

## ***Crasiella clauseni*, a New Gastrotrich Species (Macrodasyida, Planodasyidae) from Jeju Island, South Korea**

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### **ABSTRACT**

A new gastrotrich species of the genus *Crasiella* (Planodasyidae) is described from the sublittoral sandy bottom of Jeju Island, South Korea. The family Planodasyidae and the genus *Crasiella* are recorded for the first time from East Asia. *Crasiella clauseni* n. sp. differs from its congeneric species by the combination of characters: absence of cephalic sensory pits; unseparated arrangement of anterior tubes and ventrolateral tubes, comprising about 120 adhesive tubes along whole body length; 5-7 horizontal rows of adhesive tubes and a pair of TbV in the anterior part of pharyngeal region; bifid pedicles with 8-11 posterior adhesive tubes; and tube-shaped seminal receptacle and copulatory organ. This paper deals with description of the new species, and provides a key to the species of genus *Crasiella*.

**Keywords:** taxonomy, Gastrotricha, description, key, East Asia

### **INTRODUCTION**

Marine gastrotrich fauna of East Asia is still poor, in spite of serial taxonomic studies accomplished during the past 10 years and earlier. Twenty eight species of 11 genera have been recorded in five families: Cephalodasyidae, Lepidodasyidae, Thaumastodermatidae, Chaetonotidae, and Xenotrichulide. In Japan, 10 species of seven genera (Saito, 1937; Sudzuki, 1976, 1979; Chang et al., 2002; Lee and Chang, 2011); in Korea, 17 species of six genera (Chang et al., 1998a, 1998b; Chang and Lee, 2001; Lee and Chang, 2002, 2003, 2004, 2006, 2007; Lee et al., 2009); and in the Russian Far East, only one species, *Aspidiophorus oculatus* Todaro, Zotto, Maiorova and Adrianov, 2009 (Todaro et al., 2009) are currently recorded. However, planodasyid gastrotrichs have not been reported from East Asia as yet.

Herein, we describe a new gastrotrich species of the genus *Crasiella* belonging to the family Planodasyidae from a sublittoral sandy bottom at Jeju Island, South Korea. We discuss the taxonomic affinities based on the morphological characters. Moreover, we provide a key to the hitherto known species of genus *Crasiella*.

### **MATERIALS AND METHODS**

Gastrotrichs were collected from the shell-sandy bottom at about 6-7 m in depth around Saeseom islet, which is located 150 m off Seogwipo Harbor at the southern coast of Jeju Island, South Korea.

General sampling methods and extraction process are same with those of Lee et al. (2009), because the specimens were obtained from the same locality with the same collection data as for *Ptychostomella jejuensis* Lee, Hwang and Chang, 2009.

Type specimens have been deposited in the National Institute of Biological Resources (NIBR), Incheon, Korea and also in the authors' collection at the specimen room of the Department of Biology, Daegu University (DB).

Terminology mostly follows Ruppert (1991) and Clausen (2000). Abbreviations used include: fpo, female gonopore; Lt, total length, from anterior tip of head to posterior tip of pedicles including adhesive tubes; mpo, male gonopore; Ph-In, junction between pharynx and intestine; TbA, anterior adhesive tubes; TbD, dorsal adhesive tubes; TbDL, dorsolateral adhesive tubes; TbP, posterior adhesive tubes; TbV, ventral adhesive tubes; TbVL, ventrolateral adhesive tubes; U, percentage unit of Lt, used for the location (U-) from anterior

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to posterior, or for the relative length (-U).

## SYSTEMATIC ACCOUNTS

Order Macrodayida Remane, 1925 [Rao and Clausen, 1970]

<sup>1</sup>\*Family Planodasyidae Rao and Clausen, 1970

<sup>2</sup>\*Genus *Crasiella* Clausen, 1968

<sup>3</sup>\**Crasiella clauseni* n. sp. (Fig. 1)

**Material examined.** Holotype (DBG1601), 14 paratypes (NIBRIV0000245017, 0000245018, DBG1602-13), mounted in glycerin, Korea, Jeju Island, Seogwipo, Saeseom islet, 33° 14'13"N, 126° 33'33"E, 24 Apr 2006, leg, Lee J, Chang CY, Kim SH, in sublittoral sandy sediments containing shell crumbles, 6-7 m deep.

