

# A new species of *Dichelyne* (Nematoda, Cucullanidae) parasitizing sciaenid fishes from off the South American Atlantic coast

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## Abstract

A new nematode species *Dichelyne* (*Cucullanellus*) *sciaenidicola* sp. nov. is described based on specimens collected from the Whitemouth croaker *Micropogonias furnieri* (Desmarest) and the Argentine croaker *Umbrina canosai* Berg, from coastal waters of Argentina and Brazil. These nematodes were firstly identified as *D. (C.) elongatus* (Törnquist, 1931), a commonly reported species from *M. furnieri* in South American Atlantic waters. However, other species of *Dichelyne* have so far been reported from this host in the same area, namely *D. (C.) rodriguessi* (Pinto, Fábio et Noronha, 1970), *D. (C.) amaruincai* (Freitas, Vicente et Ibañez, 1969) and *D. (Dichelyne) micropogonii* Pereira et Costa, 1996. A careful re-examination of these parasites, as well as of type specimens of all species reported from *M. furnieri*, revealed that these nematodes represented a new species. The new species is distinguished from most of its congeners by having papillae 5–7 and 9 forming a subventral line close to cloaca, this feature is shared with other 6 species [*D. (C.) dichelyneformis* (Szidat, 1950), *D. (C.) fraseri* (Baylis, 1929), *D. (C.) abbreviatus* (Rudolphi, 1819), *D. (C.) adriaticus* (Törnquist, 1931), *D. (C.) minutus* (Rudolphi, 1819) and *D. (C.) mariajuliae* Alarcos, Timi, Etchegoin et Sardella, 2006], which are readily distinguished by their body size, spicules length, distribution patterns of other papillae and position of the excretory pore and deirids. Also, *D. (C.) elongatus* from *Umbrina canariensis* (Valenciennes) from West Africa is established as a new species *Dichelyne* (*Cucullanellus*) *yvonnecampanae* sp. nov.; *D. (C.) amaruincai* from Pacific waters is considered as a valid species, *D. (D.) micropogonii* is regarded as *species inquirendae* and *D. (C.) rodriguessi* is identified as *Cucullanus* sp.

## Keywords

*Dichelyne*, Sciaenidae, systematics, Argentina, Brazil

## Introduction

During parasitological surveys on sciaenid fishes, carried out simultaneously in Brazil and Argentina, nematodes of the genus *Dichelyne* Jägerskiöld, 1902 were collected from the intestines of the Whitemouth croaker *Micropogonias furnieri* (Desmarest) and the Argentine croaker *Umbrina canosai* Berg. These nematodes were firstly identified as *Dichelyne* (*Cucullanellus*) *elongatus* (Törnquist, 1931), a species commonly reported from *M. furnieri* in South American Atlantic waters (Vicente *et al.* 1989; Pinto *et al.* 1992; Sardella *et al.* 1995; Pereira and Costa 1996; Alves and Luque 1999, 2000a, b, 2001; Pereira *et al.* 2002). However, other species of *Dichelyne* have so far been reported from *M. furnieri* from the same area; Pinto *et al.* (1970) described *D. (C.) rodriguessi*

(Pinto, Fábio et Noronha, 1970) and Pereira and Costa (1996) revalidated *D. (C.) amaruincai* (Freitas, Vicente et Ibañez, 1969) and described *D. (Dichelyne) micropogonii* Pereira et Costa, 1996 from the same sample of this host species. A careful re-examination of these parasites, as well as of type specimens of all species reported from *M. furnieri*, revealed that nematodes represented a new species, which is herein described and illustrated.

## Materials and methods

Twenty specimens of *U. canosai* and 1 specimen of *M. furnieri* caught by commercial trawlers during May, 2004 from waters off Mar del Plata, Argentina (38°08'S, 57°32'W); 30

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specimens *U. canosai* caught by commercial trawlers from the coastal zone of the State of Rio de Janeiro, Brazil (22°55'S, 43°12'W) during March–August, 2005; 59 specimens of *M. furnieri* caught in waters off Pedra de Guaratiba, State of Rio de Janeiro, Brazil (23°01'S, 43°38'W) during September–December, 2003 and 37 specimens *M. furnieri* caught by commercial trawlers from waters off Cassino Beach, State of Rio Grande do Sul, Brazil (32°20'S, 52°00'W) during January, 2005, were examined. Fish were dissected immediately after capture, intestines were removed and examined under a stereoscopic microscope. Parasites were collected and fixed in glacial acetic acid, preserved in 70% alcohol, cleared in lactophenol, and studied and measured using light microscopy. Drawings were made with a drawing tube. Measurements are given in millimeters, with the mean followed by a range in parentheses. Nomenclature of the caudal papillae follows Petter (1974); prevalence and mean intensity were calculated according Bush *et al.* (1997). The studied material was deposited in the Helminthological Collection of the Museo de La Plata (CHMLP), La Plata, Argentina and in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC), Rio de Janeiro, Brazil.

Deposited material of the following species was also examined: *Dichelyne (Cucullanellus) amaruincai* (Freitas, Vicente et Ibañez, 1969): Instituto Oswaldo Cruz Helminthological Collection (CHIOC) # 30,382 a–e, from *Paralanchurus peruanus* (Steindachner) from Peru (Freitas *et al.* 1969); CHIOC 33,646 a–b from *M. furnieri* from Rio Grande do Sul, Brazil

(Pereira and Costa 1996). *Dichelyne (C.) rodriguezii* (Pinto, Fábio et Noronha, 1970): CHIOC # 30,579 a–c from *Micropogon* sp. from Rio de Janeiro, Brazil (Pinto *et al.* 1970). *Dichelyne (C.) elongatus* (Törnquist, 1931): CHIOC # 32,499 a–k and 32,356 from *M. furnieri* from Gulf of Venezuela (Vicente *et al.* 1989); CHIOC # 32,700 a–b from *Paralanchurus brasiliensis* (Steindachner) from Rio de Janeiro, Brazil (Pinto *et al.* 1992); CHIOC # 33,647 and # 33,648 from *M. furnieri* from Rio Grande do Sul, Brazil (Pereira and Costa 1996). *Dichelyne (Dichelyne) micropogonii* Pereira et Costa, 1996: CHIOC # 33,651, # 33,652, # 33, 653 a–b and # 33,654 from *M. furnieri* from Rio Grande do Sul, Brazil (Pereira and Costa 1996). All collection specimens examined were in poor condition (permanent mounts, containing dehydrated specimens, in lateral position, some of them broken), making difficult to correctly identify all structures of these nematodes.

