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Notes on the Herpetofauna of Western Mexico 27: Amphibians and Reptiles of Palo Gordo, Sierra de Tesistán, Zapopan, Jalisco, Mexico

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Abstract

We present a list of amphibian and reptile species from the locality known as Palo Gordo in the municipality of Zapopan. After one year of sampling, 55 species were recorded, of which 17 are amphibians and 38 are reptiles.

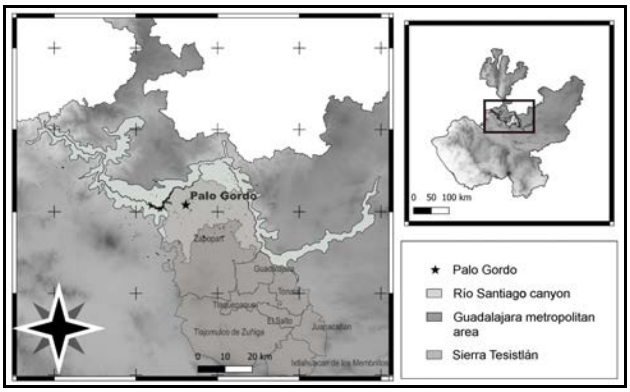
Resumen

Presentamos un listado de especies de anfibios y reptiles de la localidad conocida como Palo Gordo en el municipio de Zapopan. Después de un año de muestreo se registraron 55 especies de las cuales 17 son anfibios y 38 son reptiles.

Introduction

The great herpetofaunal diversity that Mexico harbors is well known, and is due to its variety of climates, topography and plant communities. The state of Jalisco is part of this great herpetofaunal wealth, with 151 species of reptiles and 50 of amphibians (Cruz-Sáenz et al., 2017).

Río Santiago functions as a biological corridor from the coast of Nayarit to Lago de Chapala. But it is under great pressure from the Guadalajara metropolitan area, so in 2018 it was decided to decree it as a protected natural area at the state level, this in the area of its confluences with the Río Verde that comes from the highlands of Jalisco and the Río Santiago that comes from Salto (POEJ, 2018, p. 92). The Palo Gordo area, however, which is home to great diversity, has not been considered as part of the conservation area polygon.



A portion of the Mexican state of Jalisco, showing the metropolitan area of Guadalajara, the canyon of the Río Santiago and the study site of Palo Gordo in Zapopan

Study site

The town of Palo Gordo is in the northern part of the municipality of Zapopan. It is a small town located on the edge of the Río Santiago ravine. Its vegetation in the upper part is oak forest, grasslands and cultivated areas, whereas in the lower part the vegetation is mostly deciduous tropical and gallery forest on the banks of the Río Santiago. Its elevation is 1434 masl.

Palo Gordo is in the Sierra de Tesistán. This mountain range begins at the Tepopote hill that is in front of the town of "La Primavera" and ends at the well-known Mesa de San Juan site. This site is in the middle part of the Sierra de Tesistán and falls within the Trans Mexican Volcanic Belt physiographic province (Cruz-Sáenz et al., 2017).

Methods

The sampling was carried out on a monthly basis during a year that spanned from August 2017 to July 2018. We used 40 transects of 1 km long and 10 meters wide, which were covered at least once each season of the year.

Results

After a year of sampling, a total of 55 species were recorded, of which 17 are amphibians and 38 are reptiles. Of the registered species, 16 are under some category of protection by Mexican environmental law (SEMARNAT, 2010). In addition, 34 are endemic to Mexico.

The amphibians recorded belong to seven families, 12 genera, and 17 species. As for reptiles, they belong to two orders, 16 families, and 32 species (See Table 1).

Of the 17 amphibians, 3 (17.6%) are listed in SEMARNAT

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Table 1. Species of herpetofauna recorded from Palo Gordo, Sierra de Tesistán, Zapopan Jalisco, Mexico. **NOM** = protection status under NOM-ECOL-059-2010 (SEMARNAT, 2010): Pr = *protección especial* (special protection); A = *amenazada* (threatened). **IUCN** = protection status according to the International Union for Conservation of Nature (IUCN, 2017): LC = least concern; VU = vulnerable; EN = endangered; NT = near threatened; DD = data deficient; NE = not evaluated. **EVS** = Environmental Vulnerability Score sensu Wilson et al. (2013a, b): L = low risk (3–9); M = medium risk (10–13); H = high risk (14–20). **Endemism**: E = endemic to Mexico.

