

***Ambiphrya ameiuri* (CILIOPHORA, PERITRICHIA) FROM THE GILLS OF *Jenynsia multidentata* (PISCES) IN THE SOUTHWEST OF BUENOS AIRES PROVINCE (ARGENTINA). A NEARCTIC INVADER IN OUR PONDS?**

Ambiphrya ameiuri (Ciliophora, Peritrichia) de las branquias de *Jenynsia multidentata* (Pisces) en el sudoeste de la provincia de Buenos Aires. Un invasor neártico en nuestras lagunas?

Romero, María Alejandra¹ y Rubén Daniel Tanzola²

¹Instituto de Biología Marina y Pesquera "Almirante Storni" Güemes 1030 - San Antonio Oeste (8520), Río Negro, Argentina; ²Laboratorio de Patología de Organismos Acuáticos de Interés Comercial, Universidad Nacional del Sur, San Juan 670 (8000) Bahía Blanca, Argentina

Abstract

The nearctic ectocommensal *Ambiphrya ameiuri* is described and illustrated from the branchial epithelium of *Jenynsia multidentata*. According to previous records in fish farms from USA and Europe, this ciliate constitutes a potential invader, probably introduced with cyprinid fish into water bodies in the southwest of Buenos Aires province. This is the first record of *A. ameiuri* in a South American freshwater teleost and of a representative of the order Cyprinodontiformes.

Key words: *Ambiphrya ameiuri*, ectoparasites, *Jenynsia*, freshwater fishes.

Resumen

Se describen e ilustran peritricos ectocomensales pertenecientes a la especie neártica *Ambiphrya ameiuri*. Los ciliados fueron hallados adheridos al epitelio branquial de *Jenynsia multidentata*. En virtud de registros previos en pisciculturas de EEUU y Europa se trataría de un potencial invasor biológico, probablemente introducido con la siembra de cyprinidos en cuerpos de agua del sudoeste bonaerense. El presente constituye el primer registro de *A. ameiuri* en teleósteos de agua dulce sudamericanos y en un hospedador cyprinodontiforme.

Palabras clave: *Ambiphrya ameiuri*, ectoparásitos, *Jenynsia*, peces continentales

INTRODUCTION

There are several records of peritrich ciliates in Argentina. Vucetich and Escalante (1979) and Claps and Modenutti (1984) studied peritrichs from the pleuston of ponds in the Rio de la Plata area and other ponds and lagoons in Buenos Aires province. Modenutti and Claps (1986) recorded four species of stalked forms on aquatic macrophytes from lentic and lotic environments. Modenutti (1997) studied the distribution of sessile peritrichs from Andean oligotrophic lakes. Nevertheless there is no information about the ectoprotazoans which live on the skin and gills of freshwater fish from Argentina. During a survey of the parasite fauna of *Jenynsia multidentata* (Jenyns, 1842) (Cyprinodontiformes, Anablepidae) several peritrich were found attached in the surface of the gills. The morphometric features of these individuals resemble representatives of the species *Ambiphrya ameiuri* (Thompson, Kirkegaard & Jahn, 1947) (Peritrichia, Scyphidiidae). In the present paper the species is described, illustrated and compared with other members of the genus. The presence of *A. ameiuri*, previously recorded from Nearctic teleosts, is reported for the first time in a cyprinodontiform host from South America.

MATERIAL AND METHODS

Forty-seven *J. multidentata* caught with the aid of a little net from October 2004 to May 2005 from urban bodies of water in Bahia Blanca city (artificial pond in Parque de Mayo and Maldonado stream) were examined for parasites. The fish were kept alive in the laboratory at room temperature, killed with an overdose of benzocaine, measured, weighed and sexed. The gills were carefully dissected and fixed in Bouin or FAA (formalin-ethanol-acetic acid) solutions. Smears of the filaments stained with Giemsa were made following routine methods. Drawings were made with the aid of a camera

lucida. The taxonomy of the host follows López *et al.* (2003) and that of the protists follows Levine *et al.* (1980).

RESULTS

Taxonomy

Phylum Ciliophora

Class Oligohymenophorea

Subclass Peritrichia

Order Sessilida Kahl, 1933

Family Scyphidiidae Kahl, 1935

Ambiphrya ameiuri

Host: *Jenynsia multidentata* (Jenyns, 1842)

(Cyprinodontiformes, Anablepidae)

Location on host: Gills

Type locality: Bahia Blanca, Argentina (38°41'42" S, 62°15'54" W).

Voucher material: One slide deposited in the Zoologia Invertebrados Collection, Museo de la Plata, Argentina.

