Twelve Years of Strawberry IPM in Maine: A Work in Progress

D. T. Handley and J. F. Dill University of Maine Cooperative Extension 491 College Avenue, Orono, ME 04473

Strawberries are an important crop in Maine, with between 500 and 1000 acres produced on over 100 farms in the state. Nearly all of the crop is sold directly to consumers through farm stands and farmers markets. Because the crop is frequently sold "pick your own" to customers and eaten unprocessed, potential exposure to pesticide residue is high, and consumers coming to the farms express concerns regarding pesticide use. Because of it's high value and demand, the crop was intensively managed in the past, using fairly high levels of pesticides to control insect and disease pests, with little or no regard to whether any pests were actually posing an economic threat.

In 1992, the University of Maine Cooperative Extension initiated an integrated pest management program for strawberries. IPM scouts visited six volunteer farms and monitored strawberry fields for tarnished plant bug, strawberry bud weevil and two-spotted spider mites. Control recommendations for these pests were based upon economic thresholds developed in New York. In addition, growers were asked to follow a reduced spray program for control of gray mold, limiting applications to the bloom period. Initial results were very good. Growers reduced insecticide applications by more than 50% on some farms and even greater reductions in fungicide applications were observed. Losses from pests remained stable or were reduced on participating farms.

In 2005, Extension scouts monitored nine farms. Data from the farms was shared with other growers by a a weekly newsletter (over 75 subscribers) and an internet IPM web page. In 1994 The Cooperative Extension systems of New England produced "Integrated Pest Management for Strawberries in the Northeastern United States". This bulletin provides detailed instructions for growers who wish to use IPM techniques on their farms, including pest identification, monitoring, economic thresholds and control strategies. The New England Small Fruit Pest Management Guide is updated and revised every two years and emphasizes IPM methods.

Strawberry Bud Weevil (clipper)

Monitoring: Check all buds in a 2' row length sample at 10 locations in a field. Sample from bud emergence through secondary flower bloom.

Threshold: Average of 1.2 freshly clipped buds per 2' of row sample (0.6/ft.) or one live adult.

Account for field history of injury: fields infested in past are likely to be infested again

Border sprays may be effective: Spray from field edge to about 50' in. Most clippers migrate into field from bordering wooded areas.

Tarnished Plant Bug

Monitoring: Sticky traps to determine arrival of adults; Tap 3 strawberry flower clusters per sample site over a white plate. Sample 10 sites per field = 30 flower clusters total. Sample from early bloom through petal fall

Thresholds: 4 clusters infested with nymphs out of 30 samples *or* an average of 0.25 nymphs per cluster

Two-spotted Spider Mites

Monitoring: Randomly harvest 60 leaves from throughout the field. Check for the presence of mites (mites do not have to be counted.)

Threshold: 15 leaves infested per 60 leaf sample (25%)

Annual evaluations of the program carried out through grower surveys have shown that the adoption of IPM practices in strawberries leads to significant reductions in pesticide use and can increase crop profitability. However, ability to implement IPM is hindered by time and management constraints common among small, diversified vegetable and fruit farms. While growers may be willing to pay for some private IPM services, there are very few available. Thus, Cooperative Extension must continue to take the lead in fostering IPM in Maine, and provide growers with the information necessary to make sound pest management decisions.

Applied research is an important part of Maine's Strawberry IPM Program. Past research has included evaluation of strawberry varieties for resistance to tarnished plant bug. Surveying impacts of strawberry bud weevil injury, and testing low risk pesticide efficacy and biological controls to reduce pest populations.

A Survey of Starwberry Inflorescence Injury Caused by the Strawberry Bud Weevil, *Anthonomus signatus.*

David T. Handley, Andrew Wheeler, and James F. Dill
University of Maine, Highmoor Farm, P.O. Box 179, Monmouth, Maine, 04259

Abstract:

Three strawberry fields in Maine were surveyed to determine what level of flower bud injury strawberry bud weevil caused; whether different orders of buds on the inflorescence were effected differently; and whether injury was influenced by plant location in a field. Three strawberry fields that received no insecticide applications in the spring were surveyed. Samples of 200 inflorescences were examined in four different locations in each field. The number of inflorescences injured by strawberry bud weevil in a field varied from 10% to 64%. Most of the flower clusters showing injury had only one bud girdled, but many had two or more buds girdled. The tertiary and secondary order buds had the highest levels of injury, while the primary and quaternary buds had the lowest injury levels. Location of the plants in the field did not have any obvious effects on injury levels.

Vegetative and Floral Characteristics of Six Strawberry Cultivars Associated with Fruit Size, Yield and Susceptibility to Tarnished Plant Bug Injury.

D. T. Handley* and J. F. Dill
University of Maine Cooperative Extension, P.O. Box 179, Monmouth, ME 04259-0179, USA

Abstract

Strawberry cultivars can differ in their susceptibility to tarnished plant bug injury, but the mechanisms for these differences have not been determined. Isolating such mechanisms could allow breeders to develop significant insect resistance in commercial strawberry cultivars. Selected vegetative and floral characteristics were measured in six strawberry cultivars grown in a perennial matted row system and compared to the yield data and levels of tarnished plant bug injury. "Mira" and "Mesabe" had the highest marketable yields, followed by "Jewel" and "Sable". "Cabot" and "Northeaster" had the lowest yields. "Cabot" had the largest fruit size, followed by "Jewel", "Mira", "Northeaster", "Sable" and "Mesabe". Naturally occurring levels of tarnished plant bug injury were lower than expected, but some significant differences were observed between the six cultivars. "Mira", "Northeaster" and "Cabot" had the highest levels of tarnished plant bug injury. "Jewel", "Mesabe" and "Sable" had lower levels of injury. There were no significant correlation between yield and levels of tarnished plant bug injury, reflecting the low levels of injury in this experiment. Of the floral parameters evaluated, only high pollen levels were significantly correlated with higher levels of tarnished plant bug injury. Flower size, flower number, pedicel length, peduncle length and number of stamens were not significantly correlated with injury. Primary flower diameter and flower dry weight was positively correlated with average fruit size. For the vegetative characteristics, neither petiole length nor hairiness was significantly correlated to tarnished plant bug injury.