

Redescription of *Dintheria tenuissima* de Man, 1921 (Nematoda: Bastianidae)

Alexei V. Tchesunov* and Dieter Sturhan**

*Department of Systematics, Comparative Anatomy and Ecology of Invertebrates, Faculty of Biology, Moscow State University, Moscow, 119899, Russia,

**Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Nematologie und Wirbeltierkunde, Toppheldeweg 88, 48161 Münster, Germany.

Accepted for publication 23 September 2001

Summary. *Dintheria tenuissima*, originally described from a single male in the Netherlands and reported also from Siberia, was found at two sites in western and northern Germany. Based on several males, females and juveniles a redescription of the species is given. Some newly revealed morphological details, such as dorsally coiled amphids, antidromously reflexed ovaries and the presence of two circles of six and four cephalic setae confirm the position of *Dintheria* within the family Bastianidae. *Dintheria* differs from *Bastiania*, the only other genus of Bastianidae, mainly by absence of copulative setae and larger wart-shaped supplementary organs in the males and subcylindrical tail curved ventrad, with blunt terminus without a mucro. An emended diagnosis of the genus is given.

Key words: Bastianidae, diagnosis, *Dintheria tenuissima*, Germany, redescription, soil nematodes, taxonomy.

The genus *Dintheria* is considered as one of the rarest and least known genera of soil nematodes. De Man (1921) established the genus with the species *D. tenuissima* on the basis of a single male found in May 1919 in a soil sample from river bank vegetation at the river Aa in the vicinity of the village Dinther in the Netherlands. Since the original discovery this species was recorded from the Primorski Region of the Russian Far East by Eroshenko (1977), who found two females in a forest soil sample. Bongers (1988) reported *D. tenuissima* from a second site in the Netherlands, in grassland near Achterberg, but wrote at the same time, that the species had never been found since its original discovery. In 1987, this species was found by the second author for the first time in Germany close to the border with the Netherlands and in 1990, at a second site in northern Germany. Based on males, females and juveniles from Germany a redescription of *D. tenuissima* is given and an emended diagnosis of the genus is proposed.

MATERIAL AND METHODS

Soil samples were taken at Kevelaer-Twisteden

from the upper 30 cm soil layer and the nematodes were extracted from soil using the centrifugation-flotation method with MgSO₄. The whole nematode suspensions were fixed with TAF, transferred to glycerin by a slow evaporation method and *Dintheria* specimens were mounted on glycerin slides. In contrast to most other soil nematodes in the same suspensions, the *Dintheria* specimens did not fix well and the males, females and juveniles used for the present study are in a poor condition. Permanent slides with these specimens are deposited in the German Nematode Collection at Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Nematologie und Wirbeltierkunde, Münster, Germany.

DESCRIPTION

Dintheria tenuissima de Man, 1921 (Figs. 1-3)

Morphometrics. see Table 1.

Morphology. Body very slender, cylindrical, thread-like. Cuticle distinctly annulated, annuli 1.3-1.7 µm wide, no lateral differentiation visible.

Lip region with six minute papillae. Six 7-8 µm long cephalic setae (which appear to be jointed),

Table 1. Morphometrics of *Dintheria tenuissima*.

Character	Germany (original)					Netherlands (de Man, 1921)	Russia (Erosenko, 1977)
	1st ♂	2nd ♂	3th ♂	4th ♂	♀	1 ♂	2 ♀♀
Body length (µm)	1410	1430	1560	1540	1465	1524	1610, 1730
a	78	92	91.5	106	71	90	62, 69
b	5.5	5.5	7.0	?	6.0	7	5.2
c	42	29	37	46	30.5	32	26
c'	3.5	?	3.2	3.9	4.1	3.4*	4.5*
V	—	—	—	—	56	—	59, 62
Body diameter (µm) at							
cephalic setae	6.5	7.5	7.0	7.5	6.5	8*	8*
nerve ring	?	?	14	12	12.5	?	?
cardia	14	13	15	12	14	?	18*
midbody	18	15.5	17	14.5	20	17*	25, 26*
anus	15	14	14	13	11	15*	15*

