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First report of melanistic *Mauremys reevesii* in the Iberian Peninsula

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Resumen: En este estudio se describen los tres primeros casos de individuos melánicos de la especie exótica *Mauremys reevesii* en el medio natural de la península ibérica. Además, se discute sobre las posibles implicaciones de la presencia de la especie en los humedales de la región y el riesgo de hibridación con *M. leprosa*.

The northeast of the Iberian Peninsula, due to its mild climatic characteristics and high human population density, is a region that suffered a massive introduction of alien species in the last decades (Bellver *et al.*, 2019). In particular, aquatic ecosystems are highly impacted by these introductions, in which many established populations of mammals, reptiles, amphibians, fish, crustaceans and molluscs have been detected, and whose impact on fragile native communities is starting to be understood (Pou-Rovira *et al.*, 2009; Melero *et al.*, 2012; Escoriza, 2018).

Mauremys reevesii (Gray, 1831) is a freshwater turtle native to East Asia: China, North Korea, South Korea and Hong Kong (Lovich *et al.*, 2011). This species has been introduced in several countries like Spain, although it has not established breeding populations (Lovich, *et al.*, 2011; Poch *et al.*, 2020). It inhabits slow-flowing rivers, lakes, and lentic water bodies like ponds and marshes. Studies about its ecology are scarce, but mainly due to the intense overexploitation in its natural range is catalogued as Endangered in the IUCN Red List and included in Appendix III of the CITES (Lovich *et al.*, 2011). However, it is commonly bred in Chinese turtle farms, where more than half a million individuals are produced for sale annually (Haitao *et al.*, 2008). *Mauremys reevesii* is a medium-sized geoemydid, with a straight carapace length around 100-300 mm and marked sexual

