TREE FRUIT

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Integrated Pest Management

Cherry Leaf Spot

Blumeriella jaapii (Rehm) Arx
(synonym = *Coccomyces hiemalis* Higgins)

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Leaf spot is a common and sometimes serious disease of sour cherries in the Northeast. In wet years, high levels of infection can cause trees to defoliate by mid-summer, leading to inferior crop quality, significantly reduced winter hardiness, poor return bloom the following spring, and reduced ability of blossom buds to withstand spring frosts. Sweet cherry trees also can be seriously affected, but are not as susceptible as sour cherries. Plums are occasionally affected, but seldom seriously.

Symptoms

Small dark red or purple spots, about 1/8" (3 mm) or less in diameter, first appear on the upper side of infected leaves. Under heavy disease pressure, spots (lesions) may be so numerous that some of them grow together. Individual lesions eventually turn dark brown in the center and may remain surrounded by a thin band of green tissue when the rest of the leaf turns yellow (figs. 1 and 2). On the underside of the leaf, lesions may appear slightly concave and are frequently covered with a fine white mass, particularly after periods of wet or humid weather (figs. 3 and 4). Infected leaves usually drop prematurely after they have tuned yellow (figs. 5 and 6).

Disease Cycle and Causal Organism

Cherry leaf spot is caused by the fungus Blumeriella jaapii (previously called Coccomyces hiemalis), which overwinters in leaves that became infected and fell to the ground during the previous growing season. In the spring, minute fruiting bodies (apothecia) are formed on the surface of the old lesions, and sacs (asci) of the spring or primary spores (ascospores) are formed on the apothecia. The first ascospores become mature about the end of bloom and are discharged into the air during rainy periods. Ascospores continue to mature and be discharged until about 6 wk after petal fall. The optimal temperatures for ascospore discharge are 61°F (16°C) and higher, whereas very few ascospores are discharged at temperatures below 46°F (8°C).

Infection occurs through the breathing pores (stomates) on the underside of the leaves. Because stomates do not finish developing until a leaf has unfolded, leaves are resistant to infection until this time (usually, around petal fall). Ascospores germinate in a film of water and can continue growing and cause infection if the leaf remains wet long enough at the prevailing temperature (table 1). Lesions form about 5 to 15 days after infection starts, depending on temperature and relative humidity. Lesion development is fastest at temperatures of 60–68°F (15–20°C) and high humidity.

Once lesions have developed, masses of secondary or summer spores (conidia) are formed from the slightly concave eruptions (acervuli) on the underside of the leaf. It is this mass of conidia that provides the white appearance to the underleaf lesions (Figure 4). Conidia are spread to other leaves by splashing raindrops and are capable of causing new infections (each producing thousands of additional conidia) under the temperature and wetness conditions listed in table 1. Serious leaf spot damage usually occurs in years with numerous rainy periods throughout late spring and summer, when repeated secondary infection cycles allow the disease to snowball into an epidemic.

Figure 1.

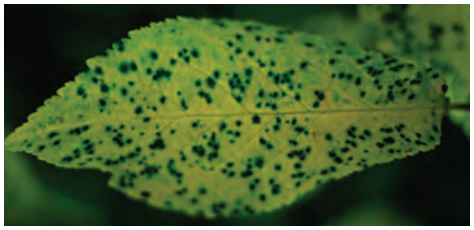


Figure 2.

Figure 3.

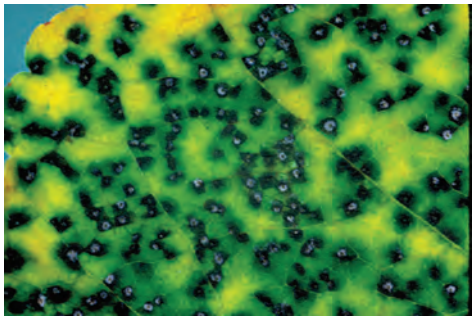


Figure 4.

Figure 5.

Figure 6.

Control

Leaf spot is controlled primarily with fungicide sprays. The intensity of spray programs can be adjusted to account for the level of overwintering (primary) inoculum, rainy periods that provide infection conditions, the presence of new lesions bearing secondary inoculum, and crop susceptibility (e.g., sour cherry varieties generally require more intense programs than sweet cherry varieties).

