citizen conservation

#Amphibians

Basic Information and Husbandry Guidelines for *Gastrotheca lojana*, the Lojanan marsupial frog

As of 21 March 2026 | *Gastrotheca lojana* | Photo: Wikiri

Contents

1. Profile

Scientific name: *Gastrotheca lojana* Parker, 1932
Common Names: Lojanan Marsupial Frog; Span.: Rana Marsupial Lojana
Head-torso length: females up to a maximum of 7.6 cm, males up to 6.1 cm
CC#Amphibians-Category: II, for advanced keepers
Threat status according to the IUCN Red List: Vulnerable (VU); assessment from 2016, but according to a more recent assessment, an upgrade to 'Critically Endangered' (CR) is necessary.
CITES protection status: no
EU protection status: no
Keeping: For a pair, a terrarium measuring at least 50 x 50 x 60 cm (length x width x height) is required; in larger tanks, group housing is also possible. 16–24 °C during the day (preferably in the cooler range of 16–20 °C); 10–18 °C at night (again, preferably in the cooler range). High humidity at night, spray twice daily. Three-month dry season.
Required equipment: Water bowl, climbing branches, dense planting. For hygienic reasons, substrate is not necessary. Simple basic lighting plus spotlights for heat islands, preferably a lamp with UV component in the light. Sprinkler system or atomiser for regular spraying. Remove faeces and debris as quickly as possible, e.g. using long tweezers. For breeding tadpoles, use water bowls, with an air stone if necessary, or an aquarium, small breeding terrariums for young frogs.
Feeding: Live invertebrate food animals such as crickets, cockroaches, flies, woodlice, etc., appropriate for the size of the frogs. Enrich the food animals with a nutritious diet and dust them with calcium-vitamin powder and pollen. Feed 2–3 times a week. Feed the tadpoles with standard fish flake food and blanched wild herbs, feed daily, change part of the water frequently.

2. Why is *Gastrotheca lojana* a citizen conservation species?

The spectacular reproductive biology of marsupial frogs exemplifies the incredible diversity of reproductive strategies among amphibians. *Gastrotheca lojana* is ideally suited to generating interest, understanding and sympathy for amphibians in general and their precarious situation in the face of the biodiversity crisis. The Loja marsupial frog can be considered an ideal ambassador species, especially since these round frogs are found to be exceptionally appealing by many human observers.

Citizen Conservation has imported the first Lojanan marsupial frogs directly from Ecuador from the amphibian conservation project Centro Jambatu/Wikiri to establish a conservation breeding programme in Europe. CC curator Johannes Penner (right) and Lukas Reese from Karlsruhe Zoo collect the shipment at Frankfurt Airport. | Timo Deible

The Lojanan marsupial frog is endemic to the southern Andes of Ecuador, occurring only in the provinces of Azuay, Loja and El Oro at altitudes of 1,650 to 3,300 metres above sea level. Parts of its range are intensively used by humans and are relatively densely populated. In many places, the natural vegetation has been destroyed to make way for agricultural and forestry land. Environmental pollution is damaging the natural waterways. The tadpoles need clear water to develop successfully.

Intensive recreational use and the introduction of non-native fish species are further contributing to the fact that natural waters are increasingly unusable for marsh frogs. Chickens and cats prey on adult animals. Recent searches have failed to find any specimens in places where the frogs used to be common. There are no strictly protected nature reserves in the species' range, and only a few sightings of the species have been documented in less strictly protected areas of the region. According to the latest assessment, *G. lojana* must now be upgraded to the highest threat category on the Red List for species still found in the wild: critically endangered. This new assessment has not yet been reflected in the official IUCN Red List, which always reacts with some delay in this regard; there, the species is still classified as 'only' vulnerable, based on an assessment from 2016.

However, the reality is that the threat level is considerably more dramatic and there is little prospect of the situation improving in the short term, making it urgently necessary to establish and maintain populations in human care for safety reasons. In Ecuador, the Centro Jambatu, which specialises in amphibians, has started such a conservation breeding programme. Citizen Conservation is helping by establishing an ex-situ population in Europe and supporting the work of the Centro Jambatu by purchasing the founder animals.

Knowledge about the biology and care requirements of *G. lojana* is still very limited. Essentially, findings about other related marsupial frog species from similar biotopes must be used. It is also CC's goal to collect reliable data on the care, reproduction and other biological data for *G. lojana*. These findings also serve the purpose of species conservation.

3. Biology and conservation

3.1 Biology
- Systematics

The Lojanan marsupial frog is a member of the relatively small but particularly interesting Hemiphractidae family of frogs, which are notable for their unusual breeding biology. With 77 species, marsupial frogs (*Gastrotheca*) form the largest genus within this family. They are found from southern Central America to northern Argentina and mainly inhabit medium to high altitudes.

Gastrotheca lojana was described by Parker in 1932 as a subspecies of *G. marsupiata*, and was subsequently considered a synonym of *G. monticola* until it was finally recognised as a separate species. The genus is often divided into three subgenera. *Gastrotheca lojana* belongs to the subgenus *Duellmania* (Duellman 2015).

The genus name *Gastrotheca* is derived from the Greek words 'gastros' for 'belly' and "theke" for 'container'. It refers to the spectacular reproductive biology of these frogs, in which the females store and incubate their eggs in a brood pouch on their backs rather than their bellies. The species name 'lojana' refers to the type locality, the city of Loja in the province of Loja in southern Ecuador.

One of the few marsupial frogs common in the lowlands is the curious *Gastrotheca cornuta*. | Amadeus Plewnia

Gastrotheca pseustes also originates from the Andean highlands of Ecuador. | Amadeus Plewnia

Location where *Gastrotheca lojana* was found in Oña, Azuay Province; tadpoles were also found in the small pool.
| Luis A. Coloma

- Distribution and habitat

Gastrotheca lojana is endemic to the southern Andes of Ecuador. There, it inhabits basins at altitudes of 1,676–3,279 m in the provinces of Azuay, Loja and El Oro. Its total range covers an area of approximately 6,000 km² (Coloma & Duellman 2025).

