

Archaeoroncus, a New Genus of Pseudoscorpions from Croatia (Pseudoscorpiones: Neobisiidae), with Descriptions of Two New Species

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Abstract: The accessible neobisiid pseudoscorpions, assigned to the genus *Roncus* L. Koch, 1873 which is distributed in Croatia (Dalmatia), have been revised. The type material previously described, along with undetermined species from different regions of that country, has been reexamined.

The occurrence of a new genus and two species previously unknown from Croatia has been proved. All are newly described. The new genus and species are as follows: *Archaeoroncus salix* n. sp. and *A. aspalathos* n. sp. Ecological and available zoogeographical information on the taxa described is briefly discussed. The presence of new genus, *Archaeoroncus* n. g., formerly reported from this region (but under the name of *Roncus* L. Koch) has been confirmed and the occurrence of another two species previously known from Croatia has been proved.

A key to genera and illustrations of diagnostic characters of a new genus and species are provided.

Key words: Pseudoscorpiones, Neobisiidae, *Archaeoroncus* n. g., *Archaeoroncus salix* n. sp., *Archaeoroncus aspalathos* n. sp., *Archaeoroncus tenuis* (Hadži), *Archaeoroncus dalmatinus* (Hadži), endemism, Croatia, Balkan Peninsula

Introduction

A number of pseudoscorpion species occurring in Croatia has been included, at one time or another in the genus *Roncus* L. Koch, 1873 which is restricted to Eastern United States, Europe and Southwestern Asia (Ćurčić, 1972, 1988; Ćurčić *et al.*, 1992, 1993, 2004, 2010a, b, c, d, e, f, g; 2011a, b, c, d, e, f, g, h; Hadži, 1937). These records would pose an interesting biogeographical problem if the species were correctly placed. However, as is shown below, they belong to different new taxa.

Although new forms of pseudoscorpions are still being described, taxonomic and phylogenetic studies of higher categories have, in general, lagged far behind description of species. This study of genus *Roncus* in the Mediterranean (Croatia) was undertaken to add to knowledge of the taxonomy and

to present a better understanding of the systematic positions of the species in the light of modern concepts of higher taxa. Taxonomic investigations were carried out by studying, in types and type series, the variation of morphological characters, and especially of those with higher taxonomic weight. This has resulted in appearance in the synonymy in the previously accepted name and in the description of one new genus and two species of this *Roncus* related genus new to science.

Apart of *Archaeoroncus salix* n. sp. and *A. aspalathos* n. sp., the species removed from *Roncus* and transferred to the new genus comprise the former *Roncus tenuis* and *R. dalmatinus*, both from Dalmatia. Representatives of this group are also characterized by conspicuous features which are not

shared by the species of the abovementioned genus. These outstanding differences appear to be great enough to allow separation at generic level of these pseudoscorpions, for which the name *Archaeoroncus*, new genus, is proposed.

Anatomical evidence has played role in the determination of generic limits particularly with regard to the identification of the probable synapomorphic character of species.

Thus, the purposes of this paper are: (i) to demonstrate the outstanding heterogeneity of 'Roncus' in the Mediterranean (Croatia), (ii) to offer evidence supporting the view that the newly established taxa are morphologically and specifically distinct, (iii) to present objective criteria for the identification of specimens of some Croatian species of 'Roncus', and to analyze their geographical distribution in South Europe, which hosts some more *Roncus*-related genera to be described elsewhere.

Setal designations follow BEIER (1963).

Family Neobisiidae Chamberlin, 1930

Genus *Archaeoroncus* B. Ćurčić & Rađa, 2012

Type Species: *Archaeoroncus salix* n. sp. B. Ćurčić & Rađa, 2012

Etymology. The new genus has been named after its probable primitive state (in Latin *archaeo* means primitive or ancient); *Archaeoroncus salix* n. sp. is derived from the Latin *salix* (Latin name for vrba) and *A. aspalathos* n. sp. has been named after Greek name of Split, otherwise close to its type locality.

