

Materials and Preparation

Advance Preparation

- Read sections 205.206, 205.601, 205.602, and 205.672 of the NOP Standard
- Read NCAT's *Organic Crops Workbook* pages 21-29 (<http://attra.ncat.org/attra-pub/PDF/cropsworkbook.pdf>)
- Read "Featured Creatures" (<http://creatures.ifas.ufl.edu/veg/leaf/melonworm.htm>)
- Read *Insect Management for Tomatoes, Peppers, and Eggplant* (<http://edis.ifas.ufl.edu/IN169>)

Materials for participants

- *Participant's Guide for Module 5*
- Relevant sections of the NOP Standards (<http://www.ams.usda.gov/nop/NOP/standards.html>). If you will be covering several modules during this training, distribute a copy of the entire NOP Standards now or during the initial session of the training program.
- NCAT's *Organic Crops Workbook* pages 21-29 (<http://attra.ncat.org/attra-pub/PDF/cropsworkbook.pdf>)
- "Featured Creatures" (for Worksheet I problems) (<http://creatures.ifas.ufl.edu/veg/leaf/melonworm.htm>)
- *Insect Management for Tomatoes, Peppers, and Eggplant* (for Worksheet II problems) (<http://edis.ifas.ufl.edu/IN169>)
- OMRI Products List (See approved seed treatments) (http://www.omri.org/OMRI_products_list.html)

Module Delivery (1 hour 30 minutes)

I. Module Objectives and Content (5 minutes)

1. Distribute the *Participant's Guide to Module 5* to all participants. Also distribute a copy of the relevant portions of the National Organic Standards if you have not already done so.
2. Review and discuss the **application objectives**.

After completing this module, you will be able to recommend mechanisms and methods for organic growers to use to manage insects, weeds and diseases.

You will be able to help growers complete the Crop Pest, Weed and Disease Management section of the Organic System Plan.

3. Review and discuss the **learning objectives**.

After completing this module you will understand:

Acceptable physical, biological, cultural, and chemical methods of pest control in an organic production system.

When emergency pest control measures can be used and how it affects an operation.

The required documentation for record keeping and certification.

4. Call attention to the **topics** that will be covered in this module.

Acceptable methods of pest control

1. Physical
2. Biological
3. Cultural
4. Chemical

Crop rotation for pest control

Inerts in pesticides

Mandated spray programs

Documentation requirements for certification relating to pest control

III. Materials and Resources (5 minutes)

1. Point out that the *Participant's Guide to Module 5* includes a list of the **Relevant Sections of the NOP Standards**.

205.206 Crop pest, weed, and disease management practice standard

205.601 Synthetic substances allowed for use in organic crop production

205.602 Nonsynthetic substances prohibited for use in organic crop production

205.672 Emergency pest or disease treatment

2. Draw attention to the **Additional Reference Materials** listed in the Guide.

Sustainable Management of Soil-Borne Plant Diseases (<http://attra.ncat.org/attra-pub/soilborne.html>)

Plant Disease Management for Organic Crops (<http://anrcatalog.ucdavis.edu/pdf/7252.pdf>)

Insect Pest Management for Organic Crops (<http://anrcatalog.ucdavis.edu/pdf/7251.pdf>)

Weed Management for Organic Crops (<http://anrcatalog.ucdavis.edu/pdf/7250.pdf>)

Principles of Sustainable Weed Management for Croplands (<http://attra.ncat.org/attra-pub/weed.html>)

EPA list of inert (other) ingredients in pesticides (http://www.epa.gov/opprd001/inerts/inerts_list4Bname.pdf)

3. Draw participants' attention to the list of **Keywords** in the Guide.

Allowed synthetic. A substance that is included on the National List of synthetic substances allowed for use in organic production or handling.

Control. Any method that reduces or limits damage by populations of pests, weeds, or diseases to levels that do not significantly reduce productivity.

