

Basic information and Husbandry Guidelines
for *Minyobates steyermarki*,
Demonic Poison Frog





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1. Characterisation

Scientific name: *Minyobates steyermarki* (RIVERO, 1971)

Vernacular name: Yapacana's Little Red Frog, Demonic Poison Frog (English), Sapito rojo del Yapacana (Spanish)

Head-body-length: about 16 mm, Males slightly smaller and somewhat slimmer than females

CC#Amphibians category: I

IUCN Red List: Critically Endangered (CR)

Protection status CITES: Appendix II

Protection status according to EU Species Protection Regulation: Appendix B,

Protection status in Germany: „reportable“

Housing: Presumably inhabitants of the ground and low vegetation; rainforest terrarium with a base area from about 40 x 50 cm and a height from 60 cm. Equally successfully kept and propagated in temperate-warm greenhouses. Important: Maximum daytime temperature not permanently above 25 °C, night-time lowering of temperature necessary for egg laying.

Equipment required: Substrate of compressed cork, modeled coated polystyrene sheets or xaxim, adequate climbing opportunities over modeled back walls, branches and plants. Bromeliads with water-filled leaf axils as a natural habitat. Lighting by fluorescent tubes or similar with UV (!). Dark plastic film tubes or similar as easily controllable oviposition sites. Larval rearing in small containers with approx. 100-200 ml water (at 22-26 °C) and a brown oak leaf, small terrariums for young animals.

Diet: According to the size, small feeding animals: springtails, small and large fruit flies, aphids, isopods, bean weevils, etc.; powder with vitamin-mineral preparation before feeding.





2. Why is *Minyobates steyermarki* a Citizen Conservation species?

As the only known representative of its genus, the preservation of *Minyobates steyermarki* is of special importance, also for further research on the relationships and evolutionary origin of poison dart frogs. Our knowledge about this species is still very incomplete.



Open pit gold mining in the Amazon region | Kakteen, Shutterstock

According to the IUCN, it is „Critically Endangered“, i.e. has the highest threat status of species still found in the wild. This is partly due to its extremely small range - the species is only known from the summit and upper slopes of a single, low table mountain, Cerro Yapacana, in southwestern Venezuela, see below. Despite its status as a national park, forest cover there - and thus the frog's habitat - has been dwindling at an alarming rate since the 1980s. The natural habitat is also completely in the hands of armed groups who have been illegally mining gold and diamonds there for decades, with devastating environmental consequences due to slash-and-burn agriculture, erosion, and also the dumping of chemicals and mercury. In the most recent assessment of the status of the species by the Red List of the IUCN, ex situ conservation breeding in human care is therefore recommended as a conservation measure - in addition to the urgently needed enforcement of the already existing official protection in the natural habitat (SEÑARIS 2022). Since there seems to be only a small tribe of animals of this species kept in terrariums, it is urgent to coordinate the remaining populations for such conservation breeding to ensure long-term conservation with the least possible loss of genetic diversity of the ex situ population. Therefore, this species has been included in Citizen Conservation's program.



3. Biology and Conservation

3.1 Biology

3.1.1 Systematics

Minyobates steyermarki is the only species of its genus within the poison dart frogs (Dendrobatiidae). While it was previously placed in a group of very small poison dart frogs (now *Andinobates*), molecular genetic studies showed that it is the sole representative of a clade that opposes all other poison dart frogs in the narrower sense (Dendrobatini) (VENCES et al. 2003; GRANT et al. 2006, 2017).



The only one of its kind | Johannes Penner



3.1.2 Description

The Demonic poison frog usually reaches a size of about 16 mm, with well-fed females appearing slightly plumper and a touch larger and broader than males.

There are no certain sex differences that could be used to determine individual, non-calling individuals. Dorsal and ventral sides are smooth, flanks and dorsum slightly granulated in adults.

The ground color varies in different shades of red from dark red to reddish brown to almost brown. Black marbling may be faint or distinct in adults, or may merge into large patches. In some animals, these spots form two broad, irregular bands on the back. Juveniles are occasionally darker and more brownish than adults, and the hind legs are darker than the back and may have more pronounced markings.

Because animals vary individually in coloration and markings, it may be possible to distinguish individual animals by the dark markings.



