

# Redescription of *Desmotimmia mirabilis* (Timm, 1961) (Nematoda, Desmoscolecida, Desmoscolecidae) from South Korea

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## ABSTRACT

*Desmotimmia mirabilis* (Timm), a rarely known desmoscolecoid nematode species, was discovered for the first time from the Yellow Sea off southwestern coast of Korea. This is the third record of the species, and the first report from the northwestern Pacific region. Redescription is prepared on the basis of a male specimen from South Korea.

**Key words:** Free-living marine Nematoda, Desmoscolecida, Desmoscolecidae, *Desmotimmia*, new record, Korea

## INTRODUCTION

*Desmotimmia mirabilis* (Timm, 1961) is distinguished from other desmoscolecoid nematodes by the peculiar head structure: 3-ring head with 4 labial setae. Since Freudenhammer (1975) established the monotypic genus *Desmotimmia*, no additional species has been added yet.

This species was originally described from the mud flat of Bengal Bay, Pakistan by Timm (1961). However, as the aberrant head structure was defined inadequately, Decraemer (1975) redescribed head structure and refined the generic criteria of Freudenhammer (1975) on the basis of the specimens from the Great Barrier Reef, Australia.

I found a male specimen of *D. mirabilis* among the meiofaunal collection from the Biando Island, Gunsan, off the southwestern coast of Korea. I herein provide a redescription with detailed illustrations and photomicrographs using a differential interference contrast microscope.

## MATERIALS AND METHODS

Nematodes were obtained from the washings of sandy mud sediments containing shell harshes on the southwestern coast of Biando Island, Gunsan, South Korea. In the field, samples were soaked in freshwater for less than a minute for osmotic shock (Kristensen, 1989). Nematodes were decanted and sieved through a fine-mesh net with a mesh size of 64 µm. The filtered specimens were fixed in 4% buffered formalin in sea water.

Specimen was mounted in anhydrous glycerin between two cover slips on H-S slides (Shirayama et al., 1993), a recently developed type of the Cobb slide, observed, measured and photographed using a differential interference contrast microscope (Olympus BX51) equipped with Nomarski optics. Measurements were done with a digital camera for microscope (Cool SNAP 5.0M, Roper Scientific) and a calibration software QCapture Pro (ver. 5.0, Media Cybernetics). All drawings were made with the aid of a camera lucida.

Terminology mostly follows Decraemer (1998).

Conventional abbreviations used in the desmoscolecoid taxonomy as follows: cs, length of cephalic setae; gub, length of gubernaculum; hd, maximum head diameter; L, body length; mbd, maximum body diameter; mbde, maximum body diameter, external material not included, at level of interzone; ph, length of pharynx; sd<sub>n</sub>, length of subdorsal somatic seta on desmenn; spic, length of spicules measured along the median line; sv<sub>n</sub>, length of subventral somatic seta on desmenn; t, tail length; tmr, length of end ring; tmrw, maximum width of end ring. Indices of de Man: a, body length divided by body maximum width; b, body length divided by the pharynx length; c, body length divided by the tail length.

