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Article *in* Herpetological Review · December 2017

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Herpetological Review, 2017, 48(4), 798–801.

Sampling Localities and Corresponding Haplotype Data for Helodermatid Lizards Analyzed in Douglas et al. (2010)

About seven years ago, Douglas et al. (2010) published a paper on the conservation phylogenetics of the Beaded Lizard and Gila Monster (Heldermatidae), well-known and famous icons of western North America and northern Mesoamerica (Bogert and Martin del Campo, 1956; Campbell and Lamar, 2004; Beck, 2005). Among a variety of findings, Douglas et al. (2010, p. 164) found no robust molecular (DNA) evidence to recognize the subspecies of *Heloderma suspectum* (Reticulate Gila Monster—*H. s. suspectum* and Banded Gila Monster—*H. s. cinctum*). This was not unexpected and similar conclusions have been echoed by others based on morphological data, in particular color pattern (Beck 2005). Recently, based on a statement by Douglas et al. (2010, p. 164) alluding to the questionable taxonomic status of beaded lizards, Reiserer et al. (2013) elevated the four subspecies of *H. horridum* to full species based on a total evidence approach (i.e., mtDNA, nDNA, morphology, color pattern).

Owing to the sensitive population status of helodermatids (e.g., Beck 2005; Domíguez-Vega et al. 2012), however, locality information (sampling sites) and corresponding haplotypes were not published in Douglas et al. (2010). In retrospect, this decision was a misstep and has led to unnecessary confusion for readers and to those researchers needing these data for their studies, among other issues.

Here, we present the locality information and corresponding haplotypes of the 48 Beaded Lizards and 59 Gila Monsters that were sampled and used in the analysis by Douglas et al. (2010, see p. 159).

Sampling Localities and Haplotypes

The original locality data (sampling sites) for the beaded lizards (*H. horridum* sensu lato; N = 48) and Gila monsters (*H. suspectum* sensu lato; N = 59) in Douglas et al. (2010) were recorded as straight-line distances (km) from the nearest town, city, or other stable point of reference. This time-honored method was employed due to the fact that use of GPS was not readily available or widespread in the late 1990s and early 2000s, especially in Mexico and other regions of Mesoamerica. Here, latitude and longitude coordinates (decimal degrees) for these collection sites were obtained by using Google Earth functions. These coordinates are supplied as approximations and not intended to be precise with known error estimates. In several cases, the original sampling localities were not sufficiently understood to derive latitude and longitude coordinates. Most of the tissue samples were obtained by one of us (GWS) and Daniel Beck. Sampling localities (original sites + lat./long.) and the corresponding 28 haplotypes for *H. horridum* (sensu lato; N = 15 haplotypes) and *H. suspectum* (sensu lato; N = 13 haplotypes) are provided in Tables 1 and 2, respectively. See Fig. 1 for corresponding tree information.

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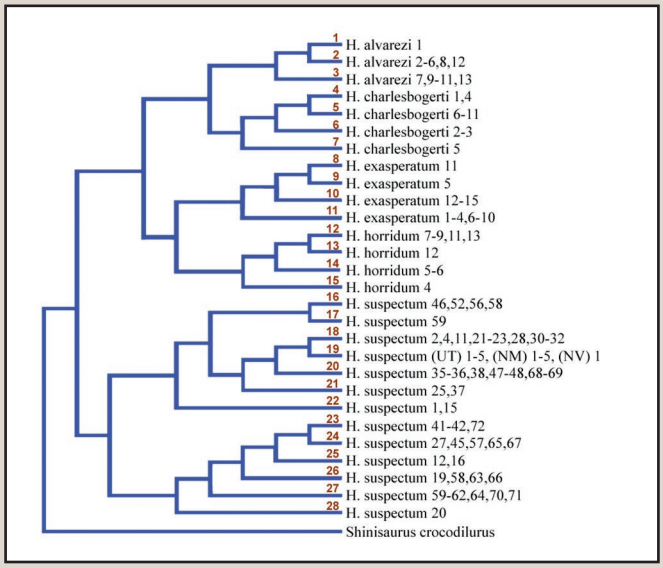

FIG. 1. Partitioned Bayesian analysis of *Heloderma* haplotypes (N = 28) presented in Douglas et al. (2010, fig. 3b, p. 159). Numbers on branches (1–28) denote the haplotypes; numbers following scientific names denote sampled individuals (see Tables 1 and 2 in this article). Modified from Douglas et al. (2010).

