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Effect of bean genotypes, insecticides, and natural products on the control of *Bemisia tabaci* (Gennadius) biotype B (Hemiptera: Aleyrodidae) and *Caliothrips phaseoli* (Hood) (Thysanoptera: Thripidae)

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ABSTRACT. Effect of bean genotypes, insecticides, and natural products on the control of *Bemisia tabaci* (Gennadius) biotype B (Hemiptera: Aleyrodidae) and *Caliothrips phaseoli* (Hood) (Thysanoptera: Thripidae). The influence of bean genotypes associated with neem oil as insecticide was evaluated to control *B. tabaci* (Gennadius) biotype B and *C. phaseoli* (Hood) during the wet season sowing. The experimental design used was the randomized block arrangement in a 4x4x3 factorial scheme, represented by genotypes, neem oil and insecticides respectively, with three replications. The genotypes Carioca, IAC Harmonia, IAC Centauro and Pérola were used. The evaluations were done at 14 and 42 days after seedling emergence, by counting *B. tabaci* biotype B eggs and nymphs and *C. phaseoli* nymphs in the genotypes leaf. Conclusion: The *B. tabaci* biotype B eggs and nymphs number were smaller in IAC Centauro and higher in IAC Harmonia. The tested genotypes were similarly infested by *C. phaseoli*. IAC Centauro and IAC Harmonia genotypes associated with neem oil (highlighting the full dose – 1%) provided lower number of whitefly eggs and thrips nymphs. Neem oil at the full dose also reduced whitefly nymph number. In the tested genotypes the insecticide provided reduction in the number of whitefly eggs and nymphs as well in the thrips nymphs, with increase in the recommend dose.

Keywords: *Bemisia tabaci* biotype B, *Caliothrips phaseoli*, *Phaseoli vulgaris*, resistance of plants.

RESUMO. Efeito de genótipos de feijoeiro, inseticida e produtos naturais no controle *Bemisia tabaci* (Gennadius) biotipo B (Hemiptera: Aleyrodidae) e *Caliothrips phaseoli* (Hood) (Thysanoptera: Thripidae). Avaliou-se a influência de genótipos de feijoeiro associado à aplicação de óleo de nim e inseticida no controle de *B. tabaci* (Gennadius) biótipo B e *C. phaseoli* (Hood) na época de semeadura "das águas". O delineamento experimental utilizados foi o de blocos casualizados dispostos em um esquema fatorial 4 x 3 x 3, representado por variedades, óleo de nim e inseticidas, respectivamente, com três repetições. Utilizaram-se os genótipos Carioca, IAC Harmonia, IAC Centauro e Pérola. As avaliações foram realizadas dos 14 aos 42 dias após a emergência das plantas, contando-se o número de ovos e ninfas de *B. tabaci* biótipo B e ninfas de *C. phaseoli* nos folíolos dos genótipos. Concluiu-se: o número de ovos e ninfas de *B. tabaci* biótipo B foi menor em IAC Centauro e maior em IAC Harmonia. Os genótipos testados foram igualmente infestados por *C. phaseoli*. IAC Centauro e IAC Harmonia associado ao óleo de nim e com destaque a dose cheia (1,0%), propiciaram menor número de ovos de mosca branca e de ninfas tripes, e o último deles atuou reduzindo o número de ninfas de mosca branca. Nos genótipos testados o inseticida proporcionou redução no número de ovos e ninfas de mosca branca e de ninfas de tripes, com incremento na dose recomendada.

Palavras-chave: *Bemisia tabaci* biótipo B, *Caliothrips phaseoli*, *Phaseolus vulgaris*, resistência de plantas.

Introduction

Brazil has important position in the world bean's (*Phaseolus vulgaris* L.) production since it is considered the biggest consumer, being this plant the main vegetal-protein source. The bean is a traditional culture that is getting more and more space in the agribusiness.

