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**Research Article**

# Management of *Rotylenchulus reniformis* in soybean cultivation positively impacts the yield of cotton grown in succession[1]

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## ABSTRACT

The *Rotylenchulus reniformis* nematode efficiently multiplies in soybean roots, thereby increasing the inoculum in soils subsequently cultivated with cotton. This study aimed to evaluate the effect of using nematode-resistant soybean cultivars, combined with chemical, phytochemical or biological nematicides, on the soil population of the nematode, as well as the yield of cotton grown in succession to soybean. Two experiments were conducted in naturally infested areas, employing a factorial design (cultivars × nematicides). There was a reduction in the soil population density of *R. reniformis* due to cultivating the nematode-resistant soybean variety, with positive repercussions on the yield of cotton grown in succession to soybean. No significant effects of chemical, phytochemical or biological nematicides were observed on *R. reniformis* or cotton yield following the cultivation of the nematode-resistant soybean.

KEYWORDS: *Gossypium hirsutum*, *Glycine max*, reniform nematode, resistant cultivars, nematicides.

## RESUMO

O manejo de *Rotylenchulus reniformis* na cultura da soja impacta positivamente na produtividade do algodão cultivado em sucessão

O nematoide *Rotylenchulus reniformis* se multiplica eficientemente nas raízes da soja, aumentando o inóculo em solos cultivados subsequentemente com algodão. Objetivou-se avaliar o efeito do uso de cultivares de soja resistentes ao nematoide, combinado com nematicidas químicos, fitoquímicos ou biológicos, na população do nematoide no solo e na produtividade do algodão cultivado em sucessão à soja. Dois experimentos foram conduzidos em áreas naturalmente infestadas, empregando-se delineamento fatorial (cultivares × nematicidas). Houve redução na densidade populacional de *R. reniformis* no solo devido ao cultivo da variedade de soja resistente a nematoides, com repercussões positivas na produtividade do algodão cultivado em sucessão. Não foram observados efeitos significativos dos nematicidas químicos, fitoquímicos ou biológicos sobre *R. reniformis* ou sobre a produtividade do algodão, quando cultivado após a soja resistente ao nematoide.

PALAVRAS-CHAVE: *Gossypium hirsutum*, *Glycine max*, nematoide reniforme, cultivares resistentes, nematicidas.

## INTRODUCTION

Cotton (*Gossypium hirsutum* L.) cultivation is practiced in tropical regions worldwide and represents an important and growing economic activity. In Brazil, during the 2023/2024 crop season, 1.94 million hectares were cultivated, with approximately 91 % located in the states of Mato Grosso and Bahia (Abrapa 2024). In Mato Grosso, Brazil's largest cotton-producing state, about 83 % of the cotton is grown as a second crop, planted in January or February, immediately following the soybean harvest (IMEA 2024).

The growth and production of cotton in various producing regions are negatively affected by the parasitism exerted by plant nematodes, among which the reniform nematode (*Rotylenchulus reniformis* Linford & Oliveira) stands out (Davis et al. 2018).

In Brazil, most cotton is sown immediately after the soybean harvest, heightening the problems caused by the reniform nematode (Machado 2022b), which is the main nematode species in traditional cotton production areas, causing considerable damage to the crop (Galbieri et al. 2016). *R. reniformis* can parasitize and multiply very effectively in soybean plants, leaving high populations for the subsequent

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cotton crop, often causing damage and yield losses (Lamas et al. 2016).

Rotation with resistant crops is currently the primary option for controlling the reniform nematode. However, the prevailing cotton production model, based on the soybean-cotton sequence, precludes the adoption of crop rotation. In addition, the lack of commercial cotton cultivars resistant to *R. reniformis* (Robinson 2002, Davis & Stetina 2016) has long meant that one of the only management options was based on the use of chemical nematicides, primarily those based on Terbufos. New chemical, microbiological and phytochemical nematicides have recently been developed (Machado 2022a, Agrofit 2025) as potential alternatives for managing the nematode (Machado 2022b).

