

A SPRING RESEARCH PROJECT  
-- The Mole Salamanders

During late winter and early spring, when many cold-blooded animals are hibernating, the mole salamanders reach a peak of activity. They emerge, migrate to ponds, and lay their eggs. Although the warm rains of late winter are the stimulus, thermometers may dip toward the freezing range without harming the salamanders, eggs, or larvae. They are hardier than most biologists. Virginian naturalists, enterprising enough to brave the cold, may join in an interesting investigation and, if successful, gather useful new scientific data.

The spring opportunities for studying most mole salamanders quickly pass.

After migrating to a pond the adults prepare for breeding activities. The males attach gelatinous receptacles of semen (the spermatophores) to leaves and debris on the bottom of the pond. The females find the spermatophores and draw them into their cloacas. After these rather remote, impersonal romances, the females lay the fertilized eggs. Each fertilized egg is a dark sphere, somewhat smaller than a BB, in a pea-sized envelope of transparent jelly. Dozens of these are joined to form large

egg masses. Eggs hatch into gilled larvae which live in the ponds for several months. After metamorphosis (development of legs and loss of gills), the young adults disappear into underground burrows -- hence the name of this group.

There is a lack of precise information on the mole salamanders in Virginia. Five species of *Ambystoma* probably occur in the State, but only three kinds are on record; i.e., found in Va. The Marbled Salamander and the Spotted Salamander have been observed often. Distribution of the Jefferson Salamander is limited and only poorly known. There is an excellent chance that the Tiger Salamander will be found on the Va. Coastal Plain to the east, and that the Small-mouthed Salamander will turn up in the extreme western part of the State. Local naturalists, alert to the spring opportunity, have the most likelihood of finding and studying them.

Where to look: Temporary ponds are the preferred breeding places of the mole salamanders. These are shallow ponds that fill with water in the fall or winter and dry up

later in spring or early summer. They may be near or actually in woods. The low parts of cultivated fields and roadside ditches may be used as often as natural woodland ponds. Permanent ponds and lakes, and flowing water, are used less often. Where fish or other predators are present the eggs or larvae stand little chance of survival. Choruses of spring peepers will often lead the way to suitable salamander breeding sites.

PROCEDURE: Likely situations should be sampled methodically as occasion permits. Even if you get a late start begin this spring. Use a map and record the location of temporary ponds where you have observed egg masses or have seen salamanders.

The first non-freezing rains bring out the first of the mole salamanders. This may mean starting in February this year, or in January next year. Trying conditions (rain and cold) must be braved to see the actual breeding activity and to collect adults of the Tiger, Small-mouthed, and Jefferson Salamanders. However, eggs and some spermatophores may be found during succeeding days. Although eggs may be identified, larvae

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collected on a return trip are preferable for identification. Repeated surveys through March to June are often productive for, although the eggs may be missed in the early spring, the larvae become more conspicuous as they develop.

FIELD NOTES: The place, date, time, air and water temperatures should be recorded on the spot. If rain is wetting your note book, observations may be recorded immediately upon reaching your car or home. Impressions recorded the following day, week, or month are increasingly inaccurate. A mellowed memory distorts accuracy.

Field observations and notes may be augmented by sketches or photography. Also, a small number of specimens may be collected for indoor observation and later release in the same spot as captured. It would be necessary to support a State or County record with a live specimen, a color photograph, or a preserved<sup>+</sup> specimen.

(Editor's note: Ardent conservationists, and the real connoisseurs of the living creature, will often not wish to sacrifice a sample of the population. Their ideals, while laudable, in this extreme can impede the advance of knowledge. In

his original article (VHS B #23, on which this item is, in part, based) then VHS President W. Leslie Burger, urged that the first adult and first larval or newly transformed specimens be collected and preserved in weak formalin solution.<sup>+</sup> FJT

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The following summaries of the Virginian ambystomids (mole salamanders) will show where (and how) scientific contributions can be made by readers.

(family) AMBYSTOMATIDAE  
(genus) Ambystoma  
-- The mole salamanders:  
Characterized by:  
Costal grooves (on sides) are conspicuous; no nasolabial groove; eye small, lungs present and well developed; 14 species in the U.S.; 26 living species in the genus.

Small-mouthed Salamander  
(Ambystoma texanum)

A species of moderate size characterized by a slender head and a small mouth. Ground color is a dark brown or black, not flecked in the northeastern part of its range (Ky. -Va.?) but elsewhere, it is overlain with a gray lichen-like pattern. The limits of its distribution in the east are unknown. If it is to be found in Virginia, it may

be expected to occur in BUCHANAN, SCOTT, or LEE counties and perhaps, in WISE, DICKENSON, TAZEWELL, SMYTH, RUSSELL, and WASHINGTON counties in SW Va.

It inhabits hilly country and may be found in a variety of situations: in moist pine or hardwood forests, or in farmed areas, river bottoms and flats, uplands or low. They may be buried in the damp turf, beneath logs, or in old crayfish holes.

Breeding is believed to occur in late February or in March. Eggs are laid singly or in small clusters. Incubation, within 25 to 40 days, means larvae will be present late March or early April. The breeding ground may be a temporary pool, or pond.

