

Occurrences of Whiteflies (Hemiptera: Aleyrodidae) on Cassava (*Manihot esculenta* Crantz) Crops Under Field Conditions in the State of Rio de Janeiro, Brazil.

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Abstract. Brazil is the second world largest cassava producer and the largest one in South America. The aleyrodids, commonly known as whiteflies, are pests that affect cassava crops and might induce economic losses, due to high infestation levels. The objective of this work was to survey the whitefly species that occur feeding on cassava (*Manihot esculenta* Crantz) crops in the State of Rio de Janeiro. Leaf samplings were conducted in five municipalities of the State and the species identification was realised according to morphological characters of the 4th instar nymphs. Among the 16 aleyrodid species described feeding on cassava in the Neotropical region, *Aleurothrixus aepim* (Göeldi), *Bemisia tuberculata* Bondar and *Trialeurodes manihoti* (Bondar) were identified occurring in the State. The species *B. tuberculata* and *T. manihoti* are reported for the first time in the State of Rio de Janeiro, where they were found feeding on cassava crops.

Keywords: Aleyrodid; monitoring; sampling.

Ocorrências de Moscas-Branças (Hemiptera: Aleyrodidae) em Lavouras de Mandioca (*Manihot esculenta* Crantz) sob Condições de Campo no Estado do Rio de Janeiro, Brasil.

Resumo. O Brasil é o segundo maior produtor mundial de mandioca e o maior produtor do continente sul americano. Os aleirodídeos, insetos comumente conhecidos como moscas-brancas, são pragas que acometem esta cultura e podem causar prejuízos econômicos, em decorrência de altas infestações. O objetivo deste trabalho foi levantar as espécies de moscas-brancas que ocorrem na cultura da mandioca (*Manihot esculenta* Crantz) no Estado do Rio de Janeiro. Foram realizadas amostragens de folhas em lavouras localizadas em cinco municípios do estado e a identificação das espécies foi feita por caracteres morfológicos das ninfas de 4.^o instar. Das 16 espécies de aleirodídeos descritas na região Neotropical em plantas de mandioca, três foram identificadas ocorrendo no estado, *Aleurothrixus aepim* (Göeldi), *Bemisia tuberculata* Bondar e *Trialeurodes manihoti* (Bondar). É registrada pela primeira vez no estado a presença das espécies *B. tuberculata* e *T. manihoti* em lavouras de mandioca.

Palavras-Chave: Aleirodídeo; levantamento; monitoramento.

Brazil is the second largest cassava producer of the world and the largest one in South America. Due to the importance of the crop to many countries around the world, it makes necessary to know the plant under the phytosanitary aspect. The aleyrodids, insects commonly known as whiteflies, are pests that affect this crop and may cause severe losses due to high infestations.

The whiteflies can affect plants in four ways: 1) by direct feeding on the phloem of the leaves, inducing chlorosis and leaf abscission. 2) The production of honeydew, what turns into a medium for sooty mould growth that can reduce yielding, by decreasing of photosynthesis rates. 3) While feeding, the whiteflies inject toxin that can produce symptoms like silver leaf of pumpkin leaves and irregular maturation of tomatoes. 4) As vectors of plant viruses (MOUND & HALSEY 1978; SCHUSTER *et al.* 1990; JIMÉNEZ *et al.* 1995).

According to MARTIN & MOUND (2007), there are 1556 Aleyrodidae species distributed in 161 genera belonging to three living subfamilies (*Aleurodicinae*, *Aleyrodinae* e *Udamoselinae*) and a fossil one (*Bernaestinae*).

The economically most important species are *Bemisia tabaci* (Gennadius) and *Trialeurodes vaporariorum* (Westwood)

(CABALLERO 1996). Despite the wide range of host plants colonised by these species, notably herbaceous and annual plants, polyphagy is not a usual character of Aleyrodidae, being the majority of species monophagous of woody hosts (BYRNE & BELLOWS JR. 1991).

Two noteworthy diseases whose vector is a whitefly are reported in cassava: *African Cassava Mosaic Virus* (*Geminiviridae: Begomovirus*), transmitted by *B. tabaci* (FAUQUET & FARGETTE 1990), and *Cassava Frogskin Disease* (*CFSD*) whose aetiology is still uncertain; there are both evidences of phytoplasma (ALVAREZ *et al.* 2007) and of virus. Studies indicate that the pathogen seems to be transmitted by *Bemisia tuberculata* Bondar (CALVERT & THRESH 2002).

The major cassava aleyrodid complex is described in the Neotropical region, where 16 species are reported: *Aleurodicus dispersus* Russell; *Aleurothrixus aepim* (Göeldi); *Aleurotrachelus socialis* Bondar; *B. tabaci*; *Bemisia argentifolii* Bellows & Perring (= *B. tabaci* biotype B); *B. tuberculata*; *Trialeurodes abutiloneus* (Haldeman); *Trialeurodes variabilis* (Quaintance); *Aleuronudus* sp.; *Paraleyrodus* sp.; *Tetraleurodes* sp. (BELLOTTI *et al.* 1999); *Aleurodicus coccolobae* Quaintance & Baker; *Bemisia afer* (Priesner & Hosny); *Tetraleurodes ursorum* (Cockerell); *T.*

vaporariorum (EVANS 2008); *Trialeurodes manihoti* (Bondar) (MOUND & HALSEY 1978).

Some results presented in this survey are part of the Master of Science Dissertation of the first author.

Periodical sampling of cassava leaves were realised in five farmlands located in municipalities of the State of Rio de Janeiro: Rio de Janeiro City (Santa Cruz zone), Itaguaí, Japeri, Paracambi and Seropédica (UFRRJ Campus). The samples from Paracambi and Seropédica were taken from August to November of 2006 and the ones from Rio de Janeiro City, Itaguaí and Japeri from April to December of 2007. The leaves were analysed under the stereomicroscope in a laboratory of the Departamento de Entomologia e Fitopatologia of the Universidade Federal Rural do Rio de Janeiro. For the taxonomic study, the 4th instar nymphs (*puparium*) found and removed from the leaves, were mounted in Hoyer's solution (BAKER & WHARTON 1952) on microscope slides, for morphological analysis under the microscope. The majority of species can not be identified by adult morphological characters. Genera and species are defined according to the *puparium* (MOUND & HALSEY 1978), or pupa case morphology (GULLAN & CRANSTON 2008).

Among the 16 species reported feeding on cassava in the Neotropical region, *A. aepim*, *B. tuberculata* and *T. manihoti* were found feeding on cassava in the State of Rio de Janeiro (Table 1).

Table 1. Occurrence of whiteflies in the State of Rio de Janeiro, Brazil.

Municipality	Species		
	<i>A. aepim</i>	<i>B. tuberculata</i>	<i>T. manihoti</i>
Rio de Janeiro City	X	X	X
Itaguaí	X	X	X
Japeri	X	X	-
Paracambi	X	X	X
Seropédica	X	-	X

The specimens identified as *B. tuberculata* and *T. manihoti* match to the Bondar (1923) morphological description of specimens found in cassava crops in the State of Bahia. These species have not been previously reported in the State of Rio de Janeiro. The collections and identifications reported in this article constitute the first record of *B. tuberculata* and *T. manihoti* in the State of Rio de Janeiro. Voucher specimens of these insects were deposited in Costa Lima Entomology Collection (CECL), UFRRJ.

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