is longer from other coxalae (Fig. 2). Gnathosoma with nude galealae and weakly barbed hypostomalae (Fig. 4). Palpfemoralae and palpgenualae each setulose. Palptibia with three setae: 2 are barbed, third is nude (Fig. 6). Palptarsus with 6 setae (together with eupathidium and solenidium), all nude (Fig. 5).

Leg length (include coxae, without claws): I 1146 holotype, 1108-1194 paratypes, II 1052, 1079-1096, III 1312, 1318-1344. Ip=3510, 3608-3616 (Figs 7-12).

Leg setal formula. Leg I: Ta 1 ω , 2 ζ , 22B; Ti 2 ϕ , 1 κ , 18B; Ge 1 δ , 1 κ , 12B; Tf 5B; Bf 4B; Tr 1B; Cx 1B (Figs 7, 8).

Leg II: Ta 1 ω , 2 ζ , 22B; Ti 2 ϕ , 18B; Ge 1 κ , 12B; Tf 5B; Bf 4B; Tr 1B; Cx 2B (Figs 9, 10).

Leg III: Ta 22B; Ti 1 ϕ , 18B; Ge 12B; Tf 5B; Bf 2B; Tr 1B; Cx 2B (Figs 11, 12).

For measurements see Table 1.

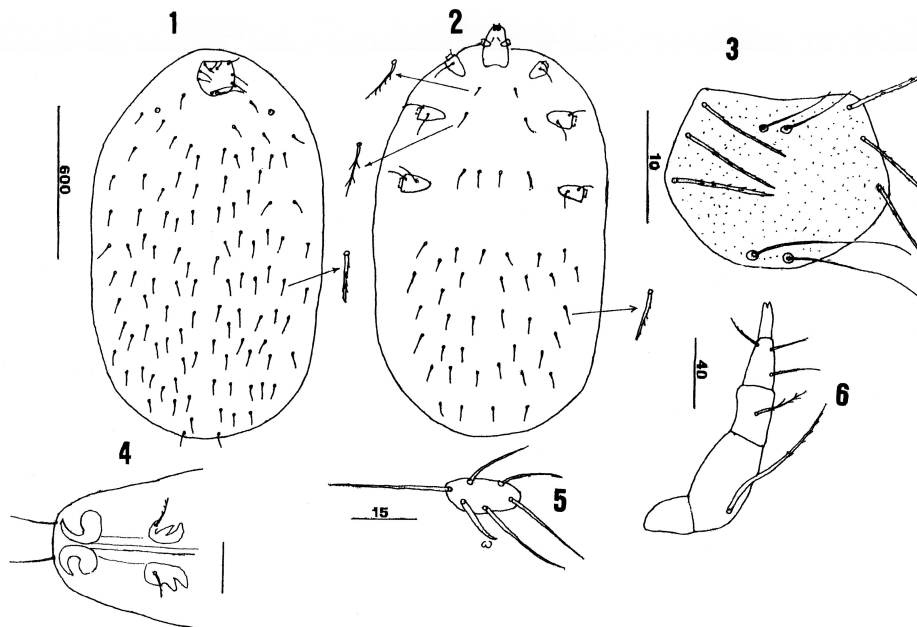
Table 1. Metric data for *Charletonia mehranensis* sp. n. H - holotype, P - paratypes.