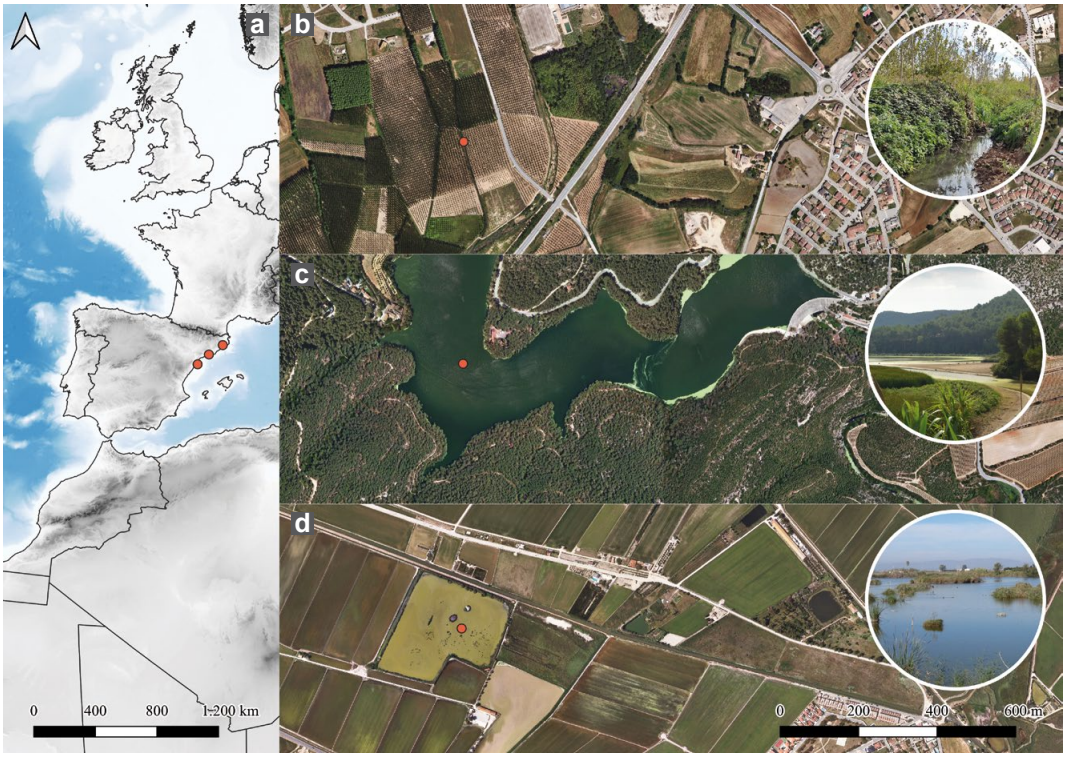

Figure 1: Map indicating the location where the turtles were caught. a) Position regarding the Iberian Peninsula (from top to bottom Riudarenes, Foix and Amposta). b) Habitat where the Riudarenes individual was caught. c) Habitat where the Foix individual was caught. d) Habitat where the Amposta individual was caught. Inside the circle, a picture in detail of each location is presented.

Figura 1: Mapa indicando las localizaciones donde se capturaron las tortugas. a) Posición respecto a la península ibérica (de arriba abajo: Riudarenes, Foix y Amposta). b) Hábitat donde se capturó al ejemplar de Riudarenes. c) Hábitat donde se capturó al ejemplar del Foix. d) Hábitat donde se capturó al ejemplar de Amposta. Dentro del círculo se muestra una foto en detalle de cada localización.

dimorphism, with females being greater and heavier (Lovich *et al.*, 2011). Typically, its color is uniform, ranging from darkish brown to black, with yellow curved and straight stripes on both sides of the neck, although is frequent to detect melanism in males as they grow in age and size (Lovich *et al.*, 2011; Yabe, 1994).

During three campaigns in Catalonia (the north-eastern Iberian Peninsula, Figure 1), we captured three melanistic males of *M. reevesii* (Figure 2; Table 1). The first was captured employing a baited funnel trap on the 31th of July 2009 (around 12:00 am) in a reservoir (Foix: 41.253 ºN / 1.641 ºE; 152 masl). The second individual was captured in a Fesquet cage trap on the 12th of October 2021 (around 12:00 am) in a pond in the Riet Vell SEO/BirdLife Reserve (Amposta: 40.663 ºN / 0.775 ºE; 0 masl). Finally, the third individual was captured together with eight individuals of the native species *Mauremys leprosa* (Schoepff in Schweigger, 1812) using a baited funnel trap on the 26th of October 2021 (around 2:00 pm) in a drainage channel (Riudarenes: 41.817 ºN / 2.721 ºE; 85 masl).

The three individuals presented almost entire black coloration, with an oval and low-arched carapace and three marked longi-

Figure 2: Detailed pictures of the *M. reevesii* individuals captured in Riudarenes (a row), Foix (b row) and Amposta (c row), and comparison with an *M. leprosa* individual captured in Riudarenes (d – carapace, e - plastron).
Figura 2: Fotografías en detalle de los individuos de *M. reevesii* capturados en Riudarenes (fila a), Foix (fila b) y Amposta (fila c), y comparación con un ejemplar de *M. leprosa* capturado en Riudarenes (d – caparazón, e – plastrón).

tudinal keels and without serrated posterior margins (Figure 2). The supra-caudal scutes were relatively shorter than the ones in *M. leprosa*. The tail was broad at their base, with the vent exceeding the posterior edge of the carapace, a typical character in males of several species of the genus Mauremys (see Lovich *et al.*, 2011; Bertolero & Busack, 2017). The head was wide and large, with the irises black, although the pupil was distinguishable. The head, neck and limbs lacked any light marking typical of these species and the plastron was also uniformly dark. For now, it remains unclear if the dark coloration is associated with a true melanism or it is age-induced, a relatively common pattern in adult males of *M. reevesii*. Superficially these specimens could be confused with melanic specimens of *M. leprosa*, but the presence of the three longitudinal keels in the carapace and the disproportionate size of the head differentiate these specimens of *M. reevesii* from the adult specimens of the native species of *Mauremys*.

