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SHORT COMMUNICATION

NEW DISTRIBUTION RECORDS OF *MESOCLEMMYS VANDERHAEGEI* (TESTUDINES: CHELIDAE) FROM SOUTHEASTERN BRAZIL, INCLUDING OBSERVATIONS ON REPRODUCTION

Fábio Maffei, Bruno Tayar Marinho do Nascimento, Guilherme Marson Moya & Reginaldo José Donatelli

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NEW DISTRIBUTION RECORDS OF *MESOCLEMMYS VANDERHAEGEI* (TESTUDINES: CHELIDAE) FROM SOUTHEASTERN BRAZIL, INCLUDING OBSERVATIONS ON REPRODUCTION

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Abstract: *Mesoclemmys vanderhaegei* is a poorly known freshwater turtle widely distributed in central South America, where it occurs in Argentina, Paraguay, Brazil, and probably Bolivia. It is considered “Near Threatened” by the IUCN Red List and “Data Deficient” by other local lists. Herein, we present new records and data on the reproductive biology of *Mesoclemmys vanderhaegei* in southeastern Brazil.

Keywords: Cerrado, chelonians, reptiles, South America.

Brazil has a great diversity of chelonians, including five species of sea turtles, 29 species of freshwater turtles and two species of terrestrial tortoises (Costa & Bérnils 2015). Chelidae is the richest family in species with 20 representatives of seven genera (*Acanthochelys*, *Chelus*, *Hydromedusa*, *Mesoclemmys*, *Phrynops*, *Platemys* and *Rhinemys*; Costa & Bérnils 2015). Among the eight species in the *Mesoclemmys* genus, *M. vanderhaegei* (Toad-headed Turtle) is a medium-sized freshwater turtle, which has a carapace length of approximately 250mm and inhabits shallow water bodies with dense aquatic vegetation (Marques et al. 2014). It is a poorly known freshwater turtle widely distributed in central South America, where it occurs in the Amazon,

Tocantins, Paraguay, Paraná, and Uruguay River basins in association with open formations (Souza 2005) in the countries of Argentina, Paraguay, Brazil, and probably Bolivia (Marques et al. 2014). In Brazil, this species has been recorded in the states of Tocantins, Goiás, Distrito Federal, Mato Grosso, Mato Grosso do Sul, Minas Gerais and São Paulo, inhabiting Cerrado areas, but there is only one record in the Atlantic Rainforest area in the state of São Paulo (Bour & Pauler 1987).

Mesoclemmys vanderhaegei is considered “Near Threatened” by the IUCN Red List (Tortoise & Freshwater Turtle Specialist Group 1996). In the List of Brazilian Fauna Threatened with Extinction, this species was already classified as “Data Deficient” (Machado et al. 2005), but is now categorized as “Least Concern” (Vogt et al. 2015). The same category is presented in the List of Fauna Species of Minas Gerais State, in which this species was evaluated as “Data Deficient” in 2007 (Biodiversitas 2007), but is currently not listed. This species is also present in the List of Endangered Fauna of São Paulo State in the category of “Data Deficient” (São Paulo 2014), while in Paraguay it is considered

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“Insufficiently Known” (Prado et al. 2012).

Despite its wide occurrence, there are few known records of *M. vanderhaegei* in southeastern Brazil (Bour & Pauler 1987; Souza et al. 2000; Silveira et al. 2009; Marques et al. 2013; Mendonça et al. 2013) and studies are needed on the geographical distribution and population dynamics of this species (Vogt et al. 2015). In this context, we present new records and additional data on the reproductive biology of *Mesoclemmys vanderhaegei*.

