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New moss mite of the *Camisia* from western Nearctic region (*Acari*: *Oribatida*: *Camisiidae*)

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ABSTRACT. A new oribatid mite, *Camisia orthogonia* n. sp. is described on the basis of specimens found in the forest litter in western states of USA and British Columbia (Canada). Its assignment to any of the species groups hitherto distinguished within the genus is problematical.

Key words: acarology, taxonomy, *Oribatida*, *Camisia*, Nearctic region, morphology, new species.

INTRODUCTION

The majority of about 20 described species of oribatid mites of the genus *Camisia* live in the Holarctic and Neotropical regions; in the Oriental, Ethiopian and Australasian regions they appear to be poorly represented. Twelve species have been so far recorded from the Nearctic region - eight of them (*C. biurus*, *C. biverrucata*, *C. foveolata*, *C. horrida*, *C. lapponica*, *C. solhoeyi*, *C. segnis* and *C. spinifer*) are known also from the Palearctic, the distribution of four species (*C. carolli*, *C. presbytis*, *C. dictyna* and *C. oregonae*) is limited to the Nearctic region (MARSHALL et al. 1987, COLLOFF 1996). Below we present a description of a new species of *Camisia* found in forest litter in western USA. It is morphologically most similar to the common, mostly arboreal species *C. biurus* C.L. KOCH.

Camisia orthogonia n. sp.

DESCRIPTION

Adult (Figs 1-16):

Body length: 1190-1220 µm; maximum width: 490-540 µm (holotype: 1200x490 µm). Colour: light brown to brown. Body elongated, almost rectangular in shape, covered with cerotegument (sometimes with dirt and debris), usually without fragments of tritonymphal exuviae; all setae in sheaths.

Prodorsum (Figs 1-5)

Surface of prodorsum with paired swellings anterolateral to bothridia, bearing interlamellar apophyses and with central region delimited posteriorly by slightly curved contour. Rostrum rounded. Rostral setae (*ro*) short and smooth. Lamellar setae (*le*) long, curved, distinctly ciliate adaxially, covered with sheaths, set on large apophyses (Fig. 4); tips of apophyses distinctly exceed rostral margin. Interlamellar setae (*in*) long, curved anteriorly, with some short ciliae, set on apophyses much smaller than lamellar. Bothridia cylindrical; sensilli short, club-shaped, their tips covered with cerotegument (Fig. 5). Both exobothridial setae represented only by alveolar vestiges.

Notogaster (Figs 1-3, 6-9)

Notogaster rectangular in dorsal aspect, dorso-lateral margins slightly wavy. Surface colliculate, with individual rounded, slightly convex bumps about 3.5-8 µm wide. Central part with concave longitudinal belt running posteriorly from level of setae c_1, broadened posteriorly at level of opisthonotal glands; posterolateral parts between setae f_2 and h_2 with semicircular lobes. Notogastral setae, except h_2, short and smooth, covered with thin sheaths (Figs. 6-8); setae h_2 distinctly longer, with large barbs, situated on distinct apophyses (Fig. 9). Sete c_2 situated slightly closer to c_3 than to c_1; distance d_1-d_2 < d_2-e_2. Five pairs of lyrifissures (*ia*, *im*, *ip*, ih, ips) in position normal for genus.

Ventral region (Fig. 2)

Coxisternal pairs delineated medially by band of soft cuticle, broadened posteriorly. Coxisternal setation: 3-1-3-3. Number of genital setae: 12-13 pairs; number of anal setae: 3 pairs. Aggenital and adanal plates fused, narrow, bearing 2 and 3 pairs of setae, respectively.

Gnathosoma (Figs 10-12)

Subcapitulum stenarthric; genal setae (*a*) slightly shorter than mental setae (*h*). Three pairs of adoral setae, or_1 forked posteriorly, the other two pairs smooth. Palp setation (trochanter to tarsus): 0-1-1-2-7[1]. Both cheliceral setae ciliated, *cha* thicker than *chb*.

Legs (Figs 13-16)

Tarsi homotridactylous; lateral claws with isotropic dorsal fringe of hyaline teeth. Setation (legs I-IV, two legs of each studied); trochanters 1-1-4-1; femora 13-11-8-4; genua 5-5-3-4; tibiae 6-6-4-4-; tarsi (famulus included) 27-23-24-23. Solenidial formulae: (legs I-IV): genua 1-1-1-0; tibiae 1-1-1-1; tarsi 1-1-0-0.

