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Five new eyed species of *Sinella* (Collembola: Entomobryidae) from China, with a key to the eyed species of the genus

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Abstract

Five new eyed species of *Sinella* from China, respectively with 3, 3, 2, 1, 1 ommatidia on each side, are described here: *S. longisensilla* **sp. nov.**, *S. yui* **sp. nov.**, *S. pseudobrowni* **sp. nov.**, *S. sacellum* **sp. nov.** and *S. gracilis* **sp. nov.** Clypeal chaetae and chaetae along cephalic groove exhibit differences among these species and could be used to distinguish species in *Sinella* and *Coecobrya*. A key to the eyed species of the genus is given.

Key words: ommatitdia, clypeal chaetae, chaetotaxy, S-chaetae

Introduction

The genus *Sinella* is characterized by 4-segmented antennae without apical bulb, reduced eye number (0–6 each side), pigment reduced or absent, polymacrochaetotic chaetotaxy, absence of dental spines and scales, and bidentate mucro. Deharveng (1990), Chen & Christiansen (1993), and Zhang *et al*. (2009, 2011) made great contributions to its modern taxonomy. A total of 27 *Sinella* species have been recorded from China. Here, five new eyed species of the genus are described; the number of eyed *Sinella* species increases to 22 in China and 41 in the world. Clypeal chaetae and chaetae along cephalic groove are also explored among five species. A key to the eyed species of *Sinella* from the world is given.

Material and methods

Specimens were mounted, after clearing in lactic acid, under a coverslip in Marc André II solution, and were studied using Nikon E600 and SMZ-1000 microscopes. Photographs were enhanced with Photoshop CS2/PC (Adobe Inc.). The Ant. III organ is described after Chen & Christiansen (1993). Dorsal body chaetae are designated following Szeptycki (1979) and Zhang *et al*. (2011). The number of macrochaetae is given by left half-tergite in the descriptions. All material is deposited in the collections of the Department of Entomology, College of Plant Protection, Nanjing Agricultural University (NJAU), P. R. China.

Abbreviations: omma—ommatidium, -a; Th.I–III—thoracic segment I–III; Abd.I–VI—abdominal segment I–VI; Ant.I–IV—antennal segment I–IV; mac—macrochaeta, -ae; mic—microchaeta, -ae; S—antennal sensillum, -a; ms—s-microchaeta, -ae (microsensillum, -a); s-chaeta, -ae—ordinary sensory chaeta, -ae on head and body.

Taxonomy

All five new species share the below characters, which are not repeated in subsequent species descriptions: smooth spiny mic at base of antennae 3 dorsal, 3 ventral on Ant.I, 1 internal, 1 external and 1 (2 in *S. sacellum* **sp. nov.**) ventral on Ant.II; dorsal Ant.II with a distal expanded S; S of subapical organ on Ant.IV thin, distally slightly

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- Omma at most 2+2 30
24 Dental smooth part more than 5 times of mucro in length 25
- Dental smooth part less than 4 times of mucro in length 26
25 Tenent hair III bifurcate; body length of adults about 1 mm. . . . . *hexophthalma* Rapoport & Rubio, 1968 (Chile)
- Tenent hair III clavate; body length of adults more than 1.5 mm . . . . . *recens* Christiansen & Bellinger, 1998 (USA)
26 Abd.III with 3+3 central mac . . . . . *sexoculata* (Schött, 1896) (USA)
- Abd.III with 1+1 central mac 27
27 Abd.IV with 3+3 central mac 28
- Abd.IV with more than 6+6 central mac. 29
28 Body pigmented; 4 sublobal hairs on maxillary outer lobe; Abd.I with 5+5 mac . . . . . *colorata* Zhang, Qu & Deharveng, 2010 (China)
- Body yellow white; 3 sublobal hairs on maxillary outer lobe; Abd.I with 4+4 mac . . . . . *longisensilla* **sp. nov.** (China)
29 Inner differentiated tibiotarsal chaetae apparently "smooth"; Abd.II with 3+3 central mac . . . . . *seudostraminea* Stach, 1965 (Vietnam)
- Inner differentiated tibiotarsal chaetae ciliate; Abd.II with 4+4 central mac . . . . . *yui* **sp. nov.** (China)
30 Omma 2+2. 31
- Omma 1+1 39
31 Unguis without unpaired inner teeth . . . . . *nigropunctata* (Imms, 1912) (India)
- Unguis with 1–2 unpaired inner teeth 32
32 Mucronal basal spine long reaching at midway between two teeth . . . . . *curviseta* Brook, 1882 (worldwide)
- Mucronal basal spine short, at most slightly exceeding tip of subapical tooth. 33
33 Tibiotarsus without rows of "smooth" differentiated chaetae 34
- Tibiotarsus with rows of apparently "smooth" differentiated chaetae 35
34 Two omma arranged in a longitudinal row . . . . . *browni* Chen & Christiansen, 1993 (China)
- Two omma arranged in a transverse row. . . . . *subquadrioculata* Yosii, 1956 (Japan)
35 Tenent hairs clavate. . . . . *quadrioculata* Mills, 1935 (USA)
- Tenent hairs pointed 36
36 Abd.III with 3+3 central mac . . . . . *barri* Christiansen, 1960 (USA)
- Abd.III with at most 2+2 central mac 37
37 Abd.III with 1+1 central mac 38
- Abd.III with 2+2 central mac . . . . . *aera* Christiansen & Bellinger, 1980 (USA)
38 Two omma separate from each other; Abd.IV with 7+7 central and 6+6 lateral mac . . . . . *plebeia* Chen & Christiansen, 1993 (China)
- Two omma close to each other; Abd.IV with 3+3 central and 5+5 lateral mac . . . . . *pseudobrowni* **sp. nov.** (China)
39 Labial chaetae as MMRELL; Abd.III with 3+3 central mac . . . . . *binoculata* (Schött, 1896) (USA)
- Labial chaetae as MRELL; Abd.III with 1+1 central mac 40
40 Tenent hairs pointed; tibiotarsus with rows of apparently "smooth" differentiated chaetae. . . . . *fuyanensis* Chen & Christiansen, 1993 (China)
- Tenent hairs clavate; tibiotarsus without rows of "smooth" differentiated chaetae . . . . . *samueli* Chen, Leng & Greenslade, 2005 (Australia)

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