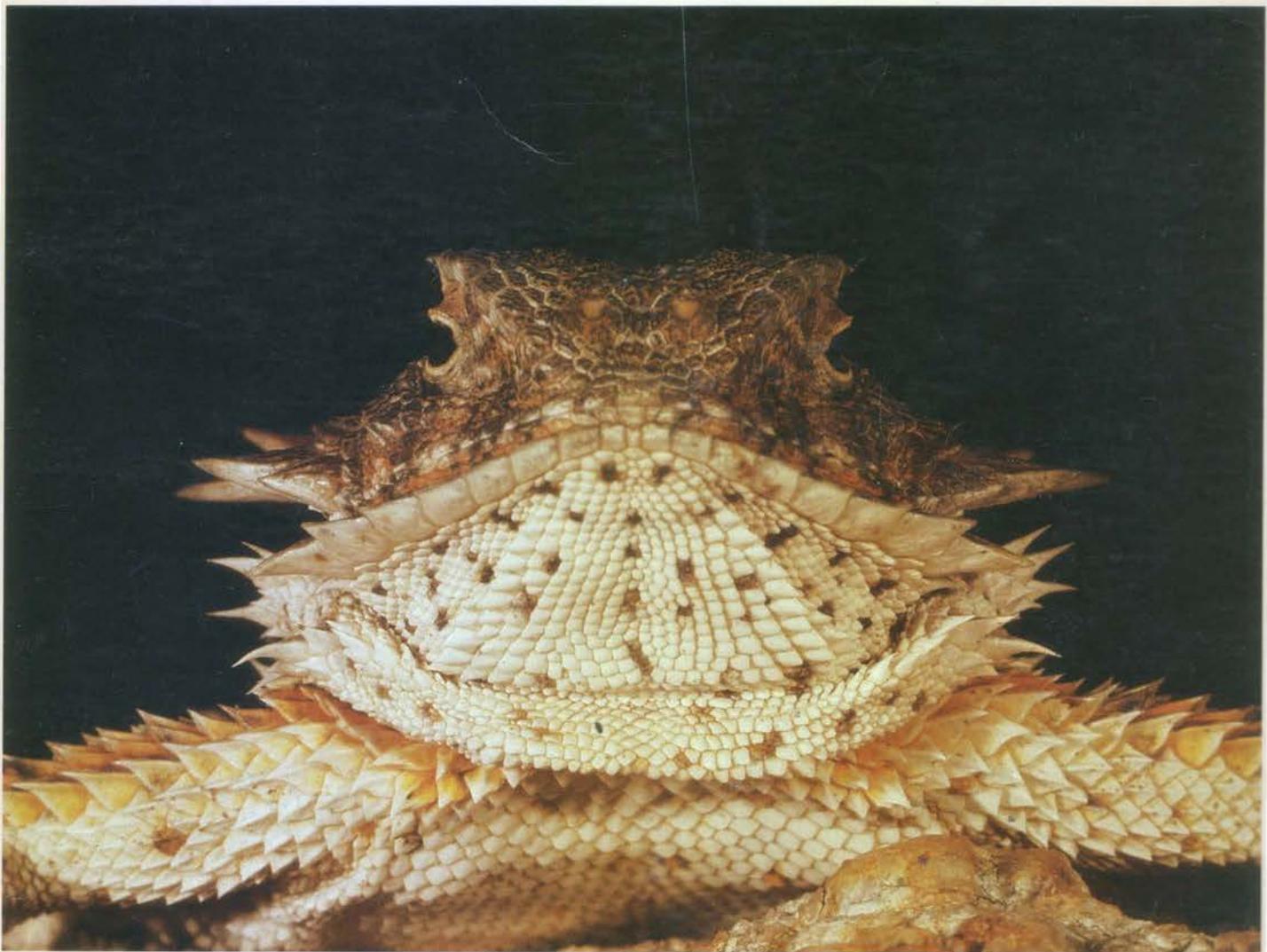


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KEEPING AND BREEDING *Dendrobates azureus* AND SOME OTHER POISON-DART FROGS IN EUROPE

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The keeping of Poison-Dart Frogs is a hobby that some of us in Europe have enjoyed for almost twenty-five years now. Especially in the last few years there has been a great increase in interest in these beautiful jewels of the tropical rain forests of Central and South America.

