

THE RARE AND ELUSIVE *ENYALIOIDES GROI* (DUNN, 1933) (SQUAMATA: HOPLOCERCIDAE) IN PANAMA

EL RARO Y ELUSIVO *ENYALIOIDES GROI* (DUNN, 1933) (SQUAMATA: HOPLOCERCIDAE) EN PANAMÁ

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The Neotropical iguanian lizard genus *Enyalioides* includes 19 species (Torres-Carvajal et al., 2023). These lizards are known from elevations below 1,874 m a.s.l. on both sides of the Andes between Panama, central Brazil and north of Bolivia, with species occurring in Peru (12), Ecuador (11), Colombia (6), Brasil (2), Panamá (2), and Bolivia (1) (Köhler, 2008; Arteaga et al., 2022; Uetz et al., 2023). Torres-Carvajal et al. (2011) list the characteristics of the genus *Enyalioides* and mention how it is distinguished from the genus *Hoplocercus*. In Panama, *E. groi* and *E. heterolepis* are present (Uetz et al., 2023), and *E. groi* differs from *E. heterolepis* in that its tail is equipped with regularly arranged whorls made up of enlarged spiky scales, which become increasingly smaller distally and are barely distinguishable at the tail tip (Köhler, 2008). Furthermore, the caudal scales of *E. heterolepis* are heterogeneous, increasing in size posteriorly in each whorl (6-8 scales in lateral view), and are not modified as conspicuous spines (Torres-Carvajal et al., 2011).

Enyalioides groi is a species recorded in very humid tropical mid-mountain undisturbed forests (between 600 to 1,300 m a.s.l.), (Corredor et al., 1985; Vásquez-Restrepo, 2021). It is a diurnal species, and forages on the ground between hollows and leaf litter, very close to its burrow (Köhler, 2008). It digs its burrows shallowly in the moist forest floor, under large rocks or thick hollow logs found along hillsides (Corredor et al., 1985; Köhler, 2003). Due to its restricted geographical distribution to mature forest it is currently listed as an Endangered species (EN) (Medina-Rangel et al., 2015; Ibáñez et al., 2016). In Panama this species was documented in two protected areas: Monumento Natural Cerro Gaital and Parque Nacional Altos de Campana (Dunn, 1933; Ibáñez et al., 1996; Köhler, 2008).

One male individual of *E. groi* (Fig. 1) was observed during on October 15th, 2022, on the ground, camouflaged among leaf litter on the west limits of Santa Fe National Park, Veraguas, Panama (8.5282° N, 81.1492° W; elevation 848 m a.s.l.; WGS 84 datum). The observation was done at 11:04 h, a day after strong rains in the region. The specimen was photographed and the photo voucher was deposited in the Digital Collection, The University of Texas at Austin (UTADC 9850a-e). The photographs show the vertebral region of the trunk without enlarged scales (Fig. 1A), the tail rings with enlarged spiny scales and with three rows of scales that separate the whorls of spines ventrally (Fig. 1B). The habitat is characterized by a plateau surrounded by sharp slopes leading to the creek of the 3rd arm of the Mulaba river. The forest is composed of large trees with a canopy reaching 30 to 40 m high and a dense understory with small palms and abundant ferns of the genus *Danae* and *Asplenium* covering the ground.

The behavior of this species is elusive, soon as they detect a threat, they quickly run to hide inside one of the caves they occupy (Dunn, 1933; Köhler, 2003); this is probably one of the reasons why this species remain undetected in fauna surveys not recorded during previous surveys in the area (Martínez & Rodríguez, 1992; Martínez et al., 1994; Lotzkat, 2014). This new locality is 112 km West of the nearest locality El Valle de Antón. In this note we extend the known distribution of the species westward in Central America, by reporting the first record in the provinces of Veraguas, Panama, Cordillera Central. This is the third known locality for the species in Panama, and the fifth in the Neotropical region (Table 1, Fig. 2; Dunn, 1933; Corredor et al., 1985; Ibáñez et al., 1996; Vásquez-Restrepo, 2021). The new location geographically belongs to the foothills of the Caribbean slope of the Cordillera Central (Autoridad Nacional del Ambiente, 2010).



Figura 1. Macho adulto de *Enyalioides groi* (UTADC 9850a-e) encontrado en un bosque primario en el Parque Nacional Santa Fe, Panamá. Vista dorsal (A) y lateral (B). Foto: Edgar Toribio.
Figure 1. Adult male of *Enyalioides groi* (UTADC 9850a-e) found in a primary forest in Santa Fe National Park, Panama. Dorsal (A) and lateral (B) view. Photo: Edgar Toribio.

