THE NORTHEAST POLLINATOR PARTNERSHIP

Research & tools to assess your apple pollinator contribution

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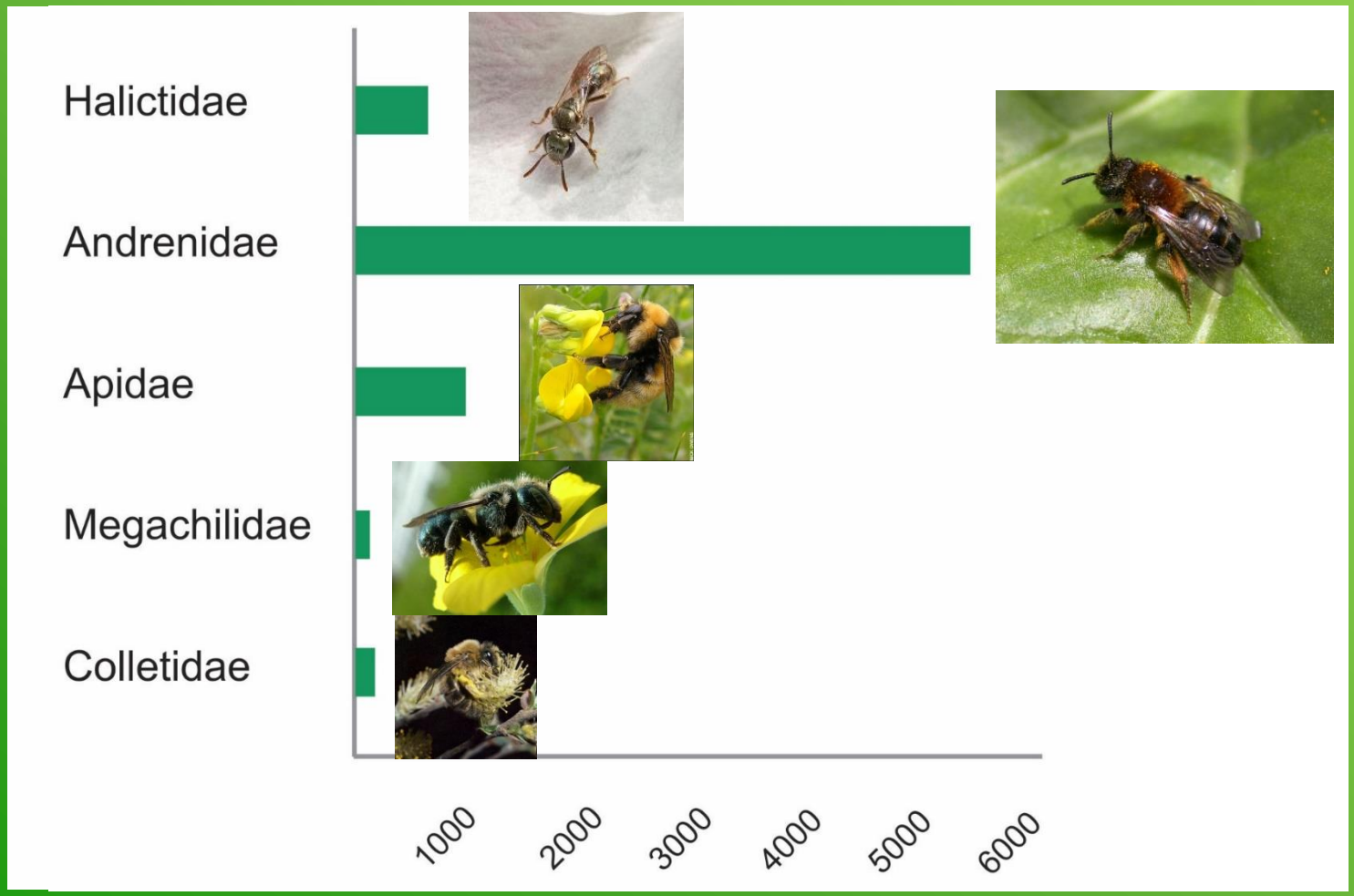
Scope of our Apple Research

1. **Importance of wild bees**
   - abundance & diversity
   - per-visit-effectiveness
   - seed set

2. **Drivers of wild bee abundance**

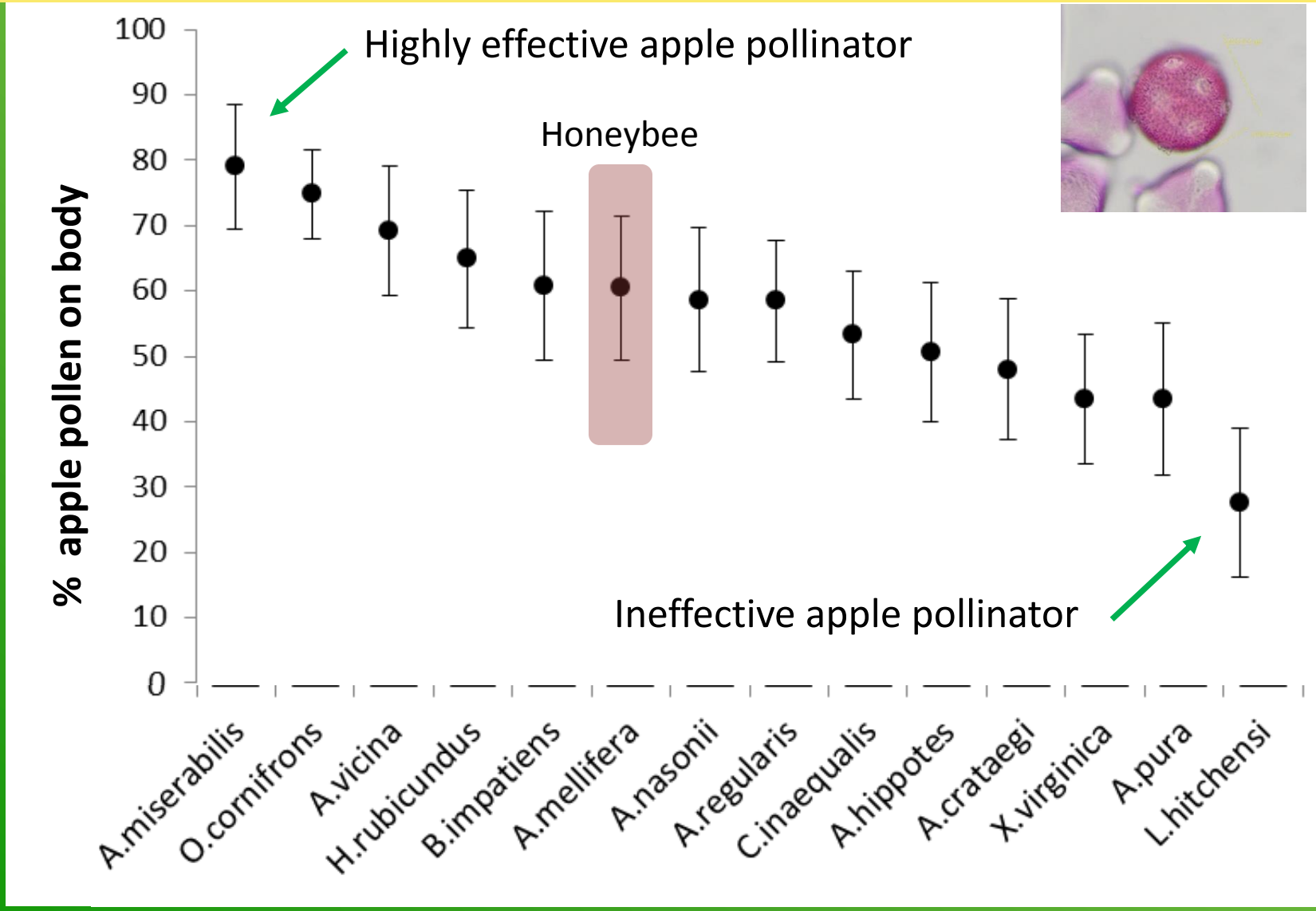
3. **A new partnership with apple growers.**

