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## A NEW SPECIES OF *NEOHAEMATOTREPHUS* (DIGENEA: ECHINOSTOMIFORMES: CYCLOCOELIDAE) IN THE SPOTTED-SANDPIPER *ACTITIS MACULARIA* (CHARADRIIFORMES: SCOLOPACIDAE) FROM VENEZUELA

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**ABSTRACT:** Fischthal and Nasir (1974) reported *Neohaematotrepus brasilianum* (as *Cyclocoelum brasilianum*) in the spotted-sandpiper *Actitis macularia* from Venezuela. Three voucher specimens from that report, deposited in the United States National Parasite Collection, however, differ from *N. brasilianum* by having the cirrus sac on the sinistral side of the body, which resembles *N. facioi*, *N. arayae*, and *N. gendrei*. The new species is similar to *N. brasilianum* by having vitelline follicles extending well anterior to the intestinal bifurcation and by having a short and laterally displaced cirrus sac whose posterior end does not reach the intestinal bifurcation, whereas all other members of *Neohaematotrepus* have a cirrus sac that is medially oriented. *Neohaematotrepus gendrei* and *N. facioi* have cirrus sacs that extend to the level of the intestinal bifurcation, and *N. arayae* has a cirrus sac that extends well posterior to the posterior margin of the ceca. By having the ovary on the sinistral side of the body, the new species is similar to *N. brasilianum*, *N. gendrei*, and *N. arayae* but differs from *N. facioi*, in which the ovary is dextral.

In their generic key to the Cyclocoelidae, Kanev et al. (2002) proposed *Neohaematotrepus*, with *Cyclocoelum brasilianum* Stossich, 1902 as type species. While describing a new species of *Neohaematotrepus* inhabiting *Jacana spinosa* from the Area de Coservacion Guanacaste, Costa Rica (Zamparo et al., 2003), we examined digeneans deposited in the U.S. National Parasite Collection as voucher specimens of *C. brasilianum*, collected in the spotted sandpiper *Actitis macularia* from Venezuela and reported by Fischthal and Nasir (1974). The specimens differ in a combination of traits not only from *N. brasilianum*, but from all previously described cyclocoelids corresponding to that genus. We believe they represent a previously undescribed species, which we name herein.

### MATERIALS AND METHODS

Specimens were deposited at the U.S. National Parasite Collection, Beltsville, Maryland, by Fischthal and Nasir (1974) under the accession number USNPC 72781. No information on fixation and preparation are given in Fischthal and Nasir (1974). All measurements are reported in microns, unless otherwise stated. The first value in the series is the mean, followed by the actual values for each specimen in parentheses. Figures were drawn with the aid of a drawing tube.

### DESCRIPTION

#### *Neohaematotrepus fischthali* n. sp.

(Figs. 1–3)

**Description (based on 3 mature worms):** Total body length: 11.45 mm (10.8, 11.4, 12.2 mm). Maximum body width 2.9 mm (2.9–3 mm) occurring in hind body. Ventral sucker lacking. Oral sucker subterminal, poorly developed 205 (200, 215, 200) wide. Pharynx, large, round, very muscular, 207 (190, 215, 215) long by 202 (200, 200, 205) wide. Prepharynx short, outer wall covered by small gland cells. Esophagus sinusoidal shaped, expanded in middle, narrowing at junction with pharynx and with ceca, lined with epithelial cells, 723 (550, 770, 850) long by 118 (90, 150, 115) wide. Ceca forming cyclocoel, anterior extent of ceca 8.6% (8.7, 8.2, 8.8)% TBL from anterior. Genital pore ventral, midlevel of pharynx. Testes oblique, spherical to oval in shape, dextral testis anteriorly situated 86% (84, 85, 89)% TBL from anterior 640 (450, 570, 900) long by 580 (450, 390,