MATERIALS AND METHODS

An inventory of the herpetofauna was made at two sites of Cerrado biome areas in southeastern Brazil, the basin of Paraná River. At the first site, field visits were conducted monthly in 2011 and 2012 in Águas de Santa Barbara municipality, São Paulo State, totaling 24 visits. The observations were made in a small pond (60 x 60 m) in the Ecological Station of Santa Barbara (22°48'50"S & 49°14'11"W, altitude 620m). The pond is located in the open area and its border is formed by grass and emergent vegetation. The water is crystal clear; the maximum depth is 3 m; the flow is slow and the water surface has floating macrophytes (Image 1). At the second site, field visits were conducted bimonthly between October 2014 and February 2016 in Estrela do Sul municipality, Minas Gerais State, totaling nine visits. The observations were made in a small pond (35x45m) at Nova Monte Carmelo Farm, Estrela do Sul municipality, Minas Gerais State (18°45'9"S & 47°51'52"W, altitude 941m). This pond is close to a crystal-clear stream in an open Cerrado area (Image 2). At this site, a funnel trap (Bury et al. 2012) was used during two days only in the third field visit. The captured individuals were marked based on the method of Cagle (1939).

The chelonians were recorded according to the permits SISBIO 30833-1 and 46085-1. The specimens were identified according to Rueda-Almonacid et al. (2007).

RESULTS AND DISCUSSION

On 13 October 2011, a couple of *Mesoclemmys vanderhaegei* (Images 3, 4 and 5) was manually captured in Águas de Santa Bárbara. We collected and deposited voucher specimens in the Herpetological Collection at the University of São Paulo, “Museu de Zoologia da Universidade de São Paulo” (Numbers MZUSP T 4396 and 4397). On 16 October 2012 another adult individual was seen in the same pond. Both records were obtained at night (about 20:00 hr) while the animals were foraging.

On 27 February 2015 a female of *Mesoclemmys*



Image 1. Habitat of *Mesoclemmys vanderhaegei* observed at the Ecological Station of Santa Barbara, Águas de Santa Bárbara municipality, state of São Paulo, southeastern Brazil



Image 2. Habitat of *Mesoclemmys vanderhaegei* at the Nova Monte Carmelo Farm, municipality of Estrela do Sul, Minas Gerais, southeastern Brazil

vanderhaegei (Image 6) in Estrela do Sul was captured by using the “funnel trap” and kept in a plastic box at the study base. The individual measured 206mm of carapace length and 134mm of carapace width. On the next day, the female laid seven eggs that had the following measures (LxW mm, weight): Egg 1 - 23.7x18.9 mm, 9.1g; Egg 2 - 21.3x19.1 mm, 8.5g; Egg 3 - 22.3x18.9 mm, 8.1g; Egg 4 - 22.7x19.8 mm, 8.7g; Egg 5 - 23.9x19.3 mm, 9.3g; Egg 6 - 22.9x19.4 mm, 8.7g; Egg 7 - 22.3x17.9 mm, 7.5g. The eggs were incubated, but did not result in hatchlings.

On 21 November 2015, a male individual was manually captured in the same pond (Image 7). This record was obtained at 21:00 hr and the animal was on



Image 3. A Couple of *Mesoclemmys vanderhaegei* observed at the Ecological Station of Santa Barbara, Águas de Santa Bárbara municipality, state of São Paulo, southeastern Brazil



Image 4. Female (left) and male (right) of *Mesoclemmys vanderhaegei* observed at the Ecological Station of Santa Barbara, Águas de Santa Bárbara municipality, state of São Paulo, southeastern Brazil



Image 5. *Mesoclemmys vanderhaegei* captured at the Ecological Station of Santa Barbara, Águas de Santa Bárbara municipality, state of São Paulo, southeastern Brazil



Image 6. Female of *Mesoclemmys vanderhaegei* observed at the Nova Monte Carmelo Farm, municipality of Estrela do Sul, Minas Gerais, southeastern Brazil.

the pond border. The individual measured 250mm of carapace length and 160mm of carapace width. Both, the female and the male were marked and returned to the same capture site.