It is consumed practically in all Brazilian States, cultivated along the year and its production comes almost 100% from the national lands. Bean can suffer insect attack and other pests that affect production before and post harvest. The estimative of yield losses by pests attack is from 33 to 86% (YOKOYAMA, 1998).

Among several factors that can cause low productivity of beans in Brazil, insects are harmful from seedling to post harvest, where the stocking can be damaged by them (MAGALHÃES; CARVALHO, 1998). There are several pests but whitefly – *Bemisia tabaci* (Gennadius) biotype B (Hemiptera: Aleyrodidae) and thrips – *Caliothrips phaseoli* (Hood) (Thysanoptera:Thripidae) are prominent because they attack the beans' leaves.

Amid the reasons for the high whitefly incidence, the soybean planting field expansion (its preferential host), the longer sowing time, and the successive and phased cultivations due the center pivot irrigation use (VIEIRA et al., 1998) can be cited. Large losses in vegetables, beans, soybeans, peanuts, cotton, and several ornamental plants (LOURENÇÃO; NAGAI, 1994; FRANÇA et al., 1996) are related to this pest attack spread all over the country.

According to Costa and Carvalho (1960) and Yokoyama (1998) the main damage caused by whitefly in the beans is the transmission of golden mosaic virus (GMV). It is a golden and shinning-type mosaic, turning the beans plant color in to an intense and generalized yellow. Causes economic losses that may vary from 30 to 100%, depending on the cultivar, stage of the plant, the vector population, presence of alternative hosts and environmental conditions (FARIA et al., 1996).

Thrips is a polyphagous species and the higher occurrence period is between November and April (GALLO et al., 2002). When the attack is intense, leaves became yellowish and fall, sometimes remain silver dots in leaves and pods (BOIÇA JÚNIOR et al., 2005).

Although Prabhaker et al. (1985) cited that the insect biological and behavioral characteristics as fast development, high fecundity, and big dispersion capacity are factors that increase the resistance to commercial insecticides from different chemical groups (DITTRICH et al., 1990). Torres et al. (2006) checked that among several aqueous extracts tested, the one based in neem oil affected the development of *Plutella xylostella* (L.) in almost all its cycle. Due to the problems caused by insecticides in the agroecosystem, alternative methods to control pest have been studied, as the use of resistant varieties to whitefly (BOIÇA JÚNIOR et al., 2000a).

This study examined the interaction between bean genotypes with plant-extract used as insecticides and chemical insecticides to control *B. tabaci* biotype B and *C. phaseoli* during the wet season.

Material and methods

The experiment was installed and carried out from October 2007 and January 2008 during the wet season in a clay dark-red Oxisoil at Phytosanity Department experimental field, Faculdade de Ciências Agrárias e Veterinárias da Universidade Estadual Paulista (Unesp)-Jaboticabal, São Paulo State (Phytossanity Department Unesp-Jaboticabal, São Paulo State, Brazil).

Plant spacing was 0.50 m between lines, 12 plants per linear meter density. Seedling fertilization was 430 kg ha^{-1}, formula 4-14-8 (NPK).

The statistic design used was the randomized blocks under a 4 x 3 x 3 factorial scheme (genotypes vs. insecticide plants vs. commercial insecticides). The experiment had three replications and thirty-six treatments as follows: Carioca, IAC Harmonia, IAC Centauro and Pérola genotypes, all of them with and without neem oil application (0.0, 0.5, and 1.0%) and thiametoxan 250 WG (0.0, 75, and 150 g ha^{-1}).

Each plot had four lines, five meters length each, summing up 10 m^2 total area and 5 m^2 useful area. Spacing adopted was 0.50 m between lines, sowing fifteen seeds per linear meter, with thinning ten days later, letting twelve plants per linear meter.

Weed control was done chemically pre-planting by incorporation trifluralin 450 EC under 3 L ha^{-1} dose and thirty days after plant emergence a hoed was done.

