

Ann. Naturhist. Mus. Wien	104 B	391 - 397	Wien, März 2003
---------------------------	-------	-----------	-----------------

The taxonomic status of *Distomum annulatum* DIESING, 1850: redescription of type specimens from the Natural History Museum, Vienna

M. Ostrowski de Núñez* & H. Sattmann**

Abstract

Distomum annulatum DIESING, 1850 is redescribed and placed into the genus *Caballerotrema*, as *Caballerotrema annulatum* comb.n. The type specimens are compared with paratypes of *C. piscicola* (STUNKARD, 1960), *C. arapaimense* THATCHER, 1980 and *C. aruanense* THATCHER, 1980. Comments on *C. brasiliense* PRUDHOE, 1960 and *C. piscicola* as described by KOHN & FERNANDES (1981) were included.

Key words: *Distomum annulatum*, redescription, *Caballerotrema annulatum* comb.n.

Zusammenfassung

Distomum annulatum DIESING, 1850 wird neu beschrieben und in die Gattung *Caballerotrema* als *Caballerotrema annulatum* comb.n. gestellt. Die Typusexemplare werden mit Paratypen von *C. piscicola* (STUNKARD, 1960), *C. arapaimense* THATCHER, 1980 und *C. aruanense* THATCHER, 1980 verglichen. Die Darstellung wird durch Anmerkungen über *C. brasiliense* PRUDHOE, 1960 und *C. piscicola* sensu KOHN & FERNANDES (1981), ergänzt.

Introduction

Karl Moritz Diesing described *Distomum annulatum* collected by Johann Natterer from the intestine of the electric eel *Gymnotus electricus* LINNAEUS, 1766 (= *Electrophorus electricus*), on 3. September 1827 in Mato Grosso, Brazil (DIESING 1850). The very brief description in Latin mentioned external characteristics, such as the length and width of worms (6''' and 1/2'', approximately 12 and 1 mm, respectively), the transverse annulation, the reniform "head" with a crown of spines and the apertures on oral and ventral suckers. The internal organisation and the number of collar spines were not described. Therefore, it was difficult for later authors to correctly classify this species. COBBOLD (1860) transferred the species to *Echinostoma*, DIETZ (1909) listed it under *species inquirenda*, MENDHEIM (1943) noted features which conform to the diagnosis of *Himasthla* and, finally, STUNKARD (1960) transferred it to this genus, as *Himasthla annulata* (DIESING).

In this study we redescribe *Distomum annulatum* based on the type specimens deposited in the Natural History Museum, Vienna, (NHMW ZOOEV) and place it in the genus *Caballerotrema* PRUDHOE, 1960.

* Margarita Ostrowski de Núñez, Departamento de Ciencias Biológicas, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, Pabellón II. 1428 Buenos Aires, Argentina.

** Helmut Sattmann, Naturhistorisches Museum in Wien, Burgring 7, A - 1014 Wien, Austria.

Original description

Distoma annulatum was first described in DIESING (1850: 386-87):

"*Corpus lineare depressiusculum, transverse annulato-plicatum. Collum conicum subtus excavatum. Caput reniforme, echinatum. Os terminale. Acetabulum ore multo majus ad colli basin, apertura circulari. Longit. 6''' : latit. ultra 1/2'''*."

Habitaculum. Gymnotus electricus: in intestinis, Septembri in Brasilia (Natterer). M.C.V."

The species was figured in DIESING (1856) (see Fig. 6) accompanied with a description identical with that above.

