

Diversity of phytophagous stink bugs (Hemiptera: Pentatomidae) associated with rice crop in Itapecuru-Mirim, Maranhão, Brazil

Diversidad de chinches fitófagos (Hemiptera: Pentatomidae) asociadas con el cultivo de arroz en Itapecuru-Mirim, Maranhão, Brasil

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ZooBank: urn:lsid:zoobank.org:pub:D3AF068B-EC5C-4B32-8F22-5CA6C70F0BB8
<https://doi.org/10.35249/rche.50.2.24.06>

Abstract. From the diversity of phytophagous stink bugs found in rice fields in Itapecuru-Mirim, Maranhão, we have the first record of *Edessa meditabunda* in the crop, and the second record in Brazil of *Paratibraca dubia*. Additionally, *Tibraca limbativentris*, *Oebalus poecilus*, and *Oebalus ypsilongriseus* were observed.

Key words: Hemipteran; Heteroptera; *Oryza sativa*; pentatomids.

Resumen. Dentro de la diversidad de chinches fitófagos encontrados en campos de arroz en Itapecuru-Mirim, Maranhão, tenemos el primer registro de *Edessa meditabunda* en el cultivo y el segundo registro en Brasil de *Paratibraca dubia*. Además, se observaron *Tibraca limbativentris*, *Oebalus poecilus* y *Oebalus ypsilongriseus*.

Palabras clave: Hemíptero; Heteroptera; *Oryza sativa*; pentatomidos.

The economic importance of stink bugs (Heteroptera: Pentatomidae) as pests of agricultural crops is recognized in several zoogeographic regions (Bianchi *et al.* 2019), with species potentially causing economic damage (Carvajal *et al.* 2019; Grazia and Schwertner 2008; Schmidt and Barcellos 2007). In Brazil, phytophagous stink bugs are considered the most harmful in irrigated rice due to significant damage to the grain production (Martins *et al.* 2009).

In this scenario, the composition of phytophagous pentatomids has increased in Brazilian rice fields within recent years with the registration of the new specie, *Paratibraca spinosa* (Campos & Grazia, 1998) (Alves *et al.* 2012), *Cyptocephala alvarengai* Rolston, 1986 (Barrigossi *et al.* 2017) and *Paratibraca dubia* (Campos & Souza, 2016) (Bianchi *et al.* 2016; Souza *et al.* 2023).

Received 20 February 2024 / Accepted 11 April 2024 / Published online 30 April 2024

Responsible Editor: José Mondaca E.

Understanding the diversity and associations that may occur with species in agricultural crops is of fundamental importance in integrated pest management (Acosta *et al.* 2017), and ecological studies (Frizzas *et al.* 2003). According to Barros *et al.* (2021) even if a species is not considered a potential pest, it is essential to record its occurrence on host plants.

In this work, we present the diversity of phytophagous Pentatomidae species obtained from a survey of rice crops in the municipality of Itapecuru-Mirim, Maranhão, Brazil.

The study was carried out during the rice harvest (January to May), agricultural year 2019/2020, in an experimental crop of 0.2 ha, in the Cristina Alves settlement, Village 17 de abril, located in the municipality of Itapecuru-Mirim, Maranhão state (3°23'42"S / 44°21'36"W"). Itapecuru-Mirim is located in the northern mesoregion of Maranhão state. It has a tropical (AW') sub-humid a climate according to the Köppen classification.

Sampling in the rice field began 25 days after plant emergence (DAE) in a zigzag pattern and at monthly intervals until the end of the crop cycle. Stink bugs were collected using an entomological net (Bianchi *et al.* 2019) after the visual examination of the plants (reading the lower part of the canopy and the entire plant). Collected specimens were then placed in killing jars and preserved in 96% ethyl alcohol (Bianchi *et al.* 2019).

In the Entomology laboratory of the State University of Maranhão (UEMA), São Luís, MA, the specimens were sorted and the abundance (n) and occurrence in the phenological phases of rice were recorded for subsequent sending to taxonomists for identification and finally the identified material was deposited in the "Iraci Paiva Coelho" Entomological Collection (CIPC-UEMA).

We collect 644 phytophagous stink bugs in the phenological stages of rice, distributed among five species of Pentatomidae: *Tibraca limbativentris* (Stål, 1860) (n = 219), *Oebalus poecilus* (Dallas, 1851) (n= 88), *Oe. ypsilongriseus* (De Geer, 1773) (n= 328), *Edessa meditabunda* (Fabricius, 1794) (n= 7) and *Paratibraca dubia* (Campos and Souza, 2016) (n= 2) (Tab. 1).

