The Good, The Bad, And The Buzzy: The Impacts Of Pesticides On Pollinators And How To Protect Them

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Who cares?

- Required for 13 crops
- Increase yield in an additional 78 crops

(Klein et al, 2007)

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More Than Just Honey Bees

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More Than Just Honey Bees

The 4 P's

Sandhill Crane Festival

PESTS
Varroa Mites

PATHOGENS
Virus, Fungus, etc.

POOR NUTRITION
Where are the flowers?

PESTICIDES
Neccesary Exposure

Graphic courtesy of Project Apis m.

Why are bees so susceptible?

(Claudianos et al. 2006)

Bee kills in the news

The largest native bee kill to day.

https://xerces.org/wilsonville-bee-kill

Treated seed is not restricted by the same disposal rules as pesticides

Photo: USDA-NRCS/Lance Cheung

https://www.xerces.org/blog/ethanol-plant-causes-severe-pesticide-contamination-in-nebraska

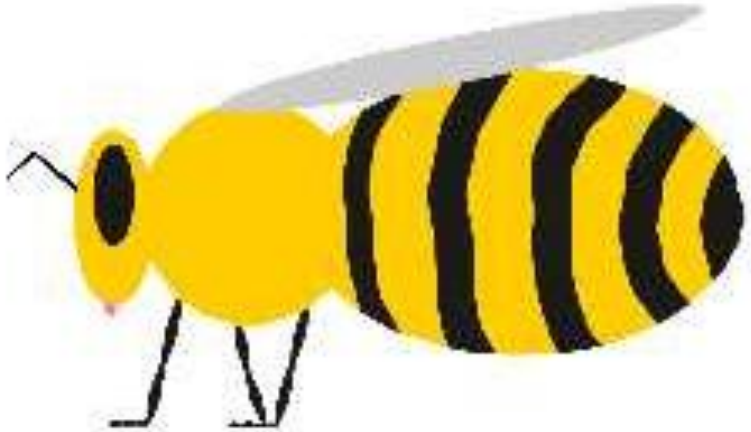
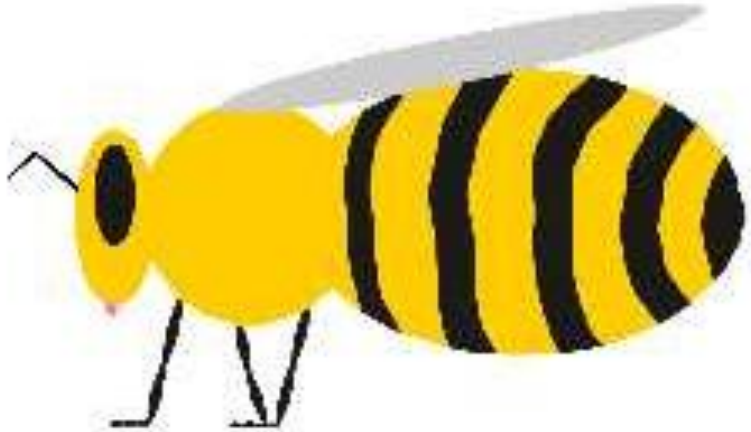
Nebraska ethanol plant

Photo: Judy Wu-Smart

https://www.xerces.org/blog/ethanol-plant-causes-severe-pesticide-contamination-in-nebraska