The little frogs can be distinguished individually by the dark markings. | Karl-Heinz Jungfer



Juveniles may show distinct patterning | Johannes Penner



Demonic poison frogs belong to the small poison dart frogs and only reach a length of about 16 mm.

| Benny Trapp, Frogs & Friends



Distribution of *Minyobates steyermarki* in Venezuela | Jonas Lieberknecht, Citizen Conservation

3.1.3 Distribution and Habitat

Minyobates steyermarki is known from only one locality, from the approximately 10 km² plateau of the isolated mesa or tepui Cerro Yapacana in Amazonas State, Venezuela (SEÑARIS 2022). Tepui is a sandstone mountain in the western Guyana Shield of northeastern South America that rises significantly above the surrounding area. The vegetation on the summit plateau is categorized as „very moist premontane forest“ and is thus distinctly different from the surrounding lowland rainforest (EWEL et al. 1976). This inselberg is located about 40 km from the confluence of the Orinoco with the Ventuari.



Tepui landscape in northern South America | Alejandro Solo, Shutterstock

As far as known, the species occurs in low forest (tree height 8-10 m) on the ground between sandstone rocks and especially in large ground bromeliads. The altitudinal distribution is reported to be 600-1,300 m a.s.l., with the confirmed finding point at 1,200 m a.s.l. and the habitat description of the discoverer corresponding to vegetation between 1,000 m a.s.l. and 1,300 m a.s.l. (LA MARCA 2016). Interestingly, the species was first scientifically discovered in 1970 by a botanist, Julian Alfred Steyermark. Behavioral observations of the animals in the natural habitat are not available due to the inaccessibility of the area.



3.1.4 *Reproduction in the Wild*

The males call in a kind of soft beep of individual, clearly separated whistles, reminiscent of a small bird (LÖTTERS et al. 2007; a call example can be listened to here: <http://www.dendro-wiki.org/minyobates-steyermarki.html>). When several males are kept together, the formation of calling communities has also been observed (BRAND IN OSTROWSKI & MAHN 2022). In the terrarium, the frogs lay 3-9 (usually 4-5) eggs. Once a head amplexus was observed during mating, but this is atypical for all Dendrobatini. Therefore, this observation was doubted several times. Terrarium observations indicate that the eggs and seeds are delivered without direct contact between the animals; the male guides the female to a suitable oviposition site, such as a moist burrow, with persistent calling (BRAND & SCHMIDT 2003). There they sit opposite each other (BRAND IN OSTROWSKI & MAHN 2022). Very well however it comes with the fight-behavior of the males among themselves occasionally to the head-amplexus.

The male transports the larvae, which hatch after 10-14 days, together on his back and deposits them individually in small accumulations of water. A supply of nourishing eggs by the female apparently does not take place. After 8-10 weeks, the front legs break through the skin pockets, and the young frogs leave the water with a still relatively long tail remnant. At this time they are still much darker and more brownish than adults.



The leaf axils of bromeliads are an important element for Demonic poison frogs: for hiding as well as for larval rearing.

| Johannes Penner



3.2 Threat Situation



Toxic chemicals are used in the search for gold. Toxic wastewater lakes remain behind. | Kathleen, Shutterstock

The Demonic poison frog has been classified as Critically Endangered by the World Conservation Union IUCN (SEÑARIS 2022). This is the highest endangerment category for species still found in the wild. In Venezuela it is classified as the amphibian with the highest protection priority (BARRIO-AMORÓS & TORRES 2010; SEÑARIS & ROJAS-RUNJAIC 2020).

One reason for the threat of extinction is the species' tiny range. It is known only from Cerro Yacapana, a mesa (tepui) about 1,300 m high in the Estado Amazonas in southwestern Venezuela. The known habitat has an area of only less than 10 km². Although the surrounding area has been declared a national park (of the same name) including Cerro Yacapana. But already in the 1980s gold prospectors started to search for gold illegally in the protected area by open pit mining. Diamonds are also mined there. The initially small amount of mining increased sharply in 2004 and 2012, so that thousands of miners are now digging there. More than half of the mountain had been completely deforested just a few years earlier, according to a 2019 report, and all vegetation had been removed. Forest fires on the mountain slopes are also attributed to the gold prospectors. Currently, within 15 months, an increase in mining areas from 36 to 69 and in the affected area from 2,035 ha to 2,227 ha has been recorded, unfortunately mainly on the tepui (SOS ORINOCO 2020). Due to the uncertain political situation in the country, there is little hope that the destruction of the habitat could be stopped in the foreseeable future. The area is cordoned off by armed groups of illegal miners and drug cartels. However, satellite images show the extent of the destruction including a large illegal mine on the Tepui Plateau (SOS ORINOCO 2019, 2020). Unfortunately, it must therefore be considered likely that this species will be extinct in the wild in the foreseeable future. The Red List of the World Conservation Union therefore recommends ex situ conservation breeding to save this species (SEÑARIS 2022).



