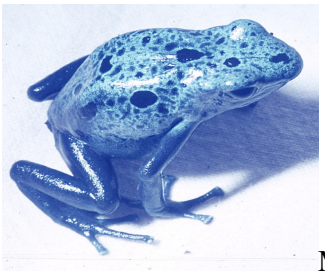
The discovery of the blue arrow poison frog, *Dendrobates azureus* in 1968

In 1968 I did my first fieldwork to study the herpetofauna (amphibians and reptiles) of Suriname, financed by WOTRO, the Dutch Organization for Tropical Research. Although some articles on reptiles and amphibians from Suriname had been published, a total overview of the herpetofauna never had been envisaged and I tried to lay the basis for that. I arrived in Suriname late in April 1968 and would stay till late November. Part of the working plan was to join an expedition to the Sipaliwini savanna of two Utrecht botanists (Reinoud Norde and Feddo Oldenburger) and the geomorphologist. Hans Riezebos (also from Utrecht) for 6 weeks.
The Sipaliwini expedition started August 22 and for me would last till October 7, 1968. The other three scientists would stay for another 4.5 months at the savanna. The day we arrived at Sipaliwini we stayed at the airstrip on a small savanna surrounded by primary forest. The next day we installed our Base Bivouac on the right bank of the Vier Gebroeders Creek, at the border of the forest and the large Sipaliwini savanna, 5 km east of the airstrip (Hoogmoed, 1969a). Until September 10 I stayed in the Base Bivouac and worked both in the forest and in the savanna with good results. This period yielded two species of frog [*Leptodactylus macrosternum* Miranda Ribeiro, 1926 and *Epipedobates hahneli* (Boulenger, 1884)] and one species of worm lizard (*Amphisbaena vanzolinii* Gans, 1963) new for Suriname, and many species of reptiles and amphibians that I already had collected elsewhere in Suriname before. But for any species collected the locality Sipaliwini was an extension of its distribution as the area had never before been explored scientifically.
On September 3, we sent two persons of our field crew (John Tawjoeran and “boss” Leo Roberts) to the mountain Vier Gebroeders close to the Brazilian border, 13 km due east of our Base Bivouac, to reconnoiter the road and decide on the place of a new camp. They left early in the morning and had not returned by 19:30 h, when it was already dark. Fortunately a full moon was out and light conditions on the savanna were rather good. Nevertheless, there was some worry about our helpers. We hoisted an oil

lamp in a small tree in the savanna to serve as a beacon for the two travelers and waited. Just after 20:00 h we noticed a flame in the savanna: our friends had lighted a newspaper to signal their arrival. After return to the Base Bivouac they reported on their more than 12 hour walk and on the possibilities to establish a new Bivouac near Vier Gebroeders Mountain. The prospects were good. On the west flank of Vier Gebroeders Mountain there was an island of primary rainforest that would make a good place for a camp. Among other things John and Leo reported having seen blue frogs in the forest island.



My first reaction was to ask them how much rum they had drunk that day, because no thing like a blue frog existed and it was like hearing about blue elephants. Anyway, they maintained they had not drunk a single drop of rum, which was indeed most likely, but that they had seen blue frogs hopping about on the forest floor. Giving this strong tale some thought I came to the conclusion that maybe they had seen *Dendrobates tinctorius* (Cuvier, 1797), a colourful frog known from Suriname, French Guiana, Guyana and Brazil, with purple legs and a black back with a yellow mark on it. But John and Leo denied they had seen any yellow on the frogs and maintained they were blue, so my curiosity was raised and I was anxious to see them myself. However, because of logistic problems and our planning I only could go to the base of Vier Gebroeders Mountain on September 10, after my supply of alcohol for preserving animals had been replenished.

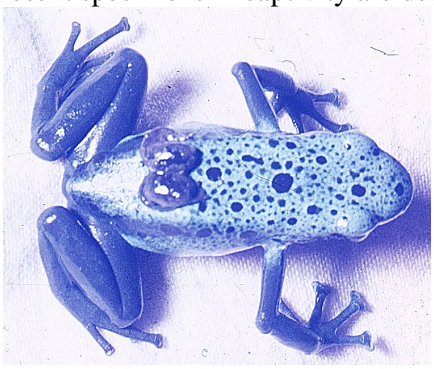
Vier Gebroeders Mountains, home of the blue arrow poison frog.