* Calculated from figures or measurements.

followed by a second circle of four indistinct 3 µm long setae. Amphids 10.5–13 µm from anterior end, relatively large, 5.5 µm wide (= almost 60 % of corresponding body diameter), appearing transversely oval at surface focusing, as depicted in the original description (de Man, 1921, p. III, Fig. 5). Fovea comma-like, dorsally spiral, with distinct cuticular edging. Amphidial nerve descending from the ventral branch and dilating into the subcuticular fusus showing a fine longitudinal striation.

In both sexes one or two short lateral setae on each body side in mid-neck region; in females immediately behind vulva four short setae in sub-ventral and subdorsal position.

Mouth opening small, buccal cavity very minute and indistinct, with weakly differentiated and non-sclerotized walls. Stoma 2.0–2.5 µm wide and 1.5–3.0 µm long. Pharynx slender, slightly widened in postneural region, with distinct internal cuticular lining and weak radial striation throughout its length. Cardia external, rounded or in shape of truncated cone. A rather large cell with hyaline cytoplasm present posterior to the cardia. Large vacuoles present in the lumen of the midgut throughout its length.

Female reproductive system amphidelphic, with two antidromously reflexed ovaries. The anterior gonad situated ventrally and somewhat shifted to the left of the intestine, the posterior gonad to the right of the intestine. Each ovary contains one elongated mature oocyte with coarsely granulated cytoplasm. Germinative zone very small and triangular. Uteri filled with spermatozoa.

Male reproductive system diorchic. Spermato-

zoa small, rounded or pear-shaped, 2x3 µm in size. Spicules very weak, arched, with acute distal and tapered proximal ends, 16.0–20.5 µm (chord) and 18.6–23.8 µm (arch) long. One midventral pore just anterior to the cloacal opening and 10–13 preanal midventral supplementary organs. Each supplement appearing as a wart with a tiny apical papilla and thin axial canal. Anterior supplements separated from each other by greater distances than posterior ones. Distances between apex of the adjacent supplements from the posterior (just precloacal) anterioriad in one male: Anus-I = 16 µm, I-II = 12 µm, II-III = 5.5 µm, III-IV = 13 µm, IV-V = 7 µm, V-VI = 13 µm, VI-VII = 10.5 µm, VII-VIII = 9.5 µm, VIII-IX = 12.5 µm, IX-X = 10.5 µm, X-XI = 14 µm, XI-XII = 15 µm, XII-XIII = 27 µm. No cervical copulatory midventral setae.

In both sexes tail short, subcylindrical, with rounded terminus and always curved ventrad. Caudal glands, terminal spinneret or caudal tube absent. One lateral seta at both sides 6–10 µm from tail terminus, 3 µm long and 1 µm wide at base.

Juveniles in general appearance similar to adults. Shape of tail as in adults, lateral setae on tail present. Both circles of cephalic setae at the same level.

Localities and habitat. Kevelaer-Twisteden, Nordrhein-Westfalen, Germany. Field balk of 1–1.2 m width, with grasses and various herbs, loamy sand, pH 5.4, 3.5 % organic matter and adjoining meadow, loamy fine sand, pH 7.0, 2.9 % organic