Material and Methods

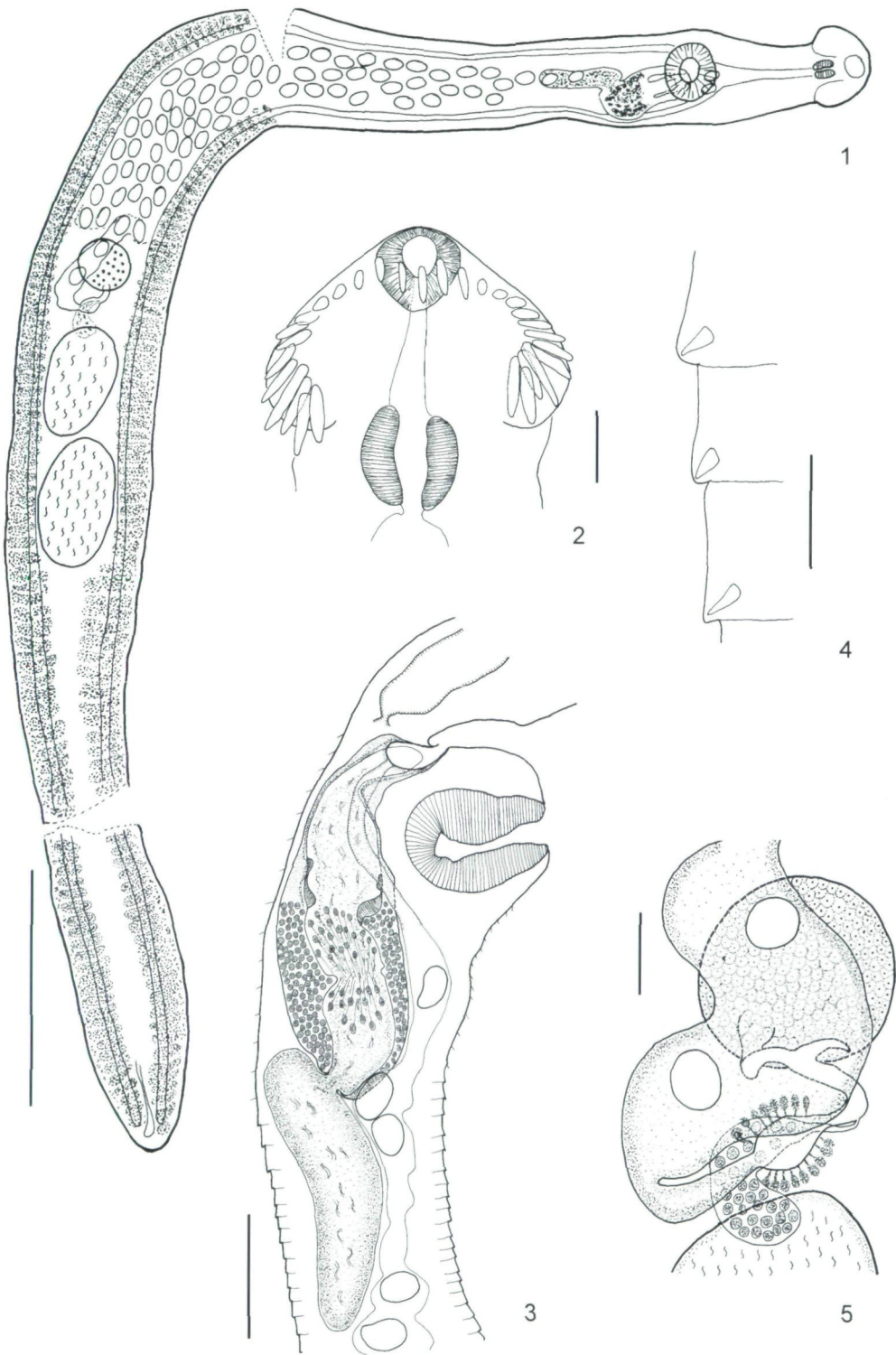
The vial No. 4572 contained 8 whole specimens and several fragments of *Distoma annulatum*. The specimens were in astonishingly good conditions, considering the time they had been stored in alcohol. Three whole specimens and two anterior fragments were dehydrated in 75%, 96% and 100% ethanol, cleared in xylene and mounted in Canada balsam. Staining was not undertaken, as this gives poor results in very old specimens (OSTROWSKI DE NÚÑEZ 1986). Studies were conducted using an Olympus interference contrast microscope and illustrations were made with the aid of a camera lucida. Measurements (given as the range in μm – unless otherwise stated – with the mean in parentheses) of total length and width and genitalia were taken from the 3 mounted specimens; for other organs the fragments were included. Only those collar spines in a straight position were measured (n = number of spines measured). For comparison, a paratype of *Himasthla piscicola* STUNKARD, 1960 (United States National Parasitic Collection, USNPC 39445), and paratypes of *Caballerotrema arapaimense* THATCHER, 1980 (No. 5745a and b) and *C. aruanense* THATCHER, 1980 (5744b) deposited in the Collection of the Museu de Zoologia da Universidade de São Paulo (MZUSP), were studied.

