

164

**Two New Species of *Paranura* (Collembola: Neanuridae) from
Colombia and México**

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ABSTRACT: Two new species of *Paranura* are described and illustrated, one from Colombia and another from Mexico. Tables for the chaetotaxy are elaborated and a key for the American species is given.

KEY WORDS: *Paranura*, taxonomy, keys

RESUMÉ: Deux espèces nouvelles de *Paranura* sont décrits et dessinés, une de la Colombie et une autre du Mexique. Des tables chaetotaxic ont été confectionné et en plus une cle de identification pour les espèces américaines y est inclu.

METS CLES: *Paranura*, taxonomie, clés

Paranura Axelson, 1902

Body more or less depressed; cuticle reticulation very weak, no clear tubercles. Color white or slightly blue (only one species with clear body pigment). Ant. III and IV fused dorsally. Ant. IV with trilobed apical lobe and 8 thick sensillae; no ventral sensorial file. 2 + 2 or 3 + 3 ocelli always with dark pigment. No postantennal organ. Bucal cone pointed. Maxillae styliform and mandible apical with 3 or 2 reduced teeth. No empodial appendage. Retinaculum and furcula lacking, only a small knob with 4–6 microsetae or none. Ventral tube with 4 + 4 setae. Unguis without teeth, unguiculus absent or bristle-like. Abd. VI blunt and slightly indented with no anal spines.

It was thought that the genus distribution was in North America, from Alaska to Mexico and in Japan. The first species from South America is here in described. For the new species chaetotaxy we have followed the system of Deharveng (1989) and constructed similar tables for easy comparisons.

TYPE SPECIES: *Paranura sexpunctata* Axelson 1902.

To date 32 species have been described from mainly from Thailand and Korea. The genus was unknown from Colombia, and there were four species described from Mexico by Palacios-Vargas & Deharveng (1987).

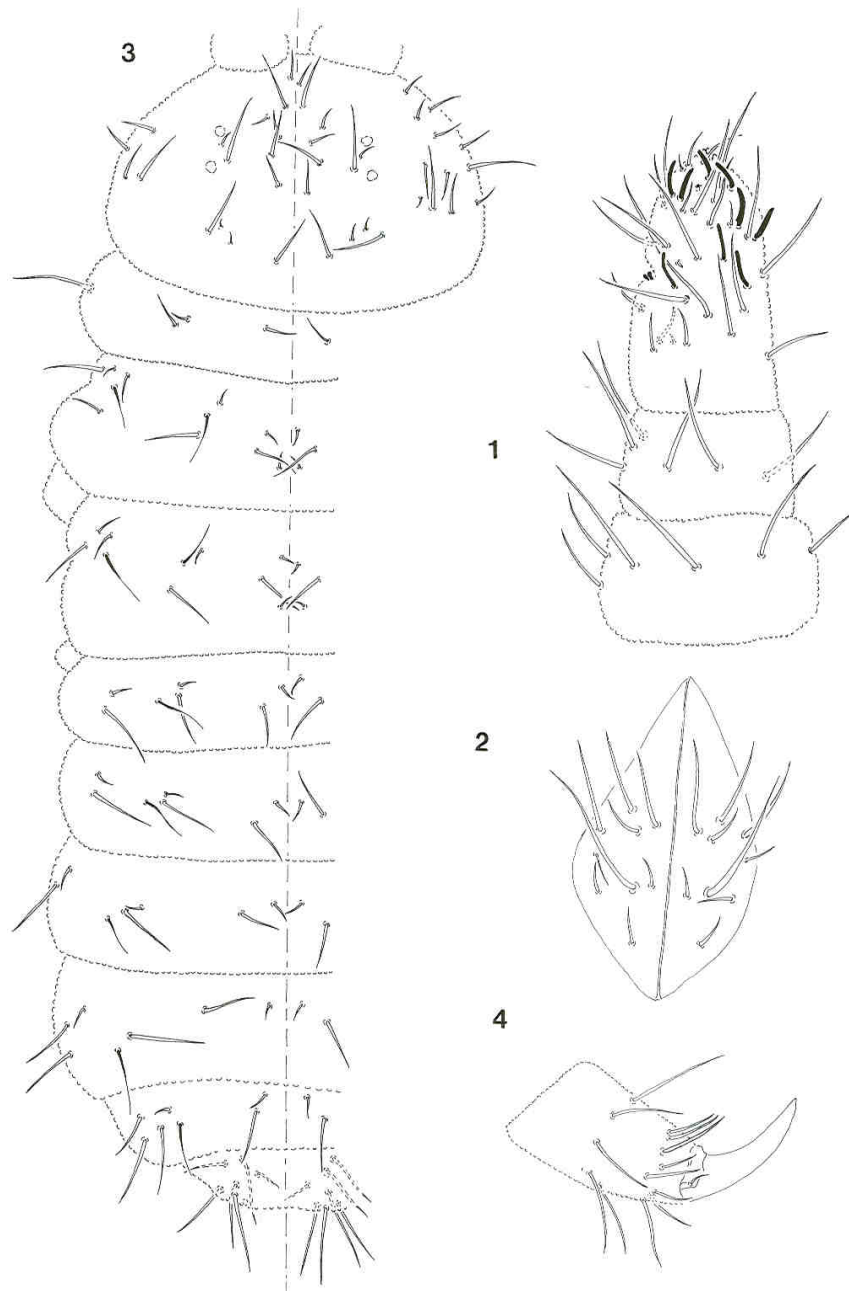
***Paranura colombiana* Palacios-Vargas & Peñaranda-Parada new species**

