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Update on Pest Management and Crop Development

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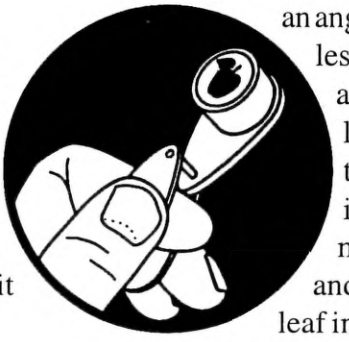
DISEASES

MILLENNIUM FEVER

2000 IS A PROBLEM YEAR FOR BACTERIAL SPOT!

(William Turechek, Plant Pathology, Geneva, and Deb Breth, Lake Ontario Fruit Team)



❖❖ Bacterial spot is a disease that affects virtually all stone fruits, but is particularly damaging to peach, nectarines, and apricots. As indicated by the name, bacterial spot is caused by the bacterium *Xanthomonas arboricola* (previously known as *Xanthomonas campestris* pv. *pruni*) . Except for Long Island, the disease does not typically cause significant losses in New York. This year, however, incidence of bacterial spot has been reported in several stone fruit orchards in Western New York and is impacting fruit sales. The disease is difficult to manage because 1) we grow susceptible varieties, 2) we have a limited number of effective pesticides, and 3) the effectiveness of any spray program is highly dependent upon appropriately timed pesticide applications (explained below). Because it is unlikely that any new chemicals to battle this disease will be introduced in the near future, we must focus on cultural practices that reduce disease development and upon improving application timing. To do this requires an understanding of how disease develops in an orchard.

Bacterial spot affects the fruit, foliage, and young woody growth (twigs). On leaves, symptoms typically begin as small, light green to whitish spots, eventually turning dark purple to brown as lesions expand and age. Leaf veins restrict lesion expansion, causing them to take on an angular appearance. Within 1–2 weeks, lesions are walled off, turn necrotic, and the center of the lesion falls out, leaving the leaves with a shothole or tattered appearance. Severe foliar infections result in leaf drop, which may significantly reduce tree vigor and winter hardiness. Bacteria from leaf infections may move into the current year's twig growth, leading to canker formation and providing an overwintering site for the bacteria. On fruit, the bacteria cause unsightly, dark-brown lesions and/or blemishes. Lesions often become sunken, the skin of the fruit cracks, causing deep pits that leave the fruit unmarketable.

The disease favors warm and wet weather and may particularly be a problem in orchards with a history of disease. Primary fruit and leaf infection occur as a result of frequent wetting events from full bloom to 4 weeks after shuck

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IN THIS ISSUE...

split. Along the lake in Niagara County, 35 days of rain totaling 13.4 inches was recorded during this time frame. Wind-driven rain or debris damage leaves and developing fruit, creating small wounds that the bacteria can enter, which can significantly influence the occurrence and severity of fruit and leaf infection and disease development. Disease does not develop under hot and dry conditions.

The most effective way to manage bacterial spot is to avoid planting varieties that are highly susceptible to this disease. Yet, this not always practical when processors ask for certain varieties such as Babygold #5 and #7 that are susceptible to bacterial spot and, unfortunately, many popular peach, nectarine, and apricot varieties are susceptible to the disease. Maintaining proper fertility is essential, as excessive growth or poor nutrition both increase a tree's susceptibility. However, chemical control is typically necessary to manage disease.

The spray program outlined in Table 1 is the result of research conducted at North Carolina State University by David Ritchie and is suggested for use in orchards that have had a history of bacterial spot. The best results are obtained when chemicals are applied during the growth stages indicated. When possible, disease control is most effective when chemicals are applied within a 24-hr period prior to anticipated rainfall, but with a sufficient time period for pesticide to dry. In wet or rainy seasons, additional applications of Mycoshield may be needed on a 10 to 14-day schedule and can be applied up to 3 weeks before harvest. Unfortunately, Mycoshield is labeled for use only on peaches and nectarines.