Cultural methods. Methods used to enhance crop health and prevent weed, pest, or disease problems without the use of substances; examples include the selection of appropriate varieties and planting sites; proper timing and density of plantings; irrigation; and extending a growing season by manipulating the microclimate within green houses, cold frames, or wind breaks.

Disease vectors. Plants or animals that harbor or transmit disease organisms or pathogens

which may attack crops or livestock.

Emergency pest or disease treatment program. A mandatory program authorized by a Federal, State, or local agency for the purpose of controlling or eradicating a pest or disease.

Inert ingredient. Any substance (or group of substances with similar chemical structures if designated by the Environmental Protection Agency) other than an active ingredient which is intentionally included in any pesticide product (40 CFR 152.3(m)).

Nonsynthetic (natural). A substance that is derived from mineral, plant, or animal matter and does not undergo a synthetic process as defined in section 6502(21) of the Act (7 U.S.C. 6502(21)). For the purposes of this part, nonsynthetic is used as a synonym for natural as the term is used in the Act.

Pesticide. Any substance which alone, in chemical combination, or in any formulation with one or more substances is defined as a pesticide in section 2(u) of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136(u) et seq).

Prohibited substance. A substance the use of which in any aspect of organic production or handling is prohibited or not provided for in the Act or the regulations of this part.

Synthetic. A substance that is formulated or manufactured by a chemical process or by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources, except that such term shall not apply to substances created by naturally occurring biological processes.

III. Exercise 1: The Crop Pest, Weed and Disease Section of the Certification Application (70 minutes)

1. Begin the activity by directing participants to read sections 205.206, 205.601, and 205.602 of the NOP Standard and pages 21-29 of NCAT's *Organic Crops Workbook*. These materials explain crop pest, weed, and disease management practice standards for organic production. Draw special attention to section 205.601. Point out that the National List of Allowed and Prohibited Substances is, in some ways, a list of **exceptions**, that is a list of synthetic substances that **are** allowed and a list of natural substances that **are not** allowed. Allow 15 minutes for the readings.
2. After they have completed the readings, divide participants into four groups.
3. Assign each group one of the four problems encountered by an organic farmer.
4. The group's task is to develop an appropriate response for the problem that is described. Participants must provide appropriate recommendations for **all three levels of pest management required by the NOP Standards**. Briefly describe the three levels of management required by the NOP to make sure that participants understand them, and refer participants to the Key Principles of Organic Pest Management on the last page in the *Participant's Guide to Module 5*. Point out that the three levels of pest management are not rigid. Some substances, such as soaps in Problem 1: Melonworm, for example, might be an appropriate substance for either level two **or** level three. The distinction between proactive measures taken to prevent a problem and the cultural and mechanical practices in level two is one of judgment and depends on the specific situation. However, it **is** important that the participant understand that the farmer **cannot**

simply rely on use of permitted synthetic substances as his/her pest management plan. The plan must be holistic and the use of permitted synthetics is a last resort when other measures fail.

Level one involves management practices that reduce the potential for the development of pests. These are proactive measures that the farmer **must take** to try to ensure that further pest management options will not be needed.

Level two involves the use of traditional management practices, primarily cultural and mechanical steps or the use of “natural” products.

Level three allows for the use of a wider array of biological and botanical products to control pests, including materials listed on USDA’s “Synthetic substances allowed for use in organic crop production.”

5. Make sure that the group that solves the “Melonworm” problem refers to the publication “Featured Creatures - Melonworm” and that the group that solves the “Yellow Leaf Curling Virus” problem refers to the publication “Insect Management for Tomatoes, Peppers and Eggplants.” These two groups will need this information. All participants will also want to use the NOP Standards, the OMRI Products List, and section 205.601, the National List of Allowed and Prohibited Substances.
6. Allow 15 minutes for the groups to complete the activity.
7. After 15 minutes, call the plenary to session. Read the first problem, “Melonworm” aloud, or give participants who were assigned other problems a couple of minutes to read the problem. Ask a representative from the group who worked on this problem to present a **very brief** (one or two minutes presentation time maximum) description of their solutions to the problem, broken down into first, second and third level solutions. Allow 10 minutes for the presentation and discussion of each problem.
8. Follow the same reporting and discussion procedure for all of the problems (40 minutes total for all four problems).
9. We give our answers to each problem after the problem statement. Make sure that the main points covered in our answers are discussed.