**Etymology.** The proposed specific name is in commemoration of the late Dr. Claus Clausen who established the genus *Crasiella*, and kindly guided us to study taxonomy of marine gastrotrichs.

**Diagnosis.** *Crasiella* with somewhat oblong body, furnished with bilobed caudum; body up to 400 µm long; PhJIn at about U33; dorsal surface smooth without cuticular armature such as hooks, scales and plates; lacking shallow lateral pits with ciliary tufts in cephalic region; without demarcation between TbA and TbVL, bearing about 120 ventrolateral tubes per side, extending along nearly whole body length; anterior tubes aligned in 5-7 horizontal rows, each composed of 2-6 tubes; a pair of TbV implanted mid-ventrally at one-third of pharyngeal region; TbD (L) absent; TbP of 9-10 tubes per side, forming small caudal lobe, each caudal lobe comprising 2 long distal tubes, flanked by 3-4 lateral and 4-5 medial ones; intestine somewhat curved like 'S' at posterior part; testes paired, their tips reaching behind pharyngeal knobs; vasa deferentia U-shaped, located at middle of intestine region; seminal receptacle elongate, tube-shaped with posterior end folded up; copulatory organ locating just behind seminal receptacle, tube-shaped.

**Description.** Holotype: Body (Figs. 1, 2) elongate, oblong, dorso-ventrally flattened, with small bilobed caudum, Lt 385 µm long. Lateral sides of body nearly parallel, weakly constricted in the level of posterior pharyngeal region and a slightly narrowed distal head region. Head indistinct; lacking shallow lateral pits and ciliary tufts. Widths of anterior part of head/PhJIn/trunk/base of caudal lobes 28/41/42/17 µm at U05/U33/U58/U96, respectively.

Dorsal surface somewhat uneven, without cuticular armature like hooks, scales and plates.

Numerous hairs (ca. 12-18 µm long) irregularly arrayed in 2-3 columns per side on subdorsal and lateral surfaces along nearly whole body length (U09-U90); several sensory hairs (ca. 5 µm long) implanted sporadically on anteroventral surface at U01-U03.

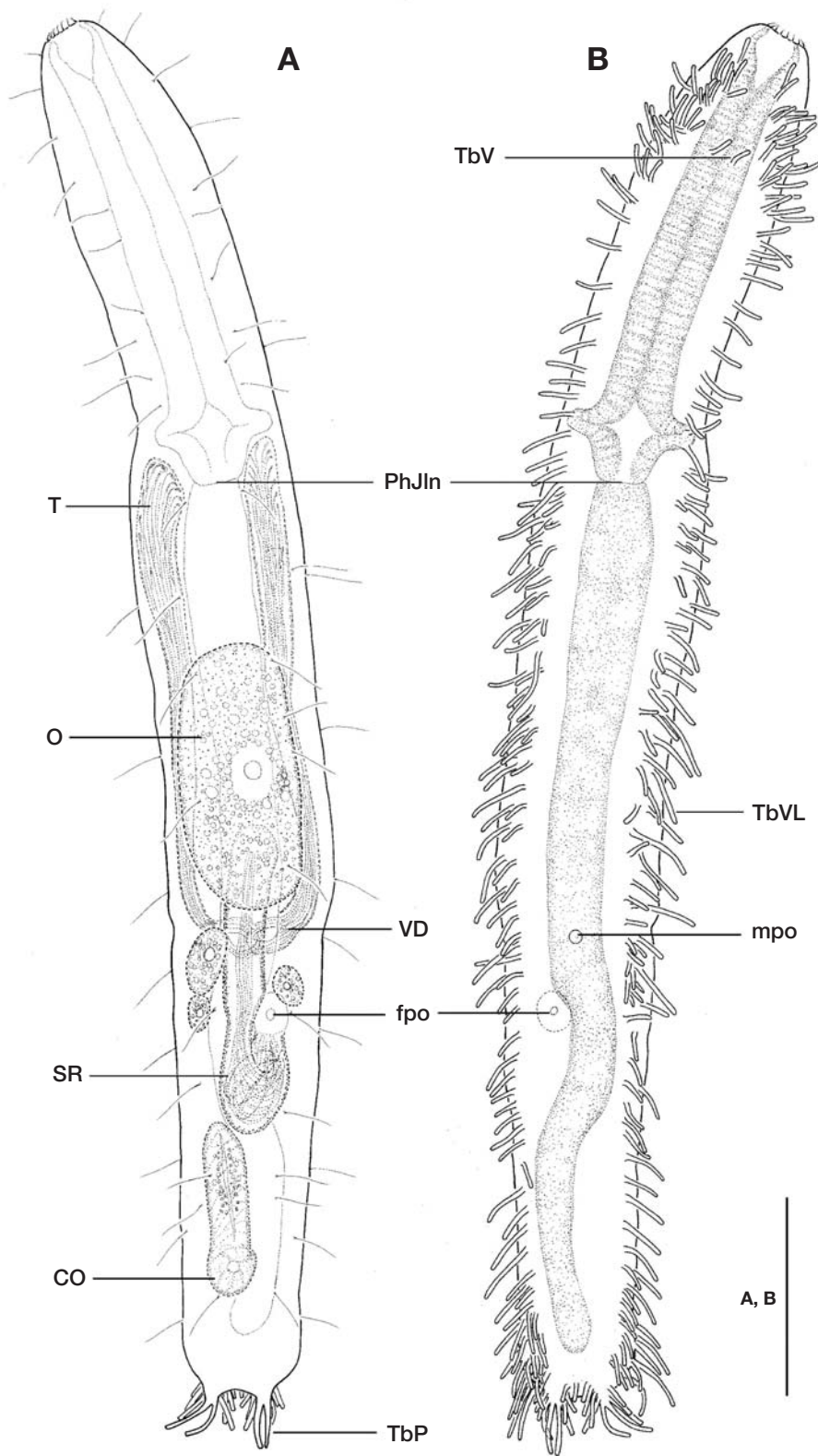
Locomotor ciliation covering entirely ventral surface from rear of oral opening to base of caudum.

