Rutgers Cooperative Extension
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TOMATO IPM FIELD GUIDE (PROCESSING)

Preplant Decisions

1. Practice 3-year rotation from solanaceous crops (potatoes, tomatoes, pepper, eggplant) for disease control. **(292, 132)***
2. Treat seed with chlorine solution or use treated seed for control of bacterial diseases. Check transplants, especially southern grown, prior to planting. **(292)**
3. Plant resistant varieties. **(292)**
4. Apply lime and fertilizer according to soil test recommendations. **(1584)**
5. Use weed maps for selecting herbicides and weed control options for the season. Match preplant incorporated and preemergence herbicide rates to soil type and percent organic matter in each field. **(292)**

Transplant to First Bloom

PEST	Damaging Stage	Monitored Stage	SAMPLING Method	SAMPLING Frequency	THRESHOLD	NOTES
Flea Beetle **(144)**	adult	adult	Check field edges the first two weeks after transplanting.	weekly	No thresholds established	**Treatment:** Treat if plants seemed stressed by flea beetle feeding.
Colorado Potato Beetle (CPB) **(144, 80)**	adult larval	adult	**Overwintered CPB:** Check field edges closest to where a host crop was grown the previous year. **Succeeding Generations:** Sample 10 consecutive plants in each of 10 locations.	weekly	**Overwintered:** treat hot spots. **First Generation:** 15 CPB/10 plants. **Succeeding Generations:** see below. **(292)**	**Treatment:** Note presence of "hot spots" and spot treat for overwintering CPB.

Disease	Sampling	Frequency	Threshold	Notes
Bacterial Speck Bacterial Spot **(99, 159)**	Random sample for this disease while scouting for CPB. **Speck:** Look for round, dark brown to black spots, often with a more intense green halo. **Spot:** Look for circular brown leaf spots, appearing watersoaked during rainy periods or when dew is present. Yellowing of leaflet may occur when many lesions are present. **(159)**	weekly	presence of disease	Cool, moist conditions favor development of bacterial diseases. Often comes into fields on transplants and spreads rapidly with favorable environmental conditions. Bacterial speck and spot look very similar on foliage. **Stay out of infested fields when leaves are wet. Take care not to spread disease with field equipment.**
Septoria Leaf Spot **(102, 168, 600)**	Random sample five 30 ft. sections of row looking for circular, tan lesions with black specks in center on leaves.	weekly	presence of disease	Commonly associate with infected transplants. Early disease spread favored by cold, wet springs. Optimum temperature for disease development 77^{o}F. **(102, 303)**
Early Blight **(78, 319, 600, 1225)**	Begin collecting data at transplanting, using information from TOM-CAST forecasting system. Disease Severity Values = DSV	Collect data 2x per week	35 DSV from transplanting; 18-22 DSV thereafter	

First Bloom to Early Fruit Set (Sampling scheme valid for 40 acre field. Larger fields may require additional sampling sites.)

Pest	Damaging Stage	Monitored Stage	Sampling Method	Sampling Frequency	Threshold	Notes
Colorado Potato Beetle (CPB)** **(144, 80)**	adult larval	adult larval egg	Random sample 10 consecutive plants in 10 locations. Record # of adults, # of large larvae (>3/16"), # of small larvae (< 3/16"), # of egg masses, # of hatched egg masses and % defoliation.	Weekly	**Chemical control:** 50% of first generation larvae hatched + >20 CPB adults or larvae per 10 plants + defoliation of about 20%. **Bt insecticides**: egg masses on 10% of plants + 30% of masses hatched.	**Precaution for Bt insecticides:** If rain occurs within 24 hours of application, re-apply as soon as possible. No rain - re-apply within 5 - 7 days. Not effective against large larvae or adults. **(526)**
Green Peach Aphid Potato Aphid **(144, 50, 611)**	all	all	While scouting for CPB, look for signs of aphid injury = leaf curling, wilting, presence of honeydew. If present, examine 50 terminals throughout the field. Determine % of terminals infested. **(526)**	Weekly	>20% of terminals infested and natural controls not present. **(1390)**	Predators, parasites & a fungus disease reduce aphid populations. Diseased or parasitized aphids turn brown and remain stuck to the leaves. **(1390, 526)**
Leafminer **(132, 319)**	larval	larval	Check same plants as CPB for presence of mined leaves. Record # of plants infested & monitor for increasing populations.	Weekly	Treat if easily found and numbers are increasing.	
Spider Mite **(144)**	adult immature	adult immature	Observe plants near field edges. Rate infestations as absent, light, moderate or heavy. Record % of field infested. **(526)**	Weekly	No thresholds established but, treat if there is significant plant injury	Late summer: check during periods of hot, dry weather. Localized infestations can be spot treated.

