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LACERTIDS

Western Green Lizard

Lacerta bilineata

Lacerta bilineata is a large, slender, diurnal lizard of the warm, sunny slopes and scrub of western Europe, with a green body, black spots and a tail that makes up two thirds of its length. The species grows to 25-40 cm, feeds on insects and other small animals, and needs sun, a large enclosure or an outdoor enclosure and a cold brumation.

Family: Lacertidae

KEY FACTS

THE ANIMAL

Adult size	**25-40 cm** total length incl. tail
Weight	**30-45 g**
Lifespan	**5-10 years**
Active	**By day**
Lifestyle	**Rock-dwelling and terrestrial**
Habitat	**Rocky terrain and temperate woodland and meadow**
Difficulty	**Intermediate**

CARE

Min. enclosure	**150 × 60 × 75 cm** L × W × H for 2 adults
Temperature, day	**22-30 °C**
Basking spot	**38-45 °C**
Temperature, night	**12-18 °C**
Humidity	**40-60%**
Water	**Water dish**
UVB	**Recommended** Ferguson zone 3
Winter rest	**4-6 °C** 8-12 weeks
Diet	**Insects and worms/snails**
Kept	**Singly, in pairs or one male with several females**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**5-23 eggs**
Clutches per year	**1-4**
Incubation	**45-80 days** at 28-30 °C

PROTECTION AND PAPERWORK

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

About the species

Lacerta bilineata is one of Europe's largest lizards. The body is slender, the head long, and adults are bright green. The tail makes up about two thirds of the total length and, as in other lizards, can be shed when the animal is threatened. It grows back, but with a rod of cartilage instead of new vertebrae. The body (snout to vent) reaches up to about 13 cm. Adults are 25-40 cm long, about 35 cm in Germany and 40 cm or more in southern Europe, and weigh 30-45 g.

The male is green with many small black spots, and the sides of the head and throat are bluish to blue-green and turn a deeper blue in the breeding season. The female has fewer, larger spots and often two or four pale lines along the back. The male also has a larger head, stronger femoral pores and a broader tail base. Newly hatched young are 8-9 cm long, beige-

brown with pale longitudinal stripes, and weigh about 1 g. In them the underside of the head is already green, and this is the most reliable distinguishing feature from *Lacerta viridis*, whose young have a whitish to brown throat. The name *bilineata* ("two-striped") probably refers to the pale stripes on the back.

The species was long regarded as a subspecies of *Lacerta viridis*. Adults cannot be told apart with certainty, but the species are genetically distinct, the eggs hatch faster in *L. bilineata*, and some of the females from crosses are sterile. Animals in the trade may therefore be misidentified: if the origin of an animal is unknown, the species name is uncertain.

The animal is fast, shy and wary, and is slow to get used to people nearby. It is an animal to watch and care for, not to handle. Adult males are strongly territorial and must not share an enclosure with another male.

Distribution and habitat

Lacerta bilineata lives in western and southern Europe: in northern Spain, Andorra, France, Monaco, southern Switzerland, the whole of Italy including Sicily, San Marino and, to the east, as far as Slovenia and Croatia, where it reaches the island of Cres. In Germany it occurs only in small, isolated populations along the Middle Rhine, the lower Moselle, the Nahe and the Lahn, and at the Kaiserstuhl and Tuniberg; some authors assign the populations at the Kaiserstuhl to *Lacerta viridis* because of their genetic make-up.

The populations on Jersey and Guernsey may have been introduced. Records from England and the USA (Kansas) come from released animals and are not shown on the map.

> **Native range:** Spain, Andorra, France, Monaco, Switzerland, Italy, San Marino, Slovenia, Croatia and Germany.

HABITAT

Lacerta bilineata lives in open, warm and sunny places with cover nearby: south-facing slopes, woodland edges, dry-stone walls, vineyards with grass, rough pasture, scrub with bramble and blackthorn, railway and road embankments, and open, sunny orchards. At the northern limit it prefers the slightly fresher and moister parts of the slopes to the very warmest and driest.

At night and in the cold part of the year the animals retreat into burrows in the ground. In Germany brumation lasts from September to the end of February or mid-March. The males emerge first, the females about four weeks later and the young in May. The mating season is April to June, the eggs are laid in May-June, and the young hatch from the end of August. In spring and autumn the animals are active in the middle of the day; in hot summers they hide during the hottest midday hours and are out in late morning and early afternoon.

Winter is cold, and the animals lie completely inactive in frost-free burrows.

Read more: Brumation and the seasons

Care

THE ENCLOSURE

Lacerta bilineata is large and active, likes to climb and uses the whole space. A pair or a male with two females needs an indoor enclosure of at least 150 × 60 × 75 cm (length × width × height), and larger is better. An enclosure of 90 × 40 × 40 cm is too small for adults.

