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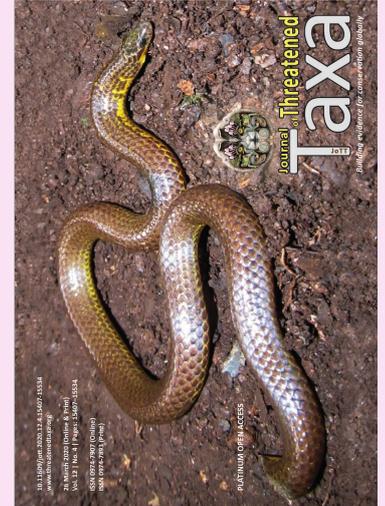
### NOTE

#### **NEW RECORDS OF *HELODERMA ALVAREZI* (WIEGMANN, 1829) (SAURIA: HELODERMATIDAE) ON THE COAST OF OAXACA AND INCREASES TO ITS DISTRIBUTION IN MEXICO**

Jesús García-Grajales, Rodrigo Arrazola Bohórquez, María Arely Penguilly Macías & Alejandra Buenrostro Silva

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## New records of *Heloderma alvarezii* (Wiegmann, 1829) (Sauria: Helodermatidae) on the coast of Oaxaca and increases to its distribution in Mexico

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In Mexico, the genus *Heloderma* is composed of five broad-ranging species: (i) the Gila Monster *H. suspectum* distributed in the Mohave Desert of extreme Nevada, southwestern Utah, extreme southeastern California and northwestern Arizona, and throughout the Sonoran Desert region in Arizona and Sonora, Mexico, as well as into the Chihuahuan Desert of southeastern Arizona and southwestern New Mexico (Campbell & Lamar 2004; Beck 2005); (ii) the Rio Fuerte Beaded Lizard *H. exasperatum* inhabits the foothills of the Sierra Madre Occidental, in the transition area between the drainage basins of Rio Mayo and Rio Fuerte and the Sonoran-Sinaloan subtropical dry forest in southern Sonora, extreme western Chihuahua, and northern Sinaloa (Campbell & Lamar 2004; Beck 2005); (iii) the Mexican Beaded Lizard *H. horridum* is found primarily in dry forest habitats from southern Sinaloa southward to Oaxaca and inland into the states of Mexico and Morelos (Bogert &

del Campo 1956; Campbell & Lamar 2004; Beck 2005); (iv) the Chiapan Beaded Lizard *H. alvarezii* inhabits dry forests in the Central Depression of central Chiapas and the Rio Lagartero Depression in extreme western Guatemala (Campbell & Lamar 2004; Beck 2005); and (v) the Guatemalan Beaded Lizard *H. charlesbogerti* that inhabits the Rio Motagua Valley in the Atlantic slope of eastern Guatemala (Campbell & Vannini 1988).

The beaded lizard is known colloquially as ‘escorpión’ and is well known to local inhabitants, yet its natural history is surrounded by mystery, notoriety and misconception (Reiserer et al. 2013; Domínguez-Vega et al. 2018), principally because these animals can pass up to 95% of their lives hidden in shelters underground, which makes it difficult to detect them. Moreover, they maintain a low population (Beck & Jennings 2003; Domínguez-Vega et al. 2018). Furthermore, it is the only group which bears venom-transmitting teeth

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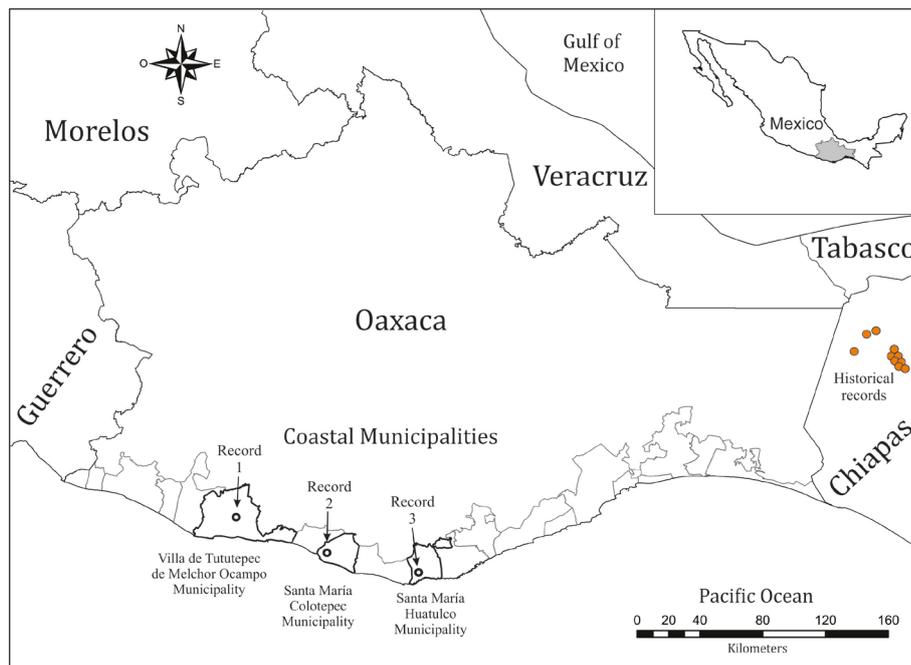
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**Figure 1.** Location of photographic records of *Heloderma alvarezii* along the coast of Oaxaca; and historic published records (orange circles) in Chiapas State.

with a deep venom groove in the rostral carina (Fry et al. 2006). Although bites by the lizards are extremely rare, envenomation is known to produce severe local pain, dizziness, diaphoresis, vomiting, paresthesia, and hypotension (Ariano-Sánchez 2006). Consequently, the lizard is frequently slaughtered when encountered by humans (Beck 2005; Domínguez-Vega et al. 2017).