They inhabit clearings, open areas and sometimes forests in the evergreen cloud forests, evergreen scrubland and even the grasslands of the high-altitude páramo. During the day, the animals can be found hiding in agaves and under rocks, and at night they sit on vegetation. The average annual rainfall in their natural habitat varies between 566 and 1,066 mm, with a dry period lasting several months. The average annual temperature is 14.4 °C. The average annual temperature is calculated from the daily averages. These do not vary greatly over the course of the year near the equator, but temperatures can vary considerably during the day, especially in the highlands. During the day, air temperatures are around 19 °C, while at night they drop to 10 °C.

High variability in colouration and markings: six males ...

... and six females of *Gastrotheca lojana* | Wikiri

- Description

Gastrotheca lojana is a medium-sized frog that resembles a typical tree frog. The animals are strongly built, roundish, and appear almost somewhat plump. The head is rounded and the eardrums are clearly visible. The fingers and toes end in enlarged sucker-like end joints with adhesive discs, which enable the frogs to maintain a secure grip when climbing. There are slightly pronounced webbing between the toes, but none between the fingers.

The maximum body length is 7.6 cm for females and 6.1 cm for males (Colóma & Duellman 2025).

The species is extremely variable in colour and pattern. The basic colouring can be brownish, beige or greenish. Typical are two broad, dark longitudinal stripes on the back, running to the right and left of the spine. The length and width of these stripes can vary greatly: in some animals, they begin at the top of the head and cover practically the entire back, so that only remnants of the lighter basic colouring are visible, but in most cases they start at the neck and run to the end of the back, becoming wider in the middle. The sides are usually dark in colour, but sometimes this dark colouring is only visible in patches on the basic colouring. A narrow white dorsolateral line sometimes runs between the side and back colouring. The legs may have more or less broad dark transverse bands or be unmarked. The front legs are unmarked or gently speckled with dark spots. The belly is whitish and marked with dark dots to small spots of varying intensity.

The eyes are large, typical of tree frogs, and protrude laterally. The skin is finely granulated. The males have a pronounced vocal sac on their throat, which appears slightly pink when inflated.

Further anatomical details and distinguishing features from other *Gastrotheca* species are listed in Colóma & Duellman (2025) and Duellman (2015).

Female *Gastrotheca lojana* – the pouch opening on the female's rear back is clearly visible. | Stefan Höss

- Sexual dimorphism

The sexes cannot be distinguished by colouring and patterning. Females can be recognised by their larger size and fuller build, but above all by the arched opening of the brood pouch at the rear end of their backs.

Males can also be recognised by their calls, and during the mating season they develop dark calluses on their hands.

Gastrotheca lojana in its natural habitat (Oña, Azuay Province)
| Luis A. Coloma

Marsupial frogs in the highlands of Ecuador deposit their tadpoles in puddles like these (here: habitat of *Gastrotheca cuencana* near Cuenca, at an altitude of 3,100 metres).
| Karl-Heinz Jungfer

- Behaviour

The Lojanan marsupial frog has been found at heights of up to 1.3 metres in bushes and totora reeds. It is mainly crepuscular and nocturnal, climbing in bushes and on leaves as well as moving around on the ground. It is sometimes found under stones. The males call mainly at night from agave leaves or raised stones, but sometimes also while sitting in the grass. They fill their vocal sac with air, causing it to bulge out like a balloon under their throat. A single call consists of a note lasting about half a second, sometimes followed by 1–2 shorter notes.

Reproduction in *G. lojana* apparently takes place throughout the year. In the natural habitat, tadpoles were observed during excursions in January, June, October and November (Centro Jambatu/Wikiri, written communication). However, when kept in terrariums in Ecuador, each female reproduced only once a year.

Amplexus takes place on land and axillarily, meaning that the male sits on the female's back and clasped her behind the armpits of her front legs. The pairs remain in amplexus for about 3–6 days. Before the eggs are released, the male distributes his semen over the rear back area of the female, especially in front of the opening of the brood pouch, and also pushes some of it into the pouch. Finally, during egg laying, the eggs (research has counted around 200–250 eggs in the brood pouch) are pushed by the male through the seminal fluid into the rear opening of the female's brood pouch on her back.

The eggs and, initially, the tadpoles that hatch from them develop in this brood pouch. They are embedded in gill-like membranes, known as bell gills – a tissue densely covered with capillaries and therefore rich in blood, which creates a placenta-like direct connection between the embryo and the mother's organism. This enables direct gas exchange and possibly also a certain exchange of nutrients (matrotrophy). However, the embryos also feed on the yolk reserves in the egg.

In *G. lojana*, the female releases the fully grown but still legless black tadpoles, which are about 4–6 cm long, into a body of water. To do this, she opens the brood pouch with a toe on her hind foot so that the tadpoles can escape into the open water, where they continue to develop. During the birth process, the nutrient tissue from inside the skin pouch is also expelled, as are sometimes a large number of unfertilised eggs.

The entire development period until metamorphosis takes 80 days in water at a temperature of 18.5 °C and a pH value of 7.2 (Coloma & Duellman 2025).

3.2 Threat Situation

Undisturbed habitats such as this one near Cuenca at an altitude of 3,100 metres, home to the closely related species *Gastrotheca cuencana*, have become rare in the densely populated and intensively farmed highlands of Ecuador.
| Karl-Heinz Jungfer

On the IUCN Red List, *Gastrotheca lojana* is still listed as 'only' vulnerable (VU) (IUCN SSC Amphibian Specialist Group 2019). However, this assessment dates from 2016 and was published in 2019. Much more recent is the assessment by Ortega-Andrade et al. (2021), who already classify the species in the highest threat category for species still occurring in the wild, namely as 'critically endangered' (CR). Due to the somewhat slow mechanisms of Red List processing, this assessment will only be included in the official IUCN Red List after some delay.