Material examined. *Archaeoroncus salix* n. sp., holotype male and paratype male, from the village Vrba near Split, Croatia, 15 July 2011, collected by Tonći Rađa; *A. aspalathos* n. sp., holotype male, from Kotlenice, Vladovići, near Split, Croatia, 17 July 2011, collected by Tonći Rađa; *Roncus tenuis* Hadži, lectotype (1929) male and paralectotype (1927) female, under stones, village Malinska, Island of Krk, Croatia (Dalmatia), collected by Jovan Hadži; *Roncus dalmatinus* Hadži, lectotype male and paralectotype male from Mt. Marjan (Meje), nr. Split, in the vicinity of the pension 'Split', 28 March – 14 April 1927, collected by Jovan Hadži.

The genus was established to accommodate four species of Croatian pseudoscorpions previously undescribed or included in the complex of *Roncus* by Hadži (ĆURČIĆ *et al.* 1992). In the present treatment, these species are allocated to the new genus, two of which are new to science. The remaining two

species were erected by HADŽI (1933) and erroneously placed in *Roncus*.

***Archaeoroncus salix* n. sp. B. Ćurčić & Rađa, new species**

(Fig. 1-7, Table 1)

Etymology. In Latin, *salix* is the name of willow or Vrba – the type locality of this taxon.

Material examined. Holotype male and paratype male, from the village Vrba, near Split, Croatia, 15 July 2011, collected by Tonći Rađa. Species previously unnamed.

Description. Epsitome small and apically rounded; carapace longer than broad (Table 1); two eyes, with prominent lenses. Setal formula of carapace: 4 + 7 + 11 + 7 = 29 and 4 + 6 + 8 + 9 = 27 setae.

Tergites I – X with 8 – 10 – 10 – 10 – 10 – 11 – 11 – 10 – 10 – 9 setae. Male genital area: sternite II with a group of 14 setae and 3 small setae on either side of the middle, sternite III with 5 anterior and 11 posterior setae. Sternite IV with 7 posterior setae, sternite V – X with 11 – 12 – 12 – 11 – 11 – 10 setae. Stigmatic plates with 3 microsetae each. Female genital area: unknown. Tergites and sternites uniseriate. Pleural membranes granulostrate.

Galea is low hyaline tubercle (Fig. 2). Fixed cheliceral finger with 12-13, movable finger with 11 teeth. Fixed cheliceral finger with six setae, movable finger with one seta. Flagellum of eight blades, three proximal blades broken (Fig. 4).

Apex of pedal coxa with 4 long and acute setae. Pedipalpal trochanter with a small tubercle; femur and chelal palm granulate. Apart from tiny granulations, pedipalpal femur with two interior and basal large tubercles, characteristics of the new genus (Fig. 1). Fixed chelal finger with 51-57 contiguous teeth, movable finger with 45 – 46 teeth. Chelal finger longer than chelal palm (Fig. 3, Table 1).

Trichobothrial pattern as in Fig. 3.

Pedal tactile setae of leg IV as in Fig. 5 and Table 1.

Morphometric ratios and linear measurements are given in Table 1.

Diagnosis. *Archaeoroncus salix* n. sp. is distinguished from *A. aspalathos* n. sp. in abdominal chaetotaxy, in the form of the pedipalps, in the number of teeth on the pedipalpal chela, as well as in many morphometric ratios and linear measurements.

Distribution. Croatia (Dalmatia), under stones.

***Archaeoroncus aspalathos* n. sp. B. Ćurčić & Rađa, new species**

(Fig. 8–14, Table 1)

Etymology. After Aspálathos, the Greek settlement near Split.

Material examined. Holotype male, from Kotlenice, Vladovići, near Split, Croatia, 17 July 2011, collected by Tonći Rađa. Species previously unnamed.

Description. Epistome small and knob-like; carapace longer than broad (Fig. 11, Table 1); two eyes, with slightly flattened lenses. Carapacial setal formula: $4 + 6 + 6 + 8 = 24$ setae.

Tergite I with 9, tergites II – X each with 13 – 11 – 11 – 14 – 11 – 11 – 11 – 11 – 10 setae. Male genital area: sternite II with a group of 20 setae, sternite III with 5 anterior and 12 posterior setae, and with 3 suprastigmal microsetae on either side. Sternite IV with 10 posterior setae and 3 microsetae on either side (Fig. 10). Tergites and sternites V – X uniseriate. Cheliceral galea almost invisible (Fig. 14). Fixed cheliceral finger with six, movable finger with one seta. Flagellum composed of eight blades (Fig. 12).

