



# **Atlantic Pollination Research at NSAC**

**Chris Cutler**

**Dept. of Environmental Sciences  
Nova Scotia Agricultural College**



# Wild Blueberry Entomology Research Chair

- June 2007; 5-year term position
- Post dedicated wild blueberry entomology
  - Gain basic knowledge into insect biology and ecology
  - Applied research delivering environmentally sound, innovative and pragmatic insect solutions
- Initiated by WBPANS
- Additional support through NSDAF Technology Development Program, and the ACAFF Councils of NS, NL, NB, PEI and QC



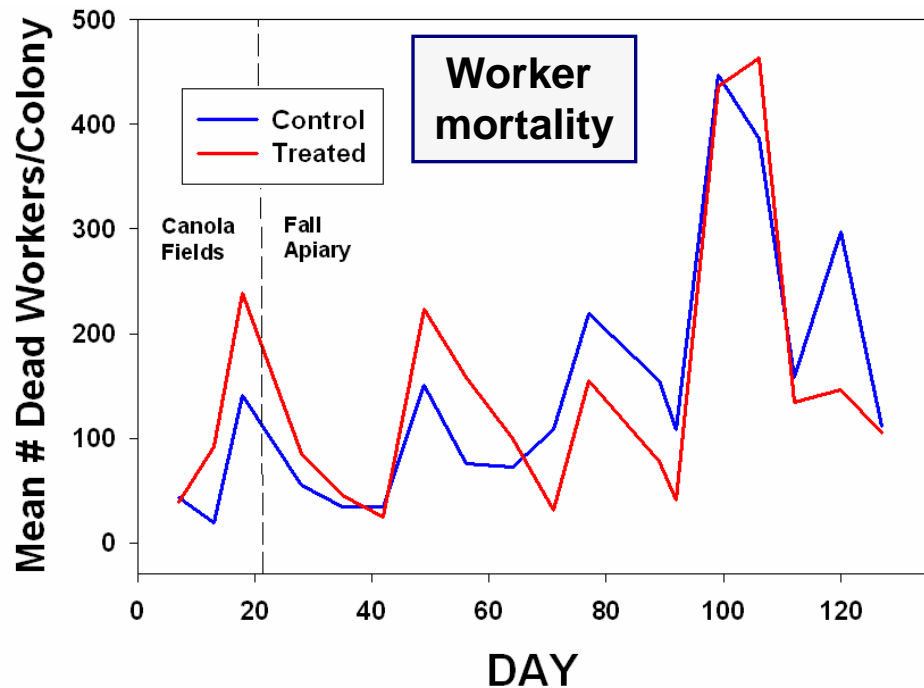
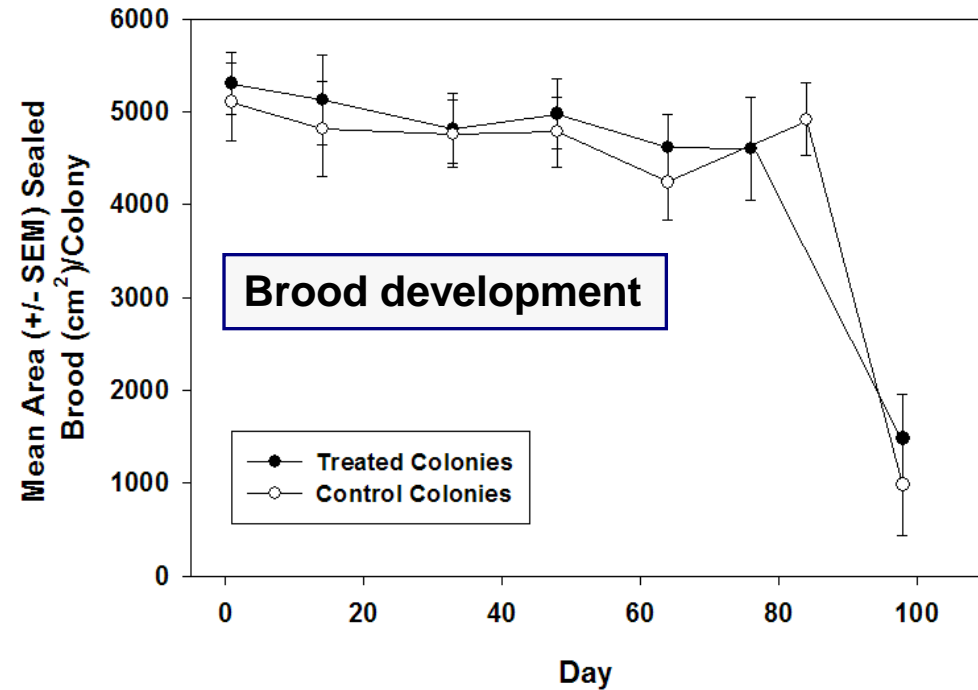
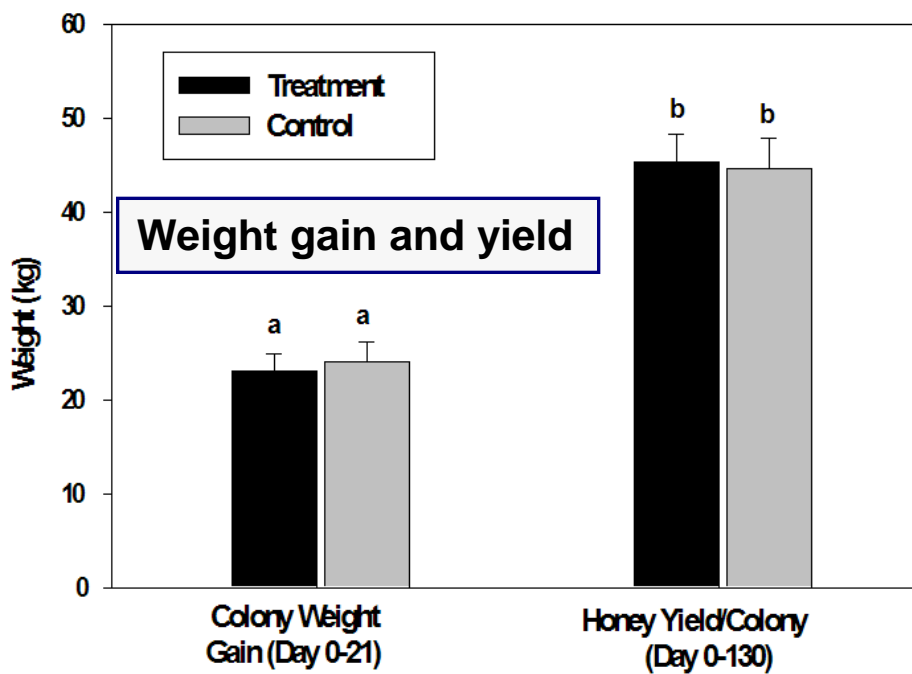
# Research Priorities

