The Spotted Salamander

"A year in my life."

by Vern L. Poole

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VERNAL POOL ASSOCIATION

SPOTTED SALAMANDERS ARE A TYPE OF MOLE SALAMANDER FOUND IN FORESTED AREAS NEAR A VERNAL POOL. THE ADULTS ARE ABOUT SIX INCHES LONG AND COLORED BLACK WITH BRIGHT YELLOW SPOTS. THEY ARE VERY COMMON IN MANY AREAS, YET ARE VERY SECRETIVE AND SELDOM FOUND OUT IN THE OPEN. YOU COULD SPEND CONSIDERABLE TIME LOOKING AND NEVER FIND ONE.

SPOTTED SALAMANDERS ARE FOSSORIAL, SPENDING MOST OF THEIR LIFE UNDERGROUND IN ANIMAL BURROWS AND UNDER LOGS OR OTHER COVER. ON MOIST NIGHTS, THEY VENTURE A SHORT DISTANCE FROM THEIR HOMES TO SEARCH FOR FOOD. THEY USUALLY FEED UPON EARTHWORMS, SNAILS, SLUGS, SPIDERS, MILLIPEDES, CENTIPEDES, AND INSECTS.

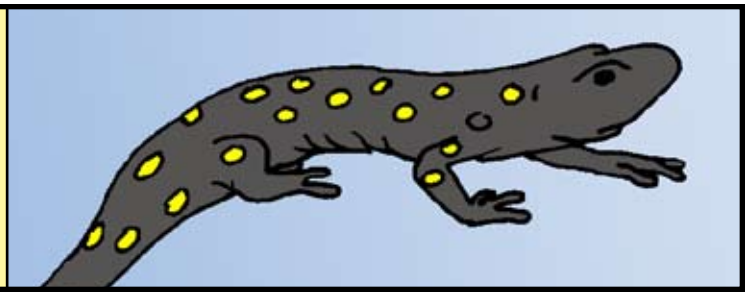
WHEN WINTER COMES, THEY GO DEEPER INTO THE BURROWS AND HIBERNATE UNTIL SPRING.

SPOTTED SALAMANDERS "AWAKEN" IN THE SPRING WHEN THE TEMPERATURE RISES, THE GROUND THAWS, AND THE RAINS BEGIN.

THE FIRST HEAVY NIGHT-TIME RAINS OF SPRING ARE WHEN THE SPOTTED SALAMANDERS IN AN AREA BEGIN THEIR MIGRATION TO THEIR VERNAL POOL. THEY TRAVEL AT NIGHT IN THE RAIN.

SOME SALAMANDERS TRAVEL AS MUCH AS *1/10* OF A MILE ON THESE WET NIGHTS TO REACH THEIR POOL. THEY ONLY TRAVEL WHEN IT IS DARK AND MOIST. IF THERE IS A LACK OF RAIN OR A DROP IN TEMPERATURE, THEY WILL BURROW UNDER LEAF LITTER UNTIL CONDITIONS IMPROVE. THE JOURNEY TO THE POOL MIGHT TAKE SPOTTED SALAMANDERS SEVERAL NIGHTS IF THE WEATHER CONDITIONS ARE NOT RIGHT.