Manducatory process with 4 long and acute setae. Pedipalpal trochanter smooth with a minute tubercle. Femur and chelal palm granulate (Fig. 9). Pedipalpal femur with minute granulations and two large tubercles anteriorly and basally (characteristic of the new genus). Fixed chelal finger with 51 teeth, movable finger with 44 close-set teeth. Chelal fingers longer than chelal palm (Table 1).

Number and disposition of trichobothria as in Fig. 8.

Pedal tactile setae of leg IV as in Fig. 13 and Table 1.

Linear measurements and morphometric ratios are presented in Table 1.

Diagnosis. *Archaeoroncus aspalathos* n. sp. is distinguished from *A. salix* n. sp. by the carapacial chaetotaxy, the form of the pedipalps, abdominal setation, and many morphometric ratios and linear measurements (Table 1).

Distribution. Croatia (Dalmatia), under stones.

***Archaeoroncus tenuis* Hadži, new status**

(Fig. 31–44, Table 3; HADŽI, 1933)

Roncus (Roncus) lubricus tenuis Hadži, 1933

Roncus tenuis Čurčić, 1992

Material examined. The type series consists of two specimens (one of each sex); neither of these was designated as the holotype by HADŽI (1933). Therefore, ČURČIĆ *et al.* (1992) designated the syntype male as the lectotype and a syntype female as the paralectotype. The lectotype is mounted on a

slide with a label ‘*Roncus*, ♂, Malinska, 1929’. The paralectotype is mounted on a separate slide and labeled ‘*Roncus*, ♀, 17 April 1927, under stone, Malinska’. This locality is situated on the Island of Krk, in the Northern Adriatic region, Dalmatia (Croatia).

Description. Epistome only slightly triangular or tubercular; with two eyes. Carapace slightly longer than broad (Table 1). Setal formulae: $4 + 6 + 2 + 4 + 2 + 6 = 24$ and $4 + 6 + 4 + 2 + 6 = 22$ setae. Male genital area: sternite II with 18 median and posterior setae; sternite III with 3 or 4 microsetae on each side, 3 anterior and median setae and a transverse row of 10 setae. Female genital area: sternite II with 7 small median and posterior setae of irregular distribution. Sternite III with 9 posterior setae and 3 microsetae along each stigma.

Cheliceral spinneret low and flattened, but somewhat more prominent in female than in male. Fixed cheliceral finger with six, movable cheliceral finger with one seta. Flagellum with one short proximal blade and seven to eight longer blades distally.

Apex of pedipalpal coxa with 4 (in lectotype) and 3–4 setae (in paralectotype). Pedipalpal femur and chelal palm granulated, and pedipalpal femur with one one large interolateral tubercle basally. Other pedipalpal articles smooth. Fixed chelal finger with 52–54 teeth and movable finger with 55–56 teeth. A single tubercle on the laterodistal side of the chelal palm evident.

Disposition of trichobothria are presented in Fig. 37 and 41 (HADŽI, 1933).

Tibia IV, basitarsus IV, and tarsus IV each with a single tactile seta. Tactile seta ratios are presented in Table 1.

Morphometric ratios and linear measurements are presented in Table 1.

Diagnosis. *Archaeoroncus tenuis* is easily distinguished from *A. dalmatinus* in a number of linear measurements and morphometric ratios (Table 1), by the setation of carapace and abdominal sternites, by the form and number of large tubercles of pedipalpal femur and chelal palm, by the form of pedipalpal articles (HADŽI, 1933) and by chelal denticulation.

Distribution. Malinska, Island of Krk, Croatia (Dalmatia).

***Archaeoroncus dalmatinus* Hadži, new status**

(Fig. 42–50, Table 3, Hadži, 1933)

Roncus (Roncus) lubricus dalmatinus Hadži, 1933

Roncus dalmatinus Ćurčić, 1992

Material examined. According to Hadži (1933), the type series of this taxon consists of 'specimens' collected in Omišalj, on the Island of Krk, and in Split (Meje), both in Croatia. We have studied two males from the type series, both from Split, Mt. Marjan (Meje). These specimens are the only available syntypes. They are both mounted on a slide labeled 'Obisium (*Roncus*) *lubricus*, Split – Marjan, in the vicinity of the pension 'Split', Meje, 28. 3. – 14. 4. 1927'. The other type specimen, if any, seem to be lost and damaged. Therefore, we hereby, designate the male specimen labeled '1' as the lectotype and the male labeled '2' as the paralectotype of this taxon.

