A new species of Artigasia Christie, 1934
(Oxyurida: Hystignathidae) from a Cuban Passalid beetle

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ABSTRACT

Artigasia milerai sp. nov. (Oxyurida: Hystignathidae) 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 esophagus and and the extension of the lateral alae.

Keywords: Hystignathidae; Artigasia; Passalidae; Passalus; Cuba.

INTRODUCTION

The genus Artigasia Christie, 1934 is the largest among Hystignathidae, 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 Artigasia parasitizing Passalus interstitialis Escholtz, 1829 from Cuba.

MATERIAL AND METHODS

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

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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 Helminológica 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 Artigasia Christie, 1934
Artigasia milerae 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 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.


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

**DISCUSSION**

*A. milera* sp. nov. presents spines arranged in alternate rows, coinciding with two other species of the genus formerly described as *Paraxyo* Travassos &
Kloss, 1958 and currently synonymised with *Artiga-
sia* (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. 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 differ-
etiated 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 vul-
va (*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* but
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 mid-
dle 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, individ-
uals from both populations agree morphologically
and metrically.

<table>
<thead>
<tr>
<th>Host</th>
<th><em>Passalus interstitialis</em></th>
<th><em>P. interstitialis</em></th>
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</thead>
<tbody>
<tr>
<td>Females measurements</td>
<td></td>
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<tr>
<td>Total length</td>
<td>1.900-2.180</td>
<td>1.800-1.810</td>
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<tr>
<td>Maximum body width</td>
<td>0.118-0.150</td>
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<tr>
<td>First cephalic annule</td>
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<tr>
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<td>Nerve ring-head</td>
<td>0.123-0.143</td>
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<td>Vulva-posterior end</td>
<td>0.990-1.130</td>
<td>0.950-0.960</td>
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<tr>
<td>Eggs</td>
<td>0.108-0.120 × 0.038-0.053</td>
<td>0.100-0.105 × 0.040-0.045</td>
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<tr>
<td>a</td>
<td>14.53-16.60</td>
<td>13.33-15.40</td>
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<td>6.19-6.96</td>
<td>6.43-6.70</td>
</tr>
<tr>
<td>c</td>
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<td>4.86-5.03</td>
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Se describe a *Artigasia milerai* sp. nov. (*Oxyurida:*
*Hystrignathidae*) parásita de los ciegos intestinales de
*Passalus interstitialis* Escholtz, 1829 (*Coleoptera: Pas-
salidae*) 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 by 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 propor-
ción, más corto, la vulva ligeramente más posterior y la
extensión de las espinas cervicales. *A. milerai* sp. nov.
está cercana a *A. ankaratrae* Van Waerebeke, 1973, pero
se diferencia por el cuerpo más robusto, el esófago pro-
porcionalmente más corto y la extensión de las alas
laterales.

**RESUMEN**

Palabras-claves: *Hystrignathidae; Artigasia; Passali-
dae; Passalus; Cuba.*
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