

Use of Cow Manure by Two Sympatric Species of Toads in the Northwestern Dominican Republic

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The bufonid genus *Peltophryne* forms a monophyletic group endemic to the West Indies (Frost et al. 2006; Pramuk 2006). Three endemic Hispaniolan species are currently recognized (Henderson and Powell 2009; Powell 2012), two of which (*Peltophryne fluviatica* and *P. fracta*) have restricted ranges (Hedges et al. 2004a, 2004b). The third, the Southern Crested Toad (*P. guentheri*), is widely distributed mainly along major lowland valleys (Henderson and Powell

2009), although it can reach elevations up to 270 and 360 m (El Matadero; MAL, pers. obs.) on the northern and southern slopes of the Cordillera Central, respectively. Introduced Cane Toads (*Rhinella marina*) are abundant in mesic areas and microhabitats at lower elevations throughout Hispaniola. *Peltophryne guentheri* is a medium-sized toad with a snout-to-vent length (SVL) to 73.8 mm in males (Schwartz 1972) and 101 mm in females (Schwartz and Henderson 1991). Most



Fig. 1. A metamorph (arrow) and a toadlet of the Southern Crested Toad (*Peltophryne guentheri*) sitting on a “cow pie” in Arroyo Bellaco. Photograph by Miguel A. Landestoy.

adult Cane Toads range in size from 85 to 150 mm SVL (Easteal 1986) but can reach 230 mm (Rivero 1998). Parsons (1995) provided the only available information on the diet of *P. guentheri*. That study was based on stomach contents of preserved specimens. No field studies have been conducted on feeding behavior (Henderson and Powell 2009). In the West Indies, *R. marina* is known to feed on beetles (including scarabeids; Wolcott 1937) or “almost anything” (Long 1974), and has been recorded exploiting the artificial night light niche (Breuil 2002; MAL, pers. obs.).

During fieldwork in Arroyo Bellaco, 1.5 km ESE of the village of Caimito, Santiago Rodríguez Province, Dominican Republic (19.4896°N, -71.27009°E, elevation 160 m), on 9 August and 5 September 2014, at 2100 h (temperature 26.3 °C, relative humidity 76.1%) and 1925 h (26.9 °C, 73.3%), respectively, we observed metamorphs and toadlets of the Southern Crested Toad and the Cane Toad sitting on and near piles of cattle manure (Fig. 1) within 2 – 4 m of the stream bank. Local residents bring cattle from neighboring semi-arid farms to the stream each day to drink (Fig. 2). We saw as many as six young *P. guentheri* and two *R. marina* using a sit-

and-wait foraging strategy to capture insects on manure. On the two nights, we counted three and five “cow pies,” respectively, on which toadlets were sitting. Piles were fresh with a thin, moderately firm crust, although cattle had stepped on some, exposing the moist interior. Because we observed prey capture and anurans using livestock manure as a foraging site has been reported for Mexican Spadefoots (*Spea multiplicata*; Barragán-Ramírez et al. 2014) and Squirrel Treefrogs (*Hyla squirrella*; Carr 1940), we assume that the association with manure piles is a foraging strategy. However, because the piles hold moisture and heat, toads also might be exploiting them to avoid desiccation or for warmth (González-Bernal et al. 2012).

We have monitored breeding choruses of both species along this section of the stream, and observed tadpoles on 21 July (*P. guentheri*) and 9 August (*R. marina*). In the course of 11 trips to several rivers and tributaries in the general area, we noticed that recently metamorphosed individuals remain close to the stream before dispersing into adjacent habitats after two to three weeks. Leaf litter accumulates along the streambed where we saw tadpoles and an adjacent narrow



Fig. 2. Local residents bring cattle from neighboring semi-arid farms to Arroyo Bellaco each day to drink. The adjacent strip of riparian forest is at the right. Photograph by Miguel A. Landestoy.



Fig. 3. An adult Cane Toad (*Rhinella marina*) foraging on cow manure. Photograph by Robert Ortíz.

strip of riparian forest is bordered by a forest clearing ~20 m from the shoreline.

We frequently find adult Cane Toads sitting on or adjacent to piles of manure (Fig. 3) in the same general area. These toads often have feet and mouths covered in fresh dung. While examining the manure, we also found introduced scarabeid dung beetles (*Digitonthophagus gazella*; Fig. 4). We dissected the stomach of one adult gravid female Cane Toad (containing oocytes weighing 48 g) and found dung beetles to be the most abundant prey item (N = 106). Although both species of toads share the same breeding sites, we have not found adult *P. guentheri* foraging in this microhabitat, which is suggestive of ontogenetic resource partitioning between these two bufonids.

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Fig. 4. An introduced dung beetle, *Digitonthophagus gazella* (Scarabaeidae), found in cow manure. Photograph by Miguel A. Landestoy.

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