Herein, we provide three new records and a significant extension on the distribution of *H. alvarezii* about different encounters between humans while performing their activities and the species during its movement along the central coast of Oaxaca, Mexico, particularly in three different municipalities (Figure 1).

The first observation occurred on 04 July 2017, when a lizard was held in captivity in the town of Santa Rosa de Lima, municipality of Villa de Tututepec de Melchor Ocampo. This animal was used as an exhibition specimen to decrease the fear of this species in the town. We were prohibited from measuring it, weighing it or determining its sex; however, to the naked eye this individual presented good body condition (Image 1a). According to the people in charge of the lizard, it came from the upper zone, close to the municipality.

The second observation occurred on 10 October 2019 at 17.15 h. An adult female *H. alvarezii* was found and captured by people who were cleaning a field in a locality known as ‘El Porvernir’ in the Municipality of Santa María Colotepec, Oaxaca. Due to their fear of the

creature, people caught the lizard in order to slaughter it, but then they reflected on the situation and reported it to the Universidad del Mar in the city of Puerto Escondido. The individual was measured (total length: 670mm), photographed (Image 1b) and then traslocated and released into the Natural Protected Area El Gavilán in San Francisco Cozoaltepec, municipality of Santa María Tonameca, Oaxaca, to ensure that the individual would not be harmed.

Most recently, the third observation occurred on 03 November 2019 at 18.20h, between the boundaries of the Universidad del Mar campus Huatulco and Huatulco National Park, in the Municipality of Santa María Huatulco. A single juvenile was found walking near a road and was later photographed on a tree (Image 2c). It was not manipulated in order to avoid causing it unnecessary stress.

The identification of these lizards was possible because this taxon is unique among the beaded lizards in that it undergoes an ontogenetic increase in melanism (Bogert & del Campo 1956; Beck 2005). Also distinctive is that yellow banding on the tail, a characteristic typical of the other species of beaded lizards, is essentially absent in adults of *H. alvarezii* (Bogert & del Campo 1956; Beck 2005). Although Bogert & del Campo (1956) and Beck (2005) explain that black individuals are uncommon, there is recent photographic evidence of black individuals on the coast of Oaxaca. Neonates and



**Image 1.** *Heloderma alvarezii* in: a—Villa de Tututepec de Melchor Ocampo municipality | b—Santa María Colotepec municipality | c—Santa María Huatulco municipality.

juveniles often are distinctly marked with yellow spots and bands on the tail, but the color pattern of adults gradually transforms to an almost uniform dark brown or gray coloration.

*Heloderma alvarezii* was described as inhabiting dry tropical forest in the Central Depression (Río Grijalva Depression) of central Chiapas and the Río Lagartero Depression in extreme western Guatemala (Campbell & Lamar 2004; Beck 2005; Köhler 2008; Johnson et al. 2010; Wilson et al. 2010). Nonetheless, Álvarez del Toro (1983 in Campbell & Vannini 1988) indicated the probability of sympatry areas between *H. horridum* and *H. alvarezii* in the region between the Isthmus of Tehuantepec (Oaxaca) and Cintalapa (Chiapas); however, up to this point, the literature on integration between these two species is inconclusive (Reiserer et al. 2013), and therefore, the most recent herpetofauna list in Oaxaca does not include *H. alvarezii*'s presence in the State. Sánchez de la Vega et al. (2012) provided, however, the photographic record of *H. horridum* in the Municipality of San Pedro Mixtepec, and previous records were made of this

species in Jamiltepec and the Isthmus of Tehuantepec (Bogert & del Campo 1956).

Helodermatid lizards are listed as “threatened” under Mexican law (NOM-059-SEMARNAT-2010, SEMARNAT 2010) and assessed as ‘Vulnerable’ by the Red List of International Union for Conservation of Nature (IUCN). The main threat to beaded lizards populations is primarily the deforestation of dry tropical forests for agriculture, cattle ranching, and the burgeoning human population (Janzen 1988; Myer et al. 2000; Williams-Linera & Lorea 2009; Pennington et al. 2006; Domínguez-Vega et al. 2012), as well as, an escalation of droughts and fires (Beck 2005; Miles et al. 2006). Additionally, anthropogenic pressure is a threat.

These three photographic records represent the most northeastern (NE) geographic records of *H. alvarezii*, and it increases the distribution of the species approximately 359km for the record 3, 405km for record 2, and 470km for record 1 to the northeast from the previously closest reported localities of Cintalapa and Ocozocoautla, Chiapas. It is necessary to gather more records on the

distribution of this Mexican species to amend the lack of information about this. In conclusion, our records of this species increase the number of reptiles present in Oaxaca to 448 species, if we considered the recent contributions made by Carbajal-Marquez et al. (2020).

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