## DESCRIPTION

Family Desmoscolecidae Schepotieff, 1907

Genus *Desmotimmia* Freudenhammer, 1975

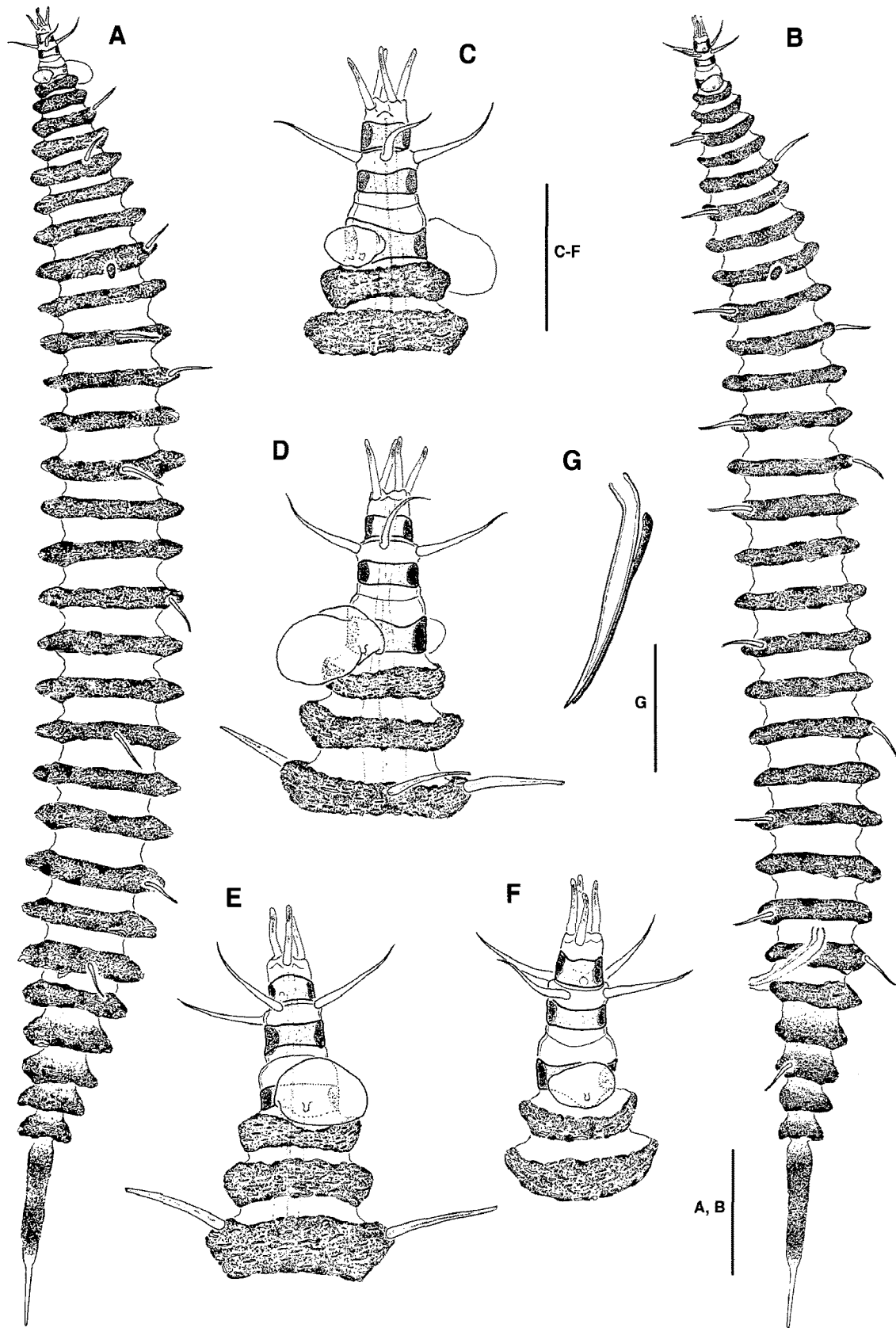
*Desmotimmia mirabilis* (Timm, 1961) (Figs. 1, 2)

*Tricoma mirabilis* Timm, 1961, p. 64, pl. 13, fig. 53a, b;  
Timm, 1970, p. 63, figs. 133, 134.

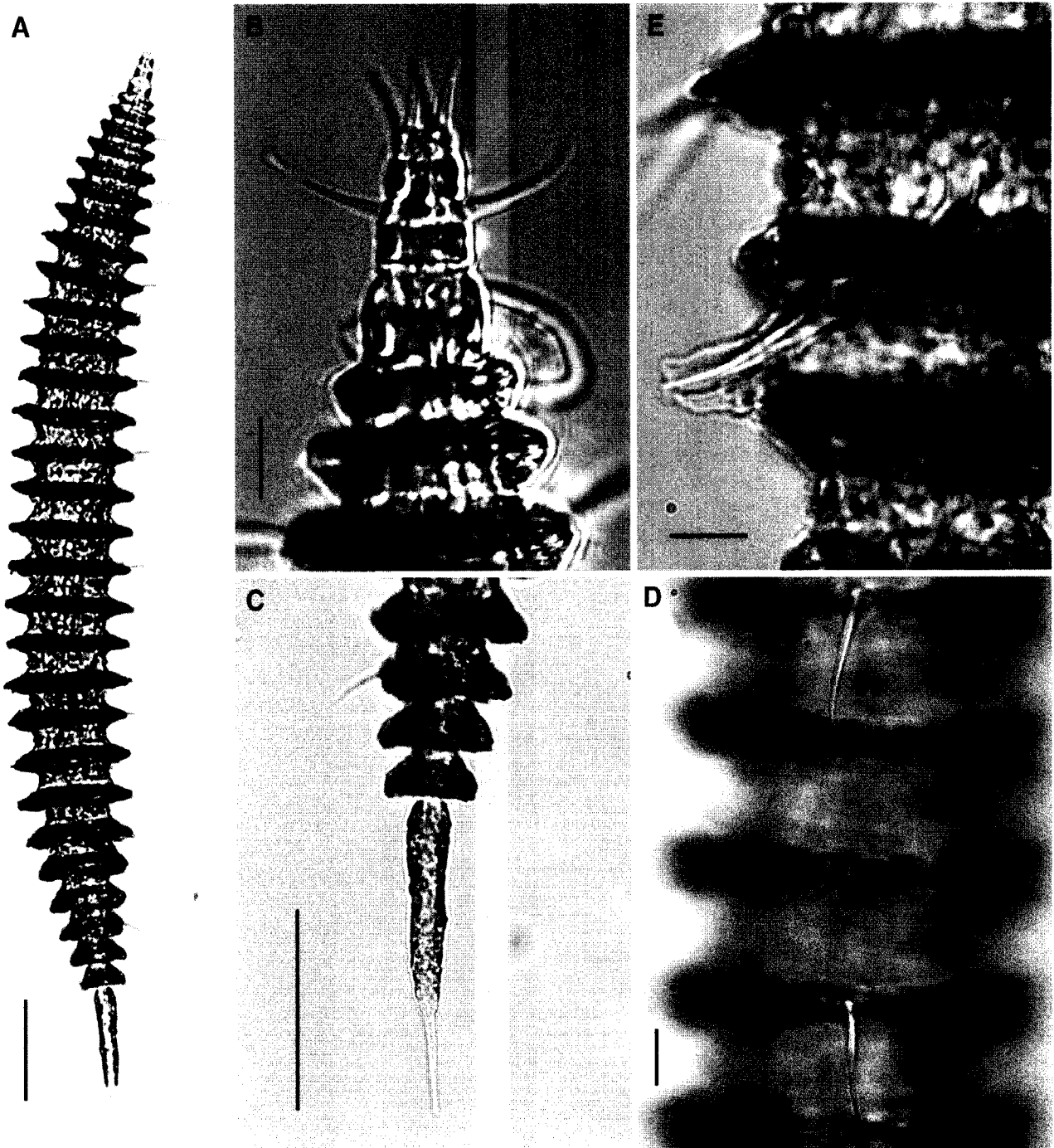
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**Fig. 1.** *Desmotimmia mirabilis* (Timm), male. A, habitus, dorsolateral; B, habitus, lateral; C, head to main ring 3, dorsolateral; D, head to main ring 3, ventrolateral; E, head to main ring 3, lateral (left); F, head to main ring 3, lateral (right); G, spicule and gubernaculum. Scale bars=50 μm (A, B), 30 μm (C-G).