(Figs. 1–4)

DESCRIPTION: Length: 1.4–1.6 mm. Color white in alcohol, with black eye spots. Tubercles very weakly developed. No tertiary granulation or reticulation. Two kinds of ordinary dorsal setae: macrosetae (64–100 μ), long smooth, sharp and thicker than sensorial setae, longer at the posterior part of the body. Seta Ocm. 81 μ ; Oca 22 μ , cephalic seta "B" 61 μ . Mesosetae (32–86 μ).

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Figs. 1-4. *Paranura colombiana* sp. nov. 1, dorsal chaetotaxy of Ant. I-IV; 2, labial chaetotaxy; 3, body dorsal chaetotaxy; 4, tibiotarsus III.

Table 1. Total chaetotaxy of *Paranura colombiana* n. sp.

Group of setae	Tubercle	Number of setae	Type of setae	Setae					
Cephalic chaetotaxy									
Cl	—	4	M, me	F,G					
Af	—	8	M, me	A,B,C,D					
Oc	—	2	M, me	Ocm, Oca					
Di	—	1	M	Di1					
De	—	3	M, me	De1, Di2, De2					
DI	—	5	M	(4)					
			me	(1)					
L..So	—	8	M	(1)					
			Me	(2,5)					
Vi	Ve	Labrum	Labium	Ant. I,II	Ant. III	Ant. IV			
5	6	2/2,2	9	7,11	15+5s	i.+or+8s+12			
	Di	De	DI	L	Sex2	Cx	Tr	F	T
Postcephalic chaetotaxy									
Th.I	1	2	1		2	2	2	12	19
Th.II	3	2+s	3+s+ms	3	2	5	5	12	19
Th.III	3	2+s	4	3	2	8	6	10	18
Abd.I	2	2+s	2	2	TV:4				
Abd.II	2	2+s	2	2	Ve:4				
Abd.III	2	2+s	2	2	Ve:3		Fu:4me		
Abd.IV	2	1+s	3	4	Ve:7		VI:2		
Abd.V	1	-----	(4+s)-----	2	Ag:3		VI:4		
Abd.VI	-----	7-----	-----	-----	Ve:13		An:2mi		

Antennal chaetotaxy normal, 8 sensorial setae, thick cylindrical, slightly bent, 2–2.5 times shorter than surrounding setae. Apical bulb trilobed (Fig. 1). Ocelli 2 + 2, diameter about 14 μ each. Bucal cone short, maxillae styliform, mandible with two teeth difficult to see. Labrum with 2/2,2, setae. Labium with no labial organ, and eleven setae on each side (Fig. 2). Labral sclerite oval. Two postlabial setae.

