

Papéis Avulsos de Zoologia

Museu de Zoologia da Universidade de São Paulo

Volume 50(36):571-577, 2010

www.mz.usp.br/publicacoes

www.revistasusp.sibi.usp.br

www.scielo.br/paz

ISSN impresso: 0031-1049

ISSN on-line: 1807-0205

A NEW SPECIE OF *ARTIGASIA* CHRISTIE, 1934 (OXYURIDA: HYSTRIGNATHIDAE) FROM A CUBAN PASSALID BEETLE

JANS MORFFE^{1,2}
NAYLA GARCÍA^{1,3}

ABSTRACT

Artigasía milerai sp. nov. (Oxyurida: Hystrignathidae) is described from the gut caeca of *Passalus interstitialis* Escholtz, 1829 (Coleoptera: Passalidae) from Escaleras de Jaruco, La Habana province, Cuba (type locality) and El Pan de Matanzas, Matanzas province, Cuba. It differs from *A. ensicrinata* (Hunt, 1981), *A. monodelpha* (Travassos & Kloss, 1958) and *A. pauliani* Théodoridès, 1955 by having ridged eggs and a comparatively shorter tail. It also differs from *A. monodelpha* and *A. pauliani* by having a comparatively shorter esophagus, the vulva being slightly more posterior, and the extension of the cervical spines. It is close to *A. ankaratrae* Van Waerebeke, 1973 but can be differentiated by a stouter body, a comparatively shorter oesophagus and the extension of the lateral alae.

KEYWORDS: Hystrignathidae; *Artigasía*; Passalidae; *Passalus*; Cuba.

INTRODUCTION

The genus *Artigasía* Christie, 1934 is the largest among Hystrignathidae, with 37 species described from the gut caeca of Passalidae (Coleoptera). The genus is characterized by having a clavate procorpus, cervical cuticle armed with rows of spines, and a monodelphic-prodelphic reproductive system (Adamson & Van Waerebeke, 1992). The taxonomy of the group is still difficult due to variability in the arrangement of cephalic annules and the presence of several morphs within a population in some species. Such morphs can be differentiated by the extension of cervical spines, lateral alae and ornamentation of eggs (Van Waerebeke, 1973; Hunt, 1981), or by differences in meristic features (Morffe & García, 2010).

Most species (17) have been described from Africa and Madagascar, and Brazil (14) (Artigas, 1926; Théodoridès, 1955; Travassos & Kloss, 1957a, b; 1958; Van Waerebeke, 1973). Also, a few species have been described from Mexico and the West Indies (Hunt, 1981; Coy & García, 1995; García & Coy, 1995; García *et al.*, 2009; Morffe & García, 2010).

The aim of this paper is to describe a new species of *Artigasía* parasitizing *Passalus interstitialis* Escholtz, 1829 from Cuba.

MATERIAL AND METHODS

Nine specimens of *Passalus interstitialis* Escholtz, 1829 from Cuba were collected: eight from Escaleras

¹ Instituto de Ecología y Sistemática, Carretera de Varona km 3½, Capdevila, Boyeros, A.P. 8029, C.P. 10800, Havana, Cuba.

² E-mail corresponding author: jans@ecologia.cu

³ E-mail: nayla@ecologia.cu

de Jaruco, La Habana province, and a single specimen from El Pan de Matanzas, Matanzas province. All hosts were caught by hand from rotting logs and kept alive in plastic jars with moistened wood chips as food and a humidity source.

Beetles were killed in a killing jar with ethyl ether or acetone and immediately dissected by practicing longitudinal incisions in the abdominal pleural membranes. The intestines were extracted and excised in Petri dishes with normal saline under a stereomicroscope. Parasites isolated from guts were killed with hot water (60-70°C) and fixed in 70% ethanol.

Nematodes were clear-mounted in slides with glycerine and edges of the coverslips were sealed with nail polish. They were examined with a maximum magnification of 1000x. Measurements were taken with the aid of a calibrated eyepiece micrometer and are given in millimeters. De Man's indexes a, b, c and V% were calculated (De Man, 1884). All variables are shown as the range, followed in parentheses by the mean plus standard deviation.

Micrographs were taken with an AxioCam digital camera attached to a Carl Zeiss AxiosKop 2 Plus compound microscope. Line drawings were made with the softwares CorelDRAW X3 and Adobe Photoshop CS2 using the micrographs as templates. The scale bars of all plates are given in millimeters.

