# FIRST FINDING OF A MALE *APHANOLAIMUS COOMANSI* (TSALOLICHIN, 1988) IN TROPICAL AREAS

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## ABSTRACT

Esquivel, A. 2000. First finding of a male *Aphanolaimus coomansi* (Tsalolichin, 1988) in tropical areas. Nematropica 30:161-166.

The rare aquatic nematode *Aphanolaimus coomansi* Tsalolichin, 1988 was found in some habitats in Costa Rican Conservation Areas, permitting additional taxonomical details to be added to the original description. The first description of a male of the species is also given in this paper. The male's relevant characteristics include: 22 pairs of epidermal glands, reproductive system with single posterior reflexed testis, six preanal tuboid supplements and long spicules, gubernaculum weakly cuticularized and tail region provided with well developed setae. *A. coomansi* is easy to distinguish from other South American species. Some useful diagnostic characteristics are the small body length, few number of body annuli, the origin of the lateral field near the head end and short cephalic setae.

*Key words*: *Aphanolaimus coomansi*, distribution, taxonomy.

## RESUMEN

Esquivel, A. 2000. Primer hallazgo del macho *Aphanolaimus coomansi (*Tsalolichin, 1988) en areas tropicales. Nematrópica 30:161-166.

El nematodo acuático *Aphanolaimus coomansi* Tsalolichin, 1988 fue encontrado nuevamente en algunos habitats en Areas de Conservación de Costa Rica; este hallazgo ha permitido agregar más detalles taxonómicos a la descripción original. Además se incluye la primera descripción de un macho de esta especie. Las características relevantes del macho son: 22 pares de glándulas epidermales, sistema reproductivo simple con un solo testículo posterior, seis suplementos preanales tuboides y espícula larga, el gubernáculo esta débilmente cuticularizado y la cola tiene setas bien desarrolladas. *A. coomansi* se distingue fácilmente de otras especies Suramericanas y algunas características diagnósticas útiles son: tamaño más pequeño, menor número de anillos en el cuerpo, inicio del campo lateral cerca del final de la cabeza y setas cefálicas más cortas.

*Palabras clave*: *Aphanolaimus coomansi,* distribución, taxonomia.

## INTRODUCTION

The National Biodiversity Institute (INBio) in Costa Rica, supported by the Nematology Department of the Universidad Nacional (U.N.A), is undertaking a nematode inventory in five conservation areas. This inventory is part of the project "Development and Sustainable Biodiversity" funded by the government of the Netherlands. Hundreds of samples have been collected from these areas and a collection of soil and fresh water nematodes is being established.

The rare aquatic nematode *Aphanolaimus coomansi* (amended from *A. coomansus*) was originally described by Tsalolichin in 1988. The description was based on the discovery of a single female in a silty sand sample from a pond in a botanical garden

in Rio de Janeiro, Brazil. During the nematode inventory in Costa Rica, eight specimens of *A. coomansi* were found in aquatic samples taken in Arenal, Osa and Guanacaste Conservation Areas. The male of *A. coomansi* is described and additional morphological and morphometrical data of the females given.

## MATERIALS AND METHODS

*Site descriptions*: *Aphanolaimus coomansi* was found in aquatic habitats with sandy sediments and organic material, especially dead leaves. Each of the three sites sampled (Fig. 1) differed in ecological characteristics as follows:

a) River with shallow and slow running water crossing a rural road. The site was characterized by clean water, sandy sediments and dead leaves at the bottom of the river. The location was surrounded by secondary vegetation and grasslands west to Maritza biological station in Guanacaste Conservation Area (ACG).