Body chaetotaxy is shown in Fig. 3 and Table 1. Tibiotarsi with 19, 19, 18 setae. Unguis without inner tooth. Ratio of Tibiotarsus: unguis = 1.0:1.2 (Fig. 4). Ventral tube with 4 + 4 setae, posterior seta much longer. Furcula absent, four mesosetae present, lacking knob or any microsetae. Female with 3 + 3 pregenital setae, 13 genital setae and 2 eugenital. Male with 3 + 3 pregenital setae, 10 genital setae and 4 + 4 eugenital setae.

TYPE LOCALITY: COLOMBIA: Cundinamarca, Neusa. High-Andean humid forest.

TYPE MATERIAL: Holotype, adult female; paratype, adult male. Both deposited at the Entomological Collection, Faculty of Agronomy, National University of Colombia.

TYPE DATA: 1-I-1998, *ex* litter, 3100 m asl. A. León col.

DERIVATION NOMINIS: The name is locative from Colombia, the country where it was discovered.

VARIATION: One specimen has Abd. V with one dorsointernal setae and dorsointernal and lateral tubercles fused with a group of three setae. Abd. VI with seven well developed setae, and on other side only six, four well developed and two smaller.

***Paranura tapatia* Palacios-Vargas & Peñaranda-Parada new species**

(Figs. 5–8)

DESCRIPTION: Length: ca. 1.0 mm. Color in alcohol white, with black eye spots. Tubercles weakly developed. No tertiary granulation or reticulation. Two kinds of ordinary dorsal setae: macrosetae (22–37 μ), short smooth, sharp and thicker than sensorial setae, longer at the posterior part of the body. Setae Ocm and Oca 15 μ , cephalic “B”, 17 μ .

Antennal chaetotaxy normal, 8 sensorial setae, thick cylindrical, slightly bent, 2–2.5 times shorter than surrounding setae. Apical bulb trilobed (Fig. 5). Ocelli 2+2, diameter about 5 μ . Bucal cone short, maxillae styliform, mandible with two small teeth. Labrum with 2/2,2, setae. Labium with no labial organ and 9–11 setae on each side (Fig. 7). Labral sclerite oval.

Body chaetotaxy is shown in figure 6 and in table 2. Legs, tibiotarsi with 18, 18, 17 setae. Claw without inner tooth. Ratio of tibiotarsus: unguis = 1.0: 1.0 (Fig. 8). Ventral tube with 4 + 4 setae, posterior setae much longer. Furcula absent but four mesosetae present, lacking knob or any microsetae.

Female not seen. Male with 3 + 3 pregenital setae, 8–9 genital setae and 4 + 4 eugenital setae.

TYPE LOCALITY: MEXICO: Jalisco State, Municipio de la Huerta. Ejido San Mateo.

TYPE MATERIAL: Holotype male (# 2988), paratype male (2987) and one paratype juvenil under the same cover. Specimens are deposited in the collection of Microarthropods of the Faculty of Sciences, UNAM.

TYPE DATA: 2-VII-1993, ex soil, J. de la Garza and A. Rodríguez col.

DERIVATIONOMINIS: The name is a vernacular name given to persons or objects, which are from Guadalajara, Jalisco.