The treatment applications were done weekly, from seven to fifty-three days after emergence (DAE), using a 40 lb pol^{-2} pressure manual sprayer, discharge of 400 L ha^{-1}, trying to reach mainly under leafs.

Evaluation started at 14 DAE and they were done weekly, up to 42 DAE. In each evaluation ten leafs were collected by plot. Using a stereoscope *B. tabaci* biotype B eggs and nymphs and *C. phaseoli* nymphs were checked. The leaves collected were situated in the middle of the plant because according Rossetto et al. (1974), this is the favorite place where the insect oviposits.

Data related to the average number of *C. phaseoli* nymphs were transformed in (x+0.5)1/2. All data were submitted to analysis of variance by F test. If data were significant, averages were compared by Tukey test at 5% probability.

Results and discussion

Analyzing the average number of eggs from *B. tabaci* biotype B among evaluated treatments, we observed significant differences among them at 14 and 28 DAE, with both periods presenting IAC Centauro less infested than IAC Harmonia. Boiça Júnior and Vendramim (1986), working with different genotypes of beans observed that the cycle from egg to adult of *B. tabaci*, was 1.8 times lower in the period of "water" compared to "dry". Regarding the neem oil doses, the full dose (1.0%) reduced the number of eggs, differing from the treatment control. To the insecticides, differences were observed at 35 DAE, where the full dose (150 g ha^{-1}) reduced the whitefly oviposition, differing from the other treatments. It is possible to verify a significant interaction between genotypes vs. insecticide and between neem oil at 14 and 28 DAE.

Table 1. Average number of eggs of *B. tabaci* biotype B by ten leaves in bean genotypes associated or not with neem oil and insecticidal. Jaboticabal, São Paulo State, 2008.

	Days after plant emergence[1]				
Genotypes (G)	14 days	21 days	28 days	35 days	42 days
IAC Harmonia	2.01 a	0.99 a	1.62 ab	2.17 a	1.76 a
IAC Centauro	1.22 bc	1.00 a	1.32 b	2.17 a	1.97 a
Pérola	0.97 c	0.87 a	1.61 ab	2.04 a	1.96 a
Carioca	1.43 b	1.03 a	1.96 a	2.34 a	2.09 a
F (G)	14.00**	0.88^{NS}	4.04*	0.44^{NS}	0.65^{NS}
Neem (N)					
Control	1.61 a	1.08 a	1.86 a	2.51 a	2.30 a
Half Dose	1.51 a	0.88 a	1.60 ab	1.98 a	1.91 ab
Full Dose	1.10 b	0.96 a	1.43 b	2.02 a	1.62 b
F (N)	6.85**	2.55^{NS}	3.77*	3.21^{NS}	5.62**
Insecticide (I)					
Control	1.57 a	1.08 a	1.69 a	2.26 ab	2.03 a
Half Dose	1.33 a	0.88 a	1.59 a	2.48 a	1.94 a
Full Dose	1.32 a	0.96 a	1.60 a	1.78 b	1.87 a
F (I)	1.97^{NS}	1.80^{NS}	0.22^{NS}	4.78*	0.31^{NS}
F (G x N)	6.72**	0.56^{NS}	3.48**	1.25^{NS}	1.58^{NS}
F (G x I)	3.50**	1.43^{NS}	2.37*	0.87^{NS}	1.31^{NS}
F (I x N)	0.97^{NS}	1.14^{NS}	0.87^{NS}	1.26^{NS}	0.60^{NS}
VC (%)	43.57	38.84	41.23	45.56	44.21

[1]Averages followed by the same letters do not differ statistically by Tukey test at 5% probability. Data transformed in $(x + 0.5)^{1/2}$.

Toscano et al. (2002) studying the oviposition of *B. tabaci* biotype B on tomato plants and Campos et al. (2005) in cotton plants observed that this pest prefers ovipositing in plants at younger stages. This is probably because the insect find chemical and morphological composition more favorable due to the plant age (WALKER; PERRING, 1994) and the stimuli involved between the insect and plant (LARA, 1991).

