# Corn Dust Research Consortium Research

Jay Overmyer

Syngenta

# Corn Dust Research Consortium (CDRC): Advisory Panel Affiliations

- American Beekeeping Federation
- American Honey Producers Association
- American Seed Trade Association
- Association of Equipment Manufacturers
- Bayer
- Canadian Honey Council
- PMRA
- Farm Equipment Manufacturers Association
- NAPPC
- National Corn Growers Association
- Pollinator Partnership
- Syngenta
- USDA ARS
- US EPA

# Research Questions

1) What are the flowering resources available to and used by honey bees in and around corn fields during plants?

2) What is the efficacy of a newly proposed fluency agent relative to talc and/or graphite in reducing the abrasion of treated seed coatings within planters during planting and the subsequent levels of pesticide-contaminated dust released into the environment?

# Proposals Funded

- Question 1
  - Mary Harris – Iowa State University
  - Reed Johnson – Ohio State University
  - Art Schaafsma – University of Guelph/Grain Farmers of Ontario

- Question 2
  - Art Schaafsma – University of Guelph/Grain Farmers of Ontario

# General Study Design: Question 1

- Honey bee hives placed next to or in areas where corn will be planted
- Hives fitted with pollen traps and dead bee traps
- Sampling pre-, during and post-planting
- Collected pollen was sorted and taxonomically identified; subsample for chemical analysis
- Floral diversity surveys

# General Study Design: Question 2

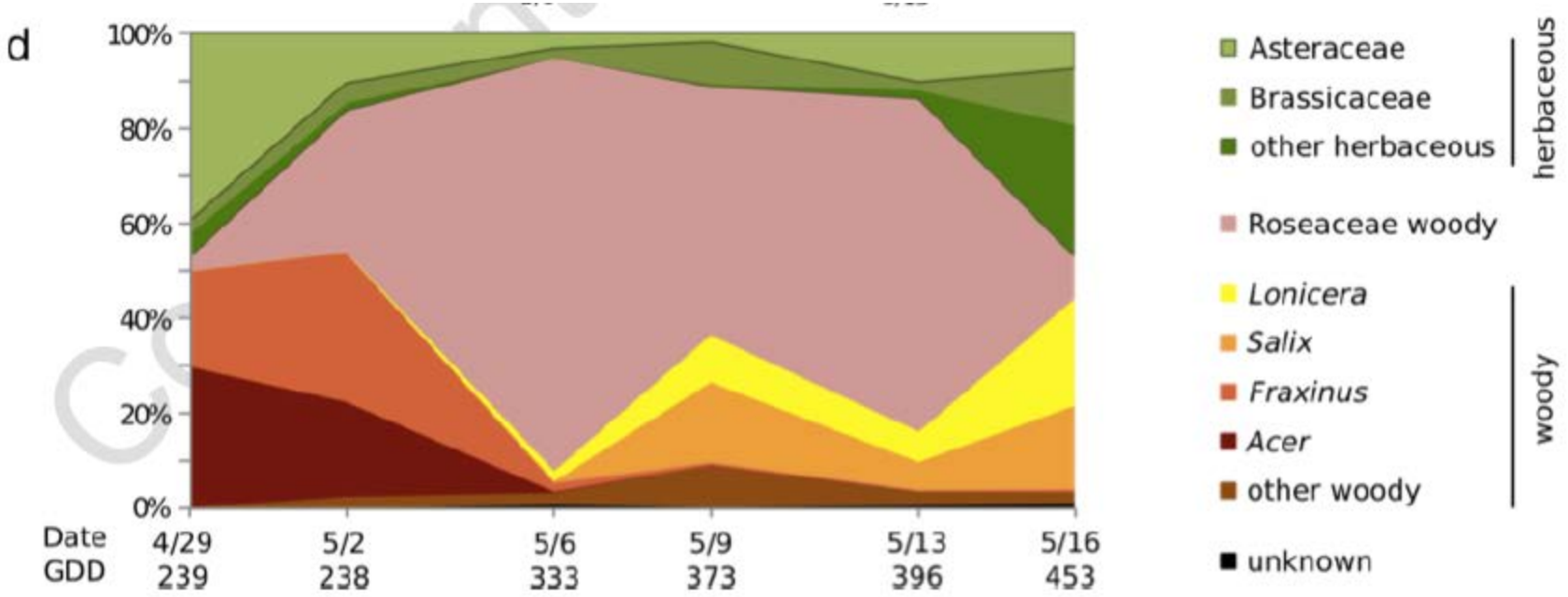
- 9 farms- 2 fields/farm
  - One for each lubricant type (talc/BFA)
  - Same seeds and equipment