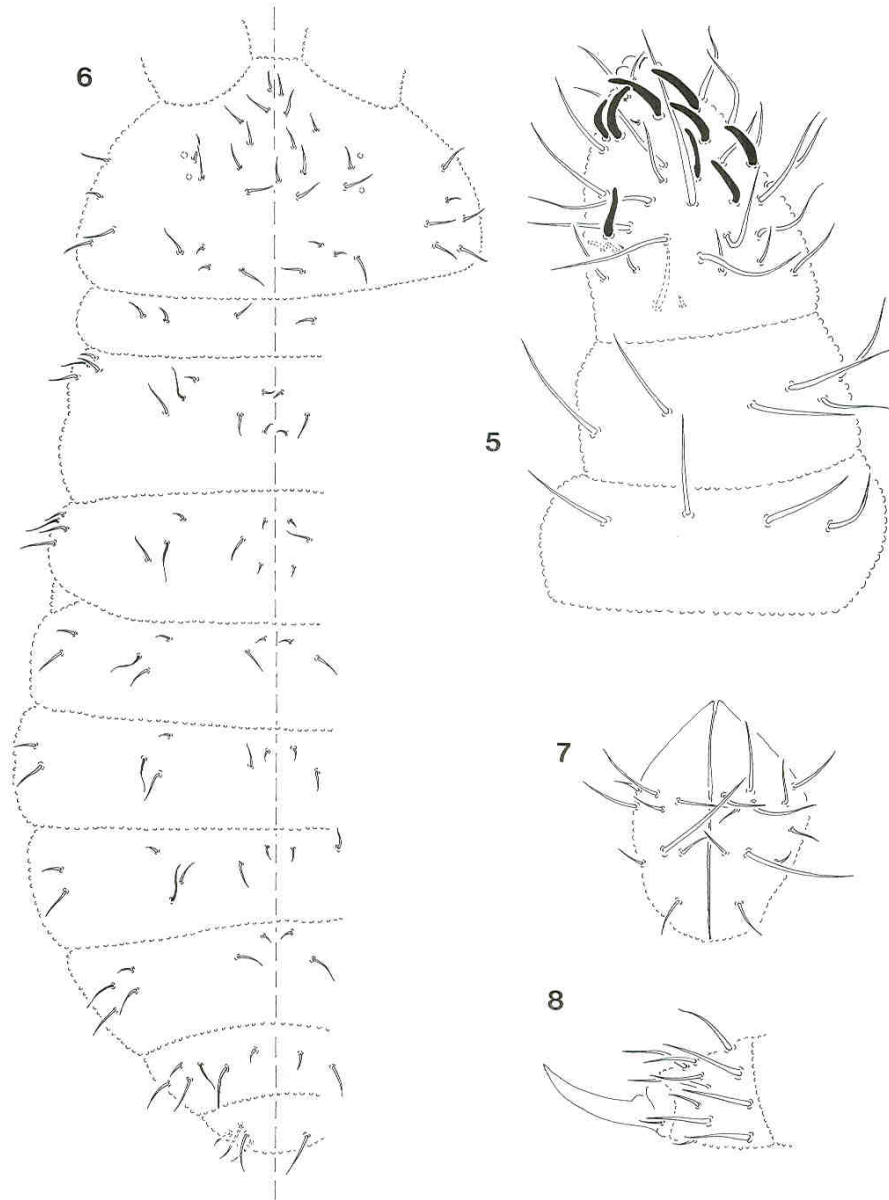
VARIATION: Asymmetrical labial chaetotaxy, both specimens present 9 on one side and 11 on the other.

Discussion

The two new species described here, share presence of 2 + 2 ocelli per side, different from the type species *P. sexpunctata* Axelson, and *P. colorata* Mills with 3 + 3 ocelli. *Paranura longisensillata*, *P. sarukhani* and *P. jorgei* (the three species describe by Palacios-Vargas & Deharveng) also have 3 + 3 ocelli and this is why they are easy to distinguish from the new species. *Paranura jorgei* is very easy identify because of its reduced chaetotaxy, and the differentiation of the few remaining setae. *P. sarukhani* and *P. longisensillata* have microsetae so small it is difficult to see them.

The two new species are close related to *P. impedita* Palacios-Vargas & Deharveng, which is the only species from America with only 2 + 2 ocelli, which also shares with *P. colombiana* and *P. tapatia* the absence of cephalic setae “E” and “Ocp”. *Paranura colombiana* differs from the two other species by the absence of cephalic setae “O”. The presence of macrosetae clearly separates *P. colombiana* from *P. tapatia* which has regular mesosetae, and *P. impedita* which has very reduced microsetae. The ocular setae Ocm and Oca are clearly of different size in *P. colombiana* and similar in the other species. On the thorax, *P. impedita* has more abundant setae (3,4) on dorso external tubercle on Th. II and III respectively, while the two new species have only two setae on this tubercle. Abdominal segments I to III of *P. impedita* have 3 setae while the other species have two.