Table 1. Species and abundance (n) of stink bugs (Pentatomidae) collected in the phenological phases of rice in a field located in the Cristina Alves settlement, Vila 17 de abril, Itapecuru-Mirim, Maranhão state, 2019. / **Tabla 1.** Especies y abundancia (n) de chinches hediondas (Pentatomidae) recolectadas en las fases fenológicas del arroz en un campo ubicado en el asentamiento Cristina Alves, Vila 17 de abril, Itapecuru-Mirim, estado de Maranhão, 2019.

Species	N	Phenological phase of rice
<i>Tibraca limbativentris</i>	219	Vegetative and reproductive
<i>Oebalus ypsilongriseus</i>	328	Reproductive
<i>Oebalus poecilus</i>	88	Reproductive
<i>Edessa meditabunda</i>	7	Reproductive
<i>Paratibraca dubia</i>	2	Reproductive
Total	644	

The found of *E. meditabunda* (Fig 1.) in the rice reproductive phase, represents the first record of this species in Maranhão state. In Brazil, there are few reports of this pest species in rice (Pasini 2013) and little is known about the damage and losses in this crop. In soybeans, there is only the study by Grazia *et al.* (2015) being considered of less economic importance. The pentatomid, *P. dubia* (Fig. 2) is reported for the first time in the municipality of Itapecuru-Mirim, Maranhão state. Previous records in Brazil indicate the description of *P. dubia* by Bianchi *et al.* (2016). In the rice, the species was previously reported by Souza *et al.* (2023) in Arari, Maranhão state.

In the genus *Tibraca* Stål, 1860 the species *T. limbativentris* (Fig 3) was the most representative species in in both vegetative and reproductive phases while in the genus

Oebalus Stål, 1862, *Oe. ypsilongriseus* (Fig. 4) and *Oe. poecilus* (Fig. 5) were the most representative species in the reproductive phase. The Pentatomidae family has a greater abundance and richness of phytophagous species (Acosta *et al.* 2017) and those observed in the study stand out as those that are frequently reported to be the most economically important in rice in Brazil (Ferreira 2006; Martins *et al.* 2019; Santos *et al.* 2006).

