



First report of *Cladonota crassepunctata* (Sakakibara, 1971) (Hemiptera: Membracidae: Membracinae: Hypsoprurini) in Paraguay

Primer reporte de *Cladonota crassepunctata* (Sakakibara, 1971) (Hemiptera: Membracidae: Membracinae: Hypsoprurini) en Paraguay

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Abstract.– The species *Cladonota crassepunctata* (Sakakibara, 1971) (Hemiptera: Membracidae: Membracinae: Hypsoprurini) is recorded from Paraguay as a new country record. Furthermore, this is also the first report of the genus *Cladonota* Stål, 1869 in Paraguay (*sensu* Flynn, 2018).

Key words: *new country record, distribution, pronotal process, treehoppers.*

Resumen.– Este es el primer registro de la especie *Cladonota crassepunctata* (Sakakibara, 1971) (Hemiptera: Membracidae: Membracinae: Hypsoprurini) para Paraguay como un registro nuevo del país. También, se registra por primera vez la presencia del género *Cladonota* Stål, 1869 para Paraguay (*sensu* Flynn, 2018).

Palabras clave: *primer reporte, distribución, cuerno pronotal*

In the last century, the native ecosystems in South America have become increasingly vulnerable to threats that impact the biodiversity of the region (Jarvis *et al.*, 2010; Luque *et al.*, 2011). Specifically, Paraguay has faced threats to the native ecosystems from fires, conversion of land to agriculture, grazing pressure, and deforestation that has changed the local flora and fauna over time (Jarvis *et al.*, 2010). Historically, the biodiversity of Paraguay is relatively understudied (Wild, 2007), and these threats to the country's ecosystems may leave much of this knowledge lost to time. To date, checklists of the insects of Paraguay are limited and particularly, there are few species of membracids known from the country.

Recent expeditions in Paraguay have contributed to expanding this limited knowledge of entomofauna including a 2019 trip in which *Cladonota* (*Cladonota*) *crassepunctata* (Sakakibara, 1971) (Hemiptera: Membracidae: Membracinae: Hypsoprurini) was discovered.

This species was originally described as *Sphongophorus crassepunctata* but all species in the genus were reassigned to *Cladonota* Stål (1869) by McKamey (1997). The genus *Cladonota* is diagnosed by the head being trilobed (fig. 3) with supra-antennal lobes on each side of the clypeus (Funkhouser, 1951). The genus has four subgenera that includes *Cladonota* Stål, *Falculifera* McKamey, *Lecythifera* Fowler, and *Lobocladisca* Stål. The subgenus *Cladonota* can be distinguished from the three other subgenera of *Cladonota* by having an intermediate pronotal process, a posterior edge on the anterior pronotal process that is entire, and an anterior pronotal process that surpasses the intermediate pronotal process posteriorly (Flynn, 2018).

The genus *Cladonota* is currently under review by Flynn, providing distributional information and keys to all 55 species in the genus. Thus far, Part I covered the subgenus *Falculifera* (2018), Part II covered the subgenus *Cladonota*



(2019), and Part III covered the subgenus *Lecythifera* (2020). Until now, *C. crassepunctata* had not yet been recorded from Paraguay, nor any species in the genus *Cladonota*. This paper presents the new country record for *C. crassepunctata* in Paraguay.

Materials and methods

One specimen was examined from the JMLC (John Leavengood, private collection, Brandon, Florida, USA). The specimen was collected by beating foliage on a 2019 scientific expedition in Paraguay led by Dr. John B. Heppner (Lepidoptera Expeditions). The GPS coordinates, which could have included a locality up to 1 kilometer away from the true coordinates, were taken once during a four-day encampment. The specimen was collected by the third author and identified to species by the second author.

There were no records of any species of *Cladonota* from Paraguay at the USNM (National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA) and overall, there are only 14 identified species of membracids, and no hypsoprines from the country (*pers. comm.* Dr. Stuart McKamey). Additionally, we examined the *Cladonota* at the FSCA (Florida State Collection of Arthropods, Gainesville, Florida, USA) which included one unidentified *Cladonota* sp. from Paraguay that was too damaged for adequate identification, but it is likely *C. crassepunctata*.

The *C. crassepunctata* specimen was photographed with a Nikon Digital Sight DS-Fi2 imaging system mounted on a Nikon SMZ-18 stereomicroscope. Photograph layers were stacked using Helicon Focus 6. Photographs were edited using Adobe® Photoshop® 2020 and formatted using Adobe® Illustrator® 2020.

Results and discussion

This record of *C. crassepunctata* in Paraguay expands the known distribution of this species to two countries. Despite the

notably unique pronotal ornamentation, the distributions of many species in the genus *Cladonota* are understudied, with numerous species having few known country distributions (Flynn, 2018). There is likely more to be discovered about the native range of many species of *Cladonota*, including *C. crassepunctata*. Moreover, there are gaps in the knowledge on the entomofauna of this region (Wild, 2007) and future scientific expeditions in Paraguay will surely continue to produce valuable information.

Cladonota crassepunctata (Sakakibara, 1971)

Specimen Examined: PARAGUAY: MISIONES DEPT.: San Ignacio, vic. Hotel Rural, S 26°52.508' W [0]56°59.355', elev. 451 ft. [137 m.], 5-8-XII-2019, Coll: Eger, Tyson, & Leavengood (JMLC, 1♀).

Distribution: This species was previously known from only Brazil (Sakakibara, 1971; McKamey, 1997, 1998; Flynn, 2018). The holotype is from Prudentópolis, Paraná and was deposited in the DZUP (Museu de Entomologia Pe. Jesus Santiago Moure, Universidade Federal do Paraná, Departamento de Zoologia, Curitiba, Paraná, Brazil) (Sakakibara, 1971; Flynn, 2019). Paraguay is a **new country record** for *C. crassepunctata* as well as for the genus *Cladonota*.

Diagnosis: *Cladonota crassepunctata* is characterized by having a large, heart-shaped (bi-lobed) tip (fig. 4) on the anterior pronotal process which is undulating and bicarinate (figs. 1, 2) (Flynn, 2019). This species also has a trilobed intermediate pronotal process with the middle section slightly larger than the other sections (fig. 1). As suggested by its name, this species also has pronounced punctures throughout the pronotum.

Remarks: This distribution is not surprising given that Paraguay shares a border with Brazil. Likewise, the type specimen was collected in southern Brazil, located east of where this



Figures 1–4. *Cladonota crassepunctata* female. 1) Lateral habitus. 2) Anterior habitus. 3) head, anterior view. 4) anterior pronotal process heart-shaped (bi-lobed) tip, dorsal view.

specimen was found in Paraguay.

Our specimen measured 6.36 mm in length and 2.31 mm in the width of the head which was the widest point. The anterior pronotal process in our specimen appears slightly more inflated (fig. 1) than in the original drawing of the holotype (Sakakibara, 1971; fig. 6), which could be attributed to mild genetic variation in the species or just in the Paraguay population. However, all other characteristics are consistent with the original description of the species and subsequent publications on the genus.

The damaged *Cladonota* sp. at the FSCA is very similar to our specimen of *C. crassepunctata* and was collected approximately 185 km away. However, due to damage of the anterior pronotal process, absolute identification is not possible. Future insect collecting efforts in Paraguay will likely produce more specimens of *C. crassepunctata*.

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