The best solution is an outdoor enclosure in full sun of at least 2 × 1 m, facing south and with a sloping back wall, so that sun-facing slopes form. Here the animals get sunlight, a natural daily rhythm, cool nights and fresh air. Parts of the glass or the lid must be removable in summer, so that the sun reaches the animals directly. A tall, transparent wall gives shelter from the wind and extends the sun in the evening. In northern Europe the animals can stay outside from May to September. Year-round outdoor keeping requires a frost-free winter refuge deep in well-drained ground, but it is safer to bring the animals indoors for a brumation where the temperature can be controlled (see Temperature). In a cool northern European climate you cannot count on the eggs hatching outdoors, so they must go into an incubator.

Furnish with a mixture of dry and slightly moist substrate: sand and gravel in the dry part and a 5 cm deep soil layer in the moist part. Flat stones, root stumps, pieces of bark and branches provide basking spots and hides, and plants such as lavender, thyme and ivy give cover. The back wall can be covered with bark, so that the animals can climb. The lid must be tight and made of wire mesh, because the animals climb right up to it. Make hides at both ends.

A female that is about to lay needs a place with loose, slightly moist soil. A hollow of about 10 cm filled with peat, soil and sand and covered with a flat stone is easy to search when the eggs are to be removed. If she has no suitable place, she digs all over the enclosure and may become egg-bound.

Keep only one male in each enclosure. At most two females can live with him, and the enclosure must have many hides, so that a subordinate female can withdraw.

Read more: Incubating eggs

TEMPERATURE

Lacerta bilineata loves the sun. The basking spot needs a surface temperature of 38-45 °C, measured with an infrared thermometer, and the air in the rest of the enclosure is 22-30 °C by day, so that there is a clear gradient from a warm end to a cool end. Use spotlights aimed at flat stones, and guard the bulbs against contact.

At night the temperature may fall to 12-18 °C. This corresponds to natural cooling outdoors and to a cool living room. Night-time heat is not necessary.

Brumation is necessary and a prerequisite for breeding. In the wild the animals lie dormant for four to six months. In captivity light and heat are wound down over a couple of weeks from September-October. Feeding stops, but the animals are kept above 13 °C for at least two weeks after the last meal, so that the gut is empty before the temperature is lowered to 4-6 °C for 8-12 weeks. A refrigerator without a freezer compartment or a cold, frost-free cellar with two thermometers is the safest. The animals lie in a box with slightly moist, not wet, soil, sand and leaf litter, so that they can bury themselves. They must be well fattened up in late summer and autumn and be healthy and free of mites and intestinal worms (see Health). Outdoors the animals overwinter in pipes or chambers that go at least 40 cm down into well-drained ground, and in hard frost the area is covered with 20 cm of straw or leaves; in a cool northern European climate this solution is uncertain. Brumation is ended by raising temperature and light again. See also the theme on brumation.

Read more: Heat and temperature

HUMIDITY AND WATER

The humidity must be 40-60 %, with a slightly moister part and a dry part, so that the animals can choose for themselves. The enclosure must have good ventilation, and the substrate must not be constantly wet, as this causes skin problems and mites.

The animals drink a lot, especially after brumation and in warm periods, and after brumation they often drink for days before they start to eat. Provide a shallow water dish, and change the water every day. Now and then spray water over plants and stones, so that the animals can lick the droplets.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

Lacerta bilineata is diurnal and basks for several hours every day, so it needs strong light and UVB. Outdoors the UVB comes from the sun. Indoors, use a UVB tube for Ferguson zone 3 over the basking spot, so that the animal gets a UV index of 3-5 at its back; the distance is determined with a UV meter. Glass blocks UVB, so the tube must be inside the enclosure or above mesh.

Day length follows the season: 9-12 hours with fluorescent tubes, and the heat spot is on for 5-7 hours in the middle of the day. The light must be reduced in autumn and increased in spring, otherwise the animals do not fall into step with brumation. Replace UVB tubes according to the manufacturer's instructions.

Read more: Lighting and UVB

FEEDING

Lacerta bilineata feeds on beetles, grasshoppers, caterpillars, flies, moths, spiders, earthworms, woodlice, snails and other small animals, and large animals also take small lizards. Newborn mice are taken occasionally but are not necessary.

Give a varied diet: crickets, grasshoppers, mealworms, cockroaches, caterpillars, flies, earthworms and small snails, in sizes the animal can swallow whole. The feeder insects must be well gut-loaded. Dust the food with calcium and occasionally with a vitamin supplement containing D3, more often if the animals do not get UVB. Crushed cuttlebone on the substrate gives extra calcium.