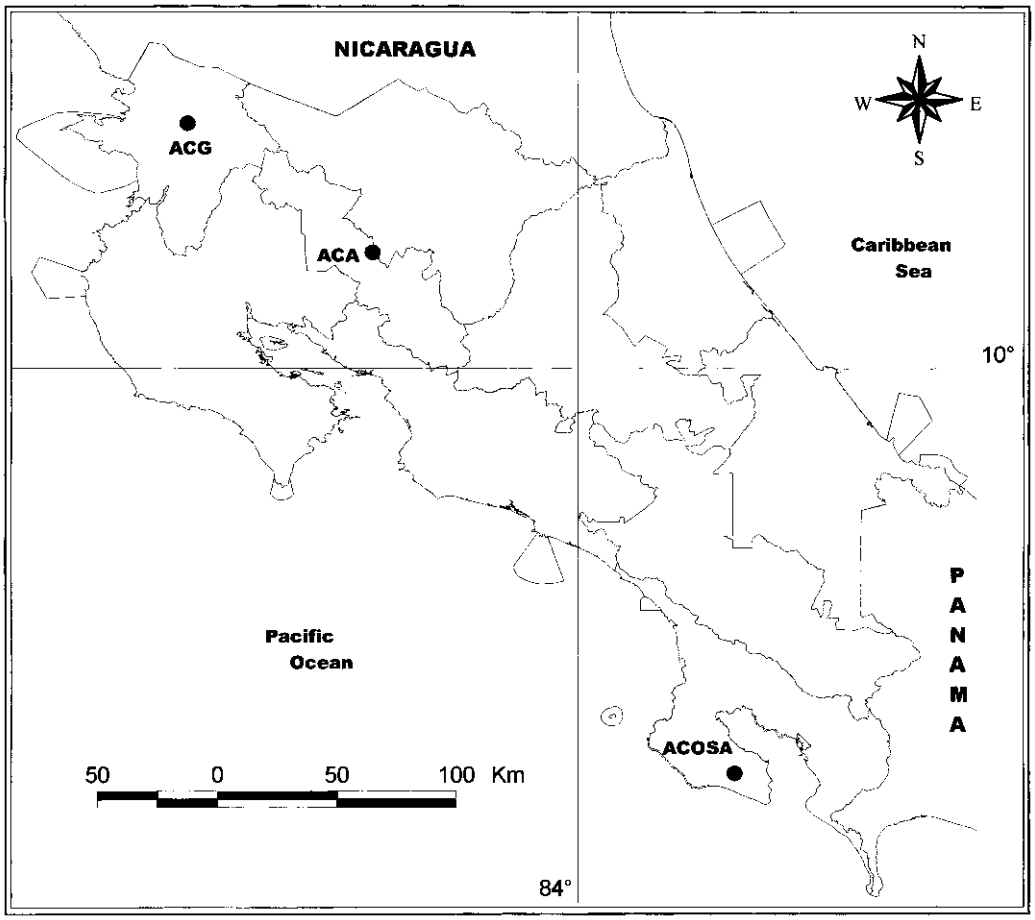


Fig. 1. Distribution of *Aphanolaimus coomansi* in some of Costa Rica's Conservation Areas: ACG Guanacaste Conservation Area; ACA Arenal Conservation Area; ACOSA Osa Conservation Area.

b) Lakeshore in Arenal Conservation Area (ACA). The site was characterized by moist and very moist perennial forest, where some areas are being altered by continuous volcanic activity. The lake is an ancient volcanic crater with sandy sediments and aquatic vegetation, located 1.6 km west from La Fortuna city.

c) A small stream passing a primary tropical forest in Osa Conservation Area (ACOSA) with high humidity and high temperature resulting in a distinctive environment. The sample site was characterized by clean running water, sandy sediments and leaves in decomposition.

The ACOSA, ACG and ACA sample sites are located at 100, 600, and 850 m above sea level, respectively.

Aquatic samples (sediment and dead leaves) of about 500 grams were processed using Cobb's modified decanting and sieving method (s'Jacob and van Bezooijen, 1984). The water suspension with nematodes was collected after 24 hours. The nematodes were fixed with hot 4% formaldehyde and transferred to pure glycerin using Seinhorst's rapid method (Seinhorst, 1959). Permanent mountings were prepared on Cobb slides. Females (slides 174-4, 180-2, 181-5, 206-3, 217-3, 219-4, 243-3) and the male (slide 206-4) are deposited at INBio's Nematode Collection, Santo Domingo, Heredia, Costa Rica.

## DESCRIPTION

*Aphanolaimus coomansi* Tsalolichin, 1988. (Table 1; Fig. 2).

*Female:* The measurements of the holotype female are also given in Table 1. Body slightly curved till C-shape after fixation, a little wider in the mid-portion and tapering regularly towards both extremities. Head end hemispherical, 5-6 µm high measured from the first annule. Amphids large, forming a single complete spiral. Cuticle heavily annulated with 210 (180-247) annules along the ventral side of the body. Annuli without longitudinal striations. Epidermal glands not clearly visible. Lateral field 2 µm wide at mid-body, beginning on the 3rd to 5th annulus from the head end and extending to the 12th to 14th annulus from tail tip.