Description. Epistome triangular and pointed. Eyes small and with somewhat flattened lenses. Setal formulae: $4 + 6 + 2 + 4 + 2 + 7 = 25$ and $4 + 6 + 2 + 4 + 2 + 8 = 26$ setae. Carpace longer than broad (Table 1).

Tergite I with 6-10 setae, the following tergites (II-X) each with 10-13 setae (mostly 11). Male genital area: sternite II with 15-17 median and posterior setae; of these, 10 longer setae along posterior sternal margin and the remainder median and posterior, thinning out anteriorly. Sternite III with 3 small setae along each stigma, 3-5 anterior and median setae, and 9-10 posterior setae. Sternite IV with 10 posterior setae and 3 small setae along each stigmatic plate. Female genital area: unknown. Pleural membranes granulostriolate. In males, sternites IV-X each with 12-15 setae.

Cheliceral spinneret low and flattened. Fixed cheliceral finger with 18 and movable finger with 15 small teeth. Flagellum of eight or nine blades with one or two short proximal blades and seven longer blades distally.

Apex of pedipalpal coxa (manducatory process) with 4 long setae. Pedipalpal trochanter with a small tubercle. Pedipalpal femur with two interior and basal prominent tubercles; surface of this podomere granulated interiorly and dorsally. Pedal tibia elongated and tulip-shaped, with few inconspicuous granulations interiorly and distally; chelal palm with some interior and exterior granulations distally. Fixed cheliceral finger with 66-66 small teeth, and movable chelal finger with 60-62 teeth.

Disposition of trichobothria as in Fig. 45 (HADŽI 1933, ĆURČIĆ *et al.*, 1992).

Tibia IV, basitarsus IV and tarsus IV each with a single tactile seta; tactile seta ratios as in Table 3 (ĆURČIĆ *et al.*, 1992).

Morphometric ratios and linear measurements are presented in Table 1.

Diagnosis. The distinctions between *Archaeoroncus dalmatinus* and its other congeners are manifested in the form of the epistome, in the proportions of carpace and appendages, in the setation of carapace and abdomen, in the form of the pedipalpal articles, in the number and position of sclerotic knobs of the interobasal parts of the pedipalpal femur, as well as in some morphometric ratios and linear measurements.

Distribution. According to HADŽI (1933), this taxon lives on the Island of Krk and Mt. Marjan (Meje) near Split, Dalmatia (Croatia). However, the available type material at our disposal comes from the vicinity of Split only. Therefore, this species is known from Middle Dalmatia only, although it may be widespread on some Adriatic islands.

According to some diagnostic characters, it can be assumed that *A. salix*, *A. aspalathos*, *A. tenuis*, and *A. dalmatinus* pertain to the same species group, which is clearly distinct from the type species of *Roncus*, *R. lubricus* (L. Koch) and its allies.

Distinctions between *Roncus lubricus* and *Roncus*-related taxa of *Archaeoroncus*

1. Two microsetae present proximal to *eb* and *esb* .
..... *Roncus lubricus*
- Two microsetae absent proximal to *eb* and *esb* ... 2
2. Pedipalpal femur with smaller granulations and one large sclerotic knob interiorly and basally.....
..... *Archaeoroncus tenuis*
- Pedipalpal femur with smaller granulations and two large sclerotic knobs interiorly and basally..... 3
3. Fixed cheliceral finger with 66-68 teeth
..... *A. dalmatinus*
- Fixed cheliceral finger with less than 60 teeth 4
4. Sternite II of the male with 14 median and posterior setae..... *A. salix*
- Sternite II of the male with 20 median and posterior setae..... *A. aspalathos*