Although its distribution area of around 6,000 km² is not excessively small and the species can also survive in partially disturbed habitats, the large-scale destruction and fragmentation of its habitat (especially its spawning grounds) is too extensive. As is so often the case, the reason for the destruction of habitats is the expansion of areas intensively used by humans for cities, settlements and agriculture. The natural vegetation has been cleared and converted over large areas throughout almost the entire distribution range. Today, the area is predominantly covered by pasture and arable land as well as forestry plantations consisting of eucalyptus and pine trees, which cannot be used by the frogs. In addition, there are introduced fish species such as trout and carp in the spawning waters, as well as intensive tourist and recreational use of the waters (Coloma & Duellman 2025) and domestic animals such as cats and chickens. In Loja and the surrounding area, where *G. lojana* used to be common, no specimens have been found in recent years (Coloma & Duellman 2025).

3.3 Conservation Efforts

Wikiri Sapoparque in Quito, Ecuador | Steven Guevara S.

Breeding facilities at the Centro Jambatu in Quito, Ecuador | Steven Guevara S.

Unfortunately, there is no state or private nature reserve where the species occurs. Only in the Macizo del Cajas, Podocarpus-El Cóndor and Bosque Seco biosphere reserves have isolated finds been reported (Coloma & Duellman 2025).

Due to the threat to the species, the Centro Jambatu, based in the Ecuadorian capital Quito, has taken in specimens of *Gastrotheca lojana* (from Oña, Azuay Province) and started a conservation breeding programme. Animals from this conservation breeding programme have been imported to Europe via the partner company Wikiri with the permission of the Ecuadorian authorities.

The founding animals of Citizen Conservation originate from an import from Ecuador via Wikiri carried out by CC itself. On the one hand, CC has thus financially supported the work of Wikiri and Centro Jambatu, and on the other hand, a further ex-situ population is now to be established in Europe as a 'backup' within the framework of CC.

4. Keeping

The Lojanan marsupial frog is still largely unknown in terrarium keeping. The only information on breeding comes from the Ecuadorian organisations Centro Jambatu and Wikiri. For this reason, CC has initially classified the species in category 2, meaning it is only suitable for advanced keepers.

The closely related Riobamba marsupial frog (*Gastrotheca riobambae*), which occurs in a comparable habitat and at a similar altitude in central and northern Ecuador, is, on the other hand, a species that is quite well known in terrariums. It can therefore be reasonably assumed that experience gained from keeping *G. riobambae* can be transferred to *G. lojana*.

The Lojanan marsupial frogs cared for at CC are descendants of animals that were taken from the wild in Oña, in the province of Azuay. They were kept and bred at the Centro Jambatu.

While there is little experience with keeping *Gastrotheca lojana* in terrariums and breeding them in captivity, the very similar sister species *G. riobambae*, which occurs in a comparable habitat, is regularly bred in terrariums in Europe | Darina Schmidt

Although temperatures in the natural habitat of *G. lojana* are lower in summer than those normally available in Central Europe during the course of the year when kept indoors without cooling, experience with G. riobambae suggests that it is nevertheless possible to keep them successfully. In any case, temporary outdoor keeping of the frogs should be feasible and probably have a positive effect on long-term keeping and breeding.

Due to a lack of experience with breeding in Central Europe, the following breeding recommendations are based on experience with other marsupial frogs, which was largely contributed by Christian Proy. In addition, the article by Darina Schmidt (2016) on the breeding of *G. riobambae* was also consulted.

Basic terrarium knowledge is required for participation in CC and must be demonstrated to the CC office before taking on the animals, either through formal certification, such as that offered by DGHT/VDA Sachkunde GbR, or by communicating previous terrarium experience and knowledge to the CC office.
Such basic knowledge is therefore not covered in our keeping recommendations.

In principle, the provisions of the general CC guidelines and the boarding agreement apply to all CC animals.

4.1 Requirements and documentation obligations

Gastrotheca lojana is not protected by international agreements, the species is not covered by the EU Species Protection Regulation, and keeping it in Germany does not require registration or authorisation. Of course, the basic legal provisions for keeping animals must be observed locally, as these may vary from country to country. In Germany, for example, these are the basic provisions of the Animal Welfare Act, which apply to the keeping of all animals.

At CC, keepers always receive the animals with a certificate of origin. Accordingly, when handing over their animals, CC breeders must ensure that they complete and sign the 'Certificate of Origin and Transfer' form provided by CC. This form should not only indicate the origin of the offspring's parents, but also that of the parents' parents. This ensures complete documentation. Even though this is not required by law, it facilitates the coordination of conservation breeding and proves legal ownership should the species later be placed under protection.
All documents relating to transfers within CC or from CC must be emailed immediately as a scan or photo to the CC office (amphibians@citizen-conservation.org). Please observe this rule, as otherwise the CC office will have to make enquiries, which consumes unnecessary resources and, in total, means a rather high amount of unnecessary additional work that we would rather invest in expanding our conservation breeding programmes or other tasks.
All CC animals are the property of the non-profit Citizen Conservation Foundation gGmbH. This also applies to all offspring (see CC guidelines and placement agreement). Owners are therefore not permitted to give away or sell the offspring themselves.

Offspring are distributed within the project as long as this makes sense in terms of population management. If offspring cannot or should not be distributed within the project, they may be given away to outside parties after prior consultation with the CC office or may be arranged by the CC office, e.g. to licensed dealers. The proceeds from this go to CC and contribute to the financing of our species conservation programmes. Transfer to the trade therefore also supports CC's species conservation work, not least because it greatly reduces the motivation for potential smuggling from the country of origin.
An essential part of CC is the coordination of our stock, which is why we must always be informed about its development. Twice a year, CC participants are therefore contractually obliged to submit a stock report, currently always on 1 March and 1 September. This inventory report (number of animals, their sex if possible, animals that have died or been bred in the last six months) can be submitted online. The CC office will send you a reminder in good time and will also inform you of the current procedure for submitting the inventory report.
The CC inventory report is a valuable tool for the CC and the breeding programme. It provides us with a clear overview of the current breeding situation and enables us to make informed decisions about the future.
We also welcome any observations and experiences you may have had with keeping and breeding these animals, as one of CC's key objectives is to generate knowledge about ex situ conservation and the biology of the species cared for in our conservation breeding network. This is particularly valuable in the case of a species such as *Gastrotheca lojana*, about which little is known in terms of its care requirements.