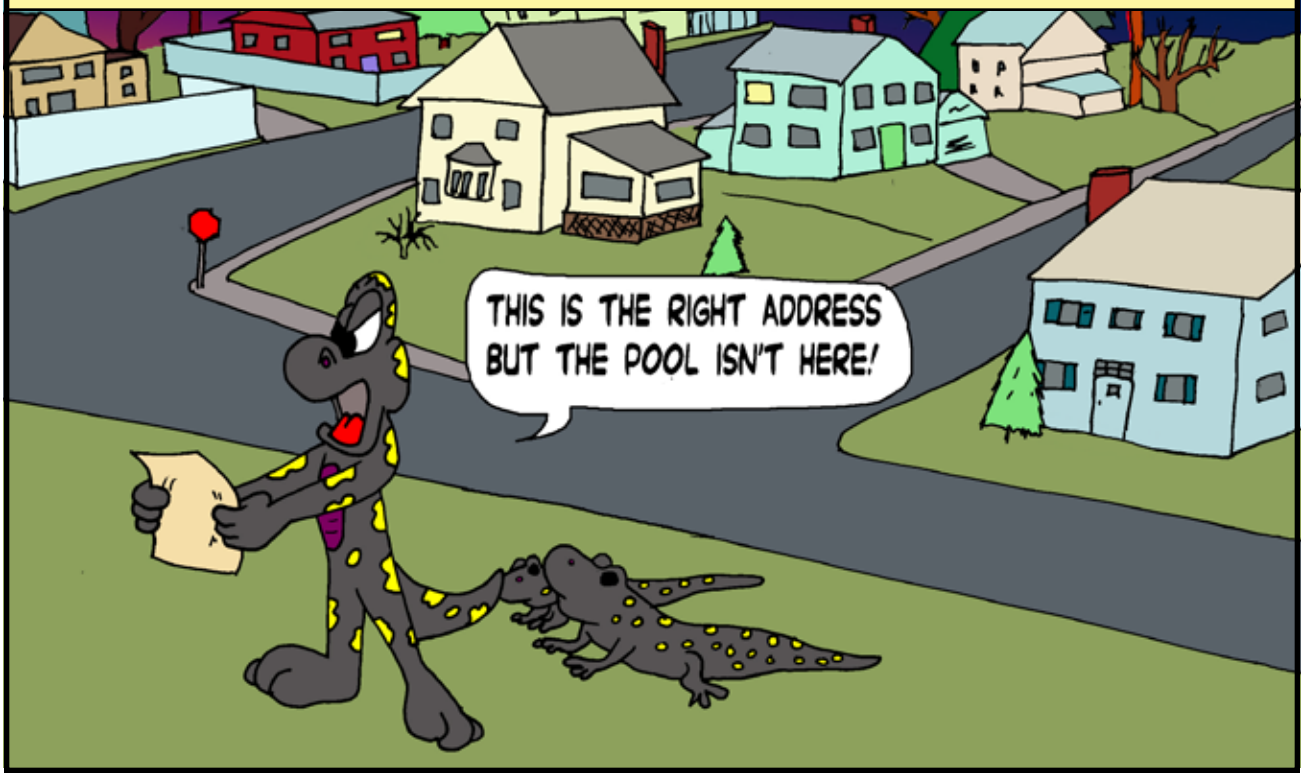
INDIVIDUALS SEEM TO TRAVEL THE SAME ROUTE TO AND FROM THEIR POOL, YEAR AFTER YEAR. THEY MIGRATE AS DIRECTLY AS POSSIBLE WITHOUT REGARD FOR TERRAIN. YOU MIGHT EVEN SEE THEM CLIMBING OVER SNOW PATCHES IF IT IS A COLD SPRING.



SCIENTISTS DO NOT REALLY UNDERSTAND HOW THE SPOTTED SALAMANDERS FIND THEIR WAY BACK EVERY YEAR TO THE SAME VERNAL POOL FROM WHICH THEY WERE HATCHED. SOME STUDIES SUGGEST THEY FIND THEIR WAY BY THE ODOR OF THE POND OR BY USING THE EARTH'S MAGNETISM.

UNFORTUNATELY, SALAMANDERS AND OTHER AMPHIBIANS ENCOUNTER MANY MAN-MADE OBSTACLES ON THEIR VOYAGES. BUILDINGS, WALLS AND CURBS BLOCK THEIR PASSAGE. ROADS NEAR VERNAL POOLS ARE VERY DANGEROUS AND MANY ANIMALS ARE CRUSHED BY ROAD TRAFFIC.

