

New Natural Weed Control Products for Organically Grown Products

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INTRODUCTION

Demand for organic food has grown tremendously throughout the developed world. Weed control remains the most significant agronomic problem associated with organic crop production. There is a need for more effective weed management, utilizing biological and lower-risk products. Developing new natural weed control products with superior weed management to control or effectively suppress weeds will help the organic crop production industry remain competitive and sustainable into the future.

OBJECTIVES

The objective of this research was to evaluate the weed control potential of bioactive, non-synthetic, natural products to provide weed control efficacy, synergy and crop safety data on natural products that are appropriate for use by organic growers.

MATERIALS AND METHODS

- Field studies were conducted at the Simcoe Research Station in 2014.
- Soil; Fox Sandy Loam- 73% Sand; 22% Silt and 5% Clay. Soil pH 6.1; Soil OM 1.5%; CEC = 5.0.
- Randomized complete block design with four replications.
- Herbicides applied at 1000 L/ha with CO₂-pressurized back-pack sprayer @ 240 kPa.
- Tomato and peppers planted 45 cm apart in 1.5 m rows on July 19.
- Sweet corn seeded in 1.5 m rows at 40,000 plants per ha on July 19.
- POST treatments for between-row weed management applied on Sept 08, when the weeds were in the 4-5 leaf stage.
- Visual weed control ratings (0-100%) taken at 7-dy intervals, starting 3 dy after 1st application.
- Visual injury ratings (0-100%) taken at 7-dy intervals, starting 7 dy after application.
- Data subjected to ANOVA and means were compared using Tukey's means comparison test.

RESULTS AND DISCUSSION

Table 1. Effect of natural-product herbicides on weed control and yield of sweet corn and pepper.

Treatment	Rate	Weed control (%)	Yield t/ha	
			Corn	Pepper
Manuka oil	1% v/v	29 h	7.5 a	9.5 a
Nu-film P	1% v/v			
Manuka oil	2% v/v	69 fg	6.3 a	9.1 a
Nu-film P	1% v/v			
Weed Zap ¹	5% v/v	78 de	7.0 a	10.4 a
Nu-film P	1% v/v			
Weed Zap	5% v/v	84 cd	6.9 a	9.1 a
Manuka oil	1% v/v			
Nu-film P	1% v/v			
Weed Pharm (20% acetic acid)	100%	65 g	5.8 a	9.2 a
Weed Pharm (20% acetic acid)	100%	85 c	7.0 a	9.4 a
Manuka oil	1% v/v			
Finalsan	8.4% v/v	73 ef	6.7 a	8.8 a
Finalsan	16.6% v/v	93 b	6.7 a	8.9 a
Weed Free		100 a	6.7 a	9.1 a
Weedy		0 i	4.5 b	5.9 b

Means with the same letters are not significantly different according to Tukey's means comparison test.

There was no crop injury from any treatment. POST treatments of manuka oil, at 1 and 2% v/v, gave 29 and 69% weed control, respectively. Weed control with manuka oil, tank mixed with Weed Zap or Weed Pharm gave about 85% control and gave a level of control comparable to the weed-free control. This was a 6 to 20% improvement in weed control, compared to each product used alone. Finalsan at 8.4 and 16.6% v/v, gave 73 and 93% weed control, respectively. All treatments gave significantly improved pepper and sweet corn yields, compared to the weedy control.