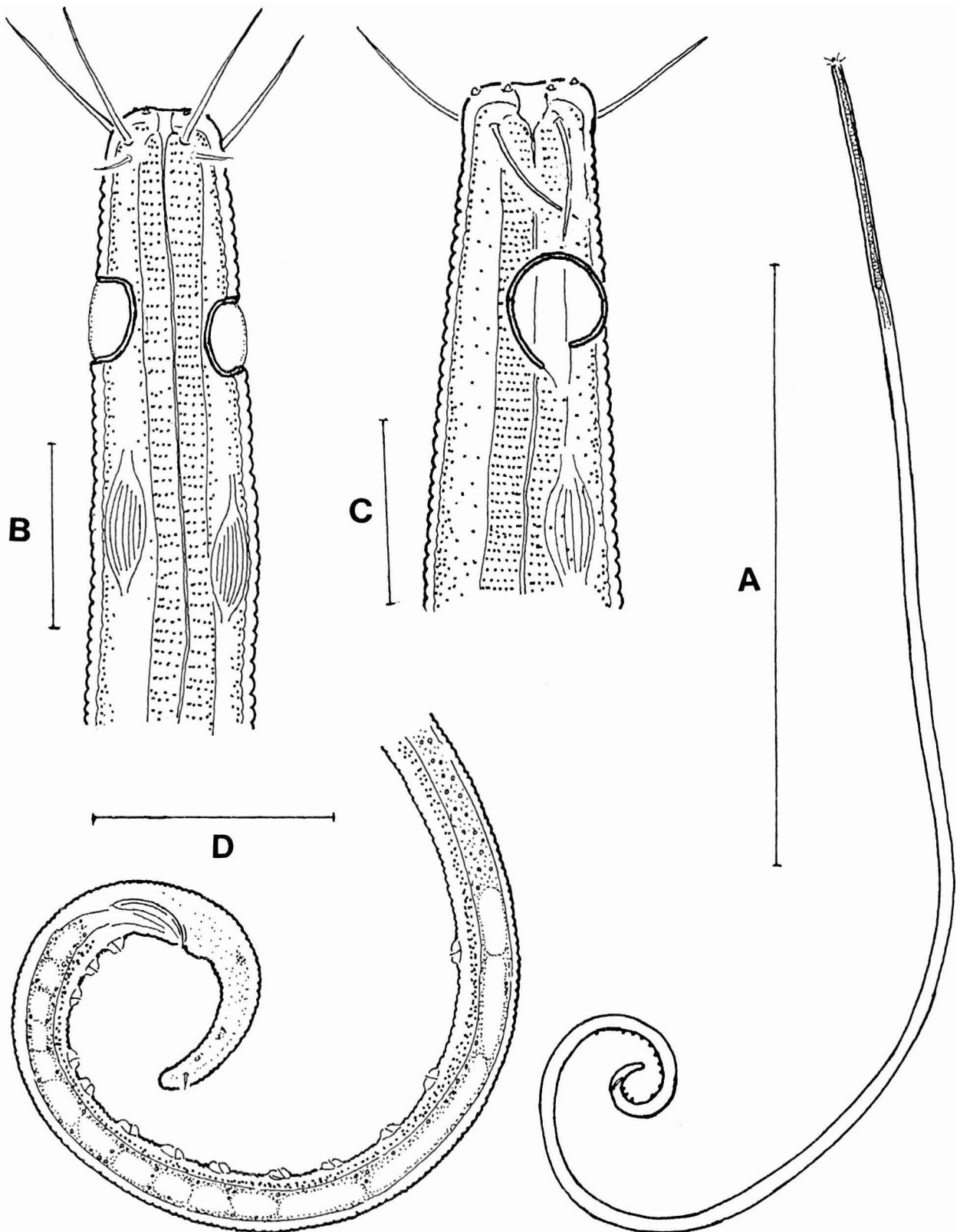


Fig. 1. *Dintheria tenuissima*, male: A: Entire view (male no. 4); B: Cephalic end, dorso-ventral view (male no. 4); C: Cephalic end, lateral view (male no. 2); D: Posterior body (male no. 4). Scale bars: A – 500 μm ; B, C – 10 μm ; D – 50 μm .