Problem 1: Melonworm

Dexter Jules has a six acre farm in the tropical US Virgin Islands that is varied and complex. On three acres of flat land Dexter grows organic tomatoes and peppers. Two acres are in the second year of transition from conventional to organic production. This area begins with a gentle 2-3% slope at the base of the hill, but has an 8-10% slope near the top of the hill. Dexter has decided to devote a quarter acre (0.25) to growing calabazas (squash), a new crop for him. He has already planted 1 3/4 (1.75) acres in tomatoes, a crop that he has grown before. One acre is on a terraced 20-40% slope where fruit trees are grown using conventional management practices.

Dexter would like to grow calabazas and has heard that Melonworm, *Diaphania hyalinata* Linnaeus, can be a problem. Before planting he decides to seek advice from his local Extension advisor about how to minimize threats from the worms before they become a serious problem.

You are the Extension advisor Dexter comes to visit. Remember, Dexter is planting calabazas in his transitional fields and has one more year before these fields reach organic status. Section 205.206 of the NOP, Crop Pest, Weed, and Disease Management Practice Standard requires that producers use a three-level hierarchical approach in dealing with pest and disease problems. What would you recommend that Dexter do? Please provide him with a checklist of management techniques he can use to minimize a potential outbreak of Melonworm. The checklist must address all three hierarchical levels of organic management. And don't forget to congratulate Dexter for planning his management strategy in advance!

Answers:

Level One

Cultural practices: Row covers (Cover at night when eggs are deposited. Covering at night will help decrease the actual numbers laid.)
Intercropping corn and beans
Early planting (except in the tropics)
Destruction of crop residues

Level Two

Identify pest and stage within the life cycle to determine treatment options
Trap cropping with squash
IPM
Soaps
Entomopathogenic nematodes eat the larvae of the worm (only moderate suppression)

Level Three

DiPel DF, Valent BioSciences Corp. *Bacillus thuringiensis*
Entrust WP, Dow AgroSciences / Mycogen. Spinosad
Neemix 4.5, Certis USA. Neem Extract
Traps with pheromones
Soaps

Problem 2: *Bacillus thuringiensis*

An organic farmer has a problem with armyworms in her beets, even after exhausting all cultural, mechanical, and physical options on her farm. She has decided to use a biological pesticide, *Bacillus thuringiensis*, to control the pest. She started looking for *Bacillus thuringiensis* and realized there are numerous brands available. She knows that biological pesticides are allowed in organic production as long as she has taken a hierarchical approach to pest control. When developing her Organic System Plan she indicated that chemical control might be used as a last line of defense. Since this is the first time she is purchasing this biological pesticide, she must decide which brand is allowed for organic production. After reviewing many of the labels, most are effective for her insect and are registered for her crop. However, she remembers hearing that some of them may not be allowed in organic production. Confirm whether all the brand names listed would be allowed in an organic system and if not tell why they are prohibited. Are there any products on the list below that you could assure her meet the NOP Standards? Before recommending them is there anything else she should check? For example, do **all** of these products control worms?

