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SHORT COMMUNICATION

New records and updated distribution of the invasive spider *Steatoda nobilis* (Araneae: Theridiidae) in Chile, with the first report in natural environments of the Atacama Desert

Nuevos registros y distribución actualizada de la araña invasora *Steatoda nobilis* (Araneae: Theridiidae) en Chile, con el primer reporte en ambientes naturales del desierto de Atacama

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ABSTRACT

In this work we present new records of the spider *Steatoda nobilis* (Thorell, 1875), an invasive species originally from Madeira and the Canary Islands, for northern Chile. We discuss its possible route of introduction, local ecological impacts in natural environments and provide brief morphological descriptions.

Keywords: biological invasion, ecological impacts, medical importance, predation.

RESUMEN

En este trabajo presentamos nuevos registros de la araña *Steatoda nobilis* (Thorell, 1875), especie invasora originaria de Madeira y Canarias, para el norte de Chile. Discutimos sobre sus posibles rutas de introducción, impactos ecológicos locales en ambientes naturales y proporcionamos breves descripciones morfológicas.

Palabras clave: depredación, impactos ecológicos, importancia médica, invasión biológica.

The spider Steatoda nobilis (Thorell, 1875) (Araneae: Theridiidae) is an invasive species worldwide distributed. (Bauer *et al.* 2019; Dunbar *et al.* 2022). This species is native to the Canary Islands and Madeira and has been introduced to Europe, North and South America (Kulczycki *et al.* 2012; Bauer *et al.* 2019; World Spider Catalog 2025). This species can inflict a painful bite often accompanied by swelling, erythema and infections (Warrell *et al.* 1991; Dunbar *et al.* 2017). This spider attacks small vertebrates and invertebrates by employing a silk "attack wrap," which can significantly impact on native species (Dunbar *et al.* 2022; Dugon *et al.* 2023; Ruiz-Villar *et al.* 2024). Consequently, S. nobilis represents a potential risk to both native ecosystems and public health (Bauer *et al.* 2019; Dunbar *et al.* 2022; Rayner *et al.* 2022).

S. nobilis can expand rapidly in the territories it invades, because it possesses a range of traits that have enabled it to expand its distribution (Bauer *et al.* 2019; Dugon *et al.* 2022). The characteristics that make it so invasive are cold thermal tolerance, high reproductive capacity (Dugon *et al.*

2017), longevity up to five years (Snazell & Jones 1993), and a potent neurotoxic venom to attack their prey (Gendreau *et al.* 2017; Rayner *et al.* 2022). However, despite these valuable phenotypic attributes that this species possesses, its presence has only been documented in anthropic urban environments (Snazell & Jones 1993; Kulczycki *et al.* 2012; Taucare-Ríos *et al.* 2016; Faúndez *et al.* 2018; Bauer *et al.* 2019; Dugon *et al.* 2023).

In Chile, this species was originally reported in urban areas during 2016 for Talcahuano (36°50' S, 73°3' W) and Temuco (38°45' S, 72°40' W) (Taucare-Ríos *et al.* 2016). After these findings, it has expanded its distribution to the north and south of the country. Its northernmost distribution is Copiapó (27°21'59" S, 70°19'56" W), and recently it has been observed in Chiloé (42°36' S, 73°57' W) (iNaturalist Community 2025).

In northern Chile, the climate of the Pampa del Tamarugal corresponds to a normal desert characterized by an average rainfall of about 1.5 mm per year and high daily thermal oscillation (Acebedo *et al.* 2007; Lanino & Poblete 2022). The average daily temperature is 18.6 °C. It is observed that cold nights always record temperatures close to zero degrees in the months of May, June, July, August and September; in these months the average maximum is 31 °C; 27 °C; 33 °C; 29 °C and 30 °C, respectively. The average minimum temperature is 8.2 °C, with the lowest temperature occurring in July (Lanino & Poblete 2022).

