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ISSD Director - At - Large

Given in recognition of service to the World Herpetological Community for his efforts in helping to establish the:

International Society for the Study of Dendrobatid Frogs

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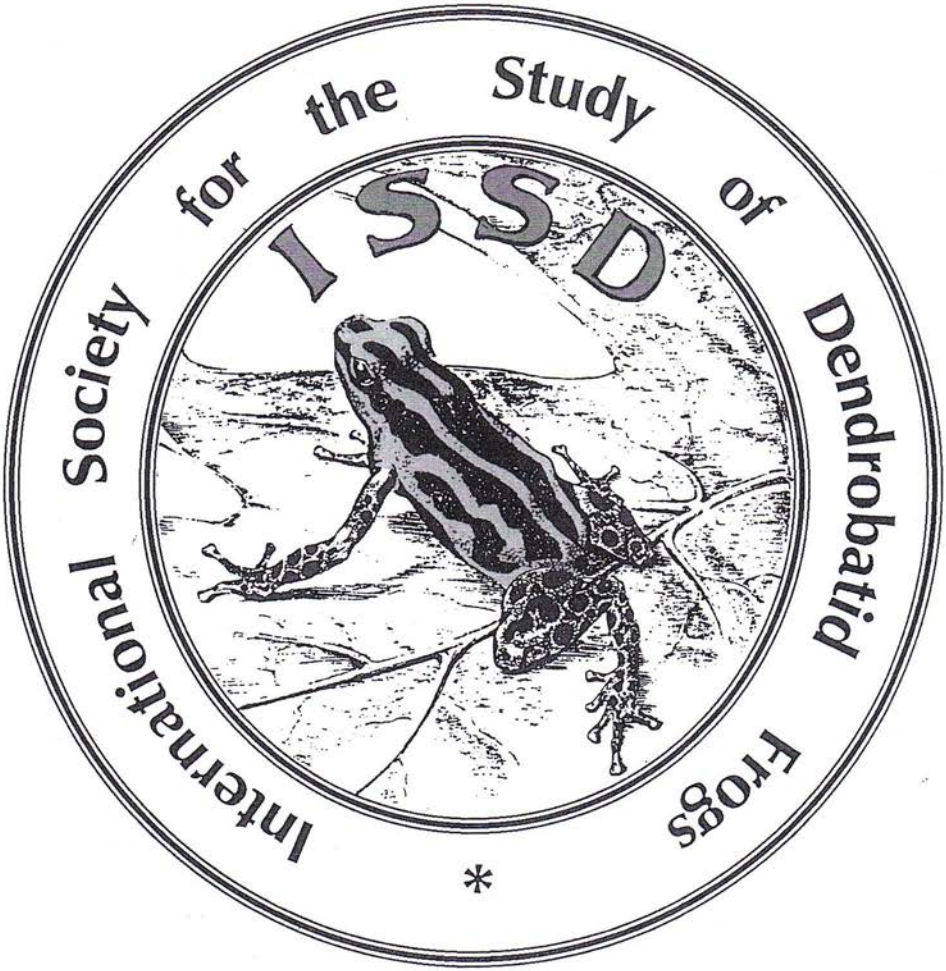
David Hulmes

David Hulmes - President, ISSD



ISSD NEWSLETTER

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De blauwe gifkikker (*Dendrobates azureus*) in het terrarium

(The Blue Poison-Arrow Frog in the Terrarium)

Abstract:

Men vindt *Dendrobates azureus* in savanne streken in Zuid-Surinam, in een paar geisoleerde bosresten. Ze bereiken een lengte van +/- 45mm. Vrouwtjes zyn onderling aggressief. Gedurende de zomer wordt voornamelyk weid plankton ge voerd. In de winter voerdt men Drosophila's. Winters worden vitamine gevoerd, aan de Drosophila's. Ze leggen 2 tot 6 eieren, deze worden in het terrarium gelaten tot ze uit komen en daarna opgekweekt by +/- 22° C. Jk voer ze met vissenvoer, en na 3 maand zyn het kikkerdjes.

Introduction:

Dendrobates azureus, described by Hoogmoed in 1969, excites many of us. This much coveted species is rare in captivity. Breeding and raising these frogs proceeds very slowly.

