herpy

FROGS

Yellow-bellied Toad

Bombina variegata

Bombina variegata is a small, compact frog of 3-6 cm with a grey-brown, sharp-warted back and a bright yellow and blue-grey belly, which it displays when it feels threatened. The species lives in the mountains and hill country of central and southern Europe, favours small, sunny waterholes and is hardy, inquisitive and long-lived in the terrarium. It needs cool temperatures and a cool hibernation, but otherwise little space.

Family: Bombinatoridae

Mild skin toxins

KEY FACTS

THE ANIMAL

Adult size	**3-6 cm** snout-vent length
Weight	**2.3-12 g**
Lifespan	**10-20 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	**Beginner**

CARE

Min. enclosure	**60 × 30 × 30 cm** L × W × H for 4 adults
Temperature, day	**20-24 °C**
Temperature, night	**16-20 °C**
Humidity	**60-80%**
Water	**Water section** depth 5-10 cm
UVB	**Optional**
Winter rest	**5-10 °C** 8-12 weeks
Diet	**Insects and worms/snails**
Kept	**In pairs or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Tadpoles in water**
Egg-laying site	**In water**
Sexually mature	**12-24 months**
Eggs per clutch	**40-170**
Clutches per year	**1-3**
Hatching	**2-3 days**
Larval period	**25-70 days** from hatching to metamorphosis
Larval diet	**Algae/plants and complete diet**
Parental care	**None**

PROTECTION AND PAPERWORK

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

About the species

Bombina variegata is a small, compact frog with a rounded snout, prominent eyes and heart-shaped pupils. The eardrum cannot be seen from outside. The back is clay to grey-brown and covered in many pointed warts with small black horny spines, often with indistinct pale spots and dark glandular patches on the neck. The underside, including the inside of the

limbs, fingers and toes, is strongly yellow to orange with lead-grey to black spots or patches. As a rule more than half of the belly is yellow. The pattern differs from animal to animal, so each individual can be recognised by its belly.

Adults reach 3-6 cm from snout to vent and weigh 2.3-12 g; animals over 5 cm are rare. Females are slightly larger and rounder than males. Males call in late spring and early summer with a dull, melodic "uh ... uh ... uh". The call is weak, because the species has no vocal sacs.

The species was described by Linnaeus in 1758 as *Rana variegata*. In the Balkans there is a south-eastern form (*Bombina variegata scabra*), and the species' relative in the Apennines, *Bombina pachypus*, is now regarded as a separate species. In the areas where *B. variegata* meets *Bombina bombina*, the two species can cross.

The yellow belly is a warning. The skin gives off a toxic secretion, and when in danger the species arches its back so the undersides of belly and limbs flash up at the attacker. The secretion is not dangerous to humans but irritates mucous membranes strongly, so wash your hands every time you have touched the animals, the water or the furnishings.

Distribution and habitat

Bombina variegata lives in the mountains and hill country of central and southern Europe. The range runs from France through Belgium, the southernmost Netherlands (Limburg), Luxembourg, southern and central Germany, Switzerland, Liechtenstein and Austria to Italy north of the Po, the Czech Republic, Slovakia, the far southern edge of Poland, Hungary, Romania, Moldova and Ukraine. To the south it continues through Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia and Albania to Bulgaria and Greece.

In the east and south the range overlaps with *Bombina bombina*. In many places the populations are in decline and occur only in scattered, isolated areas.

> **Native range:** France, Belgium, Netherlands, Luxembourg, Germany, Switzerland, Liechtenstein, Austria, Italy, Czechia, Slovakia, Poland, Hungary, Romania, Moldova, Ukraine, Slovenia, Croatia, Bosnia & Herzegovina, Serbia, Montenegro, North Macedonia, Albania, Bulgaria and Greece.

HABITAT

B. variegata is one of the amphibians strongly tied to water. Originally it was a typical inhabitant of stream and river meadows, where the shifting course of the river constantly creates new, temporary small waters. Today it is found mostly in quarries, clay and gravel pits, on military training grounds and in wheel ruts, puddles and small ditches on clay soil. The waters are usually poor in plants and free of competing species and predators, and they are warmed quickly by the sun, so eggs and tadpoles develop quickly.

