Identification of a Host Fish for Alasmidonta minor (Mollusca: Unionidae)

ABSTRACT: Among 24 species of fish periodically examined for glochidial infections between May 1979 and June 1980 in Big Moccasin Creek, Virginia, the banded sculpin *(Cottus carolinae)* was the only species infected with glochidia of *Alasmidonta minor*.

INTRODUCTION

The larvae (glochidia) of freshwater mussels (Unionidae) are, prior to their benthic existence, obligate parasites on the gills or fins of fish. Less than 25% of the host fishes for the approximately 227 species of Nearctic freshwater mussels (Burch, 1975) have been identified. Fuller (1974) summarized the host fish of Nearctic mussels known by 1972, and several mussel/fish-host relationships have been elucidated since then (Wiles, 1975; Weir, 1977; Stern and Felder, 1978; Tompa, 1979; Zale 1980). Two species of *Alasmidonta* have known fish-hosts (Howard and Anson, 1922; Morrison, in Clarke and Berg, 1959): Hosts of *A. marginata* include three catostomids *(Catostomus commersoni, Hypentelium nigricans, Moxostoma macrolepidotum)* and two centrarchids *(Ambloplites rupestris, Lepomis gulosus),* and hosts of *A. calceolus* are a darter *(Etheostoma nigrum)* and a sculpin *(Cottus bairdi)*.

The taxonomic status of *Alasmidonta minor* (Lea, 1845) is currently unresolved among malacologists; this binomial is considered a synonym of *Alasmidonta viridis* (Rafinesque, 1820) by Stansbery (1973), a synonym of *Alasmidonta calceolus* (Lea, 1829) by Johnson (1980), and a valid species analogue of *A. calceolus* restricted to headwater streams of the Cumberland Plateau Region by Bates and Dennis (1978). The geographical range of this and other Cumberlandian species has gradually declined during this century through habitat degradation. Fish-host information on *A. minor* was collected during a 2-year study of the reproductive biology of lampsiline mussels in Big Moccasin Creek, Virginia (Zale, 1980).

The study area (lat 36°47′30″N, long 82°11′50″W) was located at river km 82 of Big Moccasin Creek, a third-order tributary of the North Fork Holston River in Russell and Scott counties, southwestern Virginia. A detailed description of the study area and its fish fauna (24 species) was given by Zale (1980). The mussel community at this site was composed of the following seven species: *Medionidus conradicus* (Lea, 1834), *Lampsilis fasciola* (Rafinesque, 1820), *Villosa nebulosa* (Conrad, 1834), *Villosa vanuxemi* (Lea, 1838), *Pleurobema oviforme* (Conrad, 1834), *Fusconaia barnesiana* (Lea, 1838) and *Alasmidonta minor* (Lea, 1845). *Alasmidonta minor* was the least common species. Several specimens were taken in qualitative samples during the 2-year study, but none were collected in 30 random 0.5 m^2 quadrat samples.

Fish sampling was conducted weekly at the study site from May through November 1979 and twice monthly from December 1979 to June 1980. Specimens of all 24 fish species were captured by electrofishing and preserved in 10% buffered formalin. Fish were later examined for glochidial infections with a dissecting microscope in the laboratory. *Alasmidonta minor* was the only anodontine species (subfamily Anodontinae) in Big Moccasin Creek. The glochidia of Anodontinae have ventral hooks (Coker *et al.*, 1921) and were readily distinguished from those of other subfamilies by their distinctive shape and large size.

RESULTS AND DISCUSSION

A total of 5030 fish were collected and examined from collections between May and December 1979, but no anodontine glochidia were attached to these specimens. Among 1159 fish inspected from January to June 1980, the banded sculpin *(Cottus carolinae)* was the only species parasitized by the glochidia of *Alasmidonta minor* (Fig. 1). Encysted and metamorphosing glochidia of *A. minor* were observed on specimens between 12 February and 24 April. Of 145 sculpins collected during this period, seven (4.8%) were parasitized (Table 1). Degree of infection ranged from 1-10 glochidia per fish, and several specimens harbored glochidia of both *A. minor* and *Villosa vanuxemi*. The glochidia of *A. minor* were attached primarily to gill lamellae, although several were encysted within the thin epithelial tissue covering gill arches and rakers. No glochidia were found attached to the fins of these fish.

The presence of encysted and metamorphosing glochidia of *Alasmidonta minor* on banded sculpins provides strong evidence that this species is a host fish for *A. minor*. No anodontine glochidia were observed on any other fish species. The observations of Morrison (in Clarke and Berg, 1959) that implicated the mottled sculpin as a host for *A. calceolus* parallel our results; however, none of the four darter species examined in Big Moccasin Creek *(Etheostoma blennioides, E. flabellare, E. rufilineatum, E. simoterum)* were parasitized. The period of sculpin infection by *A. minor* and *Villosa vanuxemi* occurred when sculpins were most abundant at the study site (autumn

through spring). The low frequency (4.8%) and degree of infection (1-10 glochidia) during this period probably reflected the low density of *A. minor,* since the frequencies and degrees of infection by other mussel species were considerably higher (Zale, 1980).

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Fig. 1.—Glochidia of *Alasmidonta minor* encysted on the gill filaments of *Cottus carolinae*

TABLE 1.—Incidence of infection of banded sculpins (*Cottus carolinae*) by *Alasmidonta minor* in Big Moccasin Creek, January-June 1980

Date	No. sculpin examined	Percent infected
Jan. 17	27	0.0
Jan. 29	9	0.0
Feb. 12	23	4.3
Feb. 27	30	0.0
March 11	24	4.2
March 27	18	5.6
April 11	28	10.7
April 24	22	4.5
May 08	27	0.0
May 21	28	0.0
June 06	9	0.0

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