Survey of New England Apple Growers On Using Sanitation and Delaying Early-season Fungicide Applications

Renae Moran[1], Glen Koehler[1], Cheryl Smith[2], George Hamilton[2], William MacHardy[2], Lorraine Berkett[3], Heather Faubert[4], Mary Concklin[5], Arthur Tuttle[6], Jon Clements[6] and Daniel Cooley[6]

[1]University of Maine; [2]University of New Hampshire; [3]University of Vermont; [4]University of Rhode Island; [5]University of Connecticut; [6]University of Massachusetts

A survey was conducted in spring 2012 to learn about the extent to which New England apple growers know about and use sanitation and scab assessment methods that can reduce scab inoculum and in some cases allow them to eliminate very early fungicide applications. Growers were asked 11 questions using SurveyMonkey®, an online survey conducting program. Growers in Maine received an email invitation May 2 to take the survey, and growers in New Hampshire and Massachusetts received the same email invitation May 7. A reminder was sent June 1 to growers who had not yet completed the survey. Growers in Vermont, Rhode Island and Connecticut were invited to take the survey via a weblink, which was sent to them by email. Twenty-five growers in Maine received the survey by regular mail with five (20%) returning completed surveys by mail. By July 11, a total of 507 growers were invited to take the survey and 115 (23%) had responded.

Farm Size

Farm size ranged from 1 acre to over 50 acres. The number of acres represented was estimated to be 3170, based on the number of farms within each size category and the average farm size within each category. Farms greater than 50 acres were estimated to be 100 acres in size. Most farms were less than 10 acres, accounting for 52% of the farms in the survey (Figure 1). The relative number of midsized farms, or those farms that were 10 to 50 acres in size, accounted for 30%, and large farms represented the smallest sector accounting for less than 20%.

Sanitation

Growers were asked if they had used any sanitation method for scab reduction in their orchard. The majority, 67%, indicated that they had used some method of sanitation in their orchards. Growers who responded yes to this question were asked to indicate the number of acres on which they used sanitation in recent years. The estimated proportion of the total acres in the survey on which growers used sanitation was 41%, or 1300 acres. Growers who used sanitation did not use it on the entire orchard, but on an estimated 77% of their production

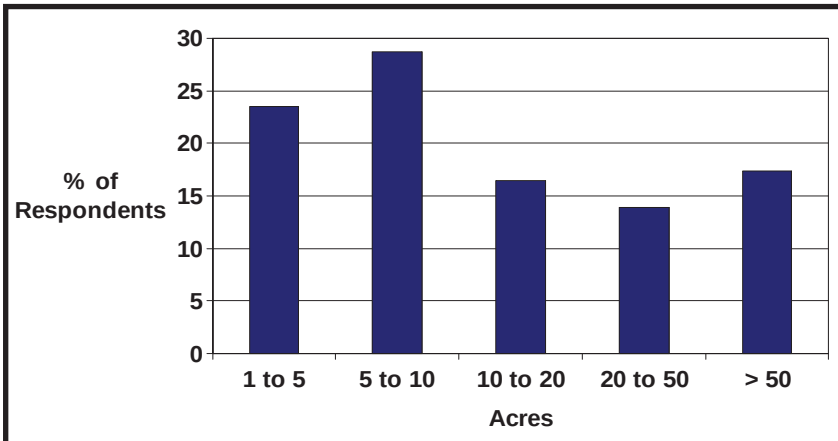

Figure 1. Number of farms, as a percentage, within each size range. Total number of respondents was 115.

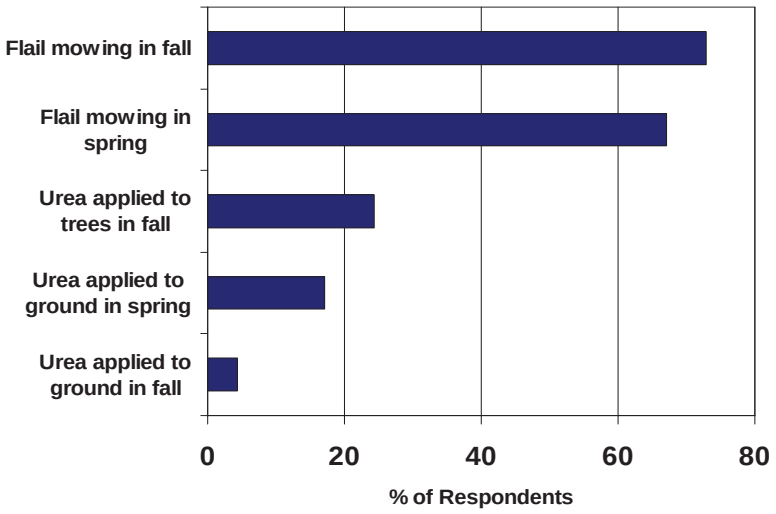

Figure 2. Scab sanitation methods used by New England apple growers. Total number of respondents was 70. Some growers indicated more than one method being used in their orchard.

acres.

