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FROGS

Oriental Fire-bellied Toad

Bombina orientalis

Bombina orientalis is a robust, semi-aquatic frog of 4-6 cm with a green, warty back and a bright red, black-spotted belly, which it shows off when it feels threatened. It is active by day, tolerates room temperature, readily takes ordinary feeder insects and can live for many years. It is therefore one of the best species to start with if you want to keep frogs.

Family: Bombinatoridae Former name: *Bombinator orientalis* **Mild skin toxins**

KEY FACTS

THE ANIMAL

Adult size	**4-6 cm** snout-vent length
Lifespan	**10-20 years**
Active	**By day and at dusk**
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 × 40 cm** L × W × H for 4 adults
Temperature, day	**22-28 °C**
Temperature, night	**16-20 °C**
Humidity	**50-80%**
Water	**Aquaterrarium** depth 5-10 cm
Water temperature	**18-22 °C**
UVB	**Recommended** Ferguson zone 1
Winter rest	**3-8 °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	**12-18 months**
Eggs per clutch	**2-150**
Clutches per year	**2-8**
Hatching	**3-10 days** at 15-25 °C
Larval period	**30-90 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 orientalis is a small, flat and compact frog with a round head, prominent eyes and triangular to heart-shaped pupils, which are typical of the genus. The back is grass-green to green-brown or brown with black spots and covered in distinct warts. The belly is bright red to orange-red with a network of black spots, and the tips of the toes are red too. The red colour

comes from carotenoids in the diet, so captive-bred animals that do not get them develop a yellow belly (see Feeding). Blue, partly black and yellow albino forms are also found in enclosures.

Adults reach 4-6 cm from snout to vent. The male is slimmer than the female, but has stronger arms, coarser and more warty skin and better developed webbing on the hind feet. In the breeding season he develops dark nuptial pads on the inside of the forearms. The female is rounder and more sturdily built. Weight is not documented.

The species was described by Boulenger in 1890 as *Bombinator orientalis* from animals from Yantai in north-eastern China. Two subspecies have been described, but more recent genetic studies support that *B. orientalis* is one species with several forms.

The colours are a warning. The skin contains a mixture of toxins, including bombinin, and when in danger the frog releases a whitish, bitter secretion, mostly from the thighs and belly. If attacked, it arches its back and lifts its head, arms and legs so that the red belly flashes at the attacker. Animals in enclosures rarely do this, because they quickly learn that humans are not dangerous. For humans the secretion is harmless on intact skin, but if it gets into the eyes, nose or mouth, it stings and causes watery eyes and a runny nose resembling hay fever, which passes by itself. The skin toxicity is therefore set to mild: wash your hands every time you have touched the animal, the water or the furnishings.

In the enclosure the species is curious, active and often sits out in the open. The animals quickly become so tame that they take food from tweezers.

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

Distribution and habitat

Bombina orientalis lives in north-eastern Asia: north-eastern China, the whole Korean Peninsula and the far south-eastern part of Russia (Primorye and the area around Khabarovsk). In Russia it is rare, and the northernmost known occurrence is at 48° 40' north. Japan has been mentioned in the past, but the species has not been found there, and the country is not shown on the map.

There are introduced populations outside the original range, including near Beijing and in Shandong in China, and escaped animals have been reported in Florida. They are not part of the natural range. The species must never be released in Europe, where it can hybridise with the native species of the genus *Bombina*.

> **Native range:** China, North Korea, South Korea and Russia.

HABITAT

B. orientalis is a lowland species, mostly found up to about 500 m and in a few places up to 1,100 m. It prefers small, often temporary bodies of water in mixed forest, grassland, scrub and marsh: ponds, ditches, flooded meadows, slow-flowing streams, rice paddies and water-filled wheel ruts. The species is tolerant of human interference and has been seen breeding in heavily polluted water.

In summer the animals stay mostly in or by the water, where they lie at the surface or on floating plants. In late summer many go onto land, up to a couple of hundred metres from the water. The species is active throughout the day with a peak at dusk and in the early evening. In the northern populations the winter rest lasts from the end of September to the end of April or the beginning of May, and the animals hibernate on land in frost-free refuges such as rotting logs, piles of stones and leaf litter.

Care

THE ENCLOSURE

Bombina orientalis spends much of its time in the water, so it needs an aquaterrarium in which about two thirds of the floor area is water and one third land. Four adults need an aquaterrarium of at least 60 × 30 × 40 cm, and a group of up to ten animals needs at least 80 × 50 × 40 cm. The species does best in a group of at least four, preferably with equal numbers of males and females or mostly females.