Wild bees are abundant & diverse!

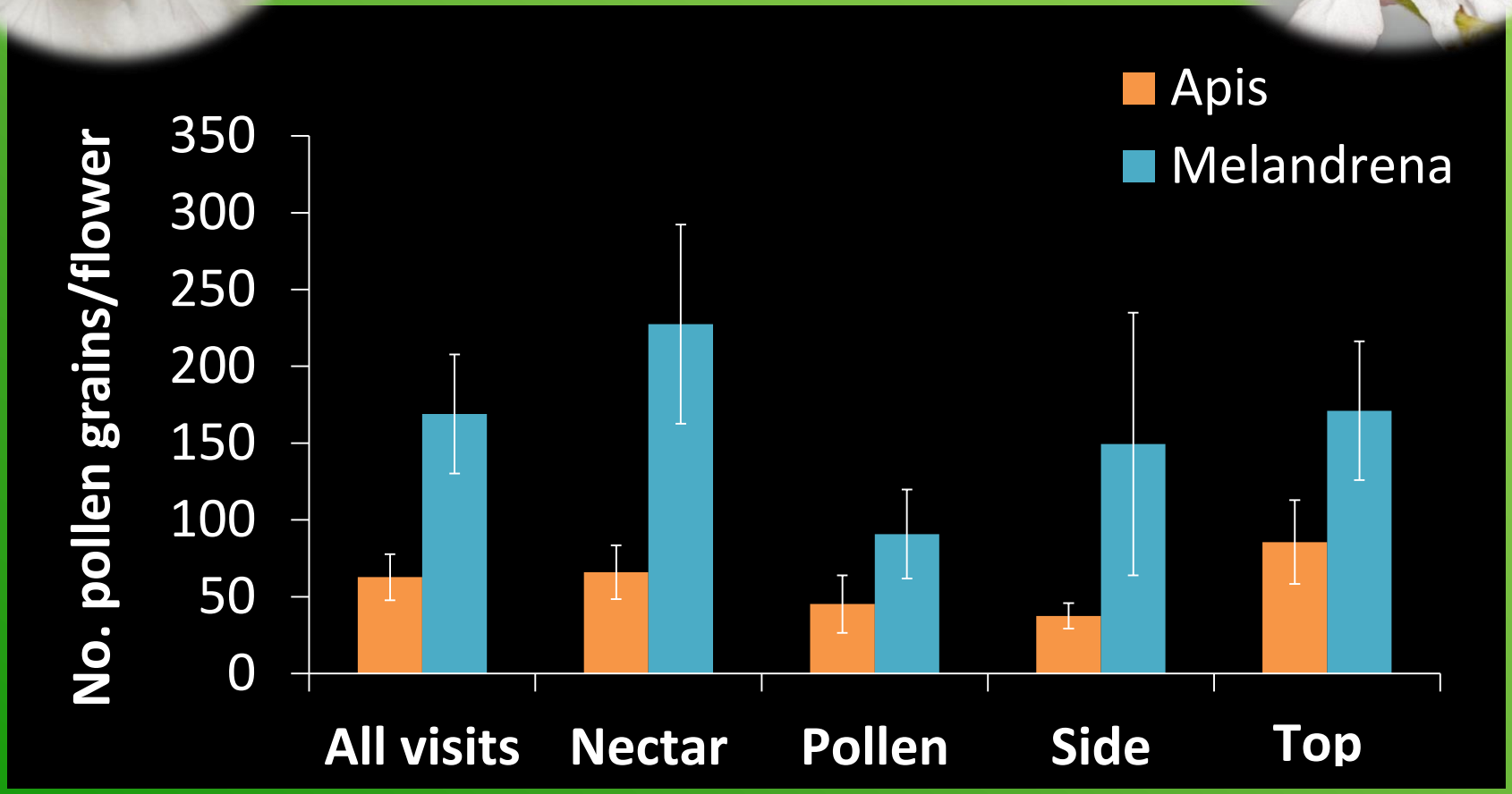


(Russo et al. 2015)

Wild bees carry more apple pollen on their body!



Wild bees deposit more apple pollen!