3.3 Protection

Like the other poison dart frogs, *Minyobates steyermarki* was included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, also known as the Washington Convention). Despite this, wild catches of this species illegally entered Germany on at least two occasions in the early 2000s and were then confiscated. For scientific purposes, animals were exported to the USA once (SEÑARIS 2022). Of these animals or their offspring, some still live sporadically and legally registered with the authorities in the terrariums of enthusiasts.

A protection of the habitat seems to be impossible at the moment with the difficult political situation in Venezuela, which is why the only possibility to save the species is probably the conservation breeding in captivity. In order to put the „population“ still living with us on as broad a basis as possible, a coordinated conservation breeding project is necessary.



Abandoned gold prospecting area in Venezuela's neighboring country Guyana - there is no room for frogs in such open-pit mines. | Kakteen, Shutterstock



4. Keeping and Breeding

The Demonic poison frog has been successfully kept and bred for nearly two decades, so far exclusively by private keepers. However, numbers are at a very low level. In principle, the species can be successfully kept much like other poison dart frogs. However, there are some - explained below - special requirements for breeding. According to previous experience, the life expectancy of these small frogs can be assumed to be 5-7 years (OSTROWSKI & MAHN 2022).

The recommendations for keeping and propagation given in the following are based on the relatively sparse literature references and on the extensive experience of Ingo Brand and Reike Müller, whom we thank very much for their support in the preparation.



Terrarium facility for keeping poison dart frogs - including Demonic poison frogs. | Tijl Liekens



4.1 Restrictions and Documentation Requirements

Minyobates steyermarki is under species protection. The species is listed on Appendix II of CITES and accordingly in Appendix B of the EU Species Protection Regulation. This means that keepers must be able to prove legal possession at the request of the authorities. For this purpose a proof of origin or a breeding certificate of the breeder is necessary. Within CC you will automatically receive the animals with this certificate.

Like all Appendix B species, *Minyobates steyermarki* is also subject to notification as a „specially protected“ species under the German Federal Nature Conservation Act. The animals must therefore be registered with the responsible nature conservation authority. At which authority the notification has to be made, varies from federal state to federal state, mostly it is the lower landscape authority - just google for: „registration of protected animals“ and your own place of residence. Also, any change in the population must be reported immediately, i.e., releases, offspring, or deaths. It is best to communicate directly with the responsible authority how soon after e.g. an offspring the young animals have to be registered. Usually, pragmatic solutions can be found to avoid having to register every single tadpole or to deregister them in case of unsuccessful breeding.

The CC animals are property of the Citizen Conservation Foundation gGmbH. This also applies to all offspring. Owners are therefore not allowed to hand over or sell the offspring on their own. If animals are to be given away, please inform the CC office as early as possible, who will then take care of finding a home for the animals. Offspring are distributed to other participants of the program in order to build up a stable population for the long-term preservation of the species. The size of this ex situ population can be calculated using statistical methods from population management for zoo animal husbandry. These numbers are published on the species page of CC and are evaluated from time to time and adjusted as necessary. For *Minyobates steyermarki*, a target of 20 husbandries with 110 sexually mature breeding animals is currently established. As long as this target is not reached, all offspring within the project will normally be distributed to new keepers, if available. Otherwise, CC takes care of an alternative placement.

All animals from CC are routinely tested for the chytrid fungus *Bd* before transferring to new keepers, and fecal samples are tested for parasites. Keepers caring for other amphibians must maintain careful hygiene to avoid transferring chytrid fungi or other pathogens from their other terrariums to the Demonic poison frog. Ideally, one should have the entire stock tested occasionally for *Bd* and parasites and maintain a strict quarantine after prior testing for all new additions. A goal of CC is also to contribute to the reduction and hopefully one day elimination of *Bd* in terrarium populations.



In general, socialization with other terrarium animals is to be avoided and only possible after consultation with the CC office.

The notification of offspring can be made to the CC#Amphibians office at the age of about six months, when the number of young animals expected to reach adulthood becomes manageable. In general, the current population must be reported to the CC office twice a year (see recruitment contract), currently on March 1 and September 1 of each year. Beginning in the summer of 2023, the inventory is to be entered by keepers* into the Wild at Home database provided by CC; the data must be updated and on 1.3 and 1.9. the actuality of the data only has to be confirmed. They will be reminded accordingly by the CC office. Special observations, problems etc. should be reported to the CC office in order to increase the knowledge about the keeping and reproduction of this species. Also in Wild at Home there is the possibility to write down such observations.

