University of Delaware Cooperative Extension & Rutgers Cooperative Extension
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MUSKMELON IPM FIELD GUIDE

Pre-planting Decisions

1. Use a combination of cultural practices to reduce problems from seed corn maggot:
    - plow down cover crops 3-4 weeks before planting.
    - completely bury cover crops or previous crop residues to reduce adult fly attraction to rotting organic matter.
    - avoid use of heavy manure applications close to planting.
    - allow manure to age before incorporating.
    - in direct seeded fields, attach a set of drag chains behind the planter to reduce the moisture gradient.
    - use seed treatment.
2. Select varieties for disease resistance and rotate crops. **(292)***
    - maintain 5 year rotation between host crops for control of Fusarium wilt. **(292)**
3. Lime and fertilize according to soil test recommendations. **(1584)**
4. Identify weeds in each field and select recommended control options for those weeds. Map perennial or noxious weeds. Match preplant incorporated and preemergence herbicide rates to soil type and percent organic matter in each field. **(292)**

Plant Emergence to Three Leaf Stage

PEST	Damaging Stage	Monitored Stage	SAMPLING Method	SAMPLING Frequency	THRESHOLD	NOTES
Striped & Spotted Cucumber Beetles **(51, 52, 179)**	larval adult	adult	Scout 5 plants in 5-10 random locations. Begin at plant emergence or transplanting.	2x per week	presence of beetles	Feeding injury & disease transmission most important before runner formation. During hot windy days, look for beetles hiding in cracks in the soil surface or under plastic mulch. If soil insecticides were used, check during cool, wet conditions.

Three Leaf Stage to Harvest Maturity

PEST	Damaging Stage	Monitored Stage	SAMPLING Method	SAMPLING Frequency	THRESHOLD	NOTES
Melon Aphid Green Peach Aphid (GPA) **(179, 419)**	all	all	Begin as soon as plants form runners. Look for wilting and curled leaves; found in small scattered spots throughout the field. Scout 5 runners in 5-10 sites. Check plants with wilted or curled leaves. Record % of runners with $\geq$ 5 aphids/leaf. Note species of aphid present.	weekly	$\geq$20% runners with $\geq$ 5 aphids/leaf + low beneficial insect populations	**Treatment:** Check level of natural controls when making treatment decisions. Treatment options dependent on aphid species predominating in field. Treat only infested areas of a field, if population is localized. Overuse of pyrethroids kill predators/parasites that help keep aphid populations under control. **(292, 335, 1390)**

PEST	Damaging Stage	Monitored Stage	SAMPLING Method	Frequency	THRESHOLD	NOTES
Twospotted Spider Mites (179)	adult immature	adult immature	**Early:** check 5 crown leaves in 5-10 sites near grassy areas, rye windbreaks or the sandiest areas of field. Use a hand lens to identify live mites on the underside of leaves.	weekly	10 - 15% of crown leaves infested with mites	**Sampling:** Shake crown leaves over white paper & count specks that move. **DO NOT MOW GRASSY AREAS OR WINDBREAKS** which harbor mites since this forces their dispersal into crop.
Thrips (34)	adult nymph	adult nymph	Examine 5 crown leaves in 5 - 10 locations. Rate feeding injury as low, moderate or heavy	weekly	No thresholds available. Treatment may be indicated if populations are heavy, feeding injury is evident & plants are not actively growing.	Thrips are generally found on undersides of leaf producing a silver flecking near large veins.
Potato Leafhopper (10)	adult nymph	adult nymph	Examine 5 runners in 5 - 10 locations for nymphs. Use sweep net for adults.	weekly	Controls will be needed if "hopper burn" is detected on leaf edges and injury is expected to retard fruit maturity and yield.	
Striped & Spotted Cucumber Beetles (51, 52, 179)	adult larval	adult	Random scout 5 plants in 5-10 locations. Rate populations as light, moderate or heavy.		**Treatment**: After runners form, transmission of disease is less likely & stem damage is rarely economic. High populations before and after bloom should be controlled to avoid larval damage to the fruit near soil surface. Feeding on small fruits results in reduced quality. This insect is sometimes referred to as "Rindworms".	

