

# FIRST RECORD OF *GONATODES ALBOGULARIS* DUMÉRIL & BIBRON, 1836 (SQUAMATA: SPHAERODACTYLIDAE) FOR THE DEPARTMENT OF ATLÁNTIDA, HONDURAS, WITH COMMENTS ON THE INTERACTIONS WITH OTHER LIZARDS

## PRIMER REGISTRO DE *GONATODES ALBOGULARIS* DUMÉRIL & BIBRON, 1836 (SQUAMATA: SPHAERODACTYLIDAE) PARA EL DEPARTAMENTO DE ATLÁNTIDA, HONDURAS, CON COMENTARIOS SOBRE INTERACCIONES CON OTRAS LAGARTIJAS

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**Resumen.**— Registramos la primera población de *Gonatodes albobularis* para el Departamento de Atlántida, siendo el registro más al noroeste en Honduras y comentando sobre su posible origen. Además, en la misma localidad encontramos a *Hemidactylus frenatus* y *Norops sagrei*, especies no nativas para Honduras. Observamos ciertos comportamientos de individuos de estas tres especies y los discutimos con información previa de sus posibles interacciones, incentivando futuras investigaciones sobre relaciones entre estas tres especies.

**Palabras clave.**— Centroamerica, competencia interespecífica, comportamiento, distribución geográfica, lagartijas.

**Abstract.**— We recorded the first population of *Gonatodes albobularis* for the Departamento de Atlántida, being the most northwestern record in Honduras and we comment on its possible origin. In addition, in the same locality, we found *Hemidactylus frenatus* and *Norops sagrei*, species not native to Honduras. We observe certain behaviors of individuals of these three species and discuss them with respect to previous information on their possible interactions, with the intent to encourage future research on the interactions of these three species.

**Keywords.**— Behavior, Central America, geographical distribution, interspecific competition, lizards.

*Gonatodes albobularis* (Duméril & Bibron, 1836) is a small diurnal gecko, widely distributed from southeastern Chiapas in Mexico to western Venezuela and from sea level to 1900 m a.s.l. (Agudelo, 2011; Martínez-Cotrino et al., 2014). *Gonatodes albobularis* prefers dry microhabitats and is often found in humid spaces and urban areas, where it feeds mainly on small arthropods (Gamble et al., 2008). The principal predators of this small lizard are larger lizards, some snakes, birds, mammals (Domínguez-López et al., 2016), and spiders (Filipiak & Lewis, 2012). Here, we report a new departmental record for *G. albobularis* in the Departamento de Atlántida, Honduras, and comment on some observed interactions between this species and two introduced lizards (*Hemidactylus frenatus* and *Norops sagrei*) in the same locality.

On June 7, 2019, at 13:54 h, we found an adult male *G. albobularis* (Fig. 1) active within a slit-like cavity on the trunk of a “Weeping fig” (*Ficus benjamina*; Moraceae) at 1.5 m height, at a restaurant adjacent to the road to La Ceiba (CA-13) in the Comunidad de El Pino, Municipio de El Porvenir, Departamento de Atlántida, Honduras (15.71247° N, 86.90533° W, WGS84 datum; elev. 39 m a.s.l.; Fig. 2). The closest town to our record site is Trujillo, Departamento de Colón, which is located approximately 105 airline km WSW (McCranie, 2018) in the West-central Caribbean Lowlands (Wilson & Townsend, 2006). The specimen was deposited in the herpetological collection of the Museo de Historia Natural “Biodiversidad y Ciencia” at the Universidad Nacional Autónoma de Honduras en el Valle de Sula, San Pedro



**Figura 1.** (A) *Gonatodes albogularis* UVS-V 1242 fotografiado luego de su captura; (B) Fotografía *in situ* de *G. albogularis* UVS-V 1242. Fotografías por CAAF.  
**Figure 1.** (A) *Gonatodes albogularis* UVS-V 1242 photographed after capture; (B) *In situ* photo of *G. albogularis* UVS-V 1242. Photos by CAAF.

