



Snakes on the Menu: A Predation Attempt by a Central American Indigo Snake (*Drymarchon melanurus*) on a Central American Boa (*Boa imperator*) and Remains of a Mexican Parrot Snake (*Leptophis mexicanus*) Identified in Feces on Utila Island, Honduras

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The Central American Indigo Snake (*Drymarchon melanurus*) is a fast-moving, large-bodied, non-venomous colubrid (maximum total length 2,950 mm; Duellman 1960, 1963), that inhabits a diverse range of habitats from the southern United States through Mesoamerica to northwestern South America (Wüster et al. 2001; Wallach et al. 2014), including Honduras (McCranie 1980, 2011) and the three major Bay Islands of Utila, Roatan, and Guanaja (McCranie et al. 2005; McCranie and Orellana 2014). Compared to other snakes on the Bay Islands, *D. melanurus* is rarely encountered (McCranie et al. 2005) and little is known about its natural history. The species, formerly considered a subspecies of the Western Indigo Snake (*D. corais*; Wüster et al. 2001), was first confirmed in surveys of Guanaja and Roatan by Wilson and Hahn (1973), who also noted that a specimen was collected during early surveys by J.S. Colman in 1937. McCranie (2011) examined a total of six known museum specimens from Roatan, one from Guanaja, and one from Utila; to our knowledge, these are the only published records from these islands. Herein we present natural history and morphological data for a single *D. melanurus* on Utila, including details of a predation attempt on a Central American Boa (*Boa imperator*), novel evidence of a prey species, a Mexican Parrot Snake (*L. mexicanus*), obtained from a fecal sample, and notes on ectoparasites.

At about 1030 h on 19 February 2021, Ibis Saúl Fernández of Jaspers Animal Shelter, Utila, encountered a large adult *D. melanurus* on Pumpkin Hill Road in northeastern Utila, attempting to prey on a juvenile *B. imperator*;

both snakes were locked in combat and brought to us at the Kanahau Utila Research & Conservation Facility in a rice-sack. We immediately placed both snakes on the floor to photograph the event and noted that the *D. melanurus* had a firm grasp of the *B. imperator* by the posterior part of its head, while in defence, the *B. imperator* had tightly coiled its body around the neck and head of the *D. melanurus*, effectively constricting and immobilizing the predator (Fig. 1). Dry leaves were trapped in the coils of the boa, suggesting the initial predation attempt occurred on the ground. We decided to separate the snakes within ten minutes, given that neither snake could withdraw from the situation and we were concerned for their welfare if left without intervention. After uncoiling the tail and body of the boa, the *D. melanurus* immediately released its head and both snakes assumed defensive postures, breathing heavily with slightly open mouths (Fig. 1). We subsequently confined them in separate cotton bags, collected morphological data, and released both snakes separately within 48 h.

The adult male *D. melanurus* had an SVL of 125 cm, a partial tail length of 12 cm, and weighed 875 g. We confirmed the sex by cloacal probing at a depth of 4–5 subcaudal scales. Its external characteristics were consistent with the few descriptions of this species on the Bay Islands (Wilson and Hahn 1973; McCranie 1980, 2011), which, unlike mainland specimens, usually have 14 scale rows anterior to the vent (mainland snakes have 15, rarely 13). The small adult female *B. imperator* measured 82 cm SVL, 10 cm tail length, and weighed 310 g. It had a laceration on its head from the

bite of the *D. melanurus*. We found various ectoparasites on both snakes; the *D. melanurus* had countless red mites (*Hirstiella* cf. *boneti*) between dorsal scales and four engorged ticks (*Amblyomma* cf. *dissimile*), which we removed with

tweezers. The *Boa imperator* had a total of 11 ticks surrounding skin lesions (visible in Fig. 1B). Both species of ectoparasites have been reported previously from two species of iguanas (*Ctenosaura similis* and *C. bakeri*) on Utila (Gutsche

