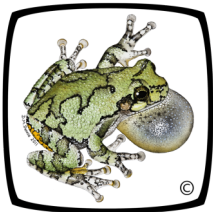


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California, USA, I encountered an adult Western Toad in pectoral amplexus with an adult female California Red-legged Frog. Both the toad and frog were on the terrestrial bank of a livestock pond (Fig. 1). The toad was clasped tightly to the frog's thoracic region, while the California Red-legged Frog appeared completely immobilized by the toad.

Davian behavior has been considered an ecological trap because, in this case, the toad was not capable of successfully reproducing (Ayres 2010, *op. cit.*). In this observation, however, neither animal was able to reproduce successfully since both were on land, and reproductively viable conspecifics were in aquatic breeding habitat and not accessible to either individual. Predation events may increase during reproductive activity in many species (Magnhagen 2003, *Trends Ecol. Evol.* 6:183–186). Here, both individuals were exposed to an increased predation potential due to their distance from water (ca. 1 m). The California Red-legged Frog may have also been subjected to an unanticipated physical stress that was brought on by the Western Toad's grasp (Fig. 2).

On other occasions, I have observed Western Toad males amplexing a root ball of *Juncus balticus*, a piece of cattle dung, and a dead conspecific individual. Arak (*In Bateson* 1983, *Mate Choice*. Cambridge Univ. Press. New York, New York. 462 pp.) suggested explosive breeding is the reason for necrogamy (Davian behavior). Among the objects reported by Arak (1983, *op. cit.*) were fish and floating debris. I integrate the hypothesis that temporally compressed breeding anurans comprise males that will attempt to amplex appropriately sized nearby objects as a result of breeding pressure from conspecifics. Although Ayres (2010, *op. cit.*) proposed that chemical factors might influence necrogamy in *B. bufo*, I offer that objects of the appropriate size are targets for Davian behavior, and that there is little regard for their composition. I further add that a heterospecific individual attempting to escape amplexus attempts would facilitate complete amplexal behavior by the Western Toad. Although Davian behavior may represent an evolutionary trap for individual Western Toads, it also represents confounding stresses on a threatened species, in this case, the California Red-legged Frog. This observation represents reduced opportunities for reproduction and increased predation risk in both species. Western Toads appear to engage in this behavior at an observable rate, which was observed by me over several years. If the target is a sympatric species, local populations of both the California Red-legged Frog and the Western Toad might be effected.

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**BUFO TERRESTRIS (Southern Toad). DIET.** *Bufo terrestris* has been reported to prey on a variety of invertebrate species including snails, ants, beetles, crickets, and bees (Dorcas and Gibbons 2008, *Frogs and Toads of the Southeast*. Univ. Georgia Press, Athens, Georgia. 238 pp.; Jensen et al. [eds.] 2008, *Amphibians and Reptiles of Georgia*. Univ. Georgia Press, Athens, Georgia. 600 pp.). On 12 July 2007 on Edisto Island, South Carolina, USA, a large adult female *Bufo terrestris* was observed consuming a Marsh Crab (*Sesarma cinereum*). The observation took place in an area where *S. cinereum* are common. This may suggest that *S. cinereum* is available as a significant food source for coastal populations of *Bufo terrestris*.



FIG. 1. *Bufo terrestris* consuming a Marsh Crab (*Sesarma cinereum*), Charleston Co., South Carolina, USA.

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**CERATOPHRYS CRANWELLI (Cranwell's Horned Frog). DIET.** Data on the diet of the anurophagous frogs of the Gran Chaco in South America is sparse (Scott and Aquino 2005, *In Donnelly et al. [eds.], Ecology and Evolution in the Tropics: A Herpetological Perspective*, pp. 243–259. Univ. Chicago Press, Chicago, Illinois). One species, *Ceratophrys cranwelli*, is frequently encountered in the Gran Chaco, but only three anurans have been confirmed as comprising part of its diet; *Leptodactylus bufonius* (Schalk 2010, *Herpetol. Rev.* 41:471), *Physalaemus biligonigerus*, and an unidentified *Leptodactylus* sp. (Scott and Aquino 2005, *op. cit.*).