In the present study, a couple foraging was recorded in October, corroborating data of Rueda-Almonacid et al. (2007) and Brito et al. (2009), who reported mating in the spring and early summer, between September and January. The clutch recorded in Estrela do Sul, was observed in February, following the pattern of the species which has its spawning season in late summer (Rueda-Almonacid et al. 2007). The recorded clutch size (six eggs) fit into the pattern for this species, which is 6.5 eggs in nature (Rueda-Almonacid et al. 2007) and 6.4 eggs in captivity (Corazza & Molina 2004). The eggs



Image 7. A Male of *Mesoclemmys vanderhaegei* observed at the Nova Monte Carmelo Farm, municipality of Estrela do Sul, Minas Gerais, southeastern Brazil.

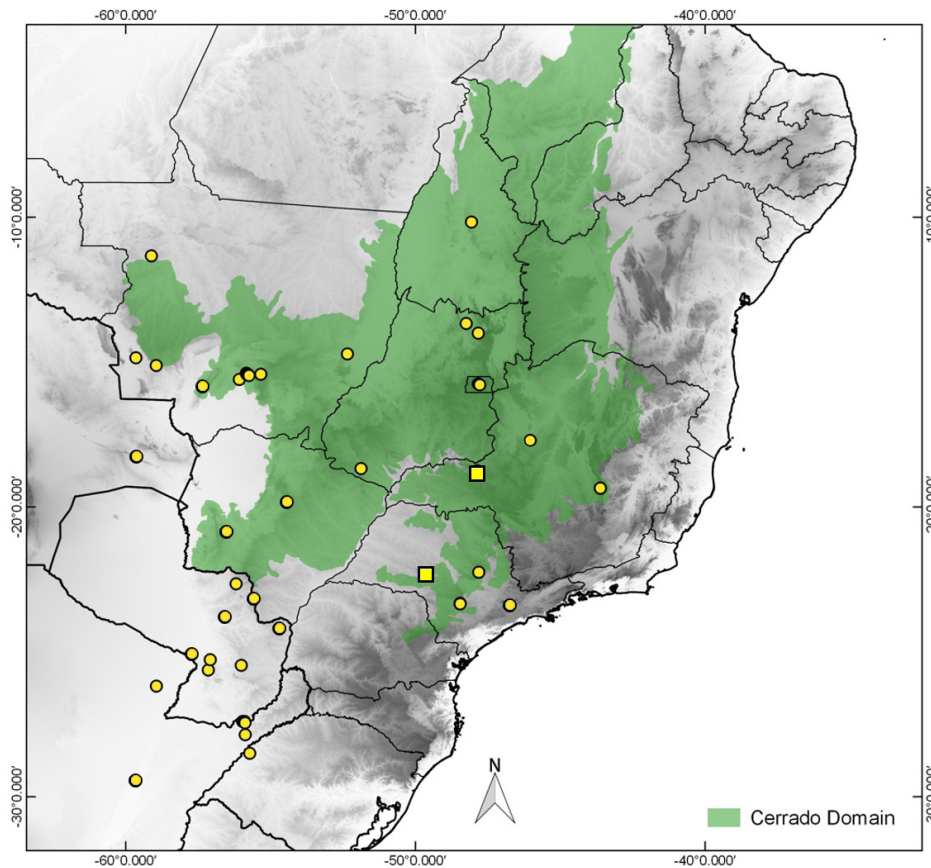


Figure 1. Map of distribution of *Mesoclemmys vanderhaegei*. Records of Mendonça et al. (2013) and Marques et al. (2014) in yellow dots, and new records in yellow squares.

had an average length of 22.7mm (± 0.9), and an average width of 19.0mm (± 0.6) and mean weight of 8.6g (± 0.6). These are below the average values reported by Corazza & Molina (2004): 34.1x26.9 mm, weight 14.4g. This should be related to the female size. Wilkinson & Gibbons (2005) reported that one of the factors contributing to the variability in egg size is the body size of the female. Rueda-Almonacid et al. (2007) reported that the size range of mature females of *M. vanderhaegei* is between 148mm and 285mm of carapace length, and the female of this study showed an intermediate value (206mm). However, Corazza & Molina (2004) did not observe any statistically significant correlation between the carapace length of the female and the clutch size in captivity for *M. vanderhaegei*.