The material examined is deposited in the Colección Helmintológica de las Colecciones Zoológicas (CZACC) of the Instituto de Ecología y Sistemática, Havana, Cuba and the Coleção Helmintologica (CHIOC) of the Instituto Oswaldo Cruz, Rio de Janeiro, Brazil.

RESULTS

Genus *Artigasias* Christie, 1934

Artigasias milerai sp. nov.

(Figs. 1A-I, 2A-D)

Measurements

Holotype female: a = 14.53, b = 6.81, c = 5.32, V% = 48.17, total length = 2.180, maximum body width = 0.150, first cephalic annule (length × width) = 0.005 × 0.030, stoma length = 0.050, procorpus length = 0.228, isthmus length = 0.035, diameter of basal bulb = 0.073, total length of oesophagus = 0.320, nerve ring to anterior end = 0.125, excretory pore to anterior end = 0.490, vulva to posterior end = 1.130, anus to posterior end = 0.410, eggs = 0.113-0.120 × 0.050-0.053 (0.116 ± 0.005 × 0.051 ± 0.002 n = 2).

Paratypes (females) (n = 8): a = 14.71-16.60 (15.50 ± 0.72), b = 6.19-6.96 (6.67 ± 0.25), c = 4.71-5.29 (4.96 ± 0.21), V% = 45.96-48.76 (47.73 ± 0.91), total length = 1.900-2.140 (2.006 ± 0.082), maximum body width = 0.118-0.140 (0.130 ± 0.008), first cephalic annule (length × width) = 0.005 × 0.020-0.025 (0.020 ± 0.000 × 0.023 ± 0.002), stoma length = 0.045-0.050 (0.048 ± 0.003), procorpus length = 0.195-0.220 (0.209 ± 0.010), isthmus length = 0.033-0.038 (0.035 ± 0.002), diameter of basal bulb = 0.055-0.063 (0.058 ± 0.003), total length of oesophagus = 0.280-0.320 (0.301 ± 0.016), nerve ring to anterior end = 0.123-0.143 (0.136 ± 0.007), excretory pore to anterior end = 0.390-0.480 (0.438 ± 0.033), vulva to posterior end = 0.990-1.120 (1.049 ± 0.050), anus to posterior end = 0.380-0.440 (0.405 ± 0.021), eggs = 0.108-0.120 × 0.038-0.053 (0.114 ± 0.004 × 0.048 ± 0.004 n = 11).

Population from El Pan de Matanzas, Matanzas province

Females (n = 2): a = 13.33-15.40 (14.37 ± 1.46), b = 6.43-6.70 (6.57 ± 0.19), c = 4.86-5.03 (4.95 ± 0.12), V% = 46.96-47.22 (47.09 ± 0.18), total length = 1.800-1.810 (1.805 ± 0.007), maximum body width = 0.118-0.135 (0.126 ± 0.012), first cephalic annule (length × width) = 0.005 × 0.023 (0.005 ± 0.000 × 0.023 ± 0.000), stoma length = 0.043 (0.043 ± 0.000), procorpus length = 0.175-0.188 (0.181 ± 0.009), isthmus length = 0.033 (0.033 ± 0.000), diameter of basal bulb = 0.055-0.063 (0.059 ± 0.005), total length of oesophagus = 0.270-0.280 (0.275 ± 0.007), nerve ring to anterior end = 0.118-0.120 (0.119 ± 0.002), excretory pore to anterior end = 0.380-0.400 (0.390 ± 0.014), vulva to posterior end = 0.950-0.960 (0.955 ± 0.007), anus to posterior end = 0.360-0.370 (0.365 ± 0.007), eggs = 0.100-0.105 × 0.040-0.045 (0.102 ± 0.003 × 0.043 ± 0.003 n = 3).