Here we report numerous specimens of *Steatoda nobilis* found and collected on the Pampa del Tamarugal, reporting the first individuals capable of colonizing natural environments. A brief diagnosis of the species is provided and its possible ecological impacts in northern Chile are discussed.

On January 27, 2025, night captures were made in the vicinity of Huara, Pampa del Tamarugal, Tarapacá, northern Chile. From these collections, several specimens of *Steatoda nobilis* were found on the bark of trees of the genus *Strombocarpa*, endemic to northern Chile. The specimens were preserved in 90 % alcohol and deposited in the spider collection of the University Arturo Prat (MUAP, Curator: Andrés Taucare-Ríos, Iquique, Chile). Specimens were identified as *S. nobilis* based on the external morphology and shape of genitalia (Taucare-Ríos *et al.* 2016). Specimens examined: I Región de Tarapacá, Huara, 19°46'12.60" S, 69°51'43.48" W, 1,144 m, 27/01/2025, Jesús Zegarra, Jheremy Méndez and Andrés Taucare-Ríos col., 4 females, 1 egg sac, 2 subadult males and 2 juveniles.

The collected females measure from 8.0 to 10 mm in body length (8.5 ± 1.29 mm). This species is characterized by brownish legs, and a dark brown prosoma and opisthosoma. The opisthosoma presents the characteristic dorsal pattern (Fig. 1A), which is white and very noticeable in juveniles and males but may be strongly reduced in older mature females. The epigynum is medially hollow and with rounded borders. The two genital openings are separated by a broad septum (Fig. 1B). Males are smaller than females, measuring from 5.0 to 5.9 mm (5.5 ± 0.7 mm). The opisthosoma is both smaller and more clearly marked.

The spiders were found in trees of the genus *Strombocarpa* (Fig. 1C), a native species of this natural environment from the Atacama Desert (Chiappa *et al.* 1997; Hughes *et al.* 2022). These trees are home to a great biodiversity, mainly birds, mammals and insects, which are their pollinators (Chiappa *et al.* 1997; Vargas & Bobadilla 2000). The main pollinating species are *Centris tamarugalis* (Anthophoridae), *Pachodynerus peruensis* (Vespidae), and *Apis mellifera* (Apidae) (Vargas & Bodabilla 2000), which may become trapped in the theridiid webs. In this sense, the spider *S. nobilis* has been able to naturalize in this hostile environment and constitutes a potential threat to the biodiversity of this ecosystem.

Since its arrival in 2016, this invasive species has rapidly expanded its distribution to different types of climates in Chile, which highlights its high phenotypic plasticity to respond to environmental changes. Our findings represent an extension of distribution of more than 1,000 km to the north, being the first record in northern Chile (Fig. 2). The transportation of fruit and the movement of cars from southern Chile via highways may be the main route of arrival of this species to the region.