Russo et al. 2015, Park et al., 2015; 2016

Honey Bee (*Apis mellifera*): mostly side-working

Andrena (Melandrena) *regularis*: mostly top-working

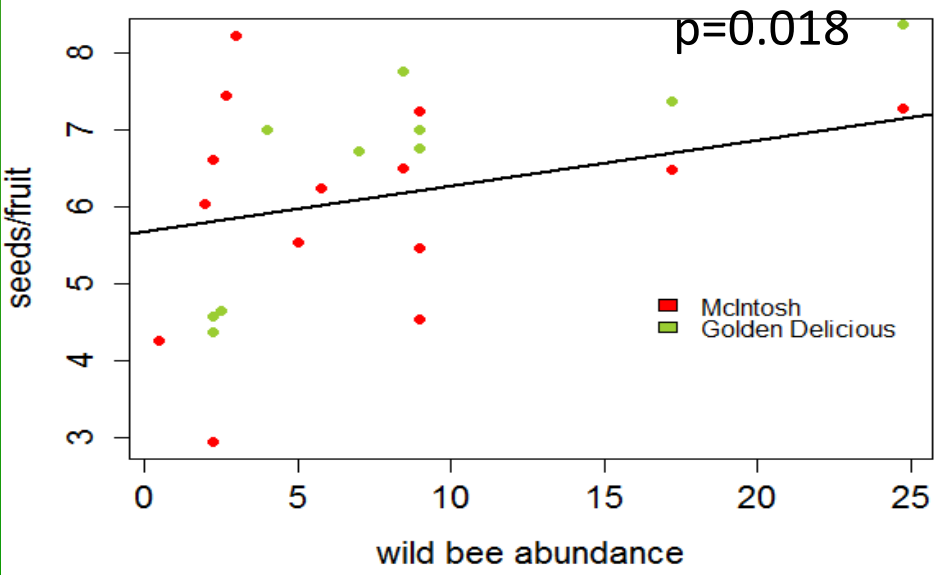
Does this translate into Production?

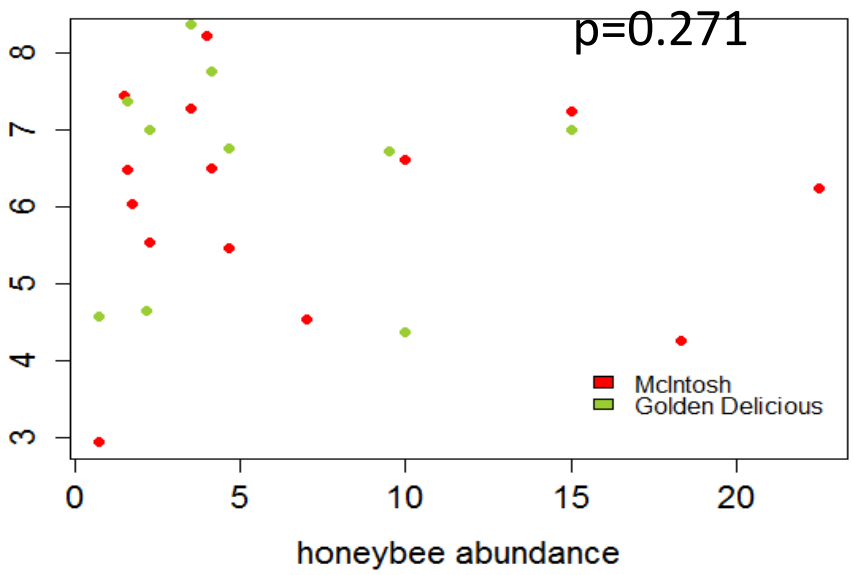
2000 apples later…

Wild bees impact seed set!

Wild Bee **Abundance** → Increased seed set

Honey Bee Abundance → **No significant effect** on seed set





Pollinator Effectivenes =

- ☐ Abundance
- ☑ Carry more pollen
- ☑ Deposit more pollen
- ☑ Pollen purity
- ☑ Flower handling

Wild bees are important to apple pollination!

Drivers of Bee Abundance

HIGH Abundance and Diversity of Wild Bees

LOW Abundance and Diversity of Wild Bees

Top 10 most toxic pesticides

Formulation	Active Ingredien	Class	% Sam	% HQ
Lorsban	*Chlorpyrifos*	ORGANOPHOSPH	13.5%	243.1%
Auvant	*Indoxacarb*	OXADIAZINE	9.6%	167.6%
Supracide	*Methidathion*	ORGANOPHOSPH	3.8%	52.3%
Entrust	*Spinosad*	SPINOSYN	1.9%	51.9%
Sevin	*Carbaryl*	THINNER	50.0%	35.4%
Actara, MP's	*Thiamethoxam*	NEONICOTINOID	21.2%	24.1%
Imidan	*Phosmet*	ORGANOPHOSPH	3.8%	4.1%
Diazinon	*Diazinon*	ORGANOPHOSPH	65.4%	2.6%
Prey, Provado	*Imidacloprid*	NEONICOTINOID	3.8%	2.6%
Seed Sticker	*Clothianidin*	NEONICOTINOID	5.8%	1.9%

Movento and Esteem

http://treefruitipm.info/

Pollination Insurance: Native wild bees



A good wild bee population can:

- **Increase the proportion of Class1/Grade A fruit**
- **enhance ‘quality’ of pollination**
- **Stimulate movement within the tree canopy and across orchard rows/pollenizers**
- **reduce grower vulnerability to honey bee decline**