900) wide. Sinistral testis posteriorly situated 90% (90, 90, 91)% TBL from anterior end, 670 (460, 550, 1000) long by 540 (520, 400, 700) wide. Cirrus sac elongate, on sinistral side, weakly muscled, thin-walled, 650 (700, 550, 700) long by 188 (160, 180, 225) wide, containing unarmed cirrus, poorly developed pars prostatica, and well developed internal seminal vesicle (Fig. 2). Ovary slightly oval in shape, anterior to testes on sinistral side, 84% (84, 83, 86)% TBL from anterior end, 272 (250, 300, 265) long by 268 (250, 275, 280) wide. Mehlis' gland posterodorsal to ovary. Laurer's canal not observed. Seminal receptacle absent. Oviduct extremely short. Proximal portion of uterus filled with sperm serving as receptaculum seminis uterinum (Fig. 3). Uterus passing posterolaterally from ootype, looping over itself and proceeding medially, then ascending anteroventrally; uterine branches extending extracecally. Vitellarium follicular, lateral, confluent posteriorly near outer wall of cyclocoel; follicles 75–100 in length and 50–60 in width. Vitelline reservoir posterodorsal to ootype, entering ootype. Metraterm present, thin-walled, lined with gland cells proximal to genital pore. Eggs elliptical, yellow to light brown, eggs near metraterm 175 long by 100–110 wide; most eggs in utero possessing eye-spotted miracidia. Excretory pore terminal, vesicle expanded posterior to cyclocoel.

### Taxonomic summary

**Type host:** *Actitis macularia* Linnaeus, 1766 (Aves: Charadriiformes: Scolopacidae).

**Site of infection:** Abdominal cavity.

**Type locality:** Laguna de Los Patos, Cumana, Venezuela.

**Type specimens:** Holotype: USNPC 72781.

**Etymology:** The species is named after Jacob Fischthal, who deposited the specimens.

### Remarks

By having a pretesticular ovary, vitelline follicles confluent posteriorly, and a genital pore opening at the midpharyngeal level, the new species belongs within *Neohaematotrepus* Kanev et al. 2002; however, those authors did not list the members of *Neohaematotrepus* beyond the type species. Zamparo et al. (2003) recognized 3 additional members of the genus: *N. gendrei* Dubois, 1959, in *Arctophilornis africana* from Guinea, West Africa; *N. facioi*, Brenes and Arroyo, 1962, in *Jacana*

FIGURES 1–3. *Neohaematotrephus fischthali*. (1) Ventral view of holotype. Scale bar = 2 mm. (2) Male genitalia. GP = genital pore; ISV = internal seminal vesicle; M = metraterm; PH = pharynx; PP = pars prostatica. Scale bar = 200  $\mu$ m. (3) Female reproductive system. MG = Mehlis' gland; OV = ovary; RSU = receptaculum seminis uterinum; VR = Vitelline reservoir. Scale bar = 200  $\mu$ m.

*spinosa* from Puntarenas Province, Costa Rica; and *N. arayae* Zamparo et al. 2003 in *Jacana spinosa* from Guanacaste Province, Costa Rica. The new species is similar to *N. brasilianum* by having vitelline follicles extending well anterior to the intestinal bifurcation, all other members having vitelline follicles posterior to the intestinal bifurcation, and by having a short and laterally displaced cirrus sac, the posterior end of which does not reach the intestinal bifurcation, whereas all other members of *Neohaematotrephus* have a cirrus sac that is medially oriented. *Neohaematotrephus gendrei* and *N. facioi* have cirrus sacs that extend to the level of the intestinal bifurcation, and *N. arayae* has a cirrus sac that extends well posterior to the posterior margin of the ceca. By having the ovary on the sinis-

tral side of the body, the new species is similar to *N. brasilianum*, *N. gendrei*, and *N. arayae*, but differs from *N. facioi*, in which the ovary is dextral. By having the cirrus sac on the sinistral side of the body, the new species resembles *N. facioi*, *N. arayae*, and *N. gendrei*, but differs from *N. brasilianum*, which has the cirrus sac on the dextral side of the body.

Madhavi and Rao (1979) reported a receptaculum seminis uterinum as well as a blindly-ending Laurer's canal containing vitelline material, and possibly sperm, arising near the insertion of the vitelline duct in the portion of the ootype proximal to the ovary in *Cyclocoelium elongatum*. *Neohaematotrephus arayae*, and *N. facioi* have the vitelline reservoir and Laurer's canal entering the ootype distally rather than proximally (Zam-

paro et al., 2003); in *N. fischthali*, the vitelline reservoir also opens into the distal portion of the ootype, but there is no Laurer's canal (Fig. 3).

### DISCUSSION

*Neohaematotrephus brasilianum* was originally described in *Tringa flavipes* and has been reported in other scolopacids from both South and North America. Both *N. facioi* and *N. araya* infect *Jacana spinosa* from Costa Rica. This report of *N. fischthali* n. sp. from a Venezuelan sand piper represents a fourth species from the New World. *Neohaematotrephus gendrei* in *Arctophilornis africana*, a jacaniid, from Africa is the only member of the genus currently listed from the Old World.

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