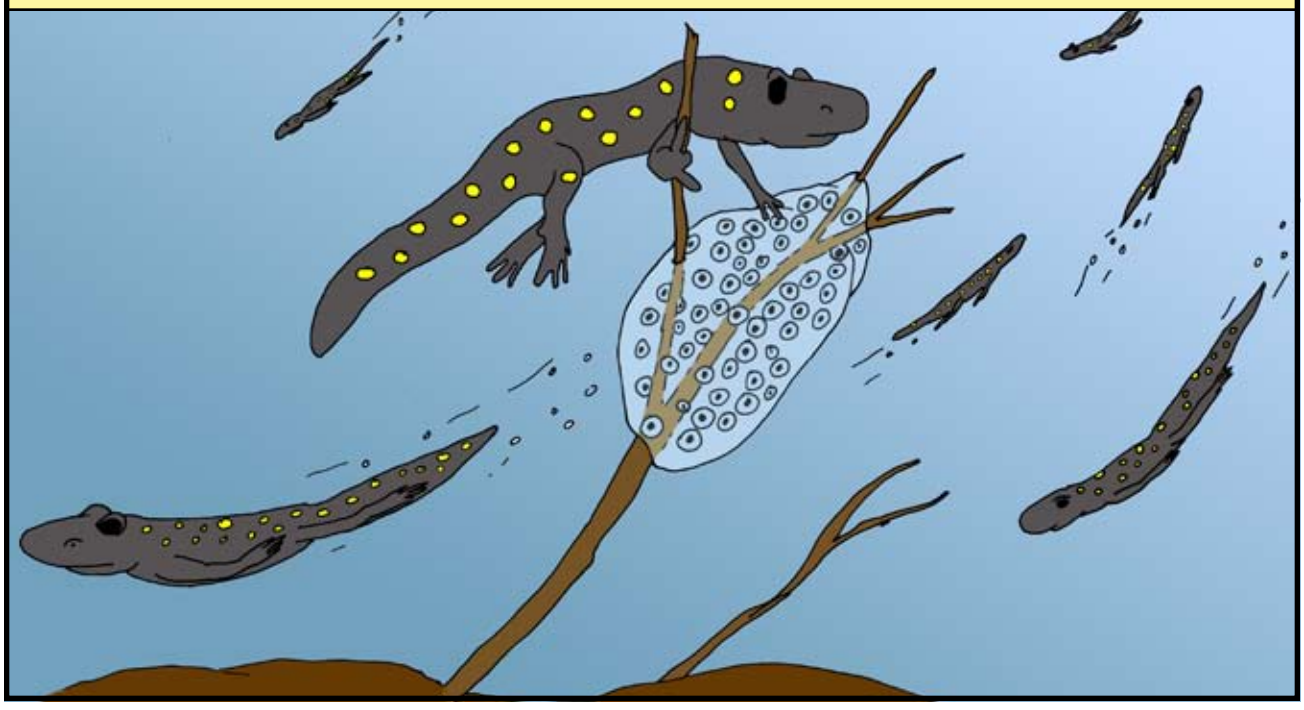
IF THEIR POOL IS DRY OR HAS BEEN DESTROYED BY CONSTRUCTION PROJECTS SUCH AS PARKING LOTS OR HOUSING DEVELOPMENTS, THE SALAMANDERS WILL NOT BE ABLE TO REPRODUCE. ADULT SPOTTED SALAMANDERS DO NOT SEARCH FOR A NEW POOL.



