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SALAMANDERS AND NEWTS

Kaiser's Spotted Newt

Neurergus kaiseri

Neurergus kaiseri is a slender newt of 10-14 cm from the Zagros Mountains in south-western Iran, with a mosaic pattern of black and white spots, an orange-red stripe along the back and an orange-red belly and orange-red legs. The species is shy and nocturnal, does not tolerate heat and needs a cool winter rest in order to breed. It lives in only a few streams and is vulnerable in the wild.

Family: Salamandridae Former name: *Neurergus crocatus kaiseri* **Mild skin toxins**

KEY FACTS

THE ANIMAL

Adult size	**10-14 cm** total length incl. tail
Lifespan	**6-8 years**
Active	**At dusk and at night**
Lifestyle	**Terrestrial and 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 × 45 cm** L × W × H for 4 adults
Temperature, day	**15-25 °C**
Temperature, night	**10-15 °C**
Humidity	**60-80%**
Water	**Aquaterrarium** depth 20-30 cm
UVB	**Optional**
Winter rest	**5-10 °C** 4-9 weeks
Diet	**Insects 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	**45-60**
Clutches per year	**1**
Hatching	**9 days** at 22 °C
Larval period	**60-120 days** from hatching to metamorphosis
Larval diet	**Small aquatic invertebrates (daphnia, mosquito larvae)**
Parental care	**None**

PROTECTION AND PAPERWORK

CITES	**Appendix I**
EU annex	**Annex A**
IUCN	**Vulnerable (VU)**

About the species

Neurergus kaiseri is the smallest species in the genus *Neurergus* and grows to 10-14 cm long including the tail. The back is a mosaic of white and black spots with an orange-red stripe down the middle, and the belly and legs are orange-red, often with small black spots. The distribution of black and white varies from animal to animal: some are almost white, others almost black. The eyes are black. The forelimbs have four toes and the hind limbs five, without webbing.

Females are slightly larger than males, but sex is clearly visible only in the breeding season: the male has a swollen, round cloacal area, while the female has an elongated, tubular cloaca and is rounder in the body when full of eggs. Outside the breeding season sex can be impossible to determine. The species was described in 1952 as a subspecies of *Neurergus crocatus* and has been treated as a separate species since 1970. DNA analyses show that the genus's closest relative is *Ommatotriton*.

The species is shy and fast on land, where it moves more like a lizard than a typical salamander, but in water it often loses its shyness and may even beg for food. It avoids light and is most active at dusk and at night. The animals are sociable and often lie together in the same hide, and they are not aggressive towards each other.

The skin toxin has not been studied in *N. kaiseri*. The high-contrast warning colouration suggests that the skin secretes an unpleasant or toxic secretion, as in many other salamanders, and the species is therefore treated as one with mild skin toxicity: wash hands after contact, and keep fingers away from eyes and mouth. The animals are handled only when necessary.

In captivity the animals often live more than 6-8 years; how old they can become is not known.

Distribution and habitat

Neurergus kaiseri is found only in Iran, in the southern part of the Zagros Mountains in the provinces of Lorestan and Khuzestan, at an altitude of about 750-1,500 m. It is known from a small number of streams and ponds. There are twelve known breeding populations, divided between a northern group in wetter areas higher up and a southern group in dry, lower areas, and the whole range is under 10,000 km². The population is more than 9,000 adults (count in 2014).

The species is listed as Vulnerable (VU) on the IUCN Red List. The threats are loss of habitat, drought, damming of streams, pollution, introduced fish that eat salamanders and larvae, and collection for the pet trade.

> **Native range:** Iran.

HABITAT

The species lives in mountain streams surrounded by dry scrub and open oak and pistachio woodland, and it also uses ponds, waterholes and artificial water basins. The climate is strongly seasonal: winters are cold with frost and snow, and summers are hot and dry with daytime temperatures above 30 °C. In many places there is water for only three to four months of the year, in winter and early spring.