Ventral gland conspicuous but very variable in size, between 9 µm to 28 µm long, situated in the region of the pharyngeal-intestinal junction; excretory pore not visible. Oral opening small, mouth cavity a short tube. Reproductive system didelphic-amphidelphic. Ovaries reflexed, sperm observed in oviduct. Vulva a transverse slit with simple rounded lips; vagina well cuticularized. Tail without setae, bearing a tubular spinneret 3.5 µm long, with 36 (31-38) annuli on ventral side and 40 (36-43) on dorsal side.

*Male:* Similar to female. Body more ventrally curved in the tail region, smooth J shape. There are 22 pairs of epidermal glands connected with cuticular pores, irregularly distributed along the dorsal and ventral side of the lateral field. The first, second and third pore each have a small seta, and they are located on the 3rd, 13th and 20th annule from the head end. Pharyngeal-intestinal junction not clearly visible.

Reproductive system with single posterior reflexed testis. There are six preanal tuboid supplements, 10 µm long; the distance between two supplements at their base (proximally) varies from 17 to 24 µm. Spicules long, rather plump. Gubernaculum simple, 3 µm long, thin and weakly cuticularized. Tail region provided with four pairs of well developed setae.

## DISCUSSION

No significant differences were observed between the female *A. coomansi* from Brazil and those from Costa Rica.

Table 1. Morphometrics of *Aphanolaimus coomansi* Tsalolichin, 1988. All absolute measurements in (μm), ratios in % (V, G1, G2).

| | Costa Rica | Costa Rica | Brazil |
|---|---|---|---|
| Localities | Females n = 7 | Male n = 1 | Female[a] n = 1 |
| L | 525.0 (503-569) | 542.0 | 623.0 |
| Pharynx | 99.5 (88-121) | 114.0 | — |
| Lip region width | 6.3 (6-6.5) | 6.5 | 6.0 |
| Max. body width | 23.0 (20-29) | 20.0 | — |
| Anal body width | 14.4 (13-17) | 16.0 | — |
| Annuli width | 2.8 (2.5-3.0) | 3.0 | 3.0 |
| Tail | 73.0 (64-85.5) | 79.0 | 91.0 |
| Cephalic setae | 4.3 (3.5-5.5) | 5.0 | 3.0 |
| Amphids width | 4.7 (4.5-5.0) | 5.0 | 4.0 |
| a | 24.0 (20-26) | 27.0 | 24.0 |
| b | 5.3 (4.7-5.8) | 4.8 | 5.1 |
| c | 7.1 (6.6-7.9) | 6.6 | 6.8 |
| c' | 5.0 (4.9-5.4) | 4.9 | 5.0 |
| V | 50.0 (49-52) | — | 50.0 |
| G1 | 16.5 (15-19) | — | 17.3 |
| G2 | 16.0 (14-17) | — | 18.6 |
| Spicules | — | 23.0 | — |

[a]Data of holotype (Tsalolichin, 1988).

The description and measurements given by Tsalolichin (1988) and the key of *Aphanolaimus* to species by Raski and Coomans (1990), support our finding. The main characteristics are the position of the beginning of the lateral field, number of body annuli, cuticule with only transverse striae, and size of cephalic setae. Other characteristics are listed in Table 1.

A comparison of *A. coomansi* with other *Aphanolaimus* species found in South America and described by Raski and Coomans, 1990 and De Waele and Coomans, 1993 shows that *A. coomansi* is the smallest species, with fewer body annuli and shorter cephalic setae. Another important difference is that the lateral field begins in *A. coomansi* on the 3rd annulus from the head end while in *A. aymarae*, *A. boliviensis*, *A. brasiliensis*, *A. quechuae*, *A. yamani*, *A. chilensis*, *A. elegans* and *A. fuegoensis* the lateral fields begin between the 10th and 27th body annuli from the head end.

