

A New Chinese Species of the Genus *Tomocerus* (*Tomocerina*) from Xinjiang (Collembola: Tomoceridae) with a Discussion of *Tomocerina*¹

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Abstract A new species, *Tomocerus (Tomocerina) tianshanensis*, from Xinjiang of northwest China is described. It is distinguished from other members of the subgenus by the presence of intermediate mucronal teeth, single trochanteral organ setae on the trochanter, no macrochaetae on the posterior third of the head and strongly clavate tenet hairs. It is most similar to the Japanese species *T. aokii* Yosii 1972 and the Chinese species *T. yiliensis*. A diagnostic table and key to the subgenus *Tomocerina* are provided.

Key Words Collembola, Tomoceridae, Tomocerinae, *Tomocerina tianshanensis*, new species, Xinjiang, China.

The Family Tomoceridae was divided into two subfamilies: Lepidophorellinae and Tomocerinae (Ma, et al. 2003). The Tomocerinae include the genus *Tomocerus* that has been divided into a number of subgenera. Paclt (1944) described *Pogonognathellus* and Mills (1949) described *Tomolonus*.

Most subgenera were created by Yosii: *Monodontocerus* and *Tomocerina* (Yosii 1955), *Aphaenomurus* and *Plutomurus* (Yosii 1956) and *Lethemurus* (Yosii 1970).

Although he considered most of these as separate genera (Yosii 1967), others have varied from treating all as valid genera to considering all as subgenera of *Tomocerus* (Christiansen and Bellinger 1998, Palissa 2000). All have considered these supraspecific taxa as members of the subfamily Tomocerinae. Herein, we describe a second new species of the subgenus *Tomocerina*.

Holotype female, China: Xinjiang: Urumchi: Tianshan Mountain: #1 glacier, altitude 3600m, VII-31-2000, C9074. Paratypes: 6 females, same data as holotype; 4 females, Tianshan Mountain: Tianchi Lake, altitude 1980m, VIII-2-2000, C9077 and C9078. Collected by Chen Jian-xiu, Wang Songjie & Wang Fang. Deposited in the Department of Biology, Nanjing University.

Diagnosis. This species is distinguished from other members of the subgenus by the presence of intermediate mucronal teeth, single trochanteral organ setae on the trochanter, no macrochaetae on the posterior third of the head, and strongly clavate tenet hairs.

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***T. (Tomocerina) tianshanensis*, sp. nov. (Figs 1 & 2)**

Body length up to 2.3 mm. Ground color pale yellow. Eye patches dark blue to black. Antennae pale to dark blue, darker from base to tip. Frontal area dark blue. Posterior part of head with 1 pair of small median dark spots and 1 pair of short and paired, posterior, narrow, lateral dark stripes. Other part of head with evenly scattered light pigment. Th. II blue. Scattered pale blue pigment also present on Th. III - Abd. II, Abd. V-VI, tibiotarsi and manubrium (Fig. 1A).

Head with eyes 6 + 6, subequal. Antennae short, .30-.51 times as long as body. Antennal and other measurements shown in Table 1. Labral setae 4/5, 5, 4, all smooth; each of distal 3 rows beset on papilla. Anterior margin of labrum with 4 recurved spinules (Fig. 1B). Dorsal macrochaetae of head as follows: anterior, 2/4, median, 2/7, lateral, 3, posterior, 0. Posterior margin with a row of 22 to 40 tiny setae (Fig. 1C).

Thorax macrochaetae and bothriotracha as shown in Fig. 1D. Trochanteral organs 1, 1 (Fig. 1E). In addition to the smooth separated setae of this organ there are numerous pointed, weakly ciliate setae of different sizes. Tibiotarsus with 0, 0, 1-2 blunt spiny setae respectively on ventral side of leg I-III (Fig. 1F, 1G). Unguis slender; a pair of pseudonychia well developed, 0.41-0.56 times as long as inner edge of unguis; inner teeth 5-6, 5-6, 6 respectively on leg I-III. Unguiculus lanceolate without inner teeth. Tenent hair developed, 0.87-1.07 times as long as inner edge of unguis, apex spatulate (Fig. 1H).

