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Observations on the Size and Fecundity of the Least Brook Lamprey, Lampetra aepyptera (Abbott) in Northcentral Arkansas

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formed and the leafhopper used its hindlegs to touch the drop; this was followed by intensive "kneading" movements of the legs. Again this behavior was followed by normal small-droplet defecation. The liquid material from the large drops consistently dried as a two-dimensional, translucent film.

Chalky deposits on the forewings of *O. orbona* appear to be restricted to females, and an ovipositing female can certainly scrape the chalky material onto an egg site. But non-ovipositing females with chalky deposits will also scrape the material off their wings.

Powdery white material on an otherwise green oviposition site seems an unlikely visual camouflage against predators and parasites, but it may be a chemical protection for the site. A white fungus began growing on a sunflower plant stem where oviposition and scraping behaviors were observed in the laboratory. The growth was much less extensive several days later in the deposit area than it was on the uncovered parts of the stem.

The antibiotic properties of allantoin became apparent earlier this century in connection with the "maggot therapy" of treating certain types of human wounds (Robinson 1935). The presence of allantoin in the chalky material from *O. orbona* could protect the oviposition site from microbial attack.

None of the literature describes the appearance of the chalky material on *O. orbona* before it is placed on the wings and dries. Turner and Pollard (1959) were vague about the physical form of the substance, saying only that "... gravid females stroke the tips of their bodies with their hind tibiae, transferring some of the chalk to their legs." I have never seen in *O. orbona* the opaque yellowish drops described by Storey and Nichols (1937) for *Cicadulina mbila*.

DeLong (1971) described the proconiine leafhoppers as xylem-feeders. In the meadow spittlebug *Philaenus spumarius* (L.), this method of feeding results in copious excretion of water (Wiegert 1964) without the familiar honeydew excreted by phloem-feeding homopterans. Observations of the excretion of copious amounts of clear liquid by *O. orbona* exemplify this situation.

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LITERATURE CITED

BORROR, D. J. and R. E. WHITE. 1970. A field guide to the insects of America north of Mexico. Houghton Mifflin, Boston. 404 pp.

DELONG, D. M. 1971. The bionomics of leafhoppers. Annu. Rev. Entomol. 16:179-210.

FENTON, F. A. 1952. Field crop insects. MacMillian, N. Y. 400 pp.

METCALFE, J. R. 1969. Studies on the biology of the sugar-cane pest *Saccharosydne saccharivora* (Westw.) (Homoptera, Delphacidae). Bull. Ent. Res. 59:393-408.

NIELSON, M. W. 1968. The leafhopper vectors of phytopathogenic viruses: taxonomy, biology, and virus transmission. U.S.D.A. Tech. Bull. 1382. 386 pp.

POLLARD, H. N. and C. E. YONCE. 1965. Significance of length of tibial spines relative to oviposition processes by some leafhoppers (Hemiptera:Cicadellidae). Ann. Entomol. Soc. Amer. 58:594-595.

RILEY, C. V. and L. O. HOWARD. 1892-93. The glassy-winged sharp-shooter. Insect Life 5:150-154.

ROBINSON, W. 1935. Allantoin, a constituent of maggot excretions, stimulates healing of chronic discharging wounds. J. Parasit. 21:354-358.

SEVERIN, H. H. P. 1950. *Texananus incurvatus* III. Life history on virus-infected and on healthy plants. Hilgardia 19:546-548.

STOREY, H. H. and R. F. W. NICHOLS. 1937. Defaecation by a jassid species. Proc. Roy. Ent. Soc. London, Ser. A 12:149-150.

SWAIN, R. B. 1936. Notes on the oviposition and life history of the leafhopper *Oncometopia undata* (Fabr.) (Homoptera:Cicadellidae). Entomol. News 47:264-266.

TURNER, W. F. and H. N. POLLARD. 1959. Life histories and behavior of five insect vectors of phony peach disease. U.S.D.A. Tech. Bull. 1188. 25 pp.

WIEGERT, R. G. 1964. The ingestion of xylem sap by meadow spittlebugs, *Philaenus spurmarius* (L.) Amer. Midl. Natur. 71:422-428.

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OBSERVATIONS ON SIZE AND FECUNDITY OF THE LEAST BROOK LAMPREY, *LAMPETRA AEPYPTERA* (ABBOTT), FROM NORTHCENTRAL ARKANSAS

Information on the least brook lamprey *(Lampetra aepyptera)* in Arkansas is limited to reports of distributional data (Robison, 1974; Harp and Matthews, 1975; Sewell et al. 1980). This is based on the fact that only 32 *L. aepyptera* are known from Arkansas (Sewell et al. 1980). However, in other parts of its range, *L. aepyptera* has been extensively studied (Schwartz, 1959; Brigham, 1973; Pflieger, 1975; Rohde et al. 1976; Rohde, 1977; Rohde and Jenkins, 1980).

The purpose of this investigation was twofold: first, to provide quantitative data for Arkansas *L. aepyptera* to compare with data reported from other portions of its range, and second, to provide foundation for future studies of the biology of the least brook lamprey in Arkansas.

Thirteen mature *L. aepyptera* were collected on 30 March 1980 with a 1.8 × 0.9 m straight nylon seine (3.2 mm mesh) from North and South Sylamore Creeks, Stone County, Arkansas (T.16N, R.12W, Sec.16; T.15N, R.11W, Sec.21). Of these, seven were males, and six were females. Total length to the nearest mm and weight to the nearest 0.01 g were obtained from all formalin-preserved fish. Mid-ventral incisions were made in females and ovarian compliments removed, weighed and preserved separately. Eggs were not free in the coelomic cavity, suggesting that spawning had not begun. Actual counts of ova were made utilizing a binocular microscope. Diameters of 20 ova were measured in each of six females to the nearest 0.01 mm with an ocular micrometer.

