

## Scientific Note

# First record of *Oxycarenus hyalinipennis* (Costa, 1847) (Hemiptera: Oxycarenidae) on *Hibiscus sabdariffa* L. (Malvales: Malvaceae) in Brazil and characterization of plant injuries

Kelly I. S. Silva<sup>1</sup>, Lucas J. B. Soares<sup>1</sup>, Gleice A. de S. Gonçalves<sup>2</sup>, Antonio H. de Souza<sup>3</sup>, Juliana M. Oliveira<sup>2</sup>, Ítalo Marcossi<sup>2</sup><sup>✉</sup>, Marinalva W. Pedrosa<sup>2</sup>

<sup>1</sup>Universidade Federal de São João del-Rei, Sete Lagoas, MG, Brazil. <sup>2</sup>Empresa de Pesquisa Agropecuária de Minas Gerais (EPAMIG Centro-Oeste), Prudente de Morais, MG, Brazil. <sup>3</sup>Universidade Federal de Viçosa, Viçosa, MG, Brazil.

✉ Corresponding author: [italo.marcossi@epamig.br](mailto:italo.marcossi@epamig.br)

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**Abstract.** Roselle (*Hibiscus sabdariffa* L.), also known as red sorrel, is an unconventional food plant (UFP) recognized for its nutritional, medicinal, and economic importance. Its primary commercial product is the calyx, which is susceptible to attack by the cotton seed bug [CSB; *Oxycarenus hyalinipennis* (Costa, 1847) (Hemiptera: Oxycarenidae)], a pest associated with Malvaceae crops such as cotton. However, until now, there have been no records of this pest causing damage to roselle plants in Brazil. This study aims to report the occurrence of *O. hyalinipennis* on roselle and to describe the injuries inflicted by this pest. Observations were conducted in June 2024 at the Campo Experimental Santa Rita of EPAMIG Centro-Oeste, in Prudente de Morais, Minas Gerais, on an organically cultivated crop. The damage initially appeared as translucent spots on the surface of developing calyces, progressing to darkened cracks, deformations, necrosis, fruit abortion, and weight loss, which rendered the calyces unmarketable. CSB individuals were observed at various developmental stages, primarily inside the calyces near the seeds. Initially, the symptoms were misdiagnosed as a fungal disease; however, the correct association with the insect was only established during post-harvest inspection. This constitutes the first record of *O. hyalinipennis* causing damage to roselle in Brazil, underscoring the importance of monitoring this crop to prevent losses and ensure the quality of the final product.

**Keywords:** Roselle, Pest insect, Monitoring, UFP, Emerging pest.

*Hibiscus sabdariffa* L. is popularly known in Brazil as *vinagreira*, *azedinha*, *groselha*, or *quiabo-róseo*, and internationally as roselle (Lorenzi & Matos 2002). It is an annual herbaceous plant with an erect stem that can reach 2 to 5 meters in height, alternate leaves, and showy, bell-shaped flowers ranging in colour from yellow to dark red (Mariod et al. 2017). Originating from Africa, *H. sabdariffa* has been introduced and adapted to different regions of the world and is currently cultivated in countries such as Russia, China, India, Malaysia, Thailand, Iran, and Iraq (Da-Costa-Rocha et al. 2014; Vasavi et al. 2019; Lorenzi & Matos 2002). In Brazil, the species is considered an Unconventional Food Plant (UFP), used especially in the production of beverages, jellies, and other derivatives. In addition to its popularity in the food industry due to its flavour and colour, the plant possesses bioactive properties (Da-Costa-Rocha et al. 2014; Kinupp & Lorenzi 2014).

Roselle is prominent in the transition region between the Cerrado and Atlantic Forest biomes, both for its economic value and its food and medicinal applications (Da-Costa-Rocha et al. 2014). This region, characterized by high plant diversity, hosts several species from the Malvaceae family (Jordão et al. 2024), which may favour the occurrence of phytophagous insects associated with this botanical group (Ferreira et al. 2001; Abdel-Moniem & Abd El-Wahab 2006; Abdel-Moniem et al. 2011). The cultivation of roselle can be affected by various pests like leafhoppers (*Empoasca* spp.), cotton aphid (*Aphis gossypii* Glover, 1877), pink hibiscus mealybug (*Maconellicoccus hirsutus* (Green, 1908)), stainer bugs (*Dysdercus* spp.), and whitefly (*Bemisia tabaci* (Gennadius, 1889)) (Abdel-Moniem & Abd El-Wahab 2006; Abdel-Moniem et al. 2011; Simon et al. 2021).