- Dust collected from exhaust outlet

- Dust deposition samplers at various distances
  - 0, 10, 50, 100 m

# Results: Question 1

- Majority of pollen collected by honey bees was from trees and shrubs at all sites (Iowa, Ohio, Ontario)
  - Hawthorne, Rose, Apple, Maple, Willow, Ash




Data from Johnson (Ohio)

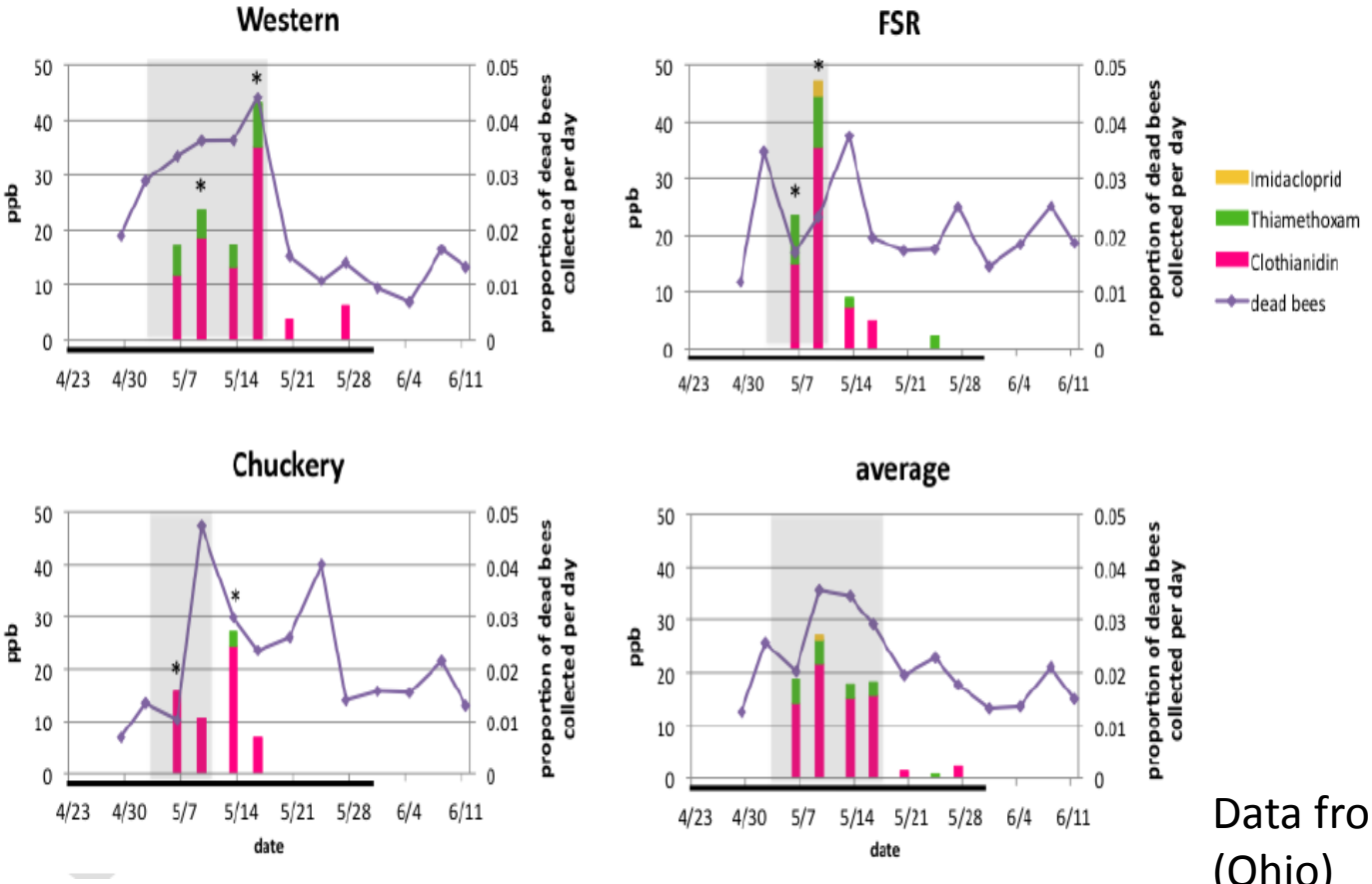
# Results: Question 1

- Neonicotinoid residues in bee-collected pollen were highly variable and primarily limited to a 2-week time period associated with corn planting
  - Iowa: 0 to 89.3 ppb
  - Ohio:  0 to 35.5 ppb
  - Ontario: 0 to 48 ppb

- Neonicotinoid residues of concern in pollen for honey bees are >100 ppb for acute effects

# Results: Question 1

- Honey bee mortality was higher during the time of corn planting but overall proportion of dead bees was low (<5%)




Data from Johnson (Ohio)

# Results: Question 2

- BFA reduced total dust emitted from pnuematic vacuum planter exhaust compared to talc/graphite by 67.5%

- The concentration of neonicotinoid residues in the BFA dust was 3.7-fold higher than in talc/graphite

- BFA reduced the amount of neonicotinoid active ingredient emitted from the pneumatic vacuum planter exhaust by 28% compared to talc/graphite

# Results: Question 2

- Most pronounced effect of BFA in reducing neonicotinid dust was at the near-field distances (0-10 m)

