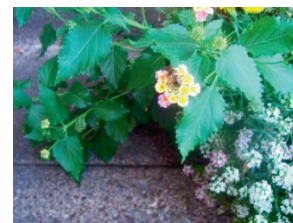


Aphid mummy on ornamental pepper



Syrphid adult, aphid predator, visiting lantana



Parasitized greenhouse whitefly scale on Lantana

What is the Ideal?

- **Pests are rare**, only concentrated on Guardian Plants which act as an early warning system.
- There is a **steady supply of natural enemies** that find and reduce pest hot spots before they flare up high enough to require pesticides.
- Greenhouses offer **support for natural enemy reproduction and establishment** in the greenhouse so that weekly purchases of fresh natural enemies are not required.
- **Staff can easily evaluate** whether the natural enemies have established in the greenhouse and are reproducing in high enough numbers to do their job.



Michelle Ten Eyck – Guardian Plant Scout

Challenges

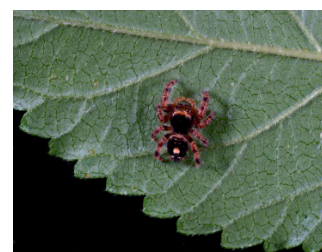
- Labor involved in special watering & grooming
- “Alternate” pests produced on Guardian Plants. Eggplants also harbor aphids, spider mites, & thrips. Marigolds harbor spider mites & whiteflies.



Orius nymph – Evidence of Orius reproduction on marigold



Predatory mite that eats spider mites



Jumping spider on lantana

Lantana Guardian Plant Case Study

At Bakers Acres in North Lansing, NY

Protocol

- 11 weekly releases of 1000 Encarsia March 9 through May
- 1 Lantana Guardian Plant per herb crop on 55 ft² table
- 10 samples per crop, 2 samples per Lantana plant

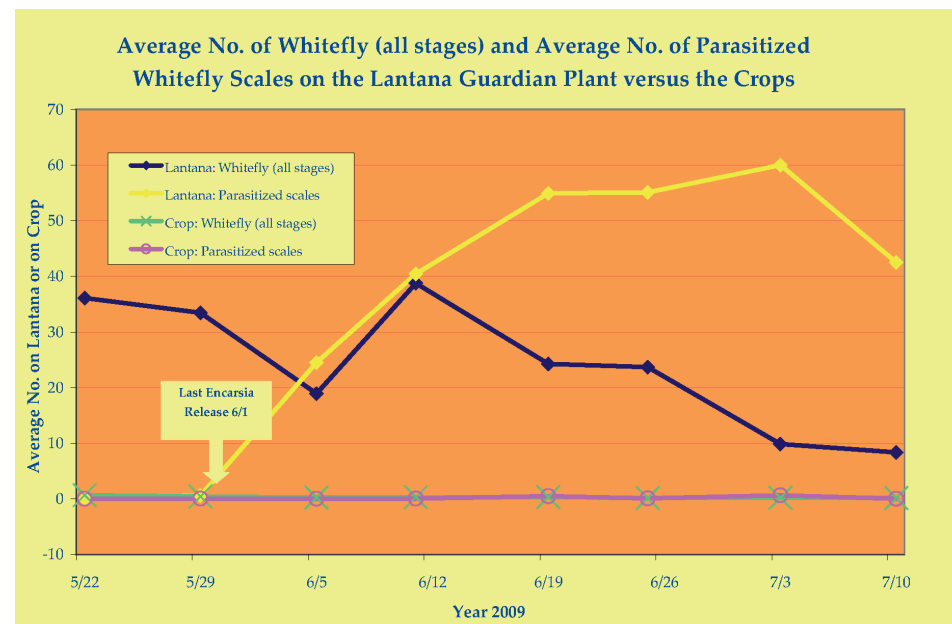
Herbs
 Strawberry
 Catnip and mixed
 Oregano
 Woodsage
 Lemon verbena
 Scented geranium

Results

- Whitefly parasites readily found on Lantana every week after establishment, but almost undetectable on crop.
- Less than 1 adult whitefly per 5 crop samples most of the season

Season Long Average Key Indicators

- Pull Ratio 79
- Balance Ratio 0.6
- Presence of Natural Enemy immatures constant
- Pest Frequency 0.17



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What is a Guardian Plant?