Adhesive tubes: TbA and TbVL not obviously separated, 119-123 tubes per side, somewhat slender, with different sizes (ranging from 5 µm to 19 µm long), extending over nearly whole body length (U3-U95) from rear of oral opening to base of caudal lobes. Adhesive tubes in pharyngeal region representing different arrangements of horizontal and longitudinal rows; foremost 2 pairs located rather ventrally at U03 and U04, respectively; 6 horizontal rows per side situating in anterior pharyngeal region from U05 to U13, each row composed of 2-6 tubes (5, 6, 5, 4, 2, 3 tubes in left side and 4, 4, 4, 3, 2, 2 in right, respectively) in different sizes (ca. 6-11 µm long); followed by 14-16 tubes per side, positioned at irregular intervals, forming a longitudinal row in remaining pharyngeal region at U15-33. About 82-85 adhesive tubes per side, ca. 5-19 µm long, arranged irregularly between PhJIn to front of caudal lobes, crowded near posterior end of trunk at level of anus (U94). A pair of TbV (ca. 7 µm long), not foot-type, implanted mid-ventrally in anterior pharyngeal region at U10. TbD (L) absent. TbP comprising 9-10 tubes per side, forming a small caudal lobe, consisting of 2 long distal tubes (15 µm long), 3 lateral (ranging ca. 7-10 µm long) and 4-5 medial ones (ranging ca. 5-8 µm long); lateral and medial TbP gradually decreased in size towards base of caudal lobe.