Unlike cotton, although in limited numbers, there are commercial soybean cultivars which exhibit good resistance to *R. reniformis* (Silva et al. 2021). Hypothetically, if these cultivars were grown before cotton planting in areas infested by the reniform nematode, it might be possible to reduce the nematode population density in the soil, benefiting the cotton grown after soybean. To test this hypothesis, experiments were established in areas naturally infested with the reniform nematode, aiming to evaluate the impact of using soybean cultivars resistant to *R. reniformis* combined or not with the use of chemical, microbiological or phytochemical nematicides on the nematode population density in the soil and the damage caused to the cotton crop.

## MATERIAL AND METHODS

Two field experiments were conducted in areas naturally infested with 505 and 1,087 *R. reniformis* per 200 cc of soil, respectively in the municipalities of Sapezal and Pedra Preta, both in the Mato Grosso state, Brazil, from October 2022 to August 2023.

The experiments consisted of planting two soybean cultivars, one resistant and the other susceptible to *R. reniformis*, treated or not with chemical, phytochemical or biological nematicides (Tables 1 and 2), followed by the planting of a single cotton cultivar, susceptible to the nematode, treated or not with the same nematicides. The susceptible cultivar and nematicides were different in the two experiments.

The experiments followed a completely randomized block design arranged in a factorial scheme (soybean cultivars x nematicides) with four replications. The plots consisted of eight soybean rows spaced at 0.45 m, followed by four cotton rows spaced at 0.90 m, each 50 m long, totaling 180 m². Soil fertilization followed the local recommendation for soybean and cotton production.

Both experiments evaluated the soil populations of *R. reniformis* at the beginning and during crop development, as well as the yields of soybean grains and seed cotton. Data were submitted to analysis of variance (Anova) and, when statistically different, the means among cultivars were compared using the F test, and the means of the nematicide treatments were compared by the Tukey test (5 %).

In the experiment 1 (Sapezal), seeds of the M 7601 and TMG 2776 IPRO soybean cultivars, respectively susceptible and resistant to *R. reniformis*, treated with 120 g of Thiamethoxam, 54 g of Cyantraniliprole and 2.5 g of Fludioxonil per 100 kg of seeds, and inoculated with *Bradyrhizobium* sp., were sown on October 13, 2022. The nematicide treatments listed in Table 1 were applied at sowing. Plant emergence occurred on October 19, 2022.

At sowing and at 40 and 70 days after emergence (DAE), soil samples were collected to determine the population density of *R. reniformis*. For sampling, three composite soil samples were collected in each plot, each consisting of five soil cores (subsamples) in a V-shaped pattern, at a depth of 0-0.2 m, using a hoe. The extraction of nematodes followed the method described by Jenkins (1964).

At the end of the soybean cycle (February 09, 2023), the grain yield (kg $ha^{-1}$) was estimated by harvesting the two central rows of each plot and adjusting the measured weight to 13 % of moisture.

On February 11, 2023, immediately after the soybean harvest, the IMA 5801 B2RF cotton cultivar was sown in all plots. The seeds were treated with 360 g of Thiamethoxam, 22.5 g of Azoxystrobin, 11.2 g of M-Metalaxyl and 3.7 g of Fludioxonil per 100 kg of seeds. The same nematicide treatments used in soybean (Table 1) were also applied during cotton sowing. Plant emergence occurred on February 16, 2023.

The population density of *R. reniformis* in the soil was evaluated at sowing and at 40 and 70 DAE, following the same methodology previously described for the soybean crop. On August 7, 2023, seed cotton was harvested from the usable area of

Table 1. Nematicide treatments in soybean and cotton crops in the experiment 1 (Sapezal, Mato Grosso state, Brazil).

