

## Research Note

# A new species of nematoda parasite of the Cerambicid Eucalyptus Longhorned Borer from Argentina

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### Summary

*Artigasias indigena* n. sp. is characterized by the cuticle thin, annulated and with spines arranged in regular longitudinal rows from the first ring to the base of medial bulb. The first ring is differentiated with eight spines, the second ring is bigger and without spines, and then a series of small rings with spines come up to the base of medial bulb. Lateral alae absent, stoma short with four thickening cuticle like teeth, excretory pore posterior situated at the beginning of the intestine, V = 67 %, eggs oval with smooth shell, male without spicule, and genital papillae arranged with one pair of preanal papillae and one pair of postanal papillae.

Keywords: *Artigasias indigena* n. sp.; Nematoda; Hystrignathidae; *Phorocantha semipunctata*; Coleoptera; Argentina

### Introduction

The family Hystrignathidae grouped a great number of species characterized by having oesophagus with cuticularised walls in the anterior pharyngeal portion, elongated eggs often with shells ornamented by ridges, males without spicules and presence of at least one median single papilla (Adamson & Van Waerebeke, 1992). Christie (1934) described the genera *Artigasias* and *Paraxyo* (Travassos and Kloss 1957) characterized the first one by cervical spines arranged as regular longitudinal rows, and the second genus by spines arranged in alternated way. However, Adamson and Van Waerebeke (1992) characterized these genus *Artigasias* according to the number of spines in the first row which may vary between eight and forty, and although spines tend to form regular longitudinal rows in species with lower numbers of spines. So these authors

described *Paraxyo* as a synonym of *Artigasias* and cited 26 genera to the family Hystrignathidae.

The Eucalyptus longhorned borer, *Phorocantha semipunctata* (Fabricius, 1775), is a serious and destructive pest of eucalyptus trees. They are attracted to freshly cut eucalyptus wood, dying trees suffering from stress. A new species of the genus *Artigasias*, was described and illustrated herein as *A. indigena* n. sp., from the Neotropical region, Misiones, Argentina. *Artigasias indigena* n. sp. is mainly characterized by lateral alae absent, stoma short with four cuticle thickening like teeth, excretory pore posterior situated at the beginning of the intestine, and genital papillae in male arranged with 1 pair of preanal and 1 pair postanal papillae.

### Materials and methods

Adults of *P. semipunctata* (n = 42) had been found feeding rot wood, in Cuña Piru (27° 16' S, 54° 50' W), Misiones Province, Argentina. They were collected in plastic containers by hand, placed in individual vials and transported to the laboratory. The insects were kept at 5 °C for 10 min, and then dissected in Petri dishes filled with distilled water under a stereoscope microscope. The nematodes were killed by placing them in distilled water at 60 °C for 2 min. They were removed to 50% TAF solution (water + triethanolamine formalin) (1:1) for 48 h, and then fixed into pure TAF (Poinar, 1975). The nematodes were transferred from the fixative to glycerol for slow evaporation and to clear parasites (Seinhorst, 1959). Fixed specimens were used for drawings and measurements using a lucida camera on a Zeiss compound microscope. All measurements are given in micrometers (µm), with mean and standart deviation in parenthesis. The identification is done by Poinar's key (1977).