Of the 70 growers who used santiation, the most common method was flail mowing in spring or fall, with 94% mowing once during either time and 46% respondents flail mowing in both spring and fall. Applying urea was used by 40% either directly to trees in fall or to the to the ground in spring. Few growers, 4%, applied it to the ground in fall.

Thirty-three percent of the growers indicated that they did not use sanitation in their orchards. The most common reasons for not using sanitation was not possessing a flail mower, indicated by 54%, and lack of time when it needed to be performed, indicated by 46%. Only 16% indicated that they did not know enough about scab sanitation to use it effectively.

Scab Indexing

The scab index, or potential ascospore dose (PAD), which is measured by counting the number of shoots that have scab in September or October, was not used as frequently as sanitation. Only 15% of growers surveyed indicated that they routinely do a scab index. Lack of time when it needed to be done was the most common reason, indicated by 37% of respondents, followed by not knowing how to do an index, indicated by 36%. Twenty-four percent indicated that scab indexing was not done because they will not delay the use of fungicides in spring. Four percent of growers indicated that they did not do indexing because their varieties were resistant to scab, and therefore an index was not needed.

Growers who measure the scab index do so to determine if they can save time and money by delaying the first fungicide application, or to measure the level of scab risk in their orchards as a way to more effectively manage the disease.

Delaying the First Fungicide

Since copper is applied as a fertilizer and for fireblight management, growers were asked when the first non-copper fungicide was applied. Most growers, 79%, apply the first non-copper fungicide at either green tip, or at half-inch green. Sixteen percent indicated that they apply their first scab fungicide at tight cluster or

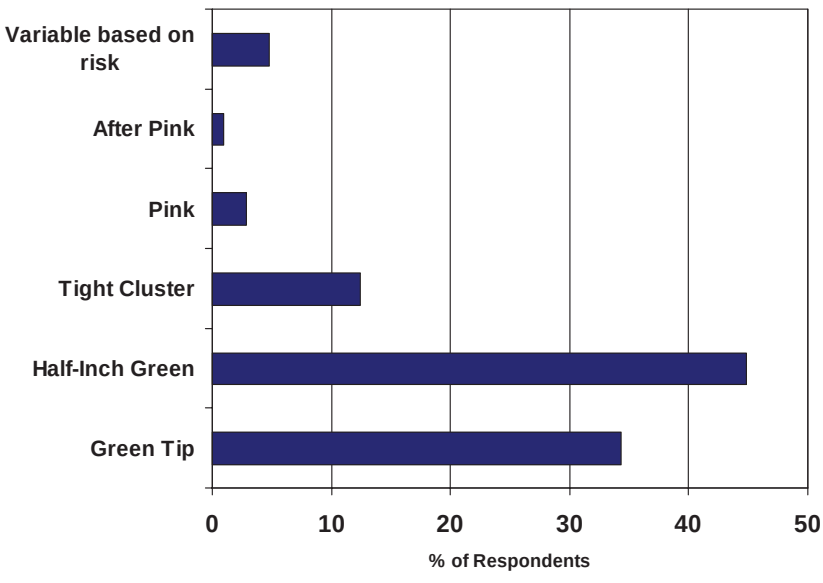

Figure 3. Bloom stage when the first noncopper fungicide is applied in apple orchards. Total number of respondants was 105.

Survey and Responses

1. Please, indicate the number of acres of managed apple orchards in your operation.	Response	Acres
1 to 5	25%	81
5 to 10	29%	248
10 to 20	17%	285
20 to 50	14%	560
>50	17%	2000
Total		3174
Answered question: 115. Skipped questions: 0		

2. Have you used scab sanitation methods in your orchard?	Response
No	33%
Yes	67%
Answered question: 115. Skipped questions: 0	

3. If you have NOT used scab sanitation, please indicate why (select all that apply).	Response
I do not know how to use scab sanitation.	16%
I do not think sanitation makes a difference in the amount of scab in my orchard.	16%
Scab sanitation requires extra time when I have none to spare.	43%
I want to winterize my sprayers and not use them in the fall when there is risk of freezing.	22%
Apple leaves do not fall early enough in the autumn to allow for ground application of urea before the ground is covered by snow.	30%
I do not have a flail mower.	54%
There is not enough time between removing winter prunings and bud break to do spring sanitation treatments.	45%
I cannot run a flail mower before budbreak because soil is too wet for tractor traffic or because the flail will do too much damage to grass so	30%
Answered question: 37. Skipped question: 78	

4. Which of the following might help you consider using orchard sanitation (select all that apply)?	Response
A better understanding of the benefits of orchard sanitation and how it works.	47%
Demonstrations of sanitation in orchards managed by growers and/or at the Univ. res. farm.	43%
I am not interested in using scab sanitation.	23%
Answered question: 30. Skipped question: 85.	