| | H | P | P | P | | H | P | P | P |
|------|-------|-------|-------|-------|-------|-----|-----|-----|-----|
| IL | 1508 | 1074 | 990 | 1250 | 1b | 108 | 114 | 112 | - |
| IW | 897 | 698 | 787 | 908 | 2b* | 94 | 92 | 84 | 92 |
| AW | 96 | 90 | 92 | 90 | 2b** | 66 | 68 | 64 | 62 |
| MW | 112 | 110 | 108 | 110 | 3b* | 74 | 76 | 80 | 70 |
| PW | 128 | 122 | 128 | 132 | 3b** | 62 | - | 64 | 62 |
| AA | 14 | 14 | 13 | 16 | TaI | 206 | - | 220 | 234 |
| SB | 24 | 22 | 24 | 24 | TiI | 296 | - | 304 | 310 |
| LN | 14 | 18 | 20 | 32 | GeI | 218 | - | 234 | 226 |
| ASBa | 38 | 26 | 40 | 42 | TfI | 136 | - | 136 | 132 |
| ISD | 76 | - | 84 | 64 | BfI | 142 | - | 152 | 150 |
| L | 116 | 92 | 126 | 98 | TrI | 62 | - | 64 | 68 |
| W | 140 | 120 | 136 | - | CxI | 86 | - | 78 | 74 |
| AAS | 46 | 42 | 44 | 36 | TaII | 204 | 206 | 196 | 216 |
| AP | 54 | 50 | 56 | 56 | TiII | 258 | 274 | 268 | 272 |
| AL | 72 | 84 | 80 | 76 | GeII | 192 | 198 | 202 | 200 |
| ML | 70 | 76 | 74 | 70 | TfII | 116 | 120 | 134 | 124 |
| PL | 60 | 70 | 70 | 58 | BfII | 124 | 124 | 130 | 134 |
| AM | 54 | 76 | 64 | 74 | TrII | 66 | 66 | 62 | 66 |
| S | 106 | 94 | 118 | 104 | CxII | 92 | 86 | 92 | 84 |
| DS | 44-68 | 44-58 | 52-62 | 46-72 | TaIII | 222 | - | 230 | 236 |
| Oc | 28 | - | 32 | 32 | TiIII | 374 | 378 | 386 | 380 |
| GL | 180 | 160 | 176 | 178 | GeIII | 228 | 236 | 232 | 222 |
| 1a | 52 | 60 | 56 | 52 | TfIII | 176 | 174 | 174 | 166 |
| 2a | 72 | 78 | 80 | 76 | BfIII | 152 | 148 | 160 | 154 |
| scI | 34 | - | 32 | 40 | TrIII | 76 | 66 | 70 | 72 |
| PsFd | 86 | 110 | 100 | 104 | CxIII | 100 | 90 | 92 | 88 |
| PsGd | 38 | 28 | 40 | 32 | | | | | |

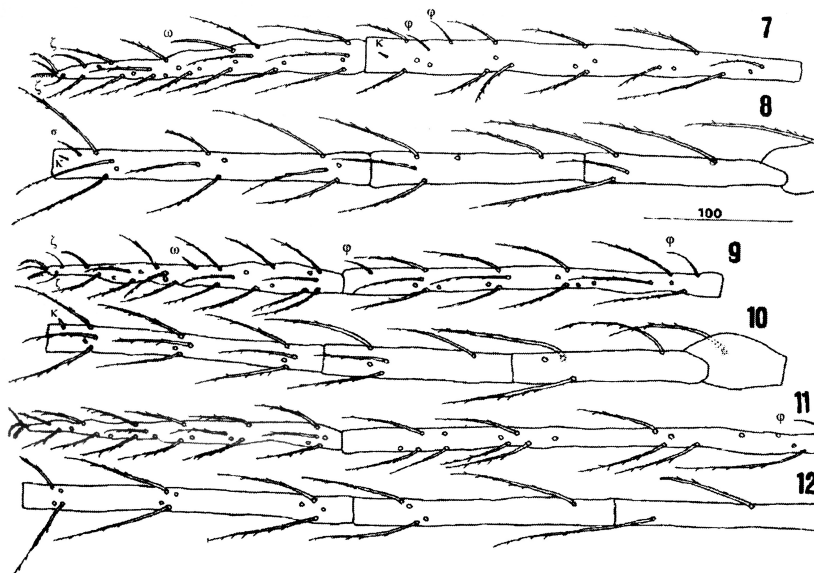
*proximal seta, ** distal seta.

