



A New Locality for the Critically Endangered Cuban Endemic Zapata Toad, *Peltophryne florentinoi* (Anura: Bufonidae), Outside the Zapata Swamp

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The Zapata Toad, *Peltophryne florentinoi* (Moreno and Rivalta 2007), the most recently described bufonid from Cuba, is closely related to *Peltophryne peltocephala* and *P. fustiger* but has a different color pattern, morphological characters, and allelic variation (Moreno and Rivalta 2007). Its advertisement call also is distinctive among those of large Cuban toads (Alonso Bosch et al. 2007; Díaz and Cádiz 2008; Hernández et al. 2010). Its taxonomic status and phylogenetic relationships were confirmed by Alonso Bosch et al. (2012) based on a phylogenetic reconstruction using mitochondrial and nuclear genes. Originally described based on specimens collected from Girón, Zapata Swamp Municipality, Matanzas Province (Moreno and Rivalta 2007), Alonso Bosch and Cobos Cobos (2016) reported *P. florentinoi* from the vicinity of Guasasas, 20 km east of the type locality, but also in the Zapata Swamp. Most recently, Díaz et al. (2019) extended the distribution of *P. florentinoi* 52.54 km east of Guasasas, where they collected a subadult of this species in Guajimico, Cienfuegos Province, representing the first locality outside of the Zapata Swamp. This species apparently inhabits semideciduous sclerophyllous forests or microphyllous evergreen forests (*sensu* Capote et al. 1989) on a coastal limestone landscape of southern Matanzas and Cienfuegos Provinces (Moreno and Rivalta 2007; Alonso Bosch and Cobos Cobos 2016; Díaz et al. 2019).

Taking into account its limited extent of occurrence, and with sea-level rise as a potential threat, this species was listed as Critically Endangered on the IUCN Red List (Rivalta 2008). Its habitat is subject to pressures from tourism and extractive activities, such as logging for charcoal production, transformation by small-scale agriculture, and dumping of solid wastes (Alonso Bosch and Cobos Cobos 2016). In addition, warmer and drier conditions can be expected within the

species’ distribution in the future, but sea-level rise is unlikely to have a direct impact, although occasional inundations and saltwater intrusion might present additional stressors (Cobos and Alonso Bosch 2018).

On 13 January 2023, we conducted a rapid survey with the goal of completing an inventory of the terrestrial fauna of Playa Caimito, a locality partially in the protected area, Refugio Fauna Sureste del Inglés, with a total surface area of 12,470 ha (11,414 ha terrestrial and 1,056 ha marine), in Nueva Paz, Mayabeque Province. We generated lists of mammals, birds, reptiles, and also of some conspicuous groups of invertebrates such as butterflies and snails. Unfortunately, the meteorological conditions were not favorable for amphibian activity, although we noticed the presence of some species of frogs in the genus *Eleutherodactylus*, the Cuban Treefrog (*Osteopilus septentrionalis*), the introduced American Bullfrog



Figure 1. Amplexant pair of Zapata Toads (*Peltophryne florentinoi*) at “The Toad Farm” near Jagueycito, Nueva Paz, Mayabeque Province, Cuba. Photograph by Roberto Alonso Bosch.

(*Lithobates catesbeianus*), and at least one unidentified species of large toad.

We revisited the area on 11 June 2023 after torrential rains. During a nocturnal survey between 2030 and 2400 h, with an air temperature of 25.7 °C and 97.3% relative humidity (HANNA Instruments thermohygrometer), we detected an amplectant pair of Zapata Toads (*Peltophryne florentinoi*) (Fig. 1), near Jaguecito, Nueva Paz Municipality, Mayabeque Province. The sighting took place inside the “El Sapo Farm” (“The Toad Farm”), near a depression in karstic soil where rainwater accumulates that is known locally as “Ojo de Agua del Sapo” (22.70772 N, 81.72911 W). This report represents the second locality outside the Zapata Swamp (Fig. 2), extending the distribution of *P. florentinoi* 101 km west of the type locality in Playa Girón, Matanzas Province, and 170 km from the easternmost known locality, Guajimico in Cienfuegos Province (Fig. 2). We measured and weighed both individuals with a caliper (± 0.05 mm) and Pesola scale (± 0.1 g). The adult male measured 109.10 mm SVL and its mass was 120 g, whereas the larger female was 138.50 mm SVL and 330 g. Animals were released immediately thereafter at the site of capture. A photographic voucher has been deposited in the University of Kansas Digital Library (KUDA 13943) and the identity of the species was confirmed by MSc. Maike Hernández Quinta, Institute of Ecology and Systematics, Havana, Cuba, who is familiar with the species and described its advertisement calls (Hernández et al. 2010).