Family	Species	NOM	IUCN	EVS	Endemism
Bufonidae	*Incilius occidentalis*	—	LC	11 (M)	E
	Rhinella horribilis	—	NE	3 (L)	—
Craugastoridae	*Craugastor augusti*	—	LC	8 (L)	—
	Craugastor hobartsmithi	—	EN	15 (H)	E
	Craugastor occidentalis	—	DD	13 (M)	E
Eleutherodactylidae	*Syrrhophus modestus*	Pr	VU	16 (H)	E
Hylidae	*Agalychnis dacnicolor*	—	LC	13 (M)	E
	Dryophytes arenicolor	—	LC	7 (L)	—
	Dryophytes eximius	—	LC	10 (M)	E
	Smilisca fodiens	—	LC	8 (L)	—
	Tlalocohyla smithii	—	LC	11 (M)	E
Leptodactylidae	*Leptodactylus melanonotus*	—	LC	6 (L)	—
Microhylidae	*Hypopachus variolosus*	—	LC	4 (L)	—
Ranidae	*Lithobates forreri*	Pr	LC	3 (L)	—
	Lithobates neovolcanicus	A	NT	13 (M)	E
	Lithobates psilonota	—	DD	14 (H)	E
Scaphiopodidae	*Spea multiplicata*	—	LC	6 (L)	—
Anguidae	*Elgaria kingii*	Pr	LC	10 (M)	E
Dactyloidae	*Anolis nebulosus*	—	LC	13(M)	E
Helodermatidae	*Heloderma horridum*	A	LC	14 (H)	E
Iguanidae	*Ctenosaura pectinata*	A	NE	15 (H)	E
Phyllodactylidae	*Phyllodactylus lanei*	—	LC	15 (H)	E
Phrynosomatidae	*Sceloporus horridus*	—	LC	11(M)	E
	Sceloporus melanorhinus	—	LC	9 (L)	—
	Sceloporus nelsoni	—	NE	15 (H)	E
	Sceloporus spinosus	—	LC	11 (M)	E
	Sceloporus torquatus	—	LC	11 (M)	E
	Sceloporus utiformis	—	LC	15 (H)	E
	Urosaurus bicarinatus	—	LC	12 (M)	E
Scincidae	*Plestiodon callicephalus*	—	LC	12 (M)	—
Teiidae	*Aspidoscelis communis*	Pr	LC	14 (H)	E
	Aspidoscelis gularis	—	LC	9 (L)	—
Xantusidae	*Xantusia sanchezi*	P	LC	16 (H)	E
Boidae	*Boa sigma*	A	NE	10 (M)	—
Colubridae	*Drymarchon melanurus*	—	LC	6 (L)	—
	Drymobius margaritiferus	—	NE	6 (L)	—
	Lampropeltis polyzona	—	NE	11 (M)	—
	Leptophis diplotropis	A	LC	14 (H)	E
	Masticophis mentovarius	A	LC	6 (L)	—
	Oxybelis microphthalmus	—	NE	5 (L)	—
	Senticolis triaspis	—	LC	6 (L)	—
	Sonora mutabilis	—	LC	14 (H)	E
	Trimorphodon tau	—	LC	13 (M)	E
	Tantilla bocourti	—	LC	9 (L)	E
Dipsadidae	*Coniophanes lateritius*	—	DD	13 (H)	E
	Hypsiglena torquata	Pr	LC	8 (L)	E
	Imantodes gemmistratus	Pr	NE	6 (H)	E
	Leptodeira maculata	Pr	LC	7 (L)	—
	Leptodeira splendida	—	LC	14 (H)	E
	Rhadinaea hesperia	Pr	LC	10 (M)	E
Leptotyphlopidae	*Rena humilis*	—	LC	8 (L)	—
Natricidae	*Thamnophis cyrtopsis*	—	LC	7 (L)	—
	Storeria storerioides	—	LC	11 (M)	E
Viperidae	*Crotalus basiliscus*	—	LC	18 (H)	E
Kinosternidae	*Kinosternon integrum*	Pr	LC	11(M)	E

Four photographs of habitat in the area of Palo Gordo, Sierra de Tesistlán, Zapopan, Jalisco, Mexico. Photographs by Israel Salcido-Rodríguez.

(2010). Of these, one is threatened (A) and the other two are special protection (Pr). Thus, 14 (82.4%) are unevaluated. As for the reptiles, one is in danger of extinction (P), three are threatened (A), and seven are special protection (Pr).

The International Union for Conservation of Nature (IUCN) categorizations are as follows: EN (endangered)—1; VU (vulnerable)—1; NT (near threatened)—1; LC (least concern)—41; DD (data deficient)—3; and NE (8)—8. The overwhelming prevalence of LC categorizations for the 55 Palo Gordo species (74.5%), as well as the sizeable representation of NE species (14.5%), is indicative that these categorizations have yet to catch up with the reality of the effect on the populations of these creatures of the encroachment of the metropolitan area of Guadalajara and that there is a need for an across-the-board population assessment for the 55 Palo Gordo species.

