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Notes and Comments

Leptodelphax maculigera (Hemiptera: Delphacidae): first occurrence in Southern Brazil and potential rayadofino vector

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Leptodelphax maculigera (Stål, 1859) (Hemiptera: Delphacidae: Delphacinae: Delphacini) is a new combination of *Delphax maculigera* (Hemiptera: Delphacidae: Delphacinae: Delphacini), described by Stål, in 1859, from Mauritius (Stål, 1859). Other records of this species and specimens of Delphacidae were mainly taken in other islands of the Western Indian Ocean, recognizing the African derivation of delphacid fauna (Fennah, 1964). The genus *Leptodelphax* is represented in several countries of Africa, Egypt, Cyprus, Turkey, and Israel (Nast, 1958, 1975; Fennah, 1964; Drosopoulos, 1983; Bonfils et al., 1994; Seignobos et al., 1996; Jacquot, 2016). *Leptodelphax maculigera* was recently recorded in Central-West of Brazil, representing the first report of this species in the American continent (Ferreira et al., 2023).

This species has an oligophagous feeding habit and is associated with feeding on Poacaea, where a large range of these host plants are economically important in agriculture, such as grasses (napier, elephant or South African pigeon grasses), sugarcane, and maize (Bonfils et al., 1994; Attié et al., 2008; Arocha et al., 2009; Koji et al., 2012). In addition to the direct damages, several species from the genus *Leptodelphax* have been reported as possible phytoplasma vectors (Koji et al., 2012). On the other hand, there is no report that associates *Maize rayado fino virus* (MRFV) to *L. maculigera*, until this moment. In this sense, our study recorded the presence of MFRV in *L. maculigera* adults, indicating the hability of this specie to transmit the pathogen. In addition,this study reports the occurrence of the African leafhopper *L. maculigera* in Southern Brazil for the first time.

Specimens of this leafhopper were collected by active searching and yellow sticky traps in maize (*Zea mays* L.), in the municipality of Londrina (23º21º36º.6"S and 51º10'07.8"W), during January and April 2023.

In total, 4 specimens in adult phases were collected by yellow sticky traps. The traps (10.0 × 12.5 cm) were used for *Dalbulus maidis* (DeLong & Wolcott) (Hemiptera: Cicadellidae) monitoring and these traps remained during the entire phenological cycle of maize, inside and outside the crop, in the study areas.

For MRFV detection, the extraction total nucleic acids was performed as modified by Doyle (1991). The head was removed of two leafhopper individuals and were macered (only the head) in 700 µL of buffer 2% CTAB; 2% PVP; 1.4M NaCl; 100 mM Tris-HCl pH 8.0; 50 mM EDTA) in 2 mL tubes, vortexed and incubated for 15 min at 65 °C. 520 µL of CIA (chloroform isoamyl alcohol 24:1) was added; the mixture was vortexed for 1 min and centrifuged for 5 min at 13000 rpm. Next, 500 µL of the supernatant was removed, transferred to another tube and added 500 µL of isopropanol and 250 µL of 7.5 M ammonium acetate. The microtube was inverted until homogenized and incubated at -20 °C for 15 min. After this period, the mixture was centrifuged at 13000 rpm for 5 min. The supernatant was discarded by adding 1 mL of 70% ethanol to the pellet and centrifuging at 13000 rpm for 2 min. The ethanol was discarded and the tubes were kept open and inverted on a paper towel to dry the precipitate. Then the pellet was resuspended in 50 µL of ultrapure water and stored at -20 °C. In the amplification via RT-qPCR of the MRFV, the following oligonucleotides were used: MRFV-CP FW, MRFV-CP RV and the probe MRFV-CP-Probe with marking at the 5' end with the fluorophore TET. In the RT-qPCR reaction, the GoTaq®Enviro RT-qPCR System master mix (Promega, Madison) and the StepOnePlus Real-time PCR Systems thermocycler (Applied Biosystems) were used. Reaction data were analyzed quantitatively and graphically, using StepOne Software v2.6.0 (Applied Biosystems) to determine the quantitative cycle (Cq). Cq values below 40 represent positive results.

This study proves that this pestis spreading in Brazil and demonstrates for the first time that it is a potential MRFV vector. Thus, it is important additional studies about potential diseases transmission and monitoring crops to adopt management measures that reduce pest infestation.

