

On the occurrence of *Scutellonema bizanae* and a new record of *Neodolichodorus rostrulatus* in Brazil

Luiz Carlos C.B. Ferraz¹, Ailton R. Monteiro¹ & Claudio M.G. Oliveira²

¹Universidade de São Paulo, ESALQ, Setor de Zoologia, 13418-900, Piracicaba (SP), Brasil.

²Instituto Biológico, C. Postal 70, 13001-970, Campinas (SP), Brasil.

Autor para correspondência: lccbferr@esalq.usp.br

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Scutellonema bizanae is reported for the first time in Brazil. Measurements of male and female specimens are presented and briefly discussed. *Neodolichodorus rostrulatus*, originally described from a single female collected in the state of Bahia, is recorded for the second time in Brazil, from soil collected at Cananéia, state of São Paulo. The variability observed on morphological (tail shape of the juvenile stages in particular) and morphometrical (body length, stylet length, distance from anterior end to the pharyngo-intestinal junction, distance from anterior data to the excretory pore, length of spicules and gubernaculum) data among populations from Brazil, Costa Rica, and Senegal are discussed. It is suggested that *N. rostrulatus* may represent a species complex.

Key words: *Scutellonema*, *Neodolichodorus*, occurrence, Brazil.

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O encontro de *Scutellonema bizanae* no Brasil é relatado pela primeira vez. Dados morfométricos de machos e de fêmeas são apresentados e brevemente discutidos. *Neodolichodorus rostrulatus*, espécie descrita originalmente com base em uma única fêmea coletada no Estado da Bahia, é registrada no Brasil pela segunda vez, tendo sido obtida de solo coletado em Cananéia, estado de São Paulo. A variabilidade observada na morfologia (forma da cauda dos juvenis, em particular) e morfometria (comprimento do corpo, comprimento do estilete, distância do término anterior ao final do esôfago, distância do término anterior ao poro excretor, comprimento dos espículos e do gubernáculo) da espécie entre populações do Brasil, Costa Rica e Senegal é discutida. Sugere-se que *N. rostrulatus* possa representar, na verdade, um complexo de espécies.

Palavras-chaves: *Scutellonema*, *Neodolichodorus*, ocorrência, Brasil.

Content

During a nematological survey in the Atlantic forest region in São Paulo state, southeastern Brazil, two soil samples collected from around roots of an unidentified weed species growing in a sandy beach located in the municipality of Cananéia yielded specimens of *Scutellonema bizanae* van der Berg and Heyns, 1973 and *Neodolichodorus rostrulatus* (Siddiqi, 1976) Siddiqi, 1977. Because the first species represents a new record for Brazil and the latter has rarely been found, a note regarding their morphometrics has been prepared. Nematodes were extracted from soil using a sieving-centrifugation technique (Jenkins, 1964), relaxed in hot water, fixed in hot formalin and mounted in dehydrated glycerin by the glycerol-ethanol method (Seinhorst, 1959).

Scutellonema bizanae

In a study dealing with the Hoplolaiminae from South Africa, Van der Berg & Heyns (1973) described *Scutellonema bizanae* and *S. multistriatum*, two closely related species that, according to the authors, could be differentiated mainly by spicule length and body annule width. However, Germani *et al.* (1985) reexamined paratypes of both species and concluded that, in light of the similarities between the measurements recorded for these two characters, *S. multistriatum* should be considered a synonym of *S. bizanae*, an action that was subsequently supported by Fortuner (1987) and later also by Siddiqi (2000). This is the first report of *S. bizanae* in Brazil, where *S. bradys* (Steiner & LeHew, 1933) Andrassy, 1958 and *S. brachyurus* (Steiner, 1938) Andrassy, 1958 are the only previously recorded members of the genus (Costa Manso *et al.*, 1994). Measurements (mean \pm sd and range) for a number of Brazilian female and male specimens were as follows:

Female (n = 18): L = 757 $\mu\text{m} \pm 39.9$ (686-828); a = 22.7 ± 3.23 (18.2-30.0); b' = 5.9 ± 0.55 (4.7-6.5); c = 40.6 ± 4.65 (36.5-51.0); c' = 0.8 ± 0.06 (0.72-0.88); V = 58 % ± 1.35 (55.2-60.5); spear = 28.1 $\mu\text{m} \pm 0.92$ (25.9-29.2); o = 26.7 % ± 4.79 (19.8-32.8).