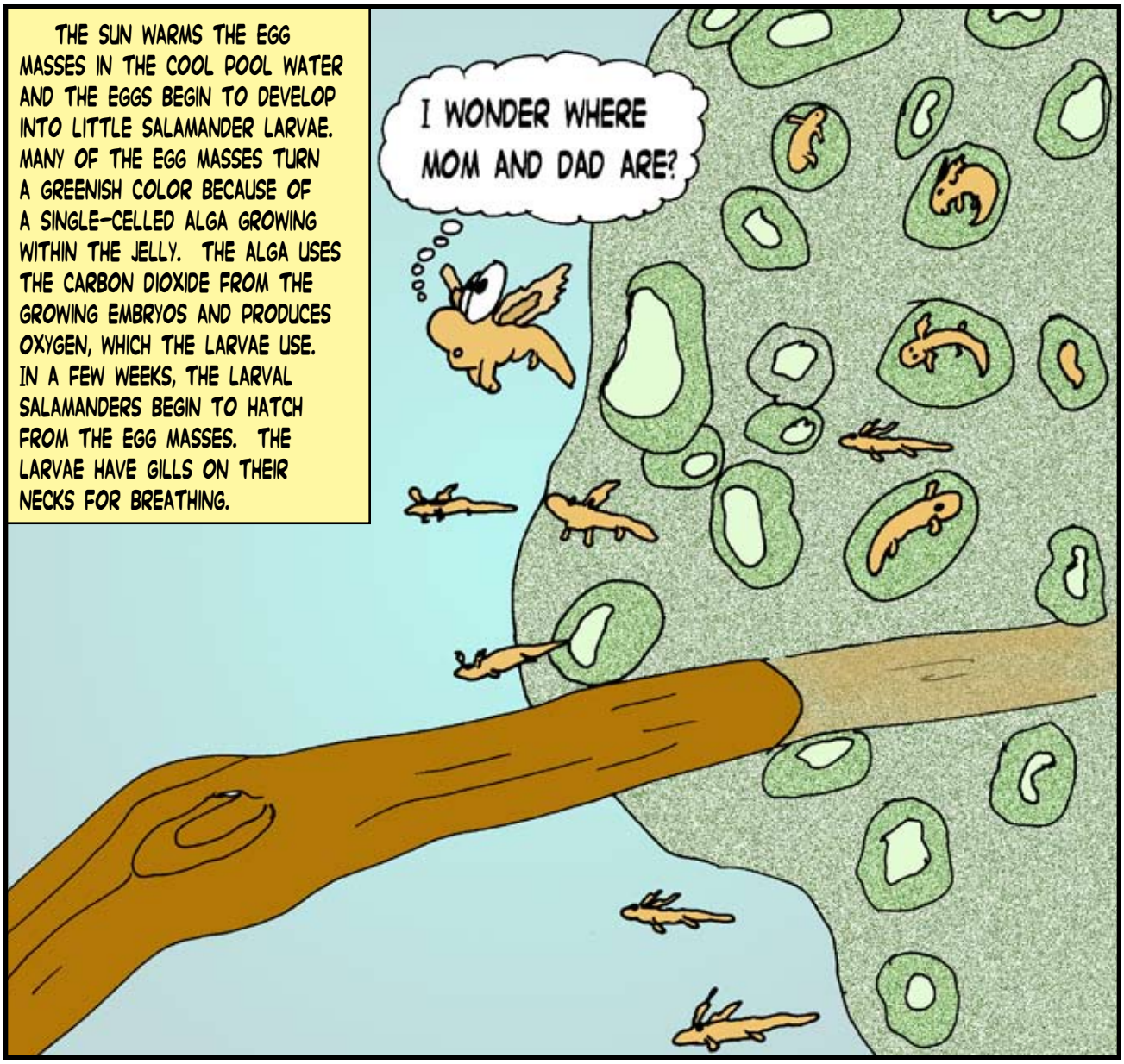
It might take several hours or a number of nights for all of the animals to arrive. As the salamanders reach the pool, they quickly enter the water.

Once in the water, a female is joined by several males and they form a breeding congress. The males produce many spermatophores which are deposited on the leaves on the pool bottom.