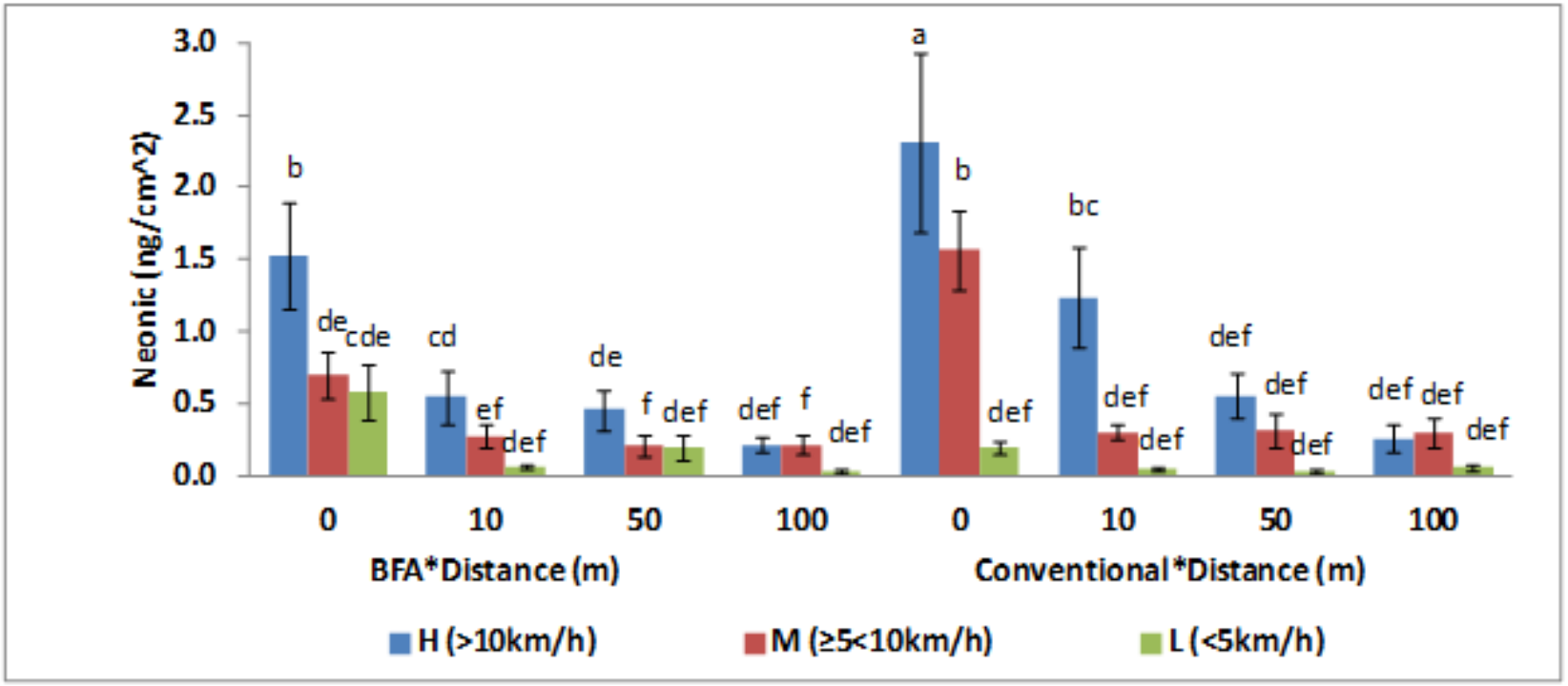
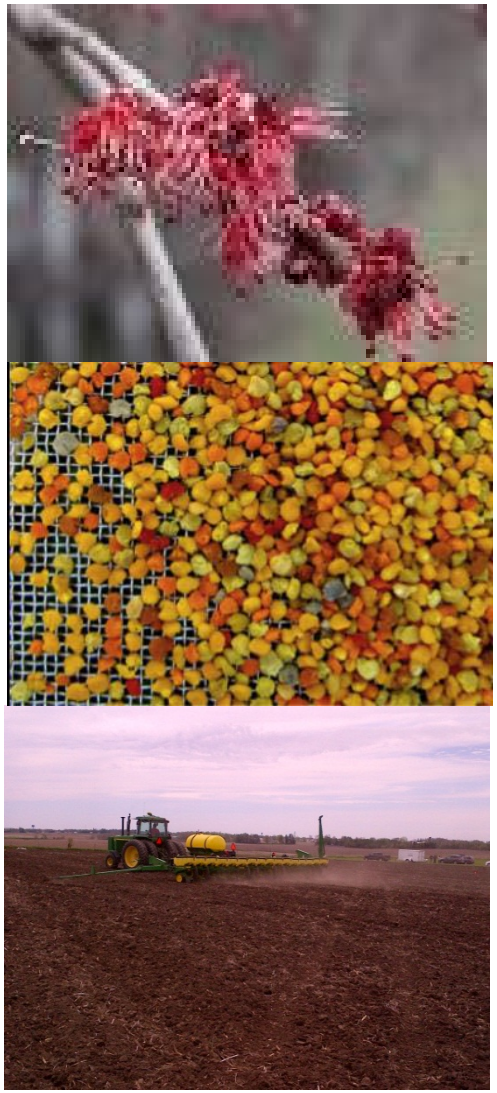



Figure 6. Interaction of seed lubricant, distance from planter origin and wind speed

Data from Schaafsma (Ontario)

# Conclusions

- Honey bees are feeding on flowering trees and shrubs more than herbaceous flowering plants in or around corn fields
  - Difficult to mitigate flowers on trees and shrubs
- Neonicotinoid residues are being detected in pollen honey bees are bringing back to hives
  - Exposure levels are below acute levels of concern
- BFA reduces the overall amount of neonicotinoid active ingredient emitted from pneumatic vacuum planter exhaust decreasing the potential for exposure to honey bees



# 2014 Research

- Question 1
  - Mary Harris – Iowa State University
  - Reed Johnson – Ohio State University
  - Jerry Bromenshenk – University of Montana
  - Art Schaafsma – (TBD)

- Question 2
  - Reed Johnson – Ohio State University