TABLE 1. Haplotypes (N = 15) and locality data for 48 Beaded Lizards (*Heloderma horridum*, sensu lato) studied in Douglas et al. (2010). See Fig. 1 in this article. Hap = haplotypes. HA = *H. alvarezi*. HC = *H. charlesbogerti*. HE = *H. exasperatum*. HH = *H. horridum*. Also see Reiserer et al. (2013).

ID	Hap	Locality	Latitude, longitude
HA1	1	Tuxtla Gutierrez (Laguitos), Chiapas, MX	16.7648, -93.1626
HA2	2	Tuxtla Gutierrez (Zona Galactica), Chiapas, MX	16.7262, -93.0458
HA3	2	Tuxtla Gutierrez (Chapultepec), Chiapas, MX	16.7672, -93.1569
HA4	2	Tuxtla Gutierrez (La Pochota), Chiapas, MX	16.7383, -93.1529
HA5	2	70 km SW Tuxtla Gutierrez (La Tendita), Chiapas, MX	16.7625, -93.1522
HA6	2	Tuxtla Gutierrez (Ejido Copoya), Chiapas, MX	16.7093, -93.1150
HA8	2	20 km S Tuxtla Gutierrez (Rancho La Utopia), Chiapas, MX	16.4129, -93.1867
HA12	2	Chiapas (collected by J. A. Campbell), Chiapas, MX	?
HA7	3	15 km NW Tuxtla Gutierrez (San Fernando), Chiapas, MX	16.7677, -93.0926
HA9	3	6 km S Tuxtla Gutierrez (Maravillas, El Jobo), Chiapas, MX	16.7316, -93.0715
HA10	3	120 km SW Tuxtla Gutierrez, 6 km N Arriga, Chiapas, MX	16.2500, -93.8985
HA11	3	6 km S Tuxtla Gutierrez (Maravillas, El Jobo), Chiapas, MX	16.7316, -93.0715
HA13	3	Chiapas (collected by J. A. Campbell), Chiapas, MX	?
HC1	4	Motagua Valley, Guatemala	14.9722, -89.5306*
HC4	4	Motagua Valley, Guatemala	14.9722, -89.5306
HC6	5	Motagua Valley, Guatemala	14.9722, -89.5306
HC7	5	Motagua Valley, Guatemala	14.9722, -89.5306
HC8	5	Motagua Valley, Guatemala	14.9722, -89.5306
HC9	5	Motagua Valley, Guatemala	14.9722, -89.5306
HC10	5	Motagua Valley, Guatemala	14.9722, -89.5306
HC11	5	Motagua Valley, Guatemala	14.9722, -89.5306
HC2	6	Motagua Valley, Guatemala	14.9722, -89.5306
HC3	6	Motagua Valley, Guatemala	14.9722, -89.5306
HC5	7	Motagua Valley, Guatemala	14.9722, -89.5306
HE11	8	Alamos region, Sonora, MX	27.0167, -108.9333
HE5	9	3 km N El Carrizal, 10 km NW Alamos, MX	27.0858, -109.0848
HE12	10	Alamos region, Sonora, MX	27.0167, -108.9333
HE13	10	Alamos region, Sonora, MX	27.0167, -108.9333
HE14	10	Alamos region, Sonora, MX	27.0167, -108.9333
HE15	10	Alamos region, Sonora, MX	27.0167, -108.9333
HE1	11	5 km NW Alamos, Sonora, MX, 1 km E Cerro el Cucurucho (DOR)	27.0478, -108. 9823
HE2	11	6 km SE Alamos, Sonora, MX, Rancho Mesquite Cuate	27.0213, -108.9189
HE3	11	6 km SE Alamos, Sonora, MX, Rancho Mesquite Cuate	27.0213, -108.9189
HE4	11	6 km SE Alamos, Sonora, MX, Rancho Mesquite Cuate	27.0213, -108.9189
HE6	11	21 km S Alamos, Sonora, MX (nr. San Vicente) (DOR)	27.0206, -108.9175
HE7	11	Alamos Highway, Sonora, MX (DOR)	?
HE8	11	Alamos, Sonora, MX across from cemetery	27.0167, -108.9333
HE9	11	Alamos Highway, Sonora, MX, 0.8 km W El Caracol	29.0833, -110.9333
HE10	11	Alamos Highway, Sonora, MX (DOR)	?
HH7	12	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH9	12	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH10	12	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH11	12	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH13	12	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH12	13	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH5	14	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH6	14	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796
HH4	15	Chamela, Jalisco, MX (Estación de Biología)	19.52762, -105.0796

* Mid-point of Departamento de El Progreso and Departamento de Zacapa. See text.