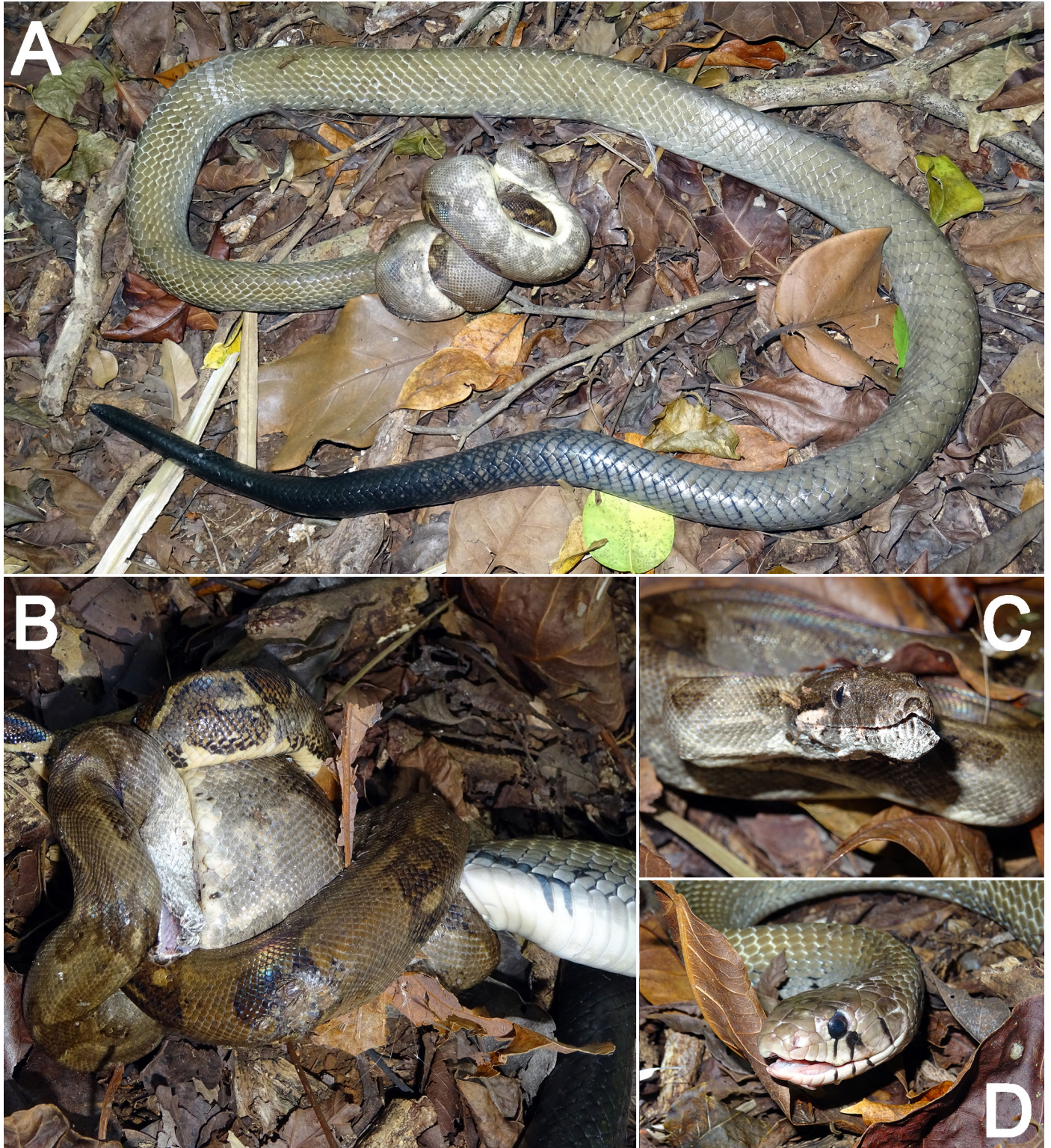


Fig. 1. A predation attempt by a Central American Indigo Snake (*Drymarchon melanurus*) on a Central American Boa (*Boa imperator*). Both snakes were locked in combat for over 10 min; the *D. melanurus* had a firm grasp on the posterior portion of the boa's head, which, in defense, had coiled its body around the head and neck of the *D. melanurus* (A & B); both snakes assumed defensive postures after intervention and separation (C & D). Photographs © Tom W. Brown.

et al. 2012; Novakova et al. 2015). *Amblyomma dissimile* is widely known to parasitize *B. imperator* and other squamates (Carrascal et al. 2009; Fiorini et al. 2014), but ours may be the first records of these ectoparasites on wild *D. melanurus*.

