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NESTING OF THE BROOK STICKLEBACK

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ABSTRACT

In the southern half of Minnesota nesting begins in late March or early April and continues until June. A male may build two successful nests in one season. The temperature of the water has usually attained a minimum of 8° C. before spawning begins. Nests are placed in shallow water (usually from 1 to 3 decimeters deep) concealed under overhanging banks, dead leaves, or other cover, and are attached to branched twigs or aquatic plant stems just above the bottom.

The chief building materials are the fibro-vascular bundles of plants especially those of monocotyledons but some membranous plant tissues are also incorporated. They are pulled from decomposing vegetation by the male and plaited about the support into a compact hollow sphere by means of his grasping jaws. The entire structure is then bound together by fine filaments of an elastic material produced in the testes. Nests average about 30 millimeters in diameter. Two circular openings about 8 mm. in diameter enter the central chamber from the sides.

The male chases interlopers from the nest site until construction is complete and then escorts one of the ripe females that hover near to the nest with an excited courting dance, circling and butting her. She enters, deposits her entire supply of mature spawn, and is then chased away by the male who promptly enters and fertilizes the eggs. When spawning is complete the male stands guard blowing water through the nest until the young are ready to leave. Two or more females may spawn in the same nest laying up to 250 or slightly more eggs each. The eggs are large (1.3 mm. in diameter) and colorless. The egg primordia present in a female at her first spawning form a continuous series of sizes and are probably ample to last the rest of her life.

The male becomes nearly black, often with a suffused coppery

glow during spawning. He is otherwise olivaceous with a course reticulate gray pattern only slightly darker than the female. The male averages slightly larger than the female. The largest specimen recorded was 66 mm. long.

Young reach sexual maturity in one year.

AN ECOLOGICAL STUDY OF THE WINTERING CONDITIONS OF POND SNAILS WITH SPECIAL REFERENCE TO *Helisoma trivolvis* SAY

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ABSTRACT

Snails living in annual ponds and shallow perennial ponds in Minnesota encounter conditions which are very unfavorable for life. Snails living in annual ponds (ponds which are dry part of the year) are faced with conditions of extreme desiccation during the middle and late summer and with freezing temperatures during the winter. Perennial ponds do not become dry, and although they may freeze to the bottom, their temperatures are not extreme because of the insulation offered by the ice.

Contrary to the reports of several writers, no evidence of preparation for winter on the part of the snails was observed in ponds studied. Snails did not burrow into the pond bottom nor did they migrate to deeper water as the temperature of the water lowered. Rather, they remained on the shallow bottoms and on aquatic plants where they were collected in frozen samples during the winter.

Twenty-four live *Helisoma trivolvis*, *Stagnicola palustris*, and *S. exilis* were recovered from frozen samples during the winter of 1947. All samples were from below eight inches of ice and snow cover. The temperature of the ice in which the snails were encased was from $-1/2^{\circ}$ C. to -1° C. at the time of collecting.

Laboratory experiments were performed in an attempt to determine the low temperature tolerance of *H. trivolvis* and *S. palustris* in water and after desiccation. In water, thirty-five snails of the two species withstood temperatures of 0° C. and -1° C. without ill effects. Five *H. trivolvis* were subjected to -2.2° C. These snails were severely injured and did not resume normal activity. From this it appears that the critical temperature in water is about -2° C.

Low temperature tolerance of several *Helisoma trivolvis* was increased by desiccation. One survived -7° C. for 48 hours after 40 hours of desiccation over a concentrated table salt solution. The

second survived —8° C. for four days after 117 hours of desiccation over a sulphuric acid solution maintaining a relative humidity of 60%. *S. palustris* did not survive either of these experiments.

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PASSING OF *Staphylococcus aureus* ROSENBACH
THROUGH THE METAMORPHOSIS OF
THE HOUSE-FLY

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ABSTRACT

The author was able to pass *Staphylococcus aureus* Rosenbach, an opportunistic pathogen of man and warm blooded vertebrates, through the metamorphosis of the house-fly. The micro-organism was carried by forty-eight of the sixty experimental flies. *S. aureus* was found in both excreta and regurgitated fluids. The parasite was still active at the end of the normal longevity period of the host. No injurious effects were observed upon the vectorous host.