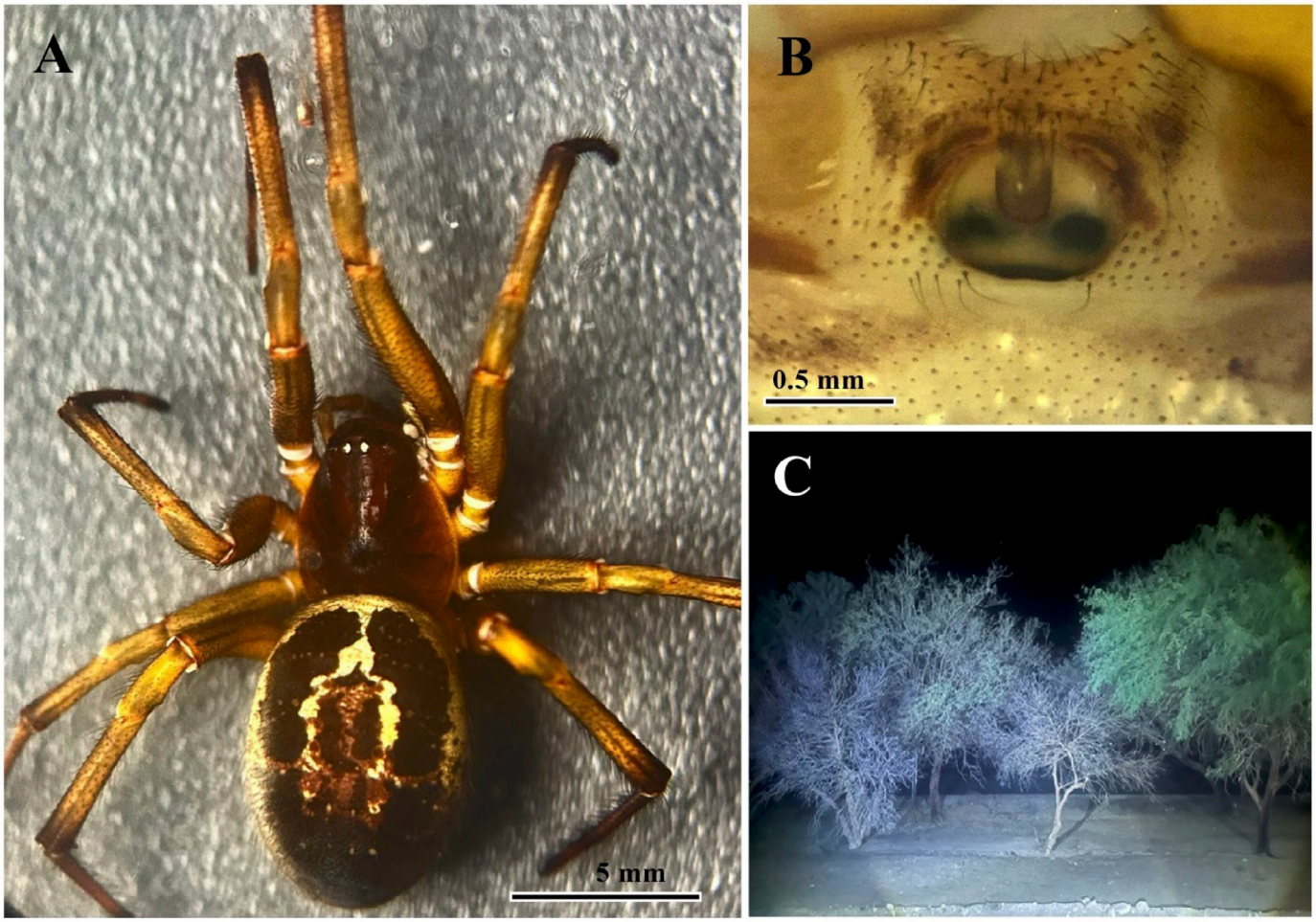

Figure 1. Female of *Steatoda nobilis* found in natural environments from northern Chile. A. Dorsal view showing the abdomen patterns marks. B. Ventral view of epigynum. C. Trees of the genus *Strombocarpa* where the individuals were found. Photos by Jheremy Méndez-Yovera. / Hembra de *Steatoda nobilis* encontrada en ambientes naturales del norte de Chile. A. Vista dorsal que muestra el patrón de marcas en el abdomen. B. Vista ventral del epígino. C. Árboles del género *Strombocarpa* donde fueron encontrados los individuos. Fotos de Jheremy Méndez-Yovera.

To date, there are no reports of negative impacts from this spider in the country; however, our findings indicate that *Steatoda nobilis* must be considered as an invasive species in Chile, since has passed the naturalization phase (*sensu* Richardson *et al.* 2000). In the words of these authors: " Naturalization starts when abiotic and biotic barriers to survival are surmounted and organism reproduce naturally in its new environment, while the invasion requires that introduced individuals produce offspring in areas distant from sites of introduction. These populations can cope with environmental restrictions and invade natural and semi-natural ecosystems". As can be seen from our findings, the definition of invasive species fits our case, although negative impacts on biodiversity have not necessarily been observed.