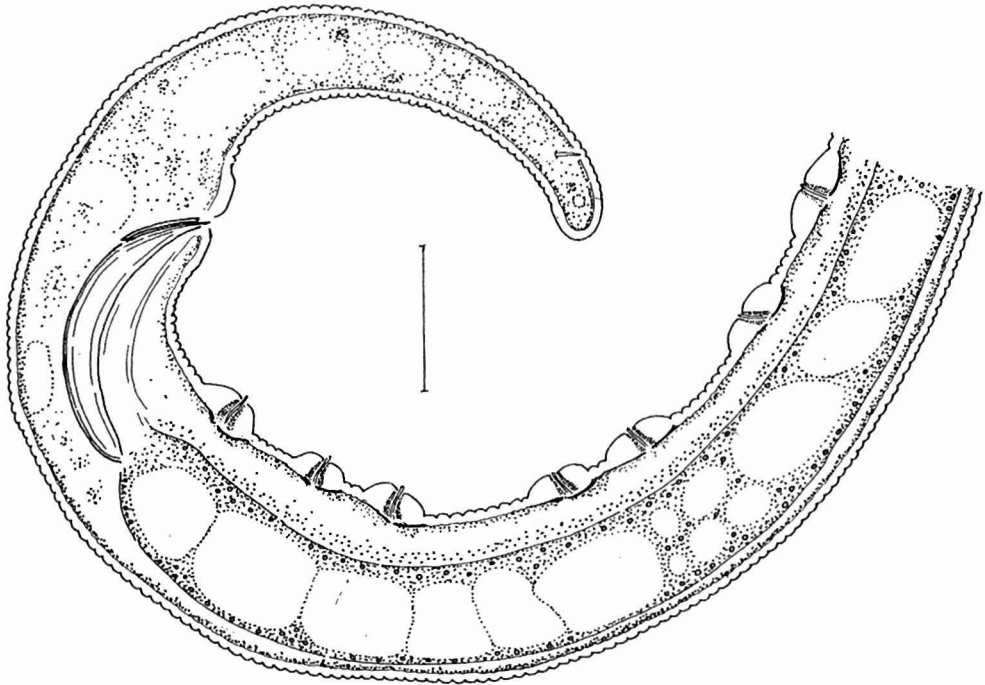


Fig. 2. *Dintheria tenuissima*, male: Tail, spicules and supplementary organs of male no. 4. Scale bar: 10 μ m.

matter. In five 250g soil samples taken from the field balk an average of seven *Dintheria* specimens were isolated and a single specimen occurred in one sample from the meadow. None was found in five soil samples from the neighbouring field. The samples were taken in April 1987, processed and the nematodes studied by Thoenissen (1988). From several soil samples collected at the same site in November 1999 no *Dintheria* specimens could be isolated.

A single *Dintheria* juvenile was recovered in a soil sample taken in July 1990 at Heeslingen near Zeven, Niedersachsen, Germany. The sample was collected from river bank vegetation with grasses, nettle, hop and elm-trees at the river Oste; the soil was moist loamy sand with pH 5.9.

DISCUSSION

Dimensions and structural characters of our recently found *D. tenuissima* specimens from Germany correspond well with the original description and diagnosis by de Man (1921). Our study revealed some new morphological details which support the relationship of *Dintheria* to *Bastiania* and thus justify the position of *Dintheria* in the family Bastianidae de Coninck, 1935. These characters are (1) the dorsally coiled amphid, (2) the antidromously reflexed ovaries [both characters evaluated by Lorenzen, (1981)], and (3) presence

of 6 + 4 cephalic setae arranged in two separate but close circles.

Dintheria differs from *Bastiania*, the only other genus of Bastianidae, by the following features: (1) absence of cervical midventral copulatory setae known for many, if not all, *Bastiania* species, (2) larger wart-shaped supplements restricted to the posterior region of the males, and (3) subcylindrical tail curved ventrad, with rounded terminus devoid of a mucro (tail generally conoid, curved dorsad or straight and tail tip with mucro in *Bastiania*).