In São Paulo State, this species was recorded at four locations. Souza et al. (2000) recorded the species in Itirapina, citing records in the cities of Caieiras and São Paulo (capital). Marques et al. (2013) recorded the species in Angatuba. The present record is at 150km SW from Itirapina and 100km NW from Angatuba (Fig. 1). In Minas Gerais State, our record is the third in the state and is at 200km SW from João Pinheiro (Silveira 2009) and 450km W from Jaboticatubas (Mendonça et al.

2013). The records of Itirapina, Águas de Santa Barbara and Jaboticatubas were in protected areas (Ecological Station of Itirapina, Ecological Station of Santa Barbara and Serra do Cipó National Park, respectively). The records of Estrela do Sul and Angatuba (Marques et al. 2013) were obtained in private eucalyptus farms. These records in protected and private areas in the southeast of Cerrado are important. Souza et al. (2000) indicated that even small reserves may be important for the conservation of this species, since some populations survive and reproduce in small remnants. The Cerrado biome is considered a global hotspot, which is a priority area for conservation characterized by a large concentration of endemic species, rich biodiversity and high threat level (Myers et al. 2000). More than half of the areas of this biome has been modified by humans and only 2.2% are protected areas (Klink & Machado 2005). Maintenance of the protected areas where this species occurs, protection of the remaining Cerrado and consequent perpetuation of the natural resident subpopulations of *M. vanderhaegei* are efficient actions for the conservation of this species (Vogt et al. 2015). Although considered “Near Threatened” by the IUCN Red List (Tortoise & Freshwater Turtle Specialist Group 1996),

Mesoclemmys vanderhaegei has a wide distribution and is abundant at some locations (e.g.: Brito et al. 2009; Marques et al. 2013). More recently, in 2012, the IUCN Tortoise and Freshwater Turtle Specialist Group evaluated the species as either Data Deficient or Near Threatened (Turtle Taxonomy Working Group, 2014). Moreover, this species is tolerant of degraded areas (Rueda-Almonacid et al. 2007). This report extends the distribution of *Mesoclemmys vanderhaegei* to the east of São Paulo State and Minas Gerais State and proposes that its threat category should be changed to “Least Concern”. The last evaluation by the IUCN (Tortoise & Freshwater Turtle Specialist Group 1996) was made 20 years ago, from that period to the present, the number of records of this species has increased significantly, making necessary an update in the threat category.

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Review

Distribution records and extended range of the Sri Lanka Frogmouth *Batrachostomus moniliger* (Aves: Caprimulgiformes: Podargidae) in the Western Ghats: a review from 1862 to 2015

-- Anil Mahabal, Sanjay Thakur & Rajgopal Patil, Pp. 9289–9305

Short Communications

Small carnivores of Parambikulam Tiger Reserve, southern Western Ghats, India

-- R. Sreehari & P.O. Nameer, Pp. 9306–9315

First record of the Diadem Leaf-Nosed Bat *Hipposideros diadema* (E. Geoffroy, 1813) (Chiroptera: Hipposideridae) from the Andaman Islands, India with the possible occurrence of a hitherto unreported subspecies

-- Bhargavi Srinivasulu, Aditya Srinivasulu, Chelmala Srinivasulu, Tauseef Hamid Dar, Asad Gopi & Gareth Jones, Pp. 9316–9321

New distribution records of *Mesoclemmys vanderhaegei* (Testudines: Chelidae) from southeastern Brazil, including observations on reproduction

-- Fábio Maffei, Bruno Tayar Marinho do Nascimento, Guilherme Marson Moya & Reginaldo José Donatelli, Pp. 9322–9326

Spiders (Arachnida: Araneae) of Gujarat University Campus, Ahmedabad, India with additional description of *Eilica tikaderi* (Platnick, 1976)

