EFFECT OF NEW INSECTICIDE (SPIROTETRAMAT) IN MIXTURE WITH NEONICOTINOID ON THE CONTROL OF APHIDS, APHIS GOSSYPII (HEMIPTERA: APHIDIDAE), IN COTTON

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Abstract

The increasing search for safer alternatives for pests control, which are less aggressive for the environment, has brought a significant development of news insecticides, with possibilities of use in agricultural pest management and contributing to a safer and more efficient way of pest control. The objective of this work was to evaluate in field conditions the effect of the new chemical molecule (spirotetramat) of the subclass tetramic acid insecticides (chemical group ketoenols), applied in mixture with neonicotinoid (imidacloprid) in cotton, on the control of the aphid, *Aphis gossypii*. The experiment was carried out with DeltaOpal cultivar, using the design of randomized blocks, with 6 treatments and 4 replicates. Plot size was 7 rows by 10m length ($63m^2$). The treatments consisted of one foliar application: spirotetramat + imidacloprid (Movento Plus) + methyled soy oil at 0.25%v/v (Aureo) at the doses of 96, 120 and 144 g a.i./ha, spirotetramat + imidacloprid (Movento Plus) at the dose of 120 g a.i./ha, acetamiprid (Mospilan) at the dose of 20 g a.i./ha and control. Evaluations were conducted at 0, 1, 3, 7 and 10 days after application, by counting of the number of aphids (apterous and winged forms) in 10 plants per plot. The analysis of the results showed that the insecticide spirotetramat, applied in mixture with imidacloprid, associated with methyled soy oil, was efficient on the control of the cotton aphid, being viable as a part of the cotton aphid management

Introduction

Cotton crop is cultivated in more than seventy countries worldwide. The main purpose of cotton production is related to the need of fibers and seeds. Currently, cotton crop in Brazil occupies an area of approximately 900 thousand hectares. The central-west region is responsible for 50.48% of the national production of cottonseed, followed by the southeast region with 29.71% and the south with 14.24%.

The modern agriculture not more admits the use of chemical products of broad-spectrum action that usually cause undesirable effects to the agricultural ecosystem as resurgence, change of the status of secondary pests for primary, besides the impact to the environment with intoxication problems in animals and human.

Due to the great amount of pests attacking cotton crop that require the adoption of rational management by the growers, only highly professionalized growers were able to continue cultivating cotton. The intensity of aphid attack on cotton crop has increased each year and, actually, it is one of the main pests attacking cotton crop on Brazilian Cerrado, where cultivars susceptible to the viruses transmitted by the species are planted. Cotton aphid normally appears at the initial stage of the crop, when the plants are 20-cm height approximately. They are small in size and live under the leaves and new sprouts of the plants where its suck the sap. Cotton aphid has a high reproduction potential, which in the Brazilian climate exclusively occurs by parthenogenesis thelytokous, being both the winged and the apterous forms constituted by larviparous females. On cotton, damages caused by the aphid can reach approximately 44%, considering the qualitative and quantitative losses. The main problem of aphid occurrence is due to the transmission of the virus that causes diseases in the plants, as the mosaic, which is responsible for more severe symptoms and greatly reduces the yield. This virus disease can occur in all development phases of the plants, impeding the growth and can even cause total loss of yield.

The current technological advancements on the chemical area have provided the introduction of safer and more adequate insecticide molecules to be used on agriculture, contributing to a more rational management of pests control and safety to growers.

Spirotetramat is a new insecticide belongs to the subclass of tetramic acid insecticides (chemical group Ketoenols). The mode of action is by the inhibition of an enzyme in the lipid metabolism. Spirotetramat is a new systemic leaf insecticide are its efficacy against a broad spectrum of sucking insects and its suitability for use on all types of crops The objective of this work was to evaluate in field conditions the effect of the insecticide spirotetramat, applied in mixture with imidacloprid, in cotton, on the control of the aphid, *Aphis gossypii.*

Materials and Methods

The experiment was installed in field conditions at the Experimental Farm, belonging to the campus of Unesp of Ilha Solteira, located in the municipal district of Selvíria/MS/Brazil, during the month of February/2007. The experiment was conducted with DeltaOpal cultivar, using the design of randomized blocks, with 6 treatments and 4 replicates. Each plot was formed by 7 rows by 10m length ($63m^2$), at the spacing of 0.9m and density of 12 plants/m. The fertilizer used at planting was NPK formula 4-18-12 + micronutrients, at the dose of 450 kg/ha. Table 1 describes the treatments and doses used. The application of each treatment was made just one time by foliar spray, using a volume of 160 L/ha. The evaluations seeking to verify the effect of the treatments on the mortality of aphids. The evaluates were made to the 0, 1, 3, 7 and 10 days after application, by counting of the number of aphids (apterous and winged forms) in 10 plants per plot. The obtained data were submitted to the analysis of the variance through the test F, comparing the averages by the test of Duncan (5%).

Table 1. Treatments used on experiment. Generic name, trade name, formulation and doses of the insecticides.