During the night, the *D. melanurus* defecated and we examined the feces in 70% clinical alcohol. The fecal sample contained numerous dorsal, ventral, and subcaudal snake scales and tail vertebrae (Fig. 2), which we identified as those of a Mexican Parrot Snake (*Leptophis mexicanus*) on the basis that, of the 14 species of snakes known to occur on Utila (McCranie and Orellana 2014), *L. mexicanus* is the only snake with strongly keeled dorsal scales possessing one apical pit (McCranie et al. 2005). The size of the ventral scales (ca. 13 mm) also was consistent with those of adult Mexican Parrot Snakes.

The diet of *D. melanurus* is known to be very diverse, with prey known to include small mammals (Platt et al. 2016), bats (Powell et al. 2011), birds and their eggs (Lazcano et al. 2005; Fernández and Delisle 2018; Platt et al. 2016), anurans (Henderson and Hoovers 1977; Leary and Razafindratsita 1998; Villa et al. 2015; Javier-Vázquez et al. 2020), fish and eels (Sunyer and Leonardi 2015; Vásquez-Cruz and Fuentes-Minor 2018), hatchling tortoises (Lazcano et al. 2005), lizards (Lee 1996), and other snakes (Stuart 1948; Duellman 1963), including venomous species and apparently conspecifics (McCranie 2011). Although not dietary specialists, snakes in particular are known to be a regular component

in the opportunistic diet of indigo snakes (Stuart 1949; Stevenson 2010; Goetz et al. 2018), and some species may even possess physiological resistance to the venoms of sympatric snakes (e.g., rattlesnakes) on which they prey (Goetz et al. 2019). While reviewing the literature, we compiled a list of 17 species of snakes in the diet of *D. melanurus* (Table 1). Published records of snake-predator-prey interactions are relatively rare, especially in Central America. We found only one previous record of a predation attempt on *B. imperator*. Duellman (1963) encountered a 2,950-mm *D. melanurus* in combat with a 1,683-mm boa in Guatemala; apparently, the *Drymarchon* had hold of the boa by its head but, unlike our experience, those snakes separated when approached. After being captured, that same indigo snake regurgitated a 953-mm Central American Jumping Pitviper (*Metlapilcoatlus mexicanus*), indicating that the snake-eating capabilities of this species should not be underestimated.

As best we can tell, our record is the second published predation attempt by *D. melanurus* on *B. imperator* (Duellman 1963) and the first record of *L. mexicanus* in the species' diet. Both potential prey species are among the snakes most commonly encountered on Utila. Unlike *B. imperator* and *L. mexicanus*, *D. melanurus* neither constricts nor uses venom to subdue its prey (McCranie 2011), but may instead rapidly approach and swallow small prey alive (Powell et al. 2011) or overpower/immobilize it using superior speed, size, and strength, killing its prey using muscular chewing motions (Stevenson et al. 2010) and perhaps by thrashing and beating it against the ground. Our observation suggests that *B. imperator* can use constriction to defend against these predation tactics, but we cannot discern whether this *D. melanurus* could have successfully overcome and consumed the boa. Similarly, we were unable to determine if the previously ingested *L. mexicanus* was prey or scavenged carrion. Nonetheless, these records provide novel data on the diet of *D. melanurus* from a rarely known insular portion in its range.

