

Evaluation of different molecules to control spider mites in Hemp grown on two different media

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INTRODUCTION

- Hemp (*Cannabis sativa*) production for CBD oil (industrial hemp) is a growing industry in the USA, and now growers in Ohio will be able produce it following ODA regulations (Hall, 2019) starting in the Spring 2020 (Stave, 2020).
- Tetranychus urticae* Koch (TSSM) is one of the most common pest found on indoor hemp production (Cervantes 2006) (Figure 1-2).
- Few products are registered for the control of TSSM in hemp and basic information about their efficacy is needed.

AIM

This study aims to find if any of the molecules currently used to control TSSM in indoor plant production will control this pest on industrial hemp.

Hypothesis: at least one of molecules will reduce the total number of TSSM and will be better than the untreated control.



Figure 1 (Left). TSSM nymphs; Figure 2 (Right) Hemp plant heavily infested with TSSM. (Photo by N. Acosta, Department of Entomology, The Ohio State University)

Table 1. List of treatments used in Hemp under greenhouse settings.

Tt	Trade Name	Common name	Rate/L	Unit	Spraying time
1	Untreated	Check	0.00	g	
2	Ancora	Isaria fumosorosea Apopka Strain 97	1.57	g	Spray days 0, 7, 14, 28
3	Sirocco	bifentazate + abamectin	0.23	ml	Spray days 0, 7, 14, 28
4	Azera	Azadirachtin + Pyrethrins	6.09	ml	Spray days 0, 7, 14, 28
5	Pyganic	Pyrethrins	6.25	ml	Spray days 0, 7, 14, 28
6	Pyganic	Pyrethrins	6.25	ml	Spray days 0, 14, 28
7	Azera	Azadirachtin + Pyrethrins	6.09	ml	Spray days 0, 14, 28
8	Azera	Azadirachtin + Pyrethrins	6.09	ml	Spray days 0, 14, 28
	Ancora	Isaria fumosorosea Apopka Strain 97	1.57	g	Spray days 7

METHODS

- Experiments were performed under greenhouse conditions, (25°C, 18:6 L:D).
- 70 Hemp plants hybrid Tango Kush were used.
- Factorial arrangement in a complete randomized block design.
- Two growing system were used: Soilless media (Pro-Mix, Figure 3), and Bato Bucket Hydroponic System, by Crop King (Figure 4).
- Eight replicates per treatments.
- Five leaves per plants were artificially infested with 5 TSSM females each to seed initial population.
- Treatments were sprayed four times (Table 1) with a CO₂ handheld sprayer.
- Insect counts on each plant were taken before spraying time (D0) and four times after: D7, D14, D28 and D35.
- During each evaluation, the total number of immature and adult mites were recorded.
- One-way ANOVA was used to test for significant differences among treatments (Alpha 0.05). SAS software (v 9.4).



Figure 3 (Top). Soilless media, Promix BX (Photo by N. Acosta, Department of Entomology, The Ohio State University)



Figure 4. Bato Bucket System by Crop King (Photo by N. Acosta, Department of Entomology, The Ohio State University)

RESULTS

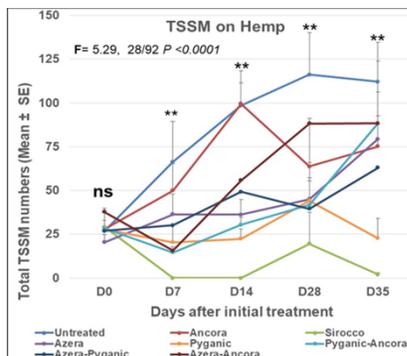


Figure 5. Total number of TSSM found at each evaluation time on hemp plants grown in soilless media. NS means "no significant difference" and asterisk (**) means "significant difference" among treatments.

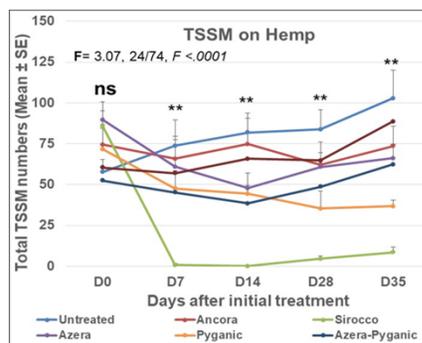


Figure 6. Total number of TSSM found at each evaluation time on hemp plants grown in the Bato bucket system. NS means "no significant difference" and asterisk (**) means "significant difference" among treatments.

CONCLUSIONS

Several of the products tested were better than the untreated control. The best product was the technical comparison Sirocco. Pyganic and the rotation of Pyganic – Ancora or Pyganic – Azera (in Bato bucket) provided some control. However, it is important that control methods are started when spider mite populations are low.

FUTURE DIRECTIONS

Experiments will be repeated in 2020 using Pyganic (pyrethrin) and six new products approved in December 2019 by the EPA.

LITERATURE CITED

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