

WG8: Economics

- Brief Discussion of Projects
 - Background and Research Questions
- Scope of Collaboration & Networking

Project I

Economic Beehiveour of Beekeepers and
Implications on Honeybees

What we learned about the Canadian Beekeeping Industry..

- **Consolidation:** # of beekeepers declined by one half over 3 decades while # hives remains stable
- **Concentration:** 20% of beekeepers own 80% of beehives
- **Pollination Services:** 60% of hives are used to pollinate at least one crop.
- **Non-*Apis* Bees:** 21% of all farms with bees own or manage non-*Apis* bees

Changes in Beekeeping Business

- Hive management is transforming.

Decisions	Honey Production	Pollination Services
Migration Scheduling	Follow Nectar Flows	Follow Monoculture Blossoms
Hive Preparation	Foragers for Nectar	Foragers for Pollen
Crop Allocation-Rotation	Wild Plants + Monoculture	Monoculture
Contractual Agreement	Verbal-Informal	Written-Formal
Pest Management	Narrow	Broad

- Beekeeping is becoming more commercialized, complex business, and diversified → competitive pressure increases → # of exiting beekeepers increases.

Implication on Honeybees

- Hive Function is transforming..

		Hive for Honey	Hive for Pollination
Migration	<i>Distance</i>	Short	Long
	<i>Time</i>	Late Spring & Summer	Early Spring
Diet	<i>Nectar</i>	Rich	Poor
	<i>Pollen</i>	General Diet	Monoculture
Chemicals	<i>Exposure</i>	Low	High
Disease	<i>Spread</i>	Limited	High

- Honeybees are weaker and more stressed → Higher likelihood to contract pathogens → Increased mortality
- The existing data show lower mortality rates in provinces where beekeeping is exclusively or primarily in honey business rather than in pollination business.

Impacts of Economic Changes on Abundance of Honeybees

- Do structural and management changes in the beekeeping industry impose any threats to the health and abundance of honeybees?
 - Specifically, is increased dependence on monoculture pollination contributing to honeybees die-offs?
 - If yes, are pollination markets sufficient to internalize the social cost of declining honeybee population. Do pollination services need to be regulated?
- Answering these questions require longitudinal data that are unavailable.
- However....

Impacts of Economic Changes on Abundance of Honeybees

We can draw inference regarding the following questions:

- Is there a correlation between pollination services (crop type, intensity, distance traveled, use of contracts) and colony losses?
- Is pest control cost per-hive higher in pollination-intensive beekeeping operations?

Additional Questions of Interest:

- Are there benefits from diversifying production (honey & pollination vs. honey or pollination)?
- Do beekeepers take into account expected colony losses when they make pollination decisions?
- What are the economic gains/losses from adopting bee-friendly practices (organic or integrated practices vs. conventional practices)?

Collaboration & Networking

- Genome Canada
 - Beekeeper's Survey (Cost & Returns, Pollination Practices, Pest Management, Other)
 - Data gathering and analysis
- CANPOLIN
 - Empirical evidence linking honeybee stress to intensive pollination practices (chemicals, monoculture diet, transportation, early foraging etc.)

Project II

Pollination Decisions by Pollination-Dependent Crop Growers

- I. Demand of Commercial Pollination Services provided by Honeybees
- II. Supply of Non-Marketed Pollination Services provided by Native Bees

What's the Issue Here?

- Agriculture has put pressure on land use leading eventually to a decline in the population of many native pollinators.
- To replace the decreasing abundance of native pollinators, growers can:
 - Set-aside land to preserve habitats for native pollinators.
 - Rent honeybee hives from local or migratory beekeepers.
- Since pollination services provided by native bees are non-marketed services, growers' incentive to produce them on their land depends on the trade-offs between crop and pollination services production (opportunity cost of pollination services)

What we are interested in answering:

- What are the costs and benefits to growers of jointly producing non-marketed pollination services along with their marketed crops? → opportunity cost of pollination services
- How does the opportunity cost differ between the case where growers have access to managed honeybees and that where they do not?
- For growers who rent honeybee hives:
 - How do socio-economic, demographic, regional, and environmental factors affect the stocking rate (# of hives per acre)?

Collaboration & Networking

- Genome Canada
 - Blueberry Grower Survey (Yield, Costs, Pollination Practices, and Farm, Farmer, and Regional Characteristics)
 - Data gathering and analysis
- CANPOLIN
 - Blueberry Hit-Squad Team: Field experiment data on bee richness, diversity, flower visitation, pollen deposition.
 - Prediction Group: Species-specific models relating abundance to land use.