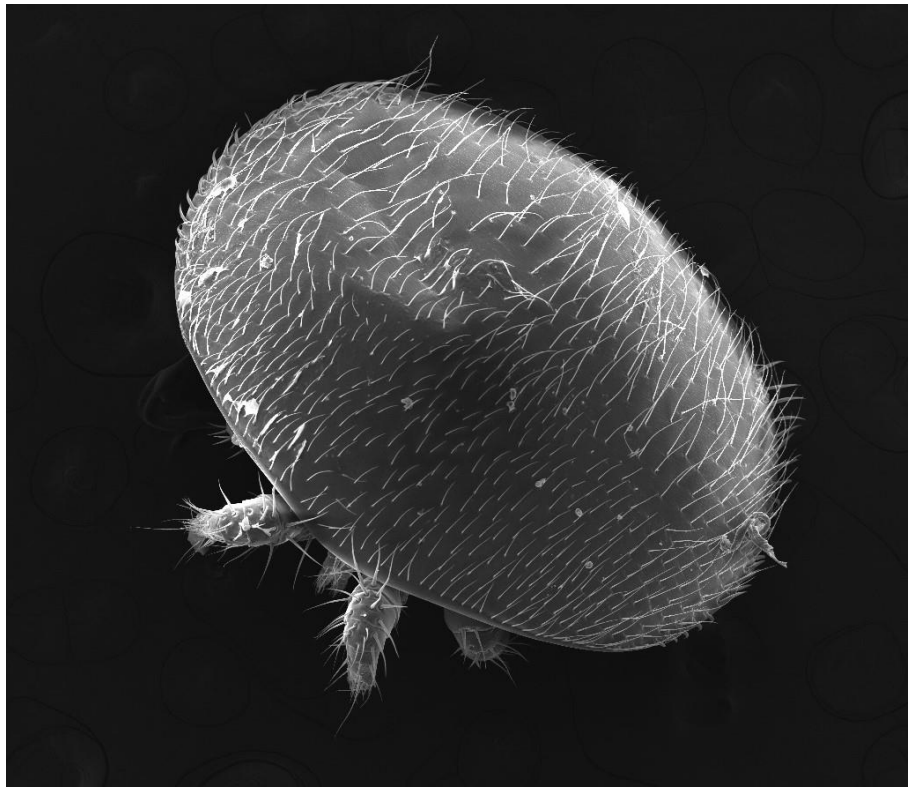
Lethal and sublethal effects

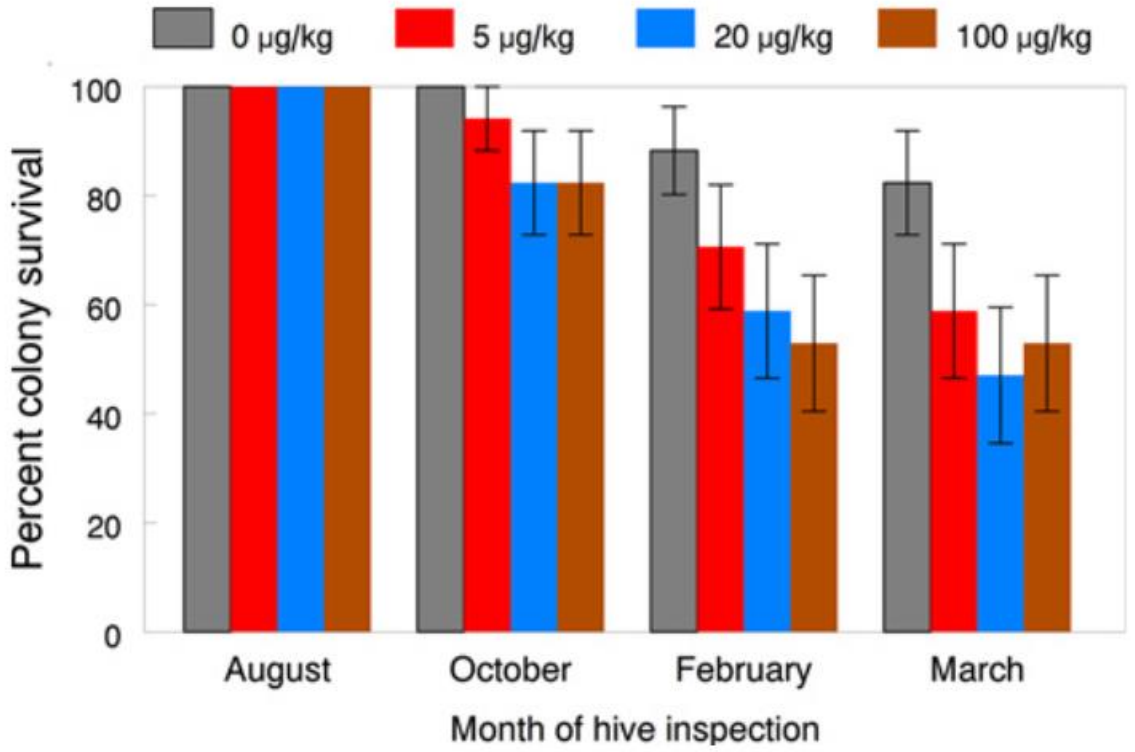
Fipronil effectively bioaccumulates in honey bees.

- 
- 

(Holder et al. 2018)

