

## NOTA CIENTÍFICA/ RESEARCH NOTE

ON THE LARVAL STAGES OF *POLYMORPHUS SPINDLATUS*  
(ACANTHOCEPHALA: POLYMORPHIDAE) FROM A NEW FISH HOST,  
*OREOCHROMIS NILOTICUS*, IN PERU

ESTADIOS LARVALES DE *POLYMORPHUS SPINDLATUS*  
(ACANTHOCEPHALA: POLYMORPHIDAE) DE UN NUEVO PEZ HOSPEDERO,  
*OREOCHROMIS NILOTICUS*, EN PERÚ

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### Abstract

Larval stages of the acanthocephalan *Polymorphus spindlatus* Amin & Heckmann, 1991 (Polymorphidae) were obtained from the intestine of tilapia, *Oreochromis niloticus* Linnaeus, 1758 (Pisces: Cichlidae) in Villa Swamps, Lima, Peru during 2006. Cystacanth stages were recovered from the intestine, observed live, and documented photographically. Early stages had an ovoid proboscis that developed into the spindle-shaped form characteristic of the adult proboscis only in the late cystacanth stage. Form and pattern of adult proboscis hooks were evident in the younger larvae. The constriction in the trunk of the early stages was lost in the developed cystacanth. The morphology of the spindle-shaped trunk and other features of the cystacanth from the fish host were similar to those reported for cystacanths previously reported from the body cavity of fish hosts in Lake Titicaca, Peru.

**Key words:** Acanthocephala - cystacanths - Lima - *Oreochromis niloticus* – Peru - *Polymorphus spindlatus* - Villa Swamps.

### Resumen

Estadios larvales del acantocéfala *Polymorphus spindlatus* Amin & Heckmann, 1991 (Polymorphidae) fueron obtenidos del intestino de la tilapia, *Oreochromis niloticus* Linnaeus, 1758 (Pisces: Cichlidae) en los Pantanos de Villa, Lima, Perú durante el 2006. Estadios de cistacantos fueron recuperados del intestino, observados vivos, y documentados fotográficamente. Los estadios tempranos tuvieron una proboscide ovoide que desarrolló en una forma de huso característica de la proboscide adulta solo en el último estadio de cistacanto. Formas y modelos de los ganchos de las proboscides adultas fueron evidentes en las larvas jóvenes. La constricción en el tronco de los estadios tempranos se desapareció al desarrollo del cistacanto. La morfología del tronco en forma de huso y otras características del cistacanto en el pez hospedero fueron similares a aquellas reportadas para cistacantos previamente reportadas de la cavidad corporal de los peces hospederos en el Lago Titicaca, Perú.

**Palabras clave:** Acanthocephala - cistacantos - Lima - *Oreochromis niloticus* – Pantanos de Villa - Peru - *Polymorphus spindlatus*.

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## INTRODUCTION

Since the original description of *Polymorphus spindlatus* Amin & Heckmann 1991 from the black-crowned night heron, *Nycticorax nycticorax* Gmelin, 1789 from Peru at Lake Titicaca (Amin & Heckmann, 1991), we have extended considerable efforts in exploring additional host systems associated with the life cycle of this acanthocephalan. Amin *et al.* (1995) subsequently described the developed cystacanth stage from the body cavity of 4 species of killifish paratenic hosts in the same lake at Puno Bay. In 2006, we have discovered another paratenic host, the fish *Oreochromis niloticus* Linnaeus, 1758 from the intestine of which larval stages of *P. spindlatus* have been documented and reported herein.

## MATERIAL AND METHODS

Tilapia fish were collected from Villa Swamps at Chorrillos, Lima, Peru (12° 12'S, 76° 59'W) in September, 2006. Fish were dissected and larval acanthocephalans recovered from the intestine and observed live while being photographed with a digital camera onto a CD by one of us (CP) who provided initial identifications of specimens in his collection. Occasional collections of cystacanths were also made from the black carachi, *Orestias agassii* Valenciennes, 1846 from Puno Bay, Lake Titicaca, Peru in March, 2005. Developmental stages of cystacanths were observed using Adobe Photoshop (version 6) and Microsoft Office Word. The stages of cystacanth development were traced from natural infections using a phase contrast compound light microscope with digital imaging equipment attached. Pictures representing developmental stages from early to late cystacanth that were stored on the CD were selected using a Dell computer. Two plates were generated. (Figures. 1-8)