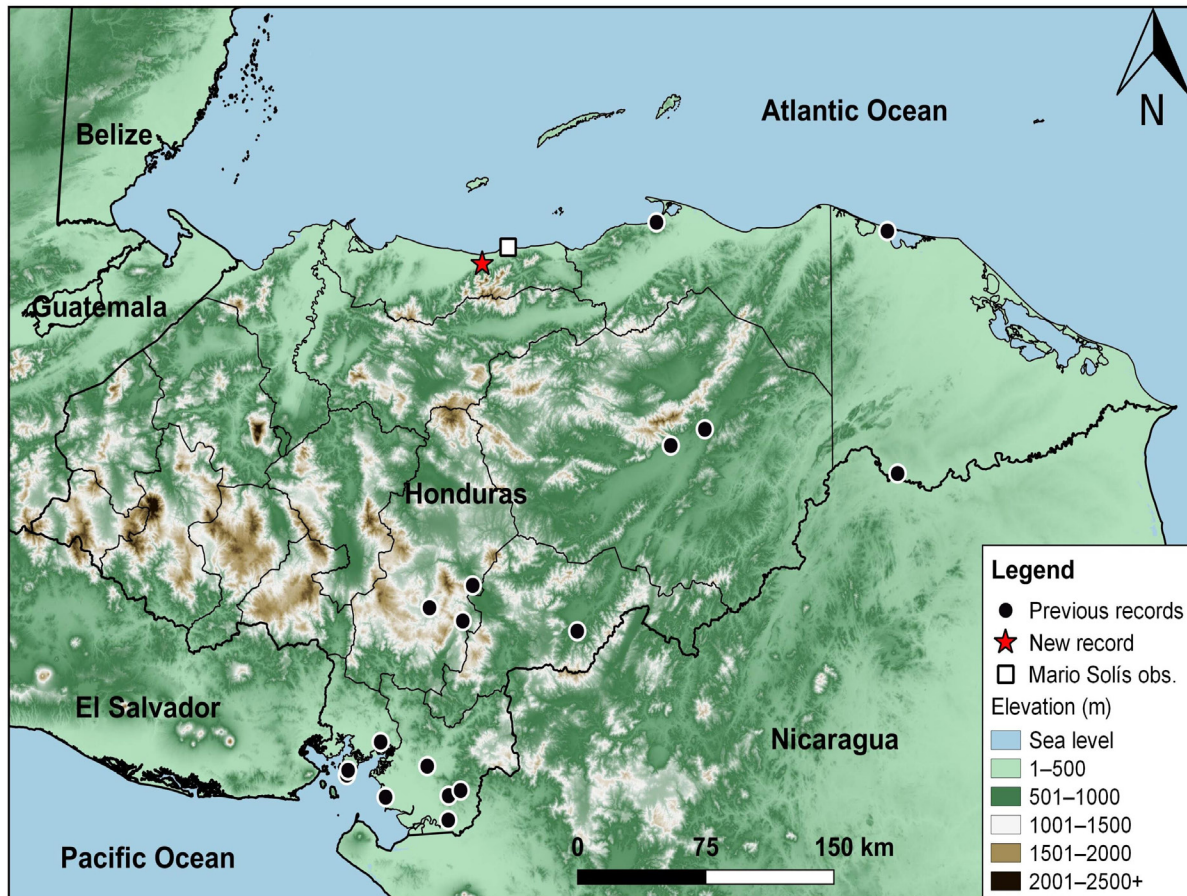
Sula, Departamento de Cortés, Honduras (UVS-V 1242, field tag EPA 01). The specimen measured a total length of 84.6 mm, snout-vent length of 36.1 mm, and a tail length of 48.5 mm. Based on the two visits made, we suggest that there is an established population of *G. albogularis*, due to the presence of three adult males and two juvenile females. Our observations were made at the westernmost locality on the Atlantic versant of Honduras, and constitute the first vouchered record for the department of Atlántida.

In the same locality that we found *G. albogularis*, we also identified two species of invasive lizard; *Hemidactylus frenatus* (Fig. 3A) and *Norops sagrei* (Fig. 3B). We observed that the three species were active during the day, although *H. frenatus* only showed a few movements in its inhabited tree. As Marcellini (1976) mentioned, *H. frenatus* is rarely active during the day. Furthermore, *H. frenatus* and *G. albogularis* appear to use the tree cavities as a refuge, promoting interactions between them. We observed that *G. albogularis* avoided interactions with *H. frenatus* on the surface of the tree and when they did occur, *G. albogularis*

demonstrated escape behavior, protecting itself by entering the closest refuge, without returning to its initial cavity. We observed that *N. sagrei* does not share space with *H. frenatus* and *G. albogularis*. We hypothesize that *N. sagrei* spatially excludes the geckos with its pugnacious temperament (Evans, 1938). If our hypothesis is affirmative, this behavior forces interspecific competition for space between *G. albogularis* and *H. frenatus*.

The natural range of *G. albogularis* on the Atlantic versant is poorly known, but we hypothesize that in these localities this lizard has been anthropogenically introduced because its sites of occurrence have been associated primarily with urban areas and do not represent a typical distribution pattern as is observed on the Pacific versant, in which the localities are closer (see Fig. 2; McCranie, 2018). This view is supported by the introduction of this species in other localities such as Belize city in Belize, Florida in The United States, Corn Island in Nicaragua, Aruba, Curaçao, Grand Cayman, and Hispaniola (McCranie, 2018). The population we report here appears to have been anthropogenically introduced; one of the local inhabitants





**Figura 2.** Mapa de la distribución geográfica de *G. albogularis* en Honduras. Los registros previos fueron basados en Wilson y McCranie 1998, Townsend et al. 2007 y McCranie 2018.