On land the animals seek cover under stones and dead wood and in crevices and cavities between rocks. The species is most active at dusk and at night and hunts insects such as beetles, ants and flies. The period from early autumn to mid-spring is spent in hibernation; how long depends on altitude. Mating takes place from May to June, but calling and egg-laying can come in up to three periods a year, often triggered by heavy rain, because the preferred small waters often appear only then.

The climate is temperate and relatively cool with cold winters. This is decisive for how the species must be kept: it does best at cooler temperatures than most terrarium animals.

Read more: Rearing tadpoles Read more: Brumation and the seasons

Care

THE ENCLOSURE

There are not many detailed husbandry accounts of *Bombina variegata*. The recommendations here are based on the species' way of life and on the close relative *Bombina orientalis*, which is far better known in captivity. The figures for the size of the terrarium are borrowed from it and adjusted for a slightly smaller species.

B. variegata is semi-aquatic and needs both water and land. Four adults need a terrarium of at least 60 × 30 × 30 cm, and a pair can be kept in 40 × 30 × 30 cm. The species sits on the ground or in the water and does not climb, so the terrarium must be longer and wider than it is tall. More animals require more floor area, and a group of ten animals needs at least 90 × 40 × 30 cm. A glass terrarium with ventilation in the side is better than a sealed tank, and the lid must fit completely, because the young in particular can climb glass.

About half the floor must be land and half water. The land section gets a drainage layer of gravel or expanded clay with unfertilised soil, moss and leaf litter on top. Use flat stones, cork bark and roots as hides, and put the hides both in and by the water, so the animals can always climb out. Damp hides under stones and dead wood imitate the places the species uses in the wild. Plants such as ferns, pothos and aquatic plants do well and give shade.

Never keep *B. variegata* with other species of the genus *Bombina*, as they can cross. Remove food remains quickly.

Read more: Terrarium construction and bioactive substrate

TEMPERATURE

The species is adapted to a temperate climate and should not be given heat like most terrarium animals. By day 20-24 °C is suitable, and at night it should be slightly cooler, 16-20 °C. Room temperature is often enough, and an extra heat source is rarely necessary. The temperature must not exceed 25 °C for long, and the terrarium must not stand in direct sun. If the room is too warm in summer, the terrarium can stand in a cool place such as a cellar or a north-facing room.

Hibernation is part of the species' natural annual rhythm and is recommended if the animals are to breed. In the wild it lasts from early autumn to mid-spring. In the terrarium the temperature and amount of light are lowered gradually during autumn, and feeding is stopped 2-3 weeks beforehand. The animals hibernate at 5-10 °C for 8-12 weeks, for example in a cold cellar or a refrigerator, individually or in small boxes with damp moss. Check them at least once a week. The temperature is raised gradually afterwards. The figures for hibernation are borrowed from *Bombina orientalis*. Only healthy, well-nourished animals should hibernate.

HUMIDITY AND MISTING

Humidity should be 60-80 %. The large water section holds most of the humidity, so it is normally enough to mist the land section lightly once a day, especially in a dry room in winter. Moss and soil on the land section must be damp but not wet, and there must always be damp hides. The animals must have a damp surface to sit on.

Good ventilation is just as important as humidity. Stagnant, saturated air causes mould and bacteria, so never close the ventilation completely.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

The water section should fill about half the floor area and be 5-10 cm deep. The animals like to lie at the surface or on floating plants and must be able to climb onto land easily, for example along sloping roots, flat stones or plants. The water should not be heated and normally sits at the same temperature as the air. The species lives in still water and needs no current; a small filter with gentle outflow can help keep the water clean.

Ordinary tap water can be used when chlorine and chloramine have been removed with a water conditioner. Change half of the water every week, more often without a filter or in a small terrarium. Amphibians absorb substances through the skin, so no soap, detergents, hand cream or insecticides must ever get into the water.

LIGHTING AND UVB

Give 12-14 hours of light in summer and down to about 10 hours in winter, controlled by a timer. An LED fixture provides the basic light and makes the plants thrive. No heat lamp is needed.

UVB is optional. The species manages without, but a weak UVB tube (Ferguson zone 1) over part of the land section can support vitamin D3 and bone building, and the animals must always be able to seek shade.

Read more: Lighting and UVB Read more: Calcium, vitamins and supplements

FEEDING

B. variegata has a large appetite and takes anything live that is small enough to fit in the mouth: crickets, small crickets, fruit flies, flies, woodlice, silverfish, small earthworms and small snails. Mealworms and waxworms are given only once in a while, because they are fatty. The animals rarely take dead food, so the food must move.