## Results

### *Dichelyne (Cucullanellus) sciaenicicola* sp. nov. (Figs 1–20)

Material studied from *U. canosai*: 10 males and 12 females from Argentina and 5 males and 2 females from Brazil; from *M. furnieri*: 10 males and 10 females from Argentina and 15 males and 20 females from Brazil (8 males and 10 females from Rio de Janeiro; 7 males and 10 females from Rio Grande

**Table I.** Morphometrics of *Dichelyne (Cucullanellus) sciaenicicola* sp. nov. from *Umbrina canosai* from Argentina and Brazil

Locality	Mar del Plata		Rio de Janeiro		
	Sex	males (n = 10)	females (n = 12)	males (n = 5)	females (n = 2)
Total length		5.08 (4.12–6.56)	5.62 (4.46–6.50)	5.73 (4.28–7.04)	5.23 (4.92–5.54)
Maximum width		0.31 (0.23–0.40)	0.33 (0.28–0.38)	0.28 (0.23–0.32)	0.32 (0.3–0.34)
Oesophagus length		0.60 (0.52–0.66)	0.66 (0.60–0.72)	0.70 (0.68–0.74)	0.73 (0.72–0.74)
Oesophagus length/total length (%)		11.9 (10.1–12.9)	11.9 (9.7–14.3)	14.1 (13.4–14.6)	10.5 (12.2–15.9)
Oesophagus width at base		0.08 (0.07–0.10)	0.09 (0.08–0.11)	0.10 (0.08–0.11)	0.10
Buccal capsule width		0.12 (0.11–0.13)	0.12 (0.11–0.14)	0.13 (0.12–0.14)	0.14
Nerve ring-anterior end		0.21 (0.18–0.23)	0.25 (0.22–0.27)	0.25 (0.24–0.26)	0.26 (0.25–0.26)
Excretory pore-anterior end		0.55 (0.47–0.65)	0.59 (0.52–0.72)	0.48 (0.40–0.60)	0.40
Right deirid-anterior end		0.51 (0.45–0.62)	0.54 (0.38–0.67)	0.35 (0.21–0.57)	0.52 (0.49–0.55)
Left deirid-anterior end		0.50 (0.43–0.58)	0.55 (0.39–0.68)	0.24 (0.11–0.51)	0.33 (0.16–0.49)
Right post-deirid		2.42 (1.82–2.98)	2.74 (2.00–3.26)	3.47 (2.18–5.72)	–
Left post-deirid		3.63 (2.80–4.64)	3.89 (3.10–4.48)	0.46 (0.32–0.60)	3.94
Tail length		0.12 (0.11–0.14)	0.18 (0.17–0.22)	0.15 (0.14–0.17)	0.19 (0.19–0.20)
Phasmid-posterior end		0.07 (0.05–0.08)	0.10 (0.09–0.12)	0.06 (0.05–0.07)	0.11 (0.09–0.12)
Right spicule length		0.49 (0.43–0.54)	–	0.54 (0.49–0.57)	–
Left spicule length		0.50 (0.44–0.54)	–	0.55 (0.53–0.59)	–
Spicule/total length (%)		9.8 (8.1–11.0)	–	9.4 (8.1–11.4)	–
Gubernaculum length*		49 (42–55)	–	60 (50–60)	–
Ovary-anterior end		–	0.73 (0.42–1.06)	–	0.60
Ovary-posterior end		–	0.45 (0.24–0.60)	–	0.42
Vulva-anterior end		–	3.31 (2.46–3.92)	–	3.16
Vulva/total length (%)		–	58.8 (55.2–61.2)	–	57.0
Egg length*		–	83 (79–86)	–	79 (73–84)
Egg width*		–	56 (52–63)	–	58 (54–63)

\*In micrometers.

**Table II.** Morphometrics of *Dichelyne* (*Cucullianellus*) *sciaenidicola* sp. nov. from *Micropogonias furnieri* from Argentina and Brazil