TABLE 2. Haplotypes (N = 13) and locality data for 59 Gila Monsters (*Heloderma suspectum*, sensu lato) studied in Douglas et al. (2010). See Fig. 1 in this article. Hap = haplotype. HS = *H. suspectum*. Also see Reiserer et al. (2013).

ID	Hap	Locality	Latitude, longitude
HS46	16	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS52	16	San Bernardino NWR (26.2 km E of Douglas; Cochise Co., AZ)	31.3437, -109.2585
HS56	16	San Bernardino NWR (26.2 km E of Douglas; Cochise Co., AZ)	31.3437, -109.2585
HS58	16	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS59	17	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS2	18	Owl Head Buttes (20.8 km E I-10; Pinal, Co., AZ)	32.5973, -111.1234
HS4	18	Dynamite Road and 61st Street; Maricopa Co., AZ)	33.7411, -111.9501
HS11	18	Old Highway 80 (4.8 km E Arlington; Maricopa, Co., AZ)	33.3026; -112.7943
HS21	18	East Valley of Phoenix (Scottsdale, Maricopa Co., AZ)	?
HS22	18	32nd Street and Carefree Highway (Maricopa Co., AZ)	33.7992, -112.0133
HS23	18	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS28	18	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS30	18	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS31	18	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS32	18	Carefree area (Maricopa Co., AZ)	33.8208, -111.9163
HS1-5	19	Red Hills, N St. George (Washington Co., UT)	37.1142, -113.5770
HS1-5	19	Red Rock Wildlife Area (Grant Co., NM)	32.7099, -108.7170
HS1	19	Valley of Fire State Park (Clark Co., NV)	36.4267, -114.5188
HS35	20	Route 96, 6.4 km W of Hillside (Yavapai Co., AZ)	34.4231, -112.9188
HS36	20	Maricopa Co., AZ	?
HS38	20	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS47	20	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS48	20	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS68	20	Highway 266, 3.5 km W of Highway 191 (Graham Co., AZ)	32.5935, -109.6917
HS69	20	Highway 266, 5.4 km W of Highway 191 (Graham Co., AZ)	32.5902, -109.6954
HS25	21	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS37	21	Carefree area (Maricopa Co., AZ)	33.8217, -111.9191
HS1	22	Kingman area (Mohave Co., AZ)	35.1987, -114.0568
HS15	22	Kingman area (Mohave Co., AZ)	35.1987, -114.0568
HS41	23	Suizo Mountains (Pinal Co., AZ)	32.6495, -111.1394
HS42	23	Arizona City (11.2 km S Casa Grande; Pinal Co., AZ)	32.7697, -111.6715
HS72	23	Suizo Mountains (Pinal Co., AZ)	32.6495, -111.1394
HS27	24	Four Season's Resort (Pinnacle Peak; Maricopa Co., AZ)	33.7281, -111.8612
HS45	24	Cottonwood Creek, Lake Pleasant area (Maricopa Co., AZ)	33.8906, -112.3195
HS57	24	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS65	24	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS67	24	Cottonwood Creek, Lake Pleasant area (Maricopa Co., AZ)	33.8906, -112.3195
HS12	25	Marana city limits (Pima Co., AZ)	32.4360, -110.8928
HS16	25	Hill 97, Freeman Road, 32 km S of Florence (Pinal Co., AZ)	32.7837, -111.1575
HS19	26	N Tucson (Pima Co., AZ)	32.2661, -111.0019
HS58	26	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS63	26	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS66	26	Saguaro National Monument (Pima Co., AZ)	32.2729, -111.1619
HS59	27	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS60	27	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS61	27	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS62	27	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS64	27	Sonora, Mexico (near Hermosillo) (Centro Ecología de Sonora)	29.0667, -110.9667
HS70	27	Highway 83, 3.5 km S of I-10 (Pima Co., AZ)	31.9813, -110.6793
HS71	27	Suizo Mountains (Pinal Co., AZ)	32.6495, -111.1394
HS20	28	Catalina Highway, Tucson (Pima Co., AZ)	32.2765, -110.7749

The distribution of *H. h. charlesbogerti* at the time of its original description (Campbell and Vannini 1988) was restricted to a small area in the Motagua Valley between El Rancho, Departamento de El Progreso, and Gualan, Departamento de Zacapa, Guatemala. Subsequently, it is also known from a limited region of the Pacific versant of Guatemala (see Roderico and Campbell 2010). Jonathan Campbell, who recognized the rarity of the Beaded Lizard in Motagua Valley, as well as the rapid destruction of habitat at that time (late 1980s), returned to the United States with 12 adult specimens of *H. h. charlesbogerti* from Motagua Valley. These individuals were permanently assigned to the San Diego Zoo and Zoo Atlanta for captive propagation and conservation efforts, which recently have been successful for both institutions (D. Boyer, J. Mendelson III, pers. comm.). Eleven of the 12 specimens of *H. h. charlesbogerti* brought back by Campbell were sampled by one of us (GWS) and described in Douglas et al. (2010). Upon their death these animals will be deposited at the University of Texas at Arlington (UTA) collection.