Tabla 1. Localidades conocidas para *Enyalioides groi* basadas en registros bibliográficos. Las coordenadas están en grados decimales.

Table 1. Known localities for *Enyalioides groi* based on literature records. Coordinates are in decimal degrees.

Country	Province/ Department	Locality	Habitat	Latitude	Longitude	Elevation (m a.s.l.)	References
Panamá	Coclé	El Valle de Antón, Cerro Gaital		8.6	-80.12	600-900	Dunn 1933
Colombia	Antioquía	Dabeiba	Tropical wet forest	6.7	-76.7	805	Corredor et al. 1985
Panamá	Panamá Oeste	El Cacao, Cerro Trinidad		8.7371	-79.9626	600-900	Ibáñez et al. 1996
Colombia	Antioquía	San Carlos		6.1338	-74.9753	1,315	Vásquez-Restrepo 2021
Panamá	Veraguas	Santa Fe, National Park, trail Tercer Brazo of Río Mulaba	Premontane forest	8.5282	-81.1492	848	This work

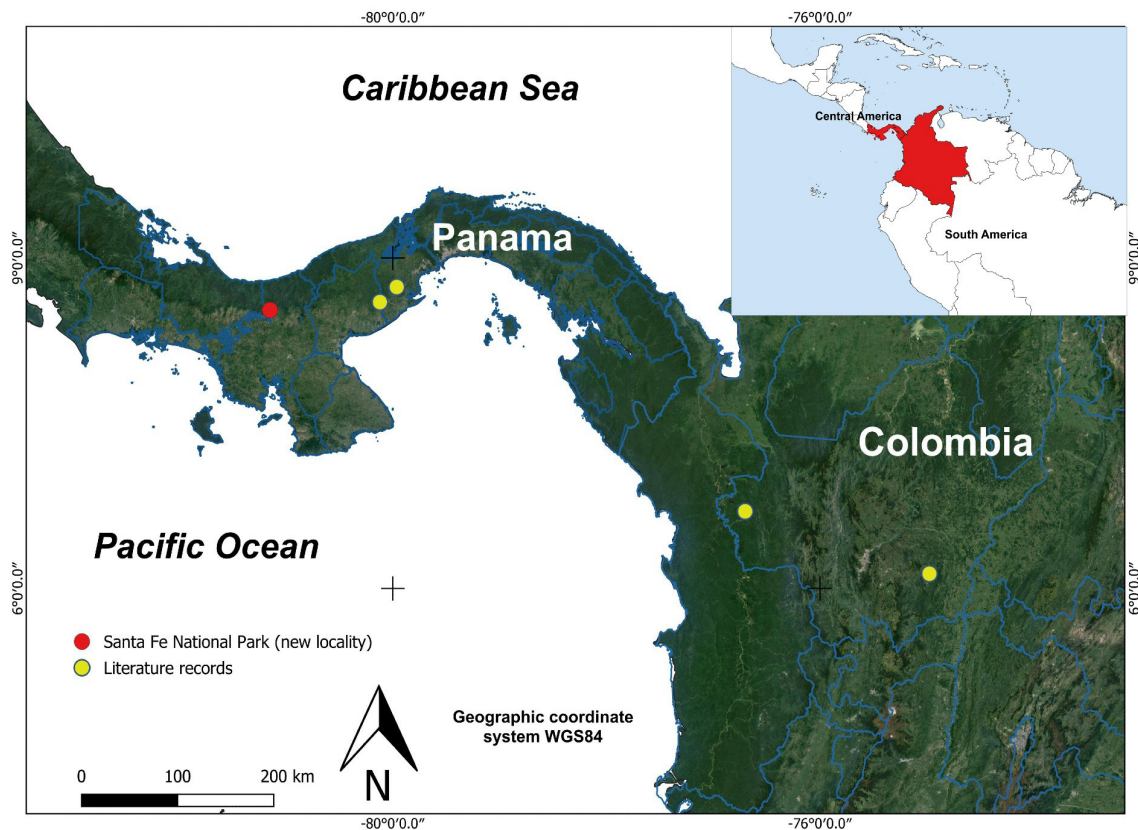


Figura 2. Distribución geográfica conocida de *Enyalioides groi* (puntos amarillos), incluyendo el nuevo registro en el Parque Nacional Santa Fe (punto rojo).

Figure 2. Known geographic distribution of *Enyalioides groi* (yellow points), including the new record in the Parque Nacional Santa Fe (red point).

The Santa Fe National Park is located in a region that in recent years has been impacted by deforestation, as well as by the migration of indigenous peoples from the Ngöbe Buglé Comarca to establish new settlements. Additionally, there are multinational mining companies installed in the Mesoamerican biological corridor (Batista et al., 2014; Ortiz et al., 2020); these may be threatening *E. groi*'s populations, so further research focused on long term monitoring and population status data is needed to clarify the current conservation status of this species in this area.

