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Putting a Sooty Blotch-Flyspeck Warning System into Practice

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Abstract
A sooty blotch flyspeck (SBFS) warning system, developed in North Carolina and modified in Kentucky, extends the period between first-cover and second-cover fungicide sprays until a total of 175 hours of wetness has been measured in the orchard canopy. After second cover,sprays are made at 2-week intervals until harvest. In our replicated field experiments, the warning system was consistently as effective as calendar based spray timing in suppressing SBFS and other summer diseases (secondary scab and fruit rots). But in our demonstration trials in commercial orchards, the warning system resulted in commercially unacceptable levels of SBFS in 12 of 28 site-years.

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Introduction

A sooty blotch flyspeck (SBFS) warning system, developed in North Carolina and modified in Kentucky, extends the period between first-cover and second-cover fungicide sprays until a total of 175 hours of wetness has been measured in the orchard canopy. After second cover, sprays are made at 2-week intervals until harvest.

In our replicated field experiments, the warning system was consistently as effective as calendar-based spray timing in suppressing SBFS and other summer diseases (secondary scab and fruit rots). But in our demonstration trials in commercial orchards, the warning system resulted in commercially unacceptable levels of SBFS in 12 of 28 site-years.

By analyzing the trials where SBFS control was unacceptable, we concluded that two factors—inadequate pruning and low-volume spraying—were most responsible. Inadequate pruning can reduce control of SBFS, scab, and other diseases, both by blocking spray penetration and slowing dryoff after rain or dew periods. Because of labor shortages, however, apple growers sometimes cannot prune all blocks annually, and SBFS damage is often greatest where pruning has fallen behind schedule.

After seven years of field experiments and on-farm demonstrations, we have reached the threshold of wide-scale implementation of the SBFS warning system in the North Central Region. To make implementation a reality, the remaining tasks are: 1) to show how pruning and fungicide-spray volume impact SBFS control using the warning system; 2) to validate reliable wetness-monitoring technology; 3) to calculate the economic impact of shifting an orchard from calendar-based spray timing to the warning system; and 4) to make all growers in the region aware of the warning system and how to use it effectively. Our project will complete these tasks in order to bring the SBFS warning system to operational reality.

The objective of this research is to determine pruning, spray-volume, and wetness monitoring practices that provide convenient, reliable control of SBFS when using the warning system.

Materials and Methods

We are conducting the experiments in Iowa and Wisconsin, in both states trials have been set up on university research farms. In Iowa we used Chieftain Apples (M7 rootstock; spacing 12 ft × 25 ft) planted at the Horticulture Research Station in a randomized complete block design (4 trees/replicate) with 8 treatments: a factorial combination of 2 pruning treatments × 4 fungicide-spray volume treatments. Trees were pruned the winter of 2005-2006. Fungicide treatments are applied with an airblast sprayer.

In Iowa the treatments applied to pruned and unpruned trees are:

- **200 gal/acre –** we are using the SBFS warning system to time the second cover spray.
- **100 gal/acre –** we are using the SBFS warning system to time the second cover spray.
- **48 gal/acre –** we are using the SBFS warning system to time the second cover spray.
- **Unsprayed control**: No fungicide sprays after petal fall.

Following second cover spray, all treatments will be sprayed with 48 gal/acre every 14 days

until harvest to most closely emulate treatment rates growers are using in the Midwest.

Results and Discussion

We rated the severity of sooty blotch and flyspeck by the percentage of the apple surface covered with darkened mycelia. We rated 50 apples from each tree (25 from the top half of the tree, 25 from the lower half). Our results showed that the unsprayed controls had more severe sooty blotch and flyspeck. The treatments all had very similar levels of sooty blotch flyspeck despite the differing spray volumes and pruning regimes (Table 1).

Table 1. The average number of apples (out of 50) with no SBFS colonies, or with 2%, 3%, 5%, 6% of their surface with colonies.

Treatment	No SBFS	2% covered	3% covered	5% covered	6% covered	Total with SBFS
Pruned, 200 gal/acre	29.6a	15.3ab	4.1cb	0.5bc	0.0c	19.9b
Pruned, 100 gal/acre	32.9a	14.5ab	2.4c	0.1c	0.0c	17.0b
Pruned, 48 gal/acre	32.1a	14.4b	2.7c	0.6bc	0.0c	17.7b
Pruned, unsprayed	12.4b	19.4a	13.1a	3.6a	1.3a	37.4a
Unpruned, 200 gal/acre	32.8a	13.5b	3.5c	0.3c	0.0c	17.3b
Unpruned, 100 gal/acre	33.3a	14.7ab	1.8c	0.3c	0.0c	16.7b
Unpruned, 48 gal/acre	33.9a	13.9b	1.9c	0.4bc	0.1bc	16.3b
Unpruned, unsprayed	20.4b	18.3ab	8b	2.1ab	1.0ab	29.4a

Means within columns followed by the same letter are not different.