Through the unfolding of genotype vs. neem oil interaction in the evaluation of 14 and 28 DAE (Table 3) and considering the genotype effect into doses, we verified in general that IAC Centauro had less oviposition in the three doses tested related to other genotypes. To neem oil doses effect on the genotypes, the number of whitefly eggs observed was lower when neem oil dose was increased, mainly in the IAC Centauro and IAC Harmonia genotypes. Studying the *B. tabaci* biologic cycle in several bean genotypes Boiça Júnior and Vendramim (1986) concluded that Carioca cultivar was the one that grew under better conditions against *B. tabaci* and the higher incidence months were from November to March.

Table 2. Values of the unfolding analysis of the interaction between genotype versus neem oil and insecticidal versus genotypes, obtained from bean plants, at 14 and 28 days after plant emergence, for the average number of eggs of *B. tabaci* biotype B in ten leaflets. Jaboticabal, São Paulo State, 2008.

14 days after plant emergence (genotypes vs. neem oil)				
Genotypes	Control	Half dose (0.5%)	Full dose (1.0%)	F (G)
IAC Harmonia	2.66 aA	2.36 aA	1.02 bA	18.11**
IAC Centauro	1.80 aB	1.17 abB	0.70 bB	7.22**
Pérola	0.80 aC	1.02 aB	1.08 aAB	0.51^{NS}
Carioca	1.18 aBC	1.50 aB	1.61 aB	1.17^{NS}
F (N)	15.59**	8.53**	3.40*	
14 days after plant emergence (genotypes vs. neem oil)				
Genotypes	Control	Half dose (0.5%)	Full dose (1.0%)	F (G)
IAC Harmonia	1.81 aA	1.81 aA	2.41 aA	2.88^{NS}
IAC Centauro	1.69 aA	1.02 abB	0.95 bB	3.95*
Pérola	0.88 aB	0.99 aB	1.02 aB	0.12^{NS}
Carioca	1.91 aA	1.44 abAB	0.95 bB	5.53**
F (I)	5.21**	3.56*	12.32**	
28 days after plant emergence (genotypes vs. neem oil)				
Genotypes	Control	Half dose (0.5%)	Full dose (1.0%)	F (G)
IAC Harmonia	2.28 aA	1.47 bA	1.12 bB	7.04**
IAC Centauro	1.03 aB	1.72 aA	1.20 aAB	2.59^{NS}
Pérola	2.16 aA	1.28 bA	1.39 bAB	4.57*
Carioca	1.97 aA	1.91 aA	1.99 aA	0.03^{NS}
F (N)	6.41**	1.53^{NS}	3.08*	
28 days after plant emergence (genotypes vs. neem oil)				
Genotypes	Control	Half dose (0.5%)	Full dose (1.0%)	F (G)
IAC Harmonia	1.21 aB	1.94 aA	1.72 aAB	2.78^{NS}
IAC Centauro	1.51 aB	1.30 aA	1.14 aB	0.67^{NS}
Pérola	1.99 aB	1.49 aA	1.35 aB	2.28^{NS}
Carioca	2.04 aA	1.64 aA	2.19 aA	1.61^{NS}
F (I)	3.15*	1.44^{NS}	4.19**	

[1]Averages followed by the same letters do not differ statistically by Tukey test at 5% probability. Data transformed in $(x + 0.5)^{1/2}$.

Analyzing genotype vs. insecticides effect at 14 and 28 DAE, it is possible notice in general that IAC Centauro, Pérola and Carioca genotypes when under full and half doses there was a reducing tendency in the eggs number. To the doses into the genotypes effect noticed low influence in the oviposition, suggesting a lack of efficiency of the product against eggs.

Related to *B. tabaci* biotype B nymphs (Table 3), there are significant differences between genotypes at 28 and 35 DAE, when IAC Centauro presented a lower number of nymphs than IAC Harmonia and Carioca.