Caballotrema annulatum (DIESING, 1850) comb.n. (Figs 1-6)

Material: 3 mounted specimens and 2 anterior fragments of vial No. 4572; lectotype [selected herein], NHMW ZOOEV microslides 3969/a; paralectotypes, NHMW ZOOEV microslides 3969/b-e.

Description: Body elongate, dorso-ventrally flattened, 6.9-7.4 (7.1) mm long by 368-416 (392) wide at level of ventral sucker, and 560-480 (520) at level of testes. Annulations visible from level of seminal vesicle to beyond the testes, each annulation with a row of spines. Head collar 320-432 (395) wide, without pronounced ventral lobes. Collar spines conspicuous, 29 in single uninterrupted row, with 4 corner spines

Figs 1-5: *Distomum annulatum* DIESING: 1: habitus of lectotype, NHMW ZOOEV micro-slide 3969a; 2: spinous head collar of paralectotype NHMW ZOOEV micro-slide 3969d; 3: cirrus-sac of paralectotype NHMW ZOOEV micro-slide 3969c; annulations (4) and female genital system (5) of lectotype, NHMW ZOOEV micro-slide 3969a. Scale is 1 mm in 1, 0.1 mm in 2 and 5, 0.2 mm in 3, and 0.05 in 4.



arranged in pairs at each side, first pair 82-95 (89) long by 16-19(16) wide ($n = 6$), first spine being larger; second pair 76-107 (90) long by 13-19 (16) wide ($n = 8$), 4th spine being larger. First lateral spine on each side larger 79-85 (82) long by 13-16 (14) wide ($n = 6$), subsequent lateral spines diminishing gradually in size 41-85 (63) long by 9-16 (12) wide ($n = 22$), dorsal spines 63-69 (66) long by 9-13 (12) wide ($n = 4$). Forebody short, 560-720 (640) long, representing 9% of total body length (TBL). Tegumental spines, 12-19 long at forebody, 19-28 long at level of testes, decreasing in size until half the distance of post-testicular space. Oral sucker ventro-subterminal, 75-119 (97) long by 94-126 (107) wide; ventral sucker, 163-327 (245) long by 232-301 (268) wide. Sucker length ratio 1:1.7-3.3 (1:2.6), width ratio 1: 2.2-3.1 (1:2.5). Prepharynx short, 107-170 (132); pharynx muscular, 119-144 (129) long by 94-138 (121) wide. Oral sucker/pharynx width ratio 1:1-1.3. Oesophagus 251-377 (318) long; intestinal bifurcation dorsally 31-82 behind anterior border of ventral sucker. Intestinal caeca blind, reaching 138-195 (161) from posterior extremity. Testes 2, oval, tandem, intercaecal, located in middle third of body; anterior testis 458-534 (484) long by 270-333 (301) wide; posterior testis 534-628 (569) long by 251-283 (267) wide, at distance 1.7-2.7 (2.2) mm from posterior extremity, corresponding to 23-39% of TBL. Cirrus-sac large, 860-1,143 (948) long by 176-251 (209) wide at level of pars prostatica, 94-157 (118) wide at level of posterior part of seminal vesicle, situated dorsally to ventral sucker, contains seminal vesicle, well-developed pars prostatica and unspined cirrus. Genital pore situated in angle formed by anterior end of ventral sucker and body wall, posterior to intestinal bifurcation, visible only in lateral view. Ovary nearly spherical, 201-207 (205) long by 226-239 (232) wide, in mid-line of body, 2.3-3.2 (2.7) mm posterior to ventral sucker, distance representing 32-43% (37%) of TBL. Mehlis' gland posterior to ovary; Laurer's canal opens dorsally. Proximal part of uterus acts as uterine seminal receptacle. Uterus intercaecal, forms numerous transverse coils between ovary and ventral sucker, distally transformed in metraterm opens into genital atrium. Eggs numerous, 72-85 (78) long by 50-85 (61) wide. Vitellarium follicular, follicles small, distributed in lateral fields, overlap caeca in part, extend from posterior level of ventral sucker to posterior extremity; in post-testicular zone not confluent, leaving narrow area without follicles. Excretory vesicle not discernible.

