SCIENTIFIC NOTE

First Report and Differential Colonization of *Passiflora* Species by the B Biotype of *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae) in Brazil

Endson S. Nunes[1], Judith K. Brown[2], Adriana G. Moreira[3], Gillian Watson[4], André L. Lourenção[5], Sônia M.S. Piedade[6], Jorge A. M. Rezende[3,*] and Maria L.C. Vieira[1]

[1]Depto. Genética, [3]Depto. Entomologia, Fitopatologia e Zoologia Agrícola, [6]Depto. Ciências Exatas. Escola Superior de Agricultura "Luiz de Queiroz", USP, 13418-900 Piracicaba, SP, Brazil; esnunes@carpa.ciagri.usp.br, agmoreir@esalq.usp.br, jsoniamsp@esalq.usp.br, amrezen@esalq.usp.br, mlcvieir@esalq.usp.br

[2]Dept Plant Sciences, The University of Arizona, Tucson, AZ 85721 USA; jbrown@Ag.arizona.edu

[4]California Dept. of Food and Agriculture, Sacramento, CA 95814-5607 USA; gwatson@cdfa.ca.gov

[5]Centro de Pesquisa e Desenvolvimento de Fitossanidade, Instituto Agronômico,13075-630 Campinas, SP, Brazil; andre@iac.sp.gov.br

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Primeiro Relato e Colonização Diferencial de Espécies de *Passiflora* pelo Biótipo B de *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae) no Brasil

RESUMO - Esse trabalho descreve pela primeira vez a ocorrência do aleirodídeo *Bemisia tabaci* (Gennadius) biótipo B colonizando maracujazeiros no Brasil. Também foi examinada a colonização de nove espécies de *Passiflora* pelo inseto em condições de telado. *P. amethystina* Mikan foi a espécie de maior preferência para oviposição e colonização, enquanto *P. suberosa* L., *P. coriacea* Juss. e duas espécies cultivadas comercialmente, *P. alata* Curtis e *P. edulis* Sims f. *flavicarpa* Degener, foram pouco colonizadas pelo aleirodídeo. *P. morifolia* Mast., *P. cincinnata* Mast., *P. foetida* L. e *P. caerulea* L. exibiram níveis intermediários de colonização. Esses resultados sugerem que certas espécies de *Passiflora* exibem diferentes graus de resistência à colonização ou preferência para oviposição de *B. tabaci* biótipo B.

PALAVRAS-CHAVE: Passifloraceae, begomovirus, resistência a insetos

ABSTRACT - This note is the first report of *Bemisia tabaci* (Gennadius) biotype B colonizing passionvine in Brazil. We examined the colonization of nine *Passiflora* species by a wild B type population under greenhouse conditions. *P. amethystina* Mikan was the most preferred species for oviposition and colonization, whereas *P. suberosa* L., *P. coriacea* Juss. and two commercially cultivated species, *P. alata* Curtis and *P. edulis* Sims f. *flavicarpa* Degener, were mostly uncolonised. *P. morifolia* Mast., *P. cincinnata* Mast., *P. foetida* L. and *P. caerulea* L. showed intermediate levels of colonization. Such differential colonization might suggest some degree of resistance by certain *Passiflora* species or oviposition preference by *B. tabaci*.

KEY WORDS: Passifloraceae, Begomovirus, colonization

The sweet potato whitefly, *Bemisia tabaci* (Gennadius) complex (Brown *et al*. 1995), is a worldwide serious pest of many agronomical, ornamental and vegetable crops. Since the early 1990's this whitefly, originally of low pest status, became a serious pest and vector of plant viruses in much of Brazil's agriculture due to the introduction and rapid dissemination of the B biotype (Costa & Brown 1991) of *B. tabaci* (França *et al*. 1996, Ribeiro *et al*. 1998). Heavy colonization by the B biotype in a number of vegetable species and cotton resulted in direct damage due to feeding, and contributed to outbreaks of virus diseases caused by begomovirus, which were particularly damaging to tomato and pepper crops (Lima *et al*. 2001, Ribeiro *et al*. 2003).

In 2001, Novaes *et al*. (2003) examining two orchards of yellow passionvine (*P. edulis* Sims f. *flavicarpa* Degener) in the State of Bahia, Brazil, reported 100% of plants infested with nymphs and adults of *B. tabaci*. All plants exhibited a bright yellow foliar mottling and distortion, and overall stunting associated with the presence of a begomovirus, the Passionflower little leaf mosaic virus (PLLMV). Field collected *B. tabaci* of unknown biotype from symptomatic plants were shown to transmit this virus to asymptomatic plants. In Puerto Rico, the B biotype has been shown to transmit Jatropha mosaic virus (JMV), which is also a begomovirus, between *Jatropha gossypifolia* L. and *J. multifida* L. plants and *Passiflora foetida* L., and *P. edulis* f.

flavicarpa (Brown *et al*. 1993, Brown & Bird 1996, Brown 2001).