The cotton seed bug (CSB), *Oxycarenus hyalinipennis* (Costa, 1847), is a significant agricultural pest of cotton (*Gossypium hirsutum* L.), which can affect seed quality and yield (Smith & Brambila 2008; Atakan

et al. 2021). Besides cotton, the insect has been reported on 15 other host plants in the Malvaceae family (Tab. 1). However, *O. hyalinipennis* is also found on other species from different families, such as *Moringa oleifera* Lam. (Moringaceae), *Psidium guajava* L. (Myrtaceae), and *Citrus limetta* Risso (Rutaceae) (Shah et al. 2016).

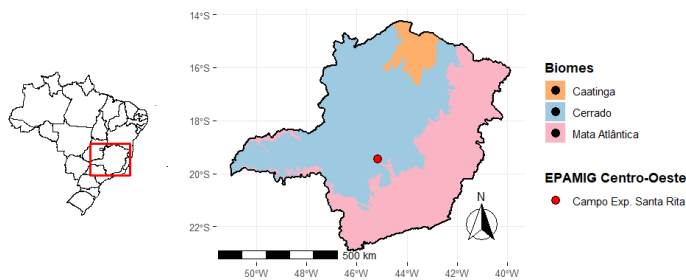
Among the host plants in the Malvaceae, species of the genus *Hibiscus* have been reported as targets of infestation, with records in countries such as Egypt and Pakistan (Abdel-Moniem et al. 2011; Shah et al. 2016). However, the damage caused by this insect to roselle has been scarcely reported until now. Therefore, the objective of this study was to report, for the first time, the occurrence and damage caused by *O. hyalinipennis* on *H. sabdariffa* in the transition region between the Cerrado and Atlantic Forest biomes in the state of Minas Gerais, Brazil.

We recorded the occurrence of *O. hyalinipennis* on roselle plants cultivated at the Campo Experimental Santa Rita of EPAMIG, located in Prudente de Morais, Minas Gerais, Brazil (19°27'15"S, 44°09'11"W, 936 m; Fig. 1). The field was managed organically, without the application of chemical pesticides. Observations were conducted in June 2024, a period characterized by temperatures between 13 °C and 30 °C no rainfall, which coincided with the beginning of the calyx harvest.

*Oxycarenus hyalinipennis* has five nymphal stages, with pink to red abdomens (Smith & Brambila 2008; Fig. 2A). Adults measure 4 – 4.3 mm and have a slender body, with a tapered anterior region and rounded posterior end, translucent whitish wings, and coloration varying from brown to black. They can be distinguished from other Heteroptera by the bicolored pattern of the hemelytra, with yellowish coria and hyaline membranes, and by the presence of fine whitish pubescence on the head and pronotum (Slater 1972; Bolu et al. 2020). Males and females are similar in coloration, although males are slightly smaller (Fig. 2B).

**Table 1.** Reports of the occurrence of *Oxycarenus hyalinipennis* on plants of the family Malvaceae.

Scientific Name	Reference
<i>Abelmoschus esculentus</i> (L) Moench)	USDA–APHIS 2010; Shah et al. 2016
<i>Abutilon fruticosum</i> Guill. & Perr.	Ananthakrishnan et al. 1982; USDA–APHIS 2010
<i>Abutilon indicum</i> Linn.	Ananthakrishnan et al. 1982; USDA–APHIS 2010; Shah et al. 2016
<i>Althaea</i> spp.	USDA–APHIS 2010
<i>Corchorus</i> sp.	USDA–APHIS 2010
<i>Dombeya</i> sp.	USDA–APHIS 2010
<i>Gossypium</i> sp.	Smith & Brambila 2008; USDA–APHIS 2010; Shah et al. 2016; Atakan et al. 2021
<i>Hibiscus cannabinus</i> L.	USDA–APHIS 2010; Shah et al. 2016; Alamu et al. 2017
<i>H. sabdariffa</i> L.	Abdel-Moniem & Abd El-Wahab 2006; USDA–APHIS 2010; Abdel-Moniem et al. 2011; Shah et al. 2016; Alamu et al. 2017; Simon et al. 2021
<i>Malva parviflora</i> L.	USDA–APHIS 2010
<i>M. pusilla</i> Sm.	USDA–APHIS 2010
<i>M. rotundifolia</i> L.	USDA–APHIS 2010
<i>Malvastrum corchorifolium</i> (Desc.)	USDA–APHIS 2010
<i>Pavonia</i> spp.	USDA–APHIS 2010
<i>Sida rhombifolia</i> Linn.	Ananthakrishnan et al. 1982; USDA–APHIS 2010
<i>Sterculia</i> spp.	Shah et al. 2016



