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SALAMANDERS AND NEWTS

Lake Patzcuaro Salamander

Ambystoma dumerilii

Ambystoma dumerilii is a large, fully aquatic salamander that never leaves the larval stage: it keeps fine, dense external gills, a tail fin and a flat, broad head throughout life. The species is found in only one lake in Mexico and is critically endangered in the wild. In the aquarium it needs cool, clean water with a gentle current and plenty of hiding places.

Family: Ambystomatidae

KEY FACTS

THE ANIMAL

Adult size	**12-35 cm** total length incl. tail
Lifespan	**10-16 years**
Active	**At night**
Lifestyle	**Aquatic**
Habitat	**Wetland**
Skin toxins	**None known**
Difficulty	**Intermediate**

CARE

Min. enclosure	**100 × 50 × 40 cm** L × W × H for 2 adults
Temperature, day	**14-22 °C**
Temperature, night	**14-20 °C**
Humidity	**100%**
Water	**Aquaterrarium** depth 25-35 cm
Water temperature	**14-22 °C**
UVB	**Not required**
Diet	**Complete diet, vertebrates and worms/snails**
Kept	**Singly or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Stays in larval form for life (neoteny)**
Egg-laying site	**In water**
Sexually mature	**18-24 months**
Eggs per season	**100-1,000**
Clutches per year	**1-2**
Hatching	**14-21 days**
Larval diet	**Other larvae and small aquatic invertebrates (daphnia, mosquito larvae)**
Parental care	**None**

PROTECTION AND PAPERWORK

CITES	**Appendix II**
EU annex	**Annex B**
IUCN	**Critically Endangered (CR)**

About the species

Ambystoma dumerilii is one of the largest species in the genus. Adults measure 12-28 cm in the wild, including the tail, and in the aquarium they can reach up to 35 cm. The sexes are the same size, but the females are heavier, and an adult weighs about 120 g on average. In captivity the species can live up to 16 years; how old it gets in the wild is not known.

The species is neotenic: it becomes sexually mature without metamorphosing. The animal keeps three pairs of large, densely filamented external gills, a fin fold from behind the head to the tip of the tail, and gill slits with fine gill rakers. The head is flat and broad, the eyes are small, and the limbs are short and strong. The toes are fully webbed, even in adults. The animal has functional lungs and can take air at the surface, but most oxygen uptake takes place through the gills and skin. The species can regenerate lost limbs.

The back is yellowish brown to olive green, often without pattern but sometimes with dark brown spots, and the belly is pale grey. The gill filaments are most often red, and the toes, snout tip and underside of the tail are darker than the body. The species was described in 1870 by Alfredo Dugès. The species name honours the French herpetologist Auguste Duméril.

The male is recognised by a swollen cloaca in the breeding season. The species resembles *Ambystoma mexicanum* and *Ambystoma andersoni*, but has a flatter head and more gill filaments. In captivity it can be crossed with *A. mexicanum* and with species in the *Ambystoma tigrinum* group.

In captivity about a third of the animals metamorphose, often in the breeding season. The metamorphosis is incomplete, can take up to three years and shortens life drastically: the animals stop eating and die after a few months. Incorrect care and stress increase the risk.

The species has no known skin toxin, but the skin is delicate, and the animal should not be handled.

Read more: Rearing tadpoles

Distribution and habitat

Ambystoma dumerilii is found only in Lake Pátzcuaro in the state of Michoacán in central Mexico. The lake lies 1,920 m above sea level, has alkaline fresh water (pH 8.1-9.6) and was historically at most 11 m deep. The last known population lives at the northern end of the lake, mostly around the islands.

The lake has been polluted by sewage, fertiliser and run-off, has lost a quarter of its volume, and introduced fish eat eggs and larvae and compete for food. The species was formerly fished and used in folk medicine, and the population collapsed in the late 1980s. It is critically endangered (IUCN: CR). The wild populations are very small, and in Mexico there are breeding colonies that keep the species alive.

> **Native range:** Mexico.

HABITAT

In the wild, *Ambystoma dumerilii* lives its whole life in a high-altitude, alkaline lake. The water near the shore is 14-25 °C. The animal is most active at night and walks along the bottom or swims with its tail fin. It finds food by smell and movement and sucks the prey in with a sudden gape.

