

## Refining and Validating a Fungicide Timing Model for Controlling Flyspeck on Apples in the Hudson Valley

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### Introduction

Flyspeck is caused by the fungus *Zygothiala jamaicensis* and appears during late summer as superficial blemishes on apple fruit. Development of flyspeck is favored by the hot and humid summer climate in the Hudson Valley, but this disease causes commercial losses throughout the Northeast in wet years. Inoculum for flyspeck infections on apples probably originates with host plants outside of the orchard. More than 100 plant species are hosts for this fungus. Researchers in Massachusetts have reported that disease incidence in unsprayed orchards was significantly higher in trees located within 90 meters of external inoculum sources. Disease incidence is also greater in orchards with poor air drainage because trees dry more slowly following rains and dews.

Apple fruit can become infected by the flyspeck fungus soon after petal fall, but symptoms of flyspeck rarely appear on apple fruit before late-August in southeastern New York. The incubation period between infection and appearance of symptoms varies from a minimum of 14 days to more than 70 days under field conditions. Long incubation periods occur when environmental conditions are less favorable for fungal growth, as during the cooler weather of September and October or during hot dry weather in mid-summer. The incubation period in commercial orchards is also extended by post infection applications of fungicides that suppress but do not eradicate pre-existing infections.

Devising low-spray strategies for flyspeck has been complicated by the long incubation period between infection and symptom development. Most growers still apply fungicides at 3-4 week intervals throughout summer even during dry periods when fungicides may not be needed.

A fungicide timing model was devised to help growers in New York, Michigan, and New England optimize timing of summer fungicides applied to control flyspeck. The model was based on the following guidelines for timing summer sprays:

1. The last spray for apple scab (usually first or second cover spray) will provide the residual activity equal to the shorter of either 21 days or 3.5 inches of accumulated rainfall if mancozeb fungicides are used in the last scab spray or 14 days or 2 inches of accumulated rainfall if captan is used in the last scab spray.
2. After the residual activity of the scab fungicides is depleted, a "protection gap" of 100 hours can be tolerated without adverse effects on fruit quality.
3. After the 100-hour protection gap, Benlate-captan or Benlate-ziram fungicide sprays must be applied throughout the remainder of the summer with maximum intervals of 21 days or 3.5 inches of accumulated rainfall.

The three rules for timing fungicide sprays comprise the NY Flyspeck Model. The model was developed using data from small research plots where fungicide applications were made with a handgun. This report covers results from the second year of testing in commercial orchards where sprays are applied with an airblast sprayer.

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