Generic name	Trade name	formulation	g a.i./ha	c.p./ha
1. Control	Control	--	--	--
2. acetamiprid	Mospilan	SP (200 g a.i./kg)	20	100 g
3.(spirotetramat+imidacloprid) + methyled soy oil	Movento Plus + Aureo 0.25%v/v	SC (120g + 360 g a.i./L)	96	200 ml
4.(spirotetramat+imidacloprid) + methyled soy oil	Movento Plus + Aureo 0.25%v/v	SC (120g + 360 g a.i./L)	120	250 ml
5.(spirotetramat+imidacloprid) + methyled soy oil	Movento Plus + Aureo 0.25%v/v	SC (120g + 360 g a.i./L)	144	300 ml
6.spirotetramat + imidacloprid	Movento Plus	SC (120g + 360 g a.i./L)	120	250 ml

Results and Discussion

The analysis of the results at the evaluations of aphid control (Table 2 and Figure 1) showed that until 10 days after application, the treatments with spirotetramat + imidacloprid at the doses of 120 and 144 g a.i./ha, applied whit addition of 0.25% v/v of methyled soy oil, presented means efficacies superiors to 82%. The standard treatment (acetamiprid) and spirotetramat + imidacloprid at the dose of 120 g a.i./ha, without addition of oil, its did not significantly differ from the treatments with spirotetramat + imidacloprid at the doses of 120 and 144 g a.i./ha, applied whit addition of 0.25% v/v of methyled soy oil, however its means efficiencies were inferior.

Table 2. Effect of spirotetramat + imidacloprid on the control of the cotton aphids, *Aphis gossypii*. Mean number of aphids and efficiency percentage (%E) of each treatment at 0, 1, 3, 7 and 10 days after application. Selvíria /MS/ Brazil. February/2007.

Treatments and doses (g a.i../ha)		Pre-evaluate	1 daa		3 daa		7 daa		10 daa	
		aphids	aphids	%E	aphids	%E	aphids	%E	aphids	%E
1. Control	--	846 a	284 a	--	325 a	--	283 a	--	298 a	--
2. acetamiprid	20	907 a	52 b	82	24 b	93	21 b	93	74 b	75
3. spirotetramat + imidacloprid*	96	828 a	65 b	77	60 b	82	46 b	84	88 b	70
4. spirotetramat + imidacloprid*	120	1104 a	54 b	81	58 b	82	36 b	87	60 b	80
5. spirotetramat + imidacloprid*	144	1118 a	50 b	82	24 b	93	30 b	89	51 b	83
6. spirotetramat + imidacloprid	120	864 a	130 a	54	72 b	78	46 b	84	79 b	73

* methyled soy oil at 0.25%v/v
daa: days after application.
Means followed by the same letter are not significantly different (Duncan, p=0.05)

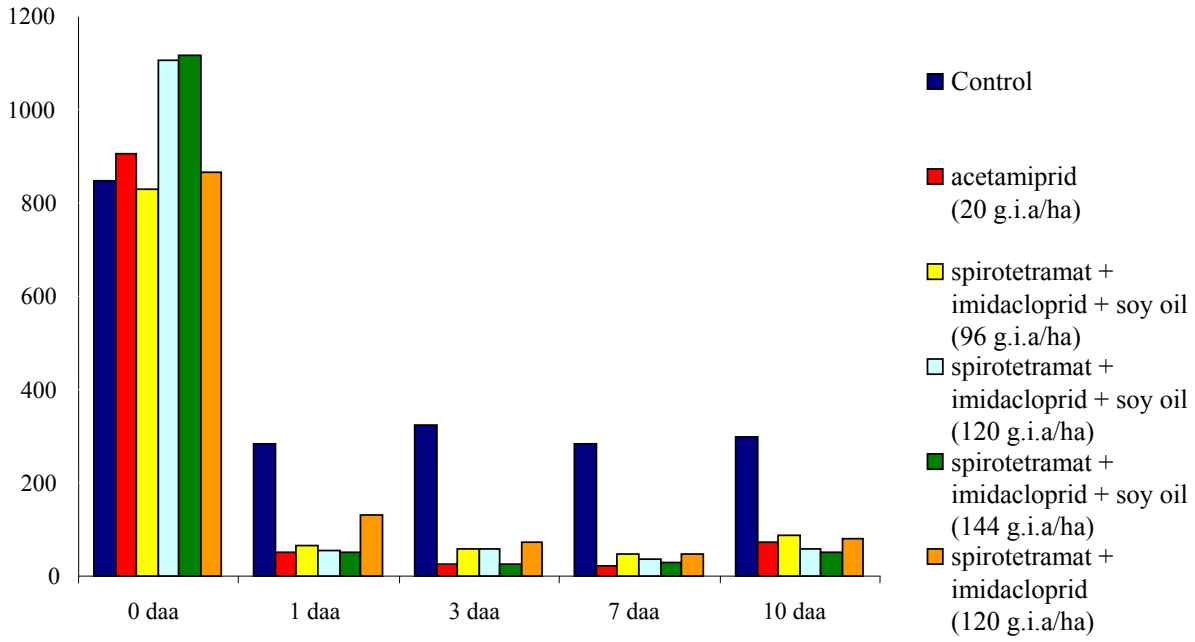

Figure 1. Effect of spirotetramat + imidacloprid on the control of the cotton aphids, *Aphis gossypii*. Number of aphids/treatment at 0, 1, 3, 7 and 10 days after application (daa). Selvíria/MS//Brazil. February/2007.

Disclaimer

Mention of a trade name or specific equipment does not constitute a guarantee or warranty by the USDA or Brazilian government and not imply its approval to the exclusion of other products that may suitable.

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