

described as carrying larvae on its back (Wilder 1913, *op. cit.*). Since then, salamanders have been shown to make prolonged skin contact with their offspring during experimental conditions (Oneto et al. 2010, *op. cit.*), as well as in a natural setting (Williams 2015. *Herpetol. Rev.* 46:226).

At ca. 1530 h on 13 October 2018, in Triggs County, Kentucky, USA (36.71694°N, 88.06351°W; WGS 84), we found one adult *Desmognathus conanti* under a rock in a dry stream bed with larvae on its back. One of the three larval salamanders immediately left the adult's back and crawled into the leaf litter while the other two stayed on the adult (Fig. 1). Furthermore, there appeared to be hydrophobic secretions along the adult's back, in particular around the back-left leg (Fig. 1). An additional survey of the streambed revealed no other instances of post-hatching paternal care; however, multiple other larval stage *Desmognathus* salamanders were seen in scattered pools of water within the otherwise dry streambed.

*Desmognathus* salamanders are known to exhibit both pre- and post-hatching parental care (Wilder 1913, *op. cit.*). It has been suggested that post-hatching parental care might be linked to increased survivorship of offspring by providing protection from predation or fungal and bacterial infections (Oneto et al. 2010, *op. cit.*). Our observation was made in particularly dry conditions, supporting the idea that this behavior may also be a method used by larvae for osmoregulation. (Williams 2015, *op. cit.*). The observed secretions on the adult's body could assist in the adherence of larvae to the adult, which might lead to protection against larval desiccation.

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**NOTOPHTHALMUS MERIDIONALIS** (Black-spotted Newt). **ANTI-PREDATORY BEHAVIOR.** Newts are known for their toxicity and aposematic coloration. When disturbed, many newt species will exhibit the unken reflex, contorting in a fashion that exposes the bright (aposematic) ventral coloration, presumably to signal toxicity (McCallum 2001. *Bull. Maryland Herpetol. Soc.* 37:101–114; Tanaka and Means 2017. *Herpetol. Rev.* 48:155–157).

At 1520 h on 2 February 2018 in Hidalgo County, Texas, USA (precise locality withheld due to conservation concerns), a *Notophthalmus meridionalis* performed the characteristic unken reflex behavior. This individual was found under debris and upon manual disturbance, contorted its tail into a spiral fashion, exposing the bright orange coloration, and tucked its head under its tail (Fig. 1). Photographs were collected to document the encounter. After a 10–15 min period without physical disturbance, the individual began to relax from its stance, but reaffirmed the position after gentle disturbance. After 30 min, the individual was replaced under debris from where it came. In a report to Texas Parks and Wildlife, Rappole and Klicka (1991. Status of the black-spotted newt [*Notophthalmus meridionalis*] in Texas and Mexico. U.S. Fish and Wildlife Service, Lower Rio Grande Valley Wildlife Refuge, Unpublished report, Alamo, Texas. 60 pp.) describe a similar behavior in wild *N. meridionalis* (Petranka 1998. *Salamanders of the United States and Canada*. Smithsonian Institution Press, Washington D.C. 587 pp.), but do not provide photographic evidence. Our finding corroborates the previous report, providing photographic documentation.

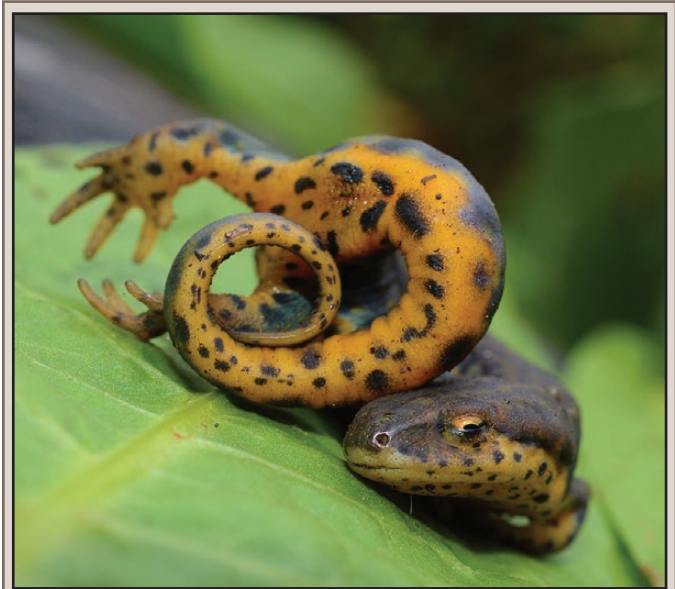


PHOTO BY CLINT GUADIANA

FIG. 1. Unken reflex exhibited by a *Notophthalmus meridionalis*.