Locality	Mar del Plata		Rio Grande do Sul		Rio de Janeiro	
	males (n = 10)	females (n = 10)	males (n = 7)	females (n = 10)	males (n = 8)	females (n = 10)
Total length	7.13 (6.42–8.10)	7.49 (5.84–9.02)	5.29 (3.94–6.31)	6.40 (4.57–8.14)	5.31 (4.32–6.29)	6.79 (5.01–8.36)
Maximum width	0.42 (0.36–0.50)	0.41 (0.30–0.48)	0.35 (0.28–0.41)	0.40 (0.30–0.57)	0.39 (0.28–0.41)	0.41 (0.29–0.67)
Oesophagus length	0.75 (0.70–0.80)	0.83 (0.74–0.94)	0.71 (0.62–0.79)	0.82 (0.69–0.89)	0.70 (0.61–0.77)	0.83 (0.71–0.88)
Oesophagus length/total length (%)	10.5 (9.6–11.7)	11.2 (9.5–13.4)	12.8 (10.9–15.1)	13.4 (12.5–15.7)	12.2 (10.5–14.2)	13.2 (12.2–14.1)
Oesophagus width at base	0.11 (0.10–0.12)	0.12 (0.10–0.16)	0.06 (0.05–0.07)	0.08 (0.06–0.11)	0.08 (0.05–0.10)	0.09 (0.05–0.11)
Buccal capsule width	0.13 (0.12–0.14)	0.14 (0.13–0.16)	0.13 (0.12–0.14)	0.14 (0.12–0.15)	0.13 (0.12–0.14)	0.13 (0.11–0.18)
Nerve ring-anterior end	0.26 (0.24–0.28)	0.27 (0.26–0.31)	0.24 (0.21–0.27)	0.30 (0.26–0.32)	0.25 (0.22–0.28)	0.28 (0.25–0.31)
Excretory pore-anterior end	0.65 (0.58–0.74)	0.68 (0.56–0.80)	0.50 (0.41–0.56)	0.58 (0.44–0.75)	0.60 (0.49–0.66)	0.63 (0.55–0.74)
Right deirid-anterior end	0.61 (0.54–0.71)	0.63 (0.57–0.73)	0.45 (0.36–0.71)	0.57 (0.38–0.82)	0.45 (0.38–0.69)	0.58 (0.40–0.78)
Left deirid-anterior end	0.60 (0.52–0.69)	0.64 (0.54–0.77)	0.49 (0.41–0.67)	0.57 (0.47–0.68)	0.51 (0.46–0.66)	0.56 (0.48–0.67)
Right post-deirid	3.41 (3.06–3.64)	3.51 (2.88–4.20)	3.93 (2.36–4.71)	4.38 (4.01–4.82)	3.88 (2.56–4.61)	4.07 (4.00–4.53)
Left post-deirid	5.12 (4.62–5.84)	5.26 (4.10–6.22)	4.16 (3.76–4.56)	4.01 (3.82–4.198)	4.33 (3.86–4.86)	5.01 (3.91–5.28)
Tail length	0.17 (0.14–0.22)	0.19 (0.16–0.22)	0.15 (0.13–0.17)	0.23 (0.15–0.39)	0.16 (0.15–0.17)	0.18 (0.16–0.29)
Phasmid-posterior end	0.08 (0.07–0.09)	0.11 (0.09–0.13)	0.05 (0.03–0.06)	0.09 (0.07–0.11)	0.06 (0.04–0.07)	0.08 (0.05–0.10)
Right spicule length	0.60 (0.57–0.65)	–	0.53 (0.48–0.61)	–	0.55 (0.49–0.64)	–
Left spicule length	0.59 (0.52–0.64)	–	0.49 (0.43–0.54)	–	0.52 (0.45–0.56)	–
Spicule/total length (%)	8.4 (7.4–9.0)	–	10.0 (8.6–10.9)	–	9.8 (8.9–10.4)	–
Gubernaculum length*	50 (46–61)	–	60 (50–70)	–	58 (50–68)	–
Ovary-anterior end	–	1.05 (0.66–1.44)	–	1.16 (0.97–1.32)	–	1.10 (0.90–1.26)
Ovary-posterior end	–	0.83 (0.42–1.36)	–	0.94 (0.47–1.76)	–	0.93 (0.56–1.44)
Vulva-anterior end	–	4.37 (3.40–5.26)	–	3.30 (2.47–4.51)	–	3.56 (2.89–4.73)
Vulva/total length (%)	–	58.4 (57.3–60.6)	–	54.0 (51.6–55.4)	–	56.6 (52.4–57.7)
Egg length*	–	79 (73–86)	–	70 (60–90)	–	75 (62–90)
Egg width*	–	52 (48–59)	–	50 (40–60)	–	52 (41–60)

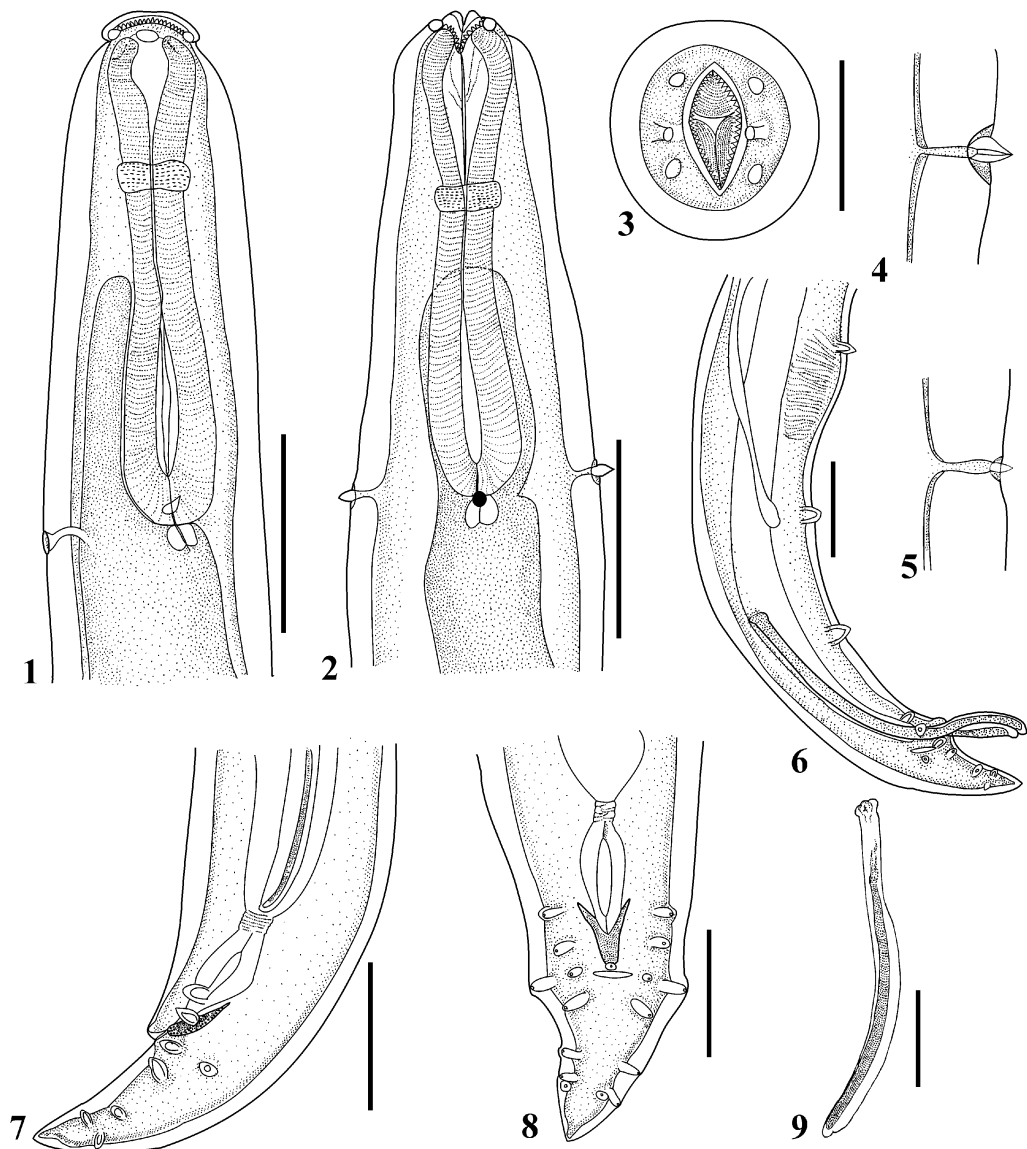
\*In micrometers.

