WHITEFLY MANAGEMENT IN THE SAN JOAQUIN VALLEY

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Abstract

The successful management of silverleaf whitefly in the San Joaquin Valley is dependent upon IPM, resistance management and hard work. As observed in 1997, chemical tools (particularly the use of the insect growth regulators (IGRs)) are an integral part of a whitefly management program. However, the efficacy of these products depends upon a good scouting program, use of the action thresholds and judicious application of each tool. A high quality program must also include cultural management techniques tailored on a regional basis. In the SJV a high premium should be placed on host plant sanitation, cotton management and intensive scouting to assist in good decision making.

Introduction

Silverleaf whitefly, *Bemisia argentifolii*, first appeared in cotton, melons and ornamental plants in the San Joaquin Valley (SJV) during 1992. The next few years were characterized by localized outbreaks in the southern and eastern portions of the SJV. In 1996 – 97, a significant increase in distribution, host range, earliness, and population levels were observed. We will discuss the current guidelines for monitoring populations, chemical control, resistance management and cultural control. In addition, the status of an infant areawide management program will be addressed.

Discussion

In tailoring a whitefly management program for the SJV we have borrowed heavily from the experiences of Arizona and acknowledge their work. For example, the sampling of silverleaf whitefly adults and nymphs successfully used in the SJV are described by Ellsworth et al. 1994 and Naranjo & Flint 1994. However, the SJV has many of its own unique characteristics, unique even within the valley itself as one moves from east to west and north to south. The unique characteristics of a particular region result in different management guidelines (Outline 1) often related to local cropping patterns. For example, Situation I exists in fields adjacent to overwintering sites or spring sources of silverleaf whitefly. This situation requires early treatment with softer compounds to minimize the impact on natural enemies. At times Situation II may be implemented early season if plants are small and continued immigration is expected. In addition, Situation II provides effective options for control of multiple pests. Situation III occurs late in the season when silverleaf whitefly migration is heavy (late August - September), the bolls are open, lint is at risk and quick knockdown is required. The use of broad spectrum tank mixes should be delayed to reserve their efficacy and minimize secondary pest outbreaks. The differences in thresholds reflect differences in the activity of suggested compounds. Intensive scouting of adjacent fields has proven helpful to detect potential problems.

Cultural management techniques (Outline 2) can be used effectively by individual growers, but their benefits in managing silverleaf whitefly have been suggested to be greatest when used on an areawide basis. The preliminary results of our areawide program would agree. In our first year managing 7500 acres of land, whitefly populations found in cotton were reduced relative to control fields. In addition, reductions in sticky lint were observed both quantitative and qualitatively (Figure 1). Although, areawide management in the SJV is in its infancy and full economic analyses are pending we are excited about the prospects.

Summary

The 1997 guidelines resulted in success in many areas. However, as the economics of growing cotton in the SJV and the silverleaf whitefly continue to change we must continue to be creative and cooperative in our thinking.

References

Ellsworth, P., J. Diehl, T. Dennehy & S. Naranjo. 1994. Sampling sweetpotato whiteflies in cotton. University of Arizona Cooperative Extension, IPM Series Number 2.

Naranjo, S. E. & H. M. Flint. 1994. Spatial distribution of preimaginal *Bemisia tabaci* (Homoptera: Aleyrodidae) in cotton and development of fixed-precision sequential sampling plans. Environ. Entomol. 23: 254-266.

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Outline 1: Resistance Management for Silverleaf Whitefly in SJV.

Situation I: Initial (internal) buildup

IGRs: KNACK & APPLAUD

Action Threshold: 5 Adults/leaf, 1 Nymph/leaf disk

Benefits: Good residual control, selective, minimal disruption of beneficials

Special Concerns: IGRs do not provide quick knockdown, are most effective when all stages are present and populations are beginning to increase, Use only one application of each IGR per season

Situation II: Gradual Invasion by Adults

NON-PYRETHROIDS (Examples: Endosulfan, Ovasyn, Provado, OPs)

Action Threshold: 10 Adults/leaf

Benefits: less disruptive to beneficials, some adult knockdown, some control of other pests present (lygus, aphids)

Special Concerns: Limit the use of any one pesticide class

Situation III Heavy Migration (lint exposed)

PYRETHROIDS + NON-PYRETHROIDS

Action Threshold: 10 Adults/leaf

Benefits: Quick knockdown of adults, good to control hot spots

Special Concerns: Early use significantly impacts beneficials, early use may also increase resistance and reduce effectiveness later in the season when protection of lint is a must.

* Whenever Possible ground applications are recommended.

Outline 2: Cultural Management of Silverleaf Whitefly in the SJV.

- Areawide Management
- Host Plant Sanitation
  - Prompt harvest & regrowth prevention in melons & potatoes
  - Host weed control in non-crop, head rows & fallow fields
- Cotton Management
  - Early planting
  - Early termination utilizing plant mapping data
  - Good defoliation to limit regrowth
  - Avoid water stress
- Scouting and Decision-making
  - Sample adult and nymph populations, follow thresholds
  - Monitor adjacent crops

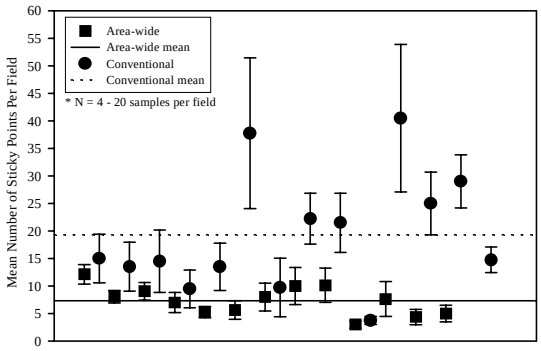

Figure 1: Lint Sample Evalautions (Thermodetector)
* each point represents mean per field ± SE.