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SALAMANDERS AND NEWTS

Spotted Salamander

Ambystoma maculatum

Ambystoma maculatum is a sturdy, 15-25 cm salamander from the deciduous forests of North America, black or dark grey with two rows of large yellow to orange spots along the back. Adults live hidden under leaves and wood and in burrows in the soil and come out at night, while eggs and larvae develop in the forest's fishless ponds. The species is placid and does best kept cool.

Family: Ambystomatidae

Mild skin toxins

KEY FACTS

THE ANIMAL

Adult size	**15-25 cm** total length incl. tail
Lifespan	**15-25 years**
Active	**At night**
Lifestyle	**Terrestrial and burrowing**
Habitat	**Temperate woodland and meadow**
Skin toxins	**Mild** Wash your hands after contact and keep your fingers away from your eyes and mouth
Difficulty	**Beginner**

CARE

Min. enclosure	**50 × 30 × 30 cm** L × W × H for 1 adult
Temperature, day	**14-20 °C**
Temperature, night	**10-16 °C**
Humidity	**80-95%**
Water	**Water dish**
UVB	**Not required**
Diet	**Insects and worms/snails**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Development	**Larvae in water**
Egg-laying site	**In water**
Sexually mature	**24-84 months**
Eggs per season	**100-370**
Hatching	**28-49 days**
Larval period	**60-120 days** from hatching to metamorphosis
Larval diet	**Other larvae and small aquatic invertebrates (daphnia, mosquito larvae)**
Parental care	**None**

PROTECTION AND PAPERWORK

CITES	**Not listed**
EU annex	**Not listed**
IUCN	**Least Concern (LC)**

About the species

Ambystoma maculatum is a stout-bodied salamander with a broad, rounded snout, strong legs and a thick tail. Adults are 15-25 cm long, tail included, and females usually grow larger than males.

The base colour is black, dark brown or dark grey, and the underside is slate grey. Along the back sit two irregular rows of round, yellow to orange spots from the head out onto the tail, 24-45 in all. The spots nearest the head are the most orange. Animals without spots exist, but are rare. The larvae are matt green to light brown with small dark spots and external gills.

The male is recognised in the breeding season by a larger cloaca than the female's. In the wild the species typically lives about 20 years, and a few animals reach over 30 years.

When threatened, the animal arches its back, butts with its head and lashes its tail, while skin glands on the back and tail release a sticky, white and poisonous secretion. It can irritate mucous membranes, so wash your hands before and after handling. The tail can be shed and grows back.

The eggs have an unusual trick: a single-celled green alga grows in and around the jelly mass and gives the developing embryos extra oxygen. The advice on substrate, water and food is partly based on experience with the closely related *Ambystoma mavortium* and *A. tigrinum*, which are kept far more often.

Distribution and habitat

Ambystoma maculatum lives in eastern North America, from Nova Scotia and the Gaspé Peninsula in Quebec west to the north shore of Lake Superior and south to southern Georgia, Alabama and eastern Texas.

> **Native range:** Canada and United States.

HABITAT

A. maculatum lives in mature deciduous and mixed forests with moist soil and a dense layer of leaves, often along floodplains. Adults are seldom seen: they lie hidden under leaves and fallen wood and in burrows dug by other animals. The species is not a strong digger and mostly uses existing burrows and crevices, most of them a few centimetres below the surface. Most animals live within 100 metres of the breeding pond.

Eggs and larvae develop in forest ponds and temporary pools without fish, which dry out often enough to keep the fish out. In the winter half of the year the animals lie underground. In spring, on the first rainy nights after the thaw, hundreds or thousands of animals migrate to the breeding ponds in a single night. The males arrive first.

Care

THE ENCLOSURE

One adult can manage with a floor area of 50 × 30 cm, two adults at least 75 × 30 cm. Floor area is more important than height, and 30 cm in height is enough. Use a plastic container with a tight-fitting lid and small ventilation holes or a glass terrarium with a wire-mesh lid; the lid must be fixed. The substrate should be at least 10 cm deep, so the animal can burrow.

Use moist topsoil without fertiliser, perlite or additives, coconut fibre, or a mixture of the two. Leave one end a little drier than the other, so the animal can choose. Avoid peat and other acidic substrates, which can cause loss of salts from the body, and never use bark or chips of cedar and pine, because the oils are toxic to amphibians. Remove faeces and food remains several times a week, and replace the substrate every month.

Provide at least one hide per animal, e.g. a half pipe, a piece of bark without sharp edges or a flat stone. Do not use gravel; decorative stones must be larger than the animal's head. Damp, unbleached kitchen paper with crumpled pieces as hides is suitable for quarantine. New animals are quarantined separately.

Read more: Quarantine and hygiene

TEMPERATURE

During the day the temperature should be 14-20 °C and at night 10-16 °C. The species is cool-loving and most active at 10-21 °C. Keep the temperature below 24 °C: heat is far more dangerous than cold, and several days above 25 °C can kill the animal. Use no heat lamp or heat mat. Place the container in a cool spot, out of direct sun, e.g. in a cellar or in a cool north-facing room.

When kept cool, the animals eat less. In winter the appetite often falls, even at room temperature. A formal brumation period is not necessary.