do Sul). Measurements of specimens from *U. canosai* and *M. furnieri* are given in Tables I and II, respectively.

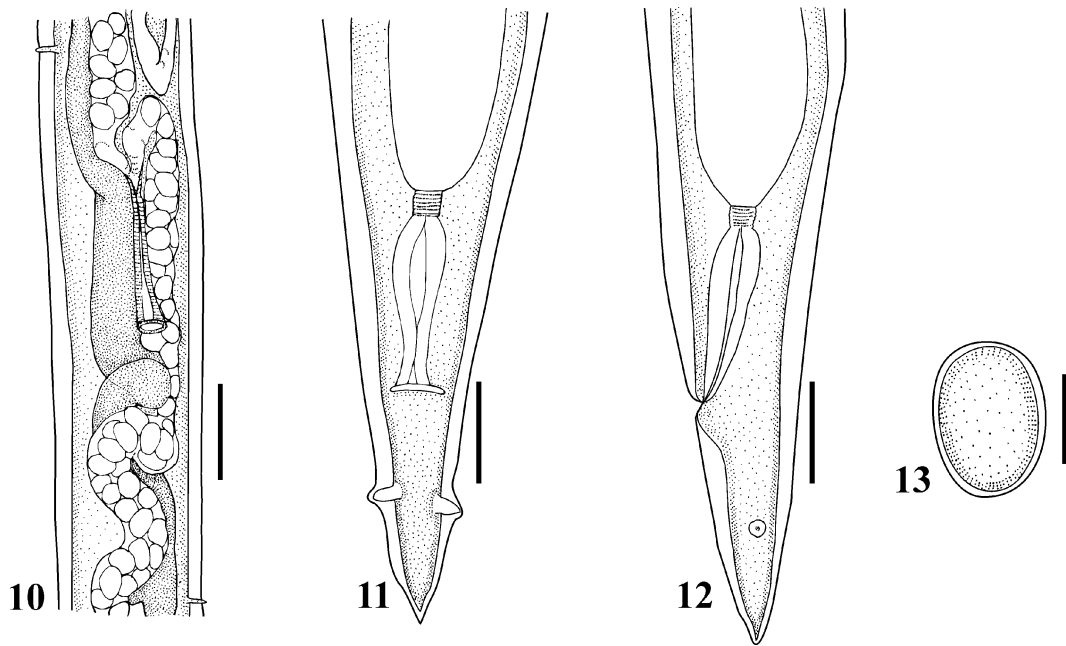
General (Figs 1–5 and 14–16): Small sized nematodes. Cuticle finely striated throughout. Lateral alae absent. Anterior end rounded, dorsoventrally expanded. Cephalic extremity with usual features of *Dichelyne*, with 2 pairs of prominent cephalic papillae, pair of amphids, inner ring of 3 pairs of small labial papillae. Mouth dorsoventrally slit-like, surrounded by collarete armed with numerous triangular denticles on each side. Pseudobuccal cavity well-developed, with internal cuticular lining; oesophagus narrow, expanded at both extremities, opening into intestine through small valve; pseudobuccal capsule wider than posterior end. Intestine with ventral caecum of variable length. Nerve ring surrounding oesopha-

gus just posterior to pseudobuccal capsule. Deirids situated laterally near oesophageal end, generally slightly anterior to it. Excretory pore at level of oesophagus end, always slightly posterior to deirids. Post-deirids postequatorial; left post-deirid situated closer to tail than right one. Tail conical.

Male (Figs 6–9 and 17–18): Ventral precloacal sucker present, very difficult to observe in smaller males. Cloaca prominent. Caudal papillae consisting of an unpaired median precloacal papilla, 11 pairs of papillae, 3 pairs precloacal (pair 1 slightly posterior to anterior margin of ventral sucker and pair 2 posterior to ventral sucker pair 3 between sucker and cloaca), 4 pairs adcloacal (pairs 5, 6 and 7 subventral; pair 4 lateral situated at level of pair 6 or slightly posterior to it) and 4 pairs of postcloacal (pairs 9 and 10 subventral, pair 9 displaced