Dr. Ritchie outlined a program of control in North Carolina including Kocide starting at dormant using higher rates, followed at 1–5% bud swell using reduced rates, pink to 5% bloom with even lower rates, and petal fall to 1% shuck split. At 75% shuck split to 1% shucks off, he recommends a choice between continued copper application or Mycoshield. If wet weather continues for the few weeks after shuck fall, continue Mycoshield applications on a 7–10-day interval. There are other copper formulations that have bacterial spot written on the label but not all copper labels include control of bacterial spot. For example, Kocide is not labeled for use on apricots for bacterial spot, only brown rot, and the label warns of possible fruit damage if applied after bloom! Most copper labels warn against the possibility of phytotoxic effects on leaves or fruit if applied later than pink. All copper formulations reduce the rates on the label after dormant when leaves and fruit are present. Other copper formulations labeled include Champ and C-O-C-S.

If bacterial spot has not been a problem in your orchard, a dormant application of copper is still recommended as a preventive spray. This application can be timed to coincide with your peach leaf curl spray. It is important to note that copper can cause significant phytotoxicity to stone fruits. Therefore, it is suggested that copper be applied beyond bud swell only in orchards with high disease pressure, using the recommended rates, and under conditions conducive for rapid drying of the foliage. Under these conditions, copper

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Table 1. Spray program for managing bacterial spot in orchards with a history of the disease.

GROWTH STAGE	MATERIAL
Dormant (prior to bud swell)	Kocide 101 4-6 lb/acre OR Kocide DF 4-6 lb/acre OR Kocide LF 10.0 pt/acre
1-5% bud swell	Kocide 101 4-6 lb/acre OR Kocide DF 2.5 lb/acre OR Kocide LF 5.0 pt/acre
Pink to 5% bloom	Kocide 101 1.5 lb/acre OR Kocide DF 1.5 lb/acre OR Kocide LF 3.3 pt/acre PLUS Ziram 76DF 3.0 lb/acre
Petal fall to 1% shuck split	Apply same as used in pink to 5% bloom
75% shuck split to 1% shuck off	Kocide 101 1.0 lb/acre OR Kocide DF 1.0 lb/acre OR Kocide LF 1.5 pt/acre PLUS Ziram 76 DF 3.0 lb/acre OR Mycoshield 17W 0.75 lb/acre
7-10 days later	Mycoshield 17W 0.75 lb/acre
7-10 days later	Mycoshield 17W 0.50 lb/acre

has not caused phytotoxicity or fruit damage on cultivars grown in North Carolina. If you are unsure of a variety's sensitivity to copper, test the formulation on a few leaves under typical drying conditions. There is no firsthand research in NYS on bacterial spot in peaches and nectarine; so, for now, we will have to try out control recommendations in other states where labeled materials are available. The key for next year's control program will depend on the weather conditions from bloom through June.❖❖

INSECTS

BEFORE THE FALL

PARTING SHOTS
(Art Agnello, Entomology, Geneva)

❖❖ Although Labor Day is now behind us, we're not quite finished with some of those last niggling pest concerns for the season, particularly a couple that can cause unnecessary fretting but could be easily taken care of with a final judicious spray while you're waiting for the late apples to color.

Pearleaf Blister Mite

This is a sporadic pest of pears that shows up in a limited number of commercial pear orchards, and is a fairly common problem in home plantings. The adults are very small and cannot be seen without a hand lens; the body is white and elongate oval in shape, like a tiny sausage. The mite causes three distinct types of damage. During winter, the feeding of the mites under the bud scales is believed to cause the bud to dry and fail to develop. This type of damage is similar to and may be confused with bud injury from insufficient winter chilling. Fruit damage is the most serious aspect of blister mite attack. It occurs as a result of mites feeding on the developing pears, from the green-tip stage through bloom, causing russet spots. These spots, which are often oval in shape, are usually depressed with a surrounding halo of clear tissue. They are 1/4–1/2 inch in diameter and frequently run together. A third type of injury is the blistering of leaves; blisters are 1/8–1/4 inch across and, if numerous, can blacken most of the leaf surface. Although defoliation does not occur, leaf function can be seriously impaired by a heavy infestation.