Immatures (Figs 17, 18):

Measurements: larva 370-380 × 180-190 µm, protonymph 480-570 × 180-220 µm, deutonymph 650-880 × 240-330 µm, tritonymph 980-1110 × 330-450 µm. Colour whitish to light brown, darker where sclerotized. Prodorsum (Fig. 17) – Features generally similar to those of adult, except bothridium weakly developed in all immatures, with small, rod-shaped (in tritonymph distally slightly broadened) sensillus. Notogaster (Figs. 17, 18) – Cuticle irregularly striate. Larva with 13 pairs of notogastral setae (including f_1 and h_3), nymphs with 15 pairs of setae as in adults, with setae f_1 lost in the protonymph. All dorsal setae inserted on apophyses on which the largest, inserted on large posterior lobes, bear setae h_2. Setae d_1, d_2, e_1 and h_1 smoth, other setae barbed; all covered with thin sheaths.

MATERIAL EXAMINED

The holotype and 42 paratypes (9 adults and 33 immatures) were collected in: **USA**, **Washington State**, Ferry Co., Colville National Forest, Hwy. 20, 18.8 mi. W. of Kettle Falls., elev. 3700 ft., 27 IX 1976, ex: spruce litter, B.D. AINSCOUGH, col.

Other material: **USA**: **California**: Yuba Co. Challenge Exp. Forest, ca. 40 mi. NE Marysville, 12 May 1979, ex: litter in ponderosa pine forest, J. HOY, col. (2 specimens); Sanoma Co., 2 mi. N Kenwood, 3 IV 1981, ex: sifted redwood litter, D. CHANDLER, col. (1 specimen); Marin Co., Lily Gulch, W side Alpine Lake, 220 m, *Sequoia* semp. forest with *Acer* near pond, 37°57'N, 122°38'W; 06 XI 1993; WINKLER extraction; leaf & log litter; A. NEWTON & M. THAYER, col. (1 specimen);

Table 1. The characters distinguishing *Camisia biurus* C.L. KOCH and *C. orthogonia* n. sp.

Character	*C. biurus* C.L. KOCH	*C. orthogonia* n. sp.
Shape of rostrum	elongated	rounded
Length of setae c_3	shorter than c_1	as long as c_1
Location of setae h_3	ventral	lateral
Remains of tritonymphal posterior exuvium on notogaster	often present	absent
Shape of postero-lateral region of notogaster	without distinct semicircular lobes	with distinct semicircular lobes
Length of genal setae (*a*)	about half length of mental setae (*m*)	only slightly shorter than mental setae (*m*)
Length of setae d_1 and d_2 in immatures	setae d_1 and d_2 almost as long as e_1	setae d_1 and d_2 distinctly longer than e_1

Monterey Co., Palo Colorado Road, 2.5 mi WNW Bottchers Gap, Turner Creek, ca. 450m, redwood-oak-maple forest, 36°22.4'N, 121°50.2W, 15 XII 1991, ex: leaf & log litter, A.NEWTON & M.THAYER, col. (1 specimen); **Arizona**: Pima Co., Santa Catalina Mts., Bear Wallow-Mt. Bigelow Road, 2480 m, *Pseudotsuga menziesii - Pinus ponderosa* & flexilis forest, 32°25.4'N, 110°43.4'W, 10 III 1995, ex: leaf & log litter, A. NEWTON & M. THAYER (1 specimen); Cochise Co., Chiricahua Mts., 0.8 mi SW Onion Saddle, 2250 m, *Pseudotsuga - Pinus ponderos*a & sp.- *Quercus* forest, 31°55.5'N, 109°16'W, 08 III.1995, ex: leaf & log litter, A. NEWTON & M. THAYER, col. (2 specimens); **New Mexico**: Lincoln Co., Eagle Ck. at Carlton Canyon (W of Alto), 2390 m, *Pseudotsuga menziesii - Pinus ponderosa* forest, 33°24'N, 105°44.3'W, 03 III 1995, ex: leaf & log litter, A. NEWTON & M. THAYER, col. (2 specimens); Otero Co., Silver/Saddle Cpgds., NE of Cloudcroft, 2790m, *Pseudotsuga menziesii - Abies concolor - Pinus ponderosa* & *flexilis* forest, 32°58.3'N, 105°43.2'W; 05 III 1995, ex: leaf & log litter, A. NEWTON & M. THAYER, col. (1 specimen); **Oregon**: Curry Co., 10 mi E, 13 mi N Brookings, Siskiyou Natl. For., Chetco Trail, 24 VIII 1973, duff, canyon live oak & knobcone pine, E. M. BENEDICT, col. (2 specimens); Union Co., Kamela W Blue Mountain summit, 10 VIII 1983, litter at log, W. SUTER, col. (2 specimens); **Wyoming**: Big Horn Co., Burgess Jct., 5 VIII 1983, midden, plateau forest, W. SUTER, col. (1 specimen); Albany Co., Centennial, Medicine Bow Natl. For., 4 VII 1983, fir buttress midden, W. SUTER, col. (2 specimens); Albany Co.; Centennial, Medicine Bow Natl. For., 4 VII. 1983, upland log litter, W. SUTER, col. (1 specimen); **Colorado**: Larimer Co., Cameron Pass, elev. 3109 m, 40°31'N 105°53'W, 11 VIII 1970, ex: fir duff, G.F. Knowlton, col. (7 specimens); **Canada**: **British Columbia**: Rt. 1, Glacier National Park, 1330 m elev., 17 VI 1984, ex: litter in conifer forest (*Picea engelmanni*, *Abies*), collector unknown (3 specimens).