| Treatment | Trademark | Active ingredient | Dose | Application form |
|---|---|---|---|---|
| 1 | Control | - | - | - |
| 2 | Nemat Stellus + Pardela* | *Purpureocillium lilacinum* strain URM 7661 (minimum 1 x $10^7$ CFU $g^{-1}$) 10.0 g $kg^{-1}$ (1 % m/m) *Pochonia chlamydosporia* strain URM 8121 (minimum of 1 x $10^7$ CFU $g^{-1}$) 35.0 g $kg^{-1}$ (3.5 % m/m) + *Trichoderma harzianum*, strain URM 8119 (minimum 5 x $10^8$ CFU $g^{-1}$) 50 g $kg^{-1}$ (5 % m/m) *Trichoderma asperellum*, strain URM 8120 (minimum 5 x $10^8$ CFU $g^{-1}$ c.p.) 50 g $kg^{-1}$ (5 % m/m) *Bacillus amyloliquefaciens*, strain CCT 7901 (minimum 5 x $10^8$ CFU $g^{-1}$ c.p.) 2 g $kg^{-1}$ (0.2 % m/m) | 50 + 30 g $ha^{-1}$ | In furrow |
| 3 | Tymirium | Ciclobotrifluran | 40 mL $ha^{-1}$ | Seed treatment |
| 4 | Verango Prime | Fluopiram (500 g $L^1$) | 300 mL $ha^{-1}$ | In furrow |
| 5 | Vigga** | *Allium sativum* | 100 mL $ha^{-1}$ | In furrow |
| 6 | Counter 150G | Terbufos (150 g $kg^{-1}$) | 20 kg $ha^{-1}$ | In furrow |

* Supplemented with MOSS (organomineral fertilizer) at the rate of 150 g $ha^{-1}$. ** Supplemented with Biomex Plus [a bioactivator formulation based on copper, zinc, sulfur, potassium and *Bacillus amyloliquefaciens* (*B. velezensis*) CNPSo 4254 (FZB 42)] at the rate of 100 mL $ha^{-1}$ and Primer Bio Zn (a formulation with high concentration of zinc and bioactive carbohydrates) at the rate of 50 mL $ha^{-1}$.

the plots, and the seed cotton yield estimated in kg $ha^{-1}$.

The experiment 2 (Pedra Preta) followed the same basic procedures as in the experiment 1, with some particularities: the susceptible M 7601 soybean cultivar was replaced by BMX Desafio RR. The soybean cultivars were sown on October 23, 2022. Seeds were treated with 120 g of Thiamethoxam, 36 g of Cyantraniliprole and 2.5 g of Fludioxonil per 100 kg of seeds. Nematicide treatments (Table 2) were applied at sowing. Plant emergence occurred on October 28, 2022, and harvest on February 6, 2023.

On February 19, 2023, the susceptible TMG 21 GLTP cotton cultivar was sown. The seeds were treated with 120 g of Thiamethoxam, 22.5 g of Azoxystrobin, 11.2 g of M-Metalaxyl and 3.7 g of Fludioxonil per 100 kg of seeds. The nematicide treatments (Table 2) were applied in the cotton planting furrow. Seed cotton was harvested on August 23, 2023.

Table 2. Nematicide treatments used in soybean and cotton crops in the experiment 2 (Pedra Preta, Mato Grosso state, Brazil).

| Treatment | Trademark | Active ingredient | Dose | Application form |
|---|---|---|---|---|
| 1 | Control | - | - | - |
| 2 | Nemat Stellus + Pardela* | *Purpureocillium lilacinum* strain URM 7661 (minimum of 1 x $10^7$ CFU $g^{-1}$) 10.0 g $kg^{-1}$ (1 % m/m) *Pochonia chlamydosporia* strain URM 8121 (minimum of 1 x $10^7$ CFU $g^{-1}$) 35.0 g $kg^{-1}$ (3.5 % m/m) + *Trichoderma harzianum*, strain URM 8119 (minimum 5 x $10^8$ CFU $g^{-1}$) 50 g $kg^{-1}$ (5 % m/m) *Trichoderma asperellum*, strain URM 8120 (minimum 5 x $10^8$ CFU $g^{-1}$) 50 g $kg^{-1}$ (5 % m/m) *Bacillus amyloliquefaciens*, strain CCT 7901 (minimum 5 x $10^8$ CFU $g^{-1}$) 2 g $kg^{-1}$ (0.2 % m/m) | 50 + 30 g $ha^{-1}$ | In furrow |
| 3 | Verango Prime | Fluopiram (500 g $L^{-1}$) | 300 mL $ha^{-1}$ | In furrow |
| 4 | Onix + Lalnix Resist | *Bacillus methylotrphicus* UFPED 20 (minimum of 1 x $10^9$ CFU $mL^{-1}$) 15 g $L^{-1}$ + *Trichoderma endophyticum* strain IBCB 56/12 (1 x $10^{10}$ viable conidia g) 320 g $kg^{-1}$ | 200 mL $ha^{-1}$ + 100 g $ha^{-1}$ | In furrow |

* Supplemented with MOSS (organomineral fertilizer) at the rate of 150 g $ha^{-1}$.