Jefferson Salamander  
(A. jeffersonianum)

A rather slender species, head moderately broad, digits are long. Brownish gray on back, darker than belly. Some individuals have small bluish dots or flecks scattered on limbs or sides. The range, in Va., is the Ridge and Valley province to the New River. It frequents both mixed and deciduous woods with swamps, pools, and slow streams, or on river

SPRING RESEARCH (cont'd)

flats. By day it will be found beneath logs, bark, or other surface cover.

Breeding occurs in March, or early April. Adults move to ponds; lay eggs along slender twigs, they do not attach them to the bottom of the pond. Blue Ridge and Allegheny Mountains, north of the New River. This species has been collected at scattered localities in the mountains: GILES, MONTGOMERY, ROCKINGHAM, AUGUSTA, and PAGE counties and at Dead Run Swamp in FAIRFAX County, on the lower Piedmont Plateau. Information on Virginia populations is scant.

Marbled Salamander (Ambystoma opacum)

A short, stocky species; the ground color is lustrous black, almost deep purple in some specimens. White, grayish, or bluish white cross-bands which are sometimes incomplete, or absent; belly uniform black. It is found in drier situations than any other ambystomid -- sandy and gravelly areas, or in low ground bordering a pond or stream.

Breeding occurs in Fall. Adult Marbled Salamanders are fully terrestrial. A female will deposit her eggs in September or October in a place where the

fall or winter rains will cause flooding. Eggs are single - not aggregated by a common gelatinous covering. Eggs may hatch in the fall or carry over until the spring rains provide a pool for larvae. Adequate habitat for the Marbled Salamander may be absent in some parts of the Piedmont Plateau.

County records for opacum are as follows: FAIRFAX, SHENANDOAH, ROCKINGHAM, AUGUSTA, PRINCE WILLIAM, LANCASTER, KING & QUEEN, HANOVER, HENRICO, AMELIA, NOTTOWAY, PRINCE EDWARD, POWHATAN, ALLEGHANY, MONTGOMERY, CHARLES CITY, JAMES CITY, NEW KENT, SURRY, SUSSEX, BRUNSWICK, SOUTHAMPTON, CHESAPEAKE, NANSEMOND, and VIRGINIA BEACH (formerly PRINCESS ANNE County). Scarcity of records in the Appalachians may mean that the species is rare or absent in the mountains.

Spotted Salamander (Ambystoma maculatum)

A stout-bodied ambystomid with two irregular rows of round spots on either side of the dark back. The spots begin on the head near the eyes and extend to the tip of the tail. Spots are yellow, cream, or orange on background of black, slate or more rarely dark brown. It occurs in mixed or deciduous woodlands; near

ly statewide except for extreme SW Va. near Kentucky line. Breeding occurs in ponds and temporary pools or slow streams in late March or early April; eggs are in large compact masses attached to submerged objects

County records for the Spotted Salamander are as follows: WYTHE, MONTGOMERY, ALLEGHANY, ALBEMARLE, NELSON, PAGE, RAPPAHANNOCK, CULPEPER, FAUQUIER, PRINCE WILLIAM, FAIRFAX, CAROLINE, LANCASTER, JAMES CITY, CHARLES CITY, and CHESTERFIELD. Local distribution studies from any part of the range are sought. Least known are the southern and southeastern parts of the range, especially on the Coastal Plain. It hasn't been taken in the Great Dismal Swamp. CHESTERFIELD is the only county south of the James River for which there is a good record (in the U. S. National Museum, Washington, D.C.)

The Spotted Salamander, although moderately common in many areas (nearly statewide) may not occur in the Great Dismal Swamp in southeastern Virginia.

(Continued on next page)

SPRING RESEARCH (Cont'd)Eastern Tiger Salamander  
(Ambystoma t. tigrinum)

The largest of the mole or ambystomid salamanders to be found in Virginia. Ground color is brown to black, with yellow to olive spots or small blotches over the back and sides in transformed adults.

Breeding: On a dark and probably rainy night in mid-January or early February, sometimes as late as March, Tiger Salamanders migrate to temporary ponds in cornfields near woodlands. Mating activities reach their zenith during a warm rain (air temperature 49°F., water temp. 46°F., relative humidity 89% typically). The adults remain in the pond 3 weeks. Eggs hatch in 30 days (20 to 35 depending on temperature range). Larvae have a light side, or lateral, stripe. The larvae of A. maculatum do not have the light stripe and thus, may be identified easily when both are found in same pool (rare). Tiger Salamanders are essentially a burrowing species which accounts for its rarity. Adults spend most of their lives below surface in pine or deciduous woods of the Coastal Plain in Virginia. Only one specimen (USNM# 9,273) has been collected (September 1874), nearly 100 years ago! There is

urgent need for information on the occurrence of this species in Virginia.

