AQUACULTURE

BIOMPHALARIA OBSTRUCTA (SYN. B. HAVANENSIS) IS HOST TO TWO SPECIES OF TREMATODES INFECTIVE TO CATFISH

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THE BIOMPHALARIA SP. SNAILS WERE PREVIOUSLY CONSIDERED A PEST OF MINIMAL CONCERN IN CATFISH AQUACULTURE. WE'VE FOUND THEY TRANSMIT TWO TREMATODES THAT HAVE DELETERIOUS EFFECTS ON CATFISH. THE BIOMPHALARIA SP. SNAILS ARE JUST AS MUCH OF A THREAT TO PRODUCTION AS THE RAMS-HORN SNAILS. ITS IMPORTANT PRODUCERS REMAIN DILIGENT IN MINIMIZING SNAIL POPULATIONS ON THEIR OPERATIONS.

Digenetic trematodes are a significant hindrance to the production of farm-raised catfish. Commercial catfish ponds are ideal environments for the propagation of digenetic trematode lifecycles as fish eating birds and the trematodes they carry are endemic to commercial catfish operations. Severe infections with the trematode *Bolbophorus damnificus* can result in death, but the real damage lies in mild to moderate infections, which can go unnoticed by producers. Research has shown that even mild infections can inhibit production to the point of operating at a net loss. Similarly *Drepanocephalus auritus* has been shown experimentally to induce mortality in channel catfish fingerlings. The ramshorn snail *Planorbella trivolvis* is the first intermediate host for *B. damnificus* and *D. auritus* and is ubiquitous in most commercial catfish ponds. Management practices aimed at controlling trematode infections primarily focus on reducing snail populations in ponds. Other aquatic snail species are also associated with commercial catfish ponds, although little is known about their contributions to trematode infections in catfish.

Figure 1: Biomphalaria *sp.*

In addition to *P. trivolvis, Biomphalaria obstructa* is also found inhabiting these ponds. Until recently they were thought to be inconsequential to catfish health.

In one study, *Biomphalaria obstructa* (syn. *B. havanensis*) snails (n=804) were collected from a commercial catfish pond and screened for trematode infections. Seven of these snails (0.81%) were actively releasing cercariae identified molecularly as *B. damnificus*. These cercariae were then used in infectivity trials with

channel catfish *Ictalurus punctatus* fingerlings (5-8 cm). Seven days post-challenge, fish were examined histologically for the presence of metacercariae, which were present in 13/15 (86.67%) surviving fish. In a second study, *B. obstructa* (syn. *B. havanensis*) (n=1740), were collected from two separate farms in Noxubee County, Mississippi and were observed for 48 hours for the presence of cercariae. Fifteen individual snails (1.01%) were actively shedding cercariae morphologically consistent with *D. auritus*. Genetic sequence analysis of cercariae was a 99%-100% match to *D. auritus* across five different gene targets. As above, these cercariae were used in infectivity trials with channel catfish fingerlings (2-3 cm). Fish were necropsied 7 days post-exposure and the presence of metacercariae was confirmed by histopathology. This is the first report of naturally occurring infections of *B. damnificus* and *D. spathans* in another snail species associated with catfish aquaculture. This work further emphasizes the importance of routine snail control on commercial catfish operations.

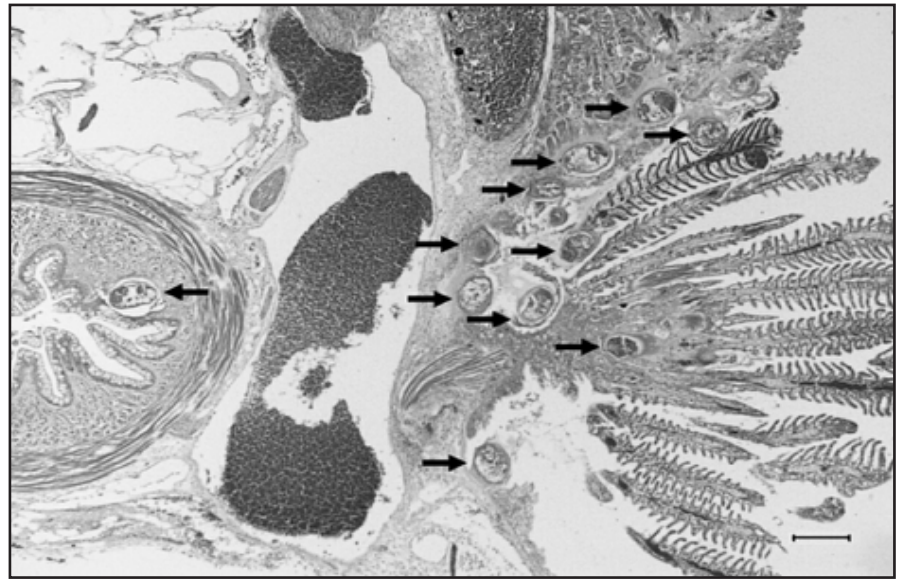

Figure 2: *Cross section of a* Drepahnocephalus spathans*–infected channel catfish fingerling at the level of the branchial chamber. Note the multiple developing metacercariae. Small arrows indicate the metacercariae at the base of the gills; larger arrow (left facing) indicates a single metacercaria in the submucosa of the esophagus. Calibration bar, approximately 200 µm (H&E).*