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References

AROCHA, Y., ZERFY, T., ABEBE, G., PROUD, J., HANSON, J., WILSON, M., PHIL, J. and LUCAS, J., 2009. Identification of potential vectors and alternative plant hosts for the phytoplasma associated with Napier grass stunt disease in Ethiopia. *Journal of Phytopathology*, vol. 157, no. 2, pp. 126-132. http://dx.doi.org/10.1111/j.1439-0434.2008.01432.x.

ATTIÉ, M., BOURGOIN, T., VESLOT, J. and SOULIER-PERKINS, A., 2008. Patterns of trophic relationships between planthoppers (Hemiptera: Fulgoromorpha) and their host plants on the Mascarene Islands. *Journal of Natural History*, vol. 42, no. 23-24, pp. 1591-1638. http://dx.doi.org/10.1080/00222930802106963.

BONFILS, J., QUILICI, S. and REYNAUD, B., 1994. Les Hémiptères Auchénorrhynques de l'Ile de la Réunion. *Bulletin de la Société Entomologique de France*, vol. 99, no. 3, pp. 227-240. http://dx.doi.org/10.3406/bsef.1994.17061.

DOYLE, J., 1991. DNA protocols for plants. In: G.M. HEWITT, A.W.B. JOHNSTON and J.P.W. YOUNG, eds. *Molecular techniques in taxonomy*. Heidelberg: Springer. NATO ASI Series, no. 57. http://dx.doi.org/10.1007/978-3-642-83962-7_18.

DROSOPOULOS, S., 1983. Zoogeographic and ecological relations between the planthopper-fauna of Greece and adjacent countries (Homoptera, Delphacidae). *Biologia Gallo-Hellenica*, vol. 10, pp. 275-286.

FENNAH, R.G., 1964. Delphacidae from Madagascar and the Mascarene Islands (Homoptera: fulgoroidea). *Transactions of the Royal Entomological Society of London*, vol. 116, no. 7, pp. 131-150. http://dx.doi.org/10.1111/j.1365-2311.1964.tb01084.x.

FERREIRA, K.R., BARTLETT, C.R., ASCHE, M., SILVA, L.R.S., MAGALHÃES, V.S. and GONDINHO, K.C.A., 2023. First record of the African species *Leptodelphax maculigera* (Stål, 1859) (Hemiptera: Delphacidae) in Brazil. *Neotropical Entomology*. In press. http://dx.doi.org/10.21203/rs.3.rs-2818951/v1.

JACQUOT, M., 2016. *Biodiversité et fonctionnement écologique des agroécosystèmes à base de manguiers à La Réunion*. Saint-Denis: Université de La Réunion, 71 p. Dissertation, Doctoraten Sciences.

KOJI, S., FUJINUMA, S., MIDEGA, C.A., MOHAMED, H.M., ISHIKAWA, T., WILSON, M.R., ASCHE, M., DEGELO, S., ADATI, T., PICKETT, J.A. and KHAN, Z.R., 2012. Seasonal abundance of *Maiestasbanda* (Hemiptera: Cicadellidae), a vector of phytoplasma, and other leafhoppers and planthoppers (Hemiptera: Delphacidae) associated with Napier grass (*Pennisetum purpureum*) in Kenya. *Journal of Pest Science*, vol. 85, no. 1, pp. 37-46. http://dx.doi.org/10.1007/s10340-011-0376-z.

NAST, J., 1958. Homopterological Notes XII. On the genus *Leptodelphax* Hpt. with description of a new species from Madagascar (Delphacidae). *Acta Zoologica Cracoviensia*, vol. 2, no. 35, pp. 887-899.

NAST, J., 1975. *Palaearctic Auchenorrhyncha (Homoptera): an annotated check list*. Warsaw: Polish Scientific Publishers, pp. 1-500.

SEIGNOBOS, C., DEGUINE, J.P. and ABERLENC, H.P., 1996. Les Mofus et leursinsectes. *Journal d'Agriculture Traditionnelle et de Botanique Appliquee*, vol. 38, no. 2, pp. 125-187. http://dx.doi.org/10.3406/jatba.1996.3745.

STÅL, C., 1859. Hemiptera: species novasdescripsit. In: O.H.M. KONUNG, ed. *Kongliga Svenska Fregatten Eugenies Resa Omkring Jorden*. Stockholm: Kungliga Svenska Vetenskaps Akademien, vol. 4, pp. 219-298.