Host: *Electrophorus electricus* (L.) (= *Gymnotus electricus* L.), collected on 3. September 1827.

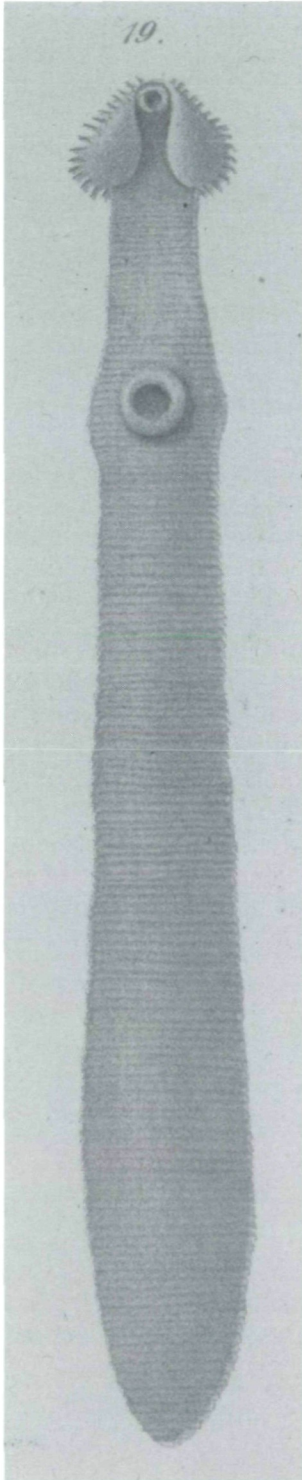
Location: Intestine.

Locality: Mato Grosso, Brazil.

Remarks: Lectotype designation has been made to ensure the names's proper and consistent application.

Discussion

The genus *Caballerotrema* PRUDHOE (1960) was established for *C. brasiliense* PRUDHOE, 1960 from the osteoglossid fish, *Arapaima gigas* (CUVIER, 1829) from Brazil. THATCHER (1980) added two more species, *C. arapaimense* from *A. gigas* and *C. aruanense* from *Osteoglossum bicirrhosum* (CUVIER, 1829), and redescribed *C. brasiliensis* based on newly collected specimens. KOSTADINOVA & GIBSON (2001) redescribed *C. brasiliense* upon



type material, considered *C. arapaimense* a species *inquirenda* and transferred *Himasthla piscicola* STUNKARD, 1960 to *Caballerotrema*. *Distoma annulatum* fits in the genus *Caballerotrema* based on its head collar with 29 collar spines and its voluminous cirrus-sac reaching far behind the ventral sucker.