We are also always happy to receive photos or videos of animals, their husbandry and interesting behavioural observations, such as reproductive activities. We can then use these for publications or social media, for example. Permission to use the images within the framework of the CC programme is deemed to have been granted upon submission, unless expressly objected to; CC always credits the image author in publications, unless expressly objected to. Please also inform the CC office informally by email at amphibians@citizen-conservation.org about unusual or unexplained deaths between inventory reports so that further steps, such as investigations of other animals, a post-mortem examination or veterinary care, can be discussed if necessary.

When reporting tadpoles, only estimates are often possible, but these are still helpful. Please also inform the CC office of any successful breeding results outside of the population reports so that new keepers for the offspring can be found in good time if necessary.

The CC office will inform you if, for population management reasons, breeding is temporarily not desired. Since marsupial frogs usually have to be specifically paired for mating, it is likely to be possible to control the number of offspring. If owners are no longer able or willing to keep the animals or offspring, the CC office should be informed as early as possible so that we can place the animals in subsequent facilities. Whenever animals are moved within CC, i.e. from one person to another, veterinary tests must be carried out. A skin swab for the chytrid fungus *Bd* and a faecal sample for parasites must be examined; further tests may be arranged if necessary. Instructions and the necessary dry swabs and faecal sample tubes can be provided by CC, which will also cover the costs of the tests. A corresponding test request form for a suitable testing laboratory is available from the CC office.

Under no circumstances should the animals be placed together with other members of the same species that are not included in the CC programme. Socialisation with other *Gastrotheca* species should be avoided due to the risk of hybridisation. In order to establish a long-term conservation breeding programme, it is crucial that the genetic background of the animals can be traced, which is why uncontrolled mixing with animals from outside the programme must be avoided. From a studbook management perspective, it is often desirable to avoid mixing between generations. Therefore, please do not keep parent and sexually mature offspring together without prior consultation with the CC office! Siblings, on the other hand, can be kept together without hesitation and also bred with each other until the CC studbook records indicate otherwise.

You can find detailed explanations of how CC works in our guidelines and in the FAQ section of our website, citizen-conservation.org.

For transport, the frogs are individually packed in plastic containers with slightly damp tissue paper, as shown here during preparations for export at Wikiri in Quito. | Wikiri

The plastic containers with the frogs are then placed in an insulated, sturdy polystyrene box. | Timo Deible

4.2 Transport and Quarantine

Please note that with CC, the recipient is responsible for the transfer of the animals and must also bear the costs.

Ideally, the frogs should be collected from the previous owner. This is the least stressful option for the animals, and it gives you the opportunity to discuss any questions you may have about keeping them or perhaps take a look at how they have been kept up to now. Alternatively, exchanges, conferences, etc. are also suitable venues for a handover, either in person, or you can ask other hobbyists in the region if they can take the animals with them.

If personal delivery is not feasible, shipping is also possible. The frogs usually survive this without any problems. Please note that vertebrates may only be shipped by licensed companies. Unfortunately, at least at present, no companies offer this service to private individuals. However, the CC office can also arrange shipping for transport to and from private individuals. As this involves some additional work for the CC office, we ask that you thoroughly explore all other options before resorting to this possibility. The CC office will then provide you with an information sheet on shipping.

Within CC, all frogs must be tested for the chytrid fungus *Bd* and parasites when they are relocated. You can also obtain a CC information sheet on how to carry out the tests correctly, and we will send you dry swabs and faecal sample tubes if required. CC will cover the costs of these tests; you only need to pay the postage for sending the samples to the testing laboratory. *Bd* has already been detected in *G. lojana* in the wild, but presumably without serious consequences..

During transport and especially during shipping, care must be taken to ensure that the marsupial frogs do not overheat. Temperatures above 25 °C should be avoided; 10–20 °C is better. It is best to place the animals individually in cricket boxes with some damp moss or damp kitchen paper and secure the boxes with tape to prevent the lid from being pushed open. Then place the boxes in a heat-insulating box, e.g. a polystyrene box (with a wall thickness of at least 5 cm). A cooling pack prevents overheating, depending on the outside temperature. In winter, a heat pack may be necessary.

Upon arrival, the marsupial frogs are placed in a quarantine terrarium and kept very moist for the first three days. After that, further quarantine is carried out in accordance with standard terrarium practice, as described below.

4.3 The Terrarium

- Size

The Citizen Conservation #Amphibians advisory board recommends a minimum terrarium size of 50 x 50 x 60 cm (length x width x height) for keeping a pair of *G. lojana*, and a tank measuring at least 80 x 60 x 100 cm for keeping a larger group, such as three pairs.

In the 'General Care Guidelines for Anurans' published by the DGHT-AG Anurans, *G. lojana* is classified in group 49, „Ground- and bush-dwelling marsupial frogs, e.g. G*astrotheca marsupiata*, *G. riobambae*). For up to two animals, a terrarium measuring 8 x 4 x 8 (length x width x height), multiplied by the length of the frogs, is recommended. With Lojanan marsupial frogs averaging approx. 7 cm in length, this would mean a terrarium measuring 56 x 28 x 56 cm. For more animals, the tank must be correspondingly larger.

Darina Schmidt (2016) recommends a terrarium with a floor space of 1 m^2 and a height of 140 cm for keeping a group of, for example, two males and six females of the approximately equal-sized *R. riobambae*.

When keeping tree frogs and other frogs, it has proven useful to use terrariums with a sloping base, with a drainage hole drilled at the lowest point so that the terrarium can be easily cleaned if natural substrate is not used. At Centro Jambatu in Ecuador, the tanks have a mesh floor with permanent water underneath. The floor is equipped with a drain. This ensures high humidity and facilitates cleaning, as spraying flushes contaminants downwards.