Type material

Holotype larva, Iran, Mehran (33°7'N, 46°9'E), from *Anacridium aegyptium* (Orthoptera), leg. A. Saboori (August 1993). Paratypes: 3 larvae, Iran, Varamin (35°19'N, 51°39'E), 1000 m asl, from undetermined Orthoptera, leg. J. S. Karimi (26 August 1996).



Figs 1-6. *Charletonia mehranensis* sp. n. 1 - idiosoma, dorsal view, 2 - idiosoma and gnathosoma, ventral view, 3 - scutum, 4 - fragment of gnathosoma, ventral view, 5 - palptarsus, 6 - palp.



Figs 7-12. *Charletonia mehranensis* sp. n. 7 - leg I, tarsus - tibia, 8 leg I, genu - trochanter, 9 - leg II, tarsus - tibia, 10 genu - trochanter, 11 leg III, tarsus - tibia, 12 leg III, genu - basifemur.

Etymology

Named according the place where the holotype was collected.

Remarks

C. mehranensis sp. n. has very long TiIII (375-386). Among other *Charletonia* also *C. ishii* SOUTHOTT, 1991 from Japan have comparably long TiIII (355-387) and somewhat shorter TiIII (302-360) stated also in *C. volzi* (OUDEMANS 1910) from New Guinea, Indonesia, Cambodja, Myanmar, Laos, Malaysia, Sri Lanka, Thailand, Vietnam and India (OUDEMANS 1910, SOUTHOTT 1991, HAITLINGER 2004b, in press). This new species differs from *C. ishii* in longer AW (90-96 vs 78-82), MW (108-112 vs 96-98), PW (122-132 vs 105-111), ML (70-76 vs 41-55) and shorter S (94-118 vs 130-135) and from *C. volzi* in longer AW (90-96 vs 71-84), MW (108-112 vs 85-100), PW (122-132 vs 100-110), W (120-140 vs 108-124) and TaI (206-234 vs 178-200).

Charletonia ahwazensis sp. n.

(Figs 13-19)

Diagnosis

More than four setae between coxae II and III, ML placed near PL, fnBf 4-4-2, AW 82-84, ML 36-42, TaI 11-120.

Description

Dorsum with ~94 slightly barbed setae. One eye on each side. Dorsal scutum punctate, with anterior border slightly concave; posterior border rounded. Three pairs of slightly barbed scutalae; MW placed near PL; ML<AL<PL. Sensillae AM and S both smooth (Fig. 13).

Ventral side of idiosoma with 2 sternalae 1a, 4 sternalae 2a and 16 setae between coxae II and III; only sternalae 1a are slightly barbed. Behind coxae III ~50 nude setae pointed on their tip. Coxalae 1b somewhat longer than the remaining ones; these setae and proximal coxalae II and III, all are nude; distal coxalae II and III are slightly barbed (Fig. 14). Gnathosoma with nude hypostomalae and galealae. Palpfemorala and palpgenuala each with setules. Palptibia with 2 smooth and one weakly setulose setae (Fig. 15). Palptarsus with 7 setae (one seta damaged), all nude (Fig. 16).

Leg lengths: I 568 holotype, 538 paratype, II 544, 510, III 622, 596. Ip=1734 holotype, 1644 paratype.

Leg setal formula. Leg I: Ta 1 ω , 2 ζ , 25B; Ti 2 ϕ , 1 κ , 17B; Ge 1 σ , 12B; Tf 5B; Bf 4B; Tr 1B; Cx 1B (Fig. 17).

Leg II: Ta 1 ω , 2 ζ , 25B; Ti 2 ϕ , 17B; Ge 1 κ , 12B; Tf 5B; Bf 4B; Tr 1B; Cx 2B (Fig. 18).