**Fig. 2.** *Desmotimmia mirabilis* (Timm), male (DIC photomicrographs). A, habitus, lateral; B, head to main ring 3, dorsolateral; C, tail part (last three main rings and end ring), lateral; D, subventral setae on main rings 14 and 17; E, spicule and cloacal tube (between main rings 23 and 26). Scale bars=50  $\mu$ m (A, C), 10  $\mu$ m (B, D, E).

*Desmotimmia mirabilis*: Freudenhammer, 1975, p. 192; De-craemer, 1975, p. 191, fig. 1.

*Material examined.* 1 ♂, algal bed, Biando Is. (35° 44'14"N, 126° 28'47"E), Gunsan, 25 Nov. 2000 (C.Y. Chang and J. M. Lee).

*Measurements. Male:* L=525.2; hd=11.6; labial seta=7.1-7.7; cs=14.8; sd<sub>3</sub>=14.8; sd<sub>5</sub>=18.1; sd<sub>10</sub>=18.7; sd<sub>11</sub>=20.0; sd<sub>13</sub>=19.0; sd<sub>16</sub>=16.1; sd<sub>19</sub>=16.1; sd<sub>24</sub>=17.1; sv<sub>3</sub>=15.4; sv<sub>6</sub>=16.8; sv<sub>9</sub>=18.7; sv<sub>11</sub>=19.4; sv<sub>12</sub>=20.0; sv<sub>14</sub>=19.5; sv<sub>17</sub>=18.4; sv<sub>21</sub>=17.1; sv<sub>23</sub>=17.6; sv<sub>27</sub>=17.4; ph=77.4; spinneret=25.2; t=140.0; tmr=75.8; tmrw=11.0; mbd=56.2; mbde

=43.2; spic=40.7; gub=33.6; a=9.4; b=6.8; c=3.8. All measurements are in micrometer ( $\mu\text{m}$ ).

*Description.* Body slender, 525.2  $\mu\text{m}$  long, pale yellow, composed of 3 head rings, 29 main rings (concretion rings) with interzones and end ring. Main rings granular and finely concretized; tapered towards both extremities, getting broader posteriorly till mid-body (between main rings 16-22), then narrowing posteriorly. Interzones much broader than main rings at mid-body, while narrower before main ring 5 and after main ring 24.

Head elongate (about 2 times longer than wide), cylindrical, composed of 3 consecutively broader rings; each ring sclerotized at posterolateral part only; narrow interzones existing between first and second, and between second and third head rings, telescoping into each other.

Two pairs of labial setae, consisting of 2 lateral, 1 right dorsal and 1 left ventral labial setae (left dorsal and right ventral ones lacking, with slight elevations on the positions), situating on anterior border of first head ring sublaterally; thick, 7.1-7.7  $\mu\text{m}$  long, a little tapering distally, and slightly swollen at each one's tip.