Download the app: www.nepp-app.org

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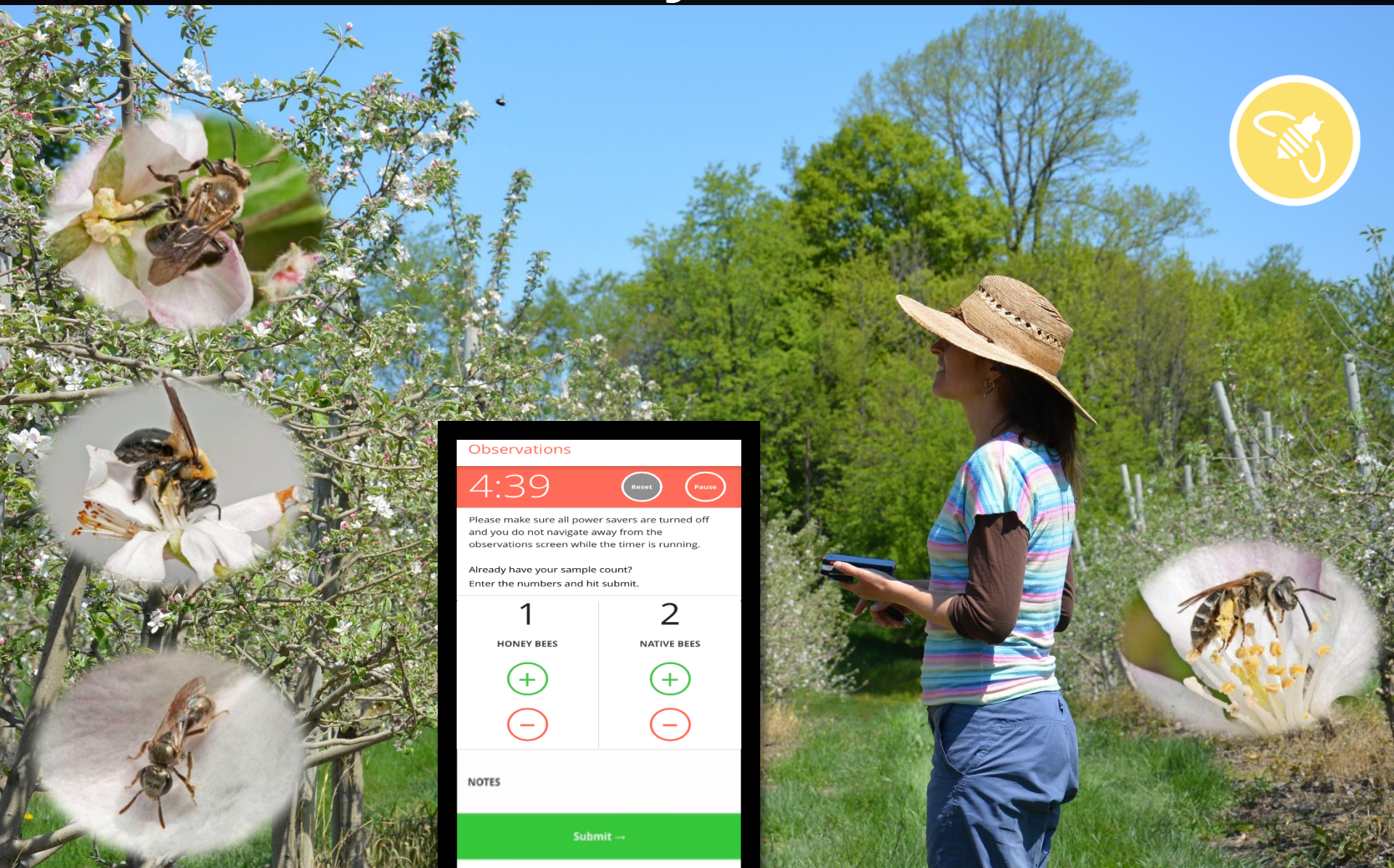
A Bee Community Assessment Tool



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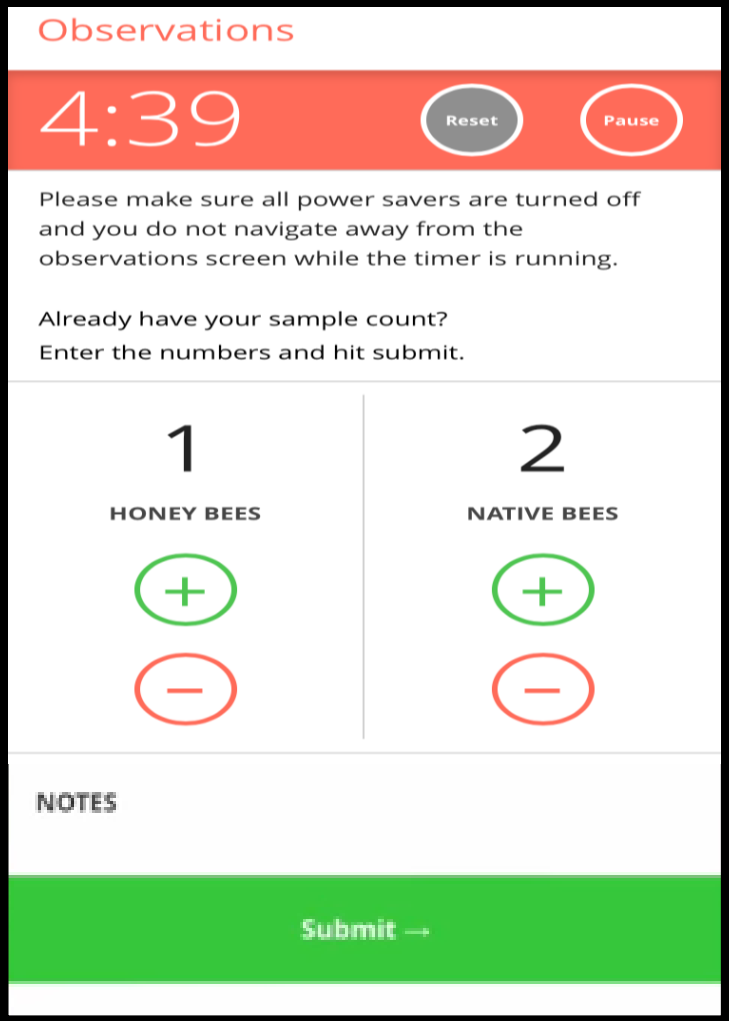

Data Collection

- A standardized count of native bees and honey bees.
- Date, Time & Weather
- GPS coordinates
- Pest management
- Bloom stage