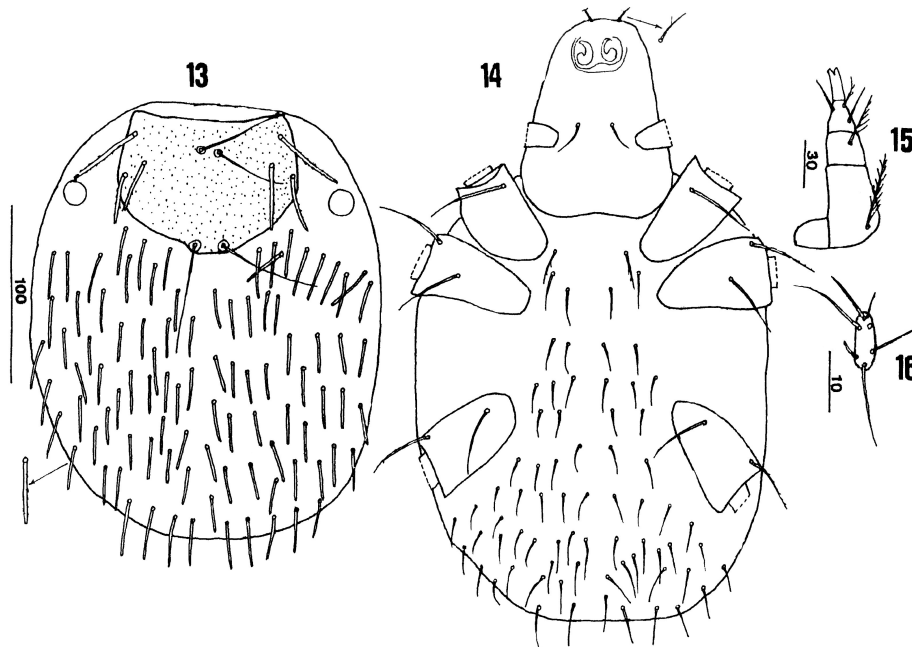
Leg III: Ta 23B; Ti 1 ϕ , 18B; Ge 12B; Tf 5B; Bf 2B; Tr 1B; Cx 2B (Fig. 19).

For measurements see Table 2.

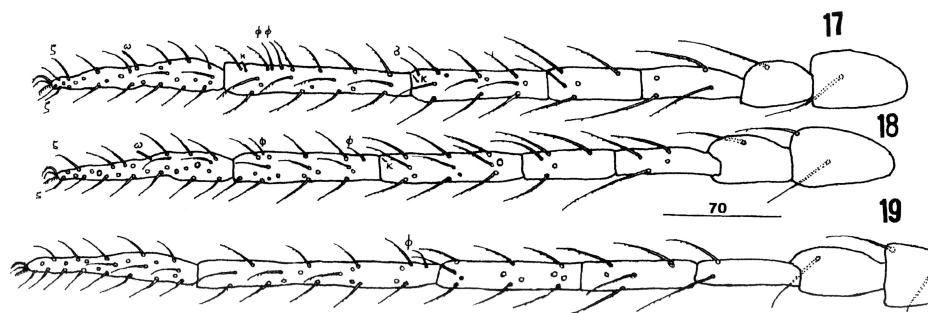
Table 2. Metric data for *Charletonia ahwazensis* sp. n. H - holotype, P - paratype.