It is expected to occur in NORTHUMBERLAND, WEST-MORELAND, KING GEORGE, STAFFORD, or PRINCE WILLIAM counties on the Coastal Plain. It has not been recorded from Great Dismal Swamp but may be sought in the Coastal Plain counties of the SE. The species occurs just 4 miles south of the North Carolina line, and less than 10 mi. north of the Potomac, near LaPlata, Md. An incubation period of about 36 days is indicated in the field when the weather is mild. On the other hand, eggs kept in an aquarium at 65-70°F. hatched in 17 days. (CJS)

The tigrinum larvae reach maturity (Maryland) in the last week of May, and transform during the last half of June, depending upon the food supply that is available.

Stine, Fowler and Simmons also note that the Tiger shares its breeding area with the Marbled Salamander (A. opacum): "Since the latter species breeds in the fall, its larvae are about half grown when the tigrinum eggs hatch. As a consequence, the opacum larvae devour some of the tigrinum larvae." This situation is soon reversed, however, for within 90 days the sur-

living tigrinum larvae are larger than the opacum (Marbled) larvae.

VHS readers living on, or near the Coastal Plain in Virginia, who are interested in working on an investigation of the Tiger Salamander, should notify the Society. Let VHS know that you are willing to participate.

State and county records, obtained as a result of a VHS member's, or reader's efforts, will become part of the VIRGINIA HERPETOLOGICAL SURVEY report to be published in VHS-B/#87-88, "Salamanders of Virginia" (Part Two of "Amphibians of Virginia"), which we hope to issue in 1972 or early 1973. Your comments, corrections, updatings, and additions will, similarly, be welcomed. Information (Va.) on the ecology and life history of the Tiger Salamander (A. t. tigrinum), is part of this long-range objective. This program should be particularly interesting to college and high school biology instructors on the Coastal Plain of Va.

+ Dilute formalin made by adding 1 to 2 parts of commercial (40%) formaldehyde to 8 parts of tap-water. For the immature stages alcohol is not a satisfactory preservative.

Here is a letter to which readers in the S.E. Va. counties may respond:

"How common is the Hog-nosed Snake (black phase) in the Portsmouth and adjacent areas? A friend has caught one, apparently the same individual, off-and-on over the past 2 years. Are they unusual and how much data exists on this?"

(Mr.) Dennie Hollowell\*  
2804 Sterling Pt. Dr.  
Portsmouth, Va. 23703

Two long-time VHS members have married in late 1970 and settled with their respective brides in Va.:

"... I work for Virginia National Bank and travel all over the State. ... I only wish I had the time to do some collecting! This past June, I caught a milk snake, copperhead, a few black rat snakes and timber rattlers while in the Blue Ridge mountains. If I do get a chance, I'd like to fill some of the gaps in Va.'s herpetology -- let me know where collecting is needed. ..."

(Mr.) Gary M. Williamson\*  
525 25th Street  
Virginia Beach, Va.  
23451

(Nov. 28, '70)

"... I have taken a job with the Agriculture Extension Service. I hope to send some items for use in the VHS-B soon .."

(Mr.) Mike Clifford\*

RFD 139A, Rt. #1,  
Bucksville, Va. 22022

LETTERS, COMMENTS, IDEAS:

Both men have collected in the Chesapeake--Portsmouth area and may have a thought or two for Dennie Hollowell. \* \* Letters to VHS BULLETIN will appear in this column unless the writer indicates otherwise. Secretary cannot maintain correspondence except through VHS-B. FJT

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"I just got back from a week in Seoul, Korea. Had a real fine time -- Seoul is much better than Saigon. However, I am having a good time here. The other day, on the street near the USO, I saw a couple of Vietnamese with small pythons for sale. One was real nice; the other looked sick. It is 85°F., -- it doesn't seem much like X-mas! In my spare time, I am recording Christmas carols being sung in the Vietnamese language! ..."

(Dec. 25, 1970)

(Mr.) Robert J. Gagnon\*  
008-01-0299  
Box #23, Post  
Engineers, Saigon,  
APO SF 96243

Mr. Gagnon's son, Bill, is also overseas; --- not in the same area as his father. Both joined VHS in 1958 and are getting the VHS-B, (as do other Va. servicemen whose addresses are known to VHS.) Bill's address is:

Sp/4 Gagnon, Bill 227646320  
83d RRSON, APO SF 96346

NORFOLK MUSEUM PROJECT

"The Natural History Division of the Norfolk Museum of Arts & Sciences conducts field classes throughout the year in various scientific disciplines. In the course of this field work, we observe and collect many species of reptiles and amphibians but we maintain the conservation principles with our students -- capture, examine, and release while in the field. . . ."

"Several students have exhibited a desire and aptitude to go further in their studies and hopefully make a contribution to the body of knowledge and understanding of these organisms. A program is now in planning to mark, release, and recapture specimens for data pertaining to population densities and ranges of individual specimens. ..."

"I regret to say that our files of the VHS BULLETIN are extremely spotty. To aid these students and the program please quote prices ... (of back issues) checklists of reptiles and amphibians with current additions; your recommended methods of collection, preservation, recording and reporting, ... for addition to our reference library. ..."

Sincerely,  
/s/ Mary Keith Garrett  
Curator, Natural  
History, Norfolk  
Museum, Norfolk, Va.  
23510

(VHS editor has responded.)