## RESULTS AND DISCUSSION

The effect of soybean cultivars on the population density of the reniform nematode during the experiment 1 is presented in Figure 1. Evaluations at 40 and 70 days after emergence - DAE (November 11, 2022, and December 30, 2022) of soybean indicated differences in the nematode population, which was significantly lower in the soil cultivated with the TMG 2776 cultivar, resistant to *R. reniformis*. This effect did not persist in a pronounced way during the cotton crop, as only at 40 DAE (March 30, 2023) a lower nematode population was observed in plots previously cultivated with TMG 2776 soybean.

Similarly to what was observed in the experiment 1, the effect of using a soybean cultivar (TMG 2776) resistant to *R. reniformis* on the nematode population density in the soil was observed in the experiment 2, but with the differences in nematode populations maintained throughout the cotton crop grown in succession to susceptible/resistant soybean varieties (Figure 2).

Few studies have evaluated the impact of resistant cultivars on soil nematode populations under field conditions. Our results confirm those obtained by Davis et al. (2003), in which, in three out of four experiments conducted in naturally infested fields in Georgia, USA, there was a significant reduction (80.04, 96.00 and 91.09 %) in the *R. reniformis* population in the soil after the cultivation of Centenial soybean, highly resistant to the nematode. In a similar study, carried out by Asmus & Richeti (2010) in naturally infested soil in the Mato Grosso do Sul state, Brazil, it was observed that, in one year of cultivation of M-Soy 8001 soybean, resistant to *R. reniformis*, prior to cotton cultivation, there was a 77.64 % reduction in the nematode population in the soil. Similarly to what was observed in the experiment 1, Davis et al. (2003) and Asmus & Richeti (2010) observed no differences in the nematode population in the soil during cotton cultivation, regardless of whether the previously planted soybean cultivar was resistant or susceptible. However, reducing the soil population during the cultivation of a nematode-resistant soybean variety resulted in benefits for the yield of cotton planted subsequently.

In the experiment 1, during the soybean crop, regardless of the cultivar, nematicide effects on the soil population of *R. reniformis* were observed only at 70 DAE, when the Terbufos treatment differed significantly from the untreated control, but was similar to all other nematicide treatments. However, this difference did not persist until the sowing of cotton, when all the treatments were similar to the untreated control. At 40 DAE of cotton, a significant interaction was observed between the soybean cultivar grown in the season preceding cotton and the nematicide treatments. In plots where the susceptible soybean cultivar (M 7601) had been grown, the *R. reniformis* population was significantly higher in those treated with Cyclobutrifluram. In plots grown

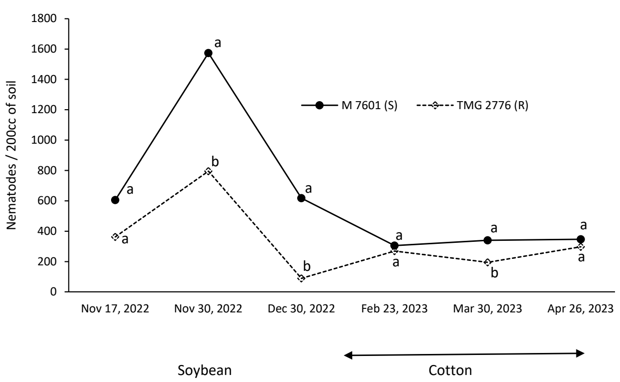


Figure 1. Number of *Rotylenchulus reniformis* nematodes in 200 cc of soil during the sequential cultivation of soybean and cotton according to the soybean cultivars: M 7601 (susceptible) and TMG 2776 (resistant), in the experiment 1 (Sapezal, Mato Grosso state, Brazil). Values followed by the same letter at each date do not differ according to the F test (p > 0.05).