Origin:

This beautiful poisonous frog originates in Surinam and is known only from some very specific isolated forest islands on the Sipaliwini-savannah; at an elevation of 315 -430 meters. *Dendrobates azureus* is found only in one specific creek valley, littered by huge boulders. The frog lives between these smooth, moss covered boulders (Hoogmoed, 1971).

Why this particular microhabitat is required is unknown to me; in my terraria the frogs seem to do just fine, with or without the rocks. Possibly there are some special food items inhabiting these rocks, or there are some particularly favorable egg deposition sites within these rocks. The temperature ranges between 27 - 32° C by day, falling to about 20° C at night, in the natural habitat.

Appearance:

D. azureus has a smooth skin. Sometimes it is said that the abdomen and the inside of the thighs have a granular texture; I have not observed this on my animals. The primary color

is black. the body is covered with a pattern of blue spots, sometimes so close together that the appearance is actually that of black spots on a blue background. The pattern of the markings is not consistent; I have some animals that are almost completely blue while others have rather large areas of black. The ventral surface is a very dark blue, almost blue-black. *D. azureus* is one of the largest of the poisonous frogs. The females are larger than the males, about 45mm (SVL); they are usually quite plump. The males grow to about 38mm (SVL). In most cases the males can be recognized by their relatively larger front feet toe pads.

TERRARIA:

My terrarium measures 125 x 80 x 90cm (LxWxH). It is sealed water tight and there is about 5cm of water filling it. On the bottom I have created a land area from stones, sticks and soil. In addition, it has an active waterfall. The water is not heated and averages about 20° C. The terrarium is ventilated. On cold nights the air temperature drops to about 15° C and it rises to a high of about 35° C on sunny days. The terrarium receives sun from a south window. Early each morning I sprinkle the terrarium with either rain or tap water. The tank is densely planted with epiphytes, ferns, Hoyas, etc. Marshy plants grow in the saturated soil.

Two males and one female occupy each terrarium, I prefer to keep only one species of frog per terrarium. Some spiders live in the terrarium, feeding on the insects with which I feed my frogs. The offspring of the spiders serve as a food supplement for the *D. azureus*. In my hobby room I have tanks especially for keeping young frogs, these measure 75 x 55 x 70cm. These terraria are arranged in the same manner as the one mentioned above, except there are no waterfalls. The bottoms are constructed with a slope so that there are areas where the soil is dry. Each rearing tank is home to two pairs of frogs; except that with some species (for example *D. pumilio*) their behavior dictates that only one male may be kept in each tank.

BEHAVIOR:

D. azureus are very active, especially after the sprinkling of water and during the feeding time. It is mentioned in some literature that the females are quite aggressive (Polder, 1973), my observations confirm this. The males are also aggressive. I have observed

them jumping through the terrarium fighting with each other. Sometimes they jump from the waterfall into the water, continuing their fight in the water. They jump onto each others necks, trying to get their feet over the others head, pushing their opponent flat to the ground. They then use their hind legs for balance, pressing more forcefully on their adversary. I have observed them fighting for hours, until one or both are exhausted; then, five minutes later, they will be catching fruitflies side by side! This all happens while the female looks on. Because of their large size and this lively behavior, they need a good size habitat. Their croaking is inconspicuous; the sound being rather like that of *D. tinctorius*. It is in their nature for two frogs to go after the same food insect; it appears as if there is some envy when one is feeding. *D. tinctorius* displays this same behavior. I feed them with only small quantities of insects at any one time; in their feeding frenzy they trample much of the food and it seems that the more food there is available, the more difficulty they have deciding which fly to go after.

FOOD:

It is not sufficient to feed *D. azureus* solely with fruitflies. I gather pasture plankton. For example; caterpillars (15mm long), spiders, arthropods etc.. The frogs will eat everything. Reproductive activity is linked with the quantity of food available. In the winter time I feed them fruitflies and I get two to four eggs once every week or once every other week. In the summer, when plankton is available, I get three to five eggs two times per week. It is true what is often said, that raising these frogs is dependent in the first instance on the food. I supplement their feedings with Osspulvit, using it more in the winter than in the summer, when plankton is available. Even my young stock are fed as much as possible with the plankton. I screen the plankton to select small insects. This process is a lot of work but it results in larger, and more beautiful frogs. They grow better this way than on a diet of vitaminized fruitflies. Since I have begun this practice, none of my frogs has died. Also, from healthy parents I raise healthy young.