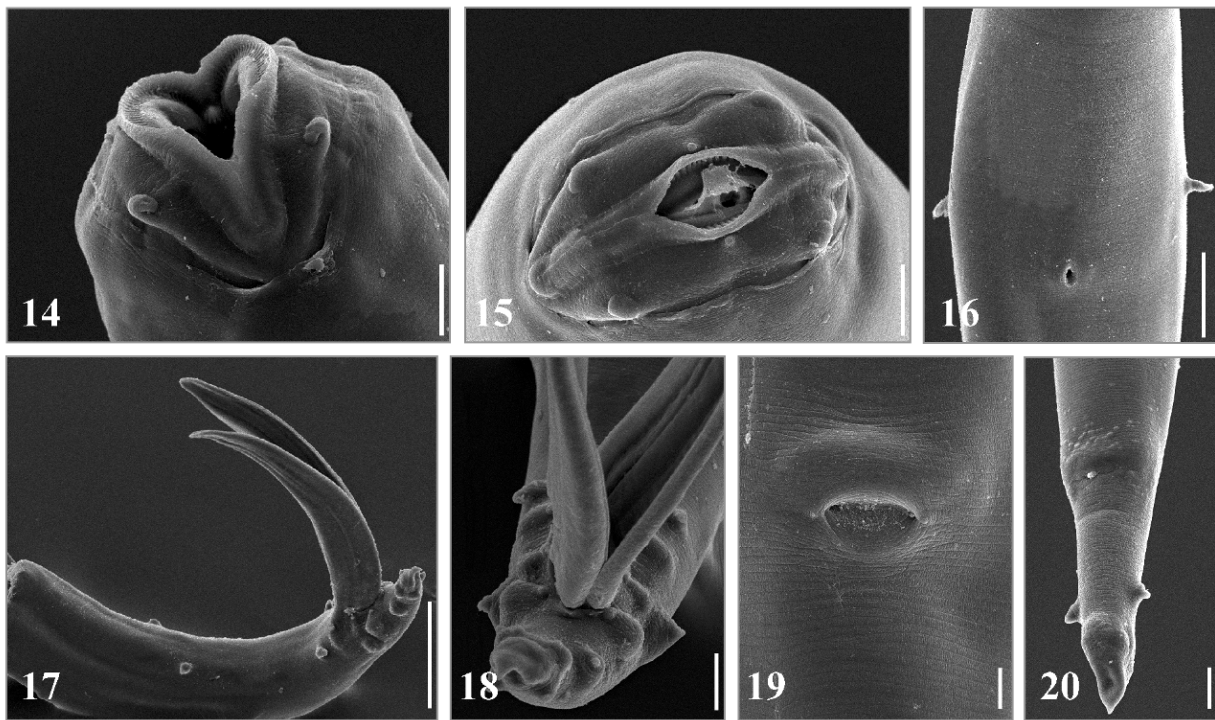
**Figs 1–9.** *Dichelyne (Cucullanellus) sciaenicicola* sp. nov. from *Umbrina canosai*. 1. Anterior end, lateral view. 2. Anterior end, ventral view. 3. Anterior end, apical view. 4. Deirid, lateral view. 5. Post-deirid, lateral view. 6. Posterior end of male, lateral view. 7. Detail of posterior end of male, lateral view. 8. Detail of posterior end of male, ventral view. 9. Spicule. Scale bars = 250  $\mu$ m (1, 2, 6); 100  $\mu$ m (3–5, 7–9)



**Figs 10–13.** *Dichelyne (Cucullanellus) sciaenicicola* sp. nov. from *Umbrina canosai*. **10.** Vulvar region, ventral view. **11.** Posterior end of female, ventral view. **12.** Posterior end of female, lateral view. **13.** Egg. Scale bars = 250  $\mu\text{m}$  (10); 100  $\mu\text{m}$  (11–12); 50  $\mu\text{m}$  (13)

to the cloaca; pair 8 subdorsal, situated at level of pair 10, phas-mids in lateral position, anterior to pair 10. Spicules subequal, left spicule longer than right one. Gubernaculum Y-shaped.

Female (Figs 10–13 and 19–20): Right and left post-deirids anterior and posterior to vulva, respectively. Vulva not prominent, slightly postequatorial. Ovijector short, directed



**Figs 14–20.** SEM micrographs of *Dichelyne (Cucullanellus) sciaenicicola* sp. nov. from *Umbrina canosai*. **14.** Anterior end, ventral view. **15.** Anterior end, apical view. **16.** Detail of deirids and excretory pore, ventral view. **17.** Posterior end of male, lateral view. **18.** Detail of posterior end of male, ventral view. **19.** Vulva, ventral view. **20.** Posterior end of female, ventral view. Scale bars = 10  $\mu\text{m}$  (14, 19); 20  $\mu\text{m}$  (15, 18, 20); 50  $\mu\text{m}$  (16); 100  $\mu\text{m}$  (17)

anteriorly from vulva. Uteri amphidelphic. Eggs *in utero* oval, not embryonated. Tail with a pair of caudal papillae (phasmids) situated near posterior extremity.

Type host: Argentine croaker, *Umbrina canosai* Berg (Perciformes, Sciaenidae).

Other host: Whitemouth croaker *Micropogonias furnieri* (Desmarest) (Perciformes, Sciaenidae).

Site of infection: Posterior end of intestine.

Type locality: Mar del Plata, Buenos Aires Province, Argentina (38°08'S, 57°32'W).

Other localities: Pedra de Guaratiba, State of Rio de Janeiro, Brazil (23°01'S, 43°38'W); Cassino Beach, State of Rio Grande do Sul, Brazil (32°20'S, 52°00'W).

Type specimens: From *U. canosai*. Holotype: 1 male (CHMLP coll. no. 5887); allotype: 1 female (CHMLP coll. no. 5888); paratypes: 5 males and 5 females (CHMLP coll. no. 5889), 5 males (CHIOC coll. no. 35615) and 2 females (CHIOC coll. no. 35616). From *M. furnieri*. Paratypes: 5 males and 5 females (CHMLP coll. no. 5890), 5 males (CHIOC coll. no. 35617) and 5 females (CHIOC coll. no. 35618).

Prevalence: For *U. canosai* from Argentina 50%, from Brazil 69%; for *M. furnieri* from Pedra de Guaratiba, Brazil 86%, from Cassino Beach, Brazil 78%.

Mean intensity: For *U. canosai* from Argentina 5.8 (1–22), from Brazil 4.8 (1–29); for *M. furnieri* from Argentina 27, from Pedra de Guaratiba, Brazil 21.3 (1–39), from Cassino Beach, Brazil 32.4 (1–42).

