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RESEARCH NOTE

Predation of the Philippine Pit Viper *Trimeresurus cf. flavomaculatus* (Gray, 1842) on the Invasive Cane Toad *Rhinella marina* (Linnaeus, 1758) in Albay, Philippines

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This paper reports the first mortality case of Philippine pit viper *Trimeresurus* cf. *flavomaculatus* (Gray, 1842) by predating an invasive cane toad *Rhinella marina* (Linnaeus, 1758) from Muladbucad Grande, Guinobatan, Albay, Philippines. This observation contributes to the knowledge of the direct impact of *Rhinella marina* involving the death of an endemic species through lethal toxic ingestion.

Keywords: bufotoxin, conservation, endemic species, invasive alien species, predation, toxicosis

Trimeresurus cf. *flavomaculatus*, commonly known as the Philippine pit viper, is endemic to the Philippine Islands – being geographically distributed in Babuyan Islands, Biliran, Catanduanes, Leyte, Luzon, Mindanao, Mindoro, Negros, Panay, Polillo, Samar, and Siquijor – and is categorized by the International Union for Conservation of Nature as "least concern" (Sanguila *et al.* 2016; Leviton *et al.* 2018). This venomous snake is one of the three *Trimeresurus* species (*T. flavomaculatus*, *T. mcgregori*, *T. schultzei*) found in the Philippine archipelago and characterized by having a tail color not distinctly different from body-color (green or red) and with hemipenes lack spines (Weinell *et al.* 2019). *T. flavomaculatus* is a sit-and-wait predator that commonly feeds on native frogs (Devan-Song and Brown 2012).

In the Philippines, invasive species are a major threat to native flora and fauna. One example is the common invasive anuran cane toad *Rhinella marina* (Linnaeus, 1758). It was intentionally introduced in the Philippines as part of the national pest control program that turns out ineffective in decreasing the population of sugarcane crop insect pests, which is now widely distributed in the Philippines inhabiting degraded habitats, human-modified environments, agricultural areas, artificial ponds, and forests (Diesmos *et al.* 2006). Mammals and reptiles (including snakes) prey upon *R. marina* (Oliveira *et al.* 2017). However, evidence of the specific predators of this invasive species in the Philippines is limited (Ravalo *et al*. 2019). In this paper, we report another case of *R. marina* predation by a Philippine endemic viper from the province of Albay, Philippines.

At 1245 h on 05 Aug 2020, in *Barangay* Muladbucad Grande, Guinobatan, Albay (13.25308333 N, 123.60916667 E), an adult Philippine pit viper *T. flavomaculatus* was seen immobilized and facing a half-dead adult Cane Toad *R. marina* in a water pit. It was observed that the *R. marina* had bite marks and bloodstains on its head part; thus, it was presumed that

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the *T. flavomaculatus* first attacked and mouthed the head of the *R. marina* but failed in consuming it. After two minutes, both *T. flavomaculatus* and *R. marina* were confirmed dead.

The snake we found might have died from lethal toxic ingestion in its attempt to consume *R. marina*. When threatened, the parotid glands of *R. marina* release bufotoxin as an anti-predatory behavior. Previous reports indicated that snakes may be able to consume *R. marina* but succumb to the effects of the toxin later or die right after mouthing (Shine 2010; Phillips *et al.* 2009; Covacevich and Couper 1992).

This observation contributes to the knowledge of the direct impact of *Rhinella marina* involving the death of an endemic species through lethal toxic ingestion. This documentation is useful in supporting information on biodiversity conservation and management efforts specifically for invasive species. Furthermore, more research is needed to clarify the direct and indirect effects of this invasive species on native biodiversity.

Figure 1. Dead *Trimeresurus flavomaculatus* and *Rhinella marina* found in *Barangay* Muladbucad Grande, Guinobatan, Albay, Philippines.

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