PROPAGATION:

Dendrobates azureus does not produce many eggs. My females produce two to five eggs, depending on the season. *Dendrobates azureus* produces the largest eggs of any of the poisonous frogs. Also the tadpoles are

large; they are larger than those of *D. tinctorius* and even *D. auratus*. It is the male who decides where the eggs will be laid. The eggs may be deposited in a petri dish under a coconut shell, or on a bromiliad leaf. The female cleans the nesting site before she lays her eggs. Next, or sometimes during the laying of the eggs if there is enough room, the male fertilizes the eggs. Sometimes a second male will fertilize the eggs, sometimes both simultaneously. I leave the eggs in the terrarium until the larvae are almost ready to emerge from the eggs. I do this because the males water and clean the eggs every other day. I have found that if I remove the eggs right away, often they will mold. This molding can be prevented by sprinkling them with a solution of one drop of SH2000 per liter of water. My experience with clutches in which some of the eggs have gotten moldy is that the healthy eggs remain unaffected. The tadpoles are cared for in a tank with thirty separate compartments connected in such a way that the tadpoles cannot congregate. The water is circulated through a biological filter beneath the tadpole compartments. The water temperature is maintained at about 22° C. I avoid higher temperatures because this leads to a faster rate of development, which results in early metamorphosis. Frogs which metamorphosize early, at a small size, will remain small the rest of their lives. I feed the tadpoles Tetra Micromin daily and sometimes crushed snails. Also, in the first few days after the eggs hatch, I feed the tadpoles Liquifry Red and Green. The larvae grow nicely on this diet so I do not use any other types of food. The incubation period from fresh egg to free swimming tadpoles is about sixteen to eighteen days. Large larvae measure about 2cm long. The development of the larvae from time of hatching to metamorphosis takes about three months and the tadpoles reach an average size of about 18mm. The tadpoles are cannibalistic. They do not shun the light, as do the larvae of *D. parvulus*, and they do not seem to be disturbed by tapping the container or by loud noises. When the front legs emerge the larvae are removed to a plastic container with shallow water and a plastic lid onto which they can climb. Next, when the tail is completely reabsorbed, they are placed in containers measuring 40 x 20 x 30cm. In these I have placed peat moss and leaves and a water dish. The temperature is kept at 22° C and the humidity maintained as high as possible. After a few weeks I raise the temperature to about 25° C. The

froglets are fed arthropods, fruit flies and young spiders. The froglets quickly adjust to their new environment, claiming their permanent place in a bromiliad, behind a fern or under a leaf.

MORE DETAILS:

It is likely that *Dendrobates azureus* is related to *Dendrobates tinctorius*. It is possible to cross breed *D. azureus* with both *D. auratus* and *D. tinctorius* but because the blue poisonous frog is so rare this practice should be discouraged, rather the genetic line should be kept pure! These species show similar behavior in their natural habitat, the males transporting the larvae. In my terraria, this behavior has not been exhibited. It is possible that, as a result of the removal of the eggs, they lose their natural instinct. When available the blue poisonous frog is easy to raise and to keep, however we need to maintain caution because import has now been made impossible. This species is now listed as endangered and is possibly threatened with extinction. At the present time all the poisonous frogs are listed as endangered (CITES - Appendix II).

LITERATURE:

HOOGMOED, M.S., 1971. *Dendrobates*, een kleurrijk genus. Het Aquarium 41 (8):182-189.

POLDER, W.N., **1973.** Over verzorging en voortplanting in gevangenschap van *Dendrobates azureus* en enkele andere *Dendrobatidae.* Het Aquarium 44(1):16-22.

ACKNOWLEDGEMENT:

A special note of thanks to Mrs. Thea VanderWel, of Janesville, Wisconsin for translating this paper from Dutch into English.

COMMENDATION

A special note of thanks and commendation to Jack K. Frenkel, M.D., of Kansas City for collecting, and successfully returning to the U.S. from Panama, a color form of D. auratus rarely seen in American collections. The frogs are rather more slender in body than other races of auratus, with long delicate toes. The body is entirely black with just a few very small brilliant green spots scattered over the dorsum and legs. This is a valuable contribution to the auratus captive gene pool. We are especially pleased that Dr. Frenkel chose to distribute these animals to experienced breeders to maximize the chances of establishing a breeding captive population.