Most Europeans like to keep their frogs in rather large terrariums; the average is about 70 x 50 x 70 cm (length x depth x height). This corresponds roughly to what you call a forty gallon-breeder size aquarium. This, of course, varies depending upon the species. In general, however, the bigger the better.

Our terrariums always have a water pool, and if possible we like to have water falls. This is aesthetically pleasing and also it is functional in as much as it helps to maintain a high level of humidity.

It is important that the frogs have a sense of security in their environment. Therefore, we use stones and wood quite liberally to provide hiding places for the frogs. Also we plant the terrariums with a dense growth of vegetation. In such a terrarium the frogs can feel at home, and they can move freely from hiding places to water and to dry land. Poison-Dart frogs are intolerant of stress. A well built terrarium will allow the frogs to live and thrive for many years. A terrarium that is proving itself to be successful should never be disturbed. Similarly, frogs that are doing well in a terrarium should not be moved to a different one. In the wild, most Dart frogs live out their whole lives in one place. Moving them from a safe and secure home to another terrarium, even if the second one is likewise well constructed, is very stressful to the frogs.

Europeans generally light their terrariums about 16 hours per day. The ideal temperature for most frogs is about 25°C to 27°C in the day time and about 20°C to 22°C during the night. In a terrarium that is of the dimensions that I have already mentioned (that is, 70 x 50 x 60 cm) we like to keep no more than 6 animals. Most Dart-Frogs are territorial and if the population density is greater than this there will no doubt be stress on the animals. This of course varies depending upon the species being kept in the terrarium. We consider it an error to keep community terrariums. Ideally there should not be mixing of species. Community set ups may go well enough for a while but in the long run it will be detrimental to all the species being kept together. Different species being kept together will increase their territorial defenses and this behavior is in fact a sign of the stress that they are being subjected too. Also, it is unlikely that breeding will occur in a community terrarium. Another reason that community set-ups should be discouraged is that there is the risk of inter-breeding and it is more difficult to keep track of the blood-lines. If we are to keep our frogs in the future we must take care to maintain genetically pure populations. If things continue as they are, there is a good chance that the rain forests will be destroyed so the Dart-Frogs that survive will be the ones we keep in our terrariums. We should take great care to breed them well.

In Europe we generally feed our frogs with various species of drosophila. It is also quite popular to heavily supplement them with wild collected insects in the summer time. Most frogs will take insects up to 30 mm, and a few of the large species will take insects up to 1 cm. Of course one must take care to collect insects from areas where insecticides have been sprayed.

Now I would like to talk more specifically about my favorite frog, *Dendrobates azureus*. I have been keeping them now for almost six years. In my opinion they are the most beautiful of all frogs. This species originates in Surinam and it is known only from a very limited and isolated forest island on the Sipaliwini - Savannah. They are found at an elevation of 315 - 430 meters. Within these forest islands they are found only in creek valleys which are littered by large moss-covered boulders, between which they live. Why they restrict themselves to this particular micro-environment is not known. In my terrariums the frogs seem to do just as well with or without the rocks. In the natural environment the daytime temperature averages 27°C - 32°C, and at night it falls to about 20°C.

Dendrobates azureus has a smooth skin, the background colour of which is black. They are covered with blue spots sometimes so close together that they appear as if the pattern is actually black on blue rather than the other way around. In some sense it is rather like the zebra - is a zebra a white horse with black stripes or a black horse with white stripes? Whatever it is, the result is a stunningly beautiful animal! The pattern of the markings is not consistent. I have some animals that are almost completely blue and I have other with rather large areas of black. *D. azureus* is one of the largest of the poisonous frogs. The females are larger than the males (about 45 cm) and they are usually quite plump. The males grow to about 38 cm. In most cases the males can be recognized by their relatively larger front feet toepads.