Etymology: The specific name refers to the family (Sciaenidae) of the two host species.

## Discussion

In most previous papers dealing with nematodes of the genus *Dichelyne* Jägerskiöld, 1902 in *M. furnieri*, the parasites were identified as *D. (C.) elongatus* (Törnquist, 1931) (Vicente *et al.* 1989; Pinto *et al.* 1992; Sardella *et al.* 1995; Pereira and Costa 1996; Alves and Luque 1999, 2000a, b, 2001; Pereira *et al.* 2002). This species was originally described from an unknown sciaenid (probably *Umbrina reedi* Günther, *Corvina stellifer*? (sic) or *Micropogon undulatus* (Linnaeus) from Juan Fernández Island (Más a Tierra), Chile (Törnquist 1931).

In addition, three descriptions of this species from South American waters are available, two based on specimens from *M. furnieri* from the Gulf of Venezuela (Vicente *et al.* 1989) and Brazil (Pereira and Costa 1996) and one from *Paralanchurus brasiliensis* (Steindachner) from Brazil (Pinto *et al.* 1992). However, comparison of both these descriptions and their deposited specimens with the present specimens from *M. furnieri* and *U. canosai*, showed that all these nematodes belong to the same species; parasites seems to attain a larger size in *M. furnieri* than in *U. canosai*.

Specimens described by Vicente *et al.* (1989) are, in general, smaller than those newly studied (total length 2.52–4.32

and, accordingly, most of their measurements are shorter. On the other hand, general measurements provided by Pinto *et al.* (1992) for only one male and one female, agree with those of the new species. It is noteworthy that both Vicente *et al.* (1989) and Pinto *et al.* (1992) described the presence of a dorsal intestinal caecum, which is clearly ventral in the collection specimens deposited by these authors. Both papers also erroneously indicate that the original description of *D. (C.) elongatus* is based on material from Greenland, instead of from Chile.

Pereira and Costa (1996) also briefly described *D. (C.) elongatus*, providing measurements, in  $\mu\text{m}$ , that are surprisingly small and some of them obviously erroneous [i.e. total length of males 175–848 (409), body width is 9–3.6 (1.9), spicules length 44 and 42, eggs  $1.25 \times 0.02$ ], and differentiating these nematodes from *D. (C.) amaruincai*, present in the same sample according to the authors (but see below), by the “absence of deirids”. However, examination of deposited material showed that these parasites are conspecific with those described in the present work (deirids are clearly observable in some specimens).

Both Vicente *et al.* (1989) and Pinto *et al.* (1992) assigned the parasites of *M. furnieri* and *P. brasiliensis* to *D. (C.) elongatus* based upon both the general morphometrics and the ratio between body length and spicules length. Despite of these similarities, *D. (C.) elongatus* from Chile differs from specimens from South American Atlantic waters by having an intestinal caecum reaching the level of nerve ring, and the deirids and excretory pore located closer to nerve ring and a different arrangement of caudal papillae in males. In fact, the pair 7 of caudal papillae is very small, the pair 4 is located posterior to pair 7, the pair 8 is at the same level or slightly anterior to pair 10 and the phasmids are at mid-length between pairs 9 and 10. Therefore, parasites from Argentina, Brazil and Venezuela are clearly members of a different species, other than *D. (C.) elongatus*.

Campana-Rouget (1957) described briefly *D. (C.) elongatus* from *Umbrina canariensis* (Valenciennes) caught in West African waters. However, these specimens differ clearly from *D. (C.) elongatus* in having larger spicules (600–800) and a different distribution pattern of caudal papillae, in fact the pair 2 is situated in the border of ventral sucker and closer to pair 3, the pair 9 is not located close to the cloaca and the pair 8 is anterior to phasmids. These features differentiate African specimens from those here described and the closeness between pairs 2 and 3 of caudal papillae also differentiate this species from its congeners. Therefore, based on the description provided by Campana-Rouget (1957), a new species, *Dichelyne (Cucullanellus) yvonnecampanae* sp. nov. is proposed for specimens from *U. canariensis*.

After re-examination of type specimens, Vicente *et al.* (1989) regarded *D. (C.) amaruincai* (Freitas, Vicente *et al.* 1969), a parasite of *Paralanchurus peruanus* (Steindachner) from Peru (Freitas *et al.* 1969) as a junior synonym of *D. (C.) elongatus*. However, *D. (C.) amaruincai* shows a pat-

tern of caudal papillae similar to that of the specimens herein described, differing consequently from *D. (C.) elongatus*. Therefore, *D. (C.) amaruincai* is considered a valid species, which differs from the present specimens by having a larger oesophagus and the deirids located posterior to excretory pore. Pereira and Costa (1996) also redescribed *D. (C.) amaruincai* from *M. furnieri* from Brazil, revalidating this species and discriminating it from *D. (C.) elongatus* from the same sample based on inconclusive differences such as the presence of deirids and the level of bifurcation of the uterus. However, most measurements are similar between the two descriptions and specimens are undoubtedly conspecific.

Pereira and Costa (1996) also described nematodes from the same sample from *M. furnieri* as a new species, *D. (Dichelyne) micropogonii*; re-examination of the deposited type-specimens showed that males are probably juvenile specimens in which the ventral sucker is difficult to observe, being therefore members of the subgenus *Cucullanellus* instead of *Dichelyne*. However, the incomplete and incorrect description of this species, as well as the poor state of preservation of the type specimens, does not allow for determining its specific status. Therefore, *D. micropogonii* is considered a *species inquirenda*.