*A coomansi* is very close to *A. furcifer* (Andrássy, 1989) and *A. louisae* (Coomans and De Waele, 1979), in having the lateral field originate near the head end, and possessing few coarse annuli and blunt heads. However, *A. furcifer* has longer cephalic setae with forked tips, large amphids, and the male has a long spicule. *A. louisae* is

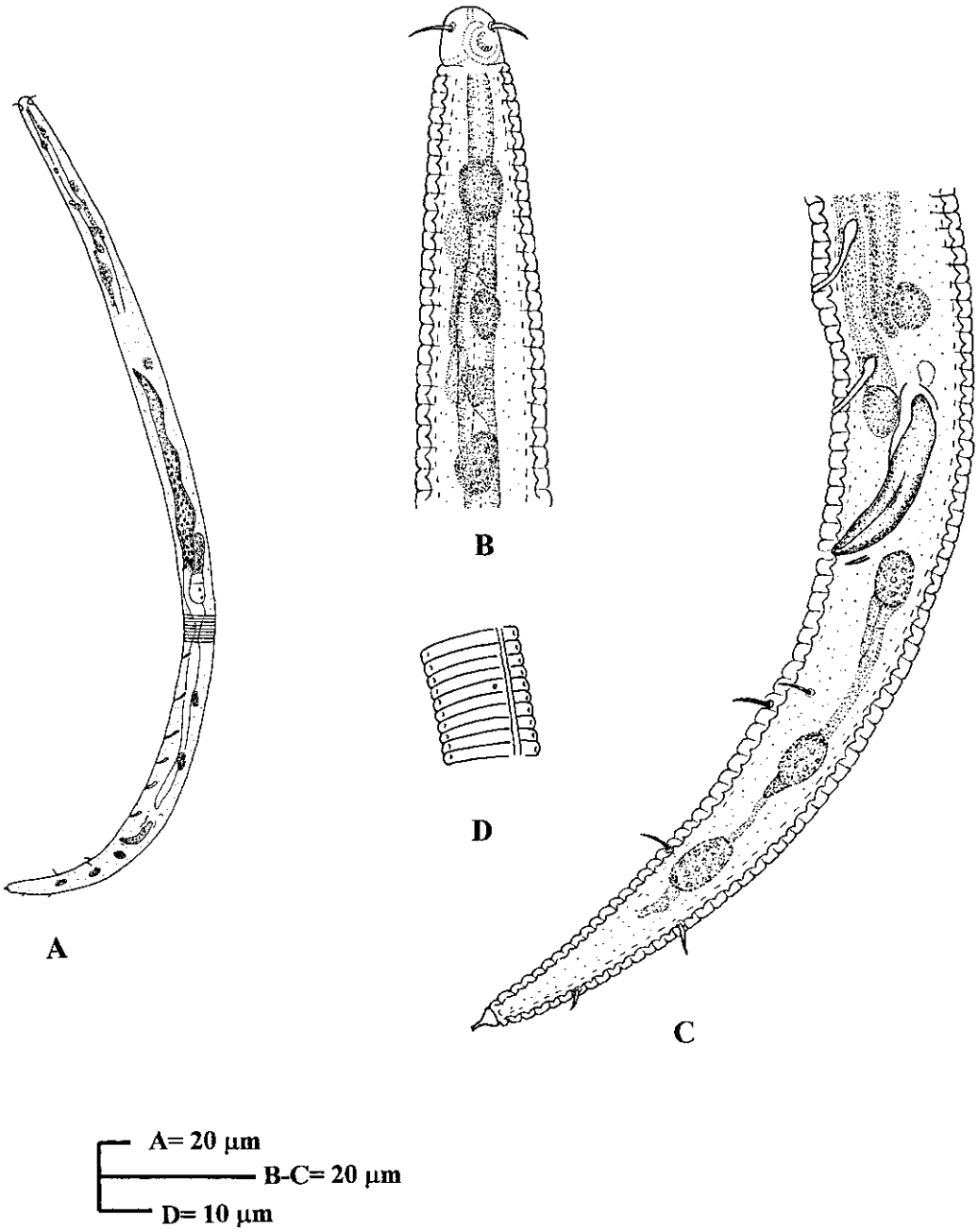


Fig. 2. *Aphanolaimus coomansi male*: A) Full length. B-C) Details of anterior and posterior body region. D) Cuticule annulated showing the lateral field and one cuticular pore.

larger, with annuli exhibiting longitudinal striations, and with a long tail and acute spinneret. The male has 2 testis as compared to *A. coomansi.*

All aquatic ecosystems sampled had clear water, and none of them had visible human-generated pollution. According to Coomans and De Waele (1983), species of *Aphanolaimus* are mainly found in fresh water environments. They can also occur in terrestrial habitats, but apparently the different species differ in their ability to colonize wet and dry soils.

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