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#### ANURA — FROGS

**ELEUTHERODACTYLUS PLANIROSTRIS** (Greenhouse Frog). **LEUCISM.** *Eleutherodactylus planirostris* is native to Cuba, and has been introduced to the continental United States, Hawaii, the Philippines, Guam, and Hong Kong via live plant trade (Kraus et al. 1999. *Herpetol. Rev.* 30:21–25; Lee et al. 2016. *Acta Herpetol.* 11:85–89). Here we report unusual coloration observed on an *E. planirostris* in Hong Kong.

At 2000 h on 4 August 2016, an *E. planirostris* (12 mm SVL) was seen at Woh Chai Hill, Shek Kip Mei, Hong Kong (22.33034°N, 114.16882°E; WGS 84). It had no melanin on its body except on the dorsal side of the head and shank (Fig. 1). Its eyes were black, and thus we determined it to be leucistic. To our knowledge, abnormal coloration in *E. planirostris* has only been documented



FIG. 1. Leucistic *Eleutherodactylus planirostris* observed at Woh Chai Hill, Hong Kong.



in an introduced population in Florida, USA (Patrovic 1973. *J. Herpetol.* 7:49–51). The frog observed by Patrovic (1973, *op. cit.*) also had melanin on the dorsal skin between the eyes but its eyes were pink.

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**FEJERVARYA LIMNOCHARIS (Asian Rice Frog). DIET.** Anurans are generalist feeders and in most cases gape-limited foragers. *Fejervarya limnocharis* is a generalist feeder, preying mostly on insects, gastropods, isopods, and arachnids (Chang et al. 2016. *BMC Microbiol.* 16:33). On 14 January 2010 around 2200 h, in Tainan County, Taiwan (23.23926°N, 120.51584°E; WGS 84), we found an individual *F. limnocharis* feeding on a smaller anuran. While taking photographic evidence, the *F. limnocharis* individual was disturbed and released its prey. The released individual was still alive, and we identified it as *Buergeria otai*. The prey individual took advantage of our activity to escape. None of the frogs were preserved or collected. Although not recorded before, this predation event is not unexpected as any animal fitting the gape of *F. limnocharis* is potential prey, including other anurans.



FIG. 1. *Fejervarya limnocharis* predating on *Buergeria otai*.

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**KASSINA MACULOSA (Marbled Running Frog) and K. ARBORICOLA (Ivory-Coast Running Frog). DEFENSIVE BEHAVIOR.** Predation has driven the evolution of cryptic and aposomatic coloration, toxic secretions, and defensive posturing across anurans (Wells 2007. *The Ecology and Behavior of Amphibians*. University of Chicago Press, Chicago, Illinois. 1400 pp.). When contacted by a predator some amphibians will “death-feign” by flipping on their back and remaining immobile (Wells 2007, *op. cit.*). Death-feigning has been observed in kassinoid frogs (family Hyperoliidae), including species of *Kassina*, *Paracassina*, *Phlyctimantis*, and *Semnodactylus*. The genus *Kassina* contains 16 species, and death-feigning has been observed in four species: *K. cochranae* (Rödel et al. 2000. *Salamandra* 36:125–130), *K.*