Training Materials

- Video: The protocol and use of survey app
- Bee ID guide & quiz

+ Add New Observation

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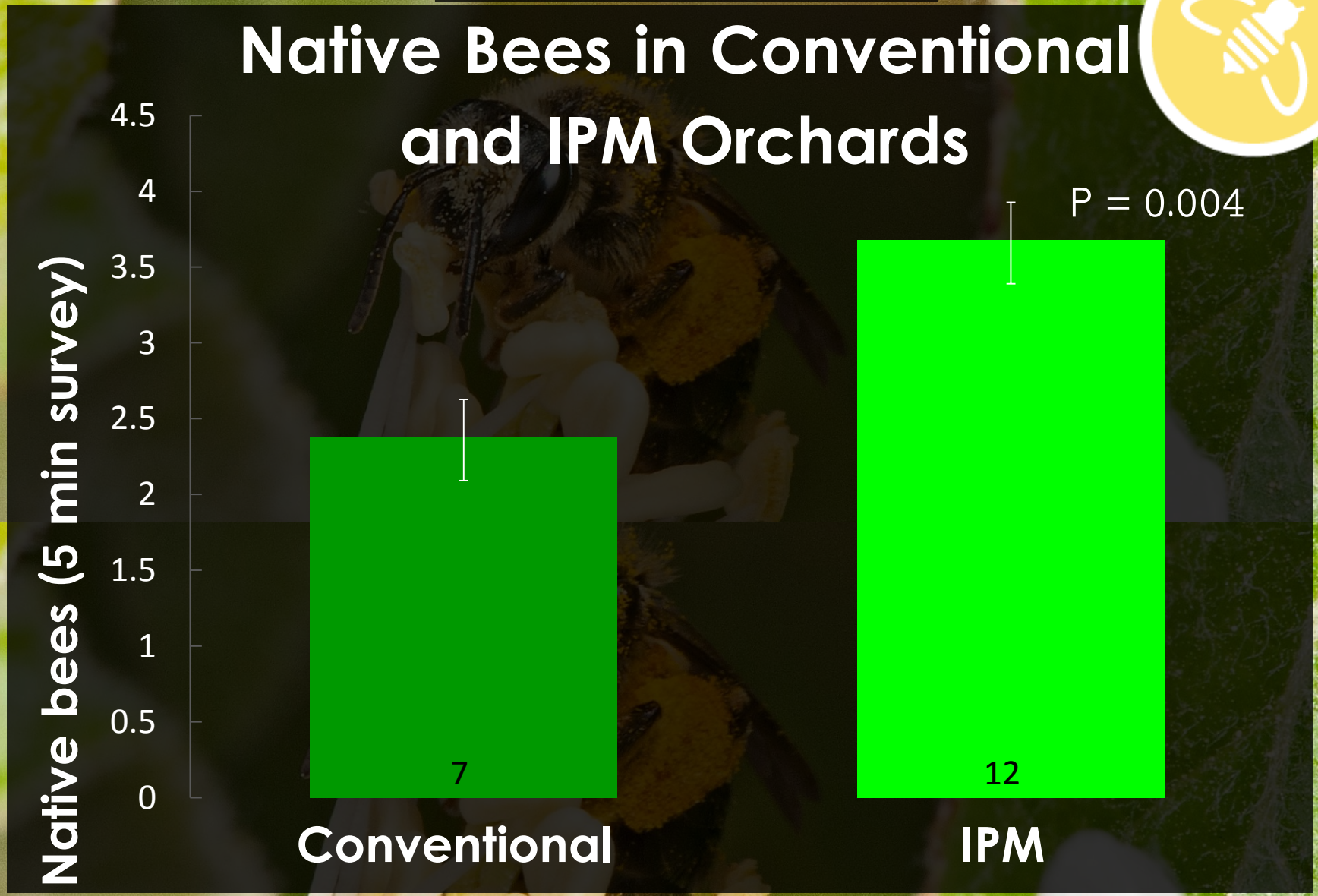
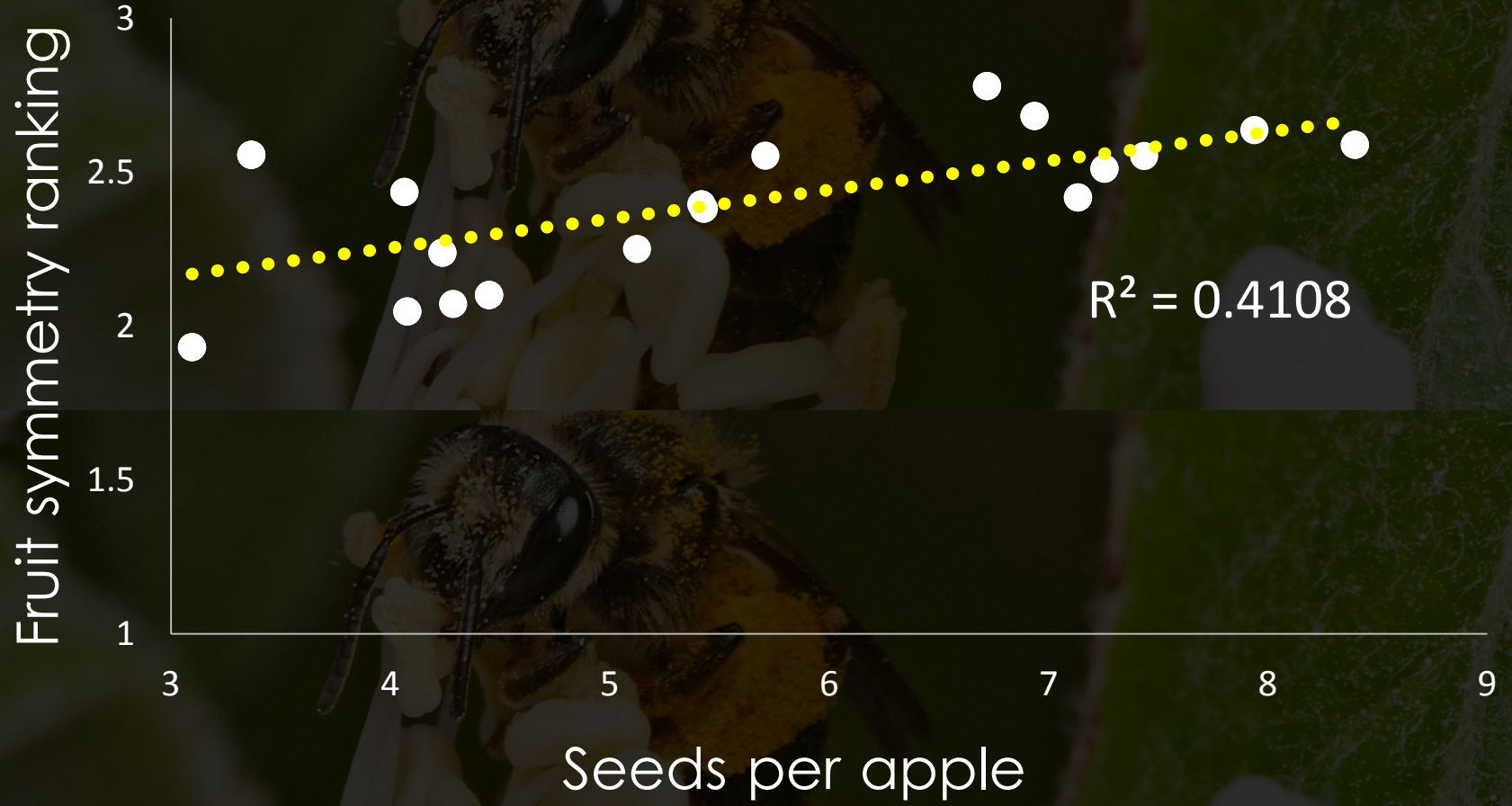
Pilot Year 2016