- **Many and varied**
  - Insect ecology (beneficial and pest species)
  - Biological control of insect pests
  - Alternative insecticides: reduced risk, biopesticides
  - Identify emerging pests
  - **Managed and wild bees**

# Past work with bees - Clothianidin

- **Long-term impacts of clothianidin (neonicotinoid) seed-treated canola on honey bees**
- **4 treated, 4 untreated fields; 4 hives per field (32 hives total); 1-ha fields**
- **Colonies in field for 21 days (bloom); thereafter held in an apiary**





- Residues in honey, nectar and pollen; not beeswax
  - Maximum of 2.6 ppb in 16/185 samples → **8-fold margin of safety** (NOAEC = 20 ppb)
- Overwinter survival
  - Only 2 control and 2 treated colonies did not survive
  - All queen right, no difference in brood or workers

# Bee Work at NSAC – Toxicology

- Impacts of new agrochemicals; *A. mellifera*, *B. impatiens*, *M. rotundata*, *Osmia lignaria*
- Various exposure routes (e.g. contact vs. ingestion); acute and sub-lethal effects
- K. Ramanaidu (MSc student) and Dr. C. Scott-Dupree, Guelph; initiated January 2009





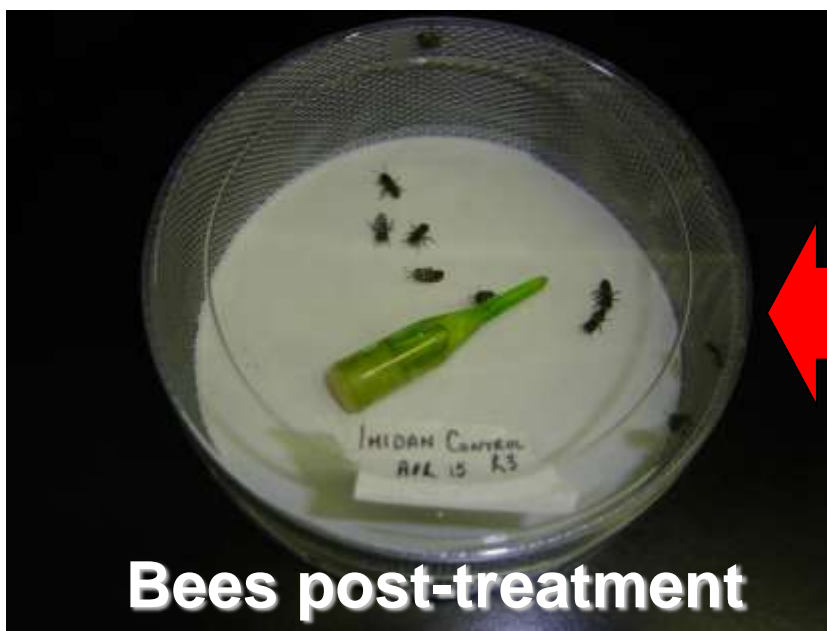
**Spray tower**



**Anesthetized bees**



**Application**



**Bees post-treatment**

# Bee Work at NSAC – Wild Bees

- **Wild pollinator ecology in wild blueberry, P. Craig (MSc student)**
  - What drives their populations?
  - How can we promote them?
- **Effects of non-crop plants and landscape**
  - Trap bees, quantify plants in fields and landscapes
  - Temporal and spatial patterns



# Canadian Pollinator Initiative (CANPOLIN)

- NSERC Strategic Network Grant
  - Dr. P. Kevan (Guelph) + > 40 scientists from 26 institutions
  - Wide range of issues surrounding pollinators and pollination
- Several Working Groups – taxonomy, managed pollinators, plant-pollinator interactions, ecosystems, economics

# Trap nests for cavity-nesting bees

- ***Osmia* spp.;** excellent blueberry pollinators but often low #
- Trap nests could encourage their populations
- Studies to determine
  - Diversity/abundance
  - Pollens collected



# CANPOLIN – *Blueberry Hit-Team*

- Much CANPOLIN research will occur in representative agricultural systems
- Why a “Blueberry Hit-Team”?
  - A leading horticultural crop in Canada
  - Rely heavily on insect pollination for fruit set
- **Objective** → a blitz of data collection in wild blueberries; NS, NB, QC; multiple areas of pollination research

