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LACERTIDS

Sand Lizard

Lacerta agilis

Lacerta agilis is a stocky, short-legged, diurnal lizard of sandy heaths, dunes and sunny slopes. It ranges from southern England to Lake Baikal, and the male develops bright green flanks in the breeding season. It grows to about 20 cm, feeds on insects and needs sun, a cold winter brumation and, ideally, an outdoor enclosure.

Family: Lacertidae

KEY FACTS

THE ANIMAL

Adult size	**15-25 cm** total length incl. tail
Lifespan	**6-12 years**
Active	**By day**
Lifestyle	**Terrestrial and burrowing**
Habitat	**Temperate woodland and meadow**
Difficulty	**Intermediate**

CARE

Min. enclosure	**120 × 60 × 60 cm** L × W × H for 2 adults
Temperature, day	**22-30 °C**
Basking spot	**38-45 °C**
Temperature, night	**12-17 °C**
Humidity	**40-60%**
Water	**Water dish**
UVB	**Recommended** Ferguson zone 2
Winter rest	**4-6 °C** 4-16 weeks
Diet	**Insects**
Kept	**In pairs or one male with several females**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**24-36 months**
Clutch size	**4-15 eggs**
Clutches per year	**1-2**
Incubation	**40-45 days** at 24-25 °C

PROTECTION AND PAPERWORK

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

About the species

Lacerta agilis is a medium-sized, stocky, short-legged lizard and the smallest of the green lizards. Adults measure about 18 cm in the north, and the occasional animal on the European mainland reaches 25 cm. The tail is about one and a half times as long as the head and body together. The head is broad and shovel-shaped, so the animal can quickly bury itself in the sand.

The male has a distinctly larger head than the female and develops bright green flanks in the breeding season, which fade again before winter. In the eastern forms the male can be green over the whole body. The female is grey to brown and, in spring and early summer, visibly swollen with eggs. Both sexes have rows of ocelli (dark spots with a pale centre) along the back and sides, and the pattern is so constant that individual animals can be recognised by it. Newly hatched young are light brown with very distinct ocelli and measure 30-60 mm from snout to vent in the first year and 60-90 mm in the second.

The tail can be shed when the animal is threatened. It grows back, but not to full length, and it holds the animal's most important fat reserve. Several subspecies are described, among them *L. a. agilis*, *L. a. argus* and *L. a. exigua*, but only a few of them can be separated genetically. Hybrids with *Lacerta viridis* have been reported. The species name is Latin and means agile.

In the wild the animals live about 6 years on average, but some reach 12 years or more.

The animal is shy but quick, and it can get used to a regular feeding routine. It is an animal to observe and care for, not to handle.

Distribution and habitat

Lacerta agilis has one of the largest ranges of any European lizard. It occurs from southern England, France and the northern Pyrenees through central and eastern Europe to Russia and on east to Lake Baikal and north-western China. In the north it reaches southern Sweden, south-eastern Norway and southern Karelia, and in the south northern Italy, the Balkans and northern Greece. Further east it is found in the Caucasus, north-eastern Turkey and Central Asia.

In Denmark, Sweden, the Netherlands and England the species lives in sandy habitats, while further south and east it is also found in meadows, on slopes, along roadsides and in gardens. The distribution is often patchy, and the populations in the north-west are small and isolated.

> **Native range:** United Kingdom, France, Andorra, Denmark, Sweden, Norway, Finland, Netherlands, Belgium, Luxembourg, Germany, Switzerland, Liechtenstein, Austria, Czechia, Slovakia, Hungary, Poland, Italy, Slovenia, Croatia, Bosnia & Herzegovina, Serbia, Montenegro, North Macedonia, Albania, Bulgaria, Greece, Romania, Moldova, Ukraine, Belarus, Lithuania, Latvia, Estonia, Russia, Georgia, Armenia, Azerbaijan, Turkey, Kazakhstan, Kyrgyzstan, Mongolia and China.

HABITAT

Lacerta agilis needs open, sunny and dry habitats with firm cover nearby. These can be dunes, heaths, coastal meadows, sunny slopes, the edges of woodland and fields, quarries and gardens. In the coldest parts of its range the species is tied to coastal heaths and dunes, because the eggs must lie in sand warmed by the sun. The animals prefer to bask on logs and at the edge of the vegetation, and seldom on open sand.

The animals emerge in March-April, when the temperature is above 12 °C. Mating takes place in May and continues until mid-June, and the female usually lays one clutch in June-July. The eggs lie in loose sand in the sun and hatch in late August and in September. Adults disappear from August, once the fat reserves in the tail, liver and body cavity are full, and look for winter quarters in self-dug tunnels 30-60 cm down in the sand or soil. The tunnel closes up with wind and rain, and the animal lies undisturbed until spring.