If the owner is no longer able or willing to keep the animals or offspring, the CC office must be informed as early as possible so that successor owners can be found to take over the animals.

The image shows the first page of a placement contract from Citizen Conservation. At the top right is the Citizen Conservation logo. Below it, on the left, is a section titled "Placement Contract" in an orange box. The text in this section reads: "between Citizen Conservation Foundation gGmbH, Reichenberger Str. 88, 10999 Berlin, hereinafter referred to as „CC“ and". Below this are several dotted lines for entering information: "Institution (optional)", "Keeper name or institution representative", "Street and house number", "Postcode and city", "Country", "Phone numbers", and "e-mail". Below these is the phrase "hereinafter referred to as the 'keeper'".

On the right side of the page, there is a grey box with two input fields: "CC participant no." and "CC contract no.", with the note "(CC office use only)" below them.

At the bottom left, there is a section titled "on the release of amphibians of the species Demonic Poison Frog (*Minyobates steyermarki*)". Below this title is a circular photograph of a brown frog. The text continues: "hereinafter referred to as „animals,“ as well as offspring of these, hereinafter referred to as „offspring.“ The current population of the animals covered by this contract can be found in the most recent update of the appendix "Population" which is documented and updated when the animals are received, when animals are given to another keeper, and during the regular population report (see point 11). Location of the animals with address (if different from the above keeper address):". Below this text are two dotted lines for an address.

A small orange circle with the number "1" is located at the bottom right of the page.

First page of Citizen Conservation's placement contract with breeders of the Demonic poison frog



During transport, the Demonic poison frogs must be protected against heat and cold. Insulated boxes are well suited for this purpose. | Tijl Liekens

4.2 Transport

You will receive the animals in the Citizen Conservation #Amphibians program free of charge. Normally you get the animals directly from the breeder or the previous owners. You are responsible for the organization of the transport, thereby resulting costs are to be borne by yourself. Preferably the animals should be picked up by yourself, alternatively a professional shipping is also possible. The CC Office has compiled information on proper shipping.

CC cooperation partners offer discounted transport conditions for CC holders. For more information, please visit the CC website or contact the CC office.

With every change of location, the animals are examined beforehand for the chytrid fungus *Bd* and, if necessary, parasites. You will therefore receive animals that are very likely to be free of these pathogens. Certain parasites may still be present; not every parasite load needs to be treated. In addition, there is always a risk that pathogens will not be detected despite testing.

You can put the animals at home directly into the designated terrarium, which, of course, has been thoroughly disinfected before commissioning, then should be already run in and, accordingly, immediately provides the appropriate climatic conditions for the frogs. Nevertheless, it is recommended to have a fecal examination performed again at your own expense during the first two months. For further information on quarantine and examination options, please refer to the brochure „Handlungsempfehlungen zum Umgang mit seuchenartig verlaufenden Amphibienkrankheiten“ (recommended actions for dealing with epidemic amphibian diseases) provided to you.

For transport, the frogs are packed individually or in small groups in small plastic boxes (e.g. cricket boxes). It is important that the air holes have no edges to the inside, so that the frogs can not hurt themselves on the sometimes sharp-edged plastic with their delicate skin. In the box one gives before some damp kitchen paper. These transport boxes are then placed in a Styrofoam box or insulated bag, secured against slipping, to protect the frogs from external weather conditions such as overheating or hypothermia. If necessary, in winter or summer it may be necessary to add a cooling battery or hot water bottle to the box. Attention - always separate such elements safely from the transport boxes (e.g. wrap them in a towel) so that the frogs in their box cannot overcool or overheat due to direct contact with a neighboring cooling or heating element.



4.3 The Terrarium

The Demonic poison frog is kept in a planted rainforest terrarium, the size of which depends on the number of animals kept. In principle, it is possible to breed with one pair, but calling males stimulate each other, so keeping several animals seems to be advantageous. Most poison dart frogs are territorial, but *M. steyermarki* lives(s) in relatively high density in the natural habitat. Nevertheless, aggressive behavior (animals push each other to the ground or hold each other in the head plexus) is commonly seen and can cause problems in terrarium husbandry.