Description: Female habitus straight. Body comparatively stout. Cuticle with marked annules in the spiny region and less marked in the rest of the body. Longitudinal sub-cuticular striae present. Lateral alae very strait and hardly visible, from the end of spines to about a body-width before the level of the vulva. Head set-off from the body by a single groove, bearing eight paired papillae. First cephalic annule short, not inflated, about half of the head length. Cervical spines arranged in alternate rows, extending from the end of the first cephalic annule to about the middle

of the isthmus. Spines clustered in the first half of the spiny region, about 30 in the rows next to the head and becoming more widely spread in the second half,

with about 40 in the final rows. Stoma about six head-lengths surrounded by an esophageal collar. Procorpus muscular, its base clavate and well set off from the

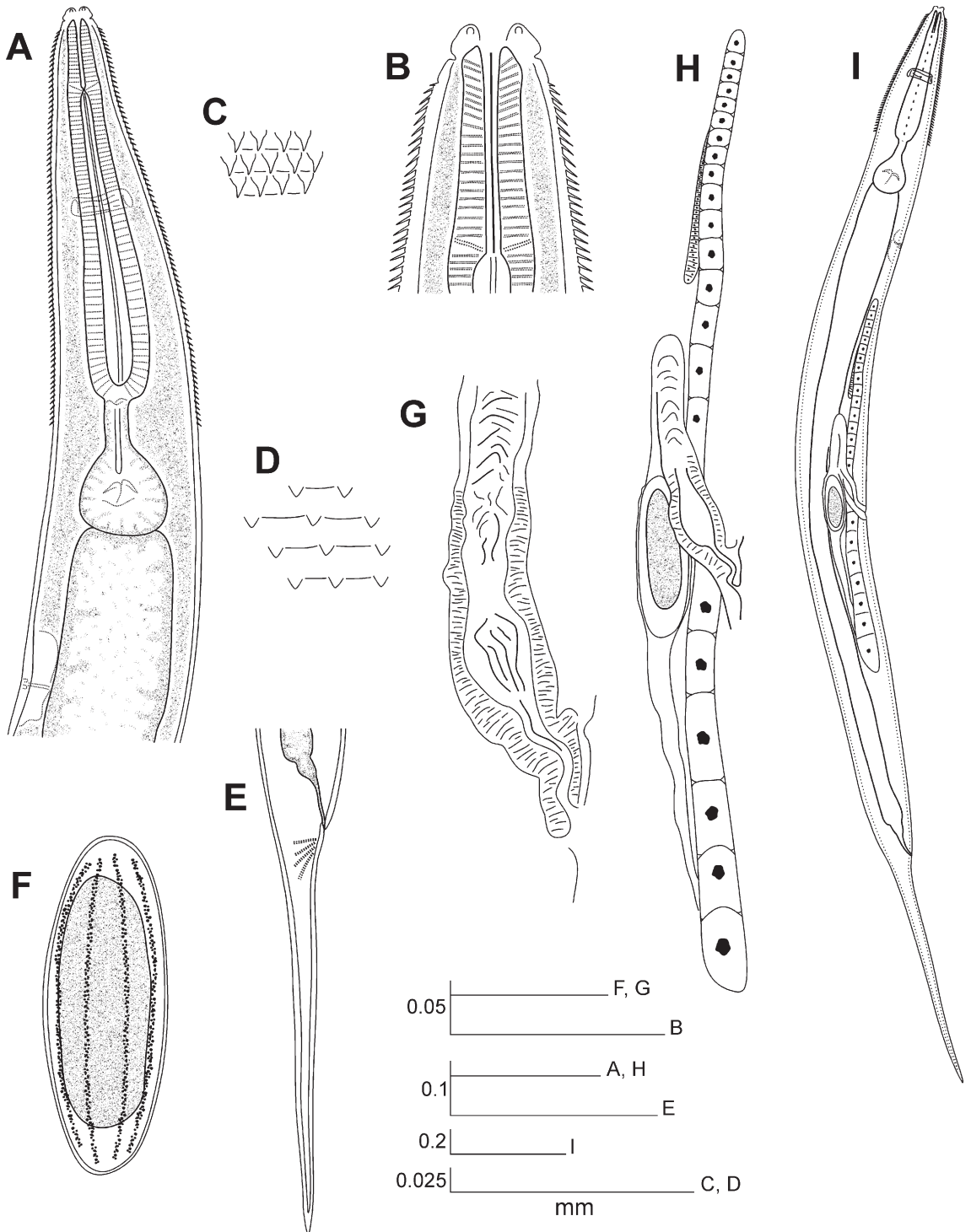


FIGURE 1: *Artigasia milerai* sp. nov. female. **A.** esophageal region, lateral view. **B.** cephalic region and stoma. **C.** cervical spines at the level of the stoma. **D.** cervical spines at the end of the spiny region. **E.** tail, lateral view. **F.** egg. **G.** vulva, ventro-lateral view. **H.** genital tracts. **I.** entire nematode, lateral view.