The holotype and 14 paratypes (4 adults and 10 immatures) are deposited in The Field Museum of Natural History, Chicago, Illinois, U.S.A.; 15 paratypes (2 adults and 13 immatures) in the collection of Z. OLSZANOWSKI, A. Mickiewicz University, Poznań, Poland; and 13 paratypes (3 adults and 10 immatures) in the collection of Roy A. NORTON, State University of New York, Syracuse, USA.

All studied specimens were females. It is consistent with other species of *Camisia* (PALMER & NORTON 1991).

ETYMOLOGY

The specific epithet is derived from a Greek word, meaning “rectangular”, and refers to the shape of the body.

DISCUSSION

The general shape of the body of *Camisia orthogonia* is most similar to that of the Holarctic species *C. biurus* (C.L. KOCH, 1839), with which it could be confused. The characters differentiating these two species are listed in Table 1.

Inclusion of the species in any of the five groups distinguished by COLLOFF (1993) seems rather difficult since the set of its morphological features may

characterise members of the three groups: "*hamulifera*", "*segnis*" and "*spinifer*". The species in these groups have lamellar apophyses and very long interlamellar setae that usually extend beyond the rostrum. Members of the "*horrida*" and "*invenusta*" groups seem to be more remote morphologically; in these groups the region bearing setae p_1 forms a caudal ledge and imparts a generally convex margin to the posterior notogaster. In addition, the "*invenusta*" group has relatively short lamellar setae, lamellar apophyses that do not extend anteriorly as far as the bases of the rostral setae, and interlamellar setae which, though well developed, do not extend to the bases of the lamellar apophyses. The species of the "*horrida*" group, on the other hand, have longer lamellar apophyses, usually extending beyond the rostrum; but they always have very short interlamellar setae, usually equal to or shorter than the length of the sensilli. Such characters as the absence of a caudal ledge or strongly developed apophyses of the *h* and *p* setae suggest that the species could belong to the "*segnis*" group. However, the presence of a concave margin between setae h_2 when the notogaster is viewed dorsally, and setae h_2 being much longer than the other posterior notogastral setae are, according to COLLOFF (l. c.), the characteristic features of species from the "*hamulifera*" and "*spinifer*" groups. Inclusion of the species in the "*hamulifera*" group is supported by the fact that the superior caudal plicature may be absent or incomplete. On the other hand, species in the 'segnis' and "*hamulifera*" groups always have setae p_1 located on the caudal shield area; but in *C. orthogonia* n. sp., just as in *C. spinifer*, the caudal shield is poorly defined. The apophyses of setae h_2 are not nearly as well developed as those of species belonging to the "*hamulifera*"group, but according to COLLOFF (l.c.) "this is the only major morphological feature separating the "*hamulifera*" and "*segnis*" groups, and the distinction between the two is, perhaps, a little arbitrary". Ventral characters are remarkably uniform between species of all groups. *C. orthogonia* n. sp. is thus an example of a species showing a mixture of characters typical of several species groups. Taking into regard the large number of exceptions and the fact that the criteria of classification to the species groups are not precise, the idea of disguishing them seems to lose significance.