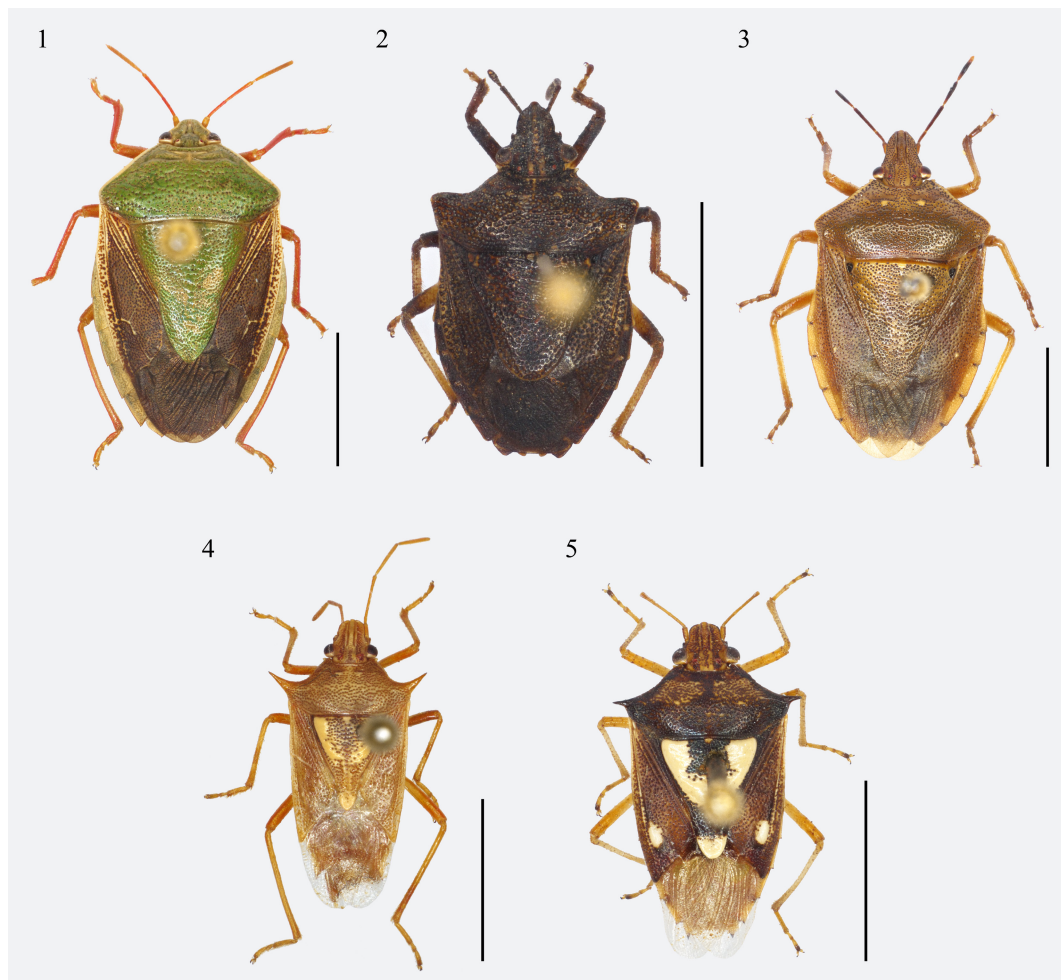


Figure 1-5. Stink bugs (dorsal view, scale bar = 5mm) collected in a rice field located in the Cristina Alves settlement, Vila 17 de abril, Itapecuru-Mirim, Maranhão state. 1. *Edessa meditabunda*. 2. *Paratibbraca dubia*. 3. *Tibraca limbativentris*. 4. *Oebalus ypsilongriseus*. 5. *Oebalus poecilus*. Itapecuru-Mirim, MA, 2019. / **Figura 1-5.** Chinchas hediondas (visión dorsal, barra de escala = 5mm) recolectadas en un campo de arroz ubicado en el asentamiento Cristina Alves, Vila 17 de abril, Itapecuru-Mirim, estado de Maranhão. 1. *Edessa meditabunda*. 2. *Paratibbraca dubia*. 3. *Tibraca limbativentris*. 4. *Oebalus ypsilongriseus*. 5. *Oebalus poecilus*. Itapecuru-Mirim, MA, 2019.

Our findings suggest that the diversity of phytophagous stink bug species observed in rice should be monitored because it will assist the farmer in making management decisions. Know of the species and in the phenological phase of rice which they will occur in the rice crop can minimize or avoid possible losses in the cost of producing the cereal, as it can provide an opportunity to investigate taxa that have not previously occurred, bringing new knowledge, and revealing species without record of occurrence in rice.

Furthermore, our results demonstrate the importance of surveys in agricultural crops for understanding the species that are part of the composition of pentatomids in rice and thus open perspectives for investigating and understanding bioecological aspects, because they are of fundamental importance within the actions of integrated pests management (MIP) in rice, mainly for species which we know very little about.

We concluded that there is a diversity of phytophagous Pentatomidae species in rice and this survey revealed the first record of *E. mediotabunda* in rice and the second record in Brazil of *P. dubia* in the municipality of Itapecuru-Mirim, MA. Furthermore, stink bugs, *T. limbiventris* and those from the *Oebalus* (*Oe. ypsilongriseus* and *Oe. poecilus*) were the most representative and economically important in rice in Maranhão.

Acknowledgements

We thank the National Council (CNPq) for granting the scholarship to the first author of the research. To José Antônio Marin Fernandes (Federal University of Pará) and Luiz Alexandre de Campos (Federal University of Rio Grande do Sul) for identifying the specimens surveyed in the research. To Lurdiana Dayse de Barros (Federal University of Rio Grande do Sul) for the photographs of specimens. To Francisco Cruz de Lima from Cristina Alves settlement for his support and availability in carrying out the study.

Author Contributions

ML: Conceptualization, methodology, investigation, data curation, writing – original draft, visualization, project administration. **JS:** Conceptualization, methodology, validation, investigation, data curation, writing – review & editing, supervision, project administration. **AMN:** Methodology, investigation. **FP:** Methodology, investigation. **PC:** Writing – review & editing. **CS:** Validation, methodology, writing – review & editing. **GA:** Validation, methodology, writing – review & editing.

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