Abdominal macrochaetae and bothriotracha on Abd. I-V as shown in Fig. 1D. Tenaculum unscaled with 4 + 4 teeth, corpus with 1-2 large smooth setae (Fig. 1I). Ventral tube scaled with weakly ciliate setae (Fig. 1J) of different sizes, anterior face with 3-9 on each side (Fig. 1K); posterior face 14-16 (Fig. 2A); each lateral flap 21-35 (Fig. 2B). Ratios of manubrium/dens/mucro = 1.4-2.6/2.7-3.7/1.0. Manubrium scaled, dorso-laterally with a row of 8-10 large setae on each side, all weakly ciliate and strongly tapering near apex but not spinelike; dorsally with 2 setaceous stripes, each consisting of numerous acuminate, striate setae of different sizes, 12-28 of them very large (Fig. 2E-2H). Dental spines as 6-8(10)/3-4(6), 1. The basal spines are irregular in arrangement but never in two parallel rows of similar sized spines; all spines are simple with fine longitudinal striations and chestnut brown (Fig. 2D). Mucro elongate with numerous ciliate setae; outer dorsal lamella with 1-4 intermediate teeth; apical and anteapical teeth subequal (Fig. 2I). Upper anal flap of Abd. VI with 14 or 18 large setae arranged in 2 irregular transverse rows (Fig. 2J).

Scales brownish, rather hyaline and heavily striated. Trunk macrochaeta and bothriotracha surrounded by 0-2 setulae (Fig. 1D).

Habitat. Found under stones in alpine barren land.

Etymology: The new species is named after the type locality.

Discussion

Tomocerina is a small taxon having only 11 species (see Table 2). A key to the species of the subgenus is given below:

Key to species of *Tomocerus* (*Tomocerina*)

Note *T. (Tomocerina) simplex* Yosii 1966 is omitted from this key. It is insufficiently described to be placed and, in our opinion, may well be a synonym of *T. minutus* Tullberg.

