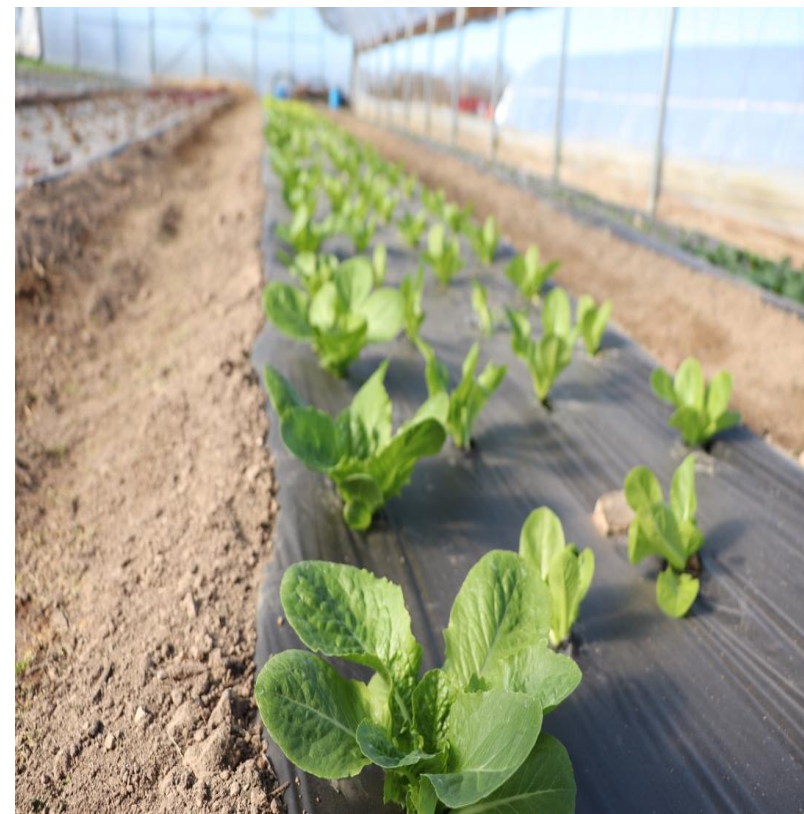


# USING ESSENTIAL OILS TO CONTROL APHIDS, SPIDER MITES AND THRIPS IN HIGH TUNNELS



# Intro Survey



# Background of project

- Winter production in high tunnels is mainly greens.
- Aphids, spider mites and thrips are main pest in these crops.
- Looking for alternatives to chemical pesticides.
- Wife told me about essential oils for pest on pets.
- Started researching different essential oils.
- Determined five essential oils had promise either as repellent or insecticide.
- Received organic certifier approval for 100% pure therapeutic grade oils.
- Wrote specialty Crop Block Grant with Webb City Farmers Market.
- Contacted 3 growers that do winter production.
- Two-year project.
- Evaluated each oil, looked at application rates and combinations.



# Economics

- 300 drops in each bottle, started at 10 drops per gallon, increased to 20.
- Oils cost from \$15 for orange, lemongrass and cedarwood.
- Oils cost from \$30 for peppermint and lavender.
- Application cost per gallon \$1-2.
- Usually applied twice per week using a backpack fogger.
- Worked with hemp and cannabis growers for corn ear worm control.











Lavender. A soothing favorite for centuries, **lavender repels fleas, moths, mosquitoes, and many other insects**. While oil extracted from the flowers makes an effective mosquito repellent, just the plant itself can ward off unwelcome insects.

Orange oil contains an extract from the peel called d-limonene, which is rated as an insecticide. According to University of Florida's IFAS Extension, it **kills fleas, aphids, mites, fire ants, house crickets, paper wasps and some flies**.



Cedarwood essential oil is a very aromatic oil that **helps repel fleas, ticks, spiders, mosquitoes, lice, and gnats** to name a few.



Peppermint oil can work as an excellent pest repellent in your garden. Due to its subtle fragrance, it confuses insects by masking the smell of [pheromones](#). Aphids, cabbage looper, flea beetles, squash bugs, whiteflies are some of the common pests that abhor the area where this peppermint oil pest repellent is sprayed.

Lemongrass essential oil is **as potent as any commercial insecticide**. It contains citronellol and geraniol, and is effective against a wide range of biting insects. It can be applied on skin directly, used with lotions, or sprayed over clothing and other surfaces, according to personal preferences.





**Box Turtle Farm**, near Mt. Vernon, is a certified organic farm specializing in greens production wholesaled to restaurants and grocery stores. Farmer Jason Hirtz (right) is participating in the market's essential oils research project to determine if various organic oils, like lavender, orange, and peppermint, are effective in controlling pests in high tunnels.







– **OakWoods Farm**, near Granby, Missouri, is a human-scale diversified farm using organic practices and growing in three high tunnels with no electricity or supplemental heat, as well as growing field crops. Owners Karen and Doug Scott sell at the Empire Market and the Webb City Farmers Market, as well as on-line and through a CSA. Karen (left) is well known for her greens, heirloom tomatoes, and peppers, as well as herbs and microgreens.





**Bishop Gardens L.L.C. Shon**

Bishop grew up in southwest Missouri around small family farms. After graduating from College of the Ozarks with a degree in Horticulture, Shon joined Lincoln University Cooperative Extension in the Southwest Region of Missouri and currently is the Small Farm Specialist for the Innovative Small Farmers Outreach Program (ISFOP) which serves Barry, Lawrence, McDonald, Newton, Jasper, and Greene counties. Shon has worked extensively with high tunnels since 2011.



# Application

Each Farmer was given a 'fumigador' back pack sprayer that holds three gallons of water.

A weekly application of oils starting with peppermint would then be applied and yellow stick cards placed throughout the high tunnel would be monitored for general pest.





# Farmer results

**The Good:** Less Expensive, Excellent for Fruit worm control

**The Bad:** Once economic impact has been reached (in number of aphids) almost impossible to control

**Final Thoughts:** Further testing needed. Specifically mixtures and amounts of product



# Exit Survey





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The Webb City  
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