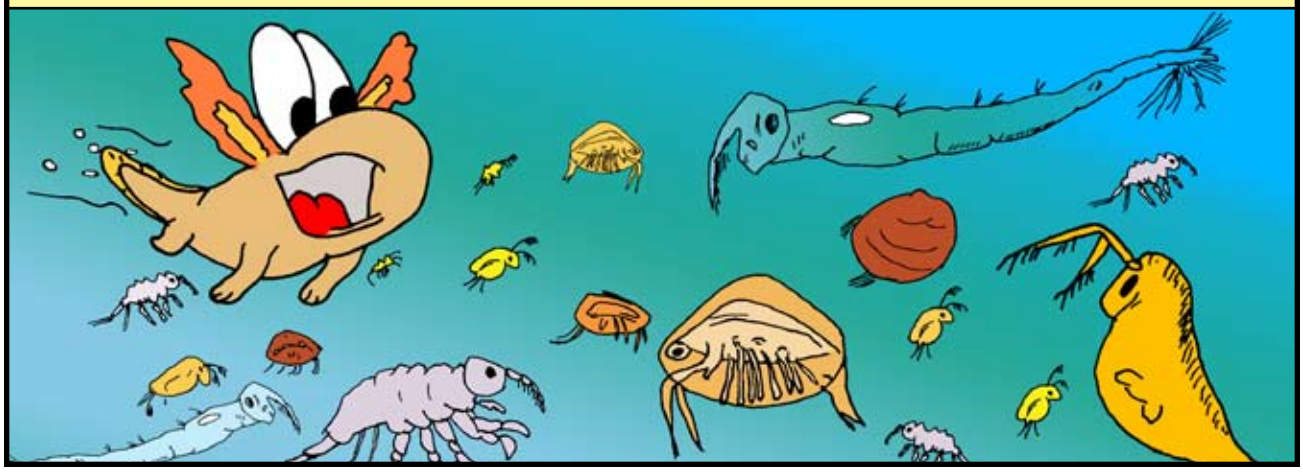
The female chooses one or more of the spermatophores and picks up sperm from them by dropping her cloaca onto the spermatophore. The sperm fertilize the eggs inside her body. In a day or so, she lays a cluster of eggs and attaches them to an underwater twig or plant stem. The egg mass is small when she releases it, but it soon swells with water to be a clear or white blob about two inches wide which is roundish or elongated. In a few days, the adults return to the forest.



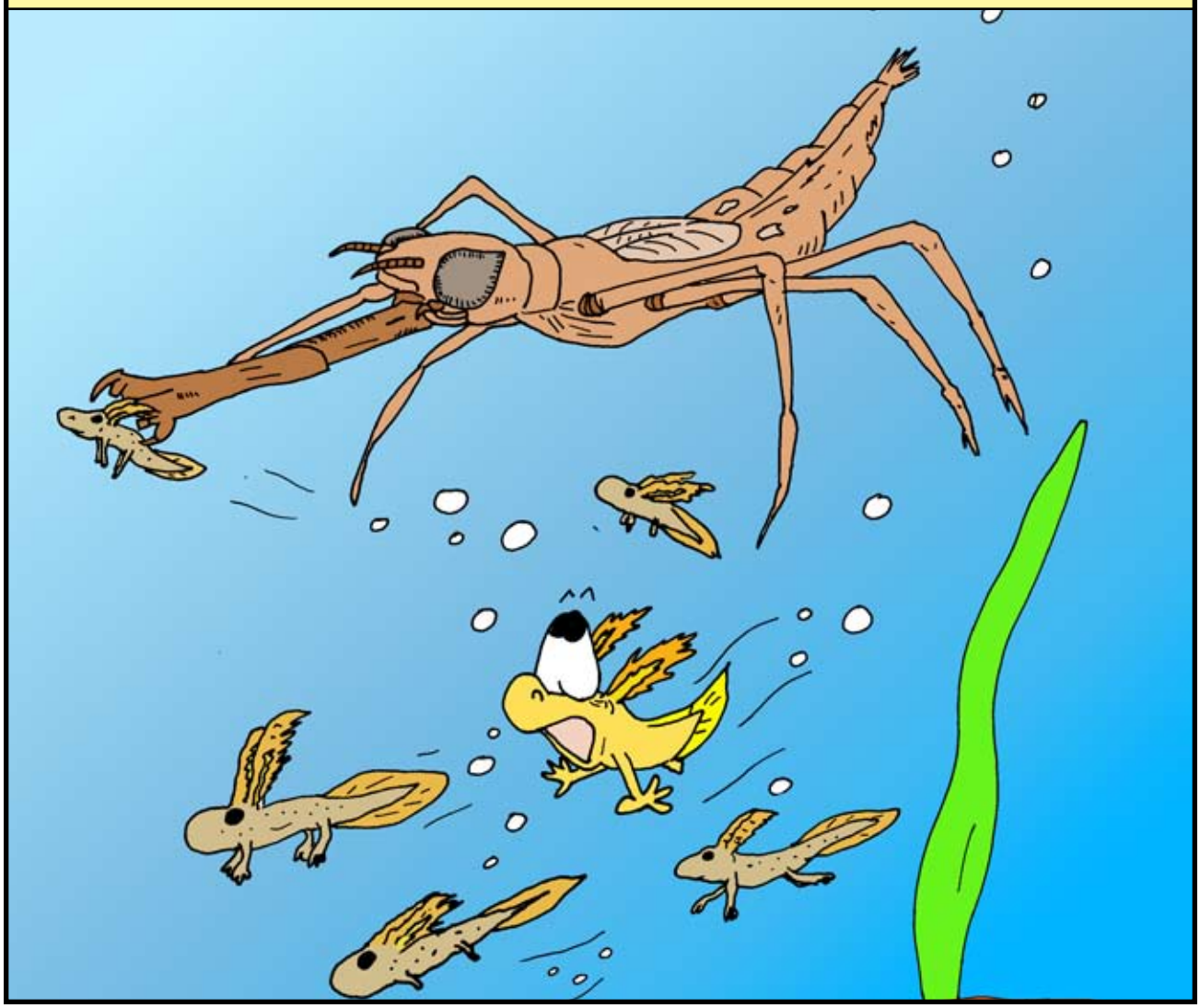
THE SUN WARMS THE EGG MASSES IN THE COOL POOL WATER AND THE EGGS BEGIN TO DEVELOP INTO LITTLE SALAMANDER LARVAE. MANY OF THE EGG MASSES TURN A GREENISH COLOR BECAUSE OF A SINGLE-CELLED ALGA GROWING WITHIN THE JELLY. THE ALGA USES THE CARBON DIOXIDE FROM THE GROWING EMBRYOS AND PRODUCES OXYGEN, WHICH THE LARVAE USE. IN A FEW WEEKS, THE LARVAL SALAMANDERS BEGIN TO HATCH FROM THE EGG MASSES. THE LARVAE HAVE GILLS ON THEIR NECKS FOR BREATHING.