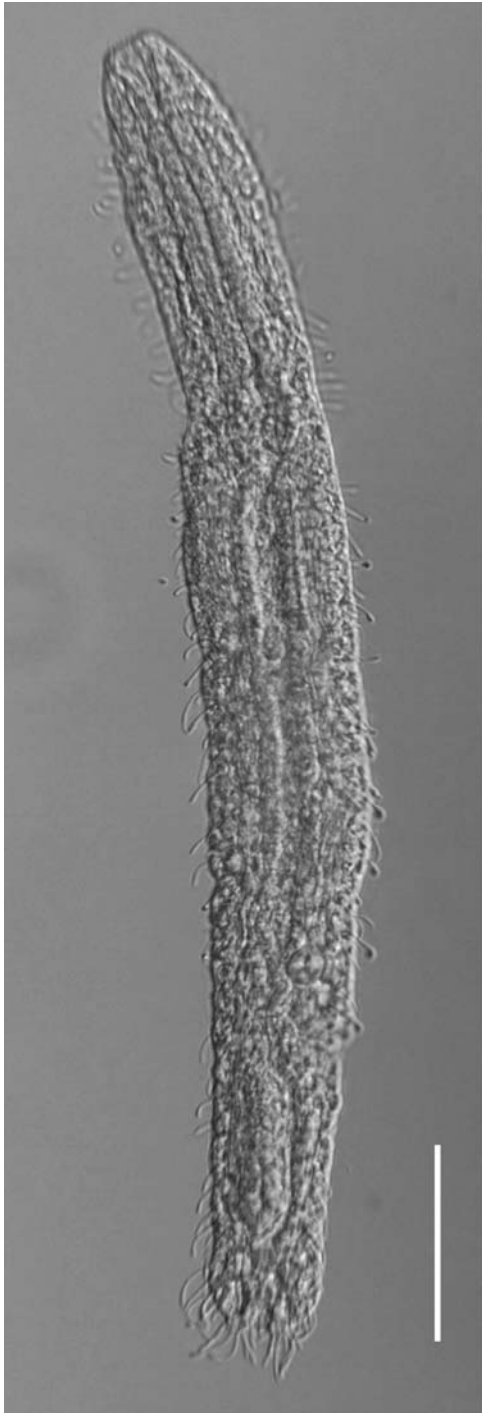
Digestive tract: Oral opening ornamented with corona of 15-18 short hook-like projections (ca. 2-3 µm long) along its terminal edge; buccal cavity funnel-shaped and slightly cuticularized; pharynx 127 µm long, with a pair of pharyngeal pores, opened laterally at U30; intestine broad and straight in its anterior region, then narrowing gradually towards anus, and curved near posterior half of seminal receptacle; anus situated ventrally at U92.

Reproductive system: Testes paired, situated along anterior intestinal region, their tips reaching just behind pharyngeal knobs at U30; vasa deferentia including spermatozoa, coiled and joined at the middle of intestine region at U63-65; mpo emerging from joint of vasa deferentia at U64. Ovum well-developed, ca. 31 × 67 µm, situated dorsally in mid-intestinal region at U44-U62, followed by 3 small oocytes. Seminal receptacle elongate, 77 µm long, tube-shaped with its posterior part a little swollen and folded; posterior end folded, opened (fpo) ventrally on two-thirds of seminal receptacle at U70; situated dorsally from posterior part of ovum to anterior

Korean name: <sup>1</sup>\*납작털배벌레과, <sup>2</sup>\*어리납작털배벌레속, <sup>3</sup>\*어리납작털배벌레



**Fig. 1.** *Crasiella clauseni* new species. A, Habitus, dorsal; B, Habitus, ventral. CO, copulatory organ; fpo, female gonopore; mpo, male gonopore; O, ovum; PhJIn, junction between pharynx and intestine; SR, seminal receptacle; T, testis; TbP, posterior adhesive tubes; TbV, ventral adhesive tubes; TbVL, ventrolateral adhesive tubes; VD, vasa deferentia. Scale bar: A, B=50  $\mu$ m.



**Fig. 2.** *Crasiella clauseni* new species, habitus. Scale bar=50  $\mu$ m.

end of copulatory organ at U57-U78. Copulatory organ (44  $\mu$ m long) tube-shaped with an internal duct, gradually narrowing to its anterior edge, located at U77-U89.

**Variability.** Body lengths of 12 adult specimens ranged 366

to 440  $\mu$ m (mean 396  $\mu$ m, standard deviation 24), and maximum width 41-58  $\mu$ m, measured in glycerin mount.

The number of adhesive tube showed somewhat asymmetrical array and individual variability. Especially, TbVL in the intestinal region ranged from 52 to 83 tubes. In contrast with ventrolateral tubes, the paired TbV was rather consistent, located typically in the anterior pharyngeal region, except for one specimen lacking the pair, and for four specimens with only one tube in one side.

Epidermal glands were not clear in holotype, however, in five paratypes numerous epidermal glands were irregularly scattered at dorsal, dorsolateral, and ventrolateral surfaces, along nearly the whole body length.