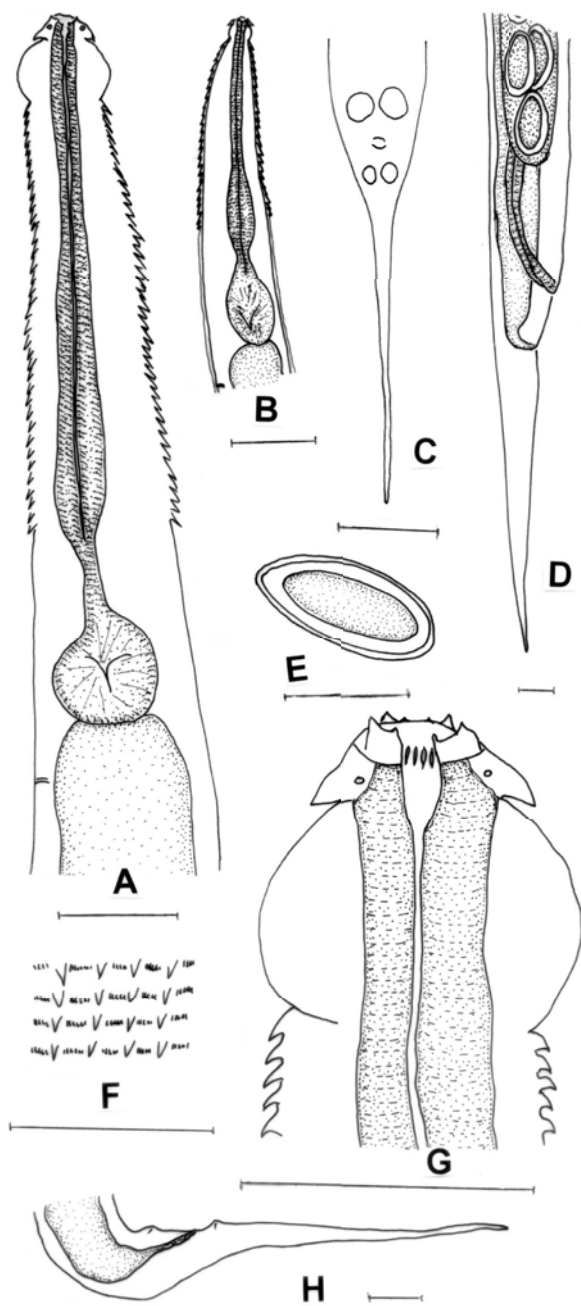


Fig. 1. *Artigasia indigena* n. sp. A) female anterior end B) male anterior end C) male posterior end, ventral view D) female posterior end, vagina, uterus with eggs E) egg F) spines G) female anterior end, in detail H) male posterior end, lateral view (Bars: A, B, C, D, E, H = 50  $\mu$ m; F, G = 25  $\mu$ m)

## Results

### Description

*Artigasia indigena* n. sp. (Fig 1A – H; Fig. 2A – D)  
Description: Cuticle thin, annulated, with spines (Fig. 1F; 2B) arranged in regular longitudinal rows from the first ring (with exceptions to second) to the base of medial bulb (Fig. 1A, B; 2A, B). First ring differentiated with eight

spines, second ring bigger than the previous one and without spines (Fig. 1G; 2B), and then a series of small rings with spines come up to the base of medial bulb. Lateral alae absent. Head homocephalic, with eight papillae around the mouth. Amphids small, porelike. Oral opening triangular. Stoma includes the first ring, with four thickening cuticle like teeth (Fig. 1G; 2B). Oesophagus consists of a long procorpus, a short isthmus and a rounded and strong basal bulb. Nerve ring encircling procorpus at about half of its length. Excretory pore posterior situated at the beginning of the intestine (Fig. 1A, B). Intestine simple, rectum short. Vulva situated at the posterior end of the body, vagina muscular long and thin (Fig. 1D). Genital tract monodelphic with two flexures. Eggs oval, smooth shell (Fig. 1E; 2C). Male without spicule, with one pair of preanal papillae and one pair of postanal papillae (Fig. 1C, H). Tail long and pointed in both sexes (Fig. 1D, H; 2D).

*Male* (n = 18): Total length: 1 290  $\mu$ m (1 213  $\pm$  187.2); labiopapillae diameter: 11.75  $\mu$ m (11.58  $\pm$  0.52); body width at nerve ring level: 35.25  $\mu$ m (35.42  $\pm$  0.52); maximum body diameter: 76  $\mu$ m (75.8  $\pm$  0.72); body width at posterior end level: 48  $\mu$ m (47.77  $\pm$  0.68); body diameter at anus level: 40  $\mu$ m (40.53  $\pm$  1.28); distance from anterior end to nerve ring: 103.4  $\mu$ m (104  $\pm$  0.4); oesophagus length: 260  $\mu$ m (283  $\pm$  20.81); distance from anterior end to excretory pore: 105.75  $\mu$ m (105.81  $\pm$  0.85); distance from anterior end to medial bulb: 185.6  $\mu$ m (186.06  $\pm$  3.72); tail appendage length: 239  $\mu$ m (236.56  $\pm$  5.75).

*Female* (n = 24): Total length: 1 470  $\mu$ m (2 220  $\pm$  649.53); labiopapillae diameter: 16.41  $\mu$ m (15.18  $\pm$  1.18); body width at nerve ring level: 70.5  $\mu$ m (74.83  $\pm$  4.8); maximum body diameter: 110  $\mu$ m (116  $\pm$  5.29); body width at posterior end level: 80  $\mu$ m (98.7  $\pm$  18.03); body width at vulva level: 100  $\mu$ m (106.67  $\pm$  11.55); distance from anterior end to nerve ring: 224  $\mu$ m (218.66  $\pm$  6.11); oesophagus length: 450  $\mu$ m (487  $\pm$  32.14); distance from anterior end to excretory pore: 496  $\mu$ m (505  $\pm$  12.86); distance from anterior end to medial bulb: 344  $\mu$ m (345  $\pm$  5.03); vagina length: 25.65  $\mu$ m (26.16  $\pm$  0.61); vagina width: 16.45  $\mu$ m (12.02  $\pm$  3.86);  $V^*$ : 67 % (66.4  $\pm$  1.47); eggs length and width: 78.57  $\mu$ m (81.19  $\pm$  3.38) x 35.71  $\mu$ m (38.57  $\pm$  3.18); tail appendage length: 430  $\mu$ m (505  $\pm$  77.10).