Read more: Heat and temperature Read more: Brumation and the seasons

HUMIDITY AND MISTING

The substrate should be moist, but never wet or muddy, because the animal absorbs water through its skin and does not drink with its mouth. A moist substrate gives 80-95 % humidity. Mist the substrate with dechlorinated or spring water when the surface looks dry, so that small puddles briefly form. In dry rooms this may be necessary every day, in humid rooms once a week. Good ventilation prevents skin infections.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

A shallow, heavy water bowl is a good safeguard: if the substrate becomes too dry, the animal can lie in the bowl. The water should be shallow enough that the animal can easily climb out, and must not be deep, because adults are poor swimmers. Change the water every 3-4 days.

Use tap water treated against chlorine and chloramine, or spring water, with a pH between 6 and 8. Distilled, demineralised and sterile water must not be used, because it is too pure and disturbs the body's salt balance. The same water is used for misting and for wetting your hands before the animal is handled.

LIGHTING AND UVB

The species is nocturnal and lives hidden underground, so it needs no special lighting and no UVB either. Strong UV light can damage the eyes and skin of amphibians. Daylight in the room or a fluorescent tube that gives no heat by day, with darkness at night, provides a good daily rhythm. The container must not stand in direct sun.

Read more: Lighting and UVB

FEEDING

Adults eat earthworms, compost worms, crickets, cockroaches and small snails. Earthworms are the best staple, because they have a good calcium-to-phosphorus ratio; cut them into pieces for small animals. Crickets are low in calcium and must be gut-loaded or dusted with calcium and vitamins once or twice a week. Waxworms and pinkies are fatty and are given only rarely, because the animal easily becomes too fat. Food items must be smaller than the animal's head.

The animal hunts by movement and usually ignores dead food and pellets; worms and insects are held in front of the snout with tweezers. At 15-20 °C adults are fed two to three times a week, at temperatures below 16 °C once a week. Give what the animal eats in ten minutes to a few hours, and remove uneaten crickets after a few hours, because they can bite the animal.

Read more: Feeder animals: keeping and breeding Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

Adults lie hidden most of the time and come out at night to hunt. The species is placid and rarely bites. Outside the breeding season they live alone, and the animals can be aggressive towards conspecifics in hides and at feeding. Two animals of the same size can share a container of at least 75 × 30 cm if each has its own hide and is fed separately; eager animals can nip each other's tails and toes during feeding.

The skin is thin and permeable, and salts and oils from the hands can damage it. Handle the animal as little as possible, with clean, wet hands, and wash your hands afterwards. Animals should not be moved to another container to eat.

Breeding

SEXUAL MATURITY AND SEXING

The animals become sexually mature after 2-7 years, fastest in the warmest parts of the range and slowest in the north. The male is recognised by a larger cloaca than the female's, most clearly in the breeding season. Females usually grow larger.

MATING

Mating and egg laying take place in spring, from late December in the south to May in the north, after rain and rising temperature. The males arrive at the water first and stay longer than the females. The male dances around the female, deposits up to 80 spermatophores, and the female takes them up into her body. Indoor breeding is very difficult, because the animals need the change of seasons with brumation, rain and rising temperature. What triggers mating in captivity is not documented.

EGGS AND LARVAE

The eggs are laid in firm, round jelly masses of 6-10 cm on water plants and submerged twigs. The jelly is clear or milky white. The female lays 100-370 eggs per season, often about 200, spread over several masses. The eggs hatch after 4-7 weeks, depending on the water temperature. There is no parental care.

Newly hatched larvae are 12-17 mm and need live, small aquatic animals such as daphnia, mosquito larvae and small crustaceans. As they grow, they take larger prey such as amphipods, water lice and insect larvae. Keep larvae of uniform size together, and sort them often, because they become cannibals when crowded or hungry. The water must be cool, clean and filtered; protozoan infections are frequent in hatched larvae in captivity.

METAMORPHOSIS

The larvae stay in the water for 2-4 months before they metamorphose. The gills shrink, the fin on the tail disappears, and the animal goes onto land. Lower the water level, and provide easy access to land when the signs appear.

Newly metamorphosed juveniles are 3-6 cm long and get their yellow spots within a week. When metamorphosis is complete, they are moved to an adult setup.

Read more: Rearing tadpoles

REARING THE YOUNG

Newly metamorphosed juveniles are placed on damp kitchen paper or moist topsoil without peat, with hides, and fed small earthworms, small crickets and pieces of worms. Feed them more often than adults. Amounts and intervals for juveniles are not documented. Keep the substrate moist and cool, below 24 °C, and sort the juveniles by size.

Health and common mistakes

The species is hardy, but these problems are frequent:

- Too warm: above 24 °C stresses the animal, and several days above 25 °C can be fatal.
- Obesity in adults: feed moderately, and use pinkies and waxworms rarely.
- Acidic substrate, e.g. peat: causes loss of salts. Avoid peat and bark of cedar and pine.
- Crickets without calcium supplement: can cause bone disease.
- Swallowed gravel or stones: can be fatal.
- Desiccation: keep the substrate moist, and provide a water bowl.
- Biting between larvae: damage to gills and legs. Sort by size.

Salamanders can carry the fungal disease Bsal (*Batrachochytrium salamandrivorans*), which is fatal to many species. Quarantine new animals for several weeks, and wash hands and tools between containers.

See a vet with amphibian expertise if the animal refuses food for a long time, has open sores or has swellings.

Always ask someone who knows

This guide is a good place to start, but it cannot replace experience. Animals differ, and much of what matters most is learned from people who have kept the species for years. Talk to a breeder, an experienced keeper or a vet who knows reptiles and amphibians before you get the animal - and again if anything looks wrong.