The mite begins overwintering as an adult beneath bud scales of fruit and leaf buds, with fruit buds preferred. When buds start to grow in the spring, the mites attack developing fruit and emerging leaves. This produces red blisters in which female blister mites then lay eggs. These resulting new colonies of mites feed on the tissue within the protection of the blister, but they can move in and out through a small hole in its center. The mites pass through several generations on the leaves but their activity slows during the warm summer months. The red color of the blisters fades and eventually blackens. Before leaf fall, the mites leave the blisters and migrate to the buds for the winter.

A fall spray is recommended sometime in early October, when there is no danger of frost for at least 24–48 hr after the spray. Use Sevin 50 WP (2 lb/100), or 1–1.5% oil plus either Diazinon 50WP (1 lb/100 gal) or Thiodan 50WP (1/2–1 lb/100 gal). A second spray of oil plus Diazinon or Thiodan, in the spring, just before the green tissue begins to show, will improve the control.

Borer Clean-up

Lesser peachtree borer adults are still flying, and although they're on the way down, a post-harvest trunk spray of Lorsban or Thiodan will do a good job of preventing the last hatchlings of the year from getting established in your peach and cherry trees for next season.❖❖

PEST FOCUS

Highland: **Oriental fruit moth** increasing. **Aphid** numbers increasing.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–9/4):	3056	2019
(Geneva 1999 1/1–9/4):	3273	2288
(Geneva "Normal" 1/1–9/4):	3056	2179

Coming Events:	**Ranges:**	
Codling moth 2nd flight subsides	2518–3693	1705–2635
Peachtree borer flight subsides	2230–3255	1497–2309
Redbanded leafroller 3rd flight peaks	2514–3285	1818–2625
San Jose scale 2nd flight subsides	2494–3582	1662–2477
Spotted tentiform leafminer 3rd flight peaks	2415–3142	1728–2231
Apple maggot flight subsides	2764–3656	1904–2573
American plum borer 2nd flight subsides	2841–3698	1907–2640
Lesser appleworm 2nd flight peak	2843–3328	1844–2359
Lesser appleworm 2nd flight subsides	2775–3466	2002–2460
Lesser peachtree borer flight subsides	2782–3474	1796–2513
Obliquebanded leafroller 2nd flight subsides	2809–3656	1930–2573
Oriental fruit moth 3rd flight subsides	2987–3522	2018–2377
Redbanded leafroller 3rd flight subsides	3103–3466	2013–2402
Spotted tentiform leafminer 3rd flight subsides	3235–3471	2228–2472

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	8/24	8/28	9/5
Redbanded leafroller	0.2	0.1	0.3
Spotted tentiform leafminer	114	346	425
Oriental fruit moth	5.0	2.1	3.3
Lesser appleworm	5.8	4.0	3.7
Codling moth	3.2	2.0	1.9
San Jose scale	1.0	0.8	0.1
American plum borer	0.3	0	0
Lesser peachtree borer	0.7	0.5	0.1
Peachtree borer	0.3	1.3	0.4
Obliquebanded leafroller	0.2	0.3	0.1
Apple maggot	0.1	0	0

Highland, NY

	8/28	9/5
Redbanded leafroller	3.0	3.1
Spotted tentiform leafminer	145.1	41.8
Oriental fruit moth	0	1.3
Codling moth	0.6	0.6
Sparganothis fruitworm	–	–
Apple maggot	0.2	0.1
Lesser peachtree borer	0.9	–
Lesser appleworm	7.6	2.6
Dogwood borer	0.1	–
American plum borer	0.7	–
Obliquebanded leafroller	1.1	1.1
Tufted apple budmoth	0	0
Variegated leafroller	0.6	0.6

* first catch

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