A terrarium of 50 x 40 cm floor space and a height of 60 cm and more seems appropriate for two to a maximum of six animals. Larger terrariums, but where you should not lose the overview, are advantageous. Especially the vertical surfaces should be able to be used as habitat, so the walls should be provided with protrusions and niches (e.g. by pressed cork or sealing slurry). Climbing branches are also suitable, especially if planted. All types of small-statured rainforest plants, such as maranta or peperomia, and climbers are suitable for planting. Of particular importance are larger, thornless bromeliads with water in their leaf axils, e.g. *Vriesea* or *Aechmea* species, which play an important role not only as bathing sites but also as places to retreat, spend the night and reproduce. If these plants are present with water-filled leaf axils, a water part at the bottom is of secondary importance.

A completely different posture has also proved very successful with *Minyobates steyermarki*: Keeping them in a warm-temperate, humid greenhouse. Especially the temperatures, temperature fluctuations (see below) and access to UV-light seem to suit the frogs very much, and they reproduce then with appropriate nutrition and equipment of the greenhouse without further action (see for example the description in CHRISTIANSEN 2014).

But be careful: if you want to keep the frogs free in the greenhouse, this keeping has to be discussed with the CC office beforehand, because then it can usually no longer be guaranteed to separate the generations from each other and to have an easy control over the condition of the animals, but this is what is initially aimed at in a coordinated breeding project like CC. A good solution may be terrariums located in a greenhouse, provided that the appropriate climatic conditions can also be achieved here.



Terrarium at Reike Müller and Kai Seelbach of 50 x 50 cm floor space and 100 cm height, in which a group of six Demonic poison frogs is successfully kept and regularly provides for offspring. The night setback is achieved by regular ventilation.
| Johannes Penner



Demonic poison frogs like to climb and prefer to use plants such as bromeliads to do so. | Tijl Liekens



Moss is very suitable as a moisture retaining layer on the substrate | Johannes Penner



Terrariums for one pair each of Demonic poison frogs with sprinkler system by Ingo Brand | Johannes Penner

4.4 Lighting, Temperatures, Humidity

So while open water areas can largely be avoided, fogging or sprinkler systems can be used. These are programmed to wet the plants in the morning, during the frogs' peak activity period, when most mating also takes place, and possibly again in the late afternoon. For spraying systems, (partially) desalinated water, which does not clog the nozzles and does not leave lime marks, has proven to be effective. Manual spraying with hand-warm water has also proved successful, as has the addition of Liquitomin to the spray water. (BRAND pers. comm.).

Already because of the plants in the terrarium lighting is essential. In principle, LED and fluorescent tubes are suitable here. Probably necessary for this species are illuminants with UV content, as they are now regularly used in terrarium keeping. It is very likely that the frogs receive not low doses of UV in the habitat (soil bromeliads usually grow where there is sunlight). These are likely to play an important role in vitality and possibly color formation. Therefore, we strongly recommend providing a UV component in the lighting. Moreover, it can possibly help to prevent spindly leg syndrome.

The day and night phases should last about twelve hours each.

A particularly critical aspect of keeping Demonic poison frogs is the temperatures in the terrarium. While most commonly kept poison dart frogs originate from lowland rainforests and are therefore housed at relatively high temperatures, this is not the case with *Minyobates steyermarki*. Although the frogs can withstand higher temperatures, breeding is then not successful in most cases. Animals that are kept at 24-25 °C during the day but experience a significant nighttime reduction to 16-17 °C, which is sometimes a problem in living spaces, especially in warm „terrarium rooms“, are much more eager to call and reproduce. So please make sure that the terrarium is placed in a location that allows appropriate night cooling, at least for much of the year. In constantly warm rooms (20-26 °C) the reproduction can also succeed. To stimulate egg laying here, the necessary temperature differences of 5-7 degrees can be achieved by evaporative cooling after spraying hand-warm water (not directly on the animals!) and appropriate ventilation.



4.5 Feeding

All food insects that are also suitable for other poison dart frogs are suitable as food, e.g. springtails, small and large fruit flies (*Drosophila sp.*), aphids, isopods, bean weevils, small crickets and house crickets, etc. According to the small size of the frogs, of course, they must be small feeders. It is therefore no surprise that springtails are eaten with particular pleasure.

The frogs are almost constantly on the search for food, so it is favorable if there are always some food animals in the terrarium. Nevertheless, one should not neglect to dust newly introduced feeding animals with a vitamin-mineral powder.