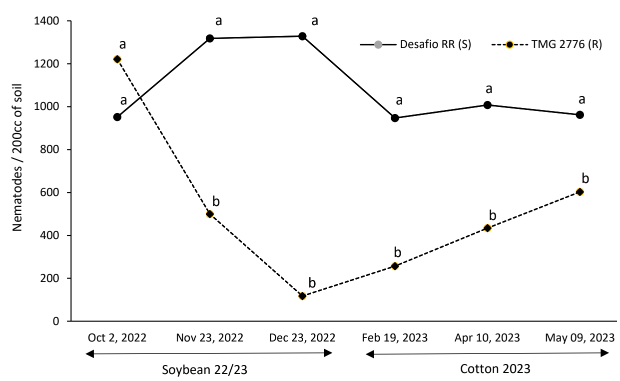


Figure 2. Number of *Rotylenchulus reniformis* nematodes in 200 cc of soil during the sequential cultivation of soybean and cotton according to the soybean cultivars: BMX Desafio (susceptible) and TMG 2776 (resistant) in the experiment 2 (Pedra Preta, Mato Grosso state, Brazil). Values followed by the same letter at each date do not differ according to the F test (p > 0.05).

with the resistant soybean cultivar (TMG 2776), the population of *R. reniformis* in the treatments with Terbufos and Fluopyram was significantly lower than in all others. At 70 DAE of cotton, no significant differences were observed among the treatments (Table 3).

In the experiment 2, the effect of the nematicide treatments during soybean cultivation was highly variable. At 40 DAE of soybean, there was a significant interaction between cultivars and nematicides. The *R. reniformis* population in plots cultivated with BMX Desafio soybean (susceptible to the nematode) treated with Fluopyram was significantly lower than in plots treated with biological nematicides containing *B. methyllotrophicus* and *T. endophyticum*. However, both were similar to the untreated control. At the same time, no differences were observed among the treatments as far as TMG 2776 was cultivated. At 70 DAE, a lower soil density of *R. reniformis* was observed in the treatment with biological nematicides containing *P. lilacinum*, *P. clamydosporia*, *T. harzianum*, *T. asperellum* and *B. amylolichefaciens*. This treatment differed significantly from the control, although statistically equivalent to the other nematicides. No effect of the nematicides on the *R. reniformis* population density evaluations was observed during the cotton cultivation (Table 4).

For many years, the management of *R. reniformis* in cotton has been primarily based on chemical nematicides, predominantly Aldicarb or Terbufos (Asmus et al. 2015). New chemical, microbiological and phytochemical nematicides have been recently developed and registered (Machado 2022a, Agrofit 2025) for nematode management (Machado 2022b). However, the effectiveness of the reniform nematode control in cotton grown in succession to soybean has not been fully established, as observed in the present study.

Specifically regarding biological nematicides, Machado (2022a) and Dias-Arieira et al. (2023) compiled results from several experiments

Table 3. Number of *Rotylenchulus reniformis* nematodes in 200 cc of soil during the sequential cultivation of soybean and cotton at planting (Pi) and at 40 and 70 days after crop emergence (DAE), according to the nematicide treatments in the experiment 1 (Sapezal, Mato Grosso state, Brazil).

| Treatments | Soybean | | | Cotton | | | |
|---|---|---|---|---|---|---|---|
| | Pi | 40 DAE | 70 DAE | Pi | 40 DAE** | | 70 DAE |
| | | | | | M 7601 | TMG 2776 | |
| 1 | 1,119 a* | 1,786 a | 718 a | 271 ab | 274 b | 527 a | 354 a |
| 2 | 484 a | 1,421 a | 314 ab | 256 ab | 415 b | 179 ab | 266 a |
| 3 | 584 a | 959 a | 459 ab | 138 b | 891 a | 162 ab | 445 a |
| 4 | 413 a | 734 a | 251 ab | 227 ab | 206 b | 87 b | 395 a |
| 5 | 222 a | 1,320 a | 238 ab | 484 a | 88 b | 153 ab | 220 a |
| 6 | 206 a | 892 a | 142 b | 350 ab | 168 b | 64 b | 254 a |
| CV (%) | 13.60 | 20.26 | 22.16 | 12.87 | 14.05 | 14.05 | 13.18 |

* Means followed by the same letter in the columns do not differ according to the Tukey test ($p > 0.05$). ** Significant interaction for cultivar x nematicides ($F = 3.40$; $p < 0.05$).