Table 1: Morphological variables of the described *M. reevesii* individuals.
Tabla 1: Variables morfológicas de los individuos descritos de *M. reevesii*.

	Riudarenes	Foix	Amposta
Weight (g)	262	297	213
Straight carapace length (mm)	118	122	111
Carapace height (mm)	45	51	47
Plastron length (mm)	109	102	97

As far as we know, those are the first reported observations of melanistic individuals of this species outside of its native range. The existence of alien turtles is exhaustively documented in north-eastern Spain, with more than twenty species occurring predominantly in urban and peri-urban environments (Poch *et al.*, 2020). This species can pose a risk to native turtle populations, not only due to direct competition, but also by the introduction of

emerging diseases or genetic pollution. Hybridization involving this species has been well documented in wild conditions (*M. reevesii* x *M. sinensis*, Fong & Chen, 2010; and *M. reevesii* x *M. japonica*, Suzuki *et al.*, 2011), and there is a case of hybridization with the native *M. leprosa* in captivity (Nickl, 2015). Moreover, the melanistic individuals of the alien species can be easily confused with dark specimens of *M. leprosa*, if those are not captured. Considering the potential similarities between this and other species of the genus, we encourage managers and scientists to withdraw any unusual-looking individual of *Mauremys* spp. and carefully check its species before releasing it back to the environment. For all these reasons it would also be advisable to further control the *Mauremys* species trade, especially considering the recent increase of species of alien turtles after the restriction on *Trachemys scripta* imports (Maceda-Veiga *et al.*, 2019; Poch *et al.*, 2020).

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Sobre el origen de *Chalcides ocellatus* en el sur de Alicante

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En la totalidad de estudios herpetológicos realizados en la Comunidad Valenciana, iniciados a finales del siglo XIX, se ha identificado una única especie de eslizón, el eslizón ibérico *Chalcides bedriagai* (Boscá, 1880, 1884; Seva & Escarré, 1976; López-Jurado *et al.*, 1978; Escarré & Vericad, 1983; Hailey *et al.*, 1987; Santos *et al.*, 1998; Lacomba & Sancho, 1999; Jiménez y Lacomba, 2002). Sin embargo, el 10 de mayo de 2006 se registró la entrada (nº 1077/06) de un eslizón ocelado *Chalcides ocellatus* en el Centro de Recuperación de Fauna de El Saler (Valencia) (Figura 1), especie alóctona de amplia distribución y extendida entre el tercio norte de África y Pakistán, con presencia en la Grecia continental y ciertas islas del Mediterráneo. En el registro constaba la indicación de que fue entregado por la policía municipal de Valencia, con la observación de que apareció "en un camión que traía palmeras de Egipto". Tiempo después, en abril de 2017 se detectó la presencia de una población reproductora de esta especie exótica en la Sierra del Molar (Elche, Alicante; Bisbal-Chinesta *et al.*, 2020). Para determinar su origen estos autores realizaron análisis genéticos, concluyendo que los ejemplares ilicitanos eran muy similares a los del Delta del Nilo (Egipto). Se propusieron tres posibles vías de introducción: fueron traídos por los fenicios algunos siglos antes de nuestra era, opción apoyada por los abundantes yacimientos de esa cultura en el entorno de la localidad donde se hallaron los eslizones; llegaron en la Edad Media con el tráfico de bienes y tropas entre Egipto y Al-Andalus, o lo hicieron recientemente con el tráfico de palmeras. Finalmente, Pérez-García *et al.* (2022) realizaron encuestas a propietarios de casas de campo y de viveros de plantas en la comarca de Elche, obtenien-

Figura 1: *Chalcides ocellatus* ingresado en el Centro de Recuperación de Fauna de "La Granja" (El Saler, Valencia) en 2006. Foto CRF La Granja (Generalitat Valenciana).