herpy

SALAMANDERS AND NEWTS

Smooth newt

Lissotriton vulgaris

Lissotriton vulgaris is a small, adaptable newt of 8-11 cm that spends most of the year on land and enters the water only to breed. In spring the male develops a wavy dorsal crest and strong colours. The species is hardy in a cool aquaterrarium with a winter rest, and it readily lays eggs, so the whole life cycle can be followed.

Family: Salamandridae English name: Smooth Newt Former name: *Triturus vulgaris* **Mild skin toxins**

KEY FACTS

THE ANIMAL

Adult size	**8-11 cm** total length incl. tail
Weight	**0.3-5.2 g**
Lifespan	**4-14 years**
Active	**At dusk and at night**
Lifestyle	**Semi-aquatic**
Habitat	**Wetland and temperate woodland and meadow**
Skin toxins	**Mild** Wash your hands after contact and keep your fingers away from your eyes and mouth
Difficulty	**Intermediate**

CARE

Min. enclosure	**60 × 30 × 30 cm** L × W × H for 4 adults
Temperature, day	**12-20 °C**
Temperature, night	**8-15 °C**
Humidity	**80-100%**
Water	**Aquaterrarium** depth 10-20 cm
Water temperature	**10-20 °C**
UVB	**Not required**
Winter rest	**5-10 °C** 8-12 weeks
Diet	**Insects, small invertebrates (springtails, fruit flies) and worms/snails**
Kept	**In pairs or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Larvae in water**
Egg-laying site	**In water**
Sexually mature	**24-36 months**
Eggs per season	**100-500**
Hatching	**8-35 days**
Larval period	**42-120 days** from hatching to metamorphosis
Larval diet	**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

Lissotriton vulgaris is a small, slender newt. Adult males grow to 9-11 cm and females to 8-9 cm, and weight is 0.3-5 g. Outside the breeding season both sexes are yellowish-brown to olive-brown, and on land the skin is dry and velvety. The belly is orange to whitish with dark spots, and in the male the spots continue up onto the throat; this is the most important feature

for telling it from *L. helveticus*, whose throat is always unspotted. Males have large, round spots on the back, while those of females are smaller and sometimes form irregular lines.

In the water the male changes appearance. A continuous, wavy skin crest grows from the back of the head along the back and tail, the colours become stronger, the cloaca swells and darkens, and the lower edge of the tail gets an orange border with a bluish sheen. The hind toes develop skin lobes, but not continuous webbing. The female develops only a low skin fold on the back and tail and remains more subdued. After the breeding season the crest disappears, and the skin becomes velvety again.

The species formerly belonged to the genus *Triturus*. It has three recognised subspecies: *L. v. vulgaris*, *L. v. ampelensis* and *L. v. meridionalis*, which differ mainly in crest, skin lobes and body shape. The genus name comes from the Greek for smooth and the sea god Triton, and the species name means common.

The skin has mucous and poison glands. The toxin is tetrodotoxin in low concentrations, often below the detection limit, but the secretion can irritate mucous membranes. Wash your hands after handling, and do not touch your eyes or mouth.

The temperament is calm. On land the animals are active at dusk and at night, but in the aquatic phase they are often seen by day. In the wild they live for 6-14 years, in captivity typically 4-8 years and exceptionally over 20 years.

Distribution and habitat

Lissotriton vulgaris has one of the largest ranges among European newts. It lives naturally from Ireland and Great Britain in the west to Siberia and northern Kazakhstan in the east. To the north it reaches central Fennoscandia, while the southern limit runs through central France, northern Italy, the central Balkans and the steppe in Ukraine and Russia. *L. v. ampelensis* is found only in the Carpathians in Ukraine and in the Danube Delta in Romania, and *L. v. meridionalis* in the northern half of Italy, southern Switzerland, Slovenia and Croatia.

The species is a lowland species and is seldom seen above 1,000 m. *L. v. meridionalis* has been introduced north of the Alps near Geneva, and *L. v. vulgaris* has been introduced to south-eastern Australia. The introduced populations are not part of the native range.

> **Native range:** Ireland, United Kingdom, France, Belgium, Netherlands, Luxembourg, Germany, Denmark, Norway, Sweden, Finland, Estonia, Latvia, Lithuania, Poland, Czechia, Slovakia, Austria, Switzerland, Italy, Slovenia, Croatia, Hungary, Romania, Bulgaria, Serbia, Ukraine, Belarus, Moldova, Russia and Kazakhstan.

HABITAT

Lissotriton vulgaris thrives in many kinds of habitat. On land it lives in deciduous and mixed woodland (dense coniferous forest is avoided), on damp meadows, in field margins, parks and gardens, where it hides under logs and stones and in small-rodent burrows. It tolerates human influence and is often found close to buildings.

For breeding it uses sunny, still, fish-free waters with many aquatic plants and water for at least three months of the year: anything from a puddle to a pond or a shallow bay in a lake. Water quality matters less; the species tolerates pH from 4 to 9.6 and is even found in slightly brackish water.