Adults are fed every second or third day with a few feeder insects at a time, young every day in small portions. Remove feeders the animals do not take, so they do not hide or drown. The feeders are fed well a couple of days beforehand and are dusted with a vitamin and mineral powder at every second or third feeding, for young at every feeding.

Read more: Feeder animals: keeping and breeding

BEHAVIOUR AND HANDLING

B. variegata is inquisitive and sociable and can be kept in pairs or in groups. The animals should be roughly the same size, because large animals can eat small ones, and at feeding they can become a little pushy. In the breeding season the males call, and they defend a small area in the water by kicking up waves with their hind legs. When two males meet, they try to climb onto each other's back until one gives up and swims away.

When in danger the species shows its yellow belly. Pick the animals up only when necessary, with wet hands or a clean, damp plastic tub, and wash your hands afterwards. The skin is delicate, and the secretion irritates eyes, nose and mouth. For cleaning, the animals are moved to a plastic box with damp kitchen paper and a lid with air holes.

Breeding

SEXUAL MATURITY AND SEXING

Females are slightly larger and rounder than males, and in the breeding season the males call. Sex can be hard to determine in young animals, so the easiest route to a pair is to acquire a group of four or more.

The animals become sexually mature after 1-2 hibernations, that is at the age of 1-2 years. They reach full adult size after a few years.

MATING

Hibernation is the prerequisite for breeding. Shortly after dormancy the males begin to call in the water. The call is weak and is repeated more than 40 times a minute. A change to cooler water and heavy misting imitate rain and often trigger both calling and egg-laying. Mating begins in spring and can extend into summer.

The male grips the female around the waist in front of the hind legs, not behind the forelegs as in most frogs and toads, and the pair sits together until the eggs are laid in the water.

EGGS AND TADPOLES

The pair attaches the eggs in loose clumps of 2-30 eggs on aquatic plants, stems and other things in the water. A clutch is typically about 70 eggs, and a female lays a total of 120-170 eggs a year, spread over up to three periods. There is no parental care, and the adults readily eat eggs and tadpoles.

The eggs measure 1.5-2 mm, and the jelly capsule 5-8 mm. Move them after a day to a separate tub, for example a small aquarium with aquatic plants and a little gravel. Remove white, unfertilised eggs before they go mouldy.

METAMORPHOSIS

The eggs hatch after 2-3 days. For the first days the tadpoles are completely still while they use up the yolk. After that they swim about and are fed several times a day in small portions: fish flakes, scalded nettles, dandelion and lettuce, supplemented with water fleas and artemia. Give each tadpole at least one litre of water, because in dense groups they inhibit each other's growth. Change part of the water almost every day.

The larval period lasts 25-70 days, usually 6-10 weeks, and depends on temperature: in warm water it goes quickly, in cool water it takes longer. The tadpoles reach up to 55 mm in length, and the water must be well oxygenated. First they get hind legs, then forelegs. When the forelimbs break through, the tadpoles are moved to a tub with a few millimetres of water and many stones and pieces of cork that they can climb onto easily, otherwise they drown. The newly metamorphosed young measure 12-16 mm.

REARING THE YOUNG

The young are kept in small plastic boxes or terrariums with damp kitchen paper at first and later moss and cork bark as a hide. They begin to eat when the tail is almost gone. For the first weeks they need plenty of small feeder insects such as fruit flies, springtails and small crickets.

Always dust the food with vitamin and mineral powder, because fast-growing young easily develop bone disease. Keep the young in groups of roughly the same size, and sort them if some grow more slowly. They can move into the adult terrarium when they are 2-3 cm.

Health and common mistakes

B. variegata is hardy, and most problems are caused by husbandry errors:

- Overheating from long periods above 25 °C or direct sun. The species is adapted to a cool climate.
- Chytrid fungus (*Batrachochytrium dendrobatidis*). The species can both carry it and fall ill from it. Quarantine new animals, and have them tested with a skin swab.
- Bone disease in young when the food is not dusted with vitamins and minerals. The signs are crooked or short limbs and poor growth.
- Skin infections from dirty water. Change water regularly, and remove food remains.
- Obesity from too much and too fatty food.

See a vet with amphibian expertise if an animal stops eating, gets red spots, swellings or sores, or sits lethargically and does not respond.

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.