

Western Ecological Research Center

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African Clawed Frog in Southern California

Introductions of exotic species often have unexpected ecological consequences, and understanding the complex ways in which they may affect native ecosystems is critical to management solutions. In recent publications in *Comparative Parasitology* and *The Southwestern Naturalist*, USGS researchers and their colleagues report on two different topics relating to the African clawed frog (*Xenopus laevis*) in southern California: its parasites and its role as novel prey for native species.

The African clawed frog can be found in many ponds, rivers, and streams in southwestern California. In its native environment, this frog has a diverse parasite fauna, with most species unique to this host. Examining feral African clawed frogs from 3 localities in southern California, researchers found California frogs had only 10 parasite species, some of African origin and others acquired after introduction. A cestode was the only African parasite to find a suitable intermediate host (a cyclopoid copepod) in California. None of the African parasites were found in other frog species collected in the same localities. Newly acquired parasites were predominantly bird parasites that use fish as an intermediate host.

In California, sunfish, bullfrogs and other ranid frogs, and African clawed frogs, all introduced over the past century, are thought to be responsible for population declines of native aquatic vertebrate and invertebrate species due to predation, competition for resources, or both. However, nonnative frogs and juvenile sunfish represent possible replacement food resources for some native species of semi-aquatic predators, such as natricine snakes. In 1998, USGS scientists documented the African clawed frog as a novel prey for a species of concern, the two-striped garter snake (Ervin and Fisher 2001). This prompted research to assess adaptation to a novel prey. Researchers tested the predatory responses

Management Implications:

- As a transporter of disease, the African clawed frog may pose more of a risk to freshwater fish than to terrestrial frogs.
- Distribution of the two-striped garter snake may be limited less by the presence of a particular prey species, and more by the availability of habitat that supports populations of aquatic and semi-aquatic vertebrates.
- To avoid negative impacts on natricine snakes, removal of nonnative aquatic prey species should be linked to restoration of native amphibians and fish.

from two different populations of the snake, one having experience of introduced prey and the other naïve, to chemosensory cues from native and introduced prey species, and controls. Odors of nonnative prey species elicited predatory responses from both groups of snakes that were comparable to responses to native prey. The generalist nature of the two-striped garter snake may be such that it readily accepts many aquatic prey species as they become established within the distribution of the snake. This adaptability may help this native snake persist in areas where native amphibians have declined.

Kuperman, B. I., V. E. Matey, R. N. Fisher, E. L. Ervin, M. L. Warburton, L. Bakhireva, and C. A. Lehman. 2004. Parasites of the African clawed frog, *Xenopus laevis*, in southern California, U.S.A. *Comparative Parasitology* 71(2):229–232.

Mullin, S. J., H. Imbert, J. M. Fish, E. L. Ervin, and R. N. Fisher. 2004. Snake (Colubridae: *Thamnophis*) predatory responses to chemical cues from native and introduced prey species. *Southwestern Naturalist* 49(4):449–456.

E. L. Ervin and R. N. Fisher. 2001. *Thamnophis hammondi* (two-striped garter snake) prey. *Herpetological Review* 32(4): 265–266.