The animals emerge in March-April, breed in the water and disappear again from late June and in July. For the rest of the year they live on land, where they aestivate in summer and hibernate in burrows in the ground and under stones. The land areas, where the animals find food and cover, are just as important as the water.

Care

THE ENCLOSURE

There are three ways of keeping them. A semi-aquatic aquaterrarium with plenty of rocks and hides both above and below water suits the animals for most of the year. A land enclosure is used for the winter rest and for a land phase outside the breeding season. The animals can also be kept fully aquatic all year round and will breed in that set-up, but it is unresolved which set-up is best in the long term. The species rarely chooses to go on land by itself.

Four adults need at least 60 × 30 × 45 cm, so that there is room for 20-30 cm of water and a pile of stones or a floating island reaching above the surface. The filter must give very gentle flow. Furnish with stacked stones, cork and hollow bricks, which provide cover both below and above water, and use large stones, never gravel of a size that can be swallowed. Java moss and other aquatic plants are used for egg-laying and cover.

For the land phase 50 × 30 × 30 cm is enough for four animals. The substrate is coconut fibre or soil, kept on the dry side, with stacked stones and bark. Provide a humidity gradient by pouring water in only one end, and keep a shallow water bowl. The lid must be tight, because the animals escape through small gaps, but with mesh so that the air does not stand still.

Read more: Humidity, misting and ventilation

TEMPERATURE

Neurergus kaiseri should have 15-25 °C by day and 10-15 °C at night. It tolerates up to 30 °C on land, but long periods above 25 °C must be avoided; a cool room or a cellar suits better than a living room. The animals are active and eat even when the temperature approaches freezing, but frost must be avoided.

The winter rest is kept on land at 5-10 °C for four to nine weeks in late autumn and early winter, and it stimulates breeding (see Mating). The temperature is lowered gradually, and afterwards the animals are warmed slowly over a few days. The water temperature in the breeding season is 10-22 °C.

HUMIDITY AND MISTING

The species does not need high humidity, and the land section should not be misted daily; too much moisture can harm the animals. 60-80 % in the land section is suitable. The soil should be moist at one end and dry at the other, so that the animals can choose for themselves. The shallow water bowl protects against desiccation, and the animals often use it for a quick bath. Mesh in the lid ensures air exchange.

WATER AND WATER QUALITY

The water in the aquaterrarium should be 20-30 cm deep. The filter gives only gentle flow: in the wild the species also breeds in still water, but a light current works well in captivity. In the breeding season 5-10 % of the water is changed daily, otherwise part of the water every week. Use rainwater or tap water that has stood or been dechlorinated. Chlorine, chloramine and heavy metals must be avoided, because amphibians absorb substances through the skin. Use no cleaning agents on the decor.

LIGHTING AND UVB

The species does not need special lighting; daylight or a day length that follows the seasons is enough, and the animals seek away from the light. UVB is optional. If used, it must be weak: a UV index of 1.5-2 at the top of the pile of stones is plenty, and the rest of the enclosure should lie in shade. During the winter rest the light is switched off. Provide enough hides for the animals to withdraw from the light.

Read more: Lighting and UVB

FEEDING

The species is not fussy. On land, crickets and cockroaches of suitable size suit, as do earthworms (whole or chopped), bloodworms, enchytraeids, small waxworms, large fruit flies, fly larvae and small isopods. In water the animals take earthworms, live and frozen red bloodworms and other ordinary newt food. Place the food in the water, preferably in the evening, two to three times a week. The animals must be well fed before the winter rest; feeding is stopped when the temperature is lowered, and they receive no food during the rest. Animals that hibernate in water at 6-12 °C continue to eat a little.

Use varied food, and dust the land food with calcium and vitamins at some feedings.

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

BEHAVIOUR AND HANDLING

Neurergus kaiseri is shy, nocturnal and sociable. On land it stays under the lowest hides by day and hunts at night between the upper hides and in open patches. It likes to sit high up and is very active shortly after the light is switched off. Wild-caught animals are shyer than captive-bred ones. The animals can be kept in a group without problems, and for breeding one male and three females suit.