Able	Britz Bt dust	Condor
Cutlass	Dipel DF	Foil Down
Full-Back	Mosquito Attack	Novodor
VectoBac WDG	XenTari DF	

Answer: Although *Bacillus thuringiensis* is a non-synthetic biological substance. Although *Bacillus thuringiensis* or “BT” as it is commonly called, is a biological substance itself, its formulation into a substance that can be applied as a pesticide requires adding inert ingredients. While these ingredients do not contain anything that acts as a pesticide, not all inert ingredients are allowed under the National Organic Standards. Therefore, a specific BT product may contain inert ingredients that are not on the list of synthetic substances allowed for use in organic crop production Section 205.601 of the NOP Standards. Only EPA List 4 – Inerts of Minimal Concern are allowed, and other inerts that may be specifically listed are permitted. The product label does not provide information about the inert ingredients in a pesticide. The OMRI Products list is the best source of information to determine what brand names are allowed. However, companies voluntarily disclose their information to OMRI for review. As a result, there could be other brand names not included in the OMRI list that meet the standard. Unfortunately, there is no way to determine this unless you can obtain documentation from the manufacturer. The easiest solution is to use the OMRI Products list. From the above list only the following have been approved by OMRI for use in an organic production system:

Able
VectoBac WDG

Britz Bt dust
XenTari DF

Dipel DF

The EPA has a labeling system to designate NOP approved pesticides that are allowed in an organic system. The EPA reviews products at the request of manufacturers to determine NOP compliance. However, the program is voluntary, which means that not all materials will be subjected to the EPA system.

Problem 3: Yellow leaf curling virus

Dexter Jules has a six acre farm in the tropical US Virgin Islands that is varied and complex. On three acres of flat land Dexter grows organic tomatoes and peppers. Two acres are in the second year of transition from conventional to organic production. This area begins with a gentle 2-3% slope at the base of the hill, but has an 8-10% slope near the top of the hill. Dexter has decided to devote a quarter acre (0.25) to growing calabazas (squash), a new crop for him. He has already planted 1 3/4 (1.75) acres in tomatoes, which he has grown before. One acre is on a terraced 20-40 % slope where fruit trees are grown using conventional management practices.

Dexter recently discovered yellow leaf curling virus, spread by whiteflies, on about 10% of the tomatoes in his organic field. He has tried removing young infected plants and staggering plantings, hoping that will help minimize the spread of the virus. It is now time to plant tomatoes in the transitional fields. He is currently using black plastic mulch and is concerned that the virus will spread to tomatoes in the transitional fields. What are his options?

Answers:

Level One

A two month or more crop-free period will reduce virus and whitefly populations

Using virus free transplants

Remove weeds that could be a host to whiteflies. Flaming, hand and electrical weeding.

Isolate infected crops from non-infected crops

Resistant varieties that are commercially available

Level Two

Reflective (silver) mulches may reduce virus spread by deterring adult whiteflies from landing on plants

Natural enemies include parasitic wasps, lady beetles, lacewings, minute pirate bugs, fungi, particularly when whiteflies are developing on weeds.

Surround WB Crop Protectant. Mined minerals, unprocessed

Level Three

Neemix 4.5, Certis USA. Neem Extract
EcoTrol, EcoSmart Technologies Inc. Botanical Pesticide

Problem 4: Citrus

Clementine Temple has a 40 acre organic citrus grove in central Florida. She transitioned her farm six years ago from conventional citrus and has never looked back. She has been extremely happy with the demand for her product and the price she has been receiving. She is a third generation farmer and believes she will be the first of her family that will consistently profit from farming. Just recently the Florida Department of Plant Industry trapped a Mediterranean fruit fly on a citrus farm on the west coast of Florida near Tampa. She was notified that the state will begin a mandated spray program in three weeks. Harvest will begin in two months. She is extremely concerned and in a state of panic over the fate of her citrus crop. She is afraid that she will lose certification of her grove and is not sure where to begin in solving her problem. The state proposes to spray Malathion, which is a prohibited substance. She has left numerous messages with her certifier and has called the administrator at the National Organic Program, but no one has returned her calls. Her local Extension faculty have just returned from an organic training workshop and she decides to see if they can provide her with some information. Can you help her? What information can you provide? Are there any recommendations you can make?