Three sub-adults were included among 15 specimens examined, with the body sizes of 281  $\mu$ m, 302  $\mu$ m, 325  $\mu$ m long and 33  $\mu$ m, 42  $\mu$ m, 48  $\mu$ m wide, respectively. They showed fewer ventrolateral and posterior adhesive tubes than in adults: 3-4 horizontal rows (vs. 5-7 in adults) in the anterior-most pharyngeal region; 21-39 ventrolateral tubes in the intestinal region (vs. 52-83 in adults); and 5-6 TbP per side (vs. 8-11 in adults).

**Taxonomic affinities.** To date, six species have been recorded in the genus *Crasiella*, since *C. diplura* was first described from Bergen area, Norway by Clausen (1968): *C. diplura* Clausen, 1968, *C. oceanica* d'Hondt, 1974, *C. pacifica* Schmidt, 1974, *C. indica* Rao, 1981, *C. azorensis* Hummon, 2008 and *C. skaia* Hummon, 2010.

Among them, *C. oceanica* from Roscoff, France (d'Hondt, 1971, 1974) and *C. azorensis* from Azore Islands (Hummon, 2008) are devoid of sensory pits with ciliary tuft in the cephalic region as in *C. clauseni* n. sp. However, *C. clauseni* is distinguished from both the species by a pair of TbV and ventrolateral adhesive tubes, which are not separated into TbA and TbVL, and arranged as 5-7 horizontal rows in the pharyngeal region. According to the d'Hondt's original description (1974), *C. oceanica* has Tb(V)L each bearing a sensory hair on its tip, however, the sensory hairs were not found in subadults from Trezen ar Skoden, France by Hummon (2008).

Other three congeneric species, *C. diplura*, *C. pacifica* from Galapagos Island and Hawaii (Schmidt, 1974; Hummon, 2009), and *C. indica* from India (Rao, 1981, 1993), possess sensory pits with ciliary tufts in the cephalic region. *Crasiella clauseni* n. sp. shares the unipartite ventrolateral tubes with *C. pacifica*. However, *C. clauseni* differs from *C. pacifica* by a large number of ventrolateral adhesive tubes (about 120 tubes, vs. 50 in *C. pacifica*), paired TbV (against absence of TbV in *C. pacifica*), and joint position of vasa deferentia (at middle of intestinal region, vs. anterior third in *C. pacifica*).

*Crasiella diplura* and *C. indica* are different from *C. clauseni* n. sp., besides the sensory pits with ciliary tuft in the cephalic region, by absence of TbV, the arrangement of adhe-

sive tubes in the anterior part of pharyngeal region (a longitudinal row in *C. diplura* and a diagonal row in *C. indica*, vs. 5-7 horizontal rows in *C. clauseni*), and the shape of copulatory organ (oblong in *C. diplura* and pear-shape in *C. indica*, vs. tube-shape in *C. clauseni*).

*Crasiella skaia* from Florida and Bahamas (Hummon, 2010) is characteristic in having a pair of pestle organs which have not been reported in other congeneric species. This species is discernable from *C. clauseni* by an irregular longitudinal row of TbA. Moreover *C. skaia* apparently differs from *C. clauseni* in having fewer ventrolateral tubes, with deficiency of TbVL between anus and caudal base.

**A key to the species of genus *Crasiella* Clausen**

- 1. With pestle organ in the cephalic region ..... *Crasiella skaia* Hummon
  - With sensory pits in the cephalic region ..... 2
  - Without sensory pits in the cephalic region ..... 4
- 2. TbA and TbVL separated ..... 3
  - TbA and TbVL not separated ..... *Crasiella pacifica* Schmidt
- 3. TbA forming 2 longitudinal rows ..... *Crasiella diplura* Clausen
  - TbA forming 1 diagonal row ..... *Crasiella indica* Rao
- 4. With 5-7 horizontal rows of adhesive tubes and a pair of TbV in the pharyngeal region ..... *Crasiella clauseni* n. sp.
  - Without horizontal rows of adhesive tubes and TbV in the pharyngeal region ..... 5
- 5. TbA forming 1 diagonal row ..... *Crasiella oceanica* d'Hondt
  - TbA forming 1 longitudinal row ..... *Crasiella azorensis* Hummon

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