THEY GROW QUICKLY FEEDING ON DAPHNIA, OSTRACODS AND COPEPODS. AS THE LARVAE GROW, THEY EAT LARGER PREY INCLUDING ADULT AND LARVAL INSECTS, SNAILS, CLAMS AND OTHER TYPES OF INVERTEBRATES.



OF COURSE, THERE ARE PREDATORS IN THE POOL THAT WILL TRY TO EAT THE SALAMANDER LARVAE. VERNAL POOLS OFTEN HAVE DRAGONFLY AND DAMSELFLY NYMPHS, WATERBUGS, DIVING BEETLE LARVAE AND ADULTS, AND OTHER PREDATORY INSECTS. LEECHES AND TURTLES, SUCH AS THE SPOTTED TURTLE AND BLANDING'S TURTLE, MIGHT ALSO PREY ON THE YOUNG SALAMANDERS. HOWEVER, BECAUSE VERNAL POOLS DRY YEARLY, THERE ARE NO FISH TO FEED ON THE LARVAE. SPOTTED SALAMANDERS CANNOT SURVIVE IN AREAS THAT HAVE FISH.



BY MID-SUMMER, THE LARVAE START TO LOSE THEIR EXTERNAL GILLS AND BEGIN TO DEVELOP THE DARK BODY COLOR OF THE ADULT. WHEN THIS HAPPENS, THEY ARE READY TO LIVE ON LAND. THEY USUALLY DO NOT DEVELOP THEIR DISTINCTIVE YELLOW SPOTS UNTIL A COUPLE OF WEEKS AFTER THE GILLS ARE GONE.

THROUGHOUT THEIR TIME IN THE POOL, THE SALAMANDER LARVAE MUST GROW RAPIDLY SO THAT THEY FINISH DEVELOPMENT AND LEAVE THE POOL BEFORE IT DRIES. IF THE POOL DRIES BEFORE THEY HAVE MATURED AND ARE READY TO LIVE ON LAND, THEY DIE.

OF ALL THE EGGS LAID IN THE SPRING, ONLY A FEW WILL DEVELOP INTO YOUNG SALAMANDERS. WHEN THEY LEAVE THE POOL, THEY BURROW UNDER THE DEBRIS NEAR THE EDGE TO AWAIT RAINY NIGHTS WHEN THEY CAN MOVE INTO THE FOREST. AFTER 2 TO 3 YEARS OF GROWTH, THEY WILL BE ADULTS AND MAKE THEIR OWN MIGRATION TO THE VERNAL POOL.