**Figure 1.** Geographic location of the Campo Experimental Santa Rita (EPAMIG Centro-Oeste, red dot) in the state of Minas Gerais, Brazil. The map shows the distribution of the main biomes in the state: Caatinga (Brazilian semi-arid scrub forest), Cerrado (Brazilian savanna), and Mata Atlântica (Atlantic Forest). Map generated in R (r-project.org) using data from the Brazilian Institute of Geography and Statistics (IBGE).

Initial damage manifested as small translucent punctures on the outer surface of developing calyces (Fig. 2C), likely resulting from the insertion of the insect's mouthparts as they attempted to reach the seeds. Moreover, *O. hyalinipennis* can also feed on the cellular contents of the calyx's outer layers (Shah et al. 2016). As the fruit ripened, the lesions increased in number and developed into darkened fissures that provided entry points for other insects and phytopathogens (Fig. 2D). The affected calyces exhibited irregular growth, asymmetrical deformations, structural necrosis, and a rotten appearance, often leading to premature fruit abortion and weight loss, which rendered them unmarketable (Fig. 2E). During harvest, the damage was initially mistaken for a fungal infection. However, processing the damaged calyces revealed the presence of numerous insects at various developmental stages, located both on the surface and inside, in direct contact with the seeds (Fig. 2F).

Record of the CSB attacking roselle (*H. sabdariffa*) in an organic field system in the central region of Minas Gerais represents the first report of this pest in the region. The Campo Experimental Santa Rita is located in a transition area between the Atlantic Forest and the Cerrado (Brazilian Savanna). The infestation was observed at the beginning of the calyx harvest, under dry conditions and mild temperatures, a context that may have favoured the insect's population development, as reported by Shah et al. (2016) and Simon et al. (2021). The damage

pattern on the calyces observed in this study, including discoloration, deformation, and rendering the fruit unmarketable, is consistent with descriptions of this pest in other host crops such as cotton (Atakan et al. 2021; Shah et al. 2016).

The diversity of host plants presents in the transition zone between the Cerrado and the Atlantic Forest is likely what favours the maintenance and dispersal of *O. hyalinipennis* populations (Jordão et al. 2024). In addition to species from the Malvaceae family (e.g. cotton, okra, and hibiscus), the insect has been recorded on plants from other families, which reinforces its polyphagous and adaptive potential (Abdel-Moniem et al. 2011; Shah et al. 2016). Given the economic, nutritional, and medicinal importance of roselle (Vasavi et al. 2019), the presence of this pest represents a challenge for production systems in the region. Future studies are necessary to understand its biology and population dynamics and to develop management strategies.



**Figure 2.** Individuals of *Oxycarenus hyalinipennis* (Costa, 1847) (Hemiptera: Oxycarenidae) and damage caused to *H. sabdariffa*. A. Nymph of *O. hyalinipennis*; B. Male and female in copula; C. Initial damage on the calyx (arrow); D. Progression of injury on the calyx (arrows); E and F. Dried calyx with presence of *O. hyalinipennis* individuals.

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## Authors' Contributions

KISS: Investigation, Methodology; LJB: Methodology; GASG: Formal analysis, Writing – original draft; AHS: Formal analysis, Writing – original draft; IM: Formal analysis, Validation, Writing – review & editing; JMO: Writing – review & editing; MWP: Conceptualization, Investigation, Supervision, Writing – review & editing, Funding acquisition.

## Conflict of Interest Statement

The authors declare that they have no conflicts of interest related to this study.

## Ethical Approval

Not applicable.

## Data Availability

Not applicable.

## Generative AI Statement

We used AI tools exclusively for linguistic editing and readability improvements. The use of these tools was strictly limited to textual enhancement and did not involve data analysis, results interpretation, or the development of scientific conclusions.

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