



Tongue in the Eye: Ocular Secretions of a Green Iguana (*Iguana iguana*) Lapped by a Hairy-legged Bee (*Centris* sp.)

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In the Neotropics (Costa Rica and Ecuador), eye secretions of the Yellow-spotted River Turtle (*Podocnemis unifilis*) and the Spectacled Caiman (*Caiman crocodilus*) are lapped by Hairy-legged Bees (*Centris* spp.), which reach the eye while hovering (Dangles and Casas 2012; de la Rosa 2014). In the Palaeotropics (Thailand), the ocular secretions of the Yellow Tortoise (*Indotestudo elongata*) are lapped by the stingless bees, *Lisotrigona cacciae* and *L. furva*, that alight and settle under the eye (Bänziger and Bänziger 2010). This behavior has been named tear-drinking, tear-feeding, or lachryphagy and is believed to supply the bees with essential nutrients, such as sodium and potassium, along with protein (Bänziger and Bänziger 2010; Dangles and Casas 2012; de la Rosa 2014).

Tear-feeding by bees appears to be unrecorded for reptiles other than chelonians and crocodylians. Herein we report on a lizard, the Green Iguana (*Iguana iguana*), whose eye secretions were lapped by a Hairy-legged Bee (*Centris* sp.) in the Brazilian Amazon. *Iguana iguana* is a large, mostly herbivorous iguanid lizard that is widely distributed in Brazil, where it lives in biomes as diverse as the humid Amazonian rainforest and the semi-arid Caatinga (Avila-Pires 1995). Iguanas often are found near water and climb trees, where they may forage, rest, and thermoregulate (Avila-Pires 1995; Burghardt and Rand 1982). The hairy-legged bees of the Centridini (Apidae) are renowned for visiting specialized flowers to collect oil that, when mixed mostly with pollen, serves as larval food (Vogel 1974; Alves-dos-Santos et al. 2007). Centridine bees are important pollinators of several plant species, including crops (Gaglianone et al. 2010). As well as nectar, another liquid collected by *Centris* spp. seems to be the ocular secretions of reptiles (Dangles and Casas 2012; de la Rosa 2014).

At about 1100 h on 6 August 2019, we observed a Green Iguana (about 100 cm total length) on a sandy beach at Ponta do Toronó, near the Arapiuns River (2.3350°S, 55.1100°W), Pará State, in northern Brazil. The lizard was on waterlogged

sand in the shallows, apparently thermoregulating. A large female Hairy-legged Bee hovered near the iguana's head and, from time to time, lapped the lizard's eye secretions (Fig. 1). While lapping tears, the bee inserted its mouthparts beneath the iguana's eyelids and was able to do so only while the reptile kept its eyes open or left a slit. The iguana seemed somewhat disturbed by the bee's visits, as it kept the eye closed when the hovering bee approached (Fig. 2) or actually touched the eye. The interaction between the lizard and the bee lasted about 7–8 min with visits to both eyes, although the right one received more attention.



Fig. 1. A Green Iguana (*Iguana iguana*) on waterlogged sand while a Hairy-legged Bee (*Centris* sp.) laps the lizard's ocular secretions through an eye slit. Photograph by Mardiore Pinheiro.



Fig. 2. A Green Iguana (*Iguana iguana*) closes its eyes when a Hairy-legged Bee (*Centris* sp.) hovers nearby. Note the clump of ticks at the edge of the lizard's dewlap. Photograph by Mardiore Pinheiro.

As the lizard was likely thermoregulating or resting on the sandy shore, we considered the presence of the Hairy-legged Bee as a nuisance that disturbed the iguana, even if only slightly, and this disruption could affect the lizard's activity (Burghardt and Rand 1982). A somewhat greater disruption by *Centris* sp. was recorded for a basking Yellow-spotted River Turtle, *Podocnemis unifilis* (Rainforest Expeditions 2013), which also closed its eyes and even moved its forelimbs to drive the bee off. We note herein that all interactions between *Centris* spp. bees and the three reptilian groups (namely turtles, crocodylians, and lizards) occurred at open sites on riverbanks (Dangles and Casas 2012; de la Rosa 2014; present paper). We agree with de la Rosa (2014) that interactions between *Centris* spp. bees and other crocodylian and chelonian species will be recorded. We also suggest that additional instances of lizard and Hairy-legged Bee interactions in Brazil could involve large semiaquatic teiids such as the Northern Caiman Lizard (*Dracaena guianensis*) and the Crocodile Tegu (*Crocodilurus amazonicus*¹), which occur in

¹ This species traditionally has been assigned to *Crocodilurus lacertinus* but see de Massary and Hoogmoed (2001).

the Amazonia, and the Paraguay Caiman Lizard (*D. paraguayensis*) that lives in the Pantanal (Avila-Pires 1995; Mesquita et al. 2016). These interactions would likely occur while these lizards bask or rest on branches near riverbanks (Avila-Pires 1995; Avila et al. 2014; Mesquita et al. 2016).

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