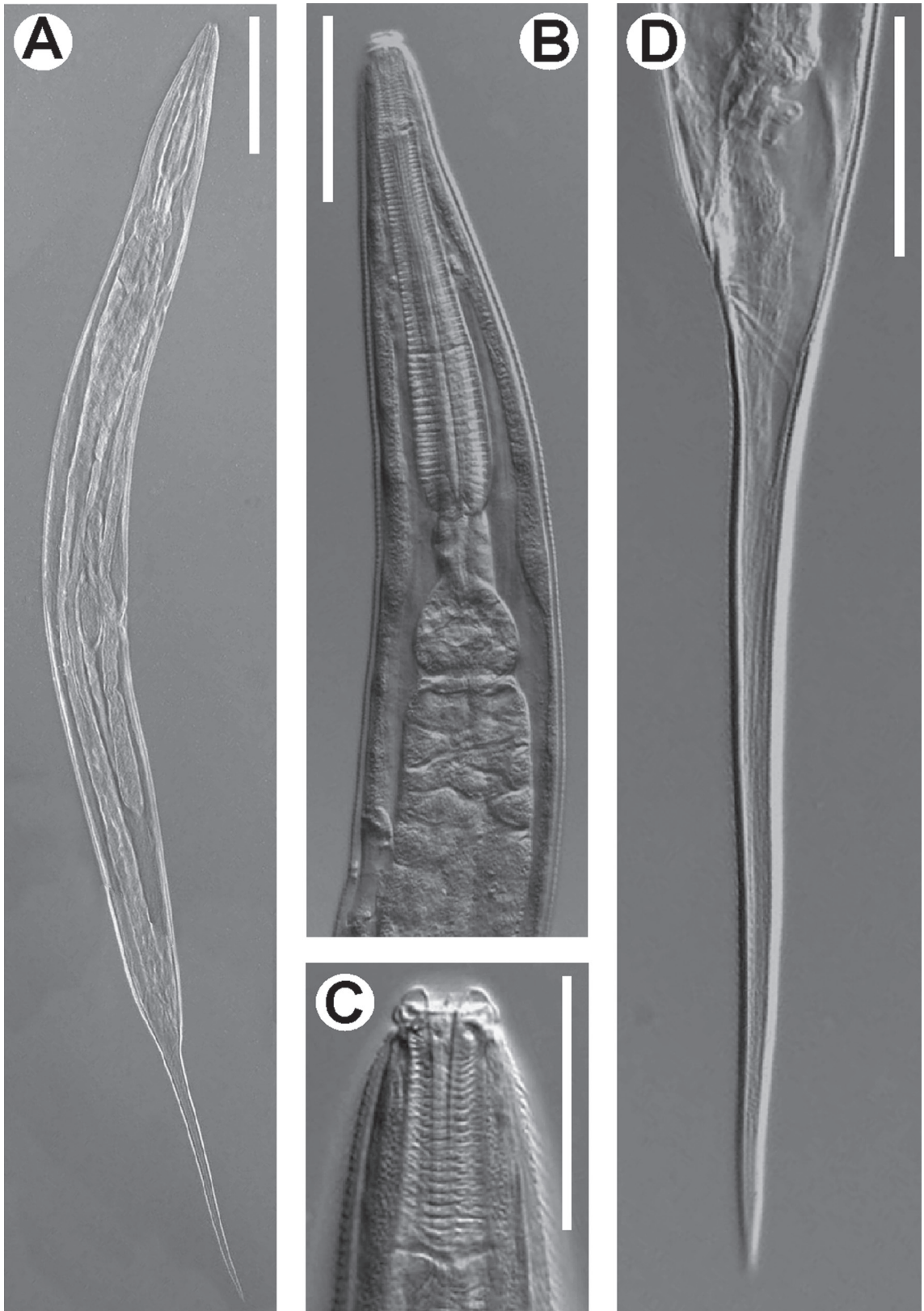


FIGURE 2: *Artigasia milerai* sp. nov. female. **A.** entire nematode lateral view. **B.** esophageal region, lateral view. **C.** cephalic region and stoma. **D.** tail, lateral view. Scale bars: A = 0.2 mm; B = 0.1 mm; C, D = 0.05 mm.

isthmus. Basal bulb sub-spherical to sub-pyriform. Valve plate well developed. Intestine simple, sub-rectilinear, its fore region inflated. Rectum short, anus not prominent. Nerve ring encircling the procorpus at about 40% of its length. Excretory pore situated at about a body width behind the basal bulb. Vulva a median transverse slit slightly displaced towards the anterior half of the body, its lips not prominent. Vagina muscular, forwardly directed. Genital tract monodelphic-prodelphic. Ovary reflexed at about a little more than a body-width beyond the basal bulb. Distal flexure of the ovary about 1.4 body-widths long. Oocytes in a single row. Eggs ovoid with eight scarcely prominent ridges in their shells. A maximum of two eggs at the same time in the uterus. Tail comparatively long, conical and slightly subulate. Male unknown.

