

# Apple Pollination & Honeybee Management

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IFTA, Boston MA



# Apple Flowers

- Pollen is sticky and heavy
- Not wind pollinated
- Insect pollination is very important
- Apples must be cross-pollinated



# Apple Flowers

- Number of seeds set per fruit increases the size of the apple
- Allows the apples to mature more evenly
- Always try to set king bloom
- Flower sets of 5%-10% for a commercial crop



# How Bees Forage

- Bees will work close to the hive for the first day or two after being moved
- Bees will work up to two miles from the hive foraging
- Bees will tend to work the most attractive crops available



# How Bees Forage

- Bees will continue to work the same crop they started working
- Bees tend to work up and down the rows in a high density planting
- Much of the pollen transfer for cross-pollination takes place within the hive
- Only 6% – 60% of trapped pollen was apple (Penn State 2010, 2011)

# Changes in Beekeeping

- Varroa mites
- Beekeepers using pesticides within the hives to control mites
- Negative impacts from using pesticides and from not controlling mites
- Nosema Cerana – fungal disease that is difficult to control and may be interacting with other viruses

# Changes in Beekeeping

- Nutrition
- Feeding- Carbohydrate source and a protein source
- Intensity of feeding schedules

# Changes in Beekeeping

- Hive Replacement
- Replacing hives is a constant operation for all commercial beekeepers
- Most beekeepers are replacing 100% or more of their hives every year



# Pesticides

- Pesticide interaction with miticides the beekeeper is using
- Fulvalinate and SI fungicides
- May increase toxicity to bees by 2000x

# Pesticides

- Try to spray pre and post bloom only
- Extended bloom makes this difficult
- Time sprays to allow for king bloom pollination



# Pesticides

- Almost all pesticides have some repellency to bees
- Never spray when bees are foraging, even fungicides
- Spray early morning or evenings if necessary during bloom
- Try to eliminate SI and Strobilurin fungicides during bloom

# Hive Placement

- Hives per acre is a Risk Management Decision
- How warm will it be, how rainy will it be during bloom?
- What are the chances of frost during bloom
- Plan on one hive per acre or per 1000 bushels of expected production as a minimum

# Hive Placement

- Place hives with exposure to morning sun
- Place hives near a wind break
- Place hives in groups to increase competition and cross-pollination



# Hive Inspection

- It is important to inspect the hives you rent
- Hive strength
- Frames of brood
- Frames of bees
- Overall quality of the hives



# Hive Inspection

- It's always more cost effective to rent stronger hives of bees for pollination
- 4-frame hive = 4000 flying bees
- 8-frame hive = 15,000 flying bees
- Two weak hives will never equal the field force of one strong hive



# Hive Inspection

- Inspect a percentage of the hives you rent
- Consider using a quality based contract
- Work with your beekeeper to get the strongest hives for apple pollination





# Alternative Pollinators

- Osmia bees- *Osmia lignaria*
- Bumblebees
- Both good pollinators
- Both prohibitively expensive



# Summary

- Always rent strong hives of bees
- Don't be afraid to check the hives you are renting
- Always decide how many hives to rent per acre based on how much risk you're willing to accept

