MELIA AZEDARACH EXTRACT AS AN ANTIFEEDANT TO *BEMISIA TABACI* (HOMOPTERA: ALEYRODIDAE)

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Melia azedarach (L.) is a tree of the family Meliaceae native to India and introduced to Brazil many years ago. The insecticidal property of meliaceous plants has been known for quite a long time (Kraus et al., 1987). Another plant of the same family, the neem tree, *Azadirachta indica*, is known for its insect antifeedant and/or insect growth regulation activity (Schumuterer, 1990).

Tests carried out under screen-house conditions showed that *M. azedarach* aqueous extract interfered with the transmission of bean golden mosaic virus (BGMV) by *Bemisia tabaci* (Genn.). The transmission efficiency of this virus by the vector was reduced by 95% in the acquisition or inoculation tests, although the extract had no insecticidal action. The extract interference was also observed under field tests, reducing transmission by 45-60% compared to the control plants (Nardo & Costa, 1990). These results were attributed to a phago-deterrent effect of the plant extract, although a toxic action on the *B. tabaci* was possible.

The purpose of the present study was to verify whether or not *M. azedarach* extract could affect feeding and colonization on bean plants by *B. tabaci*.

The tests were carried out under screen-house conditions at Campinas, State of São Paulo, Brazil. *B. tabaci* was collected from a colony reared on soybean plants in a screen-house in the same region. Test plant was the common bean, *Phaseolus vulgaris* L., cv. Carioca, with 2 primary leaves per plant and 2 plants per pot.

The extraction procedure was conducted using an aqueous cold infusion of equal parts of leaves and ripe fruits at the rate of 1:5 (w/v). Leaves and fruits were blended with water and maintained in a glass container for 24 h after which the infusion was filtered through a fine cloth and used for spraying. Two experiments were conducted with the extract.

The objective of the first experiment was to determine the mortality of *B. tabaci* caused by *M. azedarach* extracts. It consisted of 3 treatments with 3 replications at 3 different times. Each experiment consisted of 25 adult *B. tabaci* of uniform age (1 day) confined in a glass cage (12×8 cm) over a pot with 2 bean plants sprayed with *M. azedarach* aqueous extract (treatment 1); 2 bean plants sprayed with water (treatment 2); and no plants, just soil (treatment 3). The numbers of live insects was counted daily until the last one died.

The objective of the second experiment was to evaluate whether or not oviposition of *B. tabaci* would be affected by treating plants with *M. azedarach* extract. The experiment consisted of 2 treatments and 3 replicates. Each experimental unit consisted of 10 bean plants sprayed with *M. azedarach* extract (treatment 1) or water (treatment 2). Potted plants (with 2 primary leaves) were exposed to a dense population (more than 5×10^3) of *B. tabaci* adults reared on soybean plants. After 72 h the plants were moved to a different screen-house (all adult *B. tabaci* had been removed from the

TABLE 1. MORTALITY (%) OF ADULT *BEMISIA TABACI* UNDER DIFFERENT TREATMENTS.

	Mortality %[1]		
Treatments	48h	72h	96h
Bean plants sprayed with *M. azedarach* extract	70a	90a	100a
Bean plants sprayed with water	30b	40b	50b
No plant substrate	95a	100a	100a

[1]In each row, values followed by the same letters are not significantly different at 5% level (Tukey's test).

leaves). The numbers of "pupae" of *B. tabaci* on primary leaves were counted, and the adult emergence was evaluated 30-45 days later.

In the first experiment, rates of mortality of *B. tabaci* on plants sprayed with extracts were not significantly different from rates of mortality when *B. tabaci* was kept unfed (Table 1). However, those rates were significantly higher than the rates on plants sprayed with water. On those plants, some *B. tabaci* were still alive 10 days after the beginning of the experiment.

In the second experiment the number of "pupae" of *B. tabaci* on plants sprayed with *M. azedarach* aqueous extract was significantly lower than on plants sprayed with water (Table 2). Pupal development, however, was the same on both kind of plants.

The results obtained in the first experiment suggest a possible antifeedant action of the *M. azedarach* extract as the insects without food died at a similar rate. Studies of plants of the family Meliaceae have resulted in the isolation of many limonoids with insect antifeedant and insecticidal properties (Kraus & Cramer, 1981, Kraus et al, 1987). Volkonsky (1937) reported that leaf extracts of *M. azedarach* sprayed on other plants protected them against locust feeding. Similar results were observed in Brazil by Lepage et al. (1946). Nardo (1989) attributed a considerable reduction of the infection level of BGMV, a circulative virus in *B. tabaci*, to an antifeedant activity of *M. azedarach* on the vector. Also, Nardo & Costa (1990) demonstrated that the antifeedant effect of *M. azedarach* extract was not effective enough to prevent transmission of a non-circulative virus by *B. tabaci*, probably because it could not prevent probing of the leaves by the insect. This antifeeding action seems to be very specific to *B. tabaci* be-

TABLE 2. TOTAL NUMBER OF PUPAE OF *BEMISIA TABACI* ON PRIMARY LEAVES OF 30 BEAN PLANTS SPRAYED WITH *MELIA AZEDARACH* AQUEOUS EXTRACT.

	Number of Pupae[1]	
Test Number	Control Leaves	Sprayed Leaves
1	890a	401b
2	742a	384b
3	821a	418b

[1]In each row, values followed by the same letters are not statistically different at 5% level (Tukey's test).

cause Nardo(unpublished), observed that the transmission of two viruses (circulative and non-circulative) by *Myzus persicae* was not affected by *M. azedarach* extracts.

The results obtained in the second test indicate that *M. azedarach* extracts could have affected the number of eggs laid and the corresponding number of "pupae" produced, probably because of its antifeeding action. That could be explained by the fact that oviposition by *B. tabaci* occurs normally when the insect is feeding on the plant (Gamell, 1974).

The *M. azedarach* extract could interfere in field spread of BGMV directly by reducing feeding and, consequently, the transmission efficiency of this virus by the vector (Nardo, 1990) and indirectly by reducing the population of *B. tabaci*.

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SUMMARY

Tests conducted under glass-house conditions indicated that aqueous extracts of *Melia azedarach* applied on bean plant leaves interfere with longevity and development of immature stages of *Bemisia tabaci* (Genn.).That effect could reduce the transmission efficiency of bean golden mosaic virus by the vector.

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