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EGGS AND ATTACHMENT SITES FOR EGG CAPSULES OF VALVATA LEWISI

BY BRUCE Z. LANG AND NORMAN O. DRONEN, JR.

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The literature pertaining to reproductive features of *Valvata* Müller has been reviewed by Heard (1963). In this paper, the author pointed out the seasonal reproduction of *V. piscinalis* of Europe and *Valvata* of the Great Lakes region. Besides the seasonal reproductive cycle, certain species of *Valvata* demonstrate a preference for substrates during oviposition. Heard demonstrated that *V. tricarinata* (Say) preferred plants over leaves of deciduous trees for oviposition. Also, more egg capsules were recovered from the broader leaved aquatic plants than those having narrow or needle-like leaves. The number of eggs per capsule and the time required for hatching is quite variable for the various species of *Valvata* that have been studied.

Valvata lewisi Currier has been reported from the western states

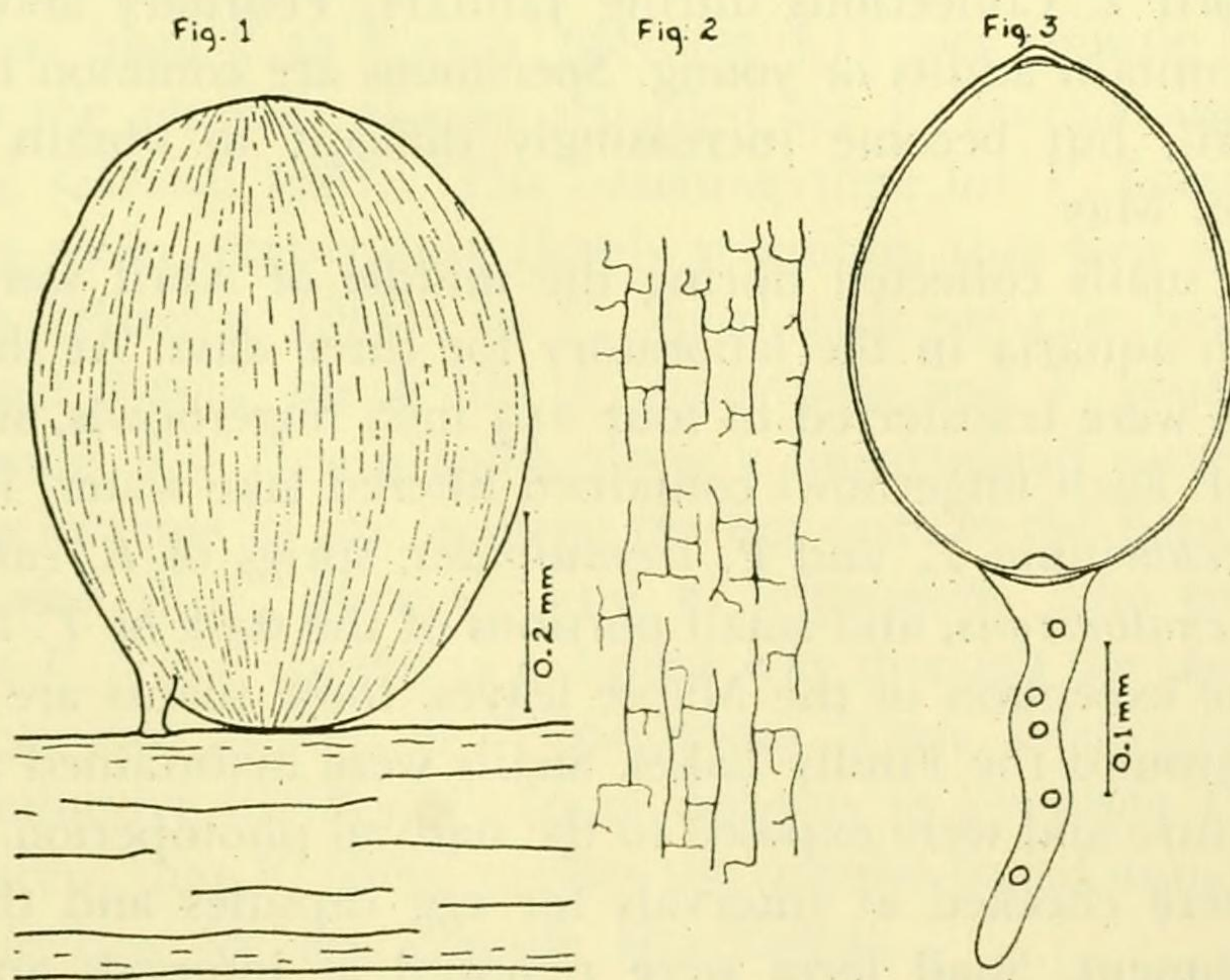


Figure 1. Egg capsule of *Valvata lewisi* attached to aquatic plant.

Figure 2. Incomplete surface striations on egg capsule.

Figure 3. Single egg showing filament.

by Henderson (1907, 1929) and Beetle (1965). In the present study, oviposition (egg capsule attachment) on various substrates was studied for *V. lewisi* along with the morphology of the capsule and egg, and the hatching time for eggs.

Valvata lewisi are present in the three Findly Lakes on the Turnbull National Wildlife Refuge in eastern Washington (Spokane Co.). The three lakes are connected by ditches and the smallest of the three usually dries up in the summer. The lakes are shallow, 2.5 meters at their greatest depth with a mud-silt bottom over one meter in depth, eutrophic, with a pH which varies from 7.2 in early spring to 9.5 in late summer. Total alkalinity is high and the oxygen concentration shows considerable diurnal and seasonal variation, from 20 percent saturation to 95 percent saturation. The dominant plant species covering the bottom of the lakes is *Myriophyllum exalbescens* Fern. Small patches of *Elodea canadensis* Michx. are scattered over the bottom, and the banks and edges are characterized by *Typha latifolia* L. *Pinus ponderosa* Dougl. is the dominant species of tree with a few *Populus tremuloides* Michx. being present. The invertebrate fauna of the lakes is extremely rich.