Historical Data

Relationship of fruit symmetry (shape) to seed number



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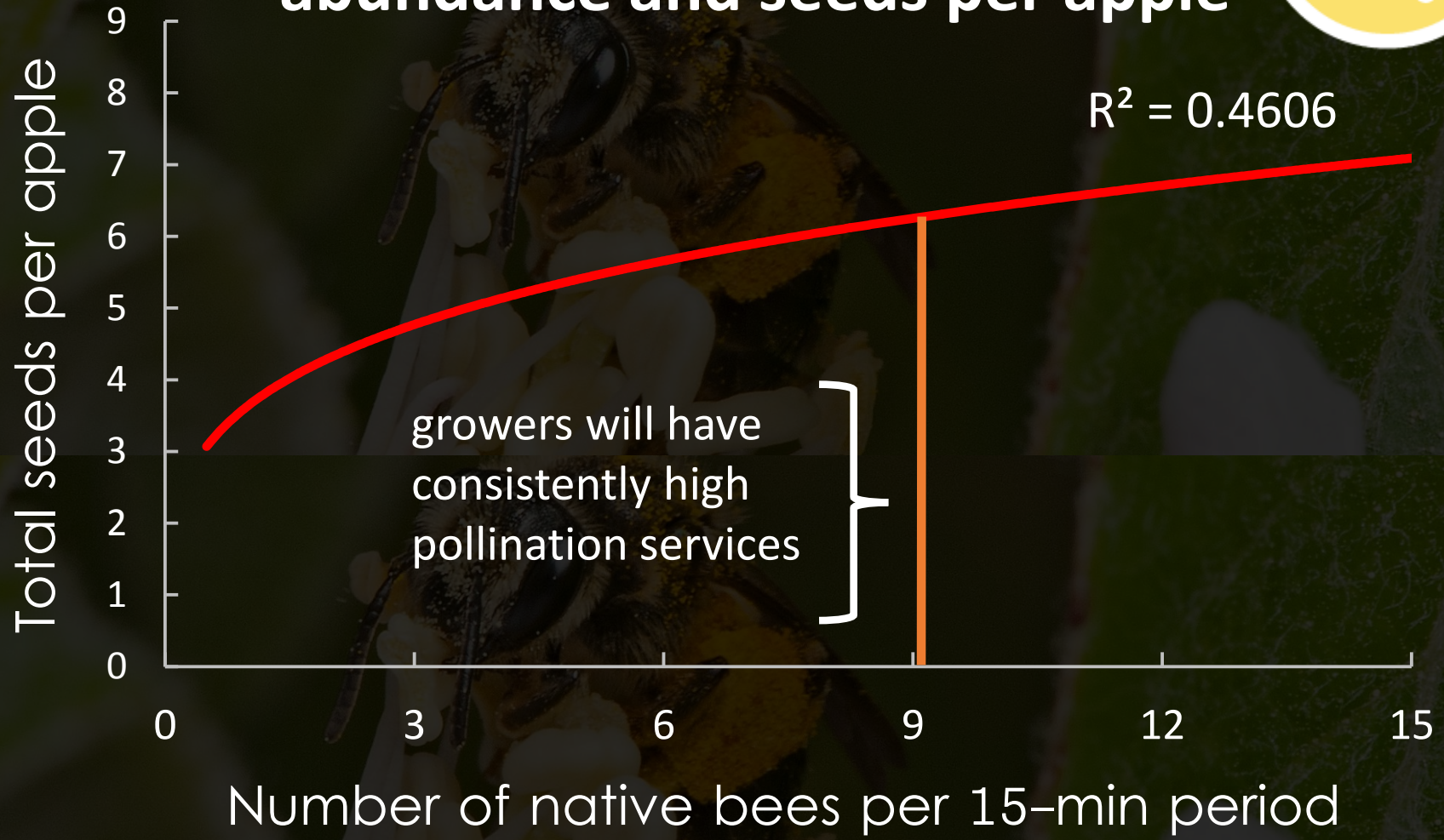
Historical Data