Its cold tolerance, polyphagous diet and high colonizing capacity (Kulczycki *et al.* 2012; Bauer *et al.* 2019; Dugon *et al.* 2022) make it a dangerous predator that can affect the animals linked to natural environments from northern Chile. We still don't know if this is a recent invasion or if there are more populations in these environments. Therefore, future studies should study the possible consequences of the presence of this species on the native communities, since they constitute a real threat to these fragile ecosystems.

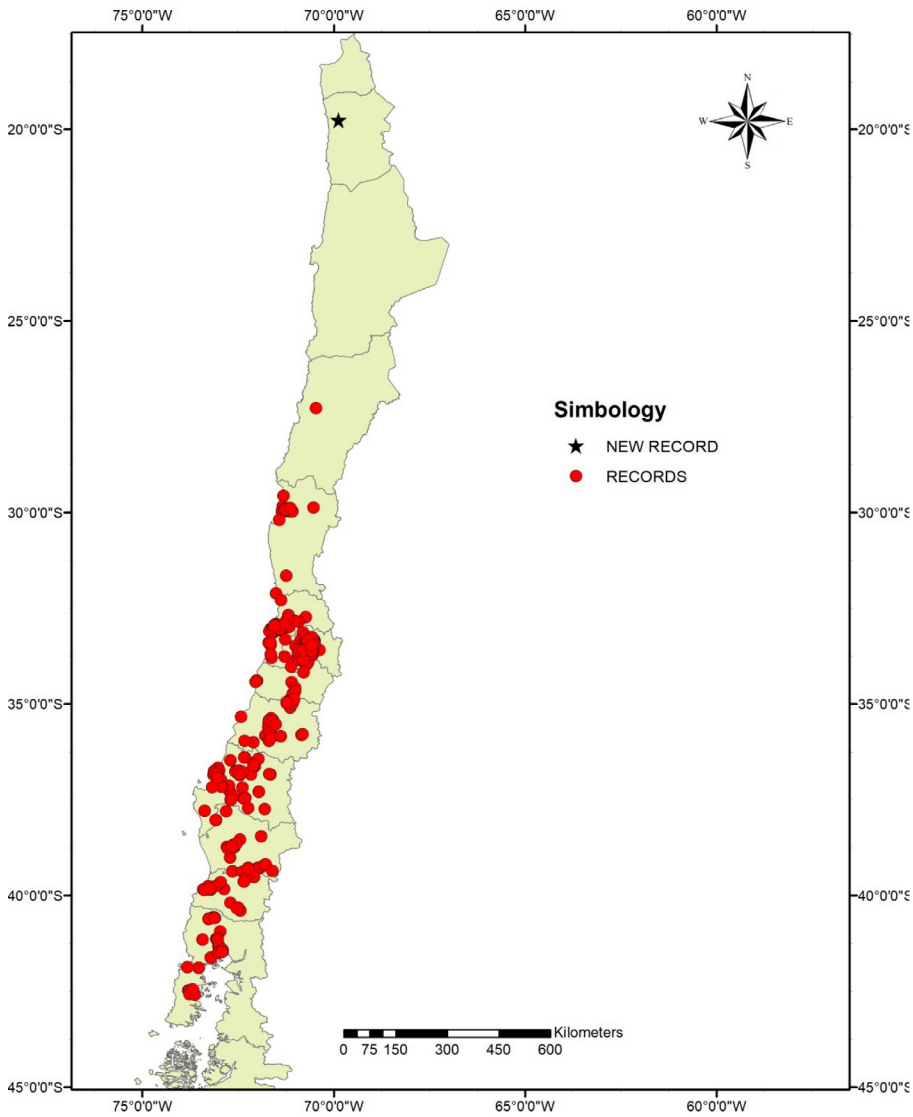

Figure 2. Distribution map showing records of *Steatoda nobilis* in Chile. / Mapa de distribución que muestra registros de *Steatoda nobilis* en Chile.

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