Managing the Uncertainties in Growing and Marketing Fruits and Vegetables

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Asparagus Disease Update

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Fusarium and the Asparagus Miner

In recent years, *Fusarium* incidence has been increasing in newly-planted or one-year-old fields of Michigan asparagus. These fields have often been associated with high populations of asparagus miner. Asparagus miner, an Agromyzid fly, lays eggs in the lower stem of asparagus in the fern stage. Larvae mine stems and pupate within them. Larvae, eggs, adults, and pupae can harbor *Fusarium* with infested pupae serving as an overwintering inoculum source.

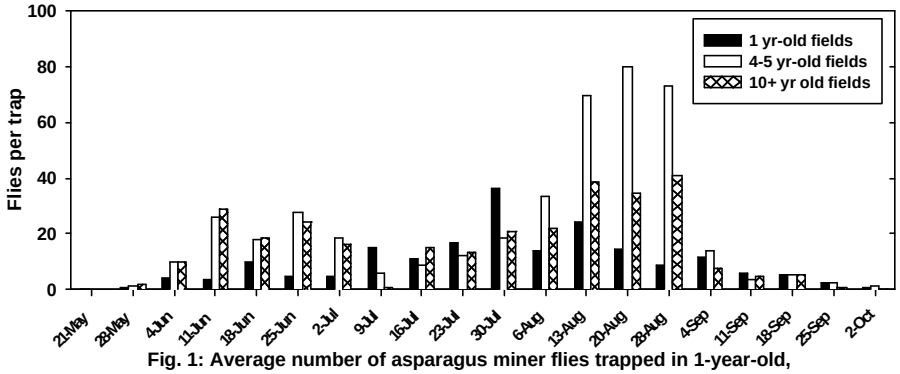


Fig. 1: Average number of asparagus miner flies trapped in 1-year-old, 4- to 5-year-old, and 10 years or older asparagus fields in 2002.

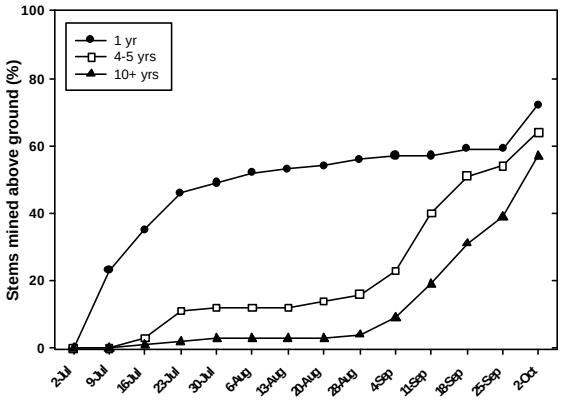


Fig. 2: The percentage of asparagus stems with mines above ground during the 2002 season. Numbers represent the average of three fields that were monitored in each of the following categories; 1 year old fields, 4 to 5 year old fields, 10 years or older fields.

During the 2002 growing season, adult asparagus miner flies were monitored in nine asparagus fields, three in each of the following categories: 1 year old fields, 4 to 5 year old fields, 10 years or older fields. Beginning 21 May, 3x5" yellow Stiky Strips™ insect traps (Olson Products), were set out and changed weekly. Nine traps were placed at ground level to which four additional traps were added at canopy height after the last harvest when the asparagus was going into fern. One exception to this was that in one of the 1 year old fields that had sparse growth, only ground traps were used. Figure 1 shows the average number of adult flies captured each week averaged over the number of traps in each field.

Fig 3. Miner fly pupa in stem.

Each week, beginning 2 July, 60 stems were labeled and examined for mining damage above ground. Figure 2 shows the weekly percentages averaged over the three fields in each maturity category. There was a high incidence of mining early in the season in the 1 year old fields

and corresponds to an early lay-by date. The fields that were in fern longer had more mining than fields that were harvested later into the season. It is on these above ground mines that *Fusarium* readily produces spores that may move on air currents to nearby healthy asparagus and cause infection and disease.