Water and land can be separated by a glass pane 5-16 cm high, glued in, or by large stones, cork and roots. The land area gets a drainage layer of gravel or expanded clay with unfertilised soil on top, covered with moss and leaf litter. Roots, stones and cork bark provide caves and crevices to hide in. Ferns, Java moss, pothos, ficus and dracaena do well and can hang out over

the water, making it easier to climb out. The water area can have gravel or sand on the bottom, underwater plants and floating plants, which the animals like to lie on, but there must also be open water.

A glass enclosure with ventilation in the side is better than an aquarium, because the animals perceive a hand from above as a danger, and because an aquarium is poorly ventilated. The lid must fit completely tight, because the young in particular can climb vertical glass. Never keep *B. orientalis* together with other species of the genus, as they hybridise, and remove food remains quickly.

Read more: Terrarium construction and bioactive substrate

TEMPERATURE

The species does fine at room temperature. During the day 22-28 °C is suitable, and at night it may fall to 16-20 °C. A difference within the enclosure is good: warmest under the light, cooler in the hides. Normally the lighting alone can provide the heat that is needed. If the room is too cold, put a heat mat or heating cable on the side or under part of the bottom, never under the whole bottom. Avoid longer periods above 28 °C, and do not place the enclosure in direct sun.

A winter rest is healthy for the species and necessary if you want it to breed. Lower the temperature and the photoperiod gradually during the autumn, and stop feeding 2-3 weeks beforehand so that the gut is empty. The animals hibernate at 3-8 °C for 8-12 weeks, for example in a cold cellar or a refrigerator, separately or together in small plastic boxes half filled with damp moss. Check them at least once a week. The animals lose almost no weight during dormancy. Afterwards they spend a couple of days in a box with a few millimetres of water at room temperature before they are fed again and return to the enclosure. Only healthy, well-nourished animals should undergo winter rest.

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

HUMIDITY AND MISTING

Humidity should be 50-80 %. The large water section does most of the work, so it is rarely necessary to mist more than lightly once a day on the land section, especially in a dry room in winter. The moss and soil on the land section must be moist but not wet, and there must be damp hides.

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 must be 5-10 cm deep, and the animals must always be able to climb out easily, e.g. up a sloping root, flat stones or plants. *B. orientalis* seldom swims under water but likes to lie at the surface. The water needs no heating and is normally 18-22 °C by itself. The species lives in still water and should not have a current, but a small filter with gentle outflow helps keep the water clean.

The species makes no special demands on the water, and ordinary tap water can be used once chlorine and chloramine have been removed with a water conditioner, or once the water has stood overnight. Change half of the water every week, and more often without a filter or in a small enclosure. Amphibians absorb substances through the skin, so soap, cleaning agents, hand cream or insecticides must never get into the water.

LIGHTING AND UVB

Give 12-14 hours of light in summer and slightly shorter days in spring and autumn, controlled by a timer. An LED fitting or a fluorescent tube provides the basic light, and a weak spot over the land area can give a warm basking spot.

UVB is recommended. With UVB, *B. orientalis* has a higher level of vitamin D3 in the blood, a stronger skeleton and shows its natural colours faster, even when the food contains D3. Use a weak UVB tube (Ferguson zone 1) over one end of the land area, and provide shade in the rest of the enclosure. The zone is common practice, not measured for the species.

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

FEEDING

B. orientalis cannot shoot out its tongue, but catches its prey with a hop of a couple of cm and stuffs larger prey in with its front legs. The food must move, and dead animals are normally not taken. Give ordinary feeder insects of suitable size: crickets, field crickets, flies, fruit flies, silverfish, woodlice, aphids, earthworms and small snails. Mealworms are fatty and

should be given only occasionally, and fly larvae should be avoided because they often pass through undigested. Tubifex and water fleas must be rinsed thoroughly and should come only from breeders, as animals from the wild can carry chytrid fungus.

Adults are fed 2-3 times a week, juveniles every day. Give only as much as the adults can take in a few minutes, because otherwise the rest hides or drowns in the water.

Feed the feeder insects well for a couple of days before they are offered, and dust them with a vitamin and mineral powder at every second or third feeding. For juveniles, dust at every feeding. The belly's red colour requires carotenoids: carrots, red pepper, parsley and spinach for the feeder insects or a powder with canthaxanthin. Without them, captive-bred animals become yellow on the belly. This does not harm them, and the colour can be corrected later with the right food.

Read more: Feeder animals: keeping and breeding Read more: Quarantine and hygiene

BEHAVIOUR AND HANDLING

The species is curious and active for most of the day and is often seen out in the open on land or in the water. *B. orientalis* is sociable and can be kept in pairs or groups, and the sexes can live together all year. In the breeding season the enclosure becomes lively: the males push rivals away with their hind legs and cling to anything that moves, including other males, who then give a release call.

The call is weak and short and is produced on the in-breath, not the out-breath as in most frogs. The males call at the surface in the evening, sometimes for hours, but so quietly that it rarely bothers anyone in the house.