Young are fed daily with small crickets and other small insects. Adults are fed every other day in the active season, as much as they eat in a few minutes. After brumation the animals eat only a little for the first few weeks. In late summer and autumn they are fed generously, so that they have reserves for the winter. Avoid obesity for the rest of the year.

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

BEHAVIOUR AND HANDLING

Lacerta bilineata is fast, wary and shy. A new animal takes a long time to settle in and hides at every approach until then. Feeding with tweezers makes the animal confident. Avoid grabbing it, because the tail is shed under stress.

The males are territorial and fight fiercely, so only one male can live in an enclosure. The females can be aggressive towards each other, especially in spring and when they are carrying eggs, and a gravid female can defend the egg-laying site so fiercely that the other animals must be removed. A pair or a male with two females in a large enclosure with many hides is possible; a pair is the safest. The male follows the female closely in the breeding season and may bite her, so check the female for wounds.

The species should not share an enclosure with other species. Move the animals as little as possible, because moving stresses them and reduces the chance of breeding.

Breeding

SEXUAL MATURITY AND SEXING

The male has a larger head, stronger femoral pores and a broader tail base than the female, and in the breeding season the sides of the head and throat are distinctly blue. The female has fewer, larger spots and often pale stripes on the back. In young the sex can only be seen after a few months, and mistakes are common.

In southern populations the females can breed from about one year of age. Young kept warm through the winter instead of resting grow faster and mature earlier, but this disturbs the animals' annual rhythm and is not recommended. Use only healthy, fully grown females for breeding.

MATING

Mating follows brumation. After brumation the animals are sluggish and bask a lot; the male wakes first, the female a few weeks later. The male sheds his skin and acquires his breeding colours. Mating begins when both are active, typically about one to three weeks after the female has woken. The male approaches the female, nudges her flanks and bites onto her tail while she drags him along. He then changes his grip to the flank, and mating takes place.

Several mating periods may follow one another, often after each clutch. Watch the animals for the first few days, and separate them if the female is wounded.

EGG-LAYING AND CLUTCHES

The female lays the eggs 2-4 weeks after mating. The clutch is 5-23 eggs, most often 9-13; young females lay the fewest. In the wild the female lays one clutch, in good years two with 3-4 weeks between them. In the enclosure the females often lay several clutches, on average 3-4 in a season.

Three to five days before laying, the female digs all over the enclosure, and shortly before laying she digs purposefully in one spot. Here there must be loose, slightly moist soil, otherwise she lays the eggs in dry sand, where they quickly dry out. The eggs are usually laid at night and often lie deep. Remove them as soon as they are laid, because rain can make them rot and heat can dry them out. The female may defend the egg-laying site, so take care.

INCUBATION

The eggs are placed in a moist substrate, such as vermiculite or fine sand, in a closed box with a little ventilation, so that they do not lie in water. At 28-30 °C they hatch after 45-80 days. At a lower temperature it takes longer. Healthy eggs are firm and plump, often with a pink tinge; eggs with many dents are often infertile.

REARING THE YOUNG

The young are 8-9 cm and about 1 g at hatching and start hunting after two to three days. Give small crickets, small mealworms, woodlice, meadow plankton and fly larvae, dusted with calcium. Young that are weaned onto fly larvae early also eat them later.

Keep the young in a small, dry and warm enclosure with sand, flat stones, dry grass and a water dish. A 25 W spotlight keeps it warm, and day length is 12 hours. A dry enclosure reduces problems with mites and ticks. The young may bite each other's tails, so many hides and, ideally, tufts of grass help. The sex can usually be seen after a few months.

When the young are half grown, they can be moved to a larger enclosure or outdoors. Small or weak young should not be brumated in their first year, but kept awake and fed.

Health and common mistakes

Most problems are caused by too little heat, too little UVB, a one-sided diet or too little space. The typical ones are:

- Metabolic bone disease from too little UVB and calcium. Provide UVB or sunlight, and dust the food.
- Mites and ticks, especially with a damp substrate and outdoors. Keep the substrate dry, and check the animals at every feeding.
- Intestinal worms and other parasites. New animals must be quarantined, and a faecal sample at the vet before brumation is a good idea.
- Wounds from fights or mating. Separate the animals if there are wounds.
- Lost tail. It grows back, but with a rod of cartilage instead of vertebrae.
- Poor brumation: thin, sick animals or animals overwintered too warm may die. If the animal is sick or underweight, it must not be brumated.
- Difficulty laying eggs, if there is no suitable place. The female is restless and digs; see a vet if she becomes weak.

Longevity has not been established for *Lacerta bilineata*; *Lacerta viridis* lives up to about 10 years in captivity.

A healthy animal has clear eyes, a plump tail base, smooth skin and a good appetite. See a vet with reptile experience if the animal is not eating, is losing weight, is breathing with its mouth open 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.