\* $V$  = distance from anterior end to vulva/body length x 100

\*The species epithet is derived from the area of study which is a region of indigenous reserve.

*Type host*: adults female and male of *Phorocantha semipunctata* (Fabricius) (Coleoptera, Cerambycidae).

*Type locality*: Cuña Piru (27° 16' S, 54° 50' W), Misiones Province, Argentina.

*Type material*: Holotype (female), allotype (male) and paratypes deposited in the Helminthological collection, N°5461, Museo de La Plata, Paseo del Bosque s/n, 1900 La Plata, Argentina.

*Site of infection*: intestine, midgut.

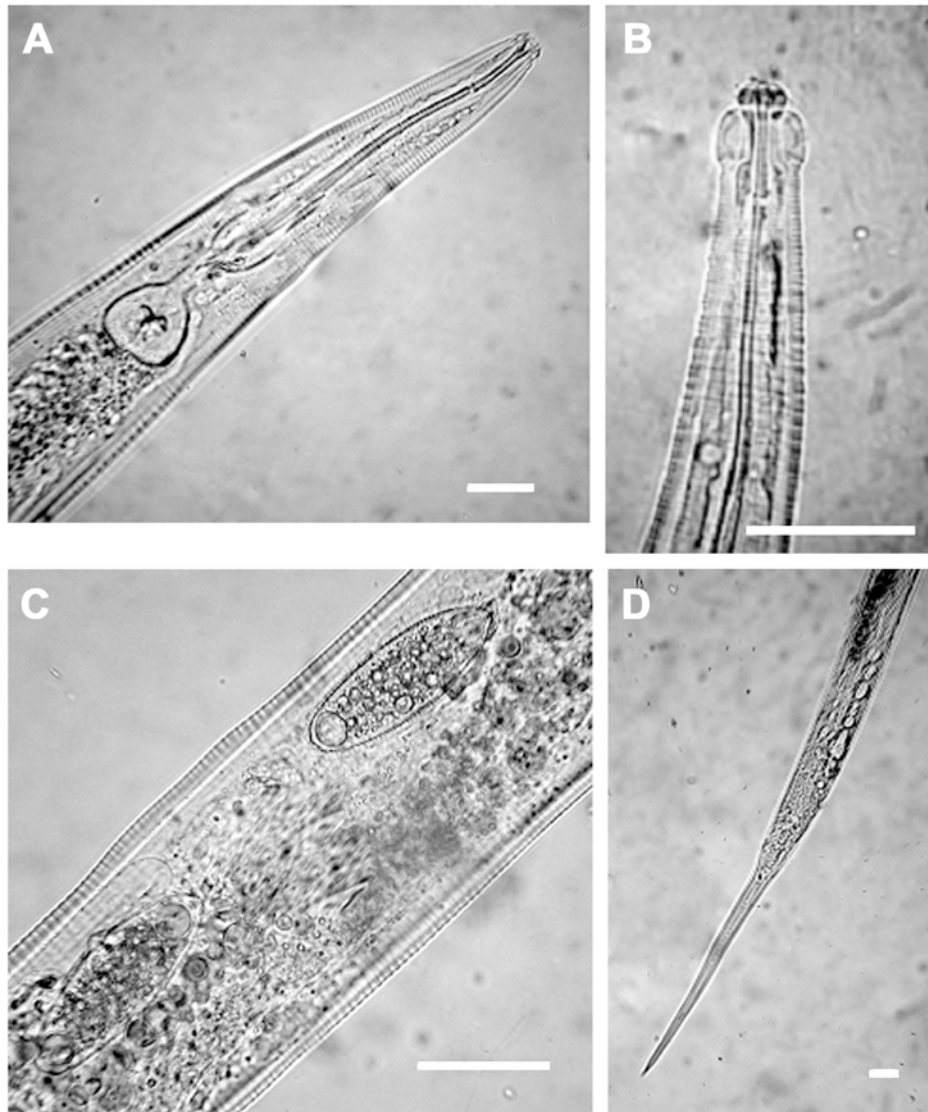


Fig. 2. *Artigasia indigena* n. sp. A) anterior end of the female showing the oesophagus B) anterior end of the female, anterior rings C) body of female with eggs D) posterior end of female, tail appendage (Bars = 50  $\mu$ m)

### Remarks

The taxonomy of the family Hystrignathidae is problematic due to lack of taxonomic descriptions for males of many species and the contradictory opinions for several authors for the species.