Chronic exposure to imidacloprid can decrease winter survival

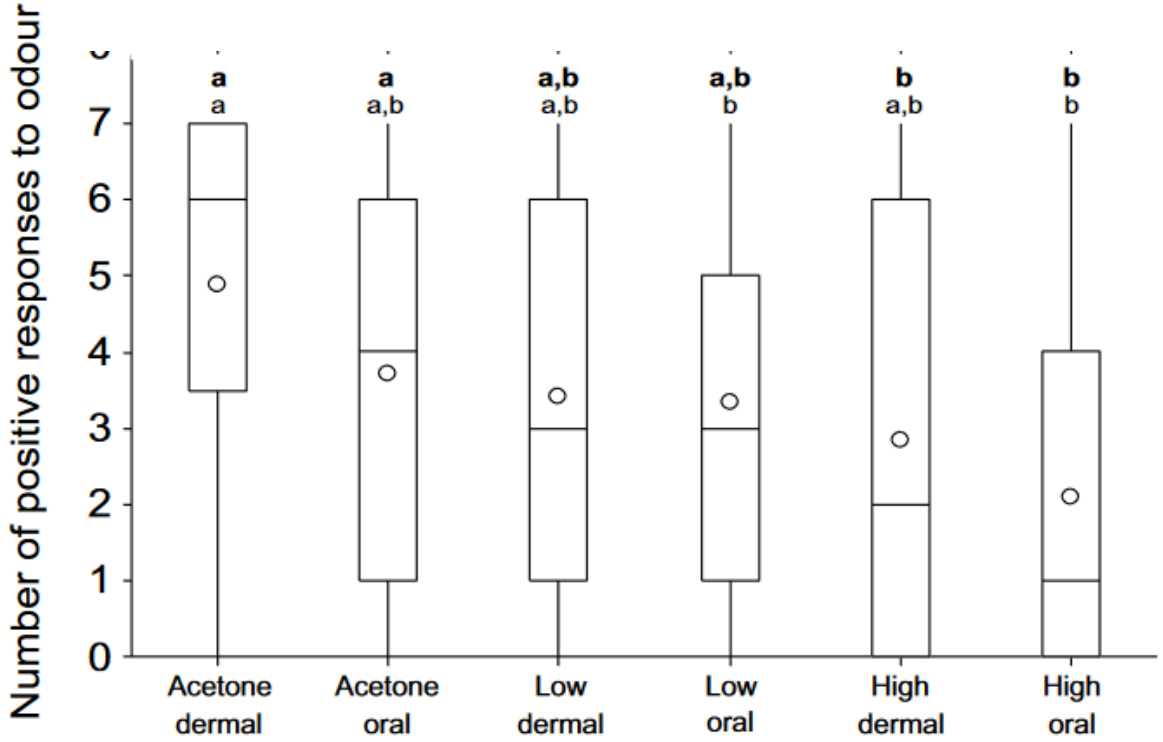




(Dively et al. 2015)

Tau-fluvalinate negatively impacts learning and memory in honey bees.

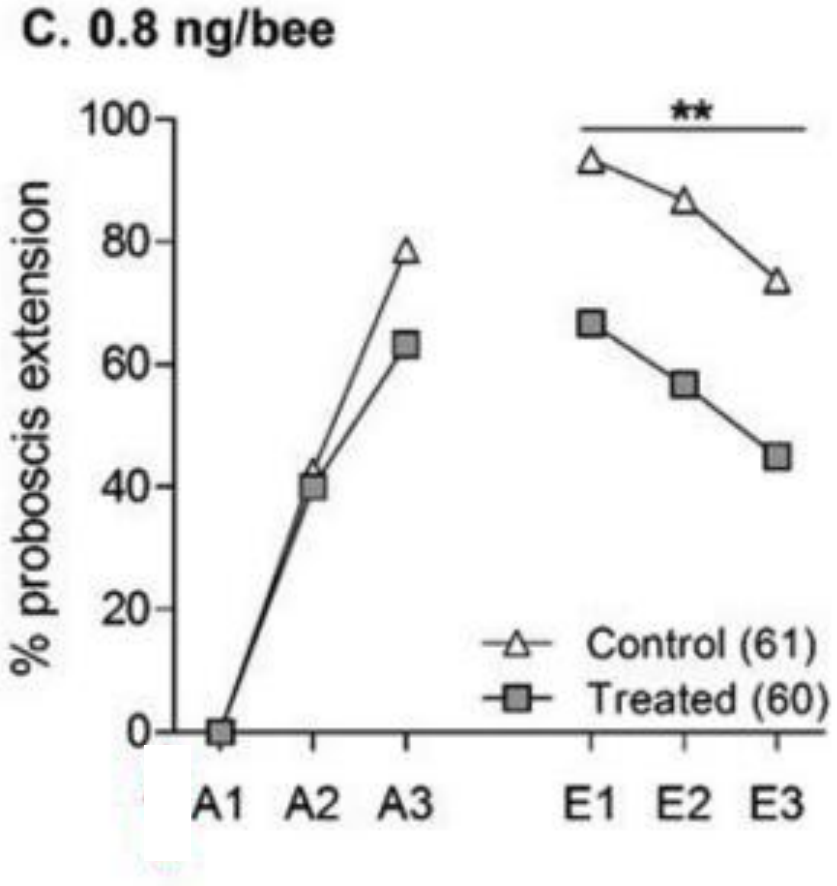
(Matsumoto et al. 2012)



(Frost et al. 2013)