Relationship between native bee abundance and seeds per apple



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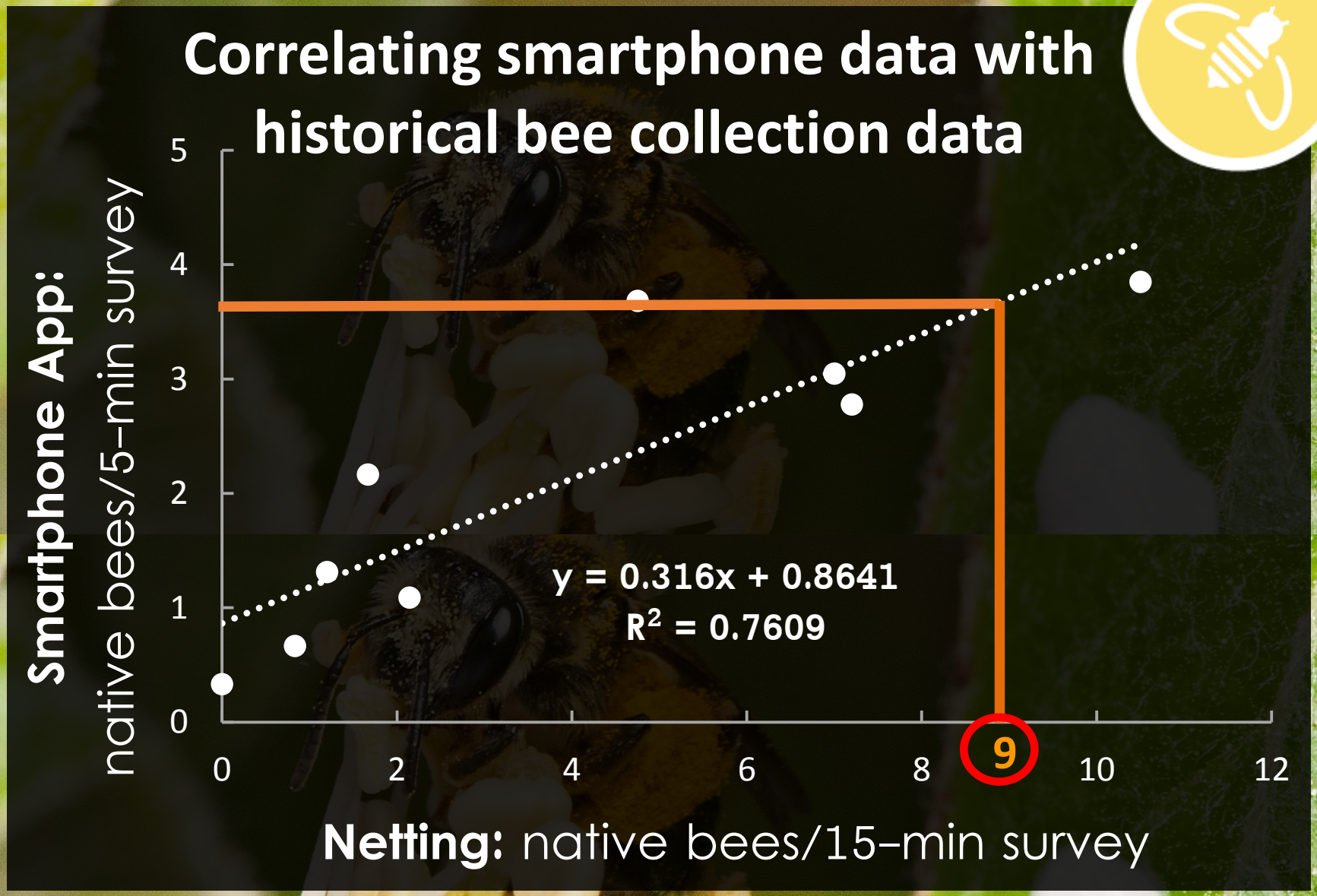
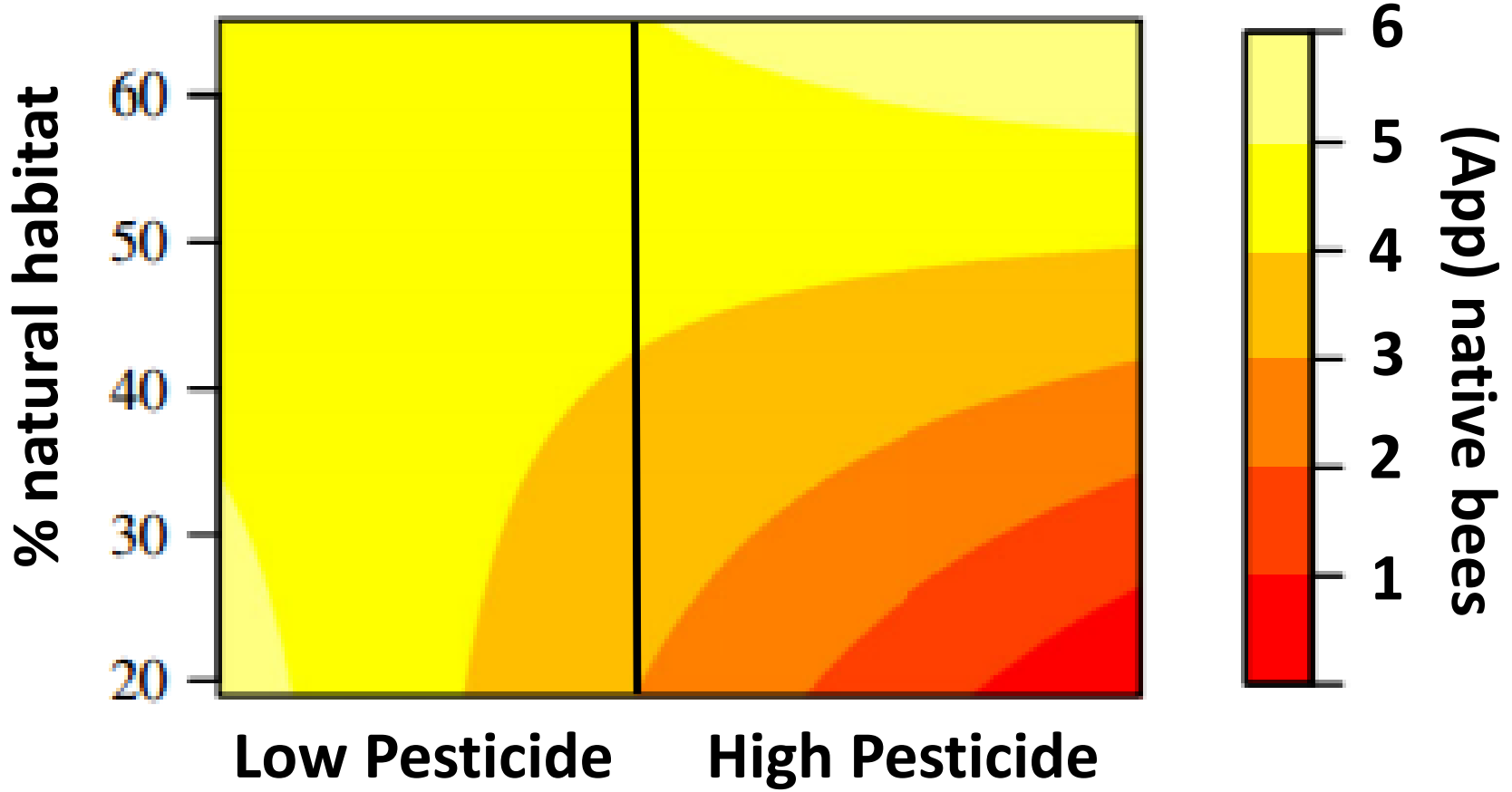
Correlating smartphone data with historical bee collection data