ACKNOWLEDGEMENTS

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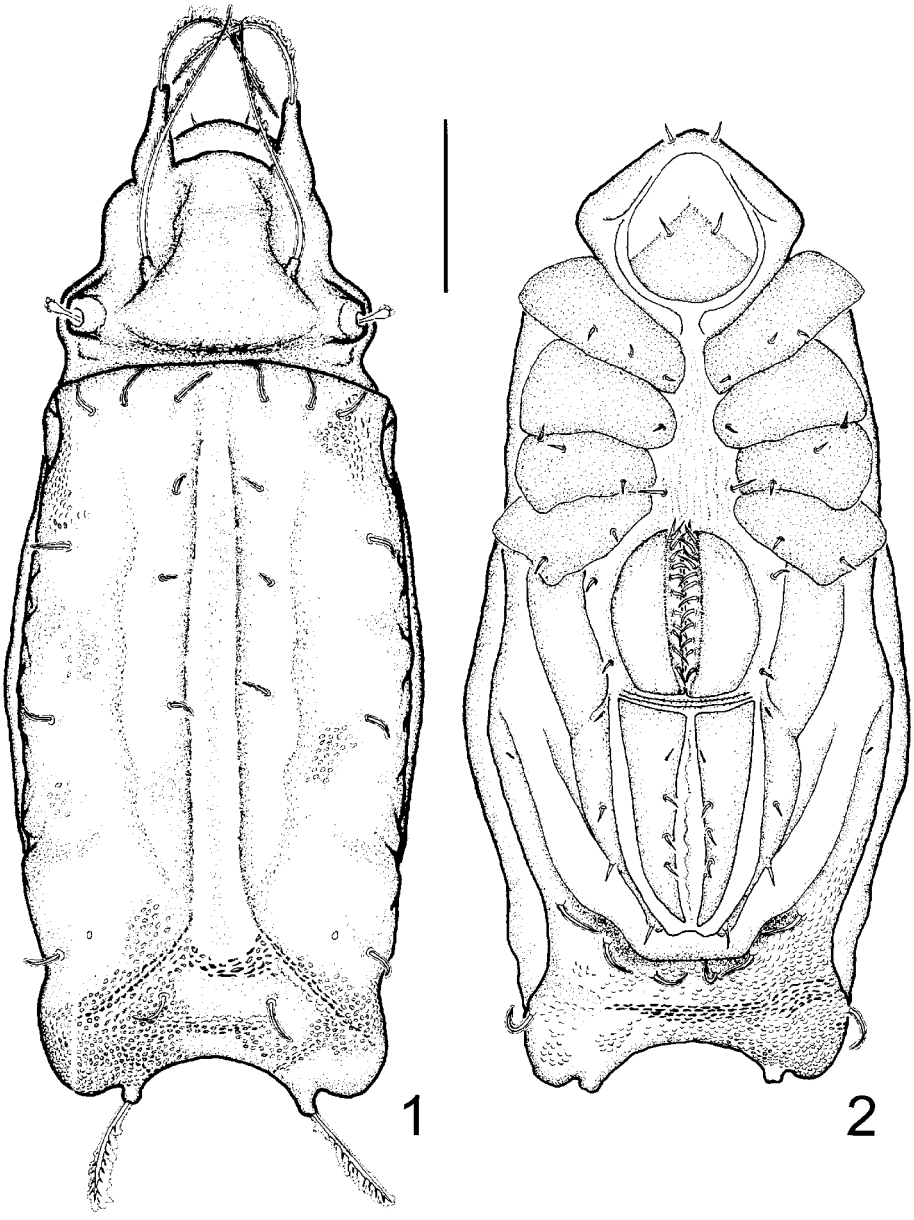