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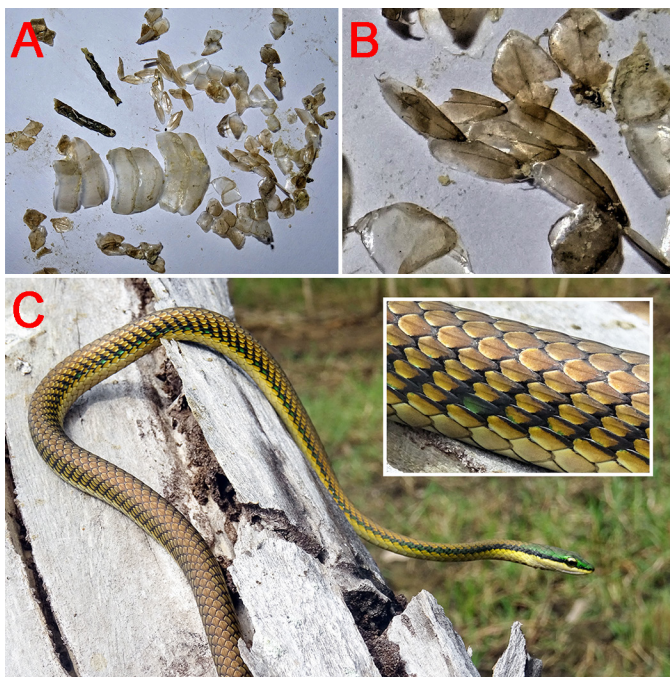


Fig. 2. Dorsal, ventral, and subcaudal scales of a Mexican Parrot Snake (*Leptophis mexicanus*) extracted from the feces of a Central American Indigo Snake (*Drymarchon melanurus*) (A); dorsal scales with a strong keel and a single apical pit (B); a Mexican Parrot Snake from Utila showing the distinctly keeled dorsal scales and apical pits characteristic of *L. mexicanus* (inset). Photographs © Tom W. Brown.

Table 1. A review of snakes recorded in the diet of the Central American Indigo Snake (*Drymarchon melanurus*). Nomenclature updated per Uetz et al. (2020). Abbreviations: P = successful predation or apparent prey, PA = failed/interrupted predation attempt, C = scavenging a dead snake/carrion, O = direct observation, FM = examination of fecal matter, SC = stomach contents, R = regurgitated prey.

Species	Context	Location	Reference
Boidae			
Central American Boa	PA, O	Guatemala	Duellman (1963)
(<i>Boa imperator</i>)	PA, O	Utila	Present study
Colubridae			
Northern Speckled Racer	PA, O	Honduras	McCranie (2011)
(<i>Drymobius margaritiferus</i>)			
Mexican Parrot Snake	P, FM	Utila	Present study
(<i>Leptophis mexicanus</i>)			
Neotropical Whipsnake	P, SC	Mexico	Hardy and McDiarmid (1969)
(<i>Masticophis mentovarius</i>)			
Sonoran Whipsnake	P, SC	Mexico	Hardy and McDiarmid (1969)
(<i>Masticophis bilineatus</i>)			
Blotched Treeracer	P, SC	Columbia	Daza (2005)
(<i>Mastigodryas pleei</i>)			
Eastern Patch-nosed Snake	P, SC	Mexico	Montoya-Ferrer et al. (2020)
(<i>Salvadora grahamiae</i>)			
Tropical Chicken Snake	P, R	Mexico	Hernández-Ríos et al. (2013)
(<i>Spilotes pullatus</i>)	PA	Mexico	Oakley and Theodorou (2020)
Dipsadidae			
Middle American Burrowing Snake	P, O	Mexico	Greene (1975)
(<i>Adelphicos quadrivirgatus</i>)			
False Coralsnake	P, SC	Guatemala	Stuart (1948)
(<i>Pliocercus</i> sp.)			
Cloudy Snail-eating Snake	P, R	Columbia	Zúñiga-Baos and Vera-Pérez (2020)
(<i>Sibon nebulatus</i>)			
Elapidae			
Capuchin Coralsnake	P, R	Columbia	Zúñiga-Baos and Vera-Pérez (2020)
(<i>Micrurus dumerilii</i>)			
Viperidae			
Terciopelo	P, O	Costa Rica	Solórzano and Sasa (2020)
(<i>Bothrops asper</i>)			
Western Diamond-backed Rattlesnake	C, O	USA	Swanson et al. (2015)
(<i>Crotalus atrox</i>)			
Middle American Rattlesnake	P, R	Mexico	Neri Castro et al. (2012)
(<i>Crotalus simus</i>)			
Central American Jumping Pitviper	P, R	Guatemala	Duellman (1963)
(<i>Metlapilcoatlus mexicanus</i>)			
Western Jumping Pitviper	P, O	Mexico	García-Padilla (2015)
(<i>Metlapilcoatlus occiduus</i>)			

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