Type host: *Passalus interstitialis* Escholtz, 1829 (Coleoptera: Passalidae).

Site: gut caeca.

Type locality: Escaleras de Jaruco, Jaruco, La Habana province, Cuba.

Additional record: El Pan de Matanzas, Matanzas province, Cuba (Fig. 3).

Type material: ♀ holotype, Cuba, La Habana province, Jaruco, Escaleras de Jaruco; in *Passalus interstitialis*; 16.III.2008; E. Fonseca, J. Morffe & F. Alvarez coll.; CZACC 11.4595. 6 ♀♀ paratypes, same data as holotype, CZACC 11.4596-11.4601; 2 ♀♀ CHIOC, same data as holotype.

Additional material: 2 ♀♀ Cuba, Matanzas province, El Pan de Matanzas; in *Passalus interstitialis*; 13.VIII.2009; J. Morffe coll.; CZACC 11.4602-11.4603.

Etymology: named after the late José Fernández-Milera, eminent Cuban zoologist and naturalist.

DISCUSSION

A. milerai sp. nov. presents spines arranged in alternate rows, coinciding with two other species of the genus formerly described as *Paraxyo* Travassos &

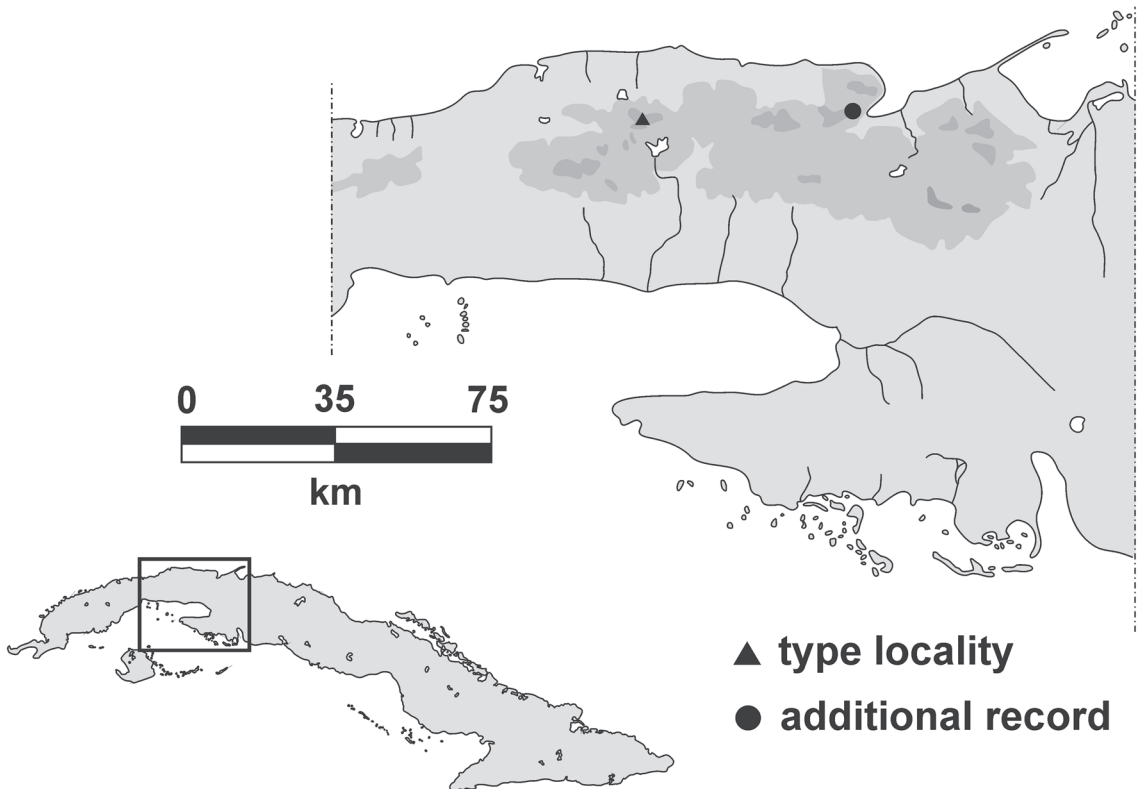


FIGURE 3: Distribution of *Artigasia milerai* sp. nov. from Cuba.