Collection sites of the *H. h. charlesbogerti* brought to the U.S. are provided in Campbell and Vannini (1988). However, we only provide a mid-point locality for latitude and longitude for the specimens we sampled because exact locality data were not assigned to these individuals.

Acknowledgments.—We thank Kevin de Queiroz and several others for bringing this issue to our attention. Donal Boyer and Joe Mendelson III kept us updated on the captive propagation program of *charlesbogerti* under their care. Robert Hansen provided invaluable advice and direction.

Literature Cited

Beck, D. D. 2005. Biology of Gila Monsters and Beaded Lizards. University of California Press, Berkeley, California. 211 pp.

Bogert, C. M., and R. Martín del Campo. 1956. The Gila Monster and its Allies: The Relationships, Habits, and Behavior of the Lizards of the Family Helodermatidae. Bull. Amer. Mus. Nat. Hist. 109:1–238.

Campbell, J. A., and W. W. Lamar. 2004. The Venomous Reptiles of the Western Hemisphere, 2 vols. Cornell University Press, Ithaca, New York. 976 pp.

———, and J. P. Vannini. 1988. A new subspecies of beaded lizard, *Heloderma horridum*, from the Motagua Valley of Guatemala. J. Herpetol. 22:457–468.

Domíguez-Vega, H., O. Monroy-Vilchis, C. J. Balderas-Valdivia. C. M. Gienger, and D. Ariano-Sánchez. 2012. Predicting the potential distribution of the beaded lizard and identification of priority areas for conservation. J. Nat. Conserv. 20:247–253.

Douglas, M. E., M. R. Douglas, G. W. Schuett, D. D. Beck, and B. K. Sullivan. 2010. Conservation phylogenetics of helodermatid lizards using multiple molecular markers and a supertree approach. Mol. Phylogenet. Evol. 55:153–167.

Reiserer, R. S., G. W. Schuett, and D. D. Beck. 2013. Taxonomic reassessment and conservation status of the beaded lizard, *Heloderma horridum* (Squamata: Helodermatidae). Amphib. Rept. Conserv. 7:74–96.

Roderico, A. V., and J. A. Campbell. 2010. Guatemalan beaded lizard (*Heloderma horridum charlesbogerti*) on the Pacific versant of Guatemala. Southwest. Nat. 55:453–454.

Herpetological Review, 2017, 48(4), 801–804.

JMIH Abstract Submission and Aftermath: The Process Demystified

You and many hundreds of other herpetologists and ichthyologists have waited until Deadline Day for abstract submission for the Joint Meeting of Ichthyologists and Herpetologists (JMIH). You hastily write your 250-word abstract, try to enter the abstract submission site, and fail. After struggling (and cussing profusely), you send an urgent message to the JMIH Program Officer—me. I respond by pointing out that, as per the instructions on the JMIH website and on the attachment you receive when you register for the meeting, the registration and abstract submission systems are not linked, and that you need to use a separate password. You register on the abstract submission site with a different password and submit your abstract successfully. Time to celebrate.

So many colleagues have asked me to describe what happens between the time they click the Submit button and the time they give their presentation several months later that I here attempt to demystify the process publicly. I began as the JMIH Program Officer in 2014, with the Chattanooga, Tennessee, meeting, after "training" with ASIH Secretary Maureen Donnelly during the 2013 Albuquerque, New Mexico, meeting. Rochester, New York, 2018, will be my fifth year as the JMIH Program Officer, aka the point person who won't let you submit an abstract six weeks after the deadline, won't include you in a student award competition if you are not a current member in good standing, and won't let you present three posters even if you plead that you need the presentations for your CV.

The JMIH is a consortium of four scientific societies: American Elasmobranch Society (AES), American Society of Ichthyologists and Herpetologists (ASIH), The Herpetologists' League (HL), and Society for the Study of Amphibians and Reptiles (SSAR). In addition, Neotropical Ichthyological Society (NIA) generally joins the JMIH. The societies met together for the first time under the umbrella of the JMIH in 2005, in Tampa, Florida. Currently, the K-State Global Campus Conference Unit coordinates our meetings. The JMIH abstract submission system is powered by Oxford Abstracts, a United Kingdom company founded in 2001.

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