The EVS categorizations by group are as follows: low (20); medium (19); and high (16). These figures are definitely not in agreement with those from either the SEMARNAT or the IUCN assessment, and provide further evidence of the need for an overall appraisal of the population status of the entire Palo Gordo herpetofauna.

The data in Table 2 demonstrate that the species richness of the Palo Gordo region is among the highest in comparison to other surrounding areas in Jalisco studied in the relatively recent past; only the Bosque de "La Primavera" (56 species) and the Hostotipaquillo region (61) have more species than does the Palo Gordo region (55). The number of protected species in the six areas in Table 2 range from 10 to 21; the value for the Palo Gordo region is the second lowest of the six regions, at 16. The number of endemic species is the highest of that in the six areas, but second in proportion to that of the Volcán de Tequila. In general, the data in this table indicate that the Palo Gordo herpetofauna is of significant importance, as measured against the situation in the other areas listed in the table.

Discussion and conclusion

Due to its isolation, this site has high species richness, but above all significant endemism (61.8%), compared to the other sited localities; thus, its conservation is a priority.

The metropolitan area of Guadalajara is expanding rapidly and some areas of this mountain range are beginning to be impacted by the sale of land to build country houses, cabins, and roads.

It is very important that the municipality and the state ensure the protection of this site, due to the diversity and the conservation significance of the herpetofaunal species it houses. Ideally, it should be included within the polygon of the protected natural area "Natural monument of state interest: Barrancas de los Ríos Santiago y Verde."

Sierra de Tesistán is an important biological corridor between Barranca del Río Santiago and Bosque de "La Primavera." Additionally, its biological wealth and high level of endemism is similar to that of the protected natural area Bosque de "La Primavera."

Here we document the presence of *Xantusia sanchezi*. That lizard was previously reported for the state of Jalisco by Cruz-Sáenz and Lazcano (2012), but there was no record of the species for the Sierra de Tesistán.

Reflection

The state of Jalisco has an area of 78,588 $km^{2,}$ ranking seventh nationally, and has a population of 8,348,000. The Metro-

Table 2. Species richness and numbers of Mexican protected and endemic species from Palo Gordo compared to surrounding areas in Jalisco that have been studied in the past.

Locality	Species richness	Protected species	Endemic species	Reference
Huaxtla	36	10	19	Cruz-Sáenz et al., 2011
Bosque de "La Primavera"	56	17	13	Reyna-Bustos et al., 2007
Hostotipaquillo, Jalisco	61	21	28	Flores-Covarrubias et al., 2012
Volcán de Tequila	31	18	22	Rojo-Gutiérrez, 2018
Arcediano	44	21	24	Cruz-Sáenz et al., 2009
Palo Gordo	55	16	34	This paper

Anolis nebulosus.

Craugastor hobartsmithi.

Dryophytes arenicolor.

Elgaria kingii.

Leptodeira maculata.

Leptophis diplotropis.

Sceloporus horridus.

Sceloporus utiformis.

All photographs by Israel Salcido-Rodríguez.

politan Area of Guadalajara (MAG) consisting of 10 municipalities has a population of 5,268,642 (IIEG, 2021, p. 151), which subjects the surrounding natural environments to great pressure, this due to the exploitation of different resources such as water. In addition the city is increasingly occupying new natural areas in the Sierra de Tesistán for its growth. These areas are important conservation sites because of their proximity to the MAG. It is vital to conserve sites such as Palo Gordo because of their high biological wealth. So far only the herpetofauna has been explored, but certainly other zoological groups will reflect the same high value.

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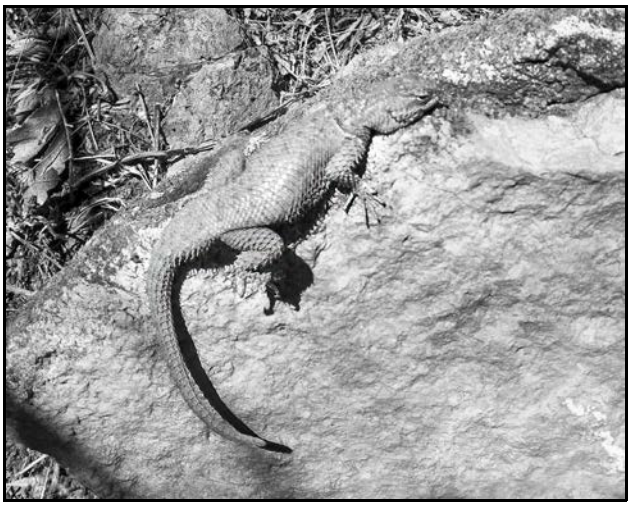

Sceloporus melanogaster. Photograph by Israel Salcido-Rodríguez.

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