Neohaematotrephus arayae n. sp. (Digenea: Echinostomiformes: Cyclocoelidae) in Jacana spinosa (Aves: Charadriiformes: Jacanidae) from the Área de Conservación Guanacaste, Costa Rica

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NEOHAEMMATOTREPHUS ARAYAE N. SP. (DIGENEA: ECHINOSTOMIFORMES:
CYCLOCOELIDAE) IN JACANA SPINOSA (AVES: CHARADRIIFORMES: JACANIDAE)
FROM THE AREA DE CONSERVACIÓN GUANACASTE, COSTA RICA

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ABSTRACT: Specimens of a species of cyclocoelid digenene inhabiting Jacana spinosa from the Area de Conservación Guanacaste, Costa Rica, most closely resemble Haematotrephus facioi (Brener and Arroyo, 1962) Yamaguti, 1971, in the same host from Aranjuez, Puntarenas Province, Costa Rica, in having confluent vitelline follicles posteriorly, diagnostic of Neoehematotrephus, and in pharynx length, ovary width, and cirrus sac on the visceral side. The new species is also highly similar in appearance to H. gendrei Dubois, 1959, also inhabiting a jacanid (from West Africa), which has vitelline follicles confluent posteriorly, and extending anteriorly to the intestinal bifurcation and genital pore opening immediately posterior to the anterior margin of the pharynx. Like H. facioi, H. gendrei has a relatively much shorter and broader cirrus sac than does the new species. Examination of the holotype and paratype of H. facioi confirmed that the specimens from Guanacaste differ in having a longer body, a larger ovary and eggs, and smaller testes. They also have the ovary on the visceral rather than the dextral side of the body, genital pore anterior to the pharynx rather than at or anterior to the level of the posterior margin of the pharynx, longer and thinner cirrus sac, and eggs without eyespotted miracidia. Half the eggs in both specimens of H. facioi have well-developed eyespotted miracidia, whereas the typical condition for cyclocoelids is for virtually all eggs to exhibit eyespotted miracidia. Both H. facioi and H. gendrei are transferred to Neoehematotrephus, along with the new species.

The family Cyclocoelidae represents an enigmatic group of digeneans living as adults primarily in the body cavities and air sacs of birds, although there have been reports of their being found in the trachea (Pence and Bush, 1973; Scott et al., 1981), orbits, and nasal cavities (Taft and Heard, 1978). Migration from the intestine to the air sacs is known to involve a body-cavity route (Scott et al., 1982; McLaughlin and Marcogliese, 1983). When miracidia hatch, they already contain redia. Rediae have posterior appendages, and some also have anterior appendages. The miracidium is either ingested or actively seeks the intermediate host, but it is the redia that penetrates aquatic snails, both marine and freshwater (Taft and Heard, 1978). Cerccariae are produced within this single redia; no other generation of rediae is produced. Cerccariae are taillss and either encyst within the redia (Stunkard, 1934; Johnston and Simpson, 1940; Wooton, 1964; McLaughlin, 1976) or emerge and encyst in the host’s tissues (Timon-David, 1955). Infection of the definitive host requires active foraging on the infected snails.

In this report on the activities of an inventory of the eukaryotic parasites of vertebrates living within the Area de Conservación Guanacaste (http://www.agcguanacaste.ac.cr) in northwestern Costa Rica (http://brooksweb.zoo.utoronto.ca/index.html), we describe a new species of cyclocoelid digenean inhabiting Jacana spinosa.

MATERIALS AND METHODS

Worms were collected alive from recently killed birds, killed and fixed by shaking in hot formalin, then stored in 70% ethanol. Specimens were stained with Mayer’s hematoxylin, dehydrated, and mounted in Canada Balsam. All measurements are in micrometers unless otherwise stated; mean values are followed by actual values in parentheses. All figures were made by using a drawing tube.

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Remarks

According to Kanev et al.’s (2002) recent key to the Cyclocoelidae, the new species is a member of the subfamily Haematotrephinae Stossich, 1902, by virtue of having a pretesticular ovary. Furthermore, by virtue of its having confluent vitelline follicles at the posterior end of the body and prepharyngeal genital pores, the new species belongs to Neoaematometrus Kanev et al., 2002.