TABLE 1: Comparative measurements of the females of *Artigasía milerai* sp. nov. from the type locality Escaleras de Jaruco, La Habana province, Cuba and El Pan de Matanzas, Matanzas province, Cuba. Measurements are given in millimeters.

Host	<i>Passalus interstitialis</i>	<i>P. interstitialis</i>
Locality	Escaleras de Jaruco (type locality) (n = 9)	El Pan de Matanzas (n = 2)
Females measurements		
Total length	1.900-2.180	1.800-1.810
Maximum body width	0.118-0.150	0.118-0.135
First cephalic annule	0.005 × 0.020-0.030	0.005 × 0.023
Stoma length	0.045-0.050	0.043
Procorpus length	0.195-0.228	0.175-0.188
Isthmus length	0.033-0.038	0.033
Basal bulb diameter	0.055-0.073	0.055-0.063
Oesophagus length	0.280-0.320	0.270-0.280
Nerve ring-head	0.123-0.143	0.118-0.120
Excretory pore-head	0.390-0.490	0.380-0.400
Vulva-posterior end	0.990-1.130	0.950-0.960
Anus-posterior end	0.380-0.441	0.360-0.370
Eggs	0.108-0.120 × 0.038-0.053	0.100-0.105 × 0.040-0.045
a	14.53-16.60	13.33-15.40
b	6.19-6.96	6.43-6.70
c	4.71-5.32	4.86-5.03
V%	45.96-48.76	46.96-47.22

Kloss, 1958 and currently synonymised with *Artigasía* (Adamson & Van Waerebeke, 1992). These are *A. ensicrinata* (Hunt, 1981) from Saint Lucia and *A. monodelpha* (Travassos & Kloss, 1958) from Brazil. It also resembles the Malagasian species *A. pauliani* Théodoridès, 1955 and *A. ankaratrae* Van Waerebeke, 1973.

A. milerai sp. nov. differs from *A. ensicrinata*, *A. monodelpha* and *A. pauliani* by having ridged eggs and a comparatively shorter tail (c = 4.71-5.32 vs. 3.0-4.1; 3.46-3.57; 4.24-4.52). It can be differentiated from *A. monodelpha* and *A. pauliani* by the comparatively shorter oesophagus (b = 6.19-6.96 vs. 5.12-5.29; 5.30-5.65), the slightly more anterior vulva (V% = 45.96-48.76 vs. 50.0; 50.0-53.3), and the spines extending further down the body.

This new species is close to *A. ankaratrae* that also presents ridged eggs. It differs from the latter by a stouter body (a = 14.53-16.60 vs. 15.0-26.0), comparatively shorter oesophagus (b = 6.19-6.96 vs. 5.3-6.0), and lateral alae terminating before the vulva. In *A. ankaratrae* the lateral alae extend from the middle of the isthmus to a short distance (about a half of the body-width) beyond the vulva (Van Waerebeke, 1973).

A. milerai sp. nov. is the first Cuban species of the genus that presents this unusual arrangement of the cervical spines. The specimens from El Pan de

Matanzas (locality near Escaleras de Jaruco) present a shorter body (Table 1). Except for this feature, individuals from both populations agree morphologically and metrically.

RESUMEN

Se describe a Artigasía milerai sp. nov. (Oxyurida: Hystrignathidae) parásita de los ciegos intestinales de *Passalus interstitialis* Escholtz, 1829 (Coleoptera: Passalidae) de Escaleras de Jaruco, provincia La Habana, Cuba (localidad tipo) y El Pan de Matanzas, provincia Matanzas, Cuba. La misma difiere de *A. ensicrinata* (Hunt, 1981); *A. monodelpha* (Travassos & Kloss, 1958) and *A. pauliani* Théodoridès, 1955 por tener los huevos ornamentados con crestas longitudinales y la cola, en proporción, más corta. Además, se diferencia de *A. monodelpha* y *A. pauliani* por el esófago, en proporción, más corto, la vulva ligeramente más posterior y la extensión de las espinas cervicales. *A. milerai* sp. nov. es cercana a *A. ankaratrae* Van Waerebeke, 1973, pero se diferencia por el cuerpo más robusto, el esófago proporcionalmente más corto y la extensión de las alas laterales.