Mean and standard deviation ($\bar{X} \pm$ s.d.) were calculated for each character examined. Sexes were compared with a one way analysis of variance (ANOVA) test. The relationship in females between characters was examined by correlation analyses. The Statistical Package for the

Social Sciences (SPSS) were performed in all statistical procedures. Lamprey voucher specimens are deposited in the Arkansas State University Fish Museum (ASUM #9326-9339).

The mean total length was 119.2 ± 6.26 mm (range 108-125), while mean weight was 2.59 ± 0.53 g (range 2.01-3.24) in males. The total lengths were slightly higher than those reported by Seversmith (1953). The mean total length was 125.6 ± 5.24 mm (range 116-132), while weight ranged from 2.15 to 3.36 g ($\bar{X}$ = 2.97 ± 0.42) in females. Seversmith (1953) and Rohde et al. (1976) reported mean total lengths of 103.6 mm and 98.5 mm for Maryland and Delaware *L. aepyptera*, respectively. Rohde et al. (1976) reported weight ranges of 0.9 to 3.0 g ($\bar{X}$ = 1.8). Mean weight is substantially higher than that reported by Rohde et al. (1976); however, his sample included three transforming *L. aepyptera*. Ova counts per individual ranged from 824 to 1,624 ($\bar{X}$ = 1306 ± 302) and are similar to the 1,164 eggs reported from one specimen by Seversmith (1953) for Maryland *L. aepyptera*, but substantially higher than the mean of 874 eggs reported for Delaware *L. aepyptera (Rohde et al. 1976)*.

Mean egg mass was 0.76 ± 0.21 g (range 0.43-1.00). Egg diameter ranged from 0.84 to 1.24 mm ($\bar{X}$ = 1.02 ± 0.08). These data are consistent with that reported by Rohde et al. (1976) and suggest an extreme uniformity between individual egg diameter. The relative fecundity index (no. eggs/ g body weight) for the six female adults ranged from 383.2 to 534.8 ($\bar{X}$ = 436.5 ± 56.4). Although slightly lower, these values accord well with those reported by Rohde et al. (1976) for *L. aepyptera* and Hardisty (1971) for other non-parasitic lampreys.

Neither total weight nor length was significantly different between males and females in this study (ANOVA, F=1.92, p=0.19; F=3.88, p=0.07, respectively). All correlations (Table 1) except egg count-total length and egg weight-total length were significant (ANOVA, p<.05).

Table 1. Correlation matrix for comparison among characters of six female *Lampetra aepyptera* from northcentral Arkansas.

	TOTAL LENGTH	TOTAL WEIGHT	EGG COUNT	EGG MASS WEIGHT
TOTAL LENGTH	1.000			
TOTAL WEIGHT	0.821	1.000		
EGG COUNT	0.615	0.877	1.000	
EGG WEIGHT	0.571	0.862	0.977	1.000

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LITERATURE CITED

BRIGHAM, W. V. 1973. Nest construction of the lamprey, *Lampetra aepyptera*. Copeia 1973:135-136.

HARDISTY, M. W. 1971. Gonadogenesis, sex differentiation and gametogenesis. *In:* The biology of the lampreys. (M. W. Hardisty and I. C. Potter, eds.), Academic Press, London, p. 295-359.

HARP, G. L. and W. F. MATTHEWS. 1975. First record in Arkansas of *Lampetra spp.* (Petromyzontidae). Southw. Nat. 20:409.

PFLIEGER, W. L. 1975. The fishes of Missouri. Missouri Dept. of Consrv., Jefferson City, Mo. 343 pp.

ROBISON, H. W. 1974. Threatened fishes of Arkansas. Proc. Ark. Acad. Sci. 28:59.

ROHDE, F. C. 1977. First record of the least brook lamprey, *Okkelbergia aepyptera*, (Pisces:Petromyzontidae) from Illinois. Trans. Illinois St. Acad. Sci. 69:313-314.

ROHDE, F. C. and R. E. JENKINS. 1980. *Lampetra aepyptera* (Abbott), Least brook lamprey. p. 21 *In* S. D. Lee, et al. Atlas of North American freshwater fishes. N. C. State Mus. Nat. Hist., Raleigh. 854 pp.

ROHDE, F. C., R. G. ARNDT and J. C. S. WANG. 1976. Life history of the freshwater lampreys, *Okkelbergia aepyptera* and *Lampetra lamottenii* (Pisces:Petromyzontidae), on the Delmarva Peninsula. Bull. South. Calif. Acad. Sci. 75:99-111.

SCHWARTZ, F. J. 1959. Records of the Allegheny brook lamprey, *Ichthyomyzon greelyi* Hubbs and Trautman, from West Virginia, with comments on its occurrence with *Lampetra aepyptera* (Abbott). Ohio J. Sci. 59:217.

SEVERSMITH, H. F. 1953. Distribution, morphology and life history of *Lampetra aepyptera*, a brook lamprey, in Maryland. Copeia 1953:225.

SEWELL, S. A., F. A. CARTER and C. T. MCALLISTER. 1980. Implications and considerations concerning the status, habitat and distribution of the least brook lamprey, *Lampetra aepyptera* (Abbott) (Pisces:Petromyzontidae) in Arkansas. Proc. Ark. Acad. Sci. 34:132-133.

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