Two pairs of cephalic setae rather slender, 14.2-14.8  $\mu\text{m}$  long, nearly as long as sum of first two head rings; tapering distally towards pointed tip; situated on non-sclerotized anterolateral corner of second head ring, without peduncle.

Amphids large, elliptical, covering third head ring and a little exceeding over anterior border of first main ring. Amphidial pores small, rounded, locating near posterior border of sclerotized zone of third head ring.

Pair of ocelli small, oval (3.2  $\times$  5.8  $\mu\text{m}$ ), dark yellow, situated at posterior border of 8th ring.

Somatic setae thick with open tips, flanked by membrane over nearly whole length; setae longest (20.0  $\mu\text{m}$  long) on main rings 11-14, short (14.8-15.4  $\mu\text{m}$  long) on main ring 3. Setal pattern with 6 pairs of subdorsal and 9 pairs of subventral setae, as follows:

subdorsal: right 3, 8, 11, 16, 22=5

subdorsal: left 5, 10, 13, 19, 24=5

subventral: right 3, 6, 9, 11, 14, 17, 21, 23, 27=9

subventral: left 3, 6, 9, 12, 14, 17, 21, 23, 27=9

Spicules narrow, about 40.7  $\mu\text{m}$  long, distal one-third curved; gubernaculum not clear, slender, nearly parallel to spicule. Cloacal tube protruding between main rings 24 and 25.

Tail consisting of 5 main rings and end ring; main rings abruptly narrowed posteriorly. Last main ring without any globular protuberance with thickened cuticular mass. End ring elongated; anterior sclerotized part spindle-shaped, about 5 times longer than wide; naked spinneret narrow, a

**Table 1.** Morphometric data of *Desmotimmia mirabilis* (Timm) (all measurements in  $\mu\text{m}$ )

	Timm, 1961 ( $\sigma$ )	Timm, 1970 ( $\sigma$ )	Decraemer, 1975 ( $\text{♀}$ )	This study ( $\sigma$ )
L	360	375-400		525.2
mbd		50-55		56.2
Labial setae		6	4-6	7.1-7.7
cs		7-8	7.5-14	14.8
spic		32-35		40.7
t		84-91		140
Spinneret		15-17		25.2
a/b/c	6/6.4/4.4			9.4/6.8/3.8

little less than half the length of anterior sclerotized part, 25.2  $\mu\text{m}$  long. Phasmata not observed.

*Habitat.* Collected from the algal bed in Korea. This species was also reported from the mud of Bay of Bengal and among the coral sediments in the Great Barrier Reef, Australia.

*Distribution.* Bay of Bengal, Pakistan; The Great Barrier Reef, Australia; Korea (Yellow Sea).

*Remarks.* As mentioned above, this species is characteristic in having the hexaradial symmetrical labial region with one circlet of only four labial setae. The specimen from Korea fits well with the aberrant head structure described by Decraemer (1975) based on the specimens from the Great Barrier Reef, Australia, except the minor discrepancies of a little longer labial setae (7.1-7.7  $\mu\text{m}$  long against 4-6  $\mu\text{m}$  long in Decraemer's) and cephalic setae (14.8  $\mu\text{m}$  long against 7.5-14.0  $\mu\text{m}$  long in Decraemer's). However, as she described the head structure only, I cannot but rely on the inadequate description of Timm (1961, 1970) for the other morphological characters.

The male specimen from Korea differs a little from the type specimens from the Bengal Bay in two aspects. First, Korean specimen has the more elongate and slender body: 525.2  $\mu\text{m}$  long (a=9.4) against 360-400  $\mu\text{m}$  (a=6) in Timm (1961, 1970). Considering the elongated body of Korean specimen, the relative lengths of labial setae, cephalic setae and tail to total body length, and the indices of de Man "b" and "c" do not show large discrepancies with those of type specimens (see Table 1). Second, the male specimen from Korea shows a little different setal pattern. This species is characteristic in having the peculiar arrangement of subdorsal spines, that is, the alternating (zigzagged) positions, not showing the general arrangement of bilateral symmetry. Korean specimen abides by the rule of alternating setal positions, while the setal formula in Timm (1970) shows the bilateral symmetry of the first pair on the main ring 3. Furthermore, in the setal pattern of subventral setae, the first two pairs situate on the main rings 3 and 4 (against on the main rings 4 and 5 in the specimens from the Bengal

Bay), and the antepenultimate pair on the main ring 21 (against on the main ring 20 in the specimens from the Bengal Bay). However, considering the size variation and the setal abnormalities shown in Desmoscolecida nematodes, the discrepancies between the specimens from the Bengal Bay and the Korean specimen are apparently within the range of the intraspecific variation.

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