The animals spend most of the year on land, where they are most active at night. The migration towards the breeding water can begin as early as February, when the ground is only 3-5 °C, and stretches into summer in the northern part of the range and at altitude. Winter is most often spent on land in frost-free hiding places under logs or in holes in the ground, often several animals together, but some animals overwinter in the water.

Care

THE ENCLOSURE

Adults need both a water section and a land section. An aquaterrarium of 60 × 30 × 30 cm suits up to 4 adults, and larger is better: more water surface gives the animals room in the breeding season.

The water section is 10-20 cm deep with many soft aquatic plants, for example Canadian waterweed (*Elodea*) or milfoil, in which the female can fold her eggs. The land section covers about half the floor and is made as a slope, an island of stones or a floating panel, so the animals can switch between water and land themselves. Use a moisture-retaining substrate of unfertilised soil with a layer of moss on top, and pieces of bark, stones and cork as hides. Bark and wood must be untreated.

The animals climb glass easily and squeeze through very small openings, so the enclosure must have a tight-fitting lid with fine ventilation. Keep the land section damp, but never soaked. Newly metamorphosed juveniles live only on land and need a set-up without deep water.

TEMPERATURE

Lissotriton vulgaris is cool-loving. The daytime temperature is 12-20 °C and the night-time temperature 8-15 °C. About 20 °C is the highest the animals should have for any length of time, and they are active right down to about 5 °C. Place the enclosure somewhere cool, out of direct sun and without heat sources; daylight through a north- or east-facing window is fine. In hot summers a chiller, a fan over the water surface or a cellar can help.

About 15 °C is the best temperature for breeding. A cool period followed by rising temperature, more light and more food brings the animals into breeding condition.

Hibernation takes place at 5-10 °C and lasts 8-12 weeks, typically from November to February. The animals rest on land in damp moss or leaf litter in a box with ventilation holes, where they do not dry out, and are checked regularly. If the enclosure is instead kept in an unheated room, the animals stay partly active and are fed every other week.

Read more: Brumation and the seasons

HUMIDITY AND MISTING

The soft skin dries out quickly, so the land section must be kept damp, with a humidity of 80-100 %. Spray the land section with dechlorinated water once or twice a day, and let the soil and moss retain moisture without the substrate becoming swampy. If most of the spraying is done at one end, a moisture gradient forms, so the animals can choose for themselves. Good ventilation prevents stagnant air and mould. If it becomes too dry, the animals head for the water or hide, and the skin becomes dull and dry.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

The water section must be 10-20 cm deep and 10-20 °C. Use dechlorinated tap water, tap water that has stood for a few days, or rainwater; the species is not fussy about pH, but chlorine is harmful. A small filter with a gentle flow keeps the water clean and makes maintenance easier. Without a filter, a third of the water is changed weekly, and food remains are removed daily.

The bottom can be bare or of coarse sand or large stones, never fine gravel, which can be swallowed. Floating plants and a floating panel let the animals leave the water when they wish. If they spend more time on the panel than in the water, the aquatic phase is coming to an end. Amphibians absorb substances through the skin, so cleaning products, soap and hand cream must never come near the water.

LIGHTING AND UVB

UVB is not necessary for the species, which lives hidden and is active at dusk and at night. The animals avoid sun. Ordinary LED light for 10-12 hours a day gives the aquatic plants what they need, and more light in spring helps bring the animals into breeding condition. The lamp must not warm the water. Plants and hides must provide plenty of shade.

Read more: Lighting and UVB

FEEDING

Lissotriton vulgaris eats all small animals it can swallow. On land, adults are given small earthworms, small slugs, woodlice, white worms, aphids, fruit flies and small crickets. In the water they take daphnia, mosquito larvae, tubifex and frozen bloodworms, and under water they also take pieces of fish or frozen food. On land, motionless food is almost never taken, so land food must be live.

Adults are fed two to three times a week. The feeder animals must be small, because the species is small. A varied diet makes supplements less important, but for juveniles and for females in the egg-laying season the food can be dusted with calcium and vitamins for amphibians.

Under water the animals are greedy and snap at each other during feeding, and a large animal can eat a much smaller one. Animals of different sizes should therefore not be kept together.

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

BEHAVIOUR AND HANDLING

The species is peaceful and can be kept in pairs or in groups with more females than males. In the breeding season the males pursue the females, so more females than males, many plants and good hides give peace. The animals can be kept with other small newts of the same size and with the same temperature requirements, but not with fish, which eat eggs and larvae.

The skin is delicate, so the animals should be handled only when necessary. If an animal has to be moved, wet your hands with dechlorinated water, or use a small net or a cup. Keep the lid closed: the animals are good at escaping.

