

Application Objective

After completing this module you will be able to:

Recommend mechanisms and methods for organic growers to use to manage insects, weeds and diseases.

Help growers complete the Crop Pest, Weed and Disease Management section of the Organic System Plan.

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

Topics

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

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

Materials and Resources for this Module

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/>)

Additional Reference Materials

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)

Keywords

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.

Exercise 1: The Crop Pest, Weed and Disease Section of the Certification Application

You will be assigned to a small group to find solutions to **one** of the following four problems brought to you by an organic farmer. Refer to the NOP Standards and the OMRI Brand Name Products List. Your solution must address **all three levels of pest management required by the National Organic Standards**.

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.”

Be prepared to make a **brief** presentation of your solutions to the plenary (maximum 10 minutes for presentation and discussion).

Problem 1: Melonworm

Refer to the publication “Featured Creatures - Melonworm” to help solve this problem.

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!

Level 1 Solutions:

Level 2 Solutions:

Level 3 Solutions:

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?

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

Level 1 Solutions:

Level 2 Solutions:

Level 3 Solutions:

Problem 3: Yellow leaf curling virus

Refer to the publication “Insect Management for Tomatoes, Peppers and Eggplants” to help solve this problem.

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 rouging out 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. Section 205.206 of the NOP, Crop Pest, Weed, and Disease Management 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 checklists of management techniques he can use to minimize the spread of yellow leaf curling virus. The checklist must address all three hierarchical levels of organic management.

Level 1 Solutions:

Level 2 Solutions:

Level 3 Solutions:

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?

Level 1 Solutions:

Level 2 Solutions:

Level 3 Solutions:

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>)