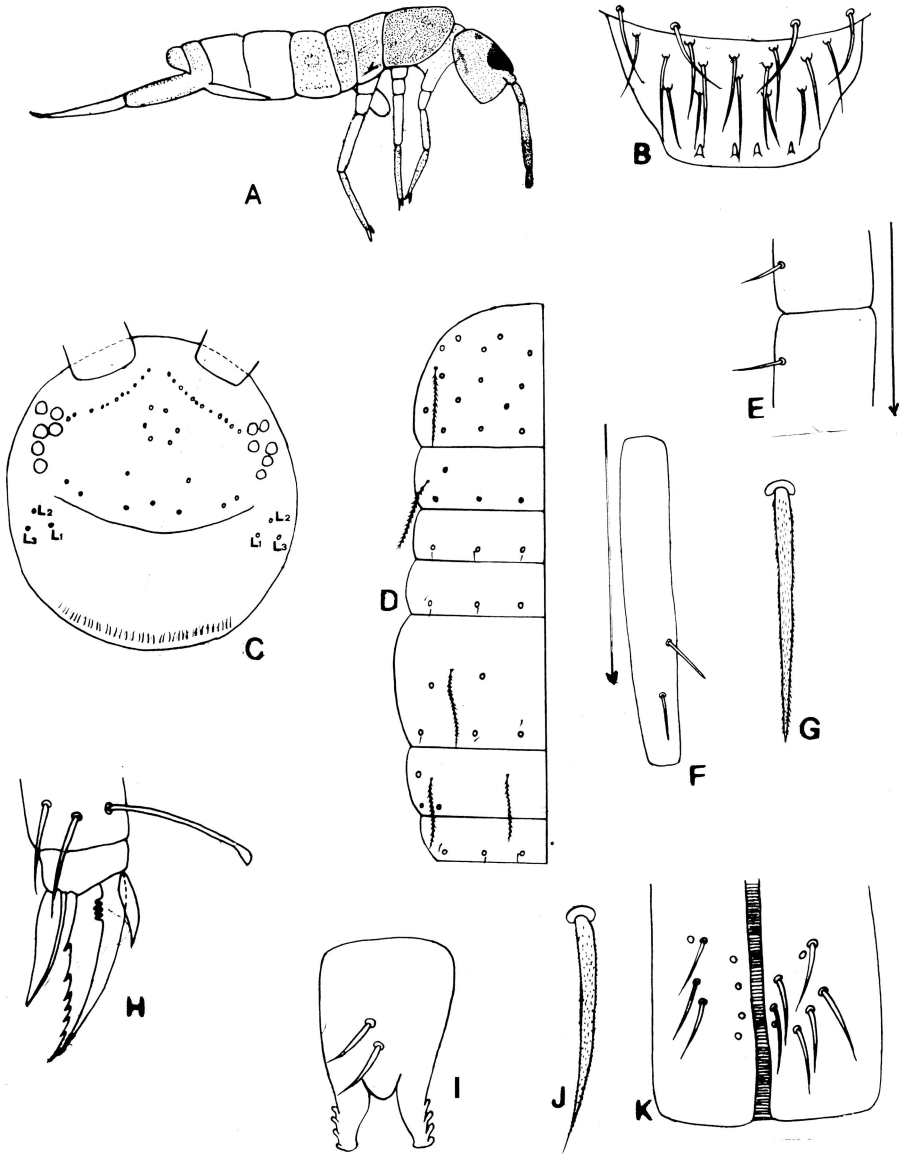


Fig. 1. *Tomocerina tianshanensis* sp. nov. All figures of type specimens. (A) Habitus, specimen from Tianchi Lake; (B) labrum, specimen from Tianchi Lake; (C) dorsum of head, specimen from Tianshan Mountain: #1 glacier; (D) dorsal chaetotaxy of Th. II - Abd. V; specimen from Tianshan Mountain: #1 glacier; (E) trochanteral organ, specimen from Tianchi Lake; (F) A hind tibiotarsus, showing blunt setae, specimen from Tianshan Mountain: #1 glacier; (G) enlargement of blunt seta, specimen from Tianshan Mountain: #1 glacier; (H) foot complex; (I) tenaculum, specimen from Tianshan Mountain: #1 glacier; (J) enlargement of large seta of ventral tube of specimen from Tianshan Mountain: #1 glacier; (K) anterior face ventral tube specimen from Tianshan Mountain: #1 glacier.