Male (n = 10): L = 745 $\mu\text{m} \pm 37.4$ (680-788); a = 21.1 ± 2.98 (18.5-25.8); b' = 5.3 ± 0.26 (4.9-5.5); c = 37.3 ± 2.34 (34.5-41.0); c' = 1.15 ± 0.07 (1.08-1.32); spear =

27 $\mu\text{m} \pm 0.75$ (25.8-28.4); o = 21.2 % ± 2.5 (17.8-24.5); spicules = 28.1 $\mu\text{m} \pm 1.56$ (25.2-30.1); gubernaculum = 12.7 $\mu\text{m} \pm 1.4$ (10.0-13.8).

Measurements of Brazilian adult male and female specimens accord with those of African specimens of *S. bizanae* (Van den Berg & Heyns, 1973; Germani *et al.*, 1985). The morphometrical values calculated for most characters of the Brazilian and African populations overlapped. This should be expected as a relatively large variation already had been reported for the measurements of *S. bizanae* and particularly *S. multistriatum* in their original descriptions (Van den Berg & Heyns, 1973). Despite this, some minor differences were noticed in our study. For example, values of c' obtained from Brazilian females were closer to those of *S. multistriatum* than of *S. bizanae*, as recorded by Germani *et al.* (1985) for African specimens. The same occurred with the males, regarding the measurements of spicules and gubernaculum. However, in general both species are morphologically and morphometrically almost indistinguishable. Accordingly, *S. multistriatum* should be regarded as a synonym of *S. bizanae* as proposed by Germani *et al.* (1985).

Neodolichodorus rostrulatus

Neodolichodorus rostrulatus was originally described as *Plesiodorus rostrulatus* based on a single female recovered from a Brazilian marine sandy soil, from around roots of coconut (*Cocos nucifera* L.) at Valença, state of Bahia (Siddiqi, 1976). Subsequently, *Plesiodorus* was considered as a junior synonym of *Neodolichodorus* Andrassy, 1976 (Siddiqi, 1977). An adequate redescription of the species was provided from an African population found in soil collected from the rizosphere of tomato (*Lycopersicon esculentum* Mill.) near Tiaroye, Senegal (Luc *et al.*, 1987). Subsequently, the species was recorded from Costa Rica, occurring around roots of coconut and a wild gramineous species (*Eustachys petraea*) in a sandy soil at Westfalia, province of Limón (Lopez & Salazar, 1989). This is the second report of *N. rostrulatus* from Brazil. Measurements of a small Brazilian population comprising two males, one female and five J₄ juveniles are provided in Table 1.

Except for a few characters, the two populations from the Americas (Costa Rica and Brazil) were quite

similar morphologically and fitted well the measurements of the holotype (Table 1). However, as for the population from Costa Rica, the Brazilian specimens showed quantitative differences from the African specimens used in the redescription of the species (Table 1). For example, the mean values calculated for the body length, distance from the anterior end to the pharyngo-intestinal junction, distance from the anterior end to the excretory pore, stylet length of males and females, and spicules and gubernaculum length from Senegal were higher than those of the adult specimens from Costa Rica and Brazil. Similar differences were noticed in relation to the J₄ juveniles when African specimens were compared only to specimens from Brazil. Only the values determined for the ratios a, b, V, and m (= stylet cone length/stylet total length) in all populations overlapped and fitted the holotype's measurements. Some other features, such as the position of the hemizonid (usually

3-4 annules posterior to the excretory pore) and phasmids (anterior to the anus), also did not differ in all cases. A distinct but shallow ventral depression of the cuticle at the vulva seems to be a remarkable specific character as it was evident in the holotype and females of all other populations. A heavy sclerotization is often noticeable at the distal part of vagina in lateral view, sometimes being asymmetrical and looking like the beak of a bird of prey, but appearing flattened and more attenuated in ventral view, as recorded in the single female examined in our study. The basic structure of the female reproductive system was identical in all populations. The most remarkable difference between the specimens we studied and those from Senegal and Costa Rica was in the length and shape of the tail. The Brazilian female and J₄ juveniles examined did not exhibit the typical obtuse, subclavate to hemispherical, tail of the species. Actually, it was more elongated than the usual, resulting in higher c' values (Table 1) and

Table 1 - Morphometrical data of *Neodolichodoros rostrulatus* populations from Brazil [present study and type population (Siddiqi, 1976)], Costa Rica (Lopez & Salazar, 1989) and Senegal (Luc *et al.*, 1987).