Pick the animals up only when necessary. The skin is delicate, and the secretion can irritate the eyes and mouth. Use wet hands or a clean, moist plastic tub, and wash your hands afterwards. During cleaning the animals are moved to a plastic box with damp kitchen paper and a lid with air holes.

Breeding

SEXUAL MATURITY AND SEXING

Males are recognised by coarser, more warty skin, a slimmer body, stronger arms and larger webbing. In the breeding season they develop dark nuptial pads on the inside of the forearms, and they begin to show already during the winter rest. Females are rounder, and after winter they become thicker because they carry eggs.

Juveniles that are fed well reach 3-4 cm in half a year and become sexually mature after about 1-1.5 years. They reach full adult size after 2-3 years. The easiest way to secure a pair is to buy a group of four or more.

MATING

The winter rest is the prerequisite for breeding, and eggs rarely appear without it. Shortly after dormancy the males begin to call while floating at the surface. A drop in air pressure before rain gives more calling, and you can help with a water change using cooler water and misting. The mating season lasts from spring to late summer, and in the wild the species breeds from May to mid-August.

When a female is ready, the male grasps her around the waist in front of the thighs. The pair may sit together for several days until egg-laying takes place in the water, often triggered by rain in the evening. If a pair is sitting together, they can be moved to a separate spawning tank so that the eggs do not have to be collected throughout the enclosure.

EGGS AND TADPOLES

The eggs are laid in small clumps of up to 20 eggs, which are attached to aquatic plants, stones or other things in the water. Each laying produces from two to several dozen eggs, in large, older females up to 100-150. The female lays eggs 2-4 times in the summer, sometimes up to 8 times, and a well-nourished female can reach about 350 eggs in a season. The number normally falls with each laying. There is no parental care, and the adults readily eat eggs and tadpoles.

Leave the eggs for a day before they are moved, because fertilisation often takes place only after a few hours. Then move them to a separate tank. The tadpoles can be reared in a group when they are roughly the same size, but give each tadpole 1-2 litres of water, because in dense groups they inhibit each other's growth. A little gravel on the bottom and some aquatic plants are enough. Change part of the water almost every day, but not all of it at once. Remove white, unfertilised eggs before they go mouldy.

In the first days the larvae live on the yolk. After that, feed several times a day in small portions: fish food flakes, scalded nettles, dandelion, lettuce and leaf litter, supplemented with water fleas, artemia or chopped tubifex.

Read more: Rearing tadpoles

METAMORPHOSIS

The eggs hatch after 3-10 days, depending on temperature. The water can be 15-25 °C, but the low end gives slower development, larger tadpoles and stronger young. At room temperature the tadpoles get hind legs after 1-3 weeks and front legs after a further 1-2 weeks, so metamorphosis is complete after about a month. In cool water it takes longer, up to about three months, and in the wild metamorphosis begins after 10-14 weeks.

When the front legs break through, the tadpoles must be moved to a tub with a few millimetres of water and many stones and pieces of cork that they can easily climb onto, or to a box with damp kitchen paper, set at a slant so that there is a little water at one end. Otherwise they drown easily. It takes a few days before the tail is completely gone, and the young then measure 9-25 mm, depending on the temperature during growth.

REARING THE YOUNG

The juveniles are reared in small plastic boxes or enclosures with damp kitchen paper at first and later moss and other damp substrate with cork bark and plants as hides. They begin to eat only when the tail is almost gone. For the first four weeks they need plenty of small feeder insects such as fruit flies, springtails and small crickets, because they are not skilled hunters yet.

Always dust the food with vitamin and mineral powder, because the fast-growing juveniles easily develop bone disease. The juveniles are olive-brown above and whitish to pink underneath. After about four weeks the back turns green, and the belly gets colour if the food contains carotenoids. After half a year they are 3-4 cm and can move into an ordinary aquaterrarium.

Health and common mistakes

B. orientalis is hardy, and most problems are caused by mistakes in husbandry:

- Chytrid fungus (*Batrachochytrium dendrobatidis*). The species can both carry it and fall ill from it and can also spread *B. salamandrivorans*, which is deadly to salamanders. Quarantine new animals, and have them tested with a skin swab.
- Bone disease in juveniles when the food is not dusted with vitamins and minerals. The signs are crooked or short limbs and poor growth.
- Yellow belly in captive-bred animals without carotenoids in the diet. It is only a cosmetic problem.
- Skin infections from dirty water. Change the water regularly, and remove food remains.
- Overheating from longer periods above 28 °C or direct sun.
- Obesity from too much and too fatty food, for example many mealworms.

Seek a vet with knowledge of amphibians if an animal stops eating, develops red spots, swellings or sores, or sits listlessly and does not react.

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.