Marsupial frog terrarium at Darina Schmidt's | Darina Schmidt

Marsupial frog terrariums at Chemnitz Zoo | Hans-Peter Berghof

Marsupial frog terrarium at Stefan Hös's homes | Stefan Höss

- Socialisation

Marsupial frogs are very compatible with each other and can be kept in groups with several males and females. Several males stimulate each other, so keeping them in a group of at least two males increases the chance of breeding. However, even when kept in pairs, *G. lojana* has been successfully bred in Ecuador under terrarium conditions (Centro Jambatu / Wikiri, written communication). Larger groups naturally require larger terrariums, see above.

Socialisation with other marsupial frog species should be avoided in order to prevent the risk of unwanted hybridisation. In appropriately large terrariums, socialisation with other amphibian or reptile species that are neither small enough to fit into the prey pattern nor large enough to pose a threat is conceivable. Please discuss any planned socialisation with other species with the CC office in advance. For breeding purposes, we generally recommend keeping only one species per terrarium at first, as there is always a risk that different species will disturb each other, which may have a negative effect on the planned breeding success.

Marsupial frogs get along well with each other. | Stefan Höss

- Terrarium Setup

The back and side walls of the terrarium can be designed to provide additional seating for the frogs. It has proven effective to attach small platforms made of cork pieces to the walls, which are popular as perches.
However, marsupial frogs can also cling to vertical glass panes and walk around on them.

The enclosure should be furnished with climbing branches and plenty of sturdy, large-leaved plants to create lots of places for the animals to sit, hide and rest. The branches should have a diameter of 2–3 cm so that the frogs can sit comfortably on them, and they should be placed in different orientations in the terrarium, i.e. horizontally and diagonally, to provide climbing opportunities and resting places.

Suitable plants include large anthuriums, large-leaved ficus, ivy, rubber tree, ray aralia, grasses, etc. The plants can be planted in pots with lava gravel (lava granulate) with a grain size of 0.5–2 cm, which retains moisture and allows them to root well. Epiphytes such as bromeliads (particularly suitable: broad-leaved ground bromeliads, which are also common in the habitat) and tillandsias are also suitable for planting in a pouch frog terrarium; they can be cultivated in moss.

Since tree- and bush-dwelling frogs are relatively susceptible to pathogens, it has proven effective in practice to keep the animals without substrate. A terrarium with a slanted base plate and drainage hole makes cleaning particularly easy, and coarse debris is easily visible and can be removed immediately. It is also possible to use easy-to-clean aquarium filter mats as a substrate substitute.

However, it is also possible to add substrate to display terrariums, but in this case, particular attention must be paid to hygiene during maintenance. All standard earth-like substrates such as soil, coconut fibres, sand-soil mixtures, etc. are suitable. Moss, leaves, stones and branches can also be placed on the floor. However, the frogs rarely linger on the floor.

Although these frogs rarely go into the water, a water bowl is important for bathing, regulating fluid balance and settling the tadpoles. A guideline for the size of this water section is 12–15 x 12–15 cm base area, which should be about 8 cm high. It is important to provide a branch or piece of cork to help them get in and out. You can also place a stone in the middle of the bowl to serve as a small island.

Robust terrarium planting is important because marsupial frogs like to rest on leaves. | Stefan Höss

Pieces of cork bark and branches serve as structural elements, climbing opportunities and resting places. | Stefan Höss

Marsupial frogs like it damp. | Hans-Peter Berghof

- Terrarium climate and technical equipment

As mentioned above, Lojanan marsupial frogs come from climates with moderate daytime and relatively cool night-time temperatures without major seasonal fluctuations.

Although temperatures in the natural habitat of *G. lojana* are relatively low, it should be noted that the frogs usually stay in bushes and can therefore spend the day in warmer microclimates. The sun is very strong at high altitudes on the equator, so it can quickly become warm during the day when the sun is shining. Experience with both *G. riobambae* and *G. lojana* at the Centro Jambatu/ Wikiri in indoor housing shows that the animals feel comfortable and reproduce even at terrarium temperatures of 16 °C at night and up to 24 °C during the day.

The daytime air temperature in the terrarium should be around 18–24 °C. It may be slightly warmer under the heat lamp. Air temperatures above 25 °C throughout the terrarium must be avoided for long periods of time. Short-term peaks are tolerated without any problems. We know from the Riobamba marsupial frog that it copes well with a moderate night-time drop in temperature that does not fall significantly below 20 °C. However, if feasible, a greater night-time drop to values between 12 and 18 °C is preferable. Lower peaks are also certainly tolerated.

The length of daylight in their natural habitat is almost exactly 12 hours throughout the year. Sac frogs do not have any special lighting requirements, but we still recommend that at least one light source in the terrarium also emits UV light. A classic lighting combination is basic lighting in the form of a fluorescent tube or LED bar, combined with a spotlight (e.g. spotlights or metal halide lamps with mild UV emission from terrarium suppliers). The spotlight creates a sunny spot where the frogs can warm up, so there should also be a suitable place to sit in the cone of light, and it also creates a temperature gradient in the terrarium so that the frogs can choose the temperature they prefer. It is advisable to simulate the course of a day in terms of temperature and brightness by switching on the spotlight or another light source at midday, depending on the terrarium.

The terrarium should be sprayed thoroughly twice a day (early in the morning and in the evening). This can be done using a manual water sprayer from plant care or, better still, using a sprinkler/misting system. It is important to maintain high humidity at night, but the terrarium should also be allowed to dry out again during the day.

Due to its location near the equator, the natural habitat experiences hardly any annual fluctuations in temperature, but it does have a seasonal rhythm with rainy and dry seasons. In the southern highlands of Ecuador, the dry season lasts from June to August. During this time, there is practically no rainfall.