**Figure 2.** Map of the geographical distribution of *G. albogularis* in Honduras. The previous records were based on Wilson and McCranie 1998, Townsend et al. 2007 and McCranie 2018.

told us that several specimens of *G. albogularis* were previously brought to the restaurant “Carnitas del Pino” from the Ciudad de La Ceiba in Atlántida. Also, in 2018 individuals were found near the “Muelle de Cabotage” at La Ceiba, which locality has not been reported previously (Mario Solís, *pers. comm.*). The report of this locality for *G. albogularis* fills part of the information gap on the distribution of the species and if it is native to this region increases the possibility of interconnection between populations from the northeastern coast of Nicaragua; northeastern, north-central, and northwestern Honduras (this last region not based on specific records, see Fig. 2), and southeastern Guatemala (Köhler, 2008; McCranie, 2018).

The two non-native species in Honduras have the potential to displace native species (e.g., *Phyllodactylus palmeus*—Brown et al., 2017, citing McCranie & Hedges, 2013), because of their following characteristics: *H. frenatus* is responsible for population

extinction/range contraction of native lizards, behavioral change, decreased abundance, changes in spatial ecology, reorganization of trophic networks, and reduction of prey availability (Kraus, 2015), and *N. sagrei* causes declines in abundance of native lizards, changes in spatial ecology, the evolution of defenses because they adapt easily to disturbed habitat, and exhibit characteristics that allow them to be successful invaders (Kraus, 2015). Furthermore, there could be an overlap between the diet of *G. albogularis* and that of the two introduced lizards, due to the coincidence of arthropod consumption (Carr Jr., 1939; Tyler, 1961; Fitch, 1973; Savage, 2002; Jadin et al., 2009; Norval et al., 2010; Agudelo, 2011; Losos, 2011; Alemán & Sunyer, 2015; Brown et al., 2017; McCranie, 2018), which also might force changes in the diet of *G. albogularis*, as demonstrated by Pringle et al. (2019) using *N. sagrei* as a model in the presence of exotic species. *Gonatodes albogularis* can be attacked, due to its smaller size (maximum snout-vent length of 42 mm) in relation to *H. frenatus* (maximum



**Figura 3.** (A) Un individuo de *Hemidactylus frenatus*; (B) Un espécimen observado de *Norops sagrei* en los árboles adyacentes habitados por las otras dos lagartijas. Fotografías por CAAF.  
**Figure 3.** (A) An individual of *Hemidactylus frenatus*; (B) An individual of *Norops sagrei* in trees adjacent to those inhabited by the other two lizards. Photos by CAAF.

snout-vent length of 60 mm for Honduran specimens) and *N. sagrei* (maximum snout-vent length of 70 mm for Honduran specimens) (Cole et al., 2005; McCranie & Köhler, 2015; McCranie, 2018). *Hemidactylus frenatus* is also a possible predator of *G. albogularis* since it attacks, predated, and consumes the eggs of other lizards, causing interspecific predation (Cole et al., 2005; Díaz Pérez et al., 2012; Gardner & Jasper, 2012), as in the case of *G. albogularis*, where attacks by *H. frenatus* have been evidenced (Alemán & Sunyer, 2015) and in the case of *N. sagrei*, which is known for its cannibalistic behavior and for predated other lizards (Campbell & Gerber, 1996; Gerber, 1999; Lee, 2000; Nicholson et al., 2000; Norval, 2007; Norval et al., 2010). Batista et al. (2019) mentioned the capacity that this anole might have in displacing *G. albogularis* (Williams, 1969; Schoener et al., 2017). We discuss these behaviors as might be very similar to those mentioned by Pianka (1973) and Fisher et al. (2019) that lead to competition between invasive and native species.

Our work contributes to a better definition of the distribution of *G. albogularis* and opens the possibility for future studies on the interactions that might exist with invasive lizards in Honduras, because this event may be occurring in several places where these introduced species are in contact with native populations of *G. albogularis*. In addition, we recommend that a greater sampling effort is necessary on the Atlantic slope to confirm the presence of *G. albogularis* where there are information gaps in the distribution of this species, to determine if the populations of species in Honduras connect the populations from Guatemala and Nicaragua (Köhler, 2008). It is necessary to confirm whether populations on the Atlantic slope are introduced or native, in the case being introduced investigate the reasons and take measures to reduce the invasion of exotic species, besides making a greater effort to understand the impact that introduced species have on native species and ecosystems.



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