A GLOCHIDIAL HOST OF *ALASMIDONTA RAVENELIANA* (BIVALVIA: UNIONIDAE)[1]

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1 Table

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Abstract. A glochidial host for *Alasmidonta raveneliana* was identified through laboratory-induced infestations on fishes known to occur sympatrically with this mussel. Of 18 species of fish tested, metamorphosed juvenile mussels were recovered from *Cottus carolinae* ~~following~~ 19-26 days ~~of~~ infestation.

Integral to an understanding of the reproductive biology of freshwater mussels (Unionoidea) is the identification of glochidial hosts. The degree of host specificity can vary considerably among mussel species (Fuller, 1974; Gordon & Layzer, 1989; Hoggarth, 1992). Fish generally ~~have been implicated~~ as hosts~~; however,~~ some species of ~~relatively~~ common, widely-distributed fish exhibit a greater propensity to function in this capacity than more regionally-endemic species (Gordon et al., 1994). Because of declining mussel populations and the increasing rarity of many species, host identification has become an important component of mussel conservation and management programs. Our investigation examined the host relationships between ~~regionally occurring~~ fish and *Alasmidonta raveneliana* (Lea, 1834), a mussel now restricted to a ~~small section~~ of the upper Tennessee River drainage in ~~the Appalachian Mountains of~~ North Carolina and Tennessee.

MATERIALS AND METHODS

Host specificity for glochidia of *Alasmidonta raveneliana* was assessed through laboratory-induced infestations of fish following the procedure described in Gordon & Layzer (1993). Gravid *Alasmidonta raveneliana* were obtained (9 October, 1992) from the Little Tennessee River, at Dean Island, 2 km east of Oak Grove, Macon County, North Carolina. Fish were collected by electrofishing from the Blackburn Fork and Spring Creek drainages of the Roaring River system, Jackson, Overton, and Putnam counties, Tennessee, and acclimated to tank conditions for one week prior to infestation.

RESULTS AND DISCUSSION

Of the 18 species of fish tested (Table 1), most ~~had~~ sloughed all glochidia during the first 6-10 days following infestation. Single, empty glochidial shells were recovered from *Campostoma anomalum* (Rafinesque, 1820), *Hypentelium nigricans* (Lesueur, 1817), *Fundulus catenatus* (Storer, 1846), *Micropterus punctatus* (Rafinesque, 1819), *Etheostoma blennioides* Rafinesque, 1819, *E. caeruleum* Storer, 1845, and *E. simoterum* (Cope, 1868) during the period of 16-19 days post-infestation. Although *Cottus carolinae* (Gill, 1861) shed rejected glochidia fairly consistently over this entire period, juvenile mussels (diagnosed by anterior and posterior adductor muscles and an actively moving foot) were recovered from this species after ~~following~~ 19 days of parasitism. Juvenile mussels continued to excyst from *C. carolinae* for an additional 7 ~~seven~~ days.

The annual reproductive cycle of *Alasmidonta raveneliana* is similar to ~~appears to approximate~~ that of *A. atropurpurea* (Rafinesque, 1831), an endemic of the Cumberland Plateau portion of the Cumberland River system. Spawning in both species occurs in early to mid-August, and infective glochidia develop by early October (Gordon, unpublished data). In *A. atropurpurea*, release of glochidia is delayed until the following March (Gordon & Layzer, 1993). Unlike *A. atropurpurea* which utilizes the cyprinid ~~cypriniform~~ *Hypentelium nigricans* (Gordon & Layzer, 1993), the host for *A. raveneliana* is a cottid ~~perciform~~ species. The wide-spread *A. marginata* Say 1818 displays a dichopatric distribution relative to both and utilizes cypriniform and perciform species as hosts (Howard & Ansen, 1922). Although phylogenetic congruence for host specificity between *A. raveneliana* and *A. atropurpurea* is not apparent, their host preferences ~~do~~ reflect a relationship with *A. marginata*. Another congener, *A. viridis* (Rafinesque, 1820), also utilizes *Cottus carolinae* and other perciforms (see Clarke & Berg, 1959; Zale & Neves 1982).

A general lack of congruency between overall distribution of mussels and their hosts (e.g., Gordon & Layzer, 1993) is illustrated by the highly endemic historical range of *Alasmidonta raveneliana* (see Clarke. 1981) and the wide distribution of *Cottus carolinae*. The occurrence of *A. raveneliana* in the poorly-buffered streams of the Appalachian Mountains is analogous to the situation of *A. atropurpurea* in streams ~~of~~ the Cumberland Plateau. Both species appear to be adapted to calcium-poor systems, are not distributed downstream in contiguous calcareous regions, and are replaced in those areas by *A. marginata* (Gordon & Layzer, 1993). Clarke (1981) considered *A. raveneliana*, *A. atropurpurea*, and *A. marginata* to be closely-related, with the latter a possibly ~~hypothetical~~ progenitor of the other two species. The above relationships in conjunction with available information on unionoid reproduction (e.g., Fuller, 1974; Gordon & Layzer, 1989) suggest that closely-related species groups may utilize a relatively common pool of hosts, whereas ~~and~~ wide-spread species may employ a larger array of hosts than species that ~~which~~ are more geographically restricted.

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FOOTNOTES

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Table 1. Species of fish subjected to laboratory-induced infestations of Alasmidonta raveneliana. Numbers in parentheses indicate the greatest number of days that glochidia were retained by ~~any particular~~ the fish species ~~of fish~~; * denotes the period over which metamorphosed juvenile mussels were recovered.

Campostoma anomalum (10)	Lepomis megalotis (10)
Cyprinella galactura (6)	Micropterus punctatus (19)
Notropis boops (6)	Micropterus salmoides (10)
Rhinichthys atratulus (7)	Etheostoma blennioides (5)
Hypentelium nigricans (5)	Etheostoma caeruleum (19)
Fundulus castenatus (13)	Etheostoma flabellare (7)
Ambloplites rupestris (7)	Etheostoma rufilineatum (6)
Lepomis cyanellus (6)	Etheostoma simoterum (19)
Lepomis macrochirus (6)	Cottus carolinae (19-26)*

give common names also

Fish Species — Days of Attachment

Sci name common name

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