In terrariums, it is also advisable to observe a dry period of about three months, during which little or no spraying is done. However, the terrarium should always have a certain basic humidity, e.g. in areas covered with moss. The water bowl should always be filled with fresh water. At Centro Jambatu/Wikiri (written in the middle), breeding has been successful even without observing a dry period; nevertheless, it is recommended by colleagues there, who have now changed their methods accordingly.

Terrarium with sprinkler system | Hans-Peter Berghof

- Outdoor Facilities

The climatic conditions of the Ecuadorian highlands can be replicated outdoors in Central Europe, at least partially (although the significantly longer days in summer do not correspond to natural conditions). For marsupial frogs, temporary outdoor terrariums have proven successful. It is important to ensure that the animals do not overheat. Therefore, only gauze terrariums should be used, with a glass front if necessary. When setting up the terrarium, the same aspects should be considered as for an indoor terrarium: dense planting and plenty of climbing and sitting opportunities on branches. A water bowl is also a must in an outdoor terrarium. The terrarium should be placed in partial shade so that the frogs have a choice and can sit in natural sunlight for at least a few hours; however, the entire terrarium must never be exposed to direct sunlight.

Even outdoors, the terrarium must be sprayed regularly when it is not raining. In summer, care must be taken to ensure that the frogs are not exposed to excessively high temperatures outdoors. At night, temperatures can easily drop to 12 °C and below.

Staying outdoors can also have a stimulating effect on reproduction, especially when combined with low pressure and heavy rain.

4.4 Care

- Regular Care Tasks

Tree- and bush-dwelling frogs are more susceptible to parasites and other pathogens than ground-dwelling species. Hygiene in the terrarium is therefore particularly important. For this reason, some owners do not use substrate or choose materials that are easy to clean, such as filter mats.

It is therefore advisable to remove coarse contaminants such as faeces or dead food animals from the terrarium as soon as possible. In practice, long tweezers, a spoon or similar tools are helpful, unless you can simply pick up the contaminants with your fingers or rinse them out if there is a drain in the terrarium.
The water in the bowl must be changed regularly and the bowl cleaned (at least every three days).

Twice-daily spraying or misting is necessary for most of the year, see point 4.2.

At Karlsruhe Zoo, the terrariums are sprayed with a pressure sprayer. | Timo Deible

- Nutrition

Lojanan marsupial frogs feed on live animals. They are not picky about their prey and will eat anything they can overpower.

They are fed with standard terrarium food such as crickets, grasshoppers, small locusts, woodlice, cockroaches, soldier fly larvae, etc. They particularly like to prey on houseflies. All feed animals should themselves have been fed a high-quality diet (feed pellets, fresh vegetables, fruit, flake feed, etc.). Before feeding, the feed animals are dusted with vitamin and mineral powders commonly used in terrariums.

Flower pollen is an excellent dietary supplement that also ensures more vibrant colouring in frogs. The pollen can be fed to food animals such as crickets about half an hour before being offered to the frogs. Houseflies are simply dusted with pollen. Dried pollen is available from beekeeping suppliers, health food shops or by ordering online, usually in 1 kg bags. Before use, it must be ground into a fine powder.

Adult frogs are fed two to three times a week. Do not feed too often, as marsupial frogs tend to become obese!

Gastrotheca lojana is actually always hungry … | Hans-Peter Berghof

5. Breeding

- Mating and incubation in the marsupial pouch

Reproduction in marsupial frogs is triggered by changing environmental conditions. Schmidt (2016) reports that her Riobamba marsupial frogs reproduced once a year, in spring and summer, each time after a change in the animals' habitat, such as a move to another terrarium or the removal of plants, resulting in more light.

Usually, intense rainfall combined with a drop in air pressure is particularly effective as a reproductive stimulus for many tree frogs and leaf frogs and, based on previous experience, also for marsupial frogs. In a room terrarium, this can be achieved by intensive spraying / watering, preferably in conjunction with a low-pressure area, e.g. during spring storms. This also applies to outdoor enclosures, where the frogs are even more directly exposed to the weather.

Christian Proy (mdl. Mittlg.) has also had good experiences with a sprinkler terrarium for marsupial frogs. The frogs are transferred to a separate tank (with climbing branches and plants) for mating stimulation, which is completely submerged under about 8 cm of water. A grid placed 7 cm above the ground leaves a 1 cm water level in which the frogs can move. The tank is sprayed intensively and continuously (e.g. by an aquarium pump that permanently sucks water from the bottom and releases it above or at the top of the terrarium). Irrigation is reduced in the morning, but otherwise runs non-stop for 2–3 days. The frogs are then returned to their usual terrarium. This initial heavy rainfall serves to synchronise the triggering of oogenesis and spermatogenesis.

Female *Gastrotheca lojana* | Hans-Peter Berghof

Amplexus in *Gastrotheca riobambae* | Darina Schmidt

Female *Gastrotheca riobambae* with a bulging pouch
| Karl-Heinz Jungfer

At the end of the 'gestation period', the female *Gastrotheca riobambae* releases the tadpoles into the water.
| Karl-Heinz Jungfer

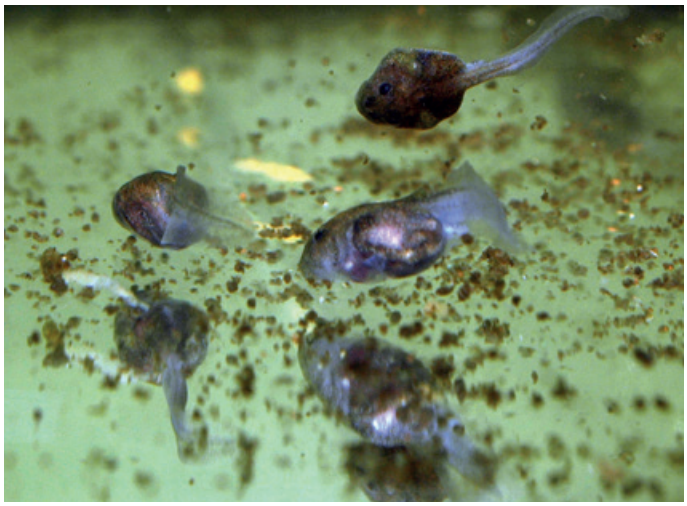
The terrarium is then also subjected to more intensive spraying, with the tank being sprayed and/or misted every 1–2 hours from the afternoon onwards. As a result, the males should begin to call more intensively.