*kuvangensis* (Channing and Howell. 2003. *Herpetol. Rev.* 34:51–52), *Kassina lamottei* (Rödel et al. 2000, *op. cit.*), and *Kassina maculata* (Liedtke and Müller 2012. *Herpetol. Notes.* 5:309–310). Here we report observations of death-feigning for two additional *Kassina* species: *K. maculosa* and *K. arboricola*. On 23 May 2018, we observed death-feigning behavior exhibited by *K. maculosa*, while surveying a small forest patch on the Batéké Plateau in Lekety Village, Cuvette department, Republic of Congo (1.59216°S, 14.95787°E; WGS 84; 381 m elev.). After hand capturing the individual, it curled into a ball and remained immobile (Fig. 1A); this was the only individual out of six who exhibited this response. This specimen is deposited at the Florida Museum of Natural History (UF 185502). This is also the first country record of *K. maculosa* for the Republic of Congo. In 2011 and 2016, we observed instances of death-feigning behavior in *K. arboricola* while conducting nocturnal surveys in the Atewa Range, Eastern Region, Ghana (Site 1: 6.24246°N, 0.5571°W; WGS 84; 816 m elev.; 28 May 2011; Site 2: 6.12799°N, 0.6289°W; WGS 84; 734 m elev.; 16–17 April 2016). Each individual curled into a ball and remained motionless while being handled (Fig. 1B; video: [osf.io/vker3/quickfiles/](https://osf.io/vker3/quickfiles/)). Some individuals rolled down an embankment after curling into a ball; however, we cannot say whether this was

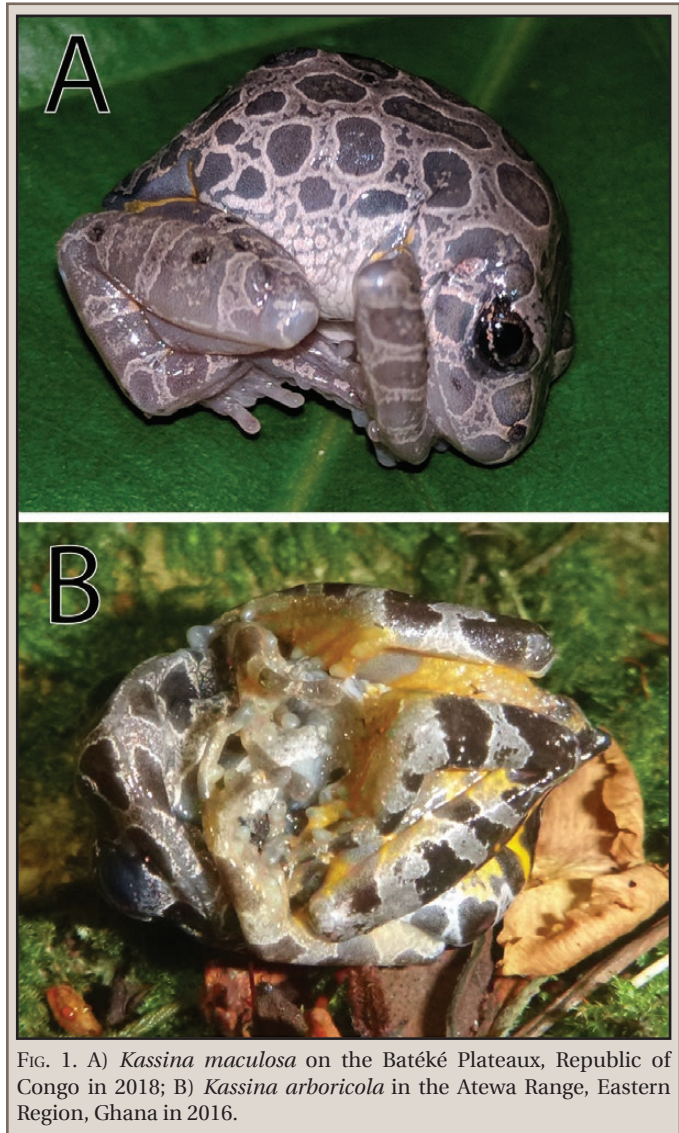


FIG. 1. A) *Kassina maculosa* on the Batéké Plateaux, Republic of Congo in 2018; B) *Kassina arboricola* in the Atewa Range, Eastern Region, Ghana in 2016.

A) PHOTO BY GREGORY FIM, JONGSMA. B) PHOTO BY DANIEL M. PORTIK