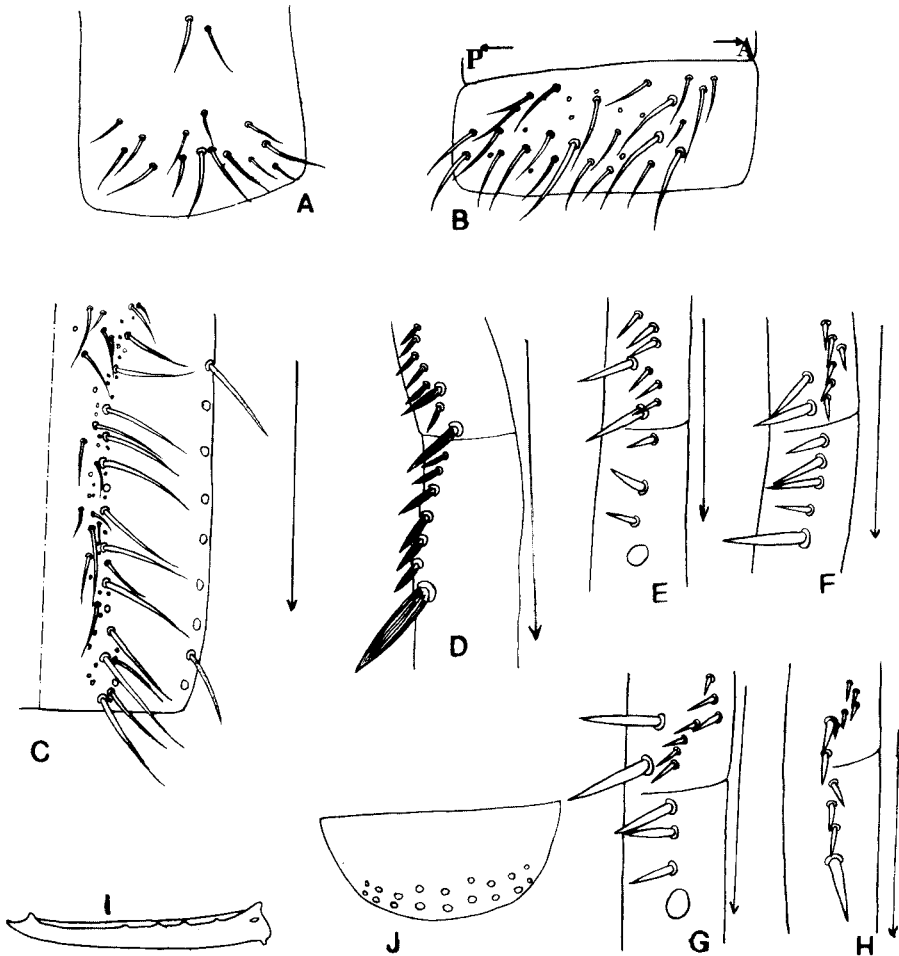


Fig. 2. *Tomocerina tianshanensis* sp. nov. All figures of type specimens. (A) posterior face, of ventral tube of specimen from Tianshan Mountain: #1 glacier; (B) lateral flap; of ventral tube of specimen from Tianshan Mountain: #1 glacier; (C) manubrium dorsal view, right side, specimen from Tianshan Mountain: #1 glacier; (D) dental spines in detail, specimen from Tianshan Mountain: #1 glacier; (E) dental spines specimen from Tianshan Mountain; (F) same of specimen from Tianshan Mountain: #1 glacier; (G) same of specimen from Tianshan Mountain; (H) same of specimen from Tianshan Mountain: #1 glacier; (I) mucro, specimen from Tianshan Mountain: #1 glacier; (J) upper anal flap, specimen from Tianshan Mountain.

- | | |
|---|-----------------|
| 1) Without intermediate teeth on mucro (Fig. 3A) | <i>T. teres</i> |
| 1') With at least 1 intermediate tooth on mucro (Fig. 3B) | 2 |
| 2) With 5 or more setae on corpus of tenaculum (Fig. 4A) | 3 |
| 2') With 1 or 2 setae on corpus of tenaculum (Fig. 4B) | 4 |



Fig. 3. Alternate states of Mucro. (A) no intermediate teeth; (B) with intermediate teeth.

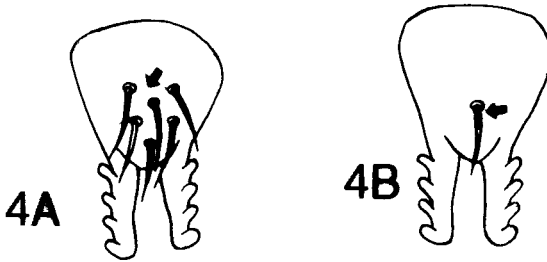


Fig. 4. Alternate states of tenaculum. (A) more than one seta; (B) one seta.

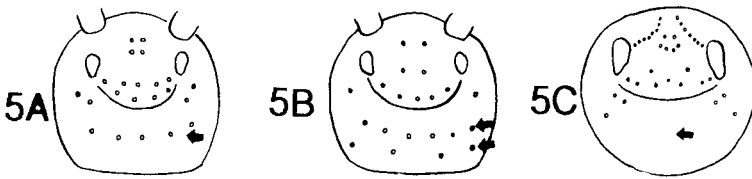


Fig. 5. Alternate states cephalic macrochaetae. (A) one row posterior macrochaetae; (B) two rows posterior macrochaetae; (C) no posterior macrochaetae.

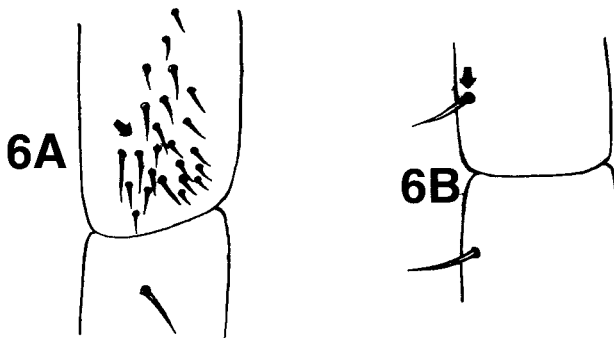


Fig. 6. Alternate states trochanteral organ. (A) Many setae; (B) one seta.

Table 1. Type specimens organ lengths in micra

Locality + specimen	Antennal segment	Antennal segment	Antennal segment	Antennal segment	Cephalic diagonal	Manubrium	Dens	Mucro
	1	2	3	4				
9074-1	76	133	409	196	490	325	458	149
9074-2	102	150	493	198	561	262	445	149
9074-3	77	124	316	150	450	222	387	138
9074-5	65	128	410	180	520	324	495	130
9074-6	80	128	417	180	390	264	365	123
9077-10	69	152	489	196	502	280	492	138
9078-8	98	175	518	185	551			
9078-10	86	153	510	177	544	390	444	142
9078-12	80	153	450	179	528	300	430	147