The food items are aquatic invertebrates, small fish and eggs. In the wild the species lives chiefly on the small freshwater crayfish *Cambarellus patzcuarensis*, and wild-caught animals often refuse other food. No large predatory fish originally lived in the lake, so the species has probably been the top predator.

Read more: Buying animals: captive-bred, wild-caught and transport

Care

THE ENCLOSURE

Ambystoma dumerilii is kept in an aquarium with no land section, because the animal never leaves the water. A pair needs at least 100 × 50 × 40 cm, about 200 litres, and the same aquarium can hold up to five adults. 80 litres for two animals is the absolute lower limit. The more water, the more stable the water quality.

A bare bottom is the most hygienic. If you want a substrate layer, use round, untreated gravel of no more than 3 mm, which gives a foothold on the slippery glass and room for beneficial bacteria. Sand is not used, and stones must be much larger than the animal's head, so that they cannot be sucked in. Give each animal a hide, for example half flowerpots, pipes or root pieces, and use live or plastic plants as cover. The aquarium must have a lid.

TEMPERATURE

The water should be 14-22 °C and must never reach 25 °C. In summer 18-22 °C is suitable. Above 22 °C the animal is stressed: it stops eating and is more prone to fungal and bacterial infections, and pale, slimy patches on the skin are an early sign. The species tolerates down to 9 °C.

The aquarium is best left unheated in a cool room out of direct sun, where the temperature follows the seasons, so that conditions are not unnaturally constant. In winter the water should fall below 14 °C, preferably down towards 9-10 °C; the cool period is necessary for breeding. If necessary, use an aquarium chiller or a fan over the water surface in summer.

HUMIDITY AND MISTING

Humidity is of no importance, because the animal never leaves the water, and misting is not relevant. Under the aquarium lid the air above the water surface is saturated with moisture, which is why the box says 100 %.

What counts is water quality: filtration, oxygenation and regular water changes. See the section on water.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

Neutral to slightly alkaline, medium-hard water suits: pH 7-8 and a conductivity of about 350-400 µS/cm. The lake is more alkaline, but it is not necessary to imitate it. Use tap water that has stood for a couple of days, or treat it against chlorine and chloramine. If the filter is new, it must mature for several weeks before the animal goes in.

Siphon food remains and droppings from the bottom regularly, and check the water after each feeding. Change part of the water as needed, typically every week or every other week, more often with many animals or heavy feeding. Nitrate and phosphate must be kept low, because in high amounts they are toxic to eggs and larvae and inhibit hatching.

The filter must give very little flow, because flowing water stresses the animal. An external filter with a gentle outlet or a sponge filter is well suited. Without a filter, the water can be oxygenated with an air stone, but then it must be changed more often.

LIGHTING AND UVB

Ambystoma dumerilii does not need UVB. Ordinary daylight tubes or LEDs are enough, and in a room with daylight from windows, artificial light is not necessary. Direct sun must be avoided, because it warms the water.

If artificial light is used, keep it on for about 12 hours a day, slightly longer in summer and shorter in winter. The species is nocturnal and needs hides it can withdraw into. LED is preferable, because it gives off the least heat.

Read more: Lighting and UVB

FEEDING

The species is a predator and takes large prey, which it sucks in with a sudden gape. Good staple foods are earthworms, thawed smelt and other freshwater fish of a suitable size, and sinking pellets for axolotls. Daphnia, rinsed tubifex, white worms and freshwater shrimp provide variety, and chopped chicken heart and waxworms are given only occasionally. Wild-caught animals may refuse anything but small crustaceans.

Adults are fed once or twice a week. It is a good idea to feed each animal with tweezers, so that all get enough and do not fight over the prey; take care that the tweezers do not injure the mouth. Remove uneaten food so that it does not pollute the water. Feeder fish and live food must come from a reliable source, so that no diseases are introduced.

BEHAVIOUR AND HANDLING

The species is nocturnal and stays mostly on the bottom. Up to five adults can be kept together in a large aquarium with many hides, but *A. dumerilii* is more inclined to bite than *Ambystoma mexicanum*, and adults occasionally fight over food, which most often affects the feet. Young animals are far more aggressive and bite the legs and gills off one another. The aquarium should contain only *A. dumerilii*: fish and other salamanders go for the gills, and anything smaller than the animal itself will be eaten.