Another species, *D. (C.) rodriguesi* (Pinto, Fábio et Noronha, 1970) was described from *Micropogon* sp. (probably *M. furnieri*) from Rio de Janeiro, Brazil by Pinto *et al.* (1970). The description is brief, with no indication of the location of the excretory pore and deirids and reports only 7 pairs of caudal papillae. The re-examination of this species by Vicente *et al.* (1989) demonstrated that Pinto *et al.* (1970) overlooked 4 pairs of papillae; nevertheless their distribution pattern was not described or illustrated. *Dichelyne (C.) rodriguesi* shows a larger and slender body than the new species, a petal-shaped sucker, and the pair 1 of caudal papillae situated far anterior to the sucker. However, measurements of type material (only 3 specimens) carried out in the present study do not agree with those reported by Pinto *et al.* (1970). In fact, a careful re-examination of these specimens showed that they belong to the genus *Cucullanus* Müller, 1777 by lacking an intestinal caecum, although such a structure was described in the original description, and by having the oral opening somewhat inclined dorsally, instead of perpendicular to body axis, a feature clearly seen in the figures given by Pinto *et al.* (1970). Unfortunately, the preservation of specimens does not allow corroborating the specific status of this species.

Other species from around the world with similar distribution pattern of caudal papillae (papillae 5–7 and 9 forming a subventral line close to cloaca) are *D. (C.) dichelyneformis* (Szidat, 1950), *D. (C.) fraseri* (Baylis, 1929), *D. (C.) abbreviatus* (Rudolphi, 1819), *D. (C.) adriaticus* (Törnquist, 1931), *D. (C.) minutus* (Rudolphi, 1819) and *D. (C.) mariajuliae* Alarcos, Timi, Etchegoin et Sardella, 2006. Two of these species have been reported from the southern region of the southwest Atlantic, parasitizing nototheniids, *D. (C.) dichely-*

*neformis*, a parasite of *Eleginops maclovinus* (Valenciennes) from Tierra del Fuego, Argentina (Szidat 1950) and *D. (C.) fraseri* parasitic in *Dissostichus eleginoides* Smitt (Nototheniidae) from Patagonian waters, Argentina (Gaevskaia *et al.* 1990). Gaevskaia *et al.* (1990) did not provide the description of *D. (C.) fraseri*; for this reason, comparisons were made compared with the description of *D. (C.) fraseri* given by Zdzitowiecki and Cielecka (1996) from several Antarctic and sub-Antarctic nototheniid fishes. Both species differ from the species here described by having a smaller body size, but similar oesophagus and spicule length (these structures being proportionally larger). Furthermore, in both species the excretory pore and deirids are situated near the nerve ring.

*Dichelyne (C.) abbreviatus*, a parasite of *Umbrina cirrosa* (L.) from Italy, despite showing similar body size as specimens from *M. furnieri* and *U. canosai*, has longer spicules (0.80–0.90 mm) (Orecchia and Paggi 1964). *D. (C.) adriaticus*, a parasite of *Chrysophrys aurata* Cuvier et Valenciennes (actually *Sparus aurata* L.) from the Mediterranean (Trieste) was briefly described by Törnquist (1931), with no reference to spicule shape and size, however it can be readily distinguished from present material by having a markedly shorter body size (males 1.90–2.68 mm; females 2.43–3.70 mm), and the excretory pore located anterior to the oesophagus end. *Dichelyne (C.) minutus*, a common parasite of pleuronectid fishes from Europe shows a smaller body size, larger spicules (0.70–0.94) and the excretory pore posterior to the oesophagus end (Fagerholm 1982, Moravec 1994). *Dichelyne (C.) mariajuliae*, a parasite of *Pogonias cromis* (L.) from Mar Chiquita coastal Lagoon, Argentina, has the deirids and excretory pore located anterior to the oesophagus end, shorter spicules and the pair 2 of caudal papillae situated at level of ventral sucker (Alarcos *et al.* 2006).

At the present, other 2 species of the subgenus *Cucullanellus* have been reported in the southwest Atlantic: *D. (C.) travassosi* (Guimarães et Cristofaro, 1974) a parasite of *Haliichoeres radiatus* (L.) (Labridae) and *Balistes vetula* L. (Balistidae) from Salvador, Bahia State, Brazil (Guimarães and Cristofaro 1974) and *D. (C.) szidati* Timi et Sardella, 2002 a parasite of *Acanthistius brasiliensis* (Cuvier) (Serranidae) from Mar del Plata, Argentina (Timi and Sardella 2002). *Dichelyne (C.) travassosi* can be distinguished from the new species by having a smaller body size, markedly longer spicules (1.92–2.8 mm), 2 intestinal caeca (according to figures in the original description), and 7 pairs of caudal papillae, although the distribution pattern of caudal papillae is difficult to discern in the figures and the authors probably overlooked the remaining 4 pairs. *Dichelyne (C.) szidati* differs from the new species in having larger body and spicules, the excretory pore situated posterior to oesophagus-intestine junction and the pair 9 of caudal papillae not displaced to the cloaca and posterior to deirids.

Based on all these differences, a new species *Dichelyne (Cucullanellus) sciaenicicola* sp. nov. is proposed.