The two *D. tenuissima* females reported by Eroshenko (1977) from the Russian Far East agree in body length and other dimensions with the original diagnosis given by de Man (1921) and with the specimens from Germany (Table 1). Eroshenko recorded the presence of a second circle of short cephalic setae, which had not been observed by de Man. The presence of a terminal tube on the tail reported by Eroshenko (1977) has been neither mentioned by de Man (1921) nor observed by us.

Diagnosis of *Dintheria* de Man, 1921 (emended)

Bastianidae. Body very slender, thread-like. Cuticle annulated, without lateral differentiation; a few short setae in mid-neck region, vulva region

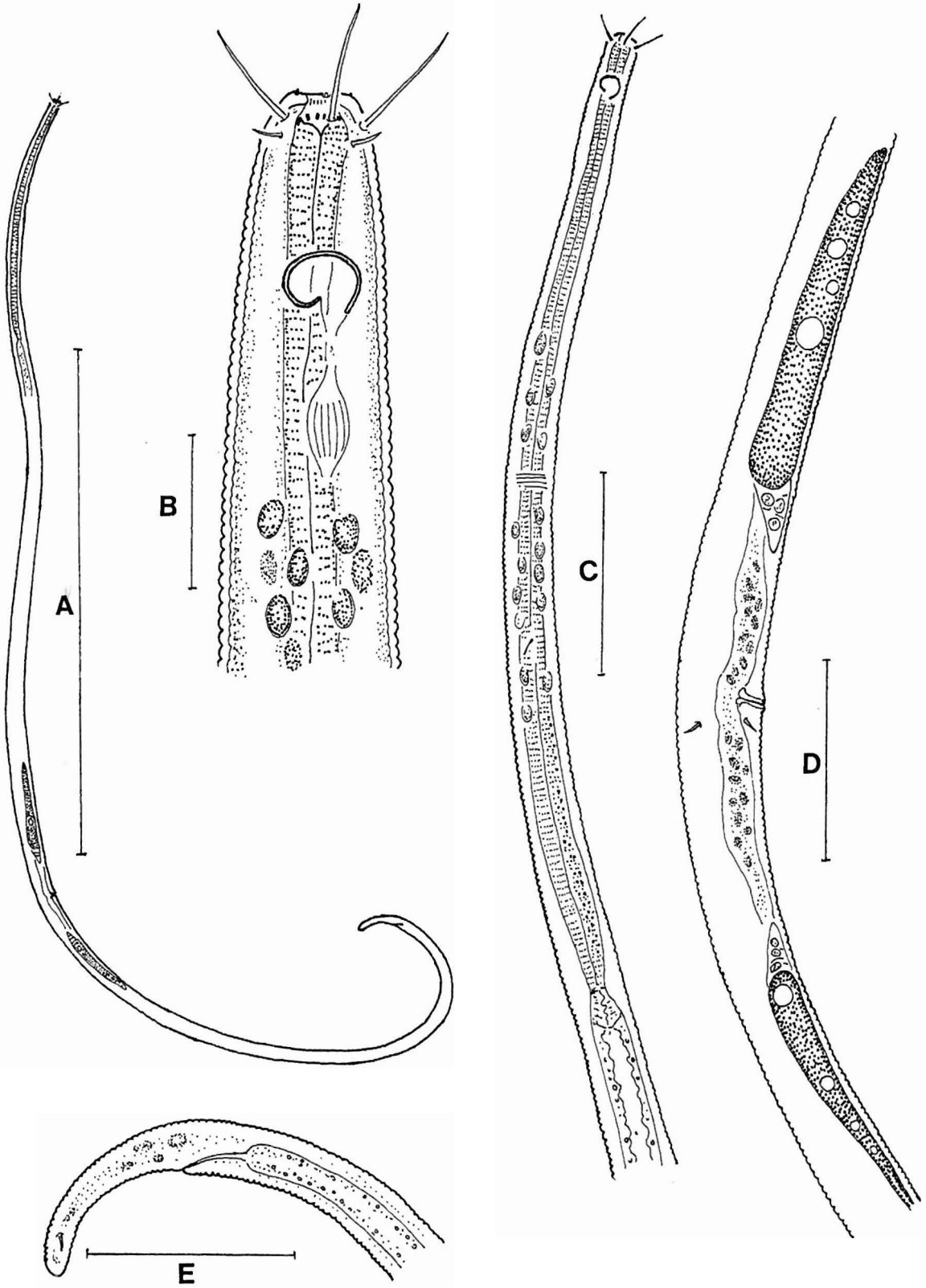


Fig. 3. *Dintheria tenuissima*, female: A: Entire view; B: Cephalic end, lateral view; C: Anterior body; D: Genital branches; E: Tail. Scale bars: A – 500 μm ; B – 10 μm ; C, D, E – 50 μm .

and on tail. Head end with 6+4 cephalic setae. Amphids large, transversely oval, dorsally spiral. Stoma small, pharynx slender, only slightly widened posteriorly. Tail in all developmental stages subcylindrical and curved ventrad, with rounded terminus lacking a mucro. Female reproductive system amphidelphic, male reproductive system diorchic. Spicules paired, arched. Series of mid-ventral wart-shaped precloacal supplements present; no cervical midventral copulatory setae.

Type and only species: *Dintheria tenuissima* de Man, 1921.

ACKNOWLEDGEMENTS

The first author is grateful to the German Academic Exchange Service (DAAD) for financial support and the opportunity to visit the Institute for Nematology and Vertebrate Research of the Federal Biological Research Centre for Agriculture and Forestry in Münster, Germany, in 1999.

REFERENCES