## RESULTS AND DISCUSSION

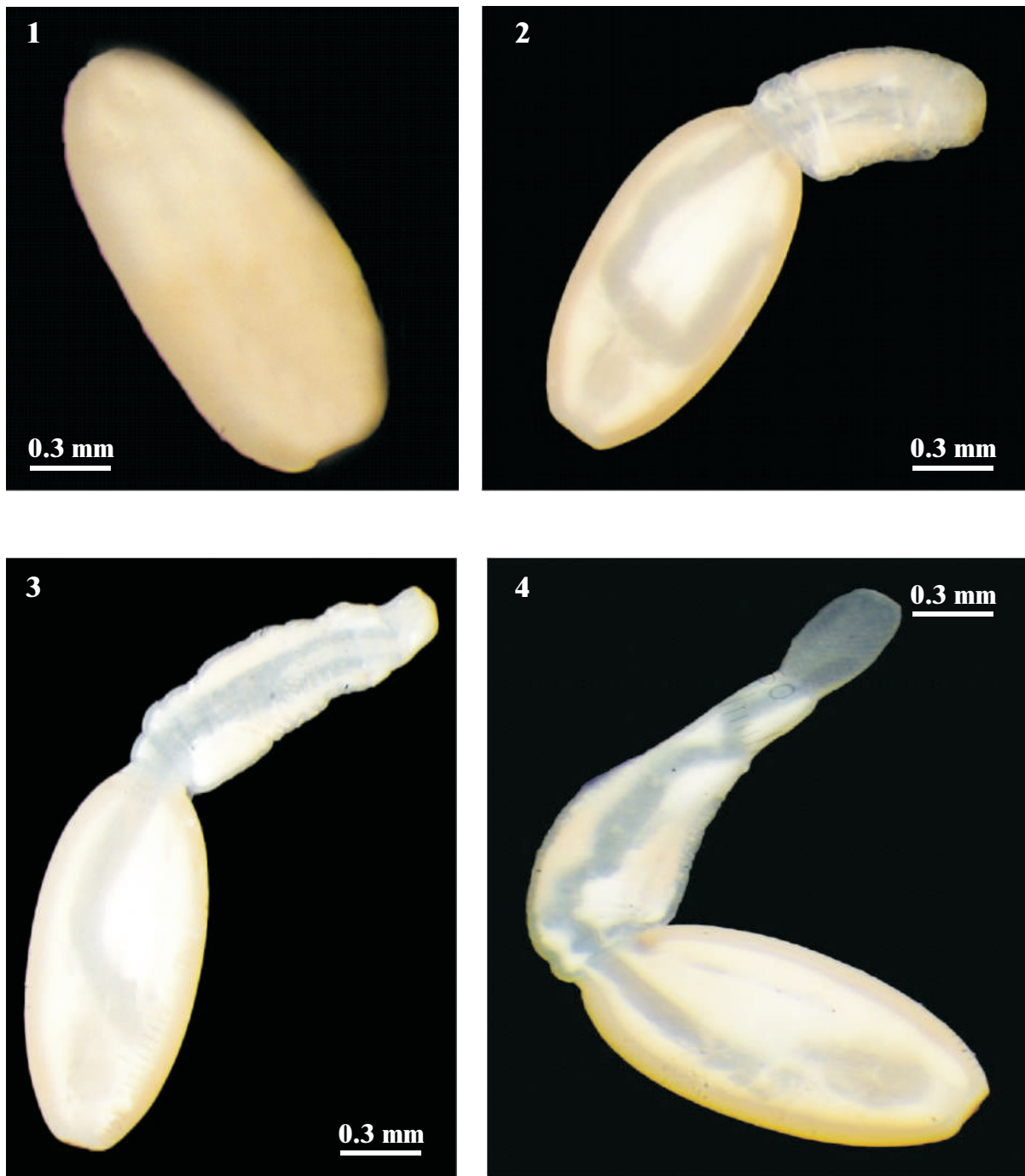
The youngest larva was ovoid in shape with broad posterior end (Fig. 1). It later evaginates

and develops an anterior praesoma with definite constriction and markedly elongated lemnisci (Fig. 2). The following stage comprised only further elongation of the praesoma (Fig. 3) which later begins to develop a well defined proboscis with the lemnisci continuing to increase in length (Fig. 4). Subsequent stage had an ovoid proboscis that develops into the spindle-shaped form characteristic of the adult proboscis only in the late cystacanth. Completely formed cystacanths with the spindle-shaped proboscis, drop-shaped trunk, and lemnisci about as long as proboscis receptacle were also observed from another fish paratenic host, *O. agassii* collected from Puno Bay, Lake Titicaca in March, 2005 (Fig. 8). Form and pattern of adult proboscis hooks were evident in the earlier stages (Figs. 5, 6). Trunk spines in the cystacanth stages were similar in organization to those reported in cystacanths from fish hosts and in adults from birds (Amin, 1992); size was comparable (Fig. 7). The constriction in the trunk was prominent in the developing acanthella and other features of the cystacanth from the tilapia were similar to those reported for cystacanths collected from other fish paratenic hosts from Lake Titicaca at Puno Bay (Amin *et al.*, 1995).