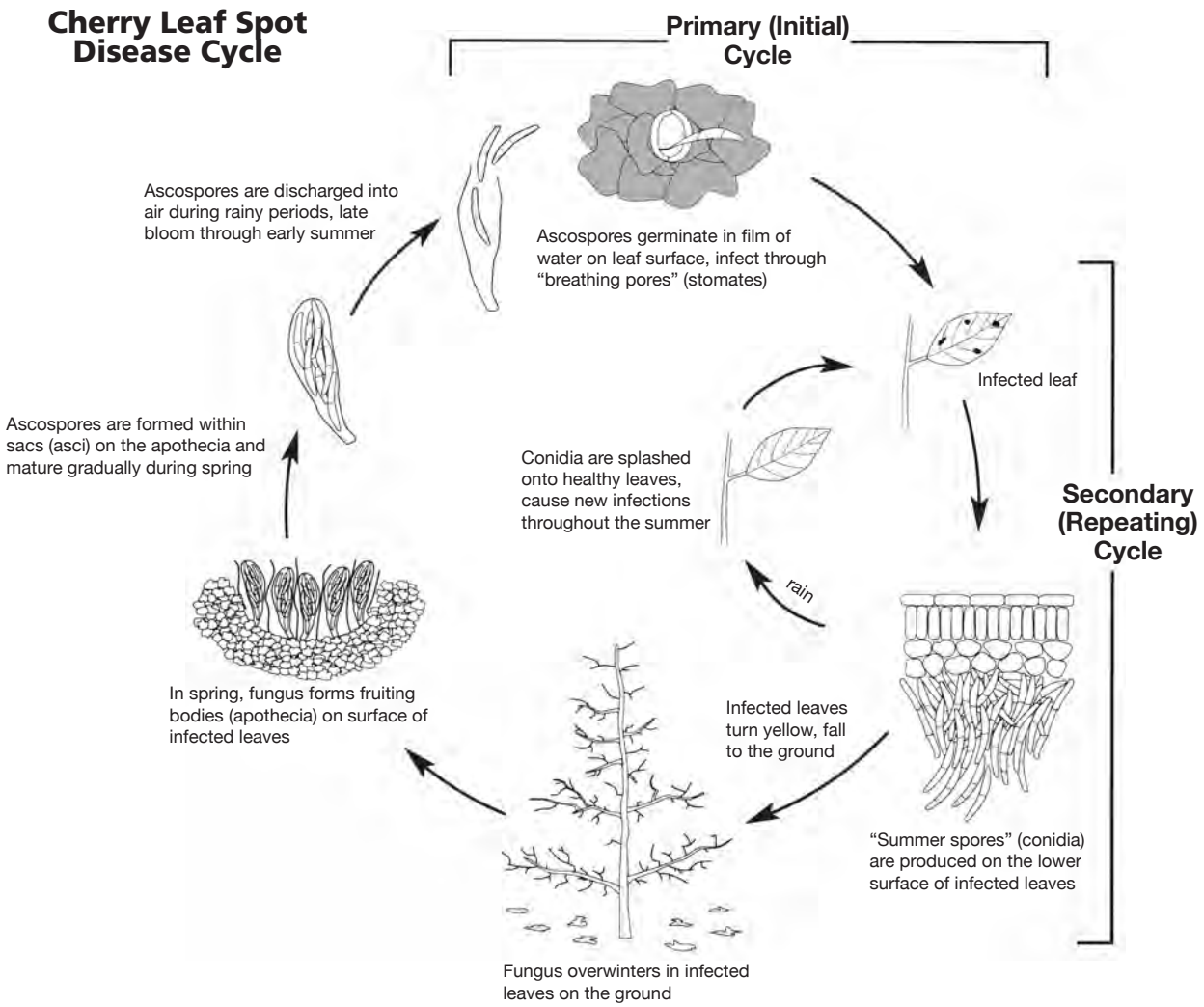
Spray programs do not usually need to start until petal fall and sometimes can be delayed further if primary inoculum levels are low because disease was well controlled the previous year. In contrast, spraying early in the season is important if primary inoculum levels are high. Because serious damage is usually caused by repeated secondary infection cycles, it is particularly important to maintain good control throughout extended rainy periods. Protection may be needed until 2 to 3 weeks after harvest.

Destruction of leaf litter should reduce primary inoculum levels and therefore also the number of fungicide sprays needed to control this disease. Although such an approach may not be practical for many commercial growers, it may be useful for small operations or individuals interested in exploring alternative management practices. The effectiveness of such a program and the number of sprays it might save are unknown.

Table 1. Approximate minimum number of hours of leaf wetness required to produce leaf spot infections caused by conidia on sour cherry[a]

Average temperature (°F)	Wetness (Hours)[b]	Average temperature (°F)	Wetness (Hours)
46	28	61-62	6
47	25	63-68	5
48	23	69-70	6
49	20	71-72	7
50	19	73	8
51	17	74	9
52	15	75	11
53	14	76	12
54	12	77	14
55	11	78	16
56	10	79	18
57	9	80	21
58	8	81	28
59-60	7		

[a]Requirements for primary (ascospore) infections are presumed to be similar
[b]Hours of wetness from the beginning of the rain. Data of S. Eisensmith and A. Jones (Michigan State University).



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