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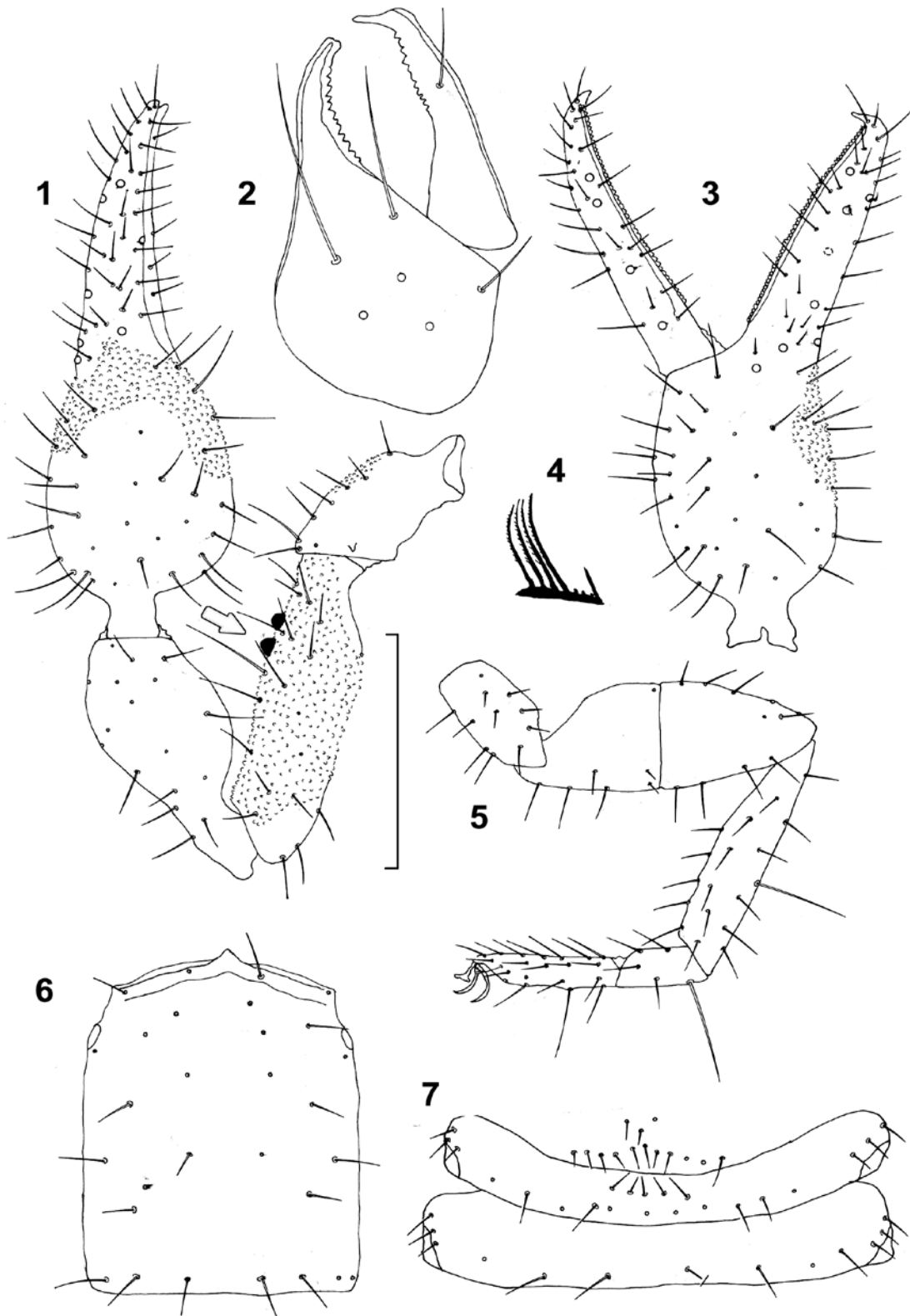


Fig. 1-7. *Archaeoroncus salix* n. sp., holotype male from the village Vrba, near Split, Croatia; 1 – pedipalp, 2 – chelera, 3 – pedipalpal chela, 4 – flagellum, 5 – leg IV, 6 – carapace, 7 – male genital area. Scale lines = 0.50 mm (Fig. 1, 3, 5, and 6) and 0.25 mm (Fig. 2, 4, and 7).

Table 1. Linear measurements (mm) and morphometric ratios in *Archaeoroncus salix* n. sp., *A. aspalathos* n. sp., *A. tenuis* (Hadži), and *A. dalmatinus* (Hadži) from Croatia. Abbreviations: M = male, F = female, MM = males.