Among species placed in Neoaematometrus by Kanev et al. (2002), the new species is most similar in appearance to Cyclocoelum (Haematotrephus) gendrei Dubois, 1959 in a jacanid from West Africa (French Guinea) (Dubois, 1959), which has vitelline follicles confluent posteriorly, vitelline follicles extending anteriorly to the intestinal bifurcation, and genital pores opening immediately posterior to the anterior margin of the pharynx. By having confluent vitelline follicles posteriorly, sinistral cirrus sac, and similar pharyngeal length and ovarian width, the new species most closely resembles C. (Haematotrephus) facioi Bresnes and Arroyo, 1962, on the basis of 2 specimens in J. spinosa from Aranjuez, Puntarenas Province (Bresnes and Arroyo, 1962). We examined the holotype and paratype of C. (H.) facioi and confirmed that the new species differs from it in some characters that might be affected by small sample size (2 for C. (H.) facioi vs. 3 for N. arayae): longer bodies, larger ovaries and eggs, and smaller testes. However, they also differ in more qualitative traits: N. arayae has the ovary on the sinistral rather than the dextral side of the body, genital pores anterior to the pharynx rather than at or posterior to the level of the posterior margin of the pharynx, longer and thinner cirrus sacs, and eggs without eyespotted miracidia. Half the eggs in both specimens of C. (H.) facioi have well-developed eyespotted miracidia, whereas the typical condition for cyclocoidids is for virtually all eggs to exhibit eyespotted miracidia. Like C. (H.) gendrei, C. (H.) facioi has a relatively much shorter and broader cirrus sac than does N. arayae.

Using primarily characters associated with the uterine loops, Yamaguti (1971) raised Haematotrephus to the generic level and placed C. (H.) facioi within it as H. facioi (Bresnes and Arroyo, 1962) Yamaguti, 1971. Yamaguti (1971) also transferred C. (H.) gendrei to Corpyrophyllum Wittenberg, 1923 as C. gendrei (Dubois, 1959) Yamaguti, 1971. Using the recent key to cyclocoelid genera by Kanev et al. (2002), we place H. gendrei in Neoaematometrus as N. gendrei (Dubois, 1959) comb. n. and C. facioi on account of the difference in the position of the genital pores (prepharyngeal vs. postpharyngeal), in Uvitellina as U. facioi (Bresnes and Arroyo, 1962) comb. n. We hasten to add that we are not completely satisfied that 2 species occurring in the same host species in adjacent provinces of the same country should be placed in different genera in the absence of a phylogenetic analysis of cyclocoidids supporting such a placement.

DISCUSSION

The female reproductive system may be a source of phylogenetically informative characters (Zamparo and Brooks, 2003). Nonetheless, many descriptions of cyclocoidid larvae lack detailed information about the female reproductive system. The most extensive discussion to date was made by Madhavi and Rao (1979), who in a study of Cyclocoelum elongatum reported a receptaculum seminis uterus as well as a blindly ending Laurer 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. This condition of the Laurer canal has evolved at least 1 other time, among members of the Hemiuroida, where it is called the Juel organ (Gibson and Bray, 1979). All 3 specimens of H. arayae exhibit the configuration reported by Madhavi and Rao, with 1 exception. The vitelline reservoir and Laurer canal in H. arayae and in H. facioi enter the ootype distally rather than proximally (see Fig. 3). We note that the blindly ending Laurer canal may be confused with a portion of the vitelline duct because it may be packed with vitelline material.

ACKNOWLEDGMENTS

We are grateful to the scientific and technical staff of the ACG for supporting this study, in particular Elda Araya, Roger Blanco, Carolina Cano, Maria Marta Chavarria, Felipe Chavarría, Roberto Espinoza, Dunia Garcia, Guillermo Jimenez, Elba Lopez, Sigifredo Marin, Alejandro Masis, Calixto Moraga, Freddy Quesada, and Petrona Rios. We also thank Dan Jansen and Winnie Hallwachs, scientific advisers to the ACG, for their support. Host specimens were collected by D.C., Jeremiah Trimble (MCZ), and Calixto Moraga (ACG) under the authority of CITES Permit US9258251, CITES Permit CR0123440, Costa Rica Ministerio del Ambiente y Energia Licencia 203640283 and Resoluciones 215-2001-OFAU and 411-2001-OFAU, Harvard University IA-CUC Protocol 21-09, and USDA APHIS Permit 47956 (form VS16-6A). Host necropy and parasite collections were made by D.R.B., D.C., Elda Araya, Sara Brant, Marie Causey, Ben Hanelt, Calixto Moraga, and Petrona Rios. This study was funded by a research grant from the Natural Sciences and Engineering Research Council of Canada to D.R.B. and by a grant from the MCZ Putnam Expedition Fund to D.C.

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