Based on experience with *G. riobambae*, another way to stimulate marsupial frogs to mate is to move them from outdoor summer housing to indoor terrarium housing in autumn.

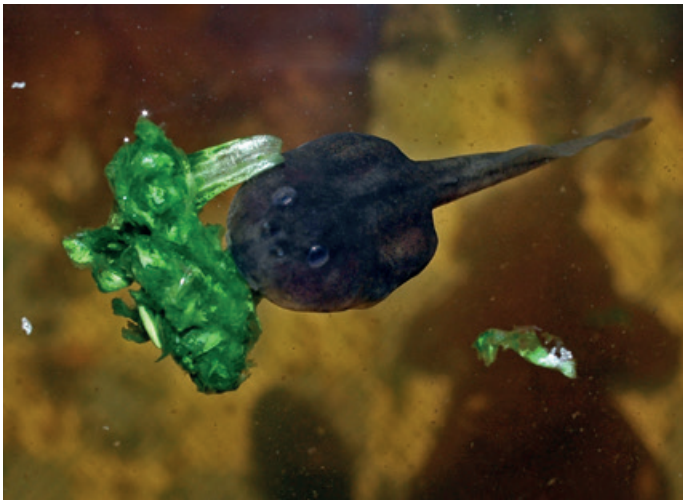
According to owners, the calls of marsupial frogs can be characterised as moderately loud to relatively loud. However, they can be kept in rented flats as well as in your own home without disturbing the peace (provided they are not kept in the living room or bedroom). If kept in the garden, care should be taken to ensure that their calls do not disturb the neighbours.

If everything goes well, amplexus follows. During egg laying and fertilisation, the eggs are pushed directly into the female's pouch on her back. In the following weeks, it is now possible to observe how the pouch visibly 'fills' and increases in volume. Sometimes the movements of the tadpoles can also be observed through the skin on the back. The female lives a more secluded life during the breeding season. The development period depends on the temperature. At around 23 °C during the day and 19–20 °C at night, it took 5–7 weeks from amplexus to the release of the tadpoles from the brood pouch in Schmidt (2016) for *G. riobambae*.

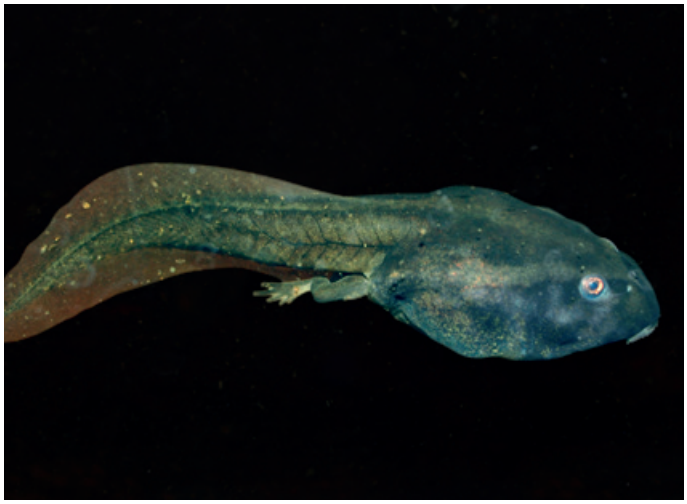
Young tadpole of *Gastrotheca riobambae* | Darina Schmidt



Tadpoles of *Gastrotheca riobambae* in the aquarium | Darina Schmidt



Tadpole of *Gastrotheca riobambae* eating green vegetation | Darina Schmidt



Tadpole of *Gastrotheca riobambae* with already developed hind legs | Darina Schmidt

- Raising the Tadpoles

The tadpoles, which are already well developed but still legless, are finally placed in the bathing bowl. The female spreads her dorsal pouch with her hind legs and releases the tadpoles into the water. They must not be disturbed during this process!

Twenty to thirty tadpoles can be raised in an aquarium or plastic tub with a base area of approximately 60 x 40 cm and a water level of 10 cm. At Centro Jambatu/Wikiri (written in the middle), groups of 20 tadpoles are raised in containers measuring 33 x 46 x 31.5 cm, which are filled with water to about 2/3 of their capacity. Alternatively, containers with a capacity of about 5 litres of water and dimensions of 30 x 22 x 25 cm are used for groups of 10 tadpoles. Overcrowding should be avoided to prevent cannibalism.

Metamorphosis in *Gastrotheca riobambae* | Darina Schmidt

An air stone provides ventilation for the tanks, while some leaves and an alder cone improve the water chemistry and provide hiding places for the tadpoles. Each tadpole should have at least half a litre of water available.

Tadpoles are omnivores. They can be fed fish flake food, blanched wild herbs such as nettles, broad-leaved plantain, dandelion, slices of (organic) cucumber and courgette, lamb's lettuce, etc. If necessary, ground dried flea crabs should be fed, which can have a positive effect on the later colouring of the frogs.

Depending on the degree of contamination, 50% of the water should be changed daily to once a week. A complete water change should be carried out depending on the degree of contamination. To do this, carefully pour the water from the breeding tank through a sieve so that the tadpoles are caught and then placed directly into a tank filled with fresh water.

Only water that has been left to stand for at least 24 hours and enriched with humic substances (add leaves, alder cones and/or coconut humus to the water) should be used for rearing tadpoles. The water temperature should be 20–21 °C (no warmer!).

If the breeding containers are positioned at an angle, a land area will automatically form on the higher side. This allows the young frogs to safely go ashore during metamorphosis. Alternatively, you can also let branches protrude from the water or place small islands in the tank so that the frogs can go ashore. You can enrich the land area with some moss and pieces of cork, some of which also reach into the water, thus making the transition zone safer by making it easier for the animals to leave the water. Please note: The metamorphosing frogs are good climbers immediately after coming ashore. It is therefore essential that the tank is securely closed to prevent them from escaping.

