United States Department of Agriculture
Natural Resources Conservation Service

UMassAmherst Outreach UMass Extension

NRCS Conservation Practice Standard: Code 595 ~ Pest Management

IPM Worksheet: Field Tomato

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Soil Nutrient Management and Cultural Practices

Cultural practices are of value in management of nutrients, weeds, diseases, or insects. The goal of a sound fertility program is to supply adequate nutrients with optimum timing for maximum economical crop yield, while avoiding excesses that can degrade water quality or adversely affect crop or soil quality.

1. Crop is planted in a field with well drained soil not prone to saturation, and with good air circulation to promote rapid drying of foliage. **10** _____

2. Crop rotation is practiced as follows to reduce the incidence of diseases and insects:
   a. Field has not been planted to tomato, eggplant or peppers for more than three years; **15** _____

   OR

   b. Field has not been planted to tomato, eggplant or peppers for two previous years; **10** _____

   OR

   c. Field has not been planted to tomato, eggplant or peppers in the previous year. **5** _____

3. Fields have been evaluated with an appropriate soil test for nutrient status and pH for the current year. **10** _____

4. Fertilizer is applied in accordance with current soil test results and expected uptake of nutrients and expected crop yield, giving credit for nitrogen supplied by organic matter, compost, manure and cover crops. Expected nutrient uptake is determined from the *New England Vegetable Management Guide.* **15** _____

5. Soil organic matter status has been tested within three years. The nitrogen contribution of the organic matter has been calculated and fertilizer application is **10** _____

6. *If compost or manure is applied, its nutrient (NPK) contribution is calculated, and fertilizer application is adjusted accordingly.* **5** _____

7. To minimize nutrient leaching, one of the following is done:
   · Nitrogen fertilizer is applied by split application. One application of 50 - 80 lb./acre is made just before planting, and one or more applications are made as sidedress (or through trickle irrigation). **10** _____
   · Some fertilizer is applied in a broad band in the bed and covered with plastic, at planting. This increases nitrogen availability to the plant and reduces risk of leaching. **5** _____

8. A nitrate test is taken before side-dressing to determine the level of nitrate-N available, and the amount of side-dressed N is adjusted accordingly. **5** _____

9. *If nitrogen is applied as a side-dress, it is a nitrate form of N (e.g. calcium nitrate) to reduce likelihood of calcium deficiency and blossom end rot.* **5** _____

10. Irrigation is provided during periods of inadequate rainfall to minimize plant stress and related problems. **10** _____

11. Trickle irrigation system is used to minimize leaf wetness periods. **5** _____

12.	*If trickle irrigation is used and side-dressing is needed, N is fed through a trickle irrigation system under plastic mulch in several applications (preferably 5 or 6 equal biweekly treatments) over the course of the season.*	5	
13.	Crop residue is turned under (plowed or disked deeply) shortly after harvest.	5	
14.	This year's crop was preceded by a winter cover crop.	5	
15.	*If the cover crop was a legume or legume/grass mix, its nitrogen contribution is calculated and fertilizer for this year's crop is adjusted appropriately.*	5	
16.	Low areas of the field are not planted, or are planted to crops that are not susceptible to *Phytophthora capsici* (such as cucurbits, eggplant, pepper, tomato).	10	
17.	Soil drainage is maintained or improved by subsoiling.	10	
18.	Irrigation systems are designed and maintained to avoid standing water in any areas of the field.	5	

Total practice points for Soil Nutrient Management and Cultural Practices
Total possible points for Soil Nutrient Management and Cultural Practices 125

Pesticides Application and Records

Only pesticides approved and registered for peppers in the state are used. Records of pesticide applications are maintained, including date, field and block, target pest, crop stage pesticide name and EPA number, formulation, rate and number of acres treated. Pesticide drift is minimized. Re-entry and pre-harvest intervals are adhered to. ***Win-PST analysis is conducted for all pesticides considered for use on the farm****.*

1.	Only pesticides with a LOW or VERY LOW environmental hazard (Win-PST) are used all major pests (includes insects, diseases and weeds).	20	
	OR		
	Only pesticides with a LOW or VERY LOW environmental hazard (Win-PST) are used for at least one major pest.	10	
2.	Pesticide application equipment is calibrated at the start of the season and the procedure is recorded.	10	
3.	Calibration is checked at least once during the season and equipment is recalibrated as needed.	5	
4.	Records of planting dates and stage of crop of treated fields are maintained.	5	
5.	Water-sensitive spray cards have been used to test the coverage of leaf surfaces in this crop within the past five years, using current pesticide application equipment.	10	
6.	A boom sprayer (not an airblast sprayer) is used for foliar applications of pesticides, to reduce spread of bacterial disease.	15	

Total practice points for Pesticides Application and Records
Total possible points for Pesticides Application and Records 65

Disease Management

Disease management includes the many cultural practices. See previous section on nutrient and soil management and cultural practices. Preventative fungicides are generally not recommended unless the field has a history of disease or weather conditions are particularly favorable for disease development. Written records are kept indicating the results of monitoring, disease forecasting, and disease identification. Diseases include early and late blight, bacterial canker, Septoria leaf spot, Anthracnose, Verticilium, Fusarium, and Sclerotinia white mold.