THATCHER (1980) considered the posterior part of the seminal vesicle as lying free in the parenchyma, KOSTADINOVA & GIBSON (2001), however, reported a fine membranous sac, enveloping the seminal vesicle posteriorly to the prostatic region in the specimen of *C. aruanense* from *Zungaro zungaro* (HUMBOLDT). This feature could not be seen in the present old material, but may be possibly present.

Comparing *C. annulatum* with the other species of the genus, as described by THATCHER (1980) and our examination of paratypes, it differs from them by its smaller head collar and the absence of distinct ventral lobes; it also has a different definitive host. It further differs from *C. aruanense* in that the anterior limit of vitelline follicles is more posteriorly (compared with paratype MZUSP 5744b) and in smaller eggs. Moreover, it differs from *C. brasiliense*, *C. arapaimense* and *C. piscicola* in testes shape. In *C. piscicola* the 4. angle spine is the smallest while in *C. annulatum* it is the largest.

KOSTADINOVA & GIBSON (2001) considered that there are no significant differences between *C. brasiliense* and *C. arapaimense*, and that the size-range for the collar spines is the same. Additionally, they find two other specimens among the type series of *C. arapaimense* with considerable differences in the size and shape of the collar spines, probably belonging to different species of *Caballerotrema*. The examination of the paratypes of *C. arapaimense* and the published drawings of *C. brasiliense* by PRUDHOE (1960) and THATCHER (1980) show a more anterior limit of vitelline follicles in *C. arapaimense*, beginning at level of posterior border of ventral sucker or a short distance behind, while in *C. brasiliense* the vitelline follicles "extend anteriorly to about midway between the ovary and the ventral sucker, or a little beyond" (PRUDHOE, 1960). Our examination of the paratype of *C. piscicola* show measurements within the range given for *C. brasiliense* by THATCHER (1980), with a forebody 10%, and post-

Fig. 6: *Distomum annulatum* from DIESING (1856, Table III, Fig. 19).

testicular space 24.6% of TBL. The ventral sucker to ovary distance in *C. piscicola* is considerably larger (46%) than that given by KOSTADINOVA & GIBSON (2001) for *C. brasiliense* (29-33% TBL), and could not be estimated from the drawing or description by THATCHER (1980). Considering that the specimens of *C. piscicola* "are much extended, a result of their protracted immersion in water, and the uterine region between the cirrus sac and the ovary is especially narrow" (STUNKARD 1960: 546), and the type material of *C. brasiliense* is contracted, and the existence of misidentified specimens in the type series of *C. arapaimense* (KOSTADINOVA & GIBSON, 2001), a critical revision of all species of *Caballerotrema* from *Arapaima gigas* upon newly collected material is needed.

The only specimen obtained from *Osteoglossum bicirrhosum* and described as *Himasthla piscicola* by KOHN & FERNANDES (1981) belong to *Caballerotrema*, as noted by KOSTADINOVA & GIBSON (2001). This specimen shares with *C. aruanense* the shape of testes and the host. Additionally, it is similar in body size (11.7 mm vs 9.1 mm given by THATCHER (1980), and 10.3 mm by KOSTADINOVA & GIBSON (2001)), head collar (1.06 mm vs 0.88 mm in THATCHER (1980) and 0.99 mm in KOSTADINOVA & GIBSON (2001)), and post-testicular space (30% estimated in the drawing of KOHN & FERNANDES (1981), 28.7% in paratype of *C. aruanense*). Only the cirrus-sac is considerably larger in the specimen of KOHN & FERNANDES (1981), 2700 vs 1200 in *C. aruanense*, but it is also larger than that in the paratype of *C. piscicola* (1143, own data). It seems to us, that *C. piscicola* of KOHN & FERNANDES (1981) is more similar to *C. aruanense* than to *C. piscicola* of STUNKARD (1960).

After the discovery of a large amount of specimens of this genus by THATCHER (1980) in fishes of the family Osteoglossidae from Brazil, it is well established that they are true and not accidental parasites of fish.