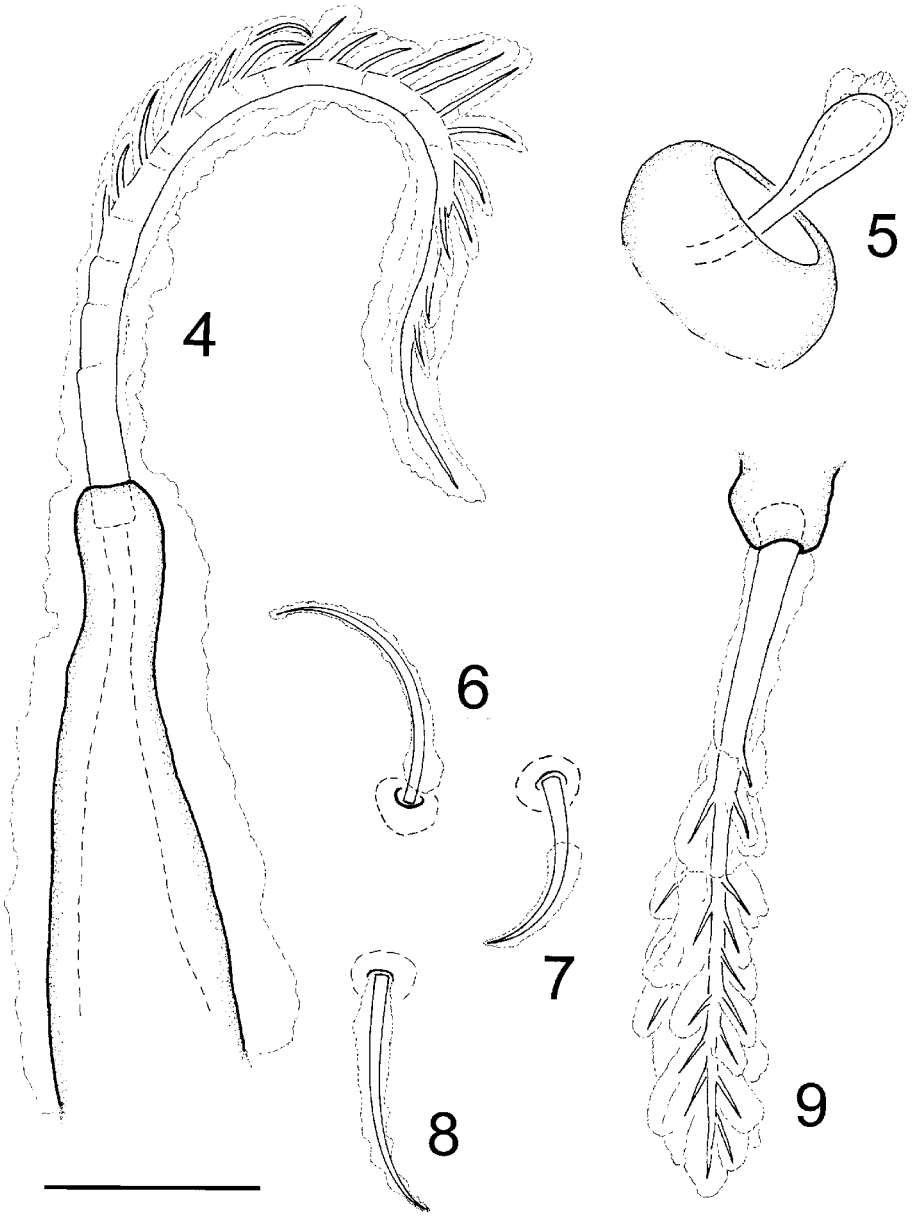
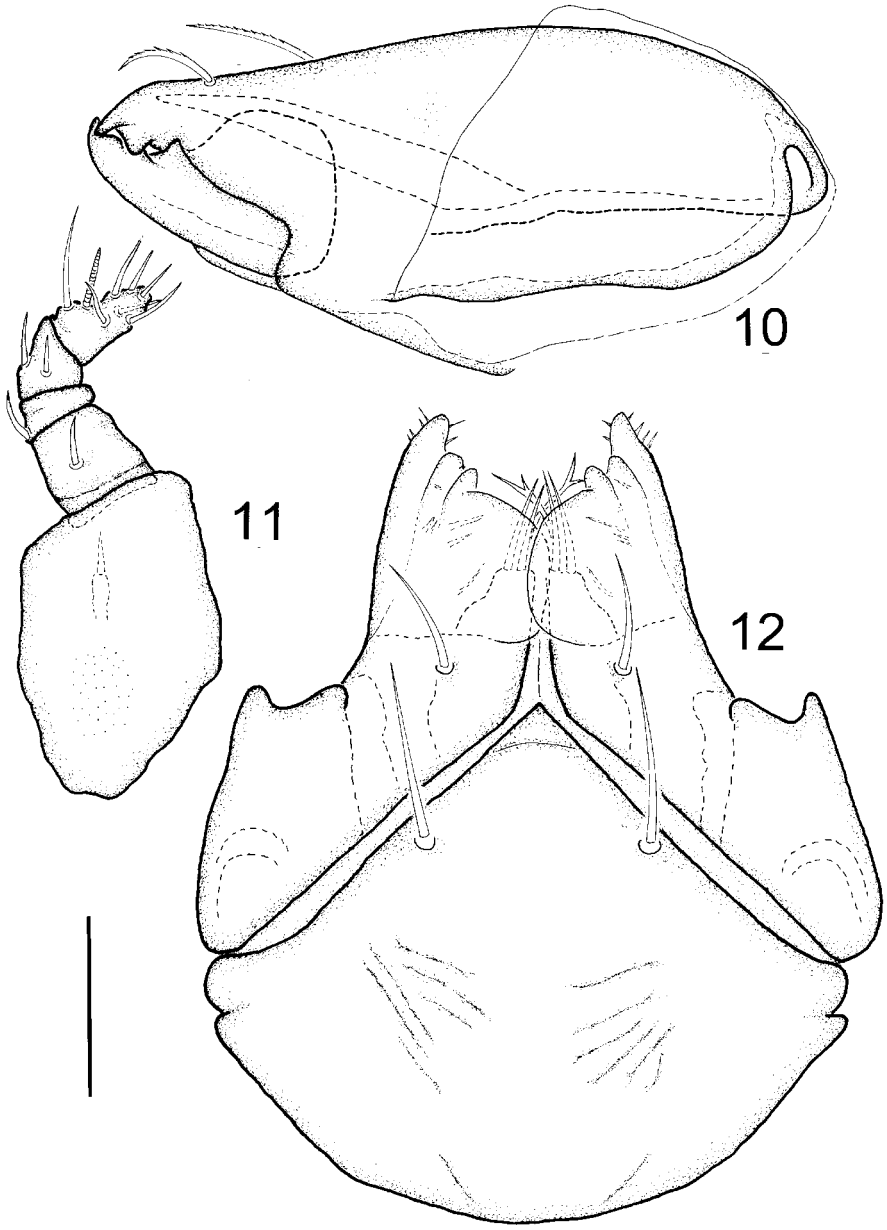