Habitats in the previously known distribution of *P. florentinoi* are coastal and subcoastal microphyllous evergreen and semi-deciduous forests on limestone substrates (Fig. 2). In sharp contrast, the habitat at Nueva Paz, approximately 8 km from the coast, is highly degraded, with patches of original forest, scrubland, secondary vegetation, and plantations, which grow over karstic substrate very close to the Swamp forest (Figs. 2 and 3). Unfortunately, the site where we found

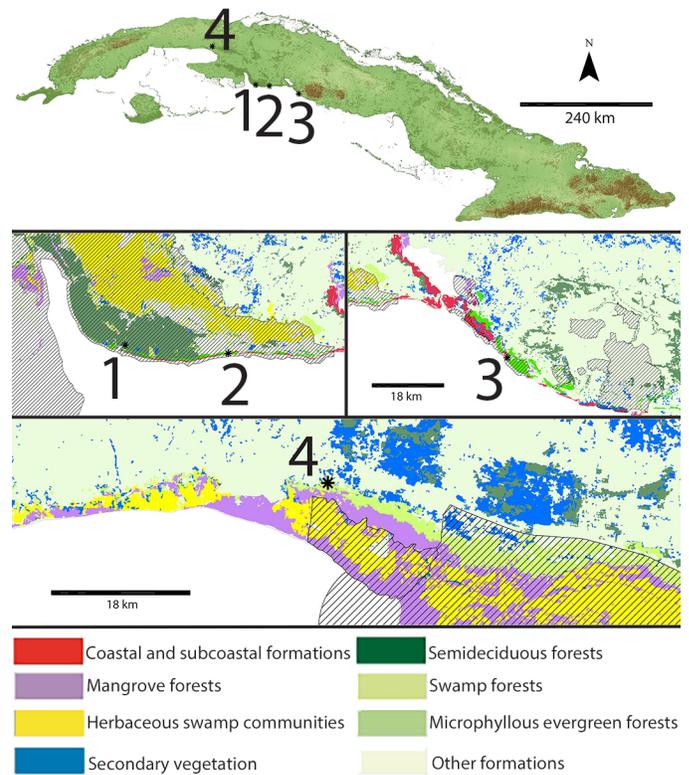


Figure 2. Known distributional records of the Zapata Toad (*Peltophryne florentinoi*): 1. The type locality near Playa Girón in the Zapata Swamp, Matanzas Province; 2. Guasasas in the Zapata Swamp, Matanzas Province; 3. Guajimico, Cienfuegos Province; 4. “The Toad Farm” near Jaguecito, close to the Refugio de Fauna Sureste del Inglés, Nueva Paz, Mayabeque Province. Vegetation types based on the map in Estrada et al. (2011). The shaded areas represent protected areas.

the toads is outside the nearby protected area, Refugio Fauna Sureste del Inglés. This area in the extreme southeast of Mayabeque Province forms part of the speleolacustrine zone of Cuba, bordered to the south by Ensenada de la Broa, to the east by the San Agustín or La Cocodrila Canal, which



Figure 3. Habitat of the Zapata Toad (*Peltophryne florentinoi*) near Jaguecito, Nueva Paz, Mayabeque Province, Cuba: Secondary vegetation and forest patches (left) and the karstic substrate that characterizes the area (center and right). Photographs by Roberto Alonso Bosch and Rafael Borroto-Páez.

also is the boundary of the Zapata Swamp National Park, and to the west and north by forested areas and swamp grassland. This area constitutes an important relict in the province, which is home to more than ninety species of aquatic and forest residents, eight of which are endemic to Cuba. It serves as an important breeding and resting site for migratory birds. Mammals, including 11 species of bats, also are well represented in this protected area (28 total species, 13 native and 15 introduced). Among the invasive species are rats, mice, cats, wild dogs, wild pigs, and mongooses that have a severe negative impact on the native biodiversity, especially the herpetofauna. More than 82 families and 307 species of plants, including 250 species of vascular plants and 40 species of orchids have been recorded in the refuge. The equally important coastal marine zone, with extensive seagrass meadows and mangrove stands, are home to more than 180 species of flora and fauna.

The adult female had a deformity on her right hindlimb (Fig. 4). Based on the nomenclature of Henle et al. (2017), the observed abnormality could be considered a type of taumely, taking into account that, although this is not a long bone out of alignment, the degree of misalignment of the fourth toe of the hindlimb is suggestive of the term. This type of abnormality has not been documented previously for this species. Alonso Bosch et al. (2021) reported externally visible skeletal abnormalities in *P. florentinoi* from Playa Girón and Guasasas in the Zapata Swamp, noting that 13 adults of both sexes had one or more abnormalities. At least six types of abnormalities in fore- and hindlimbs were identified, but brachydactyly was the most frequently observed. The causes of those abnormalities remain unknown, although physicochemical and biological stress factors affecting the small population of Zapata Toads might be responsible. These are, however, restricted to a few localities associated with coastal forests with various levels of human perturbation. Further studies are

needed to understand the causes and consequences of abnormalities in this endemic and highly threatened Cuban toad.

Although the amplexant pair of toads was outside the protected area, the species might inhabit other karstic areas in the region. Explaining to local inhabitants of the communities closest to the sighting area (Jagueycito, El Inglés) the relevance of this finding is important for raising awareness regarding the need to conserve the species and its habitats, particularly the few oviposition sites. The reproduction (oviposition and metamorphosis) of this species occurs exclusively in rainwater-inundated small depressions characteristic of karstic substrates (Díaz and Cádiz 2008; Henderson and Powell 2009; Cobos and Alonso Bosch 2018). We also strongly recommend the extension of the northern limit of the protected area to provide legal protection to this site, which appears to provide suitable resources for the survival of this specialized and threatened species of endemic Cuban amphibian.

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Figure 4. Possible taumely of the fourth toe of a female Zapata Toad (*Peltophryne florentinoi*) from “The Toad Farm” near Jagueycito, Nueva Paz, Mayabeque Province, Cuba. Photographs by Roberto Alonso Bosch and Rafael Borroto-Páez.

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