At 21 DAE checking the neem oil treatments under 0.5 and 1.0% concentration and at 35 DAE under 0.5% there were less infestations of *B. tabaci* biotype B where the infestation averages were 1.01 and 1.04 nymphs to the first evaluation and 1.87 to the second evaluation, being the higher ones the control treatment, 1.83 in the first evaluation and 2.49 in the second evaluation (Table 3).

When insecticide was sprayed (Table 3) was observed at 14 and 42 DAE differences between the evaluated doses, having less nymphs when half and full dose were used. These data evidence that the product used is efficient against nymphs, corroborating with Boiça Júnior et al. (2005) and Boiça Júnior et al. (2006) accounted that adding vegetal oil to insecticides there was good whitefly control in bean, as much in dry as in wet seasons.

By the interactions showed in Table 3 was observed a significant effect to genotypes vs. neem oil. Folding doses effect into genotypes (Table 4) in Control, Carioca was less infested than IAC Harmonia, while the other genotypes presented intermediate number of whitefly nymphs.

Table 3. Average number of nymph of *B. tabaci* biotype B by ten leaves in bean genotypes associated or not with neem oil and insecticidal. Jaboticabal, São Paulo State, 2008.

	Days after plant emergence				
Genotypes (G)	14 days	21 days	28 days	35 days	42 days
IAC Harmonia	1.27 a	1.35 a	1.40 ab	2.33 ab	1.19 a
IAC Centauro	1.42 a	1.32 a	1.31 b	1.77 b	1.59 a
Pérola	1.27 a	1.25 a	1.19 b	2.54 a	1.36 a
Carioca	1.32 a	1.39 a	1.94 a	2.16 ab	1.20 a
F (G)	0.37^{NS}	0.16^{NS}	4.51^{**}	4.43^{**}	2.75^{NS}
Neem (N)					
Control	1.38 a	1.83 a	1.60 a	2.49 a	1.33 a
Half Dose	1.27 a	1.01 b	1.26 a	2.25 ab	1.42 a
Full dose	1.31 a	1.14 b	1.52 a	1.87 b	1.26 a
F (N)	0.37^{NS}	11.56^{**}	1.75^{NS}	5.39^{**}	0.75^{NS}
Insecticide (I)					
Control	1.86 a	1.23 a	1.35 a	2.25 a	1.59 a
Half Dose	1.13 b	1.41 a	1.33 a	2.32 a	1.25 b
Full dose	0.98 b	1.34 a	1.71 a	2.03 a	1.17 b
F (I)	23.37^{**}	0.51^{NS}	2.51^{NS}	1.24^{NS}	5.26^{**}
F (G x N)	5.18^{**}	0.28^{NS}	2.13^{NS}	0.71^{NS}	0.88^{NS}
F (G x I)	0.74^{NS}	0.69^{NS}	1.52^{NS}	1.00^{NS}	1.56^{NS}
F (I x N)	2.35^{NS}	0.90^{NS}	2.48^{NS}	0.56^{NS}	0.12^{NS}
VC (%)	43.98	58.77	54.82	36.48	43.69

[1]Averages followed by the same low case letter in the line and capital letter in the column do not differ statistically by Tukey test at 5% probability. Data transformed in $(x + 0.5)^{1/2}$.

Table 4. Values of the unfolding analysis of the interaction between genotype versus neem oil, obtained from bean plants, at 35 days after plant emergence, for the average number of nymphs of *B. tabaci* in ten leaflets. Jaboticabal, São Paulo State, 2008.

