

Physical combat in the poison-arrow frog, *Kokoé-pá* (*Oophaga histrionica*) from Arusi, Choco, Colombia.

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Territorial behavior has been reported for several species of dendrobatids frogs. It involves a combination of site tenacity, aggressive behavior, and a combination of acoustic and visual displays (reviewed by Hödl & Amézquita, 2001; Prohl, 2005). Within the genus *Oophaga* (Bauer 1994) aggressive behavior, physical combat and high calling rates, have been reported in male frogs (Crump, 1972; Summers, 1992; Pröhl and Hödl, 1999; Summers, 2000), but no detailed descriptions of fighting behavior are available to date. Silverstone (1973) described two observations of male-male interactions in *Oophaga histrionica* (Berthold 1845) from Serranía del Baudó, Colombia but only one led to a wrestle between males, which lasted just one minute.

Here we described a physical combat between two males of *O. histrionica*, which lasted approximately 46 minutes since the beginning of the observation. The event occurred on the 5th of June 2011, at 11:40 am, in the Municipality of Nuquí, Chocó, Colombia (5.58°N; 077.49°W, 132m elevation). One resident male was observed for 30 minutes in several occasions either calling or eating in the top of a fallen tree, about 3 m above the ground. It was photographed some days before the event and we recognized him for its pattern of coloration, and the consistent position in the colony along those days. We did not see the initial moment when the intruder male came to the territory. The beginning of the agonistic interaction between the males occurred in a hidden place and they were observed for the first time beneath the fallen tree trunk, between dead

palm leaves. The males combined kicking with the hind limbs and grasping to each other with their forelimbs, like attempting to get on each other's back. When one of the males managed to grasp the other one on its dorsum, it started to call, while the grasped male tried to escape by kicking his opponent and moving around dead palm leaves (Figure 1A). Sometimes, both individuals attempted to grasp each other head-on (Figure 1B). The grasped male sometimes uttered calls.

On several occasions, one male walked away from the other one and called, but was afterwards followed by the second one and the combat was re-initiated. Approximately, 46 minutes after the beginning of the fight, the intruder remained in the ground near the fallen tree, calling beneath dead palms, while the resident male climbed up the tree to a higher position and called in front of a third individual. We did not see the third individual since the beginning. Because the third individual did not call during the whole interactions nor it showed signs of aggressiveness, we presumed it was a female. After the combat both males continued calling. Other aggressive interactions have been reported in *Oophaga* species. For instance, the males of *O. granulifera* and *O. pumilio* produced aggressive calls followed by kicking and grasping (Crump, 1972; Pröhl, 1997). Also, Silverstone (1973) described two events of combat behavior in *O. histrionica*: in the first, the males grasped each other, whereas in the second they called repeatedly and later advanced and retreated to the other in several occasions. Remarkably, this was the longest reported combat between *Oophaga* males, 46 min, compared to 7-10 min in Crump (1972), just 1 min of physical combat, with calling interaction for 15-18 min, in Silverstone (1973), and fights of few seconds in Pröhl (1997). Also, in those descriptions the males did not call when they were grasping each other as occurred in our described event.

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Figure 1. Male-male physical combat in *O. histrionica*. A) Male grasped on its dorsum, B) attempt to grasp head-on.

References

- Crump, M.L. (1972): Territoriality and Mating Behavior in *Dendrobates granuliferus* (Anura: Dendrobatidae). *Herpetologica* **28**(3): 195-198.
- Hold, W., Amézquita, A. (2001): Visual Signaling in Anuran Amphibians. In: *Anuran communication*, p. 121-141. Ryan, M.J., Ed. Washington, Smithsonian.
- Pröhl, H. (2005): Territorial Behavior in Dendrobatid Frogs. *Journal of Herpetology* **39**(3): 354-365.
- Pröhl, H. (1997) Territorial behaviour of the strawberry poison-dart frog, *Dendrobates pumilio*. *Amphibia-Reptilia* **18**: 437-442.
- Pröhl, H., Hödl, W. (1999): Parental investment, potential reproductive rates, and mating system in the strawberry dart-poison frog, *Dendrobates pumilio*. *Behavioral Ecology and Sociobiology* **46**(4): 215-220.
- Silverstone, P.A. (1973): Observations on the Behavior and Ecology of a Colombian Poison-Arrow Frog, the Kōkoé-Pá (*Dendrobates histrionicus* Berthold). *Herpetologica* **29**(4): 295-301.
- Summers, K. (1992): Mating strategies in two species of dart-poison frogs: a comparative study. *Anim. Behav.* **43**: 907-919.
- Summers, K. (2000): Mating and Aggressive Behaviour in Dendrobatid Frogs from Corcovado National Park, Costa Rica: A Comparative Study. *Behaviour* **137**(1): 7-24.