PALABRAS-CLAVES: Hystrignathidae; *Artigasía*; Passalidae; *Passalus*; Cuba.

ACKNOWLEDGEMENTS

We are indebted to our colleagues Lic. Elier Fonseca, Lic. Gunnary León (Universidad de La Habana), Lic. Ormaily Madruga (Museo de Historia Natural de Cuba), MSc. Rayner Núñez and Maike Hernández (Instituto de Ecología y Sistemática), and the undergraduate student Facundo Alvarez for their invaluable help during field work. We are also indebted to the inhabitants of La Jaula community and the workers of the Caunabaco dam for their hospitality. We thank MSc. Yamir Torres (Instituto de Ecología y Sistemática) for his help with the micrographs. We also thank Dr. Luis F. de Armas from the Instituto de Ecología y Sistemática for a critical review of the manuscript and Dr. Pedro Herrera from the same institution for revision of the English manuscript. This work was financed by IDEAWILD and project DB-06 “Colecciones Zoológicas, su Conservación y Manejo” of the Ministerio de Ciencia, Tecnología y Medio Ambiente, Cuba.

REFERENCES

ADAMSON, M.L. & VAN WAEREBEKE, D. 1992. Revision of the Thelastomatoidea, Oxyurida of invertebrate hosts III. Hystrignathidae. *Systematic Parasitology*, 22:111-130.
 ARTIGAS, P. 1926. Nematodes de invertebrados. *Boletim Biológica*, São Paulo, 1:1-13.

COY, A. & GARCÍA, N. 1995. Nuevas especies de nemátodos parásitos de insectos mexicanos. *AvaCient*, 12:10-15.
 DE MAN, J.G. 1884. *Die frei der reinen Erde und in sussen Wasser Lebenden nematoden neiderlandischen fauna*. Eine Systematische Faunistische Monographie. Leiden, 206p.
 GARCÍA, N. & COY, A. 1995. Nemátodos parásitos de artrópodos de la Sierra de los Organos, Cuba. *AvaCient*, 14:26-30.
 GARCÍA, N.; VENTOSA, L. & MORFFE, J. 2009. Especie nueva de Artigasia (*Thelastomatoidea: Hystrignathidae*) de Pico La Melba, Holguín, Cuba. *Solenodon*, 8:8-11.
 HUNT, D.J. 1981. On *Artigasia horridospina* sp. nov., *Longior semialata* sp. nov., *Paraxyo ensicrinatus* sp. nov. (Oxyurida: Hystrignathidae) and *Pulchrocephala pulchrocephala* Travassos, 1925 (Oxyurida: Pulchrocephalidae). *Systematic Parasitology*, 3:33-52.
 MORFFE, J. & GARCÍA, N. 2010. A new species of Artigasia Christie, 1934 (*Thelastomatoidea: Hystrignathidae*) from Cuba and redescription of Artigasia simplicitas García et Coy, 1995. *Novitates Caribaeae*, 3:53-61.
 THÉODORIDÈS, J. 1955. Contribution a l'étude des parasites e phorétiques de coléoptères terrestres. *Vie et Milieu*, Supplement 4, 310p.
 TRAVASSOS, L. & KLOSS, G.R. 1957a. Nematodeos de invertebrados. 1ª nota. *Revista Brasileira da Biologia*, 17(3):295-302.
 TRAVASSOS, L. & KLOSS, G.R. 1957b. Nematodeos de invertebrados. 2ª e 3ª notas. *Revista Brasileira da Biologia*, 17(4):467-477.
 TRAVASSOS, L. & KLOSS, G.R. 1958. Sobre a fauna de Nematodeos dos Coleopteros-Passalidae da Estação Biológica de Boracéia. *Arquivos de Zoologia*, São Paulo, 11:23-57.
 VAN WAEREBEKE, D. 1973. Les oxyuroides associes aux Passalidae à Madagascar. *Cahiers ORSTOM*, Serie Biologie, 18:3-43.

Recebido em: 09.04.2010
 Aceito em: 26.10.2010
 Impresso em: 10.12.2010