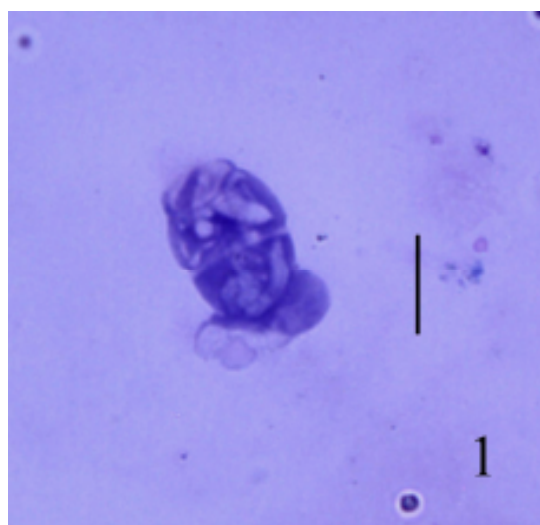


Figure 1. *Ambiphrya ameiuri*, solitary zoid, Giemsa stain (scale bar= 25 µm)

Description (based on 10 specimens fixed and stained)

Solitary sessilian peritrichs attached to the branchial surface by a broad scopula (Fig. 1). Body cylindrical with a groove in the equatorial zone. Median membrane not visible under light microscopy. Peristomial disc mostly convex surrounded by a conspicuous peristomial lip (Figs. 2 a-c). Infundibulum well developed, slightly oblicuous, not

extending beyond the groove. Several food vacuoles in the oral (supra-equatorial) region and one contractile vacuole near the buccal opening. Macronucleus typically ribbon-shaped, mostly in the basal (infra-equatorial) region, extended folded back on itself throughout the body cell. Micronucleus slightly oblong, not always visible, in the

basal region of the cell. Measurements (in μm as mean and range in brackets): length 48.5 (30-60), scopula (diameter) 36.7 (20-50), diameter of body (groove level) 31.9 (20-45), basal portion (height) 24.2 (15-37.5), diameter of peristomial disc 18.2 (17.5-20).

Table 1. Comparative data of all known species of *Ambiphrya* Raabe 1952 (*)

Species	<i>A. miri</i>	<i>A. tholiformis</i>	<i>A. neobolae</i>	<i>A. macropodia</i>	<i>A. ameiuri</i>	<i>A. ameiuri</i> (present study)
Type host	<i>Nerophis ophidion</i> (Syngnathidae)	<i>Micropterus dolomieu</i> & <i>M. salmoides</i> (Centrarchidae)	<i>Mesobola brevianalis</i> (Cyprinidae)	<i>Ameiurus nebulosus</i> , <i>Ictalurus punctatus</i> (Ictaluridae) <i>Lepomis macrochirus</i> (Centrarchidae)	(**)	<i>Jenynsia multidentata</i> (Anablepidae)
Location	Gills	Gills, skin	Skin	Gills, skin	Data not available	Gills
Type locality	Poland (Baltic Sea)	USA	Transvaal, South Africa	USA	USA, Europe, Asia	Bahia Blanca, Argentina
Length x diameter (μm)	45 x 25	59 x 35	44-84 x 24-45	35-46 x 20-25	35-45 x 20-34	30-60 x 20-45

(*) Modified from Viljoen & van As (1985)

(**) Type host: *Ameiurus melas* (Ictaluridae). Another hosts: *Ictalurus cyprinellus* (Ictaluridae), *Cyprinus carpio*, *Ctenopharingodon idella*, *Carassius auratus*, *Hypophthalmichthys molitrix*, *H. nobilis*, *Blicca bjoerkna*, *Abramis brama*, *Rutilus rutilus*, *Rhodeus sericeus*, *Leucaspis delineatus* (Cyprinidae), *Perca fluviatilis*, *Sander lucioperca* (Percidae), *Polyodon spatula* (Acipenseriformes).

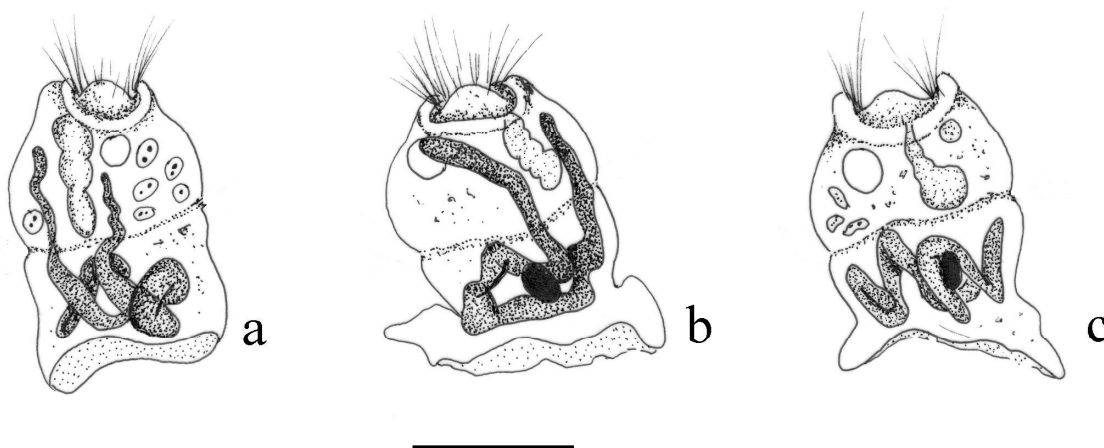


Figure 2.- *Ambiphrya ameiuri*, three zooids (schematic) showing the variation of the ribbon-shaped macronucleus (scale bar= 20 μm)