1-2. *Camisia orthogonia* n. sp., holotype female: 1 - dorsal aspect; 2 – ventral aspect. Legs and most of gnathosoma omitted. Scale bar = 200 µm

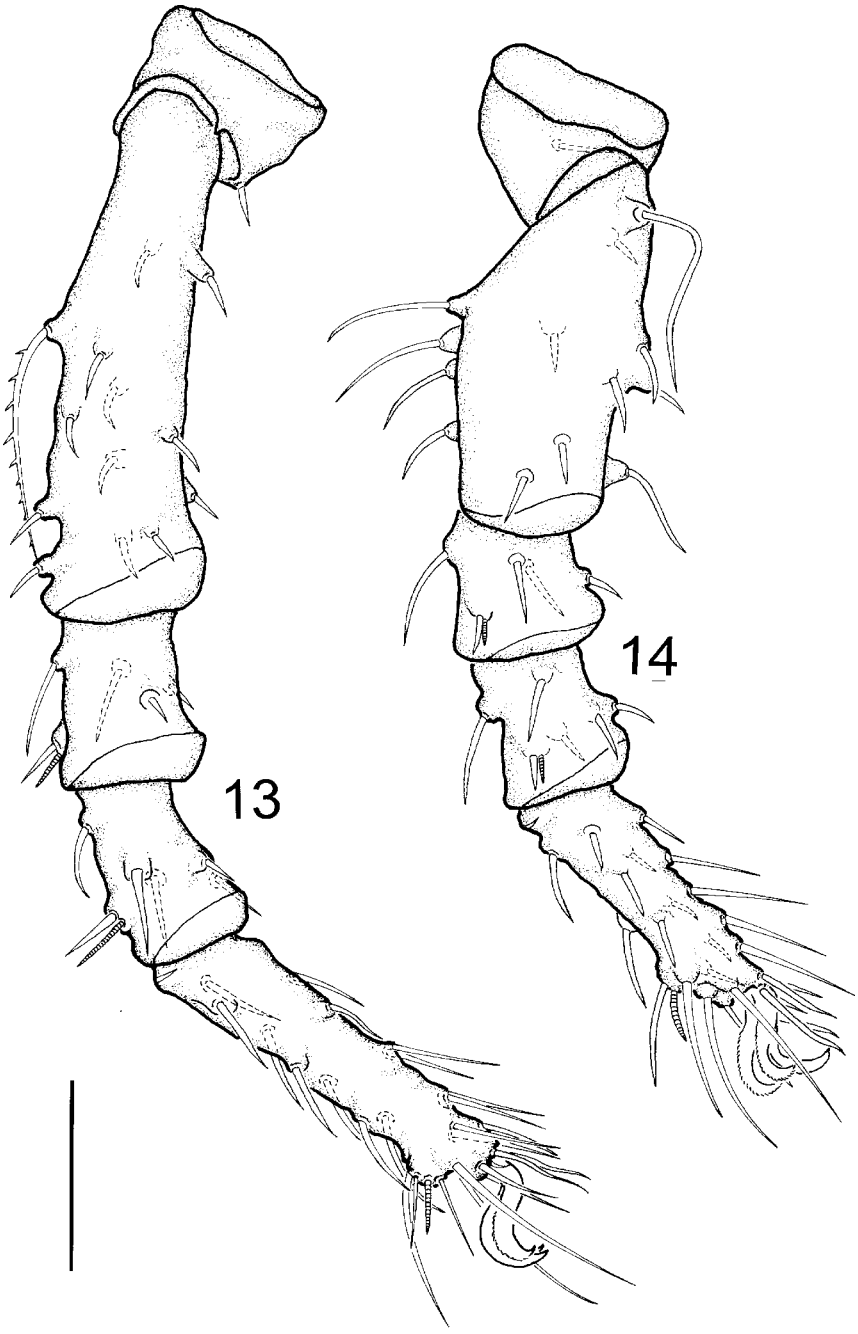
3. *Camisia orthogonia* n. sp., paratype, lateral aspect. Scale bar = 200 µm