These frogs are very active, especially during the sprinkling of water and during the feeding time. It is maintained in the literature that the females are quite aggressive, my observations confirm this. The males are also somewhat aggressive at times. This behavior is affected by the size of the terrarium. It is not necessarily bad, with these behaviors they interact with each other to establish territories - this is important in the natural breeding relationships. However in a terrarium that is overcrowded it can be detrimental. The call of *D. azureus* is very inconspicuous. It will not usually be noticed unless one is specifically listening carefully for it. It is a very faint low-pitched buzzing sound rather similar to the call of *Dendrobates tinctorius*.

These frogs are easy to feed. They eat almost any insects, from tiny drosophila to spiders up to 15 mm long. Reproductive activity is linked quite recognizably to the quality and quantity of food available. In the winter I feed them with fruit-flies and I get 2 to 4 eggs once each week or two. In the summer I feed them with "pasture plankton" and I usually get 3 to 5 eggs twice per week. It has been stated, and is true, that success is the first instance is food dependant. Occasionally I supplement their food with a dusting of vitamins. I do this more in the winter when pasture plankton is not available. I feed the growing young frogs almost exclusively with pasture plankton when it is available. I screen the collection to select the smaller insects. This is a laborious process but as a result I realize larger and more beautiful frogs. The young frogs grow better than if they are raised on vitamin-dusted fruit flies. In this manner I get healthy adults and, in turn, from them I get healthy baby frogs.

Dendrobates azureus does not produce many eggs. Clutches average from 2 to 5 eggs depending upon the season. They produce the largest eggs of any of the poisonous frogs. Likewise, the tadpoles are very big. It is the male who decides where the eggs will be layed. The eggs may be deposited in a petri-dish under a coconut or on a bromiliad leaf. Both the male and the female clean the nesting site before the eggs are layed. After the eggs are layed, or sometimes during the laying of the eggs if there is enough room, the male fertilizes them. Sometimes a second male will also fertilize the eggs, and occasionally both will do so simultaneously! I leave the eggs in the terrarium until the larvae are almost ready to emerge from

the eggs. The males clean and water the eggs at least every other day. In the natural habitat it is the male who transports the eggs. I have found that the eggs are less likely to mold if they are left to the care of the males. I have found that in clutches where some eggs have become mouldy, the fertilized eggs remain unaffected. The tadpoles are cared for in a special tank with thirty separate compartments. The tadpoles are cannibalistic. The water is free to circulate but the tadpoles cannot come in contact with each other. The water circulates through a biological filter beneath the tadpole compartments. The water temperature is maintained at about 22°C. Higher temperatures result in faster growth and early metamorphosis. Frogs which metamorphosis early are small and usually will not attain the same full natural size as those which develop more slowly. I feed the tadpoles with fishfood and sometimes with crushed snails. During the first few days after they emerge from the eggs, I feed the larvae with liquifry Red and Green. The tadpoles grow well on this diet so I do not use any other types of food. The incubation period from fresh fertile egg to free swimming tadpole is from 16 to 18 days. The larger larvae can measure up to about 2 cm long. The development of the tadpoles from the time of hatching to metamorphosis take about three months and the tadpoles reach an average size of about 4 to 5 cm. When the front legs emerge, the tadpoles are moved to a plastic box. When the tail is completely resorbed they are removed to small terrariums which contain peat moss and leaf litter and a small water dish. The temperature is maintained at about 22°C and the humidity is kept as high as possible. After a few weeks I raise the temperature to 25°C. The froglets are fed small arthropods, fruitflies and baby spiders. The young frogs grow very fast and become sexually mature in about one year.

It is quite likely that *Dendrobates azureus* is related to *Dendrobates tinctorius*. It is possible to cross-breed *D. azureus* with both *D. tinctorius* and *D. auratus*. I think that this practice should be discouraged because the blue frog is so rare. Rather, the genetic line should be maintained pure and guarded carefully. When available, the blue poisonous frog is not difficult to raise and to keep. However, we need to exercise good stewardship of the specimens already entrusted to us because new imports are not now, and may never again be possible! The species is now listed as endangered and is felt to be threatened with extinction to the wild.

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