Breeding

SEXUAL MATURITY AND SEXING

In the breeding season the male is recognised by the skin crest, the swollen, dark cloaca and the strong colours. The female is subdued in colour and has only a low skin fold. Outside the breeding season the sexes are harder to tell apart, but the male is more darkly spotted, and his cloaca is still slightly larger. The animals become sexually mature after 2-3 years; well-fed animals in captivity can reach it in their second year. The sexes cannot be told apart as juveniles, so for breeding you need a small group to be sure of both sexes.

MATING

The breeding season is triggered by rising temperature and day length after a cool period. In early spring the animals are moved from the land section to a planted water set-up with a floating panel or stones that protrude, or the water level and temperature are raised. The animals normally enter the water within a few days, and after a few weeks the male has his breeding dress.

Mating follows a fixed pattern. The male swims in front of the female, sniffs her cloaca and waves his tail, so scent molecules drift towards her. If she is interested, she follows and touches him with her snout, and he deposits a sperm packet on the bottom, which she takes up with her cloaca. Fertilisation is internal, and egg-laying begins 2-14 days later.

Breeding is also possible without a proper hibernation, but a cool period gives livelier mating. About 15 °C is ideal in the water.

EGGS AND LARVAE

The female lays 100-500 eggs over a season, most in large, older females. The eggs are laid singly, often at night, and each egg is folded into a leaf of an aquatic plant, which the female bends around the egg with her hind legs. Egg-laying stretches over several weeks, on average about five. The eggs are 1.3-1.7 mm and pale brown to grey-green, with a jelly capsule of 3-4 mm. Canadian waterweed, milfoil and soft plants with broad leaves are good to lay in; if they are lacking, the eggs are laid on stones or glass. Strips of thin plastic can be used, but only materials that are safe for amphibians.

Adults eat eggs and small larvae, so move the folded leaves or the adults to a separate tank. At 18-21 °C the eggs hatch after 8-15 days, at 12 °C it can take up to 35 days. The larvae are 6-10 mm at hatching and have external gills, small forelimb buds and two adhesive organs on the head, with which they hang on to the plants. For the first few days they live on the yolk and lie still.

After that the larvae are predators and will only take live food: first infusoria and newly hatched daphnia or artemia, later larger daphnia, white worms, mosquito larvae and other small aquatic animals. The larvae are fed daily. Change no more than 10-20 % of the water at a time in the first weeks, so conditions stay stable, and keep the larvae in clean, cool water with many plants and not too crowded, otherwise the large ones eat the small ones. The larvae grow to 3-4 cm.

METAMORPHOSIS

The larvae metamorphose after 6-12 weeks, depending on temperature and food; in cold water with little food it can take about four months. The hind legs appear after the forelegs, and when all four legs have developed, the gills and the skin fold on the tail are drawn in, and the colours change. In that phase the larvae often eat less, and that is normal.

Now lower the water level to a couple of centimetres, and put out stones, cork or floating plants, so the metamorphosed animals can climb out without drowning, and fit a tight-fitting lid. The juveniles leave the water at about 3 cm and are moved to a land set-up.

Some larvae metamorphose very late or overwinter in the water. Rarely, animals become sexually mature with gills and stay in the water all their lives; the cause is not known.

REARING THE YOUNG

The newly metamorphosed juveniles live on land until they are sexually mature. Keep them in a damp, cool enclosure with a layer of soil, moss, bark and leaves, and feed them often with the smallest live feeder animals: white worms, springtails, aphids, wingless fruit flies and small woodlice, later small earthworms. White worms can be put out in the soil, where they multiply and give the juveniles something to hunt. Keep the juveniles separate from the adults and sorted by size.

The juveniles can overwinter cool and damp in a box with soil and moss like the adults. After 2-3 years they are sexually mature and can be moved to an aquaterrarium in spring.

Health and common mistakes

The main problems in care are:

- Heat: temperatures above 20 °C for a long time stress the animals, cause poor appetite and can lead to disease and death. Keep the enclosure cool.
- Desiccation: the skin is delicate and dries out quickly if the land section is not kept damp.
- Fungal infections and skin sores, often after poor water quality or too many animals. Use clean, dechlorinated water, and change it regularly.
- Constipation: fine gravel and sand can be swallowed. Use a bare bottom, coarse sand or large stones.
- Larvae floating belly-up: underfed larvae or larvae kept too close together can swallow air. Place the larva in a dish with so little water that it cannot turn over, and give plenty of food; the air normally comes out again within a short time.
- Ranavirus and other infections that can spread in a group. Animals with swellings, lethargy, bleeding in the skin or loss of appetite are moved immediately to a separate tank.

The fungus *Batrachochytrium salamandrivorans* (Bsal) is deadly to many salamanders. New animals are quarantined before being put with others, each set-up has its own equipment, and hands and tools are cleaned between set-ups. Animals, water and tools must never come into contact with wild amphibians, and food from ponds with wild amphibians can carry infection. Captive-bred animals less often carry diseases and parasites than animals from the wild. See a vet with knowledge of amphibians if an animal becomes ill.

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

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.