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## References

- Alarcos A.L., Timi J.T., Etchegoin J.A., Sardella N.H. 2006. A new species of *Dichelyne* (Nematoda: Cucullanidae) parasitizing *Pogonias cromis* (Pisces: Sciaenidae) from Mar Chiquita coastal lagoon, Argentina. *Journal of Parasitology*, 92, 341–345. DOI: 10.1645/GE-3530.1.
- Alves D.R., Luque J.L. 1999. Aspectos quantitativos das infrapopulações de metazoários parasitos de indivíduos jovens da corvina, *Micropogonias furnieri* (Osteichthyes: Sciaenidae) do litoral do Estado do Rio de Janeiro, Brasil. *Contribuições Avulsas Sobre a História Natural do Brasil, Sér. Zoologia*, 10, 1–4.
- Alves D.R., Luque J.L. 2000a. Metazoários parasitos de *Micropogonias furnieri* (Osteichthyes: Sciaenidae) do litoral do Estado do Rio de Janeiro, Brasil. *Parasitologia al Día*, 24, 40–45.
- Alves D.R., Luque J.L. 2000b. Aspectos quantitativos das infrapopulações de metazoários parasitos de *Micropogonias furnieri* (Osteichthyes: Sciaenidae) do litoral do Estado do Rio de Janeiro, Brasil. *Parasitologia al Día*, 25, 30–35.
- Alves D.R., Luque J.L. 2001. Community ecology of the metazoan parasites of white croaker, *Micropogonias furnieri* (Osteichthyes: Sciaenidae), from the coastal zone of the State of Rio de Janeiro, Brazil. *Memorias do Instituto Oswaldo Cruz*, 96, 145–153. DOI: 10.1590/S0074-02762001000200002.
- Bush A.O., Lafferty K.D., Lotz J.M., Shostak A.W. 1997. Parasitology meets ecology on its own terms: Margolis *et al.* revisited. *Journal of Parasitology*, 83, 575–583. DOI: 10.2307/3284227.
- Campana-Rouget Y. 1957. Parasites de poissons de mer ouest-africains récoltés par J. Cadenat. Nématodes (4e note). Sur quelques espèces de Cucullanidae. Révision de la sous-famille. *Bulletin de l'Institut Fondamental d'Afrique Noire, Sér. A*, 19, 417–465.
- Fagerholm H.-P. 1982. Parasites of fish in Finland. VI. Nematodes. *Acta Academiae Aboensis, Sér. B*, 40, 1–28.
- Freitas J.F.T., Vicente J.J., Ibañez N.I. 1969. Fauna helmintológica del Perú: “*Cucullanellus amaruincaï*” sp. n. (Nematoda, Camallanoidea). *Atas da Sociedade de Biologia do Rio de Janeiro*, 12, 281–283.
- Gaevskaya A.V., Rodyuk G.N., Parukhin A.M. 1990. Peculiarities and formation of parasitofauna of the Patagonian toothfish *Dissostichus eleginoides*. *Biologiya Morya*, 4, 23–28 (In Russian).
- Guimarães J.F., Cristofaro D.R. 1974. Contribuição ao estudo da fauna helmintológica de peixes do Estado da Bahia. *Atas da Sociedade de Biologia do Rio de Janeiro*, 17, 81–85.
- Moravec F. 1994. Parasitic nematodes of freshwater fishes of Europe. Academia, Praha, Czech Republic, 473 pp.
- Orecchia P., Paggi L. 1964. Prima descrizione del maschio e ridescrizione della femmina di *Cucullanus abbreviatus* Rudolphi, 1819, parassita di *Umbrina cirrhosa*. *Parassitologia*, 6, 142–150.
- Pereira J.Jr., Da Costa M.A.S. 1996. Cucullanidae (Nematoda: Seuratoidea) em *Micropogonias furnieri* (Desmarest, 1823) (Sciaenidae) do Rio Grande do Sul, com a descrição de *Cucullanus cassinensis* sp. n. e *Dichelyne* (*Dichelyne*) *micropogonii* sp. n. *Comunicações do Museu de Ciências da PUCRS, Porto Alegre*, 9, 11–30.
- Pereira J.Jr., Da Costa M.A.S., Vianna R.T. 2002. Índices parasitológicos de Cucullanidae (Nematoda: Seuratoidea) em *Micropogonias furnieri* (Desmarest, 1823) no litoral do Rio Grande do Sul, Brasil. *Atlântica, Rio Grande*, 24, 97–101.
- Petter A.J. 1974. Essai de classification de la famille des Cucullanidae. *Bulletin du Muséum National d'Histoire Naturelle, Paris, 3<sup>o</sup>Sér.*, 225, *Zoologie*, 117, 1469–1490.
- Pinto R.M., Fábio S.P., Noronha D. 1970. Sobre uma nova espécie do gênero *Cucullanellus* Törnquist, 1931 (Nematoda, Camallanoidea). *Atas da Sociedade de Biologia do Rio de Janeiro*, 14, 75–77.
- Pinto R.M., Vicente J.J., Noronha D. 1992. On some related parasites (Nematoda, Cucullanidae) from the marine fish *Paralichthys brasiliensis* (Steindachner, 1875) (Pisces, Ostracidae). *Memorias do Instituto Oswaldo Cruz*, 87, 207–212.
- Sardella N.H., Etchegoin J.A., Martorelli S.R. 1995. Las comunidades parasitarias de *Micropogonias furnieri* (corvina) en Argentina. *Boletín del Instituto Oceanográfico (Universidad de Oriente – Venezuela)*, 34, 41–47.
- Szidat L. 1950. Los parásitos del róbalo (*Eleginops maclovinus* Cuv. & Val.). *Primer Congreso Nacional de Pesquerías Marítimas e Industrias Derivadas, 24–29 de octubre 1949*, 2, 235–270.
- Timi J.T., Sardella N.H. 2002. A new species of *Dichelyne* (Nematoda: Cucullanidae) parasitizing *Acanthistius brasiliensis* (Pisces: Serranidae) from Argentinean waters. *Journal of Parasitology*, 88, 573–576. DOI: 10.2307/3285452.
- Törnquist N. 1931. Die Nematodenfamilien Cucullanidae und Camallanidae nebst weiteren Beiträgen zur Kenntnis der Anatomie und Histologie der Nematoden. *Göteborgs Kungliga Vetenskaps-och Vitterhets-samhälles Handlingar, Femte Följden, Sér. B*, 2, 1–441.
- Vicente J.J., Magalães Pinto R., Aguilera O. 1989. On *Dichelyne* (*Cucullanellus*) *elongatus* (Törnquist, 1931) Petter, 1974: South American correlated species (Nematoda: Cucullanidae) and some other helminths of *Micropogonias furnieri* (Desmarest, 1823) (Pisces: Sciaenidae). *Memorias do Instituto Oswaldo Cruz*, 84, 357–361.
- Zdzitowiecki K., Cielecka D. 1996. Morphology and occurrence of *Dichelyne* (*Cucullanellus*) *fraseri* (Baylis, 1929), a parasitic nematode of Antarctic and sub-Antarctic fishes. *Acta Parasitologica*, 41, 30–37.