This note describes the first record of the B biotype of *B*. *tabaci* colonizing passionvine in Brazil, and examines the differential colonization behavior of the B biotype from passionvine for nine *Passiflora* species under greenhouse conditions.

The following *Passiflora* species were established from cuttings by rooting them in soil in pots (2-4) in a greenhouse at the Departamento de Genética, Universidade de São Paulo, Piracicaba, São Paulo State, in 2006: *P*. *alata* Curtis, *P*. *amethystina* Mikan, *P*. *caerulea* L., *P*. *cincinnata* Mast., *P*. *coriacea* Juss., *P*. *edulis* f. *flavicarpa*, *P*. *foetida*, *P*. *morifolia* Mast., and *P*. *suberosa* L.. When the plants were approximately three to four months old they were naturally infested by transient *B*. *tabaci* of unknown origin. These whiteflies were identified as the B biotype of *B*. *tabaci* using well-established methodologies based on the mitochondria cytochrome oxidase I gene sequence (mtCOI) (Simon *et al*. 1994, Frohlich *et al*. 1999) and comparative analysis with sequences for *B*. *tabaci* available in the Arizona laboratory database (and deposited in the NCBI GenBank database). The whiteflies (n = 10) were identified as the B biotype, and shared 98-100% of their nucleotide identity with the Arizona B biotype (and over 20 other B biotype collections for which mtCOI sequences were available and used for routine molecular identification) (data not shown).

The number of plants of each species of *Passiflora* varied from two to four, and plants were randomly distributed in the greenhouse at the time of the infestation. Three leaves per plant, one each from the base, the middle, and the growing tip of the stem, were excised and transported to the laboratory to quantify the number of instars of each whitefly life stage.

The total number of eggs and nymphs on the adaxial side of each leaf were counted using a stereomicroscope, and the total leaf area was measured using a portable leaf area calculator, Li-Cor, model LI3000 A. The average number of eggs and nymphs per cm^2/per leaf were transformed with the function $\sqrt{x} + 0.5$. Data were analyzed with the General Linear Model (GLM), using the Statistical Analysis System (SAS). The means were compared using the Tukey test ($P = 0.01$).

The colonization preferences based on female oviposition and/or nymphal development for the B biotype of *B*. *tabaci* from passionvine on the different *Passiflora* species is summarized in Table 1. The most preferred species for oviposition and colonization was found to be the ornamental species *P*. *amethystina*, with an average of 7.69 and 8.54 nymphs and eggs per cm^2 of leaf, respectively. *B*. *tabaci* did not oviposit on *P*. *coriacea*, and only a few adults were found on the leaves of this species, suggesting that it may be poorly colonized by *B*. *tabaci*. *P*. *edulis* f. *flavicarpa* (the yellow passion fruit) and *P*. *alata* (the sweet passion fruit) supported only low levels of whitefly offspring, 0.057 and 0.069 nymphs per cm^2 of leaf, respectively, also suggesting that they are poorly colonized by *B*. *tabaci*. The absence of eggs on the leaves of the latter two species indicated that they were not preferred for oviposition. In Brazil, these two species account for all passion fruit production (97% and 3% respectively) (Instituto FNP 2007).

Table 1. Average number of nymphs and eggs of *Bemisia tabaci* biotype B per cm^2 of leaf for nine species of *Passiflora.*

Species	Nymph number/cm^{2z}	Egg number/ cm^2
P. amethystina	7.690 a	8.542 a
P. morifolia	3.431 ab	3.904 ab
P. cincinnata	2.821 ab	3.939 ab
P. caerulea	1.780 ab	1.814 ab
P. foetida	1.753 ab	3.828 a
P. suberosa	0.304 b	0.046 b
P. alata	0.069 b	0.000 b
P. edulis f. *flavicarpa*	0.057 b	0.000 b
P. coriacea	0.000 b	0.000 b
CV (%)	64.54	65.05

[z]Within columns, means followed by a common letter do not differ significantly.

The lack of colonization of *P*. *edulis* f. *flavicarpa* and *P*. *alata* by *B*. *tabaci* biotype B under greenhouse conditions might explain the low incidence of PLLMV in commercial yellow passion fruit orchards in Brazil (Moreira *et al*. 2006, unpublished data).

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