Care

THE ENCLOSURE

Lacerta agilis does best in an outdoor enclosure in full sun, where the animal gets natural sunlight, a natural daily and seasonal rhythm and live prey. A pair can be kept in an enclosure of 2 × 1 m. It should face south, have a sand floor and small banks sloping at 45-60°, and be covered on top with netting against birds and cats. The edges must be tight and buried at least 30 cm deep, so that rodents cannot get in.

Indoors a pair needs at least 120 × 60 × 60 cm (length × width × height), and a larger enclosure is always an advantage. Young from the same clutch can be raised in groups of six in 90 × 45 × 45 cm.

The substrate is sand. Coastal forms are kept on washed sand mixed with crushed oyster shell or snail shells, heathland forms on a mixture of soil, peat and fine gravel. The sand must be deep enough for the animal to bury itself. Furnish with flat stones, slate, cork bark and roots, so that there are many basking spots. The males choose and defend these, so they should be spaced at regular intervals, free of planting and gently sloped. Plant heather, grasses and stonecrop. Stones and roots must sit firmly and without gaps, so that the animal cannot be crushed.

For the female there should be a layer of loose, slightly moist sand about 18 cm deep in a sunlit spot, preferably against a stone or wall. This is where she digs her nest. The lid must fit tightly and allow good ventilation.

TEMPERATURE

Lacerta agilis loves the sun. The daytime temperature in the enclosure is 22-30 °C, and the basking spot needs a surface temperature of 38-45 °C, measured with an infrared thermometer. A sun-facing dune can reach 48 °C at the top in summer and stays above 28 °C in the lowest parts, so the animal chooses its own temperature. Use halogen or metal halide spotlights, which give short-wave infrared heat, and guard the bulb against contact. The animal must be able to retreat into cool tunnels or shade.

At night the temperature falls to 12-17 °C. Young are kept at 22-24 °C by day, 15-17 °C at night and 26-28 °C at the basking spot.

Brumation is necessary if the animal is to breed. Only healthy, well-fed animals free of parasites are brumated; sick, thin and newly acquired animals are kept awake. Weigh the animal in late summer and before the wind-down. Day length and temperature are lowered gradually over about four weeks, and the last meal is given three weeks before brumation, so that the gut is empty. The animal is moved to a plastic box with gravel or wood shavings, a hide and a shallow water dish, and the box is placed in a refrigerator without a freezer compartment or in a cool room with a stable temperature. The temperature is lowered from 15 °C to 4-6 °C over a week and held there for 4-16 weeks. Frost must be avoided. Keep the substrate slightly moist and use two independent thermometers. The box must be rodent-proof. Waking is done by raising the temperature to 15 °C and then to the normal daytime temperature. The animal drinks first and starts to eat when the temperature is above 12 °C. See also the theme on brumation.

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

HUMIDITY AND WATER

Lacerta agilis comes from dry, open habitats, and the humidity in the enclosure is 40-60 %. Good ventilation matters more than humidity, and the substrate must not be constantly wet.

In the wild the animal gets moisture from morning dew and rain. A shallow water dish should be in the enclosure, even though it is rarely used, and the water is changed daily. Mist plants and stones lightly every morning on warm days, so that the animal can lick the droplets. A hide with slightly moist sand gives somewhere to get out of the heat. The female's nesting site is kept slightly moist.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

Lacerta agilis basks for most of the day and needs strong light and UVB. Outdoors the UVB comes from the sun. Indoors, use T5 HO tubes with UVB over the basking spot, so that light, heat and UVB cover the same area and are evenly distributed. At the basking spot the UV index should be 0.7-3.0, corresponding to Ferguson zone 2. Measure with a UV meter, and replace the tubes according to the manufacturer's instructions. Glass blocks UVB.

Day length follows the season: about 14 hours in summer, falling to 8-10 hours in autumn, so that the animal falls into step with brumation. The basking spotlight is on for 5-8 hours in the middle of the day.

Read more: Lighting and UVB

FEEDING

Lacerta agilis is an insectivore. In the wild the diet consists of beetles and their larvae, grasshoppers, crickets, spiders, caterpillars, woodlice and flies. Ants are avoided. The animal takes prey it can overpower, and actively searches for it.

In the enclosure, offer crickets, grasshoppers, wax worms, mealworms, cockroaches and flies in sizes the animal can swallow whole. The feeder insects must be well gut-loaded before they are offered. Dust them with calcium and a vitamin supplement containing D3; more often for animals without UVB. Crushed cuttlebone or limestone in the substrate gives extra calcium. Females need extra supplements in the weeks before egg-laying.