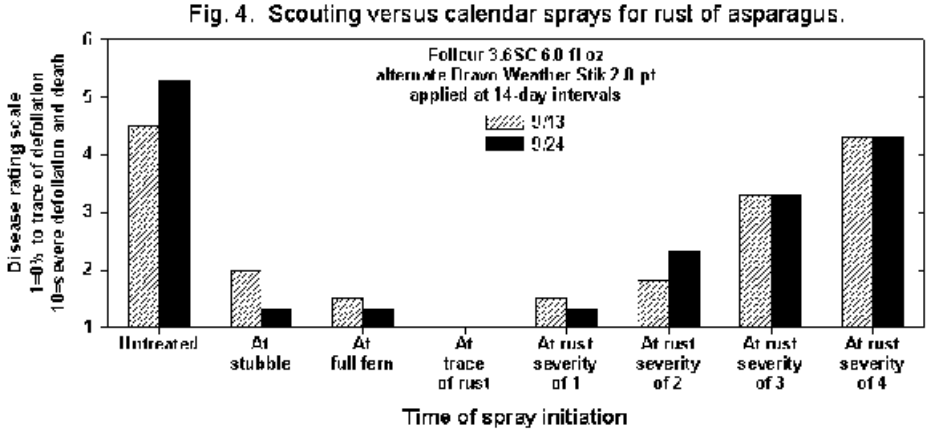
Table 1. Location and number of puparia, either emerged in 2002 or intact for overwintering, collected from 60 stems within fields of differing maturity.

	1 year	4-5 years	10+ years
Emerged above ground	42	9	4
Intact above ground	3	13	7
Total above ground	45	23	11
Emerged below ground	151	95	108
Intact below ground	25	70	141
Total below ground	176	165	250
Total Puparia	222	188	261

At the end of the season, the 60 stems that had been examined throughout the season in each field were broken away from the crowns by pulling and brought back to the lab for extraction of asparagus miner puparia. Pupa is the form in which the insect overwinters, and the puparium is the rigid outer shell that covers the pupa (Fig. 3). Puparia were removed from both above ground and below ground on the stems, and were crushed to determine whether the insect had already emerged in 2002, or if the pupae were intact for overwintering. Table 1 shows the average over the three fields within each age group of the number of puparia collected from 60 stems and whether they were found above or below ground on the stems. The average number of puparia found per stem was 3 to 4 across the maturity ranges, however the 1 year old fields had more emerged asparagus miners and less overwintering pupae than either the 4 to 5 year old or 10 years or older fields. This corresponds to the fact that the 1 year old fields were in fern longer than the others, and the young fields provide early season ovipositioning sites for the asparagus miner. While *Fusarium* was found in association with puparia in 2001, results from 2002 are not yet complete.

Rust

Rust is a problem on ferns following harvest with symptoms including red or brown elongated spots, within which spores are produced. Severe infections can stunt or kill young shoots, and can defoliate plants. Currently, there is not a disease prediction system for rust but timing the start of a spray program by scouting may be helpful. A rust scouting trial tested the effectiveness of a 14-day program of Folicur 3.6SC alternated with Bravo Weather Stik 6SC, initiated at different disease



levels based on scouting (Fig. 4). Using a rating scale where 1=healthy fern, the spray program was initiated at stubble (prior to fern emergence), at a trace of disease, at fully expanded fern, and at rust ratings of 1, 2, 3, 4. This trial showed the effectiveness of scouting as a means to monitor disease and reduce fungicide sprays. For instance, when a spray program is initiated at stubble, six applications are needed. Delaying the initiation of a spray program until the first trace of disease eliminated one spray. A further delay of initiating programs until disease progressed to a rating of 1 or 2 resulted in a further decrease in sprays without compromising disease control. Overall, a 50% reduction in fungicide use was demonstrated by this trial, using scouting to begin a spray program.

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