

POISONOUS FROGS OF SOUTH AMERICA

A South American native stalks quietly through the jungle, peering into the tree branches overhead. A monkey's slight movements divulge its presence, and the hunter takes careful aim with what appears to be an almost toylike bow and arrow. The arrow sails true, and the monkey is hit. The arrow seems ineffectual at first; however, after a few moments, the monkey tumbles from the tree. Thousands of years of cultural evolution have taught these natives a deadly secret that makes effective hunting tools out of seemingly innocuous instruments.

All amphibians possess glandular secretions that are noxious or toxic to varying degrees. These glands are distributed throughout the skin and exude milky toxins that help ward off potential predators. Warning (aposematic) coloration often signals to predators the presence of noxious secretions.

Four genera of frogs (*Atopophryhnus*, *Colostethus*, *Dendrobates*, and *Phylllobates*) in the family Dendrobatidae live in tropical

forests from Costa Rica to southern Brazil. South American natives use toxins from these frogs to tip their arrows. They kill the frogs with a stick and hold them over a fire. Granular glands in the skin release their venom, which the natives collect and allow to ferment. Poisons collected in this manner are neurotoxins that prevent nerve impulses from transmitting between nerves and between nerves and muscles. Arrow tips dipped in this poison and allowed to dry contain sufficient toxin to paralyze a bird or small mammal.

In addition to their toxic secretions, members of this family of frogs have interesting reproductive habits. A female lays one to six large eggs in moist, terrestrial habitats. She promptly abandons the eggs, but the male visits the clutch regularly and guards the eggs. The eggs hatch after approximately 2 weeks, and the tadpoles wiggle onto the male's back. The male then transports the tadpoles from the egg-laying site to water, where they are left to develop. The tadpoles metamorphose to the adult body form after approximately 6 weeks.