Feeding follows the weather: the animal eats when the sand is warm and the air temperature is above 12 °C. Adults and young are offered food daily in the active season, on warm, sunny days preferably 2-3 times in small portions. In autumn the animal is fattened up before brumation, and the last meal is given three weeks before cooling.

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

BEHAVIOUR AND HANDLING

Lacerta agilis is a solitary species that only meets conspecifics to mate. The males are territorial and chase rivals away from the best basking spots. A pair or a male with two females per square metre is a calm way to keep them. Males tolerate each other best when they differ in size, where there are many basking spots and no females. The females are more peaceful and can share hides and basking spots.

Do not keep the species with other species, to avoid competition for basking spots and food. Adults readily eat young, so young are kept separately.

A new animal is shy and hides at first. After a few weeks it comes out and takes food from tweezers and fingers. Avoid grabbing the animal, because the tail is shed under stress. Move it as little as possible.

Breeding

SEXUAL MATURITY AND SEXING

The male has a larger head and green flanks in the breeding season, while the female is grey to brown and distinctly broader around the abdomen when she is carrying eggs. In the male the colours develop once the animal is sexually mature. In young animals the sex is hard to see.

The animals become sexually mature after the second or third brumation, that is, at two to three years of age. Young kept warm through the winter grow faster, but this disturbs the annual rhythm and is not recommended. Only breed healthy, fully grown animals.

MATING

Mating follows brumation. The animals must have woken up and eaten before the male shows his colours. Mating begins about a week after waking and takes place over a few weeks, in the wild in May and until mid-June. The male grips the female at the base of the tail or the flank, and copulation lasts 2-4 minutes. Afterwards the male guards the female for hours to days. The female often mates with several males.

Keep one male with one or two females. If the female's back or tail base is wounded, separate the animals. Small scars at the base of the tail are normal and show that the female has mated.

EGG-LAYING AND CLUTCHES

The female lays eggs four to six weeks after mating, in the wild in June-July. A clutch holds 4-15 eggs, and large females lay more than small ones. One clutch per season is usual, but a second clutch can follow in favourable summers. The female grows in girth until the shape of the eggs can be seen through the skin, and she stops eating before laying.

When she digs trial holes, she is moved to a nesting chamber with about 18 cm of loose, slightly moist sand, cork bark and slate. She digs about 10 cm down and then sideways towards a hard surface. After laying she is left in place for a few days and fed generously, as her fat reserves are low. She leaves the nest without tending eggs or young.

INCUBATION

The eggs are carefully dug out and placed in a container with the same medium they lay in. They must not be turned, and eggs stuck together are not separated. Use vermiculite mixed 1:1 by weight with water in a plastic container with small air holes. Fill the container halfway, press small hollows into the medium and place one egg in each.

At 24-25 °C the eggs hatch after 40-45 days. At 22 °C incubation lasts up to 60 days and at 31 °C as little as 30 days. A sustained temperature below 20 °C gives poor hatching and weak young, and above 29 °C it causes deformities. The humidity in the incubator is about 90 %, and the container lids are aired daily. Fertile eggs are firm and glow pink against the light. If an egg smells or moulds, remove it.

Read more: Incubating eggs

REARING THE YOUNG

The young are small (30-60 mm from snout to vent in the first year) and are offered food from the first days. Give small crickets, aphids, fruit flies and other small insects, dusted with calcium and vitamins. Six young can be kept together in 90 × 45 × 45 cm with sand, flat stones, hides and a shallow water dish. The temperature is 22-24 °C by day and 15-17 °C at night, and the basking spot is 26-28 °C with UVB.

Adults readily eat young, so the young are kept in an enclosure of their own. Keep an eye on growth: animals that grow more slowly than their siblings are moved to a separate unit. Only when the young are half grown can they be moved in with the adults. In the first winter only healthy, well-fed young are brumated.

Health and common mistakes

Most problems are caused by too little heat and UVB, a one-sided diet, too little space or too much heat without shade. The typical ones are:

- Metabolic bone disease from a lack of UVB and calcium. Provide UVB or sunlight, and dust the food.
- Ticks and mites, especially outdoors and on a damp substrate. Examine the animal regularly.
- Internal parasites. New animals are quarantined, and a faecal sample is taken before brumation.
- Overheating on warm days in a closed enclosure without shade. Always provide a cool spot.
- Loss of the tail through stress or fights. It only partly regrows, and the animal loses fat reserves.
- Poor brumation in sick or thin animals. Keep them awake and fed.
- Egg-laying problems if there is no suitable nesting site. The female is restless and digs.

A healthy animal has clear eyes, a plump tail and a good appetite. See a vet with reptile experience if the animal is not eating, is losing weight or is lethargic.

Read more: Common diseases and signs of illness

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.