Answer: When a prohibited substance is applied to a certified operation due to a federal or state emergency pest or disease treatment program the certification status of an operation will not be affected. However, any harvested part of the crop that has had contact with the prohibited substance cannot be sold, labeled, or represented as organically produced. Therefore Clementine's fruit crop at the time of the application would have to be sold on the conventional market. You should recommend that she notify her certifier about the mandated spray program. The certifier can then inform the proper state or federal agency that her organic operation is within the mandated spray zone. Some state agencies have delineated organic farms using GPS coordinates and allowed sprayers to bypass organic operations. Her record keeping on the farm should also document the application of the prohibited substance by the state or federal agency.

III. Closing Comments (10 minutes)

Call participants' attention to the document "Key Principles of Organic Pest Management" (following page and last page in the Participant's Guide to Module 5). Make sure to note that this document is taken directly from ATTRA's Organic Crops Workbook. Make the following points:

The NOP Standards **require** that producers use a three-level hierarchical approach in dealing with pest problems.

Level one involves management practices that reduce the potential for the development of pests. These are proactive measures that the farmer must take to try to ensure that further pest management options will not be needed.

Level two involves the use of traditional management practices, primarily cultural and mechanical steps or the use of "natural" products.

Level three allows for the use of a wider array of biological and botanical products to control pests, including materials listed on USDA's "Synthetic substances allowed for use in organic crop production."

Key Principles of Organic Pest Management

§205.206—the Crop Pest, Weed, and Disease Management Practice Standard—requires that producers use a three-level hierarchical approach in deciding how to deal with these problems. This can most easily be explained by designating these levels A, B, and C.

Level One: The first line of defense in managing weed, insect, and disease pests generally comprises the most sustainable and systems-based practices. It emphasizes the fact that a well-designed and healthy organic system will naturally have fewer pest problems.

Level One practices specifically include:

- crop rotation and nutrient management [§205.206(a)(1)]
- sanitation measures to remove disease vectors, weed seeds, etc. [§205.206(a)(2)]
- cultural practices such as resistant or tolerant varieties, timing of planting, etc. [§205.206(a)(3)]

Level Two: Level Two is the second line of defense, to be chosen if the basic systemic practices of level A are not sufficient to control the weed, insect, or disease problem. Level B practices generally include mechanical and physical practices that are traditional in organics, and the use of nonsynthetic or “natural” materials.

Level Two weed control options include:

- mulching with fully biodegradable materials [§205.206(c)(1)]
- mowing [§205.206(c)(2)]
- grazing [§205.206(c)(3)]
- cultivation and hand weeding [§205.206(c)(4)]
- flame, heat, or electrical weeding [§205.206(c)(5)]
- plastic mulches [§205.206(c)(6)]

Level Two insect/animal pest control options include:

- introducing or augmenting predators and parasites [§205.206(b)(1)]
- developing habitat for beneficial predators and parasites [§205.206(c)(2)]
- nonsynthetic lures, traps, and repellents [§205.206(c)(3)]

Level Two crop disease control options include:

- management practices (e.g. fire, flooding) [§205.206(d)(1)]
- application of nonsynthetic biological, botanical, or mineral inputs [§205.206(d)(2)]

Level Three: Level Three is the third line of defense, to be chosen if the level of pest control required is not achieved after Levels Two and Three control options are applied [§205.206(e)]. In such instances, you are allowed the wider use of biologicals and botanicals to control pests. You also have the option to use those materials included on the National List under §205.601—“Synthetic substances allowed for use in organic crop production”. If you anticipate the need for Level Three control measures, be sure that you indicate this in your OSP. Be specific about the control materials you might be using. Outline the indicators or thresholds you monitor that will trigger the use of those materials.

This material is taken directly from Page 22 of the *Organic Crops Workbook*, (<http://attra.ncat.org/attra-pub/PDF/cropsworkbook.pdf>)