Visual of Model



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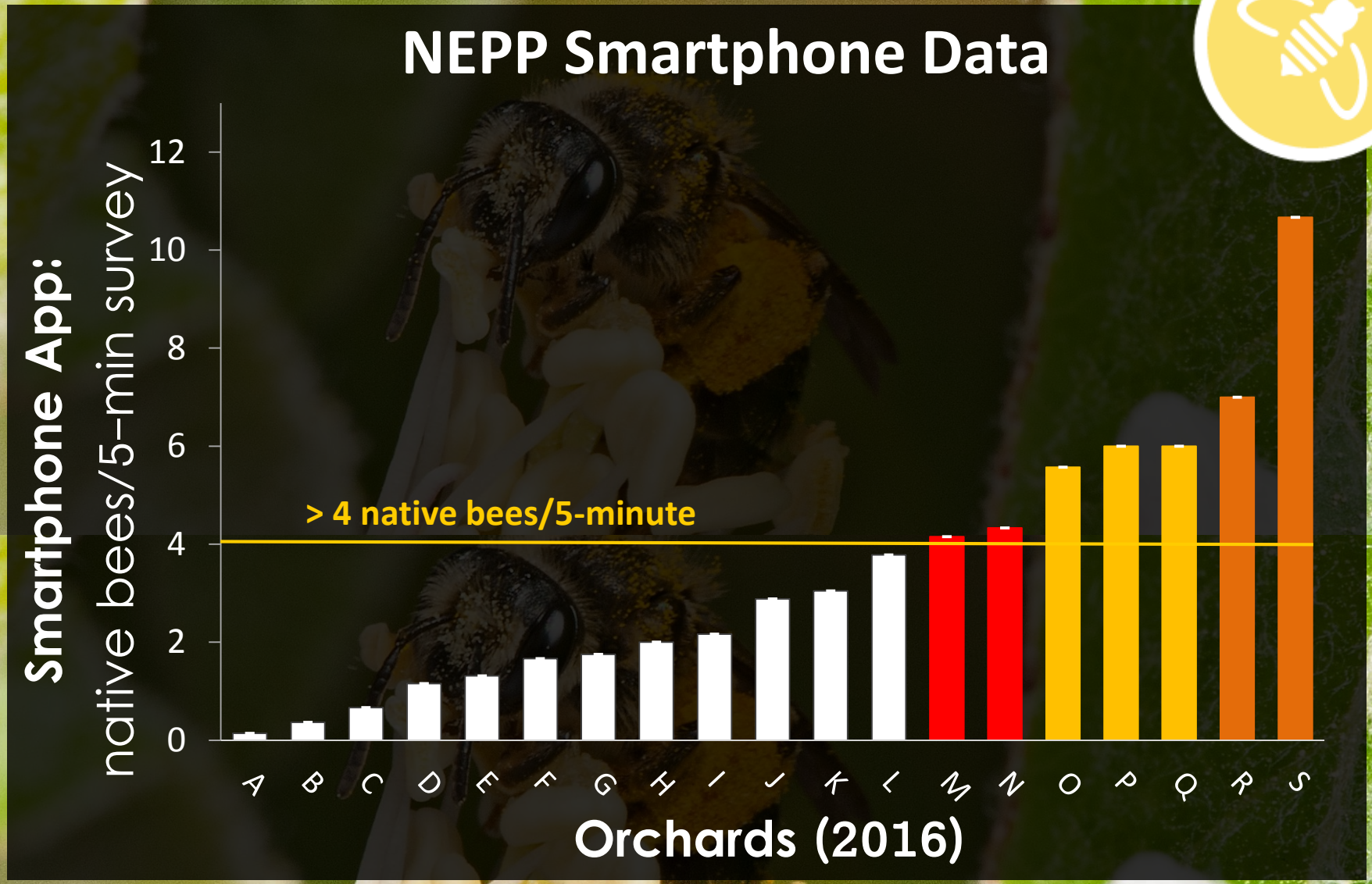

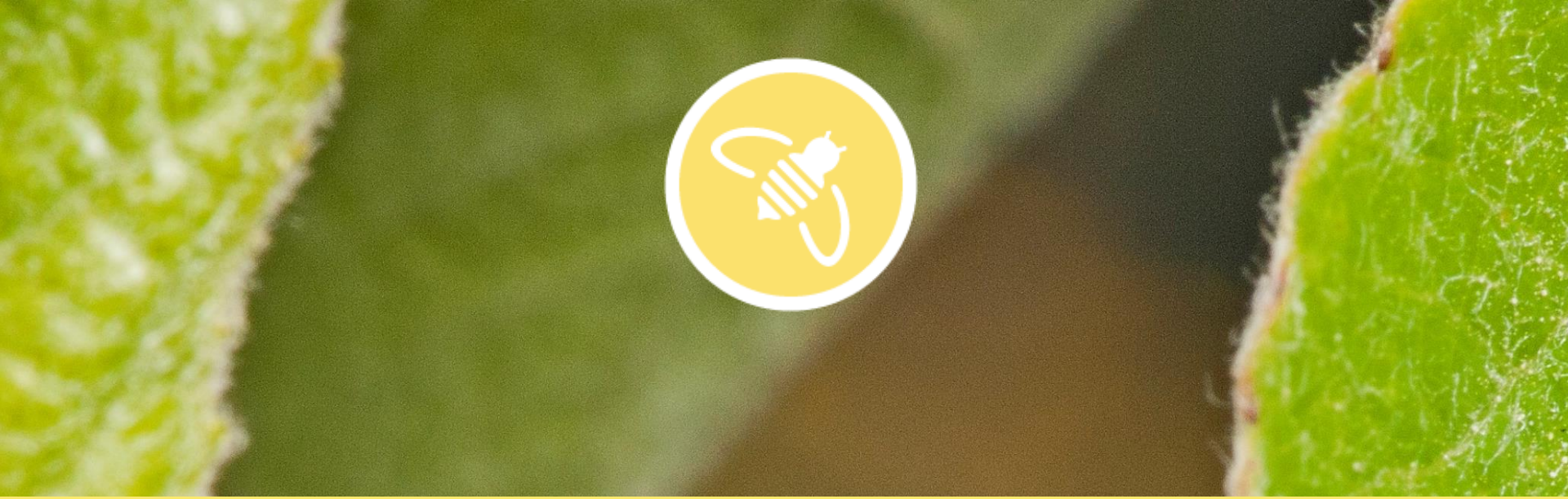

http://www.northeastpollinatorpartnership.org/count-bees/

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What **growers** could do with the data:

1. Determine how susceptible they are to honey bee declines

2. Develop a data driven pollinator management program on orchard that considers native bees.

3. Make more informed decisions about how many hives to rent.

Include Native Bees in your Pollination Management Plan

1. **Provide safe sites:** on edges where you don't spray.

2. **Maintain or plant** willow and maple.

3. **Mow small areas** on margins to provide bareground for the ground-nesting species.

Include Native Bees in your Pollination Management Plan

Reduce spraying by following a strict IPM program:

1. Scout early and often
2. Choose less toxic chemical & physical alternatives
3. Choose resistant tree varieties
4. Remove cankers/wood/leaves
5. Prevent primary infections
6. Remove hawthorne/crabapple)

Alternatives to Carbaryl

1. Mixtures of ATS & NAA or BA & NAA
2. Additions of oil to BA
3. Additions of Regulaid to NAA

   OR

4. Mechanical Blossom Thinning + BA

Fall 2016 NYFQ

Mechanical Blossom Thinning Followed by 6-BA Shows Promise as an Alternative to Thinning Without Carbaryl

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Go to App website:

www.northeastpollinatorpartnership.org

OR

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