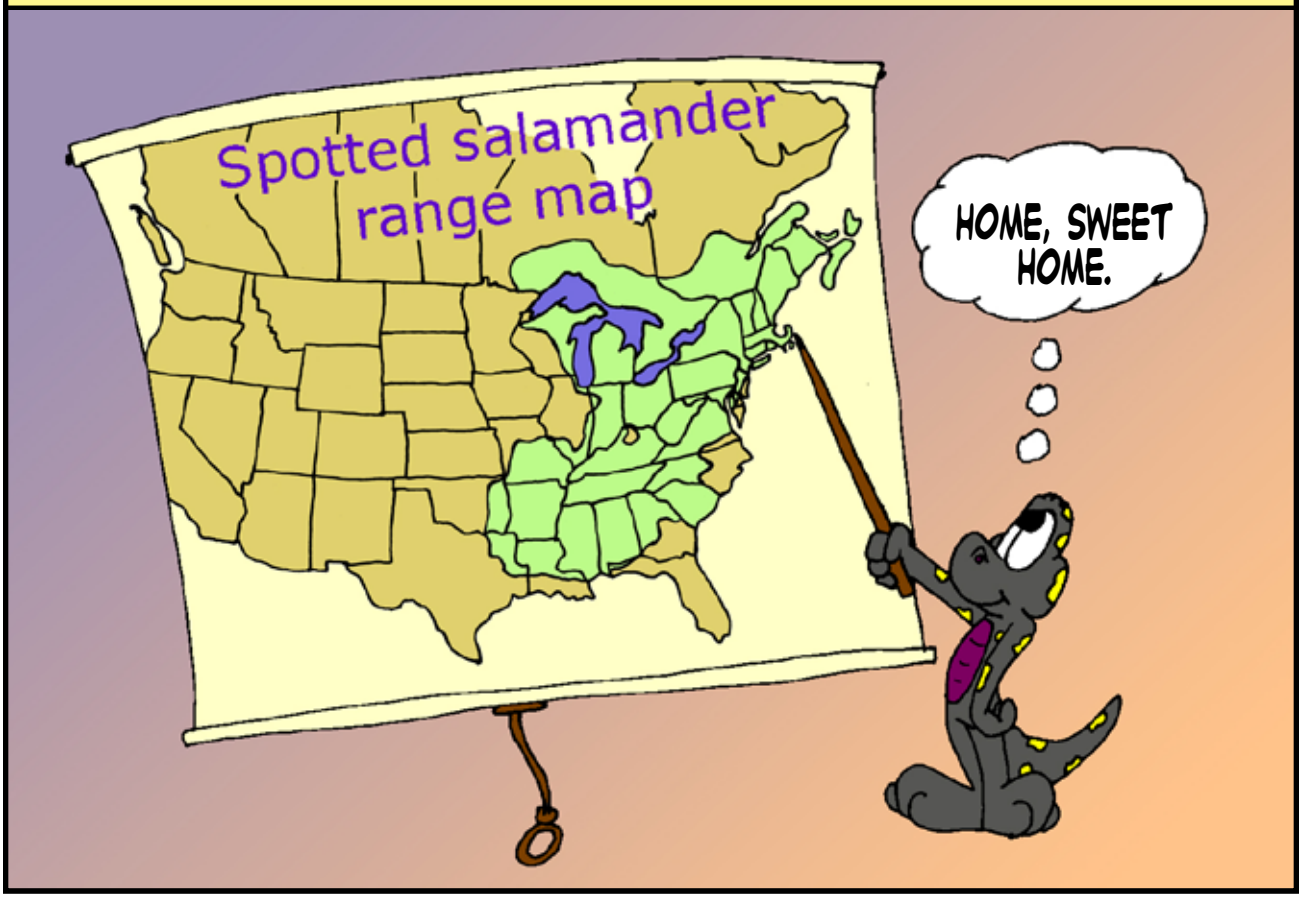
Spotted salamander
(*Ambystoma maculatum*)

Spotted salamanders grow to be up to eight or nine inches in length. They are found throughout most of eastern North America: living as far north as Quebec and Prince Edward Island, as far south as Georgia and Alabama, and as far west as Texas.