- Raising the Young Frogs

The newly metamorphosed frogs initially remain on the ground. After 2–3 days, their tails should have been completely reabsorbed.

The hygiene notes apply particularly to young frogs, as they are especially susceptible to bacterial diseases and parasites. It is therefore advisable to maintain hygienic conditions in the first rearing terrarium by using damp kitchen paper, which should be changed regularly. Tanks measuring 50 x 50 x 60 cm are well suited for a group of young frogs.

They are fed small specimens of the food animal species mentioned for adults, i.e. small crickets, etc. In addition, small buffalo worms and, above all, houseflies can be offered. It is important to ensure that the terrarium is set up in such a way that the frogs can easily reach the flies, which usually stay at the top.

After metamorphosis, the young frogs must be fed well for the first three months or so, which means that there must always be sufficient food available in high density in the breeding terrarium. If the young animals are not fed enough, either breeding problems will arise immediately, or the frogs will remain puny later on.

The young frogs must always have access to water in a small bowl in the terrarium. The tank is sprayed every evening.

Juvenile *Gastrotheca riobambae* frogs come ashore.
| Darina Schmidt

Freshly emerged *Gastrotheca riobambae*
| Darina Schmidt

Due to the high food consumption, the tank must also be cleaned frequently.
The young frogs must always have access to water and should be kept significantly more humid than the adults, at least until they are eating well, climbing and no longer sitting on the ground. Once this difficult phase is over, the frogs can be moved to a normal terrarium, as described for adult animals. After the first three months, you can start fasting them one day a week, and later two days a week. From around six months of age, increase this to 3–4 fasting days a week.
As they grow, the colouring of the young animals usually changes significantly.

From around three months of age or later, the brood pouch can already be seen in females. At around six months of age, the first male juveniles begin to call, which initially sounds somewhat awkward and higher-pitched than in adults. Sexual maturity is reached at around one year of age (Centro Jambatu / Wikiri, written communication).

Breeding terrariums for marsupial frogs | Darina Schmidt

Juvenile *Gastrotheca riobambae* in the breeding terrarium | Darina Schmidt

6. Possible Problems

The necessity of careful hygiene has already been mentioned several times above. Bacterial infections (e.g. red leg disease) and parasites such as nematodes and strongyloides are a common problem when keeping and especially breeding marsupial frogs.
Insufficient or absent night-time temperature reduction also causes problems, especially in young animals. They then grow too quickly, which can lead to deformities.
Sometimes the colours of marsupial frogs fade in captivity or in offspring. As already mentioned above, regularly enriching their food with pollen helps here.
One problem associated with breeding marsupial frogs is that the female does not expel all unfertilised eggs and/or the nutrient tissue from the brood pouch. The remains left in the pouch can cause inflammation or necrosis. For this reason, the female should be closely observed after the tadpoles have been released. If any abnormalities are noticed, veterinary assistance is required to remove the remains from the pouch.
G. lojana appear to be prone to developing corneal lipidosis, which leads to a milky clouding of the eyes due to the accumulation of fats/cholesterol (Lukas Reese, written communication; Centro Jambatu/Wikiri, written communication). Possible causes include excessive feeding, or excessively high housing temperatures and a resulting increase in metabolism rate. Females that do not spawn for a long time seem to be particularly at risk. Animals affected by lipidosis show no noticeable limitations or discomfort and can therefore continue to be cared for as normal, even if their vision may be impaired. In any case, attempts should be made to optimise the housing conditions . At Chemnitz Zoo, the team has succeeded in completely reversing the lipidosis by keeping the frogs at cooler temperatures of below 20 °C for several months, which resulted in a reduced food intake; their eyes have cleared up again (Kevin Rüffer, personal communication).

Female *Gastrotheca lojana* with corneal lipidosis | Hans-Peter Berghof

7. Further Reading

Coloma, L.A. & W.E. Duellman (2025): Amphibians of Ecuador. Phyllomedusidae, Leptodactyloidae, Ceratophryidae, Hemiphractidae, Eleutherodactyloidae, Centrolenidae, Gymnophiona, and Caudata, Volume IV. – CRC Press, Boca Raton, London, New York: 496 S.

Duellman, W.E. (2015): Marsupial Frogs. *Gastrotheca* & Allied Genera. – Johns Hopkins University Press, Baltimore, 408 S.

Duellman, W.E., A.J. Barley & P.J. Venegas (2014). Cryptic species diversity in marsupial frogs (Anura: Hemiphractidae: *Gastrotheca*) in the Andes of northern Peru. – Zootaxa 3768: 159–177.

Ortega-Andrade, H.M., M. Rodes Blanco, D.F. Cisneros-Heredia, N. Guerra Arévalo, K.G. López de Vargas-Machuca, J.C. Sánchez-Nivicela et al. (2021): Red List assessment of amphibian species of Ecuador: A multideimensional approach for their conservation. – PLOS One, Mai 2021, e0251027, DOI: 10.1371/journal.pone.0251027

IUCN SSC Amphibian Specialist Group. 2019. *Gastrotheca lojana*. The IUCN Red List of Threatened Species 2019: e.T57460899A57460905. https://dx.doi.org/10.2305/IUCN.UK.2019-1.RLTS.T57460899A57460905.en. Accessed on 16 October 2025.

Schmidt, D. (2016): Sympathische Gesellen: Haltung und Nachzucht von Riobamba-Beutelfröschen (*Gastrotheca riobambae*). – Reptilia Nr. 117, 21(1): 26–32.

Weimer, R. & S. Stubner (1993): Haltung, Zucht und Entwicklung des Beutelfrosches *Gastrotheca riobambae* (Fowler, 1913) (Anura: Hylidae). – Herpetozoa 6(3/4): 89–96.

Sleeping Lojanan marsupial frog | Stefan Höss