Adult *V. lewisi* are usually not found in field collections until after April 1. Collections during January, February and March do not contain adults or young. Specimens are common throughout April, but become increasingly difficult to obtain by the middle of May.

Adult snails collected during the middle of April were maintained in aquaria in the laboratory for three days. At this time, 24 snails were transferred to four 4½ inch fingerbowls, six snails per bowl. Each fingerbowl contained filtered lake water, leaves of *Acer saccharinum* L. and *P. tremuloides*, sprigs of *E. canadensis* and *M. exalbescens*, and small portions of the stalk of *T. latifolia*. With the exception of the Maple leaves, these plants are present in and around the Findly Lakes. Snails were maintained at room temperature and were exposed to the natural photoperiod. Fingerbowls were checked at intervals for egg capsules and their site of attachment. Snail feces were removed at intervals and fresh water was added.

During an 18 day period, 50 egg capsules were laid by the 24 snails. Forty egg capsules were studied in detail during this pe-

riod. The minimum hatching time is 12 days, the range being 12 to 18 days. From 2 to 6 eggs are present per capsule; the mean number of eggs per capsule is 4.1. Capsules that are 24 hours old range in size from 0.675 mm to 0.800 mm long. The egg capsule is connected to the substrate by a short fiber (Fig. 1). Incomplete surface striations are present on the capsule (Fig. 2). Eggs (Fig. 3) that are 24 hours old are 0.350 mm to 0.368 mm long (excluding the filament). The single filament present on each egg varies from 0.175 mm to 0.200 mm in length. Filaments of eggs are not joined. The capsule splits along a longitudinal suture, releasing the eggs which hatch within 24 hours. The shells of the young snails show coarse transverse striations.

Of the substrates provided for capsule attachment, *V. lewisi* demonstrated a high selectivity for the stalk and leaves of *M. exalbescens* (Table 1). The broader leafed *E. canadensis* and the leaves of the tree species were not favored as sites for capsule attachment. In fact, the snails seemed to prefer glass above all other substrates except *M. exalbescens*. This might be a reflection of the total surface area that was available.

Unlike *V. tricarinata*, *V. lewisi* preferred the narrow leafed aquatic *Myriophyllum* to the broader leafed plant *Elodea*. *Valvata lewisi* has from 2 to 6 eggs (average 4.1) per capsule which is close to the number of eggs recorded for *V. cristata* and *V. tricarinata* (Heard, 1963). The hatching time for *V. lewisi* (12-18 days) at room temperature closely resembles that seen for *V. tricarinata* (Furrow, 1931). In *V. lewisi* each egg case has its own individual thread, much like *V. tricarinata* and *V. cristata*. The egg capsule of *V. lewisi* splits along a longitudinal suture as the embryos increase in size, spilling the egg cases to the bottom. This is also seen in *V. piscinalis* and *V. tricarinata*. The embryonic snails of *V. lewisi* appear to eat their way through the membranes of the egg case as seen in *V. tricarinata*. Thus, in certain aspects of reproductive biology, *V. lewisi* appears to resemble *V. tricarinata*, except that *V. lewisi* prefers the narrow leafed aquatic plant *Myriophyllum* for egg capsule attachment.

The authors are grateful to Mr. Jon Malcomb, Manager of The Turnbull National Wildlife Refuge, for his encouragement and help during this study.

TABLE 1. Substrates and attachment sites for egg capsules of Valvata lewisi

	Substrates					
	<u>Myriophyllum</u> <u>exalbescens</u>	Glass	<u>Typha</u> <u>latifolia</u>	<u>Flodea</u> <u>canadensis</u>	<u>Acer</u> <u>saccharinum</u>	<u>Populus</u> <u>tremuloides</u>
Number of capsules	29	15	3	2	1	0

LITERATURE CITED

- Beetle, D. E. 1965, *Nautilus*, 78: 125-130.
 Furrow, C. L. 1931, *Trans. Ill. State Acad. Sci.* 24: 24-246.
 Henderson, J. 1907, *The University of Colorado Studies*, 4: 167-185.
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ONE MORE SINISTRAL MESODON

BY HAROLD S. FEINBERG

American Museum of Natural History
 New York, New York 10024

A sinistral specimen of *Mesodon inflectus* (Say, 1821) was found with two dextral snails of this species. The specimens were obtained in the damp soil under a large slab of rock, in a steep talus slope formed by the highway construction of Routes 19E and 321, just south of Valley Forge, Carter County, Tennessee.

Sinistral or left-handed specimens of *Mesodon* are uncommon. Over a hundred years ago, Tryon (1867, p. 104) wrote, "Reversed Helices are not nearly so numerous in America as in Europe." He listed the number of sinistral specimens of species which are now known to belong to the genus *Mesodon*. He cited single sinistral examples of *M. elevatus* (Say, 1821), *M. thyroidus* (Say, 1816), *M. mitchellianus* (Lea, 1839) and *M. inflectus*. The second sinistral *inflectus* was collected by Leslie Hubricht in St. Louis County, Missouri, and reported by Pilsbry (1940, p. 773).

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Fig. 1

FIG. 2

FioJ

Figure 1. Egg capsule of Valvata lewisi attached to aquatic plant.

Figure 2. Incomplete surface striations on egg capsule.

Figure 3. Single egg showing filament.

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