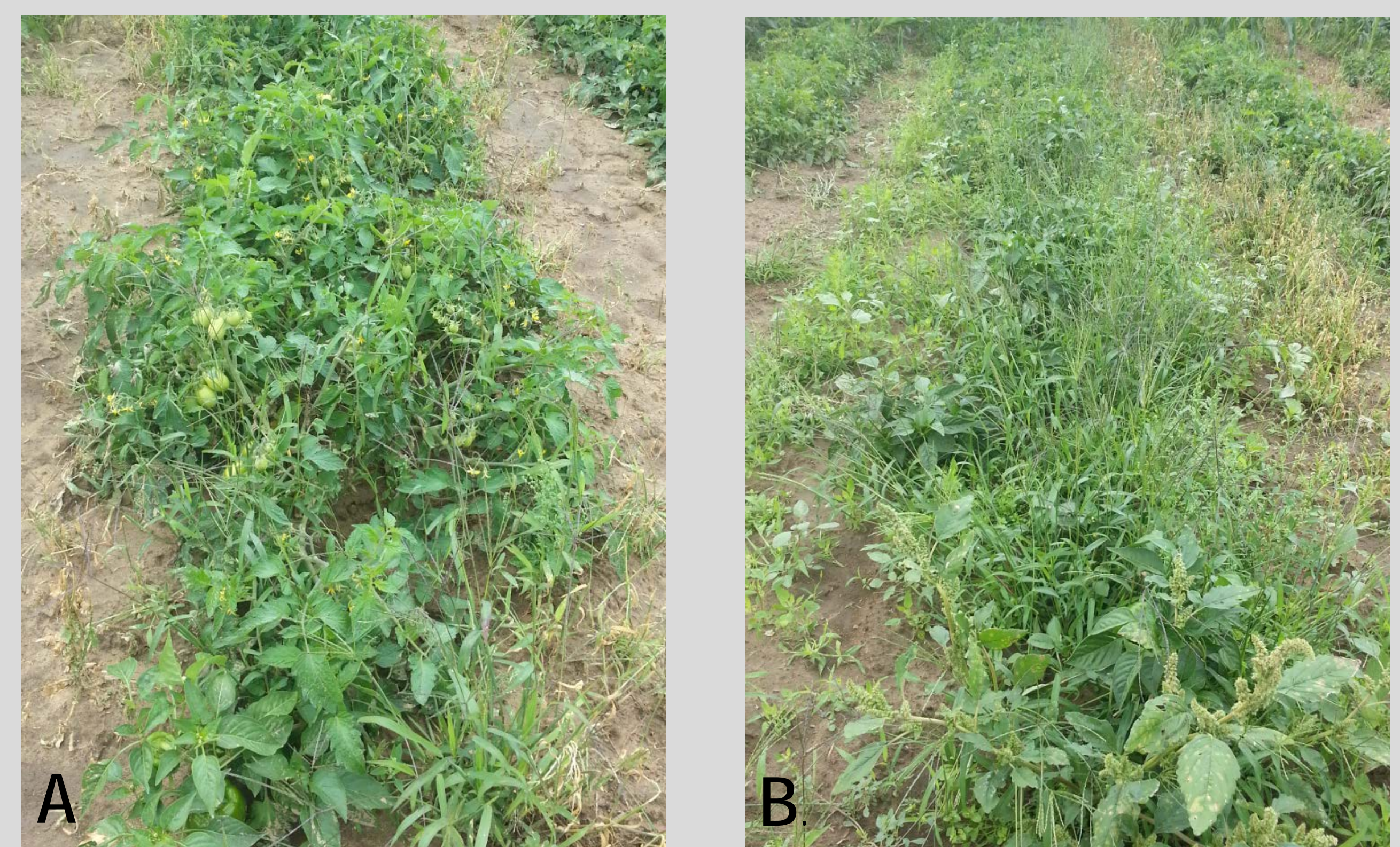


Fig. 1 The effect of Weed Zap plus Manuka oil (A) compared to the non-weeded control (B) on weed control in tomatoes.

CONCLUSIONS

The synergy associated with tank-mix applications of manuka oil with currently approved essential oils and acetic acid was demonstrated. Manuka oil is the first natural product herbicide that has soil activity, systemic and, when mixed with other approved products, enhances their weed control activity. This synergy has the potential to significantly improve weed management and will help growers to find solutions to the long standing issue of managing weeds in organic crop production. This will help address the limitations of currently-approved organic herbicides and will provide organic growers with environmentally and economically sustainable alternatives to synthetic chemical herbicides.

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