| | H | P | | H | P |
|------|----------|----------|-------|----------|----------|
| IL | 241 | 254 | 1b | 52 | 52 |
| IW | 209 | 236 | 2b* | 40 | 40 |
| AW | 84 | 82 | 2B** | 40 | 44 |
| MW | 74 | 72 | 3b* | 30 | 28 |
| PW | 104 | 100 | 3b** | 32 | 46 |
| AA | 10 | 12 | TaI | 120 | 110 |
| SB | 18 | 16 | TiI | 110 | 112 |
| LN | 8 | 12 | GeI | 92 | 88 |
| ASBa | 26 | - | TfI | 64 | 60 |
| ISD | 44 | 50 | BfI | 78 | 66 |
| L | 82 | 84 | TrI | 46 | 40 |
| W | 114 | 106 | CxI | 58 | 62 |
| AAS | 44 | 38 | TaII | 122 | 112 |
| AP | 26 | 28 | TiII | 100 | 90 |
| AL | 48 | 48 | GeII | 92 | 88 |
| ML | 42 | 36 | TfII | 56 | 56 |
| PL | 40 | 32 | BfII | 70 | 60 |
| AM | 40 | 50 | TrII | 48 | 42 |
| S | 62 | 76 | CxII | 56 | 62 |
| DS | 32-40 | 26-38 | TaIII | 124 | 124 |
| Oc | 26 | 20 | TiIII | 154 | 144 |
| GL | 104 | 114 | GeIII | 92 | 104 |
| 1a | 30 | 26 | TfIII | 66 | 64 |
| 2a | - | 32 | BfIII | 74 | 70 |
| scI | 26 | 30 | TrIII | 48 | 48 |
| PsFd | 52 | 46 | CxIII | 64 | 62 |
| PsGd | 24 | 28 | | | |

*proximal seta, **distal seta



Figs. 13-16. *Charletonia ahwazensis* sp. n. 13 - idiosoma, dorsal view, 14 - idiosoma and gnathosoma, ventral view, 15 - palp, 16 - palptarsus.



Figs 13-16. *Charletonia ahwazensis* sp. n. 13 - idiosoma, dorsal view, 14 - idiosoma and gnathosoma, ventral view, 15 - palp, 16 - palptarsus.

Type material

Holotype larva, Iran, Ahwaz (31°20'N, 48°40'E), from undetermined Orthoptera, leg. TAGHAVI (9 May 1995). Paratype: 1 larva, Iran, Karaj (35°19'N, 50°54'E), 1312 m asl, from undetermined Orthoptera, leg. MOHSEN MOFIDI (May 1996).

Etymology

Named after the place where the holotype was collected.

Remarks

C. ahwazensis sp. n. belongs to the group species with ML placed near PL and with number of setae between coxae II and III more than four. To this group belong *C. jaegerskjoeldi* (Trägårdh, 1904) known from Egypt (Sinai) and *C. shiroyama* YAITA, KATO, TORIYAMA 1961 known from Japan, Malaysia, Australia and Cambodia (TRÄGÅRDH 1904, SOUTHCOTT 1966, HAITLINGER 2004b). This new species differs from *C. jaegerskjoeldi* in shorter AW (82-84 vs 96), S (62-76 vs 102), Ip (1664-1734 vs 1999), longer AM (40-50 vs 34), ML (36-42 vs 26), number of setae between coxae I-III (16 vs 10), fV (~50 vs ~30), nude AM and sc1 and setae on palptibia (2N, 1B vs 3N); from *C. shiroyama* it differs in longer L (82-84 vs 65), W (106-114 vs 96), TaI (110-120 vs 82), TiI (110-112 vs 73) and TiIII (144-154 vs 98).

Charletonia krendowskyi (FEIDER, 1954)