*Artigasia indigena* n. sp. is close to eleven species parasites of coleopteran passalids found in Brazil: *Artigasia leidy* (Artigas 1926), Christie 1934, *A. dubia* (Travassos and Kloss 1957), *A. elegans* (Artigas 1926), Christie 1934, *A. hoehnei* (Artigas 1926), Christie 1934, *A. insignia* (Travassos and Kloss 1958), *A. longicauda* (Artigas 1926), Christie 1934, *A. minuta* (Travassos and Kloss 1957), *A. monodelpho* (Travassos and Kloss 1958) n. comb., *A. silvestris* (Travassos and Kloss 1958), *A. similis* (Artigas 1926), Christie 1934, *A. vesiculosa* (Artigas

1926), Christie 1934, which are characterized principally by the cervical cuticle spinose, and cephalic extremity with two or more dilated annules. These species have been described on the female characters because the males are unknown.

*Artigasia leidy* is characterized by the anterior end of the body with rows of external cuticular spines, which go as far down as the middle of the oesophageal bulb and the eggs are elongated elliptically (131  $\mu$ m x 44  $\mu$ m). *Artigasia dubia* is distinguished by oesophagus short, tail appendage longer than *A. indigena*. *Artigasia elegans* is separated by the cuticle of anterior part of body with small spines, buccal cavity long (53  $\mu$ m) and vulva situated at 55 % of the body. *Artigasia hoehnei* is distinguished by the cuticle of anterior part of body with small spines, which disappear anterior to oesophageal bulb, first ring is dilated

and the others are smaller and similar. *Artigasia insignia* differs from the others by the cuticle with 16 longitudinal series of spines which extend until the beginning of the intestine. Respect to *A. longicauda* is characterized by cuticle spines absent and oesophagus very long. *Artigasia minuta* is distinguished by the cuticular spines arranged in 8 rows and extended until 1/3 of the oesophagus length. *Artigasia monodelpho* differs because the cuticle has 32 longitudinal series alternated and vulva is situated at mid-body. *Artigasia silvestris* is characterized by the oesophagus with strong club-shaped oesophageal bulb and eggs with ornamentations. *Artigasia similis* is distinguished by cuticle with spines, which extend until the base of oesophagus level and head without any cephalic dilatation. Long stoma and oesophagus with a claviform corpus differ *A. vesiculosa* from the others.

Morphological characters and morphometrics data show that this nematode corresponds to a new species, called *A. indigena* n. sp. a parasite of *P. semipunctata* and constitutes the first record of this genus in Argentina.

*Artigasia indigena* n. sp. is characterized by *i*) cuticle thin, annulated with spines arranged in regular longitudinal rows from the first ring to the base of medial bulb, *ii*) first ring differentiated with eight spines, second ring bigger and without spine, and a series of small rings with spines come up to from the third ring to the base of medial bulb, *iii*) lateral alae absent, *iv*) stoma short with four cuticle thickening like teeth, *v*) excretory pore posterior situated at the beginning of the intestine, *vi*) V= 67 %, *vii*) eggs oval and smooth shell, *viii*) male without spicule, and *ix*) genital papillae arranged with 1 pair of preanal and 1 pair postanal papillae.

## Acknowledgement

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## References

- ADAMSON, M. L., VAN WAEREBEKE, D. (1992). Revision of the Thelastomatoidea, Oxyurida of invertebrate host. III Hystrignathidae. *Syst. Parasitol.*, 22: 111 – 130
- ARTIGAS, P. (1926). Nematoides de Invertebrados. *Bol. Biol.*, Sao Paulo 1: 1 – 13
- ARTIGAS, P. (1928). Nematoides de Invertebrados. *Bol. Biol.*, Sao Paulo 3: 71 – 5
- CHRISTIE, J. R. (1934). The nematoda genera *Hystrignatus* Leidy, *Lepidonema* Cobb, *Artigasia* g.n. (Thelastomatiidae). *Proc. Helminthol. Soc. Wash.*, 1: 43 – 8
- LEIDY, J. (1850). Description of some nematoid entozoa infesting insect. *Proc. Nat. Acad. Sci.*, Philadelphia 5:100.
- SEINHORST, J. W. (1959). A rapid method for the transfer of nematodes from fixative to anhydrous glycerin. *Nematol.* 4: 67 – 69
- POINAR, G. O. JR. (1975). *Entomogenous nematodes: A manual and host list of insect-nematode associations*. E. J. Brill, Leiden, 317 pp.
- POINAR, G. O. JR. (1977). *CHI Key to the groups and genera of nematode parasites of invertebrates*. Commonwealth Agricultural Bureaux, England, 43 pp.
- TRAVASSOS, L., KLOSS, G. R. (1957). Nematodeos de invertebrados. 2ª e 3ª notas. *Rev. Bras. Biol.*, Rio de Janeiro 17: 467 – 477
- TRAVASSOS, L. KLOSS, G. R. (1958). Sobre a fauna de nematodeos dos Coleopteros-Passalidae da estacao biologica de boracéia. *Arq. Zool.*, Sao Paulo 11: 23 – 57

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