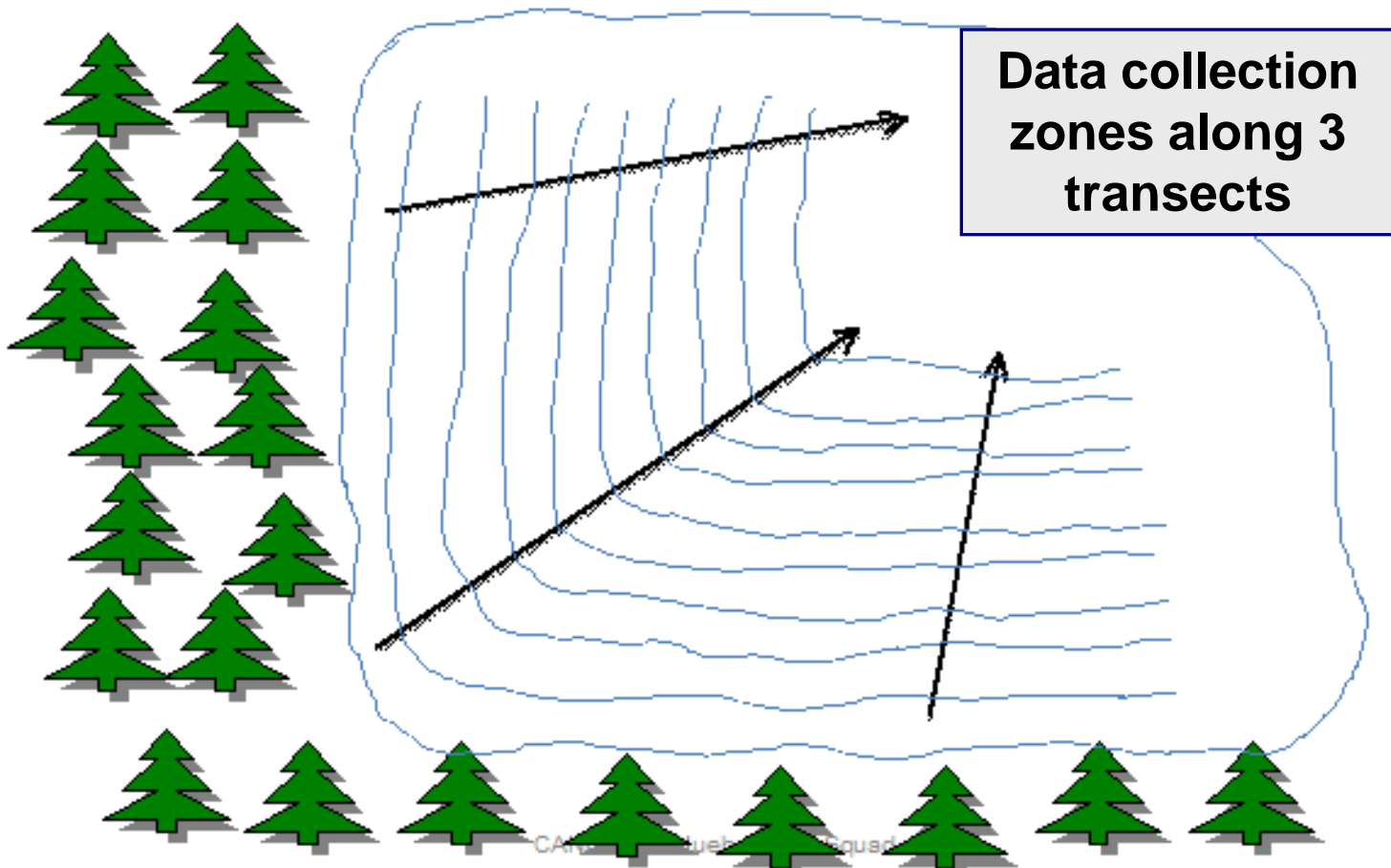
# CANPOLIN – *Blueberry Hit-Team*

## Insect pollinators (NS, QC)

- Spatial and temporal distribution of bee and fly species
- Identify pollens harvested by bees
- Pollen deposition rates, e.g. field edge vs. interior
- Correlate fruit set and yield in different parts of fields with pollination rates and species distributions

# Blueberry Hit-team

- Species diversity/abundance, pollination levels, % fruit-set, yield
- NS & QC



# CANPOLIN – *Blueberry Hit-Team*

## Fruit-set limitations & geneflow (NB, QC)

- Controlled pollinations (cages for self- or out-crosses)
  - Examine floral structure development → fertilization success
  - What is the maximum seed and fruit set?
- Receptivity of flowers at different times
- Does low genetic diversity (fewer clones) = less fruit?
- Which pollinators are better? Do pollinators drive floral characteristics?

# CANPOLIN – *Blueberry Hit-Team*

## Floral morphology

- Pollen-ovule ratio in flowers
- Structure and development of the pollen tetrads, poricidal anthers, stigma and nectary in flowers



# Acknowledgements

- PEI Wild Blueberry Growers Association
- Bragg Lumber Co.
- *Technology Development 2000 Program, NSDA*



Canada Foundation for Innovation  
Fondation canadienne pour l'innovation



Canada  
Agriculture et Agroalimentaire Canada



**Nova Scotia's ACAAF Council**  
Advancing Canadian Agriculture and Agri-Food

Canada

Agriculture and Agri-Food Canada  
Agriculture et Agroalimentaire Canada

Prince Edward Island AD APT Council