Table 4. Number of *Rotylenchulus reniformis* nematodes in 200 cc of soil during the sequential cultivation of soybean (BMX Desafio RR and TMG 2776) and cotton (TMG 21 GLTP) at planting (Pi) and at 40 and 70 days after crop emergence (DAE), according to the nematicide treatments in the experiment 2 (Pedra Preta, Mato Grosso state, Brazil).

| Treatments | Soybean | | | | Cotton | | |
|---|---|---|---|---|---|---|---|
| | Pi | 40 DAE** | | 70 DAE | Pi | 40 DAE | 70DAE |
| | | BMX Desafio | TMG 2776 | | | | |
| 1 | 848.8 b* | 1,165.9 ab | 463.0 a | 1,355.2 a | 461.9 ab | 656.2 a | 803.4 a |
| 2 | 1,481.3 a | 1,204.1 ab | 398.3 a | 439.6 b | 430.6 b | 678.9 a | 902.8 a |
| 3 | 1,150.4 ab | 919.4 b | 711.3 a | 568.6 ab | 656.9 ab | 813.1 a | 610.6 a |
| 4 | 867.9 b | 1,983.6 a | 428.4 a | 528.5 ab | 859.4 a | 737.7 a | 813.4 a |
| CV (%) | 36.66 | 22.46 | 22.46 | 41.96 | 26.36 | 39.54 | 42.64 |

* Means followed by the same letter in the columns do not differ statistically ($p > 0.05$). ** Significant interaction for cultivar x nematicides ($F = 4.05$; $p < 0.01$).

demonstrating the effectiveness of fungi or bacteria-based nematicides, although most are effective for controlling nematodes other than *R. reniformis*. Greenhouse experiments indicate the effectiveness of some biological agents in controlling *R. reniformis* (Wang et al. 2005, Castilho et al. 2010, Jayakumar & Ramakrishnan 2011, Smith et al. 2019). However, it must be considered that their effectiveness in field conditions is highly influenced by climatic and soil conditions, which are not always favorable for establishing and activating biological control agents in cotton-growing conditions in the Brazilian Central-West region. Soils with low vegetation cover and large variations in temperature and humidity challenge their effectiveness (Dias-Arieira et al. 2022, Silva et al. 2023). Our results were very similar to those obtained by Loreto et al. (2024), who evaluated the effectiveness of combining resistant cultivars with biological nematicides and observed that the biological products did not provide any benefit for controlling *R. reniformis* in soybean crops.

There was a significant difference in grain yield between the cultivars in the experiment 1. The grain yield of M 7601 was 349 kg ha$^{-1}$ higher than that of TMG 2776. However, there were no significant differences in soybean grain yield due to nematicide treatments (Table 5).

Cotton plants grown after the TMG 2776 soybean cultivar produced 423 kg ha$^{-1}$ more seed cotton. The seed cotton yield of plants treated with nematicides did not differ significantly from untreated plants. However, plants treated with Fluopyram produced significantly more seed cotton than those treated with *A. sativum* extract and Terbufos.

In the experiment 2, a significant difference was noted for soybean grain yield according to the cultivars. The soybean susceptible to *R. reniformis* (BMX Desafio) achieved a yield of 926.4 kg ha$^{-1}$, higher than that of the nematode-resistant cultivar (TMG 2776). No significant differences in soybean grain yield were observed according to the nematicide treatments (Table 6).

There were significant differences on seed cotton yield based on the soybean cultivar planted before cotton and the nematicide treatments. Plots cultivated after TMG 2776 soybean, resistant to *R. reniformis*, produced, on average, 208.6 kg ha$^{-1}$ more than plots cultivated after the susceptible soybean, representing an increase of approximately 81.6 kg ha$^{-1}$ of cotton lint. Except for the treatment with *B. methyllotrophicus* and *T. endophyticum*, which produced 367 kg ha$^{-1}$ less than the untreated control, all other treatments were statistically similar to each other and the control.