The animal should not be handled, because the skin is delicate. If it has to be moved, use a soft, fine-meshed net or a container. Forward-curled gills and loss of appetite are signs of stress, most often from too much current or water that is too warm.

Breeding

SEXUAL MATURITY AND SEXING

The male has a swollen cloaca in the breeding season. Sexual maturity is most often reached after 18-24 months, but a few animals are mature after 8-12 months. Males mature faster than females. Females under 18 months should not breed, because the eggs are often not viable.

MATING

A cool period in winter triggers breeding: let the water fall below 14 °C and then raise it to 14-18 °C, and the females will normally lay eggs in April and May, and sometimes again in autumn when the water is cooled. At a constant temperature breeding seldom succeeds. The male swims around the female with the base of his tail arched and lifts the tail to show the cloaca. If the female is receptive, she follows him, and he deposits up to 16 spermatophores, which she picks up. Place flat, rough stones and plants on the bottom.

EGGS AND LARVAE

Egg laying takes 24-72 hours. The female attaches the eggs singly to plants or stones, so plastic plants, which do not rot, are a good choice. In captivity a female typically lays 100-200 eggs, but a spawning can exceed 1,000 eggs, and each egg is up to 1.8 mm in diameter. There is no parental care, and the adults eat eggs and larvae, so move the eggs to a separate container with gently aerated water. The larvae hatch after two to three weeks, depending on the temperature.

Newly hatched larvae are 1-2 cm long and have developing forelimbs. They eat small animals: newly hatched artemia, daphnia without yeast residues and chopped tubifex. From about 5 cm they take white worms, bloodworms and tubifex, and from about 10 cm earthworms and pellets. The larvae are fed every day, and in small containers the water must be changed daily.

METAMORPHOSIS

The species does not metamorphose in the wild. A larval period in the classical sense does not exist, because the animals remain in larval form throughout life. At a snout-vent length of about 35 mm the larva has all four legs and has begun to darken, and after that it resembles the adults in everything but size. The young grow to 10-15 cm in 4-6 months.

Spontaneous metamorphosis in captivity is a sign of stress and a serious problem. The animal loses its gills and fin fold, stops eating and lives for only a few months. See the section on health.

REARING THE YOUNG

Larvae and young are very aggressive and bite legs off one another. At most five larvae can be kept together in a container of at least 15 × 20 cm, but the safest approach is to keep them separately from the moment the hind legs begin to show. This also makes it easy to give each larva the right food. Only at a length of about 12 cm does the aggression subside, and the young can again be kept together in an aquarium. Provide hides, sort by size, and keep the water cool, clean and almost without current.

Health and common mistakes

Ambystoma dumerilii requires cool, clean and calm water. The most frequent problems are:

- Water that is too warm: above 22 °C come loss of appetite, pale slimy patches and fungal and bacterial infections. The water must never reach 25 °C.
- Fungus on skin and gills, often from food remains in the gills. Siphon the bottom clean regularly. In the case of fungus or sores, the conductivity of the water can be raised to 1,000-2,000 μS/cm for a week with salt free of iodine, anti-caking agent and fluoride.
- Spontaneous metamorphosis: the gills shrink, the animal refuses food and dies after a few months. Metamorphosed animals can survive only with force-feeding.
- Bites: young animals bite legs and gills off one another. Serious bite wounds on the legs must be treated by a vet; lost legs normally grow back.
- Swallowed stones: constipation and death. Use a bare bottom or fine, round gravel.
- Too strong a current: forward-curled gills and loss of appetite.
- High ammonia, nitrite, nitrate or phosphate: requires water changes and a well-established filter.
- The fungus *Batrachochytrium dendrobatidis* can infect the species.

Salamanders can carry the fungal disease Bsal (*Batrachochytrium salamandrivorans*), which is fatal to many species. New animals are quarantined, and equipment and hands are washed between aquariums.

See a vet who knows amphibians if the animal will not eat for more than a couple of weeks, swells up or develops white coatings.

Read more: Quarantine and hygiene

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.