DISCUSSION

Ultrastructural studies on peritrichs from freshwater fish show that these ciliates should be considered as phoretic individuals or ectocommensals that do not penetrate the epithelial tissue or obtain nutrients from the host (Fitzerald *et al.* 1982). They feed mostly on organic material dissolved in water (Lom & Dyková, 1992). Nevertheless, Paperna (1996) remarks that in heavy infestations fry mortalities could result from anoxia due to the dense cover of protozoans blocking gas exchange in the gills. Kuperman *et al.* (1994) reported that in heavy infestations (40-200 individuals/fish) the scopula of *Ambiphraya ameiori* from *Blicca bjoerkna* and *Abramis brama* (7.5-8.5 mm long) may occupy up to 50-60% of the fish surface causing disease and death. Furthermore Lom & Dyková (1998) recognized that massive growths of *A. ameiori* on the skin and gills of *Cyprinus carpio* and *Ctenopharingodon idella* fry can cause mass mortalities due to irritation and anoxia.

The taxonomy of the piscine sessile peritrich parasites of marine and freshwater fish needs to be clarified (Lom, 1966). Nevertheless only two genera of Scyphidiidae are recognized as fish parasites: *Riboscyphidia* Jankovski, 1985 (syn. *Schyphidia* Dujardin, 1841 *p.p.*) and *Ambiphraya* Raabe, 1952. These genera are very similar in shape but their macronuclei are quite different. In *Ambiphraya* the shape of the macronucleus is like a long winding ribbon. Also the presence of a broader scopula and a permanent pectinelar girdle composed of motionless cilia are typical features which are absent in *Riboscyphidia*. Individuals from *J. multidentata* possess the typical characters of *Ambiphraya* and although no special staining technique was used (i.e. protargol, silver impregnation) they seem to belong to *Ambiphraya ameiori*. Following Lom and Dyková (1992)'s criterium *A. ameiori* and *A. macropodia* (Davis, 1947) from American ictalurid and centrarchid are obvious synonyms of the type species, *A. miri* Raabe 1952,

from the Baltic syngnathid fish, *Nerophis ophidion* (Table 1). Further studies are needed to clarify their taxonomical status. The peritrichs in the present paper differ slightly from the nearctic forms of *A. ameiori* and *A. macropodia* in the position of the macronucleus, which lies mostly in an infraequatorial position (Figs. 2 a-c). The scopula is broader than in *A. miri*. Lom & Dyková (1992) stated that *A. tholiformis* from the gills of the American centrarchids *Micropterus dolomieu* and *M. salmoides* may be a synonym of *A. ameiori*, but recommended more detailed studies to confirm its taxonomical status. Nevertheless *A. tholiformis* has a higher and thinner body cell, with the ciliary groove situated in the anterior third. Finally Viljoen and van As (1985) described *A. neobolae* from the skin of the South African cyprinid *Mesobola brevianalis*. They are very similar in shape to the ectoparasites of *J. multidentata*, but slightly shorter with a broader scopula than its congeners from Limpopo River, Transvaal of South Africa. Lom & Dyková (*op.cit.*) mentioned the presence, perhaps autochthonous, of *A. ameiori* as a common parasite of *Cyprinus carpio* and *Ctenopharingodon idella* fry in Europe. Trombitsky *et al.* (1992) refer to the quick spread of *A. ameiori* from Moldavia region, between 1981 to 1987, where eight cyprinid, two percids and one acipenseriform species were colonized.

There have been several introductions of exotic cyprinid in ponds and streams in Buenos Aires province. In 1925 *Cyprinus carpio* was introduced into an artificial pond in Palermo (Buenos Aires city) as an ornamental fish and later in the provinces of Cordoba and San Luis. More recently, the species spread to most of the northern patagonian provinces (Colautti 2001). *Ctenopharingodon idella* was introduced from Japan in 1970 for use in the biological control of aquatic weeds (Tanzola *et al.* 2009). Firstly, it was reared in Laguna El Burro, Buenos Aires, and later in ponds and lakes of Mendoza, Corrientes, Formosa and Misiones, where it is actually cultured as human

food. In light of the aforementioned, it may be concluded that the epibranche peritrichs found on *Jenynsia multidentata* from Bahía Blanca ponds and streams belong to the nearctic species *Ambiphraya ameiuri*. Moreover, it might have been introduced in Argentina with some species of cyprinid. Further studies to confirm its presence in these exotic species are needed. The presence of *A. ameiuri* is reported for the first time in a cyprinodontiform host from South America.

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