On 31 Dec 2010 at 2230 h we came upon a pair of *C. cranwelli* in amplexus in a temporary pond (19.60434°S, 62.57558°W; WGS 84) in the Isoceño community of Yapiroa, Province Cordillera, Department of Santa Cruz, Bolivia. While being grasped by the male *C. cranwelli*, the female was observed eating an adult *Physalaemus albonotatus* (Fig. 1). The *P. albonotatus* made continuous attempts to free itself from the mouth of the female, but it was consumed after approximately ten minutes. The pair remained on the edge of the pond for two minutes, after which the female (with the male still grasping her) then lunged at a male



FIG. 1. A female *Ceratophrys cranwelli* consuming a *Physalaemus albonotatus* while being amplexed by a male *C. cranwelli*. Located in the lower right of the photo is the male *Rhinella major* that the female *C. cranwelli* attempted to capture after ingesting the *Physalaemus*.



*Rhinella major* that was calling approximately 10 cm away (visible in Fig. 1). The female *C. cranwelli* failed to capture the *R. major*, which escaped into a nearby cluster of plants. The pair then swam into the middle of the pond, presumably to mate. This observation confirms one additional anuran species and supports the possibility of another anuran species in the diet of *C. cranwelli*.

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**CHAPERINA FUSCA (Saffron-bellied Frog). OCULAR ANOMALY.** *Chaperina fusca* is a small anuran (to 26 mm SVL) with an oval-shaped body, small head, blunt and projecting snout, fine dermal spine on each elbow and heel, greenish or bluish black dorsum with whitish or bluish dots, brown limbs with dark bars, and the highly distinctive ventral coloration of numerous yellow to rich yellow blotches bordered by a dark brown network (Inger 2005. The Systematics and Zoogeography of the Amphibia of Borneo. Natural History Publications [Borneo] Sdn. Bhd. Kota Kinabalu. 402 pp.; Inger and Stuebing 2005. A Field Guide to the Frogs of Borneo. Second ed. Natural History Publications [Borneo] Sdn. Bhd. Kota Kinabalu. 201 pp.). *Chaperina fusca* dwells in primary or old secondary forests on the forest floor and sometimes in low vegetation from near sea level to 1800 m elev., and the adults move to water bodies, especially those with decaying plant materials, to breed (Inger 2007. Systematics and Zoogeography of Philippine Amphibia. Natural History Publications [Borneo] Sdn. Bhd. Kota Kinabalu. 370 pp.; Malkmus et al. 2002. Amphibians and Reptiles of Mount Kinabalu [North Borneo]. A.R.G. Gantner Verlag K.G. Ruggell. 424 pp.). The species occurs in Central Peninsular Thailand, Peninsular Malaysia, Borneo (Sabah and Sarawak of Malaysia, Brunei Darussalam, and Kalimantan of Indonesia), and southern Philippines (Palawan, Mindanao, and Sulu Archipelago) (Das 2007. A Pocket Guide: Amphibians and Reptiles of Brunei. Natural History Publications [Borneo] Sdn. Bhd. Kota Kinabalu. 200 pp.; Frost 2010. Amphibian Species of the World: an Online Reference. Version 5.3 [8 April 2010]. Electronic database accessible at <http://research.amnh.org/vz/herpetology/amphibia/>. American Museum of Natural History, New York. Accessed on 22 Dec 2010).

