

AMBYSTOMA LATERALE (Blue-spotted Salamander). **COURTSHIP and EGG LAYING BEHAVIOR.** *Ambystoma laterale* is a spring breeder found from Nova Scotia to New England and throughout the Great Lakes region (Vogt 1981. Natural History of Amphibians and Reptiles of Wisconsin. Milwaukee Public Museum, Milwaukee, Wisconsin. 205 pp.). Few studies on the courtship behavior of this species have been published (Arnold 1977. In D. H. Taylor and S. I. Guttman, eds., The Reproductive Biology of Amphibians, pp. 141–183. Plenum Press, New York). Observations on the courtship and egg laying behavior of *A. laterale* were conducted during March–April of 1991, 1992, and 1995 at an ephemeral pond in Waukesha Co., Wisconsin, USA. These observations confirm the pattern reported by Kumpf and Yeaton (1932. Amer. Mus. Novit. 546:1–7) and Storez (1969. J. Herpetol. 3:87–95) and provide additional observations on courtship.

Salamanders were collected in pitfall traps, or during nocturnal migration. In the laboratory, they were maintained at 15–20°C in a 37.9-liter aquarium containing moist soil and bark for cover. Salamanders were not segregated by sex. Courtship and egg laying observations were made in a 75.7-liter aquarium with a gravel substrate, plastic plants, twigs, leaves, and rocks to stimulate natural conditions during two weeks following capture. Approximately 25 cm of dechlorinated or pond water at 20°C was used for all the trials. Courtship and egg laying behaviors were observed under light and dark conditions using red and white light. Females were placed in the tank with either one or two males. The courtship description follows Salthe's (1967. Copeia 1967:100–117) division of salamander courtship into five stages: 1) awareness and overtures, 2) capture of female, 3) initiation of spermatophore deposition, 4) spermatophore deposition, and 5) insemination of female.

Five courtships were observed for *A. laterale* in the laboratory: three with one male and one female, one with two males and one female, and one with two females and one male. Courtship rituals were variable, but all had recognizable characteristics.

The first stage, awareness and overture was brief. The first awareness by the male of the female, or vice versa, seemed to be chemically dependent, as both sexes seemed to be tasting the water while moving about the tank. The nudging behavior that followed awareness became critical to the male's recognition of the sex of his partner. When a male approached another animal he would direct his snout to the side region between the fore and hind limbs. Simultaneously, the male would prod his snout against the other animal's side and/or cloacal region. This behavior was directed equally to both sexes when present but soon became more intense and directed solely toward the female. This short nudging process usually lasted 30–45 s and was followed by the second stage capture of the female.

Capture of the female began by the male amplexing with the female. Amplexing usually lasted 1–2 minutes. The capture of the female consisted of three parts as described by Storez (*op. cit.*). In the initial clasp the male was passive while the female moved about the tank. Following this passive phase, which lasted 10–30 s, the male began rubbing his chin from side to side over the female's snout. The second phase occurred when the male

arched forward, released his grasp, and moved ahead of the female. He then turned and moved directly back over the female until his body was even with the female's tail. At this point, phase 3, the male turned once again and resumed his clasp of the female and resumed rubbing his chin against the female's snout. The male became very excited during the third phase, his rubbing became more intense, and he began to rub his cloaca against the female's back by undulating his tail from side to side.

The capture stage led to the spermatophore initiation and deposition stages. In these two stages, the male released the female and moved ahead of her, his body vibrating intensely. With the female behind him, the male held his hind legs straight out to either side, pressed his cloaca against the substrate, and released a spermatophore. Males were observed releasing 1–3 spermatophores per courtship and no females were observed picking up the spermatophores. Males would stop depositing spermatophores if the female stopped following the male or if the male got too far out in front of the female.

Other characteristics arose in the courtship when two males or two females were placed in the breeding tank with one member of the opposite sex. When two males were placed with one female the non-courtship male was observed to interrupt the courtship at all stages by amplexing with the pair or dislodging the courting male. When two females were placed with a single male, the non-courtship female would align herself parallel to the courted female. As the male proceeded with the capture of the female he became disoriented and switched partners, amplexing with the non-courtship female.

One female deposited eggs two days after courtship was observed. Egg laying began at 2230 h and continued until 0317 h. The female was observed climbing up onto twigs and other vegetation in the tank. Once finding a suitable location the female pressed her cloaca against the vegetation and deposited clumps of 1–13 eggs. A total of 212 eggs were laid in 4.75 h, most of them being deposited singly. None of the eggs was fertile.

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Submitted by **MATTHEW G. BOLEK**, Department of Biology, Carroll College, Waukesha, Wisconsin 53816, USA. Present Address: Department of Biological Sciences, University of Wisconsin–Milwaukee, Milwaukee, Wisconsin, 53201, USA; e-mail: bolekm@csd.uwm.edu.