Genotypes	Control	Half dose (0.5%)	Full dose (1.0%)	F (G)
IAC Harmonia	1.74 aA	0.93 bB	1.15 abA	4.63^{*}
IAC Centauro	1.54 aAB	1.21 aB	1.51 aA	0.89^{NS}
Pérola	1.28 aAB	0.97 aB	1.56 aA	2.32^{NS}
Carioca	0.98 bB	1.95 aA	1.02 bA	8.06^{**}
F (N)	2.85^{*}	5.97^{**}	1.91^{NS}	

[1]Averages followed by the same low case letter in the line and capital letter in the column do not differ statistically by Tukey test at 5% probability. Data transformed in $(x + 0.5)^{1/2}$.

Boiça Júnior et al. (2000a) evaluating the fertilization and insecticide effect in beans to control *B. tabaci* biotype B observed that IAPAR MD-806 and IAPAR MD-808 genotypes were less infected by whitefly nymphs from 21 to 35 DAE. Boiça Junior et al. (2005) evaluating vegetal oils associated to insecticides interaction observed that this combination was positive to control the pest and reduced the population from 7 to 42 DAE.

Lemos et al. (2003) evaluating the beans genotypes susceptibility to GMV verified an increase in the pest population in the genotypes without chemical treatment, and an increase of 87.5% when compared with the chemically treated genotypes. Boiça Júnior et al. (2000b) also obtained reduction in the pest population and the illness incidence using insecticide in the planting line.

The average number of *C. phaseoli* nymphs (Table 5) was similar in all evaluated genotypes in all treatments, suggesting all of them are susceptible to the insect. To nymphs average in the treatments with different neem oil concentrations, a significant difference was observed only at 35 DAE being the highest value observed in the control treatment, differing from the other treatments, evidencing the neem oil action against the insect.

The thiametoxan insecticide provided a reduction in the thrips nymphs number in all the evaluations (Table 5), increasing the efficiency in the full dose treatment (150 g ha^{-1}) characterizing a good control when related to the control treatment.

Among the interactions it is possible to register significance between genotypes vs. neem oil at 14 DAE and genotypes vs. insecticide at 14 and 42 DAE (Table 5). By the genotypes tested vs. neem oil interaction unfolding at 14 DAE (Table 5) we recorded the neem oil significant effect on the tested genotypes where the lower values of thrips nymphs number occurred at half and full doses to IAC Harmonia and IAC Centauro. To the neem oil effect on the genotypes of the control, we observed lower pest attack in the Carioca Genotype.

Table 5. Average number of nymphs of *C. phaseoli* by ten leaflets in genotypes of bean or not associated with oil and insecticide nin. Jaboticabal, São Paulo State, 2008.

	Days after plant emerging				
Genotypes (G)	14 days	21 days	28 days	35 days	42 days
IAC Harmonia	1. 24 a	1.71 a	0.93 a	1.29 a	1.22 a
IAC Centauro	1.28 a	1.79 a	1.22 a	1.55 a	1.56 a
Pérola	1.34 a	1.93 a	1.05 a	1.71 a	1.27 a
Carioca	1.42 a	1.79 a	1.29 a	1.83 a	1.42 a
F (G)	0.83^{NS}	0.38^{NS}	1.61^{NS}	2.20^{NS}	2.40^{NS}
Neem (N)					
Control	1.83 a	1.80 a	1.15 a	1.89 a	1.44 a
Half Dose	1.40 a	1.84 a	1.21 a	1.43 b	1.36 a
Full dose	1.18 a	1.79 a	1.01 a	1.46 b	1.31 a
F (N)	2.47^{NS}	0.01^{NS}	0.88^{NS}	3.66^{*}	0.63^{NS}
Insecticide (I)					
Control	1.66 a	2.31 a	1.61 a	2.13 a	1.62 a
Half Dose	1.31 b	1.60 b	0.90 b	1.38 b	1.15 b
Full dose	1.00 c	1.50 b	0.85 b	1.27 b	1.33 ab
F (I)	18.51^{**}	11.66^{**}	14.96^{**}	11.77^{**}	7.69^{**}
F (G x N)	3.77^{**}	1.18^{NS}	0.58^{NS}	1.09^{NS}	1.18^{NS}
F (G x I)	5.54^{**}	0.33^{NS}	1.17^{NS}	0.72^{NS}	4.82^{**}
F (I x N)	0.26^{NS}	0.17^{NS}	1.99^{NS}	0.80^{NS}	1.60^{NS}
VC (%)	34.78	43.11	58.19	50.91	37.39

[1]Averages followed by the same low case letter in the line and capital letter in the column do not differ statistically by Tukey test at 5% probability. Data transformed in $(x + 0.5)^{1/2}$.