	Brazil (present study)			Brazil (Siddiqi, 1976)		Costa Rica		Africa		
	J ₄	♀	♂	♀	♀	♂	J ₄	♀	♂	
n	5	1	2	1	10	10	10	20	20	
L	992	1230	1223	1560	1495	1152	1200	1800	1500	
	864-1109*		1185-1260		1372-1676	1040-1356	1030-1300	1570-2010	1360-1660	
phij	170	190	201	-	216	196	204	250	235	
	160-174		190-212		200-227	177-212	183-215	225-263	221-248	
exc. pore	131	138	139	-	-	-	155	188	173	
	123-136		130-148				135-163	166-207	152-186	
a	33.9	37	45	41	39.2	35.8	33.5	40	40	
	31-38		43-47		33.4-45.9	30.4-41.1	29.2-35.9	34.2-44.5	32.4-46.6	
b	5.8	6.6	5.9	7.2	6.9	5.87	5.8	7.2	6.4	
	5.4-6.5		5.8-6.0		6.2-7.7	5.62-6.86	5.5-6.1	6.6-7.8	5.6-7.0	
c	35.8	50	51.5	78	92.0	40.6	50.5	79.4	53.0	
	32-38		50.5-52.5		80.7-127.3	33.3-54.0	40.5-69.2	63.3-106.1	43.6-66.7	
c'	1.22	1.1	1.28	0.65	0.54	1.40	0.9	0.6	1.2	
	1.10-1.28		1.21-1.35		0.44-0.64	1.00-1.68	0.7-1.0	0.5-0.8	0.9-1.4	
V	-	55	-	56	55.4	-	-	55.9	-	
					52.4-58.4			53.1-58.2		
stylet	78.5	83	82	91	85	78	81.5	96	94	
	77-80				80-88	73-83	74-85	91-103	87-99	
spicule	-	-	45.5	-	-	44	-	-	55	
			45-46			42-46			52-59	

All measurements are in µm; phij = distance from anterior end to pharyngo-intestinal junction

* minimum and maximum values determined.

gradually tapering to the rounded terminus.

In addition to the quantitative differences, Lopez & Salazar (1989) noted that morphological variation also occurred between the population from Costa Rica, the Brazilian holotype (Siddiqi, 1976) and the population from Senegal (Luc *et al.*, 1987). According to their observations, except in the African females, the lateral fields at the level of the phasmids were completely areolated, a condition that also existed in the female examined in this study. Another important distinction was the tail shape in the juvenile stages. In the redescription of the species, Luc *et al.* (1987) observed that the tail was conical and typically pointed, in both J₂ and J₃, but rounded in the J₄ juveniles from Senegal. However, Lopez & Salazar (1989) reported that the J₂ juveniles had a pointed tail while it was rounded and hemispherical in the J₃ and J₄ in the population from Costa Rica. In the Brazilian population only J₄ juveniles were obtained.

The large variation reported here for several measurements (body length, stylet length, distance from anterior end to the pharyngo-intestinal junction, distance from anterior end to excretory pore, spicule length) and a few ratios (c, c') among the populations from Brazil, Costa Rica and Senegal may suggest, as previously speculated by Lopez & Salazar (1989), that *N. rostrulatus* is a species complex. The differences in the tail shapes of the juvenile stages from Senegal compared to those from Costa Rica provide additional support for this view. An adequate reexamination of the morphology of additional populations from different geographical areas combined with molecular analysis is needed to clarify the status of *N. rostrulatus*, as it has been done for *Pratylenchus coffeae* (Zimmermann, 1898) Filipjev and Schuurmanns Stekhoven, 1941 (Duncan *et al.*, 1999) and *Xiphinema krugi* Lordello and Costa, 1961 (Oliveira *et al.*, 2006). Until this is done, the current taxonomic status of *N. rostrulatus* should be retained.

Vovlas *et al.* (2003) and Hodda & Nambiar (2005) published keys for the identification of *Neodolichodorus* species (currently eleven) based on female and male characters. Although no special mention was made of

N. rostrulatus, Hodda & Nambiar noted the large variability in the diagnostic characters within the genus and stated that further analysis of diagnostic characters of the various species and also the genera of the subfamily Dolichodorinae may be warranted.

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