On 5 Dec 2010 at 1910 h, an adult *C. fusca* (21 mm SVL, 1.1 g) was collected at an artificial pond within the compound of Haleluyah Retreat Centre (6°N, 116.536°E; 1518 m elev.), Bundu Tuhan, Ranau District, West Coast Division, Sabah, Bornean Malaysia. Air temperature was 18.7°C, and relative humidity was 84.1%. The anuran was missing a right eye, while the left eye was

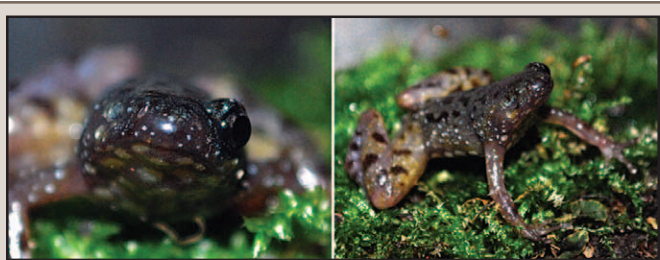


FIG. 1. Left: Front view of an adult *Chaperina fusca* with ocular anomaly found in the Haleluyah Retreat Centre compound, Ranau, Sabah, Malaysia. Right: Dorsolateral view.

normal (Fig. 1). Anuran deformities can be attributed to physical injuries, infections and diseases, exposure to chemicals, UV radiation, mutation, and developmental errors (Adams et al. 2008. Herpetol. Rev. 39:460–461; Silva and Toledo 2010. Herpetol. Rev. 41:333–334; Streicher et al. 2010. Herpetol. Rev. 41:208–209). Close examination showed no body injuries. The pond and surrounding vegetation are not adjacent to any source of chemical pollutants and effluents. pH of the pond water was 7.48. On the same night, another *C. fusca* (25 mm SVL, 1.5 g) was collected at the same pond but without ocular anomaly or other deformities. By comparison, the *C. fusca* with ocular anomaly exhibited lighter dorsal and ventral hues. Otherwise, the anuran seemed unaffected by the anomaly as it was agile during an indoor *ex-situ* photography session. The specimen (HEP01794) was deposited in BORNEENSIS, the Bornean reference collection of the Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah. To our knowledge, this is the first observation of ocular anomaly in *C. fusca*.

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**CYCLORANA AUSTRALIS (Giant Frog). EMERGENCE.** Amphibians in seasonally dry or desert environments become active when water is available. During prolonged dry periods many frogs burrow to avoid desiccating conditions. Rainfall is required to facilitate emergence from burrows and induce aboveground activity (Cartledge et al. 2006. J. Exp. Biol. 209:3309–3321; Mayhew 1965. Amer. Midl. Nat. 74:95–109; Morton et al. 1993. The Beagle 10:67–70; Poynton and Pritchard 1976. Zool. Africana 11:313–318), including foraging and spawning (Balinsky 1969. Zool. Africana 4:37–93; Wells 2007. The Ecology and Behavior of Amphibians. Univ. Chicago Press, Chicago, Illinois. 1148 pp.).

*Cyclorana australis* is a fossorial species from northern Australia that forms a cocoon (Christian and Parry 1997. Aust. J. Zool. 45:13–20; Withers 1998. Aust. J. Zool. 46:405–418). Monsoonal northern Australia has markedly seasonal rainfall with the great majority falling in the summer rainy season. Each year during the prolonged dry season, *C. australis* spend approximately six months underground in shallow burrows (<15 cm deep; Tracy et al. 2007. Copeia 2007:901–912). From previous studies, it is known that the frogs usually bury in April and May as rainfall attenuates. The frogs emerge following intermittent rains during the pre-monsoonal period (usually October–November), but there are no data concerning the amount of rainfall required for mass emergence of frogs in this environment.

To determine the amount of rainfall required to induce emergence from underground burrows, field investigations were carried out during the onset of the wet season in 2007. The Mickett Creek area (12.4108°S, 130.9436°E) near Darwin, Northern Territory, was visited regularly at night and searched on foot with the aid of a spotlight. A transect through the area was followed and known breeding chorus aggregation sites were visited. The total number of *C. australis* observed by sight was noted (some individuals were located by call). Sex was determined as male if