	<i>A. salix</i> n. sp.	<i>A. aspalathos</i> n. sp.	<i>A. tenuis</i>		<i>A. dalmatinus</i>
Character	MM	M	M	F	MM
Body					
Length (1)	2.23-2.39	2.48	2.19	2.49	2.86-2.91
Cephalothorax					
Length (2)	0.69-0.72	0.67	0.61	0.67	0.85-0.87
Breadth (2a)	0.56-0.65	0.55	0.54	0.63	0.65-0.665
Ratio 2/2a	1.11-1.23	1.22	1.13	1.06	-
Abdomen					
Length	1.51-1.70	1.81	1.58	1.82	1.99-2.06
Chelicerae					
Length (3)	0.41-0.45	0.38	0.37	0.41	0.47-0.48
Breadth (4)	0.19-0.20	0.20	0.195	0.21	0.23-0.24
Length of movable finger (5)	0.275-0.295	0.275	0.25	0.29	0.31-0.32
Ratio 3/5	1.49-1.525	1.90	1.48	1.41	-
Ratio 3/4	2.16-2.25	1.38	1.90	1.95	-
Pedipalps					
Length with coxa (6)	3.41-3.46	3.28	3.21	3.28	4.31-4.375
Ratio 6/1	1.43-1.55	1.32	1.465	1.32	1.50-1.51
Length of coxa	0.53-0.54	0.52	0.50	0.51	0.65-0.73
Length of trochanter	0.42-0.43	0.41	0.39	0.39	0.51-0.555
Length of femur (7)	0.71-0.74	0.66	0.63	0.67	0.85-0.88
Breadth of femur (8)	0.20-0.21	0.21	0.195	0.21	0.255-0.26
Ratio 7/8	3.52-3.55	3.14	3.23	3.19	3.27-3.45
Ratio 7/2	1.03	0.985	1.03	1.00	0.98-1.035
Length of patella (tibia) (9)	0.54-0.59	0.55	0.54	0.55	0.74-0.75
Breadth of patella (tibia) (10)	0.25-0.275	0.26	0.24	0.25	0.34
Ratio 9/10	1.96-2.36	2.115	2.25	2.20	2.18-2.205
Length of chela (11)	1.15-1.22	1.14	1.15	1.16	1.48-1.54
Breadth of chela (12)	0.38-0.39	0.38	0.35	0.38	0.47-0.50
Ratio 11/12	3.03-3.13	3.00	3.285	3.05	2.96-3.28
Length of chelal palm (13)	0.53-0.60	0.54	0.57	0.58	0.74-0.78
Ratio 13/12	1.39-1.54	1.42	1.63	1.53	1.48-1.66
Length of chelal finger (14)	0.62	0.60	0.58	0.58	0.74-0.76
Ratio 14/13	1.03-1.17	1.11	1.02	1.00	0.97-1.00
Leg IV					
Total length	2.31-2.375	2.18	2.355	2.385	2.67
Length of coxa	0.36-0.37	0.33	0.38	0.39	0.45
Length of trochanter (15)	0.285	0.275	0.31	0.32	0.34
Breadth of trochanter (16)	0.13-0.14	0.13	0.15	0.15	0.15
Ratio 15/16	2.035-2.19	2.115	2.07	2.13	2.27
Length of femur + patella (17)	0.60-0.64	0.58	0.59	0.61	0.69
Breadth of femur + patella (18)	0.23	0.25	0.22	0.22	0.25
Ratio 17/18	2.61-2.78	2.32	2.68	2.77	2.76
Length of tibia (19)	0.55-0.56	0.52	0.55	0.545	0.63
Breadth of tibia (20)	0.10-0.12	0.09	0.11	0.11	0.14
Ratio 19/20	4.67-5.50	5.78	5.00	4.95	4.50
Length of metatarsus (21)	0.19-0.20	0.17	0.195	0.20	0.23
Breadth of metatarsus (22)	0.08-0.09	0.08	0.10	0.08	0.10
Ratio 21/22	2.22-2.375	2.125	1.95	2.50	2.30
Length of tarsus (23)	0.315-0.33	0.305	0.33	0.32	0.33
Breadth of tarsus (24)	0.07-0.08	0.08	0.07	0.08	0.08
Ratio 23/24	3.94-4.71	3.81	4.71	4.00	4.125
TS ratio – tibia IV	0.53-0.62	0.54	0.60	0.58	0.58
TS ratio – metatarsus IV	0.18-0.20	0.205	0.21	0.21	0.19
TS ratio – tarsus IV	0.32-0.34	0.33	0.33	0.30	0.35