Guardian Plants Pull Pests and Host Their Natural Enemies

Indicator and trap plants pull pests
 Habitat and banker plants support natural enemy reproduction
 The term Guardian Plant includes all these functions



Orius on Marigold Guardian Plant

Guardian Plant Benefits

- Save time detecting pests and their natural enemies
- Grow your own steady supply of natural enemies
- Cut shipping costs for natural enemies
- Efficiently evaluate pest/natural enemy balance



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GUARDIAN PLANT

PEST

NATURAL ENEMY

Lantana



Whitefly

Encarsia formosa

Marigolds in a pepper crop



Thrips

Orius

Beans in a tomato crop



Two-spotted spider mite

Predatory mites

Eggplants in bedding



Whitefly

Encarsia formosa

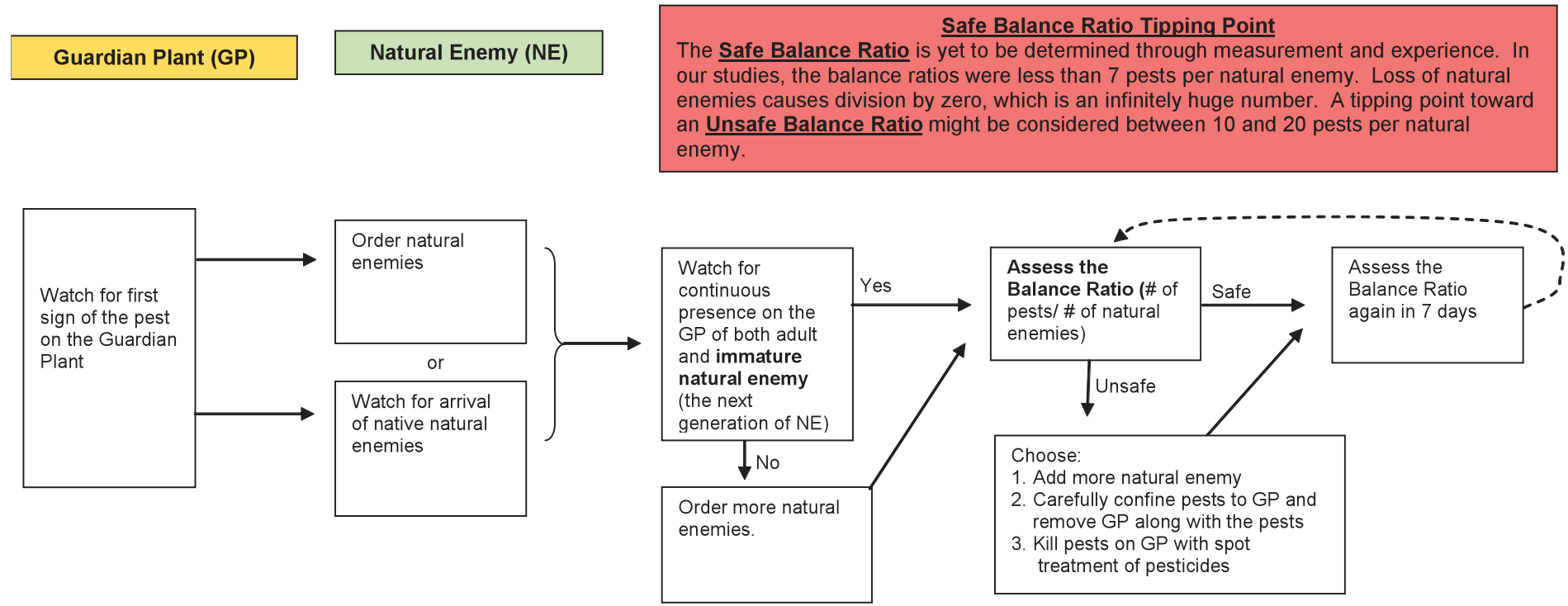
Peppers in bedding plants



Aphids

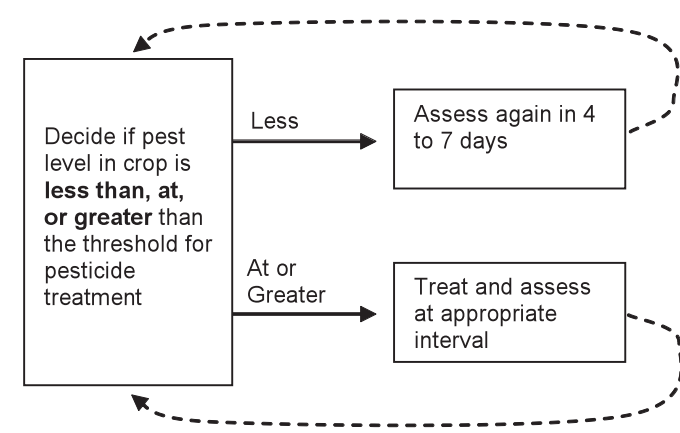
Aphids parasites

MONITORING AND DECISION MAKING IN GUARDIAN PLANT SYSTEMS



Pest Levels in Crops

In an ideal Guardian Plant System, the Guardian Plant will hold the pests and the crop plants will be free of pests. Even the crop plants next to the Guardian Plant will be free of pests. Pest levels will stay low enough on the crop that pesticides will be unnecessary on the crop. However, crops must still be regularly checked for pests.



Measurement of Guardian Plant Impact:

Pest frequency in crop (% of crop plants where one or more individuals of the pest are found)

Pull ratio (# pests counted on Guardian Plant samples / # Pests on the same number of Crop samples)

Balance Ratio (# pests / # of natural enemies on the Guardian Plants). Gives the number of pests per natural enemy.

Presence of immature natural enemies indicates of natural enemy population producing its next generation on the Guardian Plant