- Bongers, T. 1988. *De nematoden van Nederland*. Koninklijke Nederlandse Natuurhistorische Vereniging: Natuurhistorische bibliotheek nr. 46, Utrecht. 408 pp.
- Eroshenko, A.S. 1977. [Nematodes of the orders Araeolaimida and Dorylaimida from the Primorski Region]. In: "Paraziticheskie i svobodnozhivustchie chervi Fauny Dalnego Vostoka". *Trudy Biologopochvennogo Instituta*, Novaja seria 47 (150): 3-20.
- Lorenzen, S. 1981. Entwurf eines phylogenetischen Systems der freilebenden Nematoden. *Veröffentlichungen des Instituts für Meeresforschung in Bremerhaven*, Supplement 7: 1-472.
- De Man, J.G. 1921. Nouvelles recherches sur les Nématodes libres terricoles de la Hollande. *Capita Zoologica* 1: 1-62.
- Thoenissen, G. 1988. Die Bedeutung von Saumbiotopen für die Nematodenfauna des Bodens, dargestellt an vergleichenden Untersuchungen in Grünland, Feldrainen und im Ackerland. M. Sc. Thesis, University Münster, 113 pp.

Tchesunov A. V., Sturhan D. Переописание *Dintheria tenuissima* de Man 1921 (Nematoda: Bastianidae).

Резюме. Вид *Dintheria tenuissima*, описанный по единственному самцу из Нидерландов и отмеченный также в Сибири, был обнаружен в двух пробах из западной и северной Германии. Предложено переописание, основывающееся на нескольких самцах, самках и личинках. Некоторые вновь обнаруженные особенности их морфологии, такие как дорсально закрученные амфиды, антидромные яичники и наличие двух кругов из 6 и 4 щетинок, подтверждают отнесение *Dintheria* к семейству Bastianidae. *Dintheria* отличается от *Bastiania*, единственного другого рода Bastianidae, главным образом, по отсутствию копулятивных щетинок, более крупными бородавкообразными супплементарными органами и субцилиндрическим, загнутым вентрально хвостовым концом с тупой оконечностью и без мукро. Предложен измененный диагноз рода.