5. Approximately how many acres were given scab sanitation treatment(s) in recent years?	Response	Acres
<1 acre	4%	1.5
1 to <3 acres	15%	22
3 to <5 acres	16%	48
5 to <10 acres	26%	142.5
10 to <20 acres	16%	180
20 to <50 acres	10%	175
>50 acres	14%	750
Answered question: 74. Skipped question: 41		

6. Which of the following sanitation methods are done in your orchard (select all that apply)?	Response
Flail mowing in fall.	73%
Flail mowing in spring.	67%
Urea applied to trees in fall.	24%
Urea applied to the ground in fall.	4%
Urea applied to the ground in spring.	17%
Answered question: 70. Skipped questions: 45	

7. Please, indicate which of the following describes the use of fall scab indexing (PAD assessment) in your orchard (select all that apply):	Response
I do not know how to do a fall scab index.	36%
I grow varieties with good resistance to scab and therefore do not need it.	4%
I am not confident that my scab index would be accurate.	19%
I have no time in September to do a scab index.	37%
I will not use a delayed first spray strategy the next spring, so there is no gain from doing it.	24%
I normally do a scab index in all or part of my orchard.	15%
Answered question: 105. Skipped question: 10.	

8. Which of the following describes your reasons for doing a scab index (select all that apply):	Response
To determine if I can save time and money by delaying the first scab fungicide next spring.	11%
If the scab level is high, I want to figure out why, do sanitation measures, and give priority to that block for scab control next spring.	22%
It is worth it to have a measure of the scab level in the orchard, whether or not I am going to delay the first scab fungicide next spring.	22%
I do not perform a scab index in my orchards.	68%
Answered question: 94. Skipped question: 21.	

9. When do you normally plan to make your first fungicide application, excluding copper, in blocks that had good scab control last year?	Response
Green Tip	34%
Half-inch Green	45%
Tight Cluster	12%
Pink	3%
After pink	1%
Timing is based on the risk of scab in each orchard, but is regularly delayed to tight cluster or after in at least one orchard.	5%
Answered question: 105. Skipped question: 10.	

10. Select all of the following statements that you agree with:	Response
Without a scab index from the previous fall, the risk of scab infection from green tip to half-inch green is too high to leave green tissue unprotected.	35%
Even if I had done a fall scab index and found a low amount of scab, the risk of scab is still too high. I'd rather spray more than risk scab.	54%
I don't control scab well enough as it is, so cutting back is not an option.	24%
The first spray serves as a test of the spraying system. Delaying the first spray to a later growth stage when scab risk is higher puts too much pressure on the first spray.	38%
The first scab spray is typically applied at or after the tight cluster bud stage in our orchards that have a lower risk of scab.	23%
Answered question: 99. Skipped question: 16.	

11. Which of the following might help you consider delaying the first scab fungicide spray in low scab risk orchards (select all that apply).	Response
Training in scab sanitation and in doing a fall scab index.	37%
Demonstration of delayed first spray in grower orchards.	40%
Demonstration of delayed first spray in a university research orchard.	31%
Access to disease model forecasts for timing and relative severity of primary scab infection periods.	48%
I am not interested in delaying the first scab spray.	26%
Answered question: 98. Skipped question: 17.	

later, and an additional 5% time the first fungicide based on the risk of scab infection in each orchard block, but typically delay it until tight cluster or later in at least one orchard. A few growers selected more than one stage indicating that the answer may vary according to scab risk in each block.

Delaying fungicide use was considered too risky by 53% of respondents. Twenty-five percent indicated that they were not interested in delaying fungicide, but 75% indicated that they would consider delaying fungicide use with additional demonstration of its effectiveness and training in methods that reduce scab risk such as sanitation and measuring the scab index or PAD.

Summary

About 20% of the apple growers contacted to do this survey supplied information on the use of sanitation and elimination of early fungicide applications for apple scab in New England. Most of these growers currently practice scab sanitation as a routine cultural practice on at least part of their orchards. However, less than half the apple acreage represented in the survey received sanitation. Assessing scab inoculum potential using a formal PAD index is practiced less frequently due to a lack of time, or because of perceived risks of delaying the earliest fungicide applications. About half of the growers said that the risk of scab was too high, even in a clean block, for them to consider delaying. Nearly 80% normally plan to apply a fungicide by half-inch green even in blocks with good scab control the previous year. While about 25% of the growers would not consider delaying sprays, the remaining 75% would, given further training in using and demonstration of the effectiveness of the methods.