- 3) With Posterior row or rows of macrochaetae on dorsum of head (Fig. 5A & B) *T. purpurithorus*
- 3') Without Posterior row of macrochaetae on dorsum of head (Fig. 5C) *T. aokii*
- 4) Eyes 5 + 5 *T. lilliputanus*
- 4') Eyes 6 + 6 5
- 5) With 1 or 2 rows of macrochaetae on the posterior third of the dorsum of the head (Fig. 5A & B) 6
- 5') Without such rows of macrochaetae on the posterior third of the dorsum of the head (Fig. 5C) 7
- 6) With 1 row of macrochaetae on the posterior third of the dorsum of the head (Fig. 5A) *T. minutus*
- 6') With two such rows (Fig. 5B) *T. calceus*
- 7) Tenent hair truncate or very weakly clavate *T. curtus*
- 7') Tenent hair strongly clavate 8
- 8) Trochanteral organs of both trochanter and femur with only a single seta (Fig. 6A) *T. tianshanensis*
- 8') Trochanter with many setae in trochanteral organ (Fig. 6B) *T. yiliensis*

With one exception-the somewhat questionable species *T. minutus*-these species are limited to Asia and North America. Four of these were described or have been reported from China: *T. minutus* Tullberg 1876 from Shanxi and (as *T. varius*) from Yunnan, *T. calceus* and *T. purpurithorus* Liu 1999 from Sichuan and *T. yiliensis* from Xinjiang.

This new species is similar to the Chinese species *Tomocerus (Tomocerina) yiliensis* in dental spines, foot complex, setae on tenaculum and blunt setae on ventral side of tibiotarsus. It differs from *T. yiliensis* in trochanteral organs (1/1 in the former, 8-22/1 in the latter) and having fewer ventral tube setae. It also shares some characters with Japanese *Tomocerina aokii* Yosii 1972, such as the number of inner teeth on unguiculus and intermediate teeth on outer dorsal lamella of mucro. *Tomocerus*

Table 2. Species of the subgenus *Tomocerina* and their major distinguishing characteristics

Species	Trochanteral organs			Mucro			Microsetae around macrochaetae	Tenaculum setae	Biogeographic region**
	Trochanter	Femur	Dental spines	Lamella	Intermediate teeth	teeth			
aokii	1	1	6-8 (2 rows)/5-6, 1	entire	2-4	0	5-6	3a	
calceus	1	1	1/1 <u>1</u> or 2/2 <u>1</u>	-?	1	0	1	3a	
curtus	1	1	Variable	Subapical + basal tooth	1-2	0-2	1	7a, 7b, 8	
lamelliferus	1, (6-7?)	1, (3?)	3 <u>1</u> /1-2 <u>1</u> or 2-4 <u>1</u>	Entire	2-3	0-2	1	7a, 7b, 8	
lilliputanus	1	1	3-4/1 <u>2</u>	Median & basal teeth	1	0	1	3a	
minutus*	1	1	4-5/4-5 <u>1</u>	Entire or on one or more teeth only	1-2	0-1	1	1, 2a, 2b, 3a, 4, 5	
purpurithorus	1	1	5/7 <u>1</u>	-?	5-7	0	5	3a	
simplex	?	?	4/3 <u>1</u>	Entire	1	?	1	3b	
teres	1	1	4/1 <u>1</u> 1	Entire	0	0	0	8	
tianshanensis	1	1	6-10/3-6 <u>1</u>	Entire	1-4	0-2	1-2	4	
ylliensis	11-20	1	10-13/4-6 <u>1</u>	Entire	3-6	0-3	1	3a	

With dental spines / indicates subdivision of dens underlined indicates clearly larger spines. In all cases () indicates rare conditions.

* Three closely related species *minutus* Tullberg, *mixtus* Gisin and *varius* Folsom have been described and separated but Dunger (1972) synonymized all three species with supporting evidence and this has never been clearly refuted. Further study is required.

** See Christiansen and Bellinger: 1995.

tianshanensis differs from *T. aokii* in lacking a basal lamella on either of the basal mucronal teeth and having only a single rather than 5-6 setae on the corpus of the tenaculum. It also differs in lacking the two parallel rows of similar sized basal dental spines. The unguiculus of *T. tianshanensis* is smoothly curved on its inner margin whereas that illustrated by Yosii is straight basally and sharply angulate distally. The two species also differ in coloration and pattern.

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