-- Dhruv A. Prajapati, Krunal R. Patel, Sandeep B. Munjpara, Shiva S. Chettiar & Devendrasinh D. Jhala, Pp. 9327–9333

New records of Termite species from Kerala (Isoptera: Termitidae)

-- Poovoli Amina, K. Rajmohana, K.V. Bhavana & P.P. Rabeeha, Pp. 9334–9338

Odonata (Insecta) diversity of southern Gujarat, India

-- Darshana M. Rathod, B.M. Parasharya & S.S. Talmale, Pp. 9339–9349

An update on the distribution pattern and endemism of three lesser-known tree species in the Western Ghats, India

-- K. Sankara Rao, N.V. Page, A.N. Sringswara, R. Arun Singh & Imran Baig, Pp. 9350–9355

Heavy metal distribution in mangrove sediment cores from selected sites along western coast of India

-- P. Vidya & Rajashekhar K. Patil, Pp. 9356–9364

Notes

New distribution record of the Bhutan Takin *Budorcas taxicolor whitei* Hodgson, 1850 (Cetartiodactyla: Bovidae) in Bhutan

-- Tashi Dhendup, Tshering Tempa, Tsethup Tshering & Nawang Norbu, Pp. 9365–9366

Recent records and distribution of the Indian Brown Mongoose *Herpestes fuscus* Gray, 1837 (Mammalia: Carnivora: Herpestidae) from the southern Western Ghats, India

-- R. Sreehari, Sandeep Das, M. Gnanakumar, K.P. Rajkumar, K.A. Sreejith, Navaneeth Kishor, Dhaneesh Bhaskar, P.S. Easa & P.O. Nameer, Pp. 9367–9370

First record of Dobson's Long-tongued Fruit Bat *Eonycteris spelaea* (Dobson, 1871) (Mammalia: Chiroptera: Pteropodidae) from Kerala, India

-- P.O. Nameer, R. Ashmi, Sachin K. Aravind & R. Sreehari, Pp. 9371–9374

Road kills of the endemic snake Perrotet's Shieldtail *Plectrurus perrotetii*, Dumeril, 1851 (Reptilia: Squamata: Uropeltidae) in Nilgiris, Tamil Nadu, India

-- P. Santhoshkumar, P. Kannan, B. Ramakrishnan, A. Veeramani, A. Samson, S. Karthick, J. Leonaprinicy, B. Nisha, N. Dineshkumar, A. Abinash, U. Vigneshkumar & P. Girikaran, Pp. 9375–9376

Reappearance of the rare Shingle Urchin *Colobocentrotus (Podophora) atratus* (Camarodonta: Echinometridae) after eight decades from the rocky shore of Kodyaghat (Port Blair), South Andaman Islands, India

-- Vikas Pandey & T. Ganesh, Pp. 9377–9380

Sallywalkerana, a replacement name for *Walkerana* Dahanukar et al. 2016 (Anura: Ranixalidae)

-- Neelesh Dahanukar, Nikhil Modak, Keerthi Krutha, P.O. Nameer, Anand D. Padhye & Sanjay Molur, P. 9381

A sighting of *Plastingia naga* (de Nicéville, [1884]) (Lepidoptera: Hesperidae: Hesperinae) from central Assam, India

-- Gaurab Nandi Das, Arajush Payra & Bitupan Boruah, Pp. 9382–9383

A note on the taxonomy, field status and threats to three endemic species of *Syzygium* (Myrtaceae) from the southern Western Ghats, India

-- R. Ramasubbu, C. Divya & S. Anjana, Pp. 9384–9390

Arnebia nandadeviensis Sekar & Rawal (Boraginaceae) a new synonym of *Onosma bracteata* Wall.

-- Umeshkumar L. Tiwari, Pp. 9391–9393

Exosporium monanthotaxis Piroz. (Fungi: Ascomycota: Pezizomycotina) from Biligirirangan Hills, southern India

-- Rashmi Dubey & Shreya Sengupta, Pp. 9394–9396