If the animals have to be moved, use wet gloves or a damp net, and transport them in boxes with air holes and damp moss or damp paper so that they do not dry out.

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

Breeding

SEXUAL MATURITY AND SEXING

Males have a swollen, round cloacal area, and females have an elongated, tubular cloaca, but sex is clearly visible only in the breeding season. Females are also rounder when full of eggs. The animals become sexually mature after 2-3 years. A group with one male and three females is a good breeding group.

MATING

A cool winter rest is necessary to get the animals to breed. The safest method is a land phase at 5-10 °C for four to nine weeks. Beforehand the animals are kept for a week at 18-20 °C without food, so that the gut empties. During the rest they lie in boxes with damp moss, and temperature and humidity are checked regularly. Afterwards they are warmed slowly over a few days and fed generously before being put in an aquarium with a pile of stones and a floating island. The males start waving their tails within the first few days. Cooling at about 17 °C is not enough: the females become full of eggs, but the males do not come into breeding condition. Breeding also succeeds with animals kept aquatic all year round at 6-12 °C in winter. They lay the occasional egg even at the low temperatures, and egg-laying increases as the water warms in spring.

The male waves the outer third of his tail in front of the female, turns, deposits a spermatophore and blocks the female's path so that she can pick it up with her cloaca. Mating is less violent than in the other species of the genus.

EGGS AND LARVAE

The female lays the eggs singly or in small clumps on aquatic plants, stones and glass, often on shaded, rough surfaces, but also in lit areas. The eggs are larger than in the other species of the genus. Egg-laying can stretch over several months, and a female lays 45-60 eggs per season. Only some of the eggs are fertilised; the unfertilised ones turn grey. The eggs can be moved to another container and disinfected with methylene blue if necessary, but most develop without. Eggs and larvae are kept at roughly the same temperature as in the breeding aquarium. The adults may eat the eggs, so the eggs are moved, or the adults removed.

METAMORPHOSIS

The eggs hatch after about 9 days at 22 °C and later in cooler water. The larvae are predators and are kept at 17-24 °C, preferably about 21 °C, in 5-40 cm of water. They tolerate water down to 10 °C, but then eat only a little. The larvae are fed daily on daphnia, brine shrimp, amphipods and chopped white worms as they grow. Crustaceans such as daphnia and amphipods are necessary for the animals to acquire their orange-red colour after metamorphosis.

The water is changed 1-2 times a week, up to 100 %. After two months no more than six larvae are kept per container, and the water level is lowered to 4-5 cm with Java moss. Metamorphosis occurs after 2-4 months and can be slow, and the young may have adult colours before the gills are gone. Provide bark and other land areas at metamorphosis so that they do not drown.

Read more: Rearing tadpoles

REARING THE YOUNG

The newly metamorphosed young are robust, have a good appetite and grow quickly: well-fed young double their size in a few months. They can be raised both in water and on land, and the aquatic ones grow fastest. Even young on land often go into the water to find food. Keep them in boxes or aquaria with limestone as hides, without gravel, and 12 hours of light. Young on land are kept at 60-80 % humidity, and the boxes are misted daily. An aquarium of 90 × 50 × 40 cm holds about 70 young, but requires a filter. Feed them bloodworms, enchytraeids, fruit flies and newly hatched crickets.

Health and common mistakes

Diseases and husbandry errors in *Neurergus kaiseri*:

- Heat: long periods above 25 °C stress the animals. Keep the enclosure cool.
- Excessive moisture and stagnant air, which cause skin problems and fungi. Use mesh in the lid, and keep a gradient from damp to dry.
- Bsal (*Batrachochytrium salamandrivorans*) and chytrid (*Batrachochytrium dendrobatidis*) are fungal diseases that can be fatal to caudates and can be carried by animals without symptoms. Quarantine new animals, use separate equipment, and never move water, plants or equipment between enclosures without cleaning.
- Wild-caught animals are often emaciated, have infections and die shortly after acquisition. Choose captive-bred animals.
- Animals that will not eat or have sores or swellings need to see a vet with knowledge of amphibians.

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.