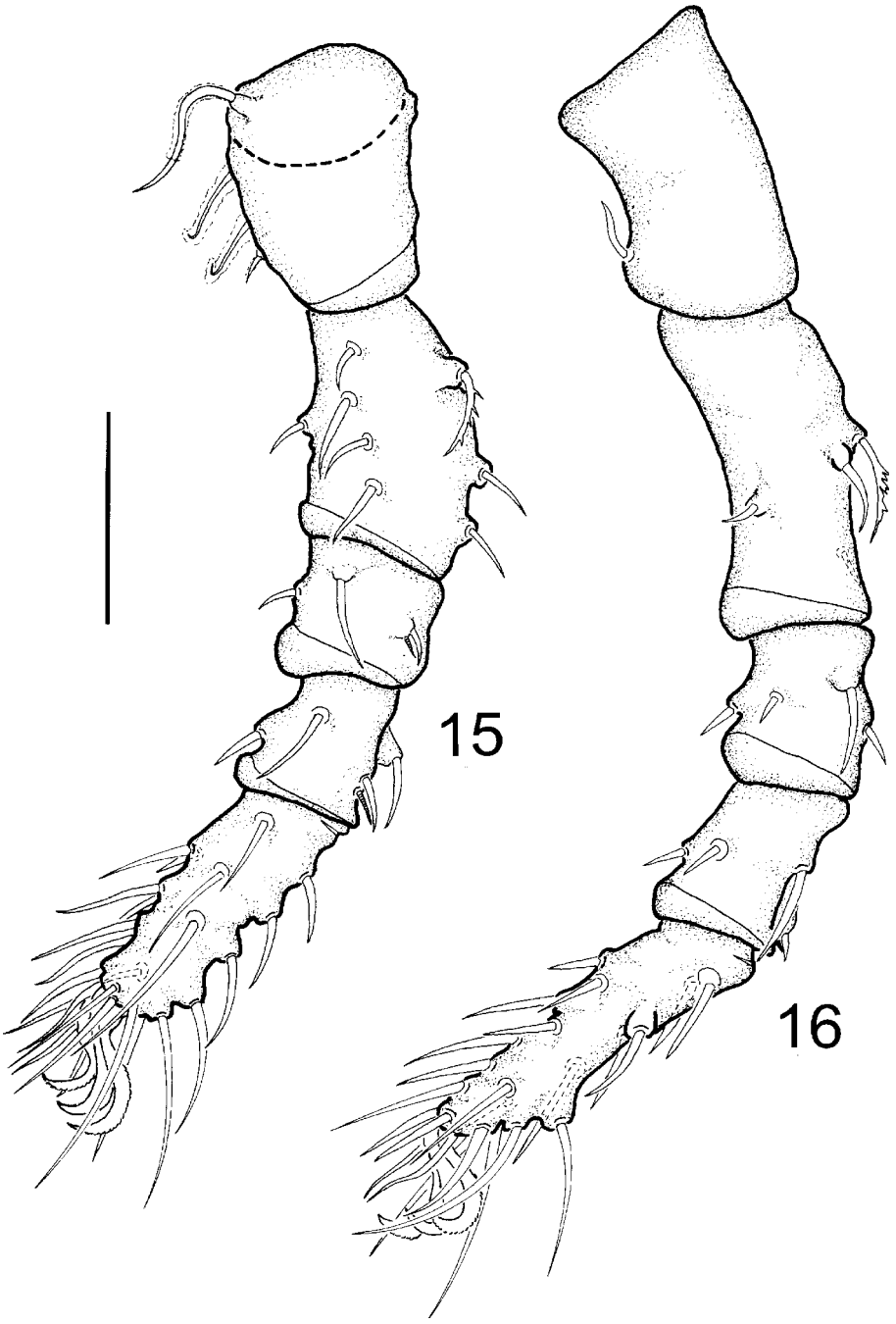
4-9. *Camisia orthogonia* n. sp., holotype, dorsal aspects: 4 – seta *le*; 5 – sensillus; 6 – seta c_3; 7 – seta e_2; 8 – seta h_1; 9 – seta h_2. Scale bar = 50 µm



