

throughout its known distribution. It is a species of conservation concern in all states where it occurs (Dodd 2013. Frogs of the United States and Canada. The Johns Hopkins University Press, Baltimore, Maryland. 982 pp.). Monitoring populations and surveying for this species is challenging because male choruses are difficult to detect (e.g., they are relatively quiet) and occur only briefly after winter and spring rains. Non-breeding adults are very difficult to find because they are fossorial. Surveys for egg masses and tadpoles are easier but complicated by the presence of *Lithobates sphenoccephalus* (Southern Leopard Frog), a congener with very similar breeding requirements, phenology, and egg and tadpole morphology. The survey tool eDNA can be used to detect the presence of *L. capito* (McKee et al. 2015. J. Fish Wildl. Manag. 6:498–510; J. Godwin, unpubl. data) but increases resource costs. Although dichotomous keys are available for distinguishing the tadpoles of *L. capito* vs. *L. sphenoccephalus* (Altig 1970. Herpetologica 26:180–207; Gregoire 2005. Tadpoles of the United States Coastal Plain. USGS Survey Report. Florida Integrated Science Center. 60 pp.; Altig and McDiarmid 2015. Handbook of Larval Amphibians of the United States and Canada. Cornell University Press, Ithaca, New York. 345 pp.), a simple, illustrated key comparing gross physical differences between the two species' tadpoles is needed (Fig. 1) and will be useful for researchers, especially given Dodd's (*op. cit.*) mention that distinguishing them may be impossible. Such a key, based upon Gregoire (*op. cit.*), is provided below. The author has found these features to be most reliable and easy to observe in the field, and has > 25 years experience conducting surveys for *L. capito*.

1a) Intestinal coil not observable through ventral skin, belly light to cream; tail fin with high arch at dorsal insertion; reduced oral papillae – *L. capito*

1b) Intestinal coil observable through ventral skin, belly dark; tail fin with low to medium arch at dorsal insertion; enlarged oral papillae – *L. sphenoccephalus*.

I thank Sean P. Graham for comments on an earlier draft of this manuscript and Crystal Kelehear for her assistance with Fig 1.

JAMES C. GODWIN, Alabama Natural Heritage Program, Auburn University, Auburn, Alabama 39846, USA.

PHYLLOBATES LUGUBRIS (Lovely Poison Frog). PREDATOR-PREY INTERACTIONS. A wide variety of invertebrates and vertebrates prey upon anurans (Toledo 2005. Herpetol. Rev. 36:395–400), yet relatively little is known about predators of chemically defended frogs. Poison frogs contain skin alkaloids, which are thought to be effective at deterring potential predators due to their unpalatable nature (for review, see Saporito et al. 2012. Chemoecology 22:159–168). Anecdotal reports of successful predation upon dendrobatid poison frogs (Dendrobatidae) include an ant, fish, amphibian, and bird, as well as several spiders and snakes (Santos and Cannatella 2011. Proc. Natl. Acad. Sci. 108:6175–6180; Alvarado et al. 2012. Herpetol. Rev. 44:298; Lenger et al. 2014. Herpetol. Notes 7:83–84). Herein, we report a successful predation event on the dendrobatid poison frog *Phylllobates lugubris* by the snake *Coniophanes fissidens* (Yellowbelly Snake).

At 1015 h on 7 October 2015, we observed an adult *P. lugubris* being chased, captured, and subdued by a *C. fissidens* on the soil of the forest floor near Guayacan, Limon, in northeastern Costa Rica (10.024460°N, 83.537174°W; WGS 84). The snake consumed the frog entirely, and appeared unimpaired and unharmed after

the predation event. *Phylllobates lugubris* is a conspicuously striped, alkaloid-containing, diurnal frog that inhabits the Caribbean lowland rainforest, and marginally, premontane wet forest from extreme southeastern Nicaragua, through Costa Rica, and into northwestern Panama (Savage 2002. The Amphibians and Reptiles of Costa Rica: a Herpetofauna between Two Continents, between Two Seas. University of Chicago Press, Chicago, Illinois. 934 pp.). Adult *Coniophanes fissidens* are leaf-litter dwelling snakes that are most active during the day and early evening, and are found within the geographic range of *P. lugubris* (Savage, *op. cit.*). The diet of *C. fissidens* is reported to contain a diversity of small vertebrates, including frogs, lizards, snakes, salamanders, and lizard and frog eggs (Savage, *op. cit.*). *Coniophanes fissidens* is also a reported predator upon another dendrobatid, the strawberry poison frog *Oophaga pumilio*, at the La Selva Biological Station in northeastern Costa Rica (Saporito et al. 2007. Copeia 2007:1006–1011), suggesting that this snake may be resistant or tolerant to the effects of alkaloid-based chemical defenses of dendrobatid frogs.

MIGUEL SOLANO, ANDRES VEGA, and RALPH A. SAPORITO, Department of Biology, John Carroll University, University Heights, Ohio 44118, USA (e-mail: rsaporito@jcu.edu).

RANA AURORA (Northern Red-legged Frog). EGG INCUBATION PERIOD. Data on the incubation period of *Rana aurora* eggs under field conditions are scarce, being limited to two published accounts. The most thorough is that of Storm (1960. Herpetologica 16:251–259), who reported on a series of seven *R. aurora* egg masses laid in a small pond in northwestern Oregon (elev. 72 m). The incubation period of these masses were as follows: 35 days (1 mass), 42 days (1 mass), 44 days (1 mass), 49 days (2 masses), and ≥ 50 days (2 masses). Subsequently, Brown (1975. Northwest Sci. 49:241–246) reported that the incubation period of 35 *R. aurora* egg masses laid in a pond in northwestern Washington (elev. 120 m) required, on average, just over 35 days. Based on these two accounts, the incubation period for *R. aurora* eggs under field conditions is 35–50 days. Here, we provide data which reduce the minimum incubation period by 2.5 weeks (18 days) from that reported previously. Here, incubation period is defined as the period of time between egg deposition/fertilization (Gosner stage 1; Gosner 1960. Herpetologica 16:183–190) and the complete emergence of embryos from the egg jelly (Gosner stage 20–22 at this site).

During ongoing studies of *R. aurora* in the Tualatin River Basin, Washington County, Oregon, USA (45.50470°N, 122.99000°W, WGS 84; elev. 39 m), we have observed a range of incubation periods under field conditions. Our observations during the winter of 2015 are typical. In 2015, we monitored the development of 91 *R. aurora* egg masses laid in a floodplain wetland adjacent to the Tualatin River. These egg masses were laid between 14 January and 11 February. The time required for complete hatching of these masses was between 17 and 48 days (mean = 30 days; Fig. 1). Incubation period was inversely related to spawn date: the eggs which were laid first (14–23 January) experienced the longest incubation period (mean = 37 days, range = 25–48 days); those which were laid later (06–11 Feb.) experienced the shortest (mean = 26 days, range = 17–33 days). This difference was probably due to water temperature: measured water temperatures at egg masses increased during the egg development interval. During January, they averaged 7.2°C (range: 4.0–11.1°C); during February, 9.7°C (range: 5.5–14.0°C). Our data extend the documented incubation period of *R.*