Springtails are ideal food for the little frogs.
| Karl-Heinz Jungfer



Fruit flies (*Drosophila*) of various sizes are also good for treecreeper feeding. | Karl-Heinz Jungfer



Adult Demonic poison frog feeding
| Johannes Penner



4.6 Incubation



Pair of *Minyobates steyermarki* in front of an artificial spawning ground. One recognizes very nicely the somewhat slimmer male. | Johannes Penner



Clutch in terrarium in a film tube with a fertilized egg on the left and an unfertilized one on the right. Note the „double” bottom, which allows easy and gentle transfer of the clutches. | Johannes Penner

As a rule, Demonic poison frogs do not reproduce year-round. The most promising times are spring (March to May) and fall (September to early November). An egg-laying event is preceded by increased calling activity by the male(s). The clutch consists of 3-9 (usually 4-5) eggs and is laid as a spawning mass about 15 mm in diameter on leaves or, more conveniently, in dark, horizontally placed film tubes (BRAND pers. comm.) or tad pools (MÜLLER pers. comm.; <https://tad-pool-project.company.site/>). The initially black eggs lighten somewhat during development. The male occasionally supplies the clutch with water from the bladder and transports the larvae all at once on his back after hatching. They are deposited individually in bromeliad leaf axils filled with water or other small accumulations of water and are apparently not supplied with any further water afterwards. Therefore, „artificial” rearing is an option, where the clutches are removed from the terrarium and kept in a petri dish that is kept moist at room temperature until hatching.



4.7 Rearing of the Larvae

Once the larvae have emerged from the jelly shell after about 10-14 days at 20 °C with a size of 8-10 mm, they are carefully transferred to small water containers of about 100-200 ml, which contain no furnishings except a brown oak leaf. There they are then kept at 22-26 °C and can be fed with fish food, mosquito larvae, water fleas, and the like.

A dry food mixture of spirulina, fine fish flake food and some vitamin powder as well as black mosquito larvae, copepods (cyclops, thawed frozen food) and a granulate from Organix has proven itself. This is fed every ten days, in an amount appropriate to the tadpole size („less is more“). Depending on the pollution, after a few days the water is replaced with stagnant water. Otherwise, they apparently do not make great demands on the water quality. The oak leaf provides a hiding place and also acidifies the water somewhat.

After 8-10 weeks the legs are formed and the young frogs leave the water with a still long tail rest. Even before this happens, they should be transferred to an inclined, covered dish that has a water level of about 1 cm on one side. In this way, the metamorphs can easily reach land without any hurdle.



Freshly hatched larvae in artificial micro water body
| Johannes Penner



Young tadpole, still without hind legs | Johannes Penner



Tadpole with already well developed hind legs
| Johannes Penner



Tadpole shortly before the breakthrough of the front legs
| Johannes Penner



A successful feed composition for rearing tadpoles. The dry food mixture in the Petri dish (right picture) consists of spirulina, fine fish flake food and some vitamin powder. The black mosquito larvae and the cyclops are thawed frozen food, the red pellets are the pictured granules from Organix. | Ingo Brand



4.8 Rearing of the Young

Once the tail is resorbed, the young frogs, which are initially about 8-10 mm in size, are placed in a small rearing terrarium about 20-30 cm long. The substrate can be moist peat or compressed cork. A small plant, moss and some old brown leaves complete the setup. Initially, the food consists mainly of springtails. As they continue to grow, the same foods as the adults are taken. Room temperature or a little higher is sufficient.

The young frogs are initially still brown and have only two faint to reddish stripes on the back. Only with further growth the frogs become more or less red. The males start to call at the age of about eight months, the first fertilized clutches were laid at the age of about twelve months (BRAND & SCHMIDT 2003).



Subadult Demonic poison frogs – note the contrasting, individually distinct dorsal markings | Johannes Penner



4.9 Husbandry Problems

The main reason for animals not striding to breed seems to be too little change between day and night temperatures. Too constant (high) temperatures seem to be tolerated by the frogs, but offspring usually fail to breed.

Fungal growth of clutches and spindly leg syndrome is a recurrent phenomenon in the breeding of poison dart frogs. The causes are complex and not yet satisfactorily solved. However, it can be stated that spindly leg syndrome does not or rarely occur if the larvae and especially the parents are optimally cared for. This refers in particular to the supply of minerals and vitamins, but also the use of lights with UV content (see above). The latter could also play a role if the frogs do not turn red but remain predominantly brownish.



The best possible care with UV content in the light and an adequate supply of vitamins and minerals helps to prevent health problems | Johannes Penner



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