ENTOMOLOGY

RESEARCH

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1. TITLE: Spatial Distribution of Spotted Wing Drosophila (SWD) Infestation

OBJECTIVES & INTRODUCTION

Past research has focused on how trap placement relative to the crop canopy affects catches of spotted wing drosophila, oviposition site preferences and diurnal activity, and movement of adults in fields. We have also monitored the time it takes SWD adults to recolonize a field following an insecticide application, as well as the distance traveled within and into blueberry fields using mark, release, and capture studies. This study looked at the spatial pattern of fruit infestation within a field.

LOCATIONS: Union, Stockton Springs, and Northport, ME
PROJECT TIMEFRAME: July 2019 - September 2019

METHODS

Samples were collected from three transects at each of three sites. Two fields were crop fields managed in a two-year cycle and the third field was a “hold-over” field (two crop cycles in a row). Each transect was 165 ft long and 150 to 175 ft apart from one another. Within transects, three fruit samples (ca. 500 berries/sample) were collected at each of five distances from the field edge (10, 20, 40, 80, and 165 ft, n = 15 samples per transect). To assess infestation, a 1 gal. 10% saline solution was mixed (1-part salt:10 parts water, v: v) and ca. 1 cup was added to a zip-lock bag containing a sample. The bag was sealed, and the berries were gently pressed with a wooden block just enough to crack the skins. The split berries were allowed to remain in saline for 60 min. The berries and saline liquid were then strained through a coarse sieve into a dark colored tray. The fruit in the sieve was discarded and the strained liquid was inspected for larvae. Regression was used to determine the relationship between average maggot numbers per sample and the variance between samples. Spatial interpolation was used to generate the spatial pattern within fields and produce heat maps.

RESULTS

The three fields varied greatly in their infestation level (0.7 – 4.1 maggots per sample). The variance (variation from one place in a field to another) was quite high and increased as the mean infestation increased (Figure 1). Spatial heat maps of the maggot infestation in each of the three fields are shown in Figure 2. Dark blue is 0 to very low-density maggot areas and dark red is the high-density fruit infestation areas.

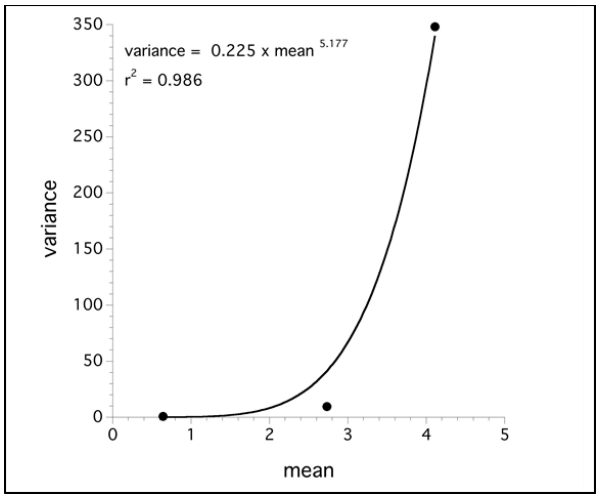

Figure 1. Relationship between the mean and variance of maggots per sample of blueberries.

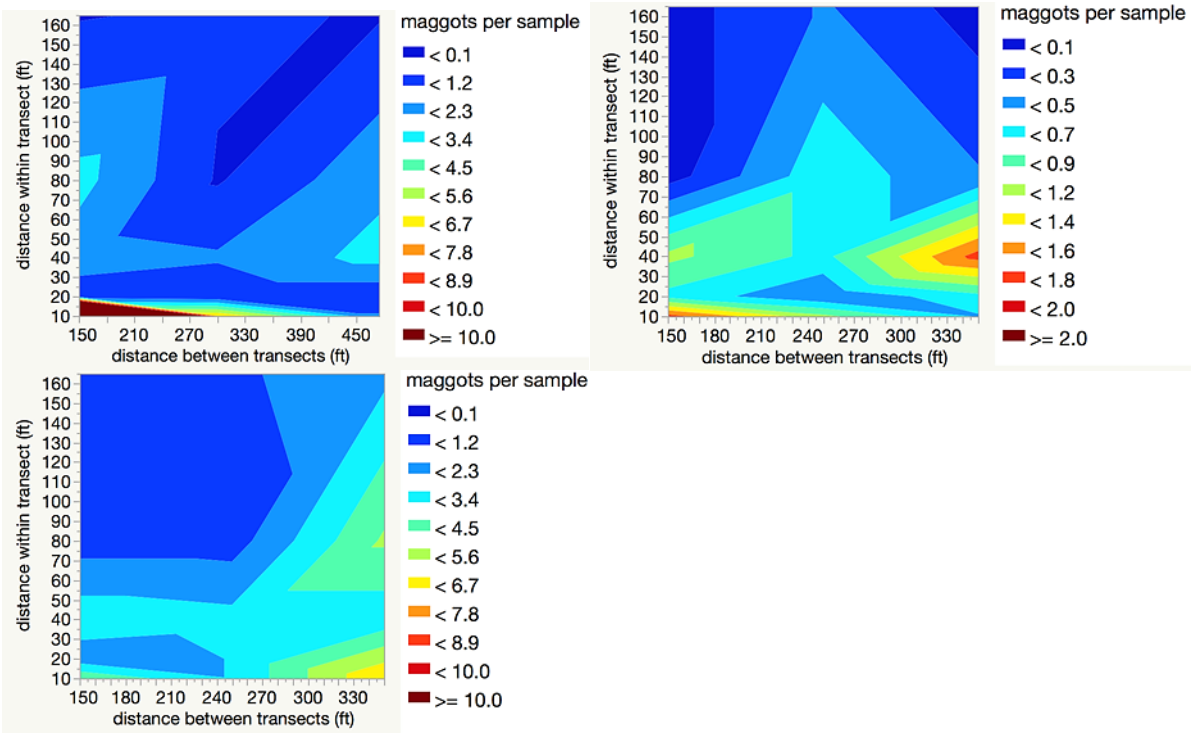

Figure 2. Heat maps of maggot infestation in each of three fields (last field is a "holdover field"). Densities of maggots / sample are (left to right and then below): 4.1, 0.7, and 2.7.

DISCUSSION

This preliminary study suggests that infestation is concentrated at the field edge and decreases as one moves out into the field. It was surprising that the "holdover" field showed a similar pattern to the standard crop fields. We expected that the "holdover" field would be characterized by a more uniform distribution of fruit infestation throughout the field and with higher densities toward the field interior. However, this was not the case, fruit infestation was high near the field edge.

NEXT STEPS

- The potential for field edge treatments should be investigated with a more thorough sampling of spatial pattern of fruit infestation.