Sampling procedure for diseases: scout 5 plants in 5-10 random locations except where otherwise noted.

Disease	Sampling – what to look for	Frequency	Threshold	Notes
Bacterial Wilt (41, 52,151)	Look for wilting plants. Affected runners appear dark green at first and then become necrotic as the wilt becomes irreversible. Cut wilted runner close to crown of plant, rejoining cut ends, look for oozing bacterial strands as ends are pulled apart.	weekly	presence	Plants may wilt dramatically during the heat of the day, then recover by morning. **Treatment:** Control of "cucumber beetles" is essential for prevention of wilt. No controls available once disease is present.
Viruses (44, 151)	Symptoms include chlorotic mottling, distortion of leaves, mosaic, color breaking of fruit,	weekly	presence	**Early Season:** Practice strict aphid control. **Later:** Maximize distance between cucurbit plantings. Planting on reflective mulches helps repel aphid vectors. (44, 151, 292)
Fusarium Wilt (151)	Look for general wilt of the plant occurring sporadically in the field. May be one sided. A longitudinal necrotic lesion may develop in the stem near the crown and extend up the stem 20-50 cm.. (151)	weekly	presence	No controls available once disease is present. Use the information for planning rotations and selecting varieties. See "preplant decisions".

Disease	Sampling – what to look for	Frequency	Threshold	Notes
Downy Mildew **(49, 151, 168)**	First symptoms: small, slightly chlorotic to bright yellow areas on upper leaf surface appearing first on older crown leaves, progressing to younger more distal leaves as these expand. With age, the lesions may become necrotic and brown. Under favorable conditions, a downy colorless to light gray to deep purple appearance may be found on the underside of lesions. **(151)**	weekly from mid-July to harvest.	presence of disease	This disease, favored by moist conditions (heavy dews lasting till mid-morning) and temperatures between 50-80^{o}F with optimum 61-72^{o}F, generally does not occur until August. **NJ:** Check weekly Plant & Pest Advisory newsletter for occurrence of downy mildew in the region. Controls are required before disease appears. Use resistant varieties, where possible. **(49, 168)**
Alternaria Leaf Blight **(151)**	Small (0.5 mm) yellow brown lesions with light green or yellow halo on older leaves near the crown, expanding into large, brown necrotic area (up to 20 mm) usually showing concentric zonation. Lesions often coalesce. Leaves may develop a cupped appearance before dying. **(151)**	weekly	presence	Disease development favored by frequent rainfall. Minimum of 2 year rotation from any cucurbit, deep plowing and maximizing distance between cucurbit plantings are practices that help control the disease. Fungicide sprays are often started when plants start to run. **(151, 292)**
Scab (gummosis) **(45, 151)**	Initial symptoms: pale green, water-soaked areas on leaves & runners. The apical runners of young plants can be killed. Gradually the initial spots turn gray to white and may become "shot-holed" in appearance. A sticky substance may ooze from fruit followed by secondary invasion by soft rot bacteria. **(151)**	weekly	presence of disease	Favorable weather conditions: wet weather (valley fogs, heavy dews, light rains) and temperatures <70^{o}F with night temperatures <60^{o} F. Use resistant varieties when possible. Controls usually begin as true leaves form. **(292)**
Powdery Mildew **(168, 1585)**	Sample 5 plants in 5-10 random locations looking for yellow lesions on surface of older leaves. White mildew colony will be present on the under side of lesion. **(1585)**	weekly from mid-July to harvest.	one lesion per 45 older leaves	When threshold is reached, use an alternating treatment schedule to avoid development of fungicide resistance. **(292)**
Gummy Stem Blight **(47, 151)**	**Foliage symptoms:** Circular tan to dark brown lesions on leaf margins with black specks in center of lesion. **Fruit symptoms:** small, water soaked spots initially, enlarging to indefinite size and exuding a gummy material. Spots contain conspicuous black fruiting bodies. **(151)**	weekly from mid-July to harvest	presence	Occurs primarily in late summer. Rotation and the use of treated seed important cultural controls (see preplant decisions). Chemical controls usually begin when vines begin to run. **(292)**

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***Bolded numbers in parenthesis indicate sources of additional information found in the IPM database by this special reference number.**