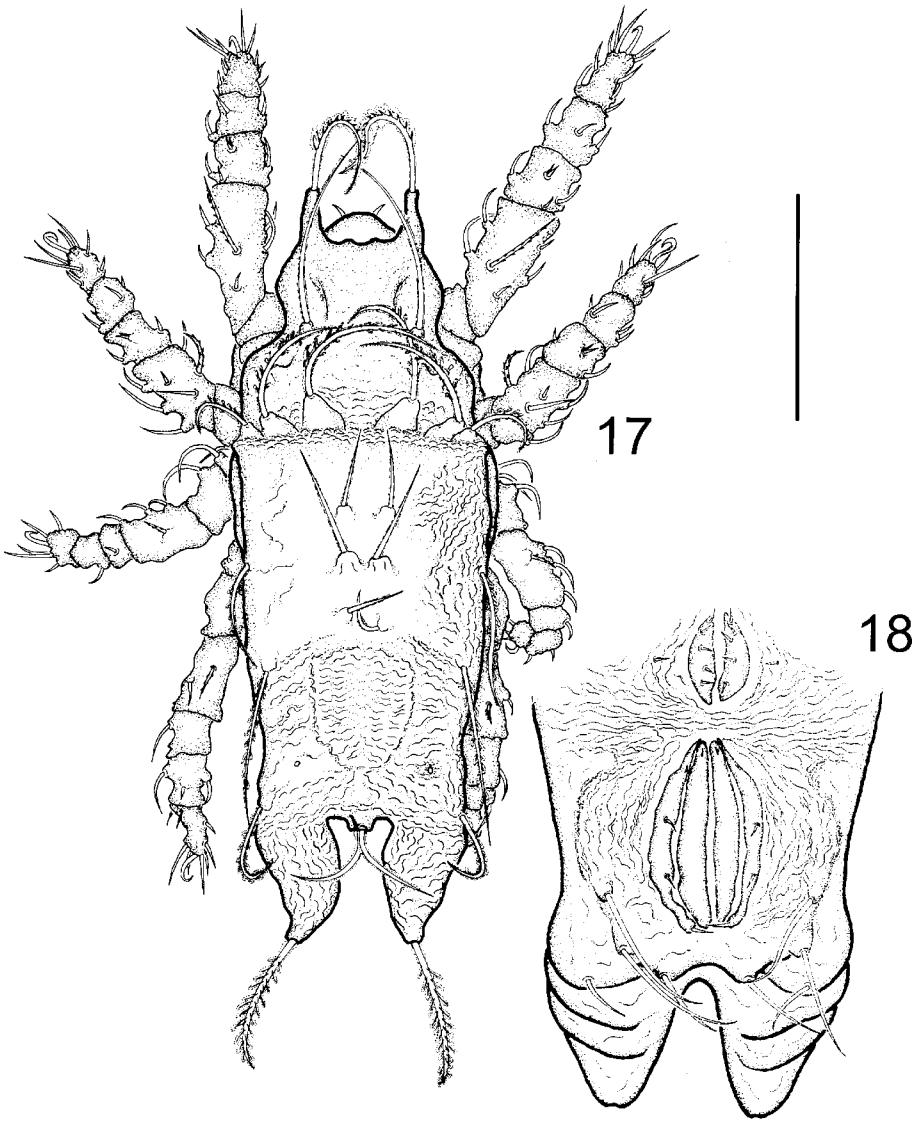
10-12. *Camisia orthogonia* n. sp., paratype: 10 – left chelicera, antiaxial aspect; 11 – right palp, antiaxial aspect; 12 – subcapitulum, ventral aspect, palps omitted. Scale bar = 50 μm



13, 14. *Camisia orthogonia* n. sp., paratype, antiaxial aspect: 13 – left leg I; 14 – left leg II. Scale bar = 100 μm



15, 16. *Camisia orthogonia* n. sp., paratype, antiaxial aspect: 15 – left leg III; 16 – left leg IV. Scale



17, 18. *Camisia orthogonia* n. sp., paratype, protonymph: 17 – dorsal aspect; 18 – anogenital region. Scale bar = 200 µm