To the interactions genotypes vs. insecticides at 14 and 42 DAE (Table 6) we observed that in general the more the insecticide dose, the smaller the insect numbers in the tested genotypes. Between these and the control, again, the lower index was verified to genotype Carioca.

Table 6. Values of the unfolding analysis of theinteraction between genotypes versus neem oil and insecticidal versus genotypes, obtained from bean plants, at 14 and 42 days after plant emergence, for the average number of nymphs of *C. phaseoli* in ten leaflets. Jaboticabal, São Paulo State, 2008.

14 days after plant emergence (genotypes vs. neem oil)				
Genotypes	Control	Half dose (0.5%)	Full dose (1.0%)	F (G)
IAC Harmonia	1.43 aAB	1.39 abA	0.90 bB	3.78^{*}
IAC Centauro	1.72 aA	1.11 bA	0.99 bB	6.53^{**}
Pérola	1.22 aAB	1.41 aA	1.40 aB	0.48^{NS}
Carioca	1.15 bB	1.68 aA	1.44 abA	3.00^{*}
F (N)	2.82^{*}	2.26^{NS}	3.30^{*}	

14 days after plant emergence (genotypes vs. insecticides)				
Genotypes	Control	Half dose (75 g ha $^{-1}$)	Full dose (150 g ha^{-1})	F (G)
IAC Harmonia	1.43 aA	1.28 aB	1.01 aA	1.92^{NS}
IAC Centauro	1. 79 aA	0.87 bB	1.17 bA	9.16^{**}
Pérola	1.45 aA	1.88 aA	0.70 bA	15.01^{**}
Carioca	1.95 aA	1.22 bB	1.10 bA	9.04^{**}
F (I)	2.77^{NS}	7.37^{**}	1.78^{NS}	

42 days after plant emergence (genotypes vs. insecticides)				
Genotypes	Control	Half dose (75 g ha $^{-1}$)	Full dose (150 g ha^{-1})	F (G)
IAC Harmonia	1.47 aB	1.14 aA	1.05 aB	1.70^{NS}
IAC Centauro	2.22 aA	1.38 bA	1.09 bB	11.69^{**}
Pérola	1.47 aB	1.07 aA	1.27 aB	1.38^{NS}
Carioca	1.32 bB	1.01 bA	1.93 aA	7.38^{**}
F (I)	5.51^{**}	0.89^{NS}	5.64^{**}	

[1]Averages followed by the same low case letter in the line and capital letter in the column do not differ statistically by Tukey test, at 5% probability. Data transformed in $(x + 0.5)^{1/2}$.

Boiça Júnior et al. (2008) studying the interaction of genotypes and insecticides to control *C. phaseoli* in the wet season verified satisfactory index in the pest control at 25, 32, 39 and 46 days after plant emergence in genotypes sprayed with insecticides, resulting in low average number of *C. phaseoli* nymphs.

Conclusion

The number of eggs and nymphs of *B. tabaci* biotype B was lower in IAC Centauro and higher in IAC Harmonia. The genotypes if are on the experiment were the some infestation for *C. phaseoli*. IAC Centauro and IAC Harmonia associated to neem oil, highlighting the ful dose (1.0%) provided lower whitefly and thrips eggs' number being that the last one acted reducing the whitefly nymphs' number. In the tested genotypes the insecticide provided reduction in the whitefly eggs and nymphs thrips nymphs' number, with increment in the recommended dose.

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