## AGRICULTURE



# Organic Insecticide Rotations and Tank-mixes for Vegetable Crops

Implement these organic prevention and control strategies to reduce pest populations in your vegetable crops.

Whether you are a conventional or an organic vegetable producer, an integrated pest management (IPM) strategy for the modern farm includes a multifaceted approach consisting of prevention and control to reduce pest populations below threshold levels. Prevention tactics include cultural control as well as pest exclusion systems suitable for small and large operations.

Proper pest identification and scouting are critical initial steps that form the basis of a successful IPM practice. Indiscriminate use of conventional or organic insecticides has resulted in many cases of insecticide resistance.

While insecticides should always be the last resort, sometimes they are needed. Consider organic options that are low-persistence products designed to be environmentally friendly. These can be used in a program of rotations and tank-mixes that work synergistically to control insect pests.

On-farm testing is recommended to help you gain experience in using new premix insecticides or rotations according to the insecticide label. Always maintain good spray records and compare multiyear observations for developing a long-term IPM plan.

### **Organic Insecticide Tank-mixes**

- Xentari (Bt-product, Valent USA) and Pyganic (natural pyrethrin, Valent USA) form a great combination for caterpillar control. Xentari (Bacillus *thuringiensis* subsp. aizawai)-Pyganic tank-mix improves plant stands and the quality of vegetables such as tomatoes.
- Based on past research on cabbages, Dipel (Bacillus thuringiensis subsp. kurstaki) can be tank-mixed safely with pyrethrin for significant caterpillar control. See section "Pointers for Vegetable Growers" for use of surfactants on waxy-leaf crops.
- Pyganic and Neem 7-Way (Georgia Organic Solutions) tank-mix also can reduce small



caterpillars. This tank-mix can significantly reduce damage to crops such as tomatoes that are close to harvest in low pest-pressure regions.

- Neem 7-Way and Xentari tank-mixes can provide significant protection to tomato fruits without phytotoxic effects. Neem oil applications may help with low populations of whiteflies and aphids (immature stages).
- The effectiveness of tank-mixes or insecticide rotations with Bts is enhanced when applications are made inside high tunnels (protection from rain) or in cooler weather (fall crop production).

# **Organic Insecticide Rotations with Single Active Ingredient (AI) and Premixes**

- When dealing with some tough insect pests, organic insecticide rotation can be critical compared to repeated applications of a single AI. Proper insecticide rotation can reduce costs by reducing the application frequency of expensive products and by targeting multiple species.
- Good insect control has been seen by alternating selective insecticides with a broad-spectrum product. Always check the need for additional spray applications to reduce undesirable environmental

effects. Incorporating selective insecticides in a rotation schedule encourages natural enemy populations to rebound after using harsher products. For example, using Bt products first on leafy brassicas is a good strategy when population pressure is low. Later applications can include pyganic or spinosad-based products (e.g., Monterey Garden insect spray). Three or four alternating applications can provide significant cabbageworm, looper, and diamondback moth control in open field or high tunnel crops.

- If you have yellowmargined leaf beetles on brassicas, good options are early application of pyrethrin, spinosad, or premix products such as Azera (neem + pyrethrins, Valent USA) or Botanigard Maxx (Beauveria bassiana insect pathogenic fungus + pyrethrins, BioWorks). As caterpillar pressure rises through the season, Bt-based insecticides can be part of the rotation.
- In tomatoes and other summer crops, Bt-Pyganic or Bt-Azera rotations improved plant stands compared to the untreated check, indicating successful caterpillar control in the early season that generally resulted in higher crop production levels later.

#### **Pointers for Vegetable Growers**

- Use surfactants on leafy vegetables with a wax layer to increase insecticide retention on or below the leaf surface where insects hide. Some organic surfactants include SKH Sticker, Ag Aide, and EcoSpreader (Brandt Inc.). Before mixing a spreader/ sticker, check the insecticide labels for compatibility issues; when in doubt, use the spray mixture in a small area before treating large fields.
- Benefits from tank-mixes and rotations may occur after three or four applications with weekly assessment of pest population levels (need-based applications). Tank-mixes should not be used for pest prevention; this may result in the target pest becoming resistant to two products simultaneously and wipe out the natural enemies leading to new pest problems.
- Use caution while spraying pyrethrin and spinosad products around beneficial insects. While these products are organic, they are toxic to pollinators. Avoid spraying when winds are high or when pollinators are active.

### **Organic Insecticide Sources**

Always check the insecticide label on the manufacturer's website before purchase. Many single or premix insecticides are available from online retailers that include Arbico Organics, Gardens Alive, Seven Springs Farm, Forestry Distributing, Amazon, and many others. Always check the expiration date on the package and the product quality before mixing. Consult product labels for primary tank-mixing instructions.

To prevent corrosion, do not store insecticide mixes in spray tanks. Wash application equipment thoroughly after use to prevent cross-contamination and accidental crop damage due to misapplication. When in doubt, call the manufacturer and/or the retailer for product details.

#### Organic Vegetable IPM Toolkit Slide Chart

A revised Organic Vegetable IPM Toolkit slide chart is available for natural and organic farmers. The rectangular slide chart offers sustainable IPM recommendations for more than twenty major vegetable insect pest species. It provides a good starting point for beginning or transitioning growers.

To obtain a free copy of the slide chart, email bugdoctor@auburn.edu, contact a commercial horticulture regional Extension agent, or attend a beginning farmer workshop in Alabama.

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