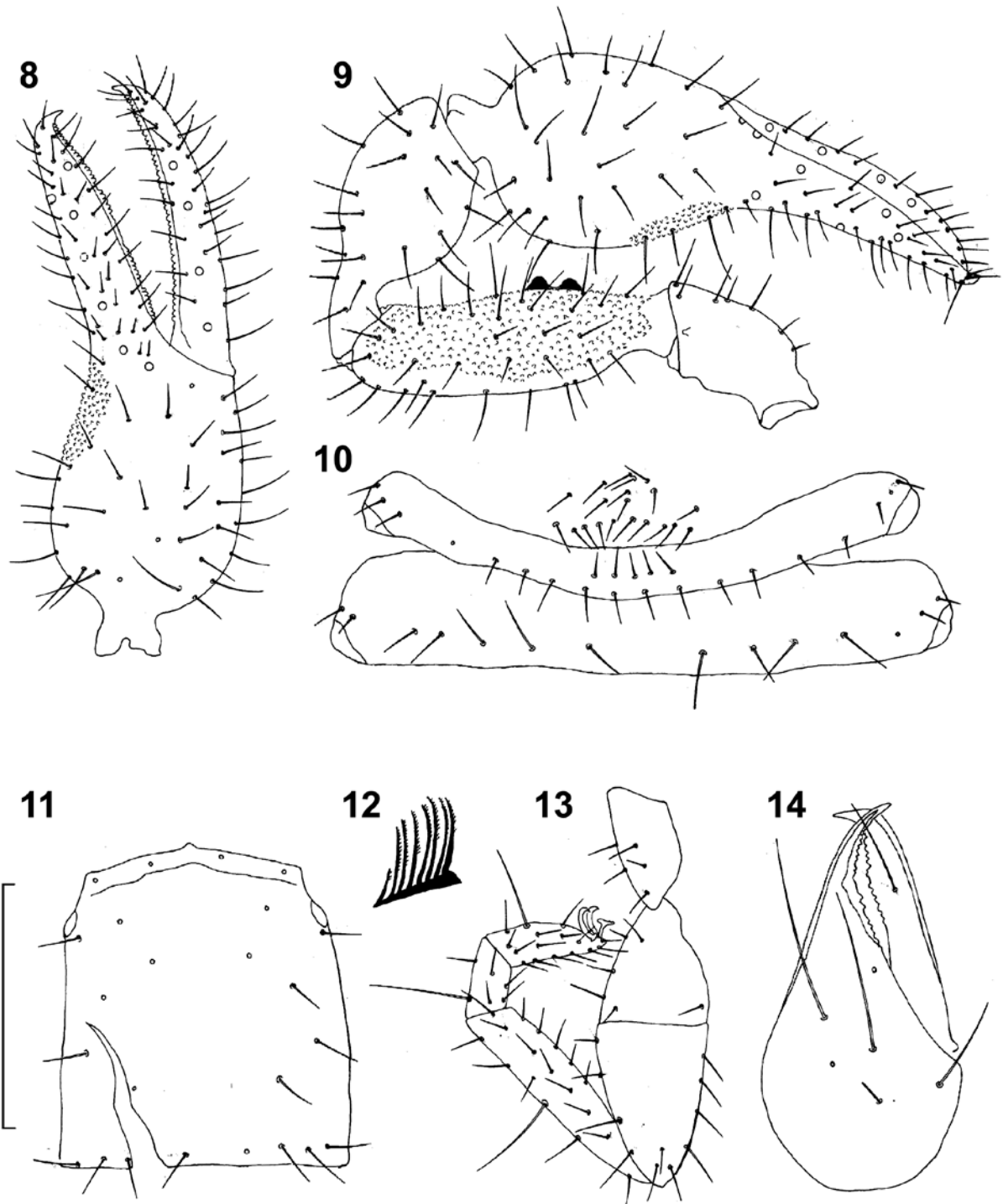


Fig. 8-14. *Archaeoroncus aspalathos* n. sp., holotype male from Kotlenice, Vladovići, near Split, Croatia. 8 – pedipalpal chela, 9 – pedipalp, 10 – male genital area, 11 – carapace, 12 – flagellum, 13 – leg IV, 14 – chelicera. Scale lines = 0.50 mm (Fig. 8, 9, 11, and 13) and 0.25 mm (Fig. 10, 12, and 13).

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