On September 8 the three scientists from Utrecht University and all field personnel moved to the new Vier Gebroeders Bivouac. I stayed in Base Bivouac to await a fuel flight from Paramaribo that also would bring new alcohol supplies. John and Leo came back that evening and the next day we went to the airstrip to await the plane with supplies. On September 10 I departed in a plastic boat, loaded with supplies, together with John Tawjoeran, to the Vier Gebroeders Bivouac. As the boat did not have an

outboard motor, we had to pole and drag the boat against the current of the Vier Gebroeders Creek, which fortunately was not very strong in the dry season. It was a pleasant day in and out of the water, characterized by breathtaking views of the savanna, the creek, rolling hills, and above all, silence. Just the murmuring of the water and some calling birds were to be heard, sometimes broken by our own voices when giving indications about where to go with the boat. At 16:15 h we reached a point from where the supplies could be carried to the Vier Gebroeders Bivouac, where we arrived at about 18:00 hours. In the camp everybody started to tell me enthusiastic stories about the blue frog and finally someone produced one and put it in my hands. Indeed it was bright blue with black spots, no other colours. It was sensational, and it was clear I was looking at a new species of frog that differed from all other known poison arrow frogs by its gaudy colour. It was clearly related to *D. tinctorius*, the only other species of *Dendrobates* known from Suriname, but with a completely different colour. It was a strange sensation, sitting there in a small forest camp at the border of Suriname and Brazil, without any literature to consult, but still be able to decide I had just discovered a new species in the field. A once in a lifetime sensation. It was already dark and too late to start looking for the blue frogs myself, but there would be another day tomorrow.
On September 11 I got up early and after a good breakfast started out to climb the Vier Gebroeders Mountain by following the creek stream-up. The creek ran between large boulders and at times disappeared completely under them. The vegetation along the creek was dense with many lianas swinging between trees

After about 20 minutes I saw my first blue *Dendrobates* in the wild. It was sitting on the forest floor on fallen leaves, and when I moved nearer it hopped away with short, quick movements. Its bright blue colour contrasted beautifully with the brown dead leaves. It was easy to capture. During my trip through the creek valley I saw many more and collected some of them, restraining myself of capturing more than a few because I had no idea about

the extent of the forest island and the size of the population of the blue *Dendrobates*. Also, at the time, I had no idea whether this species would occur in other forest islands in the region or not. Most specimens were on the ground, but a few were moving up the trunks of large trees to…..where?
During my further stay at Vier Gebroeders Bivouac (till October 7, 1968) I discovered that populations of blue frogs were present in several other forest islands around Vier Gebroeders Mountain. However, because of the size of the forest islands and the fact that they were not interconnected, exchange of genetic material between populations was likely to be low, and only some individuals were collected as evidence of their presence in other forest islands.
Back in Holland I set to work on the collected material and, finally, the description of the new *Dendrobates*, which one year later was published under the name *Dendobates azureus* Hoogmoed, 1969. Because of its very striking colour I could convince the editors of the journal to publish a coloured plate to show the real life colour. At that time a rare and very costly thing (Hoogmoed, 1969b).
The stay at Vier Gebroeders bivouac yielded two other new species: the wormsalamander *Microcaecilia taylori* Nussbaum & Hoogmoed, 1979, and the tree frog *Scinax trilineatus* (Hoogmoed & Gorzula, 1979). However, these species were only recognized in the laboratory after careful study, comparison with other species and browsing the literature.
In 1970 I returned to the Sipaliwini savanna on another expedition and at that time I collected 10 specimens of *D. azureus* from the Vier Gebroeders forest island, and transported them alive to Holland, where they formed the basis of the first, and only legal, breeding colony of *D. azureus*. All other colonies were established with smuggled specimens, from which the present specimens in captivity are descendants.



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All publications mentioned here may be freely downloaded from the following website: http://www.repository.naturalis.nl/cgi/b/bib/bib-idx?type=simple&c=naturalis&rgn1=entire+record&q1=Hoogmoed&Submit.x=11&Submit.y=18

Belém, Brasil, 20 november 2010
Dr. M.S. Hoogmoed

From left: Marinus Hoogmoed, Reinoud Norde and John Tawjoeram.
Morro Grande in the background.