Acknowledgements:

Thanks are due to Prof. Dr.R. Menzel (Freie Universität, Berlin, Germany) for financial support to M. Ostrowski de Núñez for a visiting trip to natural history museums in Europe. We are indebted to Drs J.Lima de Figueredo and J.L. Moreira Leme, Museu de Zoologia da Universidade de São Paulo, for providing vouchers of *C. arapaimense* and *C. aruanense*, to Drs E.Hoberg and P. Pillit for the loan of *H. piscicola*, and to Rosalinde Esberger for technical assistance in the collection of the Natural History Museum in Vienna.

This study was partly supported by Conicet Grand BID 1201/OC-AR-PICT No. 1-6604 to M. Ostrowski de Núñez

References

- COBBOLD, T.S., 1860: Synopsis of the Distomidae. – Journal of the Linnean Society of London, Zoology (17) 5: 1-56
- DIESING, K.M. 1850: Systema Helminthum. Vol. I. – Braumüller Wien, 680 pp.
- DIESING, K.M. 1856: Neunzehn Arten von Trematoden. – Denkschrift der Adademie der Wissenschaften Wien, mathematisch- naturwissenschaftliche Classe 10: 59-70.
- DIETZ, E. 1909: Die Echinostomiden der Vögel. – Zoologische Anzeiger 34: 180-192.
- KOSTADINOVA, A. & GIBSON, D.I. 2001: Redescription of two echinostomes from freshwater fishes, with comments on *Singhia* YAMAGUTI, 1958 and *Caballerotrema* PRUDHOE, 1960 (Digenea: Echinostomatidae). – Systematic Parasitology 49: 195-204.

- KOHN, A. & FERNANDES, B.M.M. 1981: The adult form of *Himasthla piscicola* STUNKARD, 1960 and other trematodes from Brazilian freshwater fishes. – *Journal of Helminthology* 55:85-87.
- MENDHEIM, H. 1943: Beiträge zur Systematik und Biologie der Familie Echinostomatidae. – *Archiv für Naturgeschichte* 12(2):175-302.
- OSTROWSKI DE NÚÑEZ, M. 1986: *Acanthostomum scyphocephalum* (BRAUN 1901) HUGHES, HIGGINBOTHAM und CLARY, 1941: Neubeschreibung des typischen Materials aus dem Naturhistorischen Museum in Wien. – *Annalen des Naturhistorischen Museums in Wien* 87B:331-337.
- PRUDHOE S., 1960: On two new Parasitic worms from Brazil. Libro Homenaje al Dr. Eduardo Caballero y Caballero. – Secretaría de Educación Pública, Instituto Politécnico Nacional, México, D.F., pp. 415-421.
- STUNKARD, H.W. 1960: Further studies on the trematode genus *Himasthla* with descriptions of *H. mcintoshii* n.sp., *H. piscicola* n.sp. and stages in the life-history of *H. compacta* n.sp. – *Biological Bulletin* 119(3): 529-549.
- THATCHER, V.E. 1980: Duas novas especies de *Caballerotrema* (Trematoda: Echinostomatidae) do pirarucu e do aruana (Osteoglossidae), com uma redefinição do genero e uma redescrção de *C. brasiliense* PRUDHOE, 1960. – *Acta Amazonica* 10(2):419-423.
- YAMAGUTI, S. 1971: Synopsis of digenetic trematodes of vertebrates. – Keigaku Publishing Co, Tokyo, Vol.I-II., 1074 pp. + 249 pls.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Annalen des Naturhistorischen Museums in Wien](#)

Jahr/Year: 2003

Band/Volume: [104B](#)

Autor(en)/Author(s): Sattmann Helmut, Ostrowski de NÚÑEZ Margarita

Artikel/Article: [The taxonomic status of *Distomum annulatum* DIESING, 1850: redescription of type specimens from the Natural History Museum, Vienna. 391-397](#)