Prior to field planting:

1. Tomato seed has been (MAXIMUM of 15 points):
   - tested and found to be disease-free, **AND/OR** **5** _____
   - treated with sodium hypochlorite, **AND/OR** **10** _____
   - hot water, at temperature and time sufficient to kill pathogens, is used to treat seed. **15** _____
2. Plants with resistance to soil-borne diseases (e.g., Verticilium, Fusarium) or foliar diseases (e.g., early or late blight) are grown. **10** _____
3. Transplants are grown in-state. **5** _____
4. *If transplants are grown on-farm, preventative practices are followed (maximum of 15 pts):*
   - *The growing medium does not include field soil.* **5** _____
   - *Transplants are grown in a separate greenhouse from ornamental crops.* **5** _____
   - *Sanitation practices in the greenhouse include cleaning of benches, trays, hose nozzles, etc. with a disinfectant and avoiding contamination of the transplant medium and hose nozzles.* **5** _____
   - *Greenhouse is kept weed-free.* **5** _____

In the field:

1. Plants are grown in stake and weave culture, which can help reduce early blight. **10** _____
2. *If early and late plantings are made, they are grown in separate (isolated) fields to reduce movement of foliar disease into late plantings.* **5** _____
3. High tunnels are employed for early season crop to reduce early blight and other foliar diseases. No chemicals are used for disease control. **10** _____
4. Soil surface around plants is covered to reduce splashing of soil pathogens onto leaves. Cover may include plastic or organic mulch or cover crop residue. **10** _____
5. Fields are monitored weekly for disease. Scouting results are recorded, including disease symptoms and percent infected plants and foliage. **15** _____
6. *If disease problems occur, diseases are accurately identified (using the help of consultants or a diagnostic laboratory if needed).* **10** _____
7. Chemical applications include materials which increase plant resistance to disease. **5** _____
8. *If the farm has a history of bacterial diseases of tomato, copper materials are used within 4 weeks after planting.* **5** _____
9. Initial fungicides for control of early blight and Septoria leaf spot are triggered by date (first week of July) or disease forecasting (TOM-CAST, accumulation of 35 DSV since planting), or first occurrence of leaf symptoms **10**
10. After July 1, scheduling of fungicides for control of early blight and Septoria leaf spot is based upon one of the following:
    - 〈 Disease forecasting (cumulative TOM-CAST DSV = 15, since previous spray), based upon local or regional weather information. OR **15** _____
    - 〈 If weather conditions favor disease development (i.e. long leaf wetness periods and warm temperatures). Weather information is recorded. **10** _____
    - 〈 Residual period of fungicidal products. **5** _____
11. Fungicides and bactericide are applied only when the application will be followed by a drying period of at least two hours. **5** _____
12. Precautions are taken to avoid spreading pathogens during pruning and tying of plants, including working the crop only when plants are dry. **5** _____
13. *If late blight occurs locally, protectant or systemic fungicides are used to prevent the outbreak or spread of this disease.* **10** _____

Total practice points for Disease Management _____

Total possible points for Disease Management **115**

Insect Management

Major Pests: cutworms, aphids (esp. green peach aphid), pepper maggot, European corn borer, tomato hornworm

1.	Aphids are monitored weekly by direct observation of two fully expanded leaves per plant on at least 20 plants per field.	5	_____
2.	Insecticides are applied for aphid control only if aphid densities exceed 6 aphids per leaf. .	10	_____
3.	From transplant to fruit set, Colorado potato beetle and flea beetle are monitored weekly on at least 20 plants across the field. Defoliation estimates and percentage of clipped stems are recorded.	5	_____
4.	From transplant to fruit set, Colorado potato beetle and flea beetle controls are applied according to state-specified thresholds.	5	_____
5.	From fruit set through harvest, foliar pests (hornworms, spider mites, stink bug, tomato fruitworm, CPB and other occasional pests) are monitored through weekly scouting of foliage. If pests are present, numbers, percent infestation and/or percent defoliation are recorded.	5	_____
6.	From fruit set through harvest, fruit quality is monitored by examining 2-4 fruits per plants on at least 20 plants across the field. Insect damage and physiological disorders are recorded.	5	_____
7.	From fruit set through harvest, insecticides for foliar or fruit pests are applied only if pest numbers, foliage or fruit injury, or trap captures exceed state-specified thresholds.	10	_____
8.	*If tomato fruitworm (corn earworm) is historically a problem in tomato, flights are monitored on-farm with pheromone traps, according to state IPM guidelines.*	5	_____
9.	*If caterpillar control is needed (hornworm or fruitworm), microbial or low-risk insecticides are used for control.*	10	_____

Total practice points for Insect Management _____

Total possible points for Insect Management **45**

Weed Management

Major weed pests are summer annual grasses and broadleaves.

1.	This year's fields were scouted for weeds in the previous year, at mid- to late season. Weeds were identified and mapped. This information was used in the current weed management program	10	_____
2.	Weed management includes one or more of the following:		
	a. Herbicide use is supplemented by at least one cultivation or hand weeding;	5	_____
	b. Herbicide rates are reduced through banding of herbicides & cultivation;	10	_____
	c. No herbicides are applied and weeds are controlled through cultivation.	15	_____
3.	Weeds in fields, alleys and roadways are prevented from going to seed.	10	

4.	Fields are scouted in midseason for weeds. Location and species of uncontrolled weeds are mapped and the information is used in planning for next year.	10	
5.	Outbreaks of new or problem weed species are controlled, using chemical or non-chemical means, to prevent spreading or seed production.	10	
6.	*A trial plot is maintained to test a different weed management technique. The methods and results are recorded. Bonus*	10	
	Total practice points for Weed Management		
	Total possible points for Weed Management		55

Education

1.	Manager has a current copy of the *New England Vegetable Management Guide.*	5	
2.	Manager attends one or more state/regional/national Extension vegetable conference or educational program during the current year.	5	
3.	Manager subscribes to the UMass Extension *Vegetable Notes & IPM Message or other in-season vegetable pest alert.*	5	
	Total practice points for Education		
	Total possible points for Education		15

POINT SUMMARY

TOTAL POINTS	
TOTAL POSSIBLE POINTS	420
Percentage	%