Among the three species, *P. tapatia* has a fusion of seta groups De and Dl. *P. colombiana* is very easily distinguished from the others based on it's bigger size (1.5 mm) than the Mexican species (about 1.0 mm). For *P. tapatia* the diagnostic character is the presence of



Figs. 5-8. *Paranura tapatia* sp. nov. 5, dorsal chaetotaxy of Ant. I-IV; 6, body dorsal chaetotaxy; 7, labial chaetotaxy; 8, tibiotarsus III.

Table 2. Total chaetotaxy of *Paranura tapatia* n. sp.

Group of setae	Tubercle	Number of setae	Type of setae	Setae					
Cephalic chaetotaxy									
Cl	—	4	Me	F,G					
Af	—	9	Me	A,B,C,D,O					
Oc	—	2	Me	Oca, Ocm					
Di	—	1	Me	Di1					
De	—	3	Me	De1					
			Mi	De2, Di2					
DI	—	4	Me	(4)					
L,So	—	7	Me	(1)					
			Mi	(6)					
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Vi	Ve	Labrum	Labium	Ant. I,II	Ant. III	Ant. IV			
5	6	2/2,2	9-11	7,11	15+5s	i.+or+8s+12			
	Di	De	DI	L	Scx2	Cx	Tr	F	T
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Postcephalic chaetotaxy									
Th.I	1	2	1		2	1	6	13	18
Th.II	3	2+s	3+s+ms	3	2	6	5	12	18
Th.III	3	2+s	3+s	3	1	7	6	10	17
Abd.I	2	2+s	2	3	TV:4				
Abd.II	2	2+s	2	3	Ve:4				
Abd.III	2	2+s	2	3	Ve:3		Fu:4me		
Abd.IV	2	-----3+s-----		5	Ve:7		VI:2		
Abd.V	1	-----3+s-----		2	Ag:3		VI:5		
Abd.VI		-----7-----			Ve:11		An:2mi		

only one seta at the “Di” group on Abd. V. Finally the vestigial furcula is a knob with six microsetae in *P. impedita*, but there is a complete lack of such microsetae on both new species. *P. tapatia* has tibiotarsal setae reduction compared with the other two species.

NOTE: The new species *P. tapatia* was cited by Palacios-Vargas & Gómez-Anaya (1993) as “*Paranura new species*” from Jalisco State without name or description.

Key to the American Species of *Paranura*

- 1. 3 + 3 ocelli 2
- 1'. 2 + 2 ocelli 7
- 2. Tibiotarsi with 12,12,11 setae, from which 3–4 tenent hairs
P. sexpunctata Axelson 1902
- 2'. Tibiotarsi with 17 or more setae none of them tenent hair. 3
- 3. Abd. V and VI with clavate setae *P. sitchensis* Fjellberg
- 3'. Abd. V and VI without clavate setae 4
- 4. Tubercle Di on Abd. V with one macroseta 5
- 4'. Tubercle Di on Abd. V with no macroseta
P. longisensillata Palacios-Vargas & Deharveng.
- 5. Tubercle Di on Abd. V with one macrosetae and one or two microsetae 6
- 5'. Tubercle Di on Abd V with one macroseta and without microsetae
P. jorgei Palacios-Vargas & Deharveng

6. Tubercle Di on Abd. V with one macroseta and two microsetae
 *P. colorata* Mills
- 6'. Tubercle Di on Abd. V with one macroseta and one microsetae
 *P. sarukhani* Palacios-Vargas & Deharveng
7. With three ocular setae and complete cephalic chaetotaxy (A-G)
 *P. quadrilobata* Hammer
- 7'. With two ocular setae and incomplete cephalic chaetotaxy 8
8. Body with blue pigment *P. impedita* Palacios-Vargas & Deharveng
- 8'. Body without blue pigment 9
9. Vestige of furcula with 8 setae, posterior setae smaller than length of unguis
 *P. nalo* Christiansen & Bellinger
- 9'. Vestige of furcula with 4 setae, posterior setae longer than length of unguis 10
10. Length less than 1 mm; ocular setae of same length. Abd. IV with two groups of
 setae (Di, De + DI). *P. tapatia* sp. nov.
- 10'. Length about 1.5 mm: anterior ocular less than half the length posterior ocular seta.
 Abd. IV with three groups of setae (Di, De, DI) *P. colombiana* sp. nov.

Acknowledgments

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