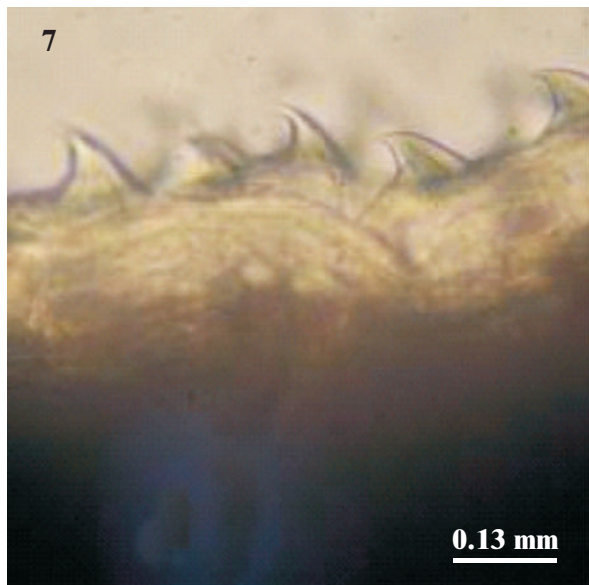
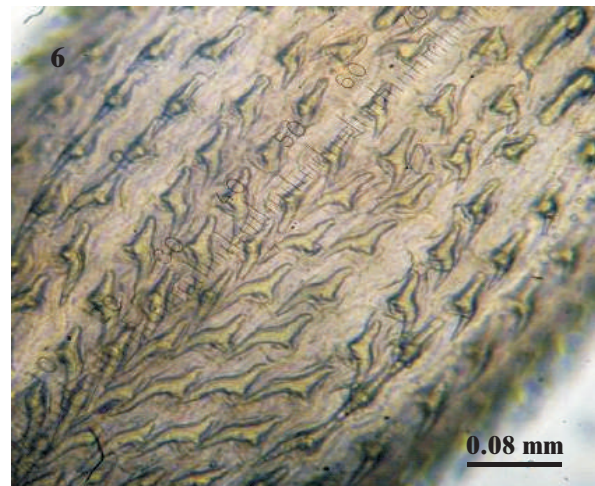
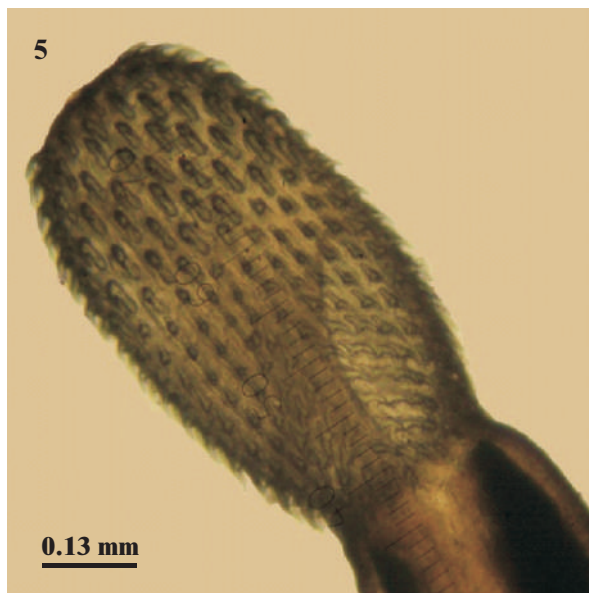
Only two species of *Hyaella* are known from Lake Titicaca: *Hyaella armata* (Faxon, 1876) and *Hyaella longispina* González & Coleman, 2002; see González & Coleman (2002). These crustaceans represent possible intermediate hosts that may infect the reported fish paratenic hosts in Lake Titicaca (Amin *et al.*, 1995). Whether these crustaceans are related to the infectious cycle in Villa Swamps, or in Lake Titicaca, will have to be an issue for future investigations.

## ACKNOWLEDGEMENTS

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**Figures 1-4.** Photographs of early cystacanths of *Polymorphus spindlatus* observed live after removal from the fish intermediate host, *O. niloticus*. **1.** An early stage with a flat posterior end. **2.** A later stage showing the beginning of the development and evagination of the praesoma. **3.** A later stage showing more developed praesoma and the beginning of proboscis formation at its anterior tip. **4.** A later cystacanth stage showing most development of praesoma which is inflated posteriorly, a nearly fully formed ovoid proboscis with flat anterior end, and maximal development of lemnisci.



**Figures 5-8.** Photographs of cystacanths of *Polymorphus spindlatus* observed live after removal from fish intermediate hosts, *O. niloticus* (Figs. 5-7) and *O. agassii* (Fig. 8). **5.** The ovoid proboscis of an early cystacanth showing the characteristic hook pattern of the adult. **6.** The posterior part of the proboscis of a later cystacanth showing the characteristic posterior hooks with anterior manubria. **7.** A profile of trunk spines of a young cystacanth consistent with those of the adults. **8.** A completely formed cystacanth with the spindle-shaped proboscis, drop-shaped trunk, and lemnisci about as long as proboscis receptacle obtained from *O. agassii* in Lake Titicaca.

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