The results of the present study confirm those by Rush et al. (1996), Gazaway et al. (2000) and Davis et al. (2003) in field experiments conducted in the USA, in which cotton yield after cultivation of a soybean variety resistant to *R. reniformis* was higher than that obtained after cultivation of susceptible soybean or with cotton monoculture. Davis et al. (2003) concluded that the effect of the nematode-resistant soybean cultivar provided a cotton yield higher than that obtained by using the nematicide Aldicarb at a dose of 0.59 g a.i. ha$^{-1}$. On the other hand, Asmus & Richeti (2010) observed no differences in

Table 5. Yields of soybean grains (M 7601 and TMG 2776 cultivars) and seed cotton (IMA 5801 B2RF cultivar) treated or not with nematicides in the experiment 1 (Sapezal, Mato Grosso state, Brazil).

| Treatments | Soybean yield (kg ha$^{-1}$) | Cotton yield (kg ha$^{-1}$) |
|---|---|---|
| | Effect of soybean cultivars | |
| M 7601 | 4,665.9 a* | 4,200.0 b |
| TMG 2776 | 4,316.5 b | 4,623.0 a |
| | Effect of nematicides | |
| 1 | 4,438.3 a | 4,379.5 abc |
| 2 | 4,507.2 a | 4,285.0 abc |
| 3 | 4,278.0 a | 4,814.6 ab |
| 4 | 4,448.4 a | 4,906.7 a |
| 5 | 4,570.1 a | 3,925.6 c |
| 6 | 4,704.4 a | 4,154.3 bc |
| CV (%) | 2.20 | 10.68 |

* Means followed by the same letter in the columns do not differ statistically ($p > 0.05$).

Table 6. Yields of soybean grain (BMX Desafio and TMG 2776 cultivars) and seed cotton (TMG 21 GLTP cultivar) treated or not with nematicides in the experiment 2 (Pedra Preta, Mato Grosso state, Brazil).

| Treatments | Soybean yield (kg ha$^{-1}$) | Cotton yield (kg ha$^{-1}$) |
|---|---|---|
| | Effect of soybean cultivars | |
| BMX Desafio | 5,580.0 a* | 2,560.1 b |
| TMG 2776 | 4,653.6 b | 2,768.7 a |
| | Effect of nematicides | |
| 1 | 5,054.6 a | 2,759.2 a |
| 2 | 5,089.7 a | 2,866.2 a |
| 3 | 5,251.5 a | 2,639.9 ab |
| 4 | 5,047.4 a | 2,392.2 b |
| CV (%) | 9.72 | 8.25 |

* Means followed by the same letter in the columns do not differ statistically ($p > 0.05$).

the yield of cotton grown after nematode-resistant or susceptible soybean. However, the treatment with Aldicarb at a dose of 1.950 g a.i. $ha^{-1}$ provided a higher cotton yield than the untreated control, what cannot be compared with Davis et al. (2003), due to the difference in the nematicide dose.

An important aspect is the fact that, in both experiments, the yield of soybean resistant to *R. reniformis* was lower than that of susceptible soybean, a fact also observed by Asmus & Richetti (2010). However, considering the market prices of soybean grains and cotton lint at the time of harvesting, the cumulative financial gain from both crops was profitable in the experiment 1. The higher cotton yield achieved after cultivating a nematode-resistant soybean variety compensated for the lower soybean grain yield.

Resistance to specific pathogens very frequently leads to lower yield cultivars, due to the plant's allocation of resources to defense mechanisms (Barros et al. 2010). This seems to be the case of *R. reniformis*-resistant soybean cultivars. Therefore, selecting the appropriate nematode-resistant cultivar is fundamental for achieving the best management benefits, reducing nematode population density and maximizing overall profitability in areas cultivated with soybean and cotton.

## CONCLUSIONS

1. Cultivating a soybean variety resistant to *Rotylenchulus reniformis* is an effective management strategy in areas with successive soybean and cotton cultivation;
2. Chemical, phytochemical or biological nematicides do not contribute to managing *R. reniformis* when resistant soybean cultivars are used before cotton cultivation.

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