Even though spotted salamanders are found in some locations in all of these areas, they are not found everywhere. These salamanders need both hardwood forests and a nearby vernal pool. Without the appropriate habitat of both uplands and pools, a population of spotted salamanders cannot exist.

Spotted salamanders migrate to vernal pools each spring to mate and lay eggs. Since vernal pools do not have fish, there is less predation of the eggs and larvae in these wetlands than there would be in permanent wetlands. The big risk to the survival of the young is whether they can complete their development before the pool completely dries. However, since the adults live long lives, a few bad years in which the young do not develop should not greatly harm the population.

Probably the most severe threat to spotted salamanders, as well as other salamanders and frogs in North America, is the destruction or fragmentation of their habitat by human activities such home and road construction. These human actions destroy both the upland and vernal pool habitat as well as making the salamander's journeys dangerous or impossible.



Vern's terms

Alga, algae (pl.): Algae are single-celled or multi-cellular organisms that have chlorophyll. Most algae in vernal pools are green in color and microscopic in size.

Amphibians: Amphibians have an aquatic larval form (tadpole) and an air-breathing adult form. Since the larvae develop in water, amphibians such as the spotted salamander must go to a wetland to lay eggs even though they live their adult life on land.

Breeding congress: The first few nights spotted salamanders are in the vernal pool, they form breeding congresses of up to fifty or more males and females. As these animals swim in a tight group in the shallow water, they constantly bump into and rub against one another. Males produce spermatophores and attempt to court individual females.

Cold-blooded: Cold-blooded organisms cannot internally control their body temperature as humans do. These animals change their temperature by using environmental sources such as sun, rain, warm soil, cool mud, shady areas and burrows. They often feel cool to the touch because their body temperature is lower than ours.

Egg masses: Spotted salamanders lay their eggs in clumps which may contain up to 200 individual eggs. All of the eggs are surrounded by a jelly layer and the mass is attached to vegetation in the pool. The newly-laid egg mass swells with water to be about the size of a golf or tennis ball.

Fossorial: Fossorial animals are those which dig or burrow underground.

Hibernation: To prevent their bodies from freezing, spotted salamanders seek shelter under logs and in burrows before winter arrives. During the winter months, when the outside temperature drops, salamanders go into a dormant state which protects them from the effects of winter.

Larva, larvae (pl.): A spotted salamander larva is like a frog tadpole. It is the aquatic stage of life between the egg and the adult. Unlike the frog tadpole, salamander larvae have gills outside their body, just behind their head, to help them breathe. After a few weeks of development, the larvae absorb their gills, begin breathing air, and move onto land.

Mole Salamander: Mole salamanders, a type of salamander found throughout North America, spend most of their lives in forests under logs and in burrows. Most of these amphibians lay eggs in isolated wetlands, such as vernal pools. The mole salamanders include the spotted salamander, the blue-spotted salamander, the marbled salamander and the tiger salamander.

Salamander burrow: Spotted salamanders can dig a shelter in soft soil and leaf litter. They also inhabit deeper burrows dug by other animals, such as shrews.

Salamander habitat: A spotted salamander's life is spent largely in burrows in wooded upland areas away from the vernal pool. This upland area must provide suitable food, shelter, and moisture conditions. The vernal pool is used only for breeding and the development of the larvae.

Spermatophores: Spermatophores are small plugs of mucus with sperm cells at the top. These are produced by males during mating courtship.

Vernal pool: A vernal pool is a wetland which usually holds water for only a few months each year. It is isolated from streams and lakes. Its water comes from rain, melted snow and ground water. Because it dries regularly and is isolated, a vernal pool has no fish. The lack of fish makes a vernal pool a somewhat safe place for many types of amphibians to lay their eggs. The salamander larvae still fall prey to predatory insects and other animals, but these predators do not cause the amount of harm that would be done by fish.