Disease	Sampling	Frequency	Threshold	Notes
Bacterial Speck Bacterial Spot **(99, 159)**	Random sample for this disease while scouting for CPB. **Speck:** look for slightly raised black spots (fly speck like) surrounded by a dark green halo on immature fruit. **Spot:** starts as small black specks on green fruit, enlarging to brown scabby spots which are crater-like and may be surrounded by a light halo.	Weekly	presence of disease	Cool, moist conditions favor development of bacterial diseases. Spreads rapidly with favorable environmental conditions. Bacterial speck and spot look very similar on foliage. **Stay out of infested fields when leaves are wet. Take care not to spread disease with field equipment.**
Septoria Leaf Spot **(102, 168, 600)**	**If not using TOM-CAST forecasting system**: Random sample five 30-ft. sections of row looking for small dark watersoaked spots on older leaves. These enlarge to form circular spots about 3mm in diameter having black or brown borders with gray centers peppered with tiny black specks. If there are many spots, the leaf dries up and falls off.	Weekly	presence of disease	Lesions on stems, pedicels and petioles are elongated. Disease overwinters on nightshade, horse nettle, jimsonweed, and groundcherry. Splashing rain and wind spread the disease. Optimum temperature for disease development 77^{o}F. **(102, 303)**

First bloom to early fruit set, continued

Disease	Sampling	Frequency	Threshold	Notes
Early Blight **(78, 319, 600, 1225)**	**If not using TOM-CAST forecasting system**: Random sample five 30-ft. sections of row. Look for small black lesions on lower mature leaves. Older lesions appear leathery, have blackened concentric rings and a yellow halo.	Collect data 2x per week	35 DSV from transplanting; 18-22 DSV thereafter	

Early Fruit Set to Maturity

Pest	Damaging Stage	Monitored Stage	Sampling Method	Sampling Frequency	Threshold	Notes
Colorado Potato Beetle (CPB) **(144, 80)**	adult larval	adult larval	Scout CPB as above. Record number of plants exhibiting fresh feeding injury. Note whether population is increasing or decreasing.	weekly	>10% defoliation >2% of plants with fruit feeding injury	**Treatment:** To avoid development of resistance, do not use imidacloprid on second generation CPB.
Tomato Fruitworm (Corn Earworm or CEW) **(381, 94)**	larval	adult larval egg	When CEW catches in blacklight traps reach 100/5 nights, scout 20 green fruits $\geq$ 1 inch in diameter in 10 locations. **Using pheromone traps:** when 20 moths/week are caught, scout 10 consecutive plants in 5 locations. Examine leaves from the top of the plant down to the most recent fully expanded leaf for egg masses. **(1586)**	weekly	5 CEW damaged fruit per 200 fruit **For use with pheromone traps:** 20 moths/week + presence of eggs on leaves sampled. **(1586)**	**Pheromone Trap Scouting:** valid for 5 acres; add 1 sampling site for each additional 3 A. Within 1-6 days after hatching, larva bore into stem end of green fruit. A single larva will often damage several small green fruit. **CEW must be controlled before entering the fruit.** Repeat treatments may be necessary if adult populations remain high. Processors often reject CEW contaminated fruit because it is difficult to separate out. **(381, 1586)**

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Bacterial Speck Bacterial Spot **(99)**	Random sample for this disease while scouting for CPB. **Speck:** look for slightly raised black spots (fly speck like) surrounded by a dark green halo on immature fruit. **Spot:** starts as small black specks on green fruit, enlarging to brown scabby spots which are crater-like and may be surrounded by a light halo.	weekly	presence of disease	Cool, moist conditions favor development of bacterial diseases. Spreads rapidly with favorable environmental conditions. **Stay out of infested fields when leaves are wet. Take care not to spread disease with field equipment.**
Early Blight **(78, 319, 600, 1225)**	**If not using TOM-CAST forecasting system:** Random sample five 30 ft. sections of row. Look for small black lesions on lower mature leaves. Older lesions appear leathery, have blackened concentric rings and a yellow halo. .	Check TOM-CAST twice weekly, scout weekly.	TOM-CAST 35 disease severity values (DSV) from transplanting; 18-22 DSV thereafter.	

Early Fruit Set to Maturity, continued

Disease	Sampling	Frequency	Threshold	Notes
Late Blight **(168, 600)**	**Use Blite-Cast forecasting system.** Scout areas with poor air circulation scanning entire plant including fruit. Look for water soaked leaf spots.	Check Blite-Cast twice weekly, scout weekly.		Suspect lesions may be held in moist chamber & checked for sporulation after 12 - 24 hours. If late blight is found on potatoes or tomatoes in the area, apply control.
Septoria **(102, 168, 600)**	**Use TOM-CAST forecasting system.** Sample the same as early blight looking for small dark brown pimple-like structures.	Same as early blight.	Same as early blight.	Commonly associated with infected transplants. Fungus prefers cold, wet springs for early disease spread. Optimum temperature for disease development: 77^{o} F. **(303, 102)**

Ripening Fruit

Disease	Sampling	Frequency	Threshold	Notes
Anthracnose **(101)**	**Use TOM-CAST forecasting system OR:** Monitor fruit. Most severe in red fruit in first cluster, on surface of fruit near ground. Found in moist, low areas, shady spots of field or areas bordering woods so 2 of 10 sites scouted should be in these locations. **(303)**	same as above	Same as early blight.	TOM-CAST forecasting for controls for early blight effective for controlling anthracnose as well. **(303)**

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***Bolded numbers in parenthesis indicate sources of additional information found in the Mid-Atlantic IPM Database by this special reference number.**