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CITED LITERATURE

- Arteaga, A., L. Bustamante, J. Vieira & J.M. Guayasamin (Eds.). 2022. Reptiles of Ecuador: Life in the middle of the world. Universidad Tecnológica Indoamericana. Quito, Ecuador.
- Autoridad Nacional del Ambiente. 2010. Atlas ambiental de la República de Panamá. Primera versión. Editora Novo Art, S.A., Panamá, Panamá.
- Batista, A., C. A. Jaramillo, M. Ponce & A.J. Crawford. 2014. A new species of *Andinobates* (Amphibia: Anura: Dendrobatidae) from west central Panama. *Zootaxa* 3866:333-352.
- Corredor, V., J.M. Renjifo & S. Ayala. 1985. Discovery of *Morunasaurus groi* Dunn (Sauria: Iguanidae) in northwestern Colombia. *Journal of Herpetology* 19:162-164.
- Dunn, E.R. 1933. Amphibians and reptiles from El Valle de Antón, Panama. *Occasional papers of the Boston Society of Natural History* 8:65-79.
- Ibáñez, R.D., C. Jaramillo, F.A. Solís & F.E. Jaramillo. 1996. Inventario de anfibios y reptiles: Fase inicial para la conservación de estas especies en el Parque Nacional Altos de Campana. Informe Final, Fundación Natura.
- Ibáñez, R., C. Jaramillo, M.R. Castañeda, J. Renjifo, W. Bolívar & J. Velasco. 2016. *Morunasaurus groi*. The IUCN Red List of Threatened Species 2016:e.T203070A2759787.
- Köhler, G. 2003. A new species of *Morunasaurus* from Peru (Reptilia, Squamata, Hoplocercidae). *Senckenbergiana Biologica* 82:235-242.
- Köhler, G. 2008. Reptiles of Central America. 2nd Edition. Offenbach: Herpeton Verlag. Germany.
- Lotzkat, S. 2014. Diversity, taxonomy, and biogeography of the reptiles inhabiting the highlands of the Cordillera Central (Serranía de Talamanca and Serranía de Tabasará) in western Panama. Tesis de Doctorado, Goethe-Universität. Frankfurt, Alemania.
- Martínez, V., & A. Rodríguez. 1992. Del primer inventario en Cerro Tute. Amphibia: Caudata y Anura. Reptilia: Squamata. Sauria y Serpentes. *Scientia (Panamá)* 7:29-53.
- Martínez, V., N. Pimentel, & A. Hurdaneta. 1994. Diversidad herpetofaunística en los Cerros Narices y La Anselma, Provincia de Veraguas. Distrito de Santa Fe. *Scientia (Panamá)* 9:59-79.
- Medina-Rangel, G.F., Y.R. López-Perilla & J.M. Renjifo. 2015. *Morunasaurus groi* (Dunn, 1933). pp. 65-67. En M.A. Morales-Betancourt, C.A. Lasso, V.P. Páez & B.C. Bock (Eds.). Libro Rojo de Reptiles de Colombia. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt – Universidad de Antioquia, Bogotá, Colombia.
- Ortiz, O., Y.M. de Niño, U.V. Cusatti, V.D.L.C. Cabrera & A. Lanuza-Garay. 2020. Situación Actual de las Áreas Protegidas en la Provincia de Colón, Panamá: Marco Descriptivo para una Mejor Gestión y Manejo. *Tecnociencia* 22:151-174.
- Torres-Carvajal, O., R. Etheridge & K. De Queiroz, 2011. A systematic revision of Neotropical lizards in the clade Hoplocercinae (Squamata: Iguania). *Zootaxa* 2752:1-4.
- Torres-Carvajal, O., F. P. Werneck, I.Y. Fernandes & K. de Queiroz. 2023. Spiny tails and clades: a fully sampled phylogeny of hoplocercine lizards (Iguanidae/Hoplocercinae) and its taxonomic and nomenclatural implications. *Bulletin of Phylogenetic Nomenclature* 1:8-28.
- Uetz, P., P. Freed, R. Aguilar, F. Reyes, J. Kudera & J. Hošek. 2024. The Reptile-Database. Available at <https://reptile-database.org> [Consulted on March 30, 2024]
- Vásquez-Restrepo, J.D. 2021. 35 years behind the scenes: range extension of the rare Gro's mantichore, *Morunasaurus groi* (Squamata, Hoplocercidae), in Colombia. *Papéis Avulsos de Zoologia* 61:e20216163.