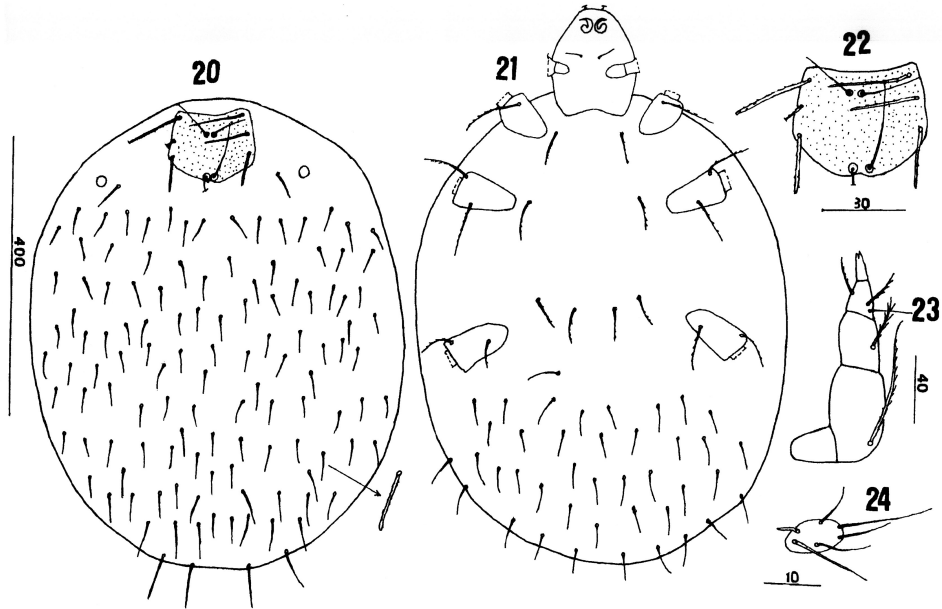
(Figs 20-30)

This species was known from Romania, Bulgaria, Croatia and Greece (FEIDER, 1954, BERON 1975, HAITLINGER 2003, 2004a). At present, from Iran were obtained: 1 ♀, Tabriz, from *Chrysops* sp. (Diptera: Simuliidae), 6.VIII.1993. Coll. Fathipour; 4 ♀, Karaj, from undetermined Orthoptera, 16.VII.1997. Coll. A. Saboori. New for the fauna of Iran. Figures of this species given by FEIDER (1954), BERON (1975) and SOUTHCOTT (1966) are incomplete and dimensions were based on not many specimens. Therefore, in this paper figures and measurements for *C. krendowskyi* are given (Table 3).

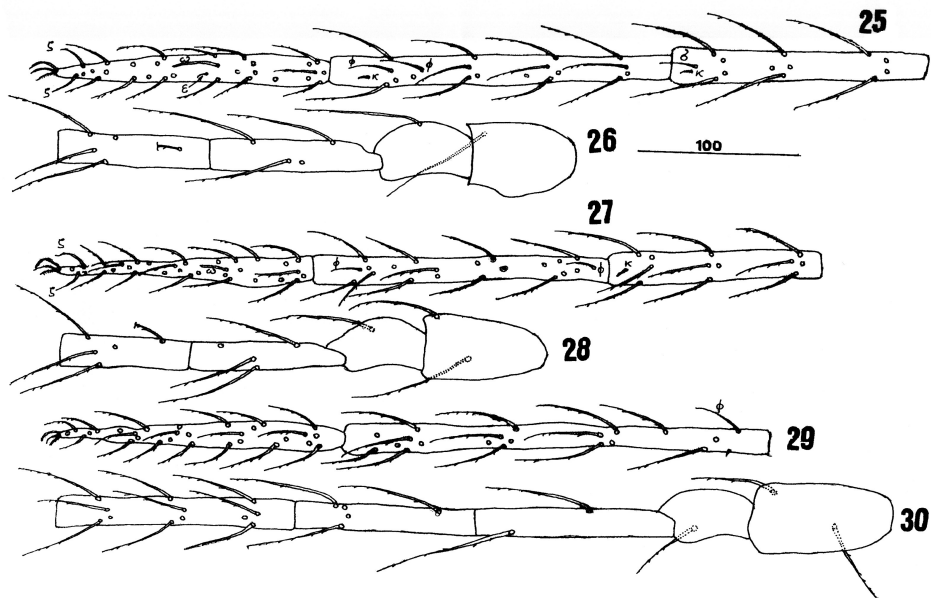
Table 3. Metric data for *Charletonia krendowskyi* (FEIDER, 1954). Specimens from Romania (1)***, Bulgaria (2), Rhodes (3), Iran (4).

| | 1 | 2 | 3 | 4 | | 1 | 2 | 3 | 4 |
|------|----------|----------|----------|----------|-------|----------|----------|----------|----------|
| IL | - | - | 686 | 647-1333 | 1b | - | - | 76 | 84-100 |
| IW | - | - | 413 | 444-1111 | 2b* | - | - | - | 64-82 |
| AW | 80-91 | 83-90 | 92 | 82-94 | 2b** | - | - | 60 | 56-60 |
| MW | 99-106 | 95-105 | 102 | 94-100 | 3b* | - | - | - | 54-64 |
| PW | 104-122 | 115-125 | 122 | 108-124 | 3b** | - | - | 62 | 54-60 |
| AA | 10-13 | - | 12 | 10-12 | TaI | 178 | 170-182 | 182 | 164-184 |
| SB | 15-22 | 18-20 | 26 | 18-22 | TiI | 199 | 197-215 | 218 | 204-232 |
| LN | - | - | - | 12-16 | GeI | 163 | 155-170 | 166 | 150-174 |
| ASBa | 22-33 | 15-18 | - | 22-30 | TfI | 91 | - | 100 | 92-108 |
| ISD | 67-73 | 71-73 | 70 | 54-74 | BfI | 107 | - | 108 | 100-122 |
| L | 103-110 | 108-113 | 106 | 88-112 | TrI | - | - | 56 | 52-64 |
| W | 106-129 | 118-135 | 132 | 116-128 | CxI | - | - | 64 | 62-84 |
| AAS | - | - | - | 34-42 | TaII | 166 | 158-173 | 174 | 154-184 |
| AP | 54-58 | 58-61 | 50 | 44-54 | TiII | 184 | 185-192 | 196 | 174-206 |
| AL | 54-69 | 60-75 | 68 | 60-78 | GeII | 145 | 130-143 | 142 | 126-154 |
| ML | 53-58 | 60-70 | 68 | 48-62 | TfII | 87 | - | 84 | 78-94 |
| PL | 47-53 | 55-63 | 62 | 46-60 | BfII | 101 | - | 104 | 92-110 |
| AM | 54-60 | 50-61 | 60 | 48-60 | TrII | 54 | - | 62 | 52-64 |
| S | 76-91 | 85-90 | 86 | 74-88 | CxII | 76 | - | 74 | 78-86 |
| DS | 29-58 | - | 40-60 | 36-66 | TaIII | 181 | 170-190 | 184 | 172-202 |
| Oc | - | - | - | 22 | TiIII | 260 | 263-290 | 284 | 260-304 |
| GL | - | - | 174 | 152-172 | GeIII | 163 | 155-165 | 170 | 142-182 |
| 1a | - | - | 50 | 40-50 | TfIII | 116 | - | 128 | 104-134 |
| 2a | - | - | 70 | 50-70 | BfIII | 108 | - | 112 | 114-130 |
| sc1 | - | - | 40 | 22-38 | TrIII | 62 | - | 74 | 62-68 |
| PsFd | - | - | 82 | 66-82 | CxIII | 76 | - | 90 | 82-90 |
| PsGd | - | - | 34 | 28-40 | | | | | |

* proximal seta, ** distal seta, *** after FEIDER (1954) and SOUTHCOTT (1966).



Figs 20-24. *Charletonia krendowskyi* (Feider) 20 - idiosoma, dorsal view, 21 - idiosoma and gnathosoma, ventral view, 22 - scutum, 23 - palp, 24 - palptarsus.



Figs 25-30. *Charletonia krendowskyi* (Feider) 25 - leg I, tarsus - genu, 26 - leg I, telofemur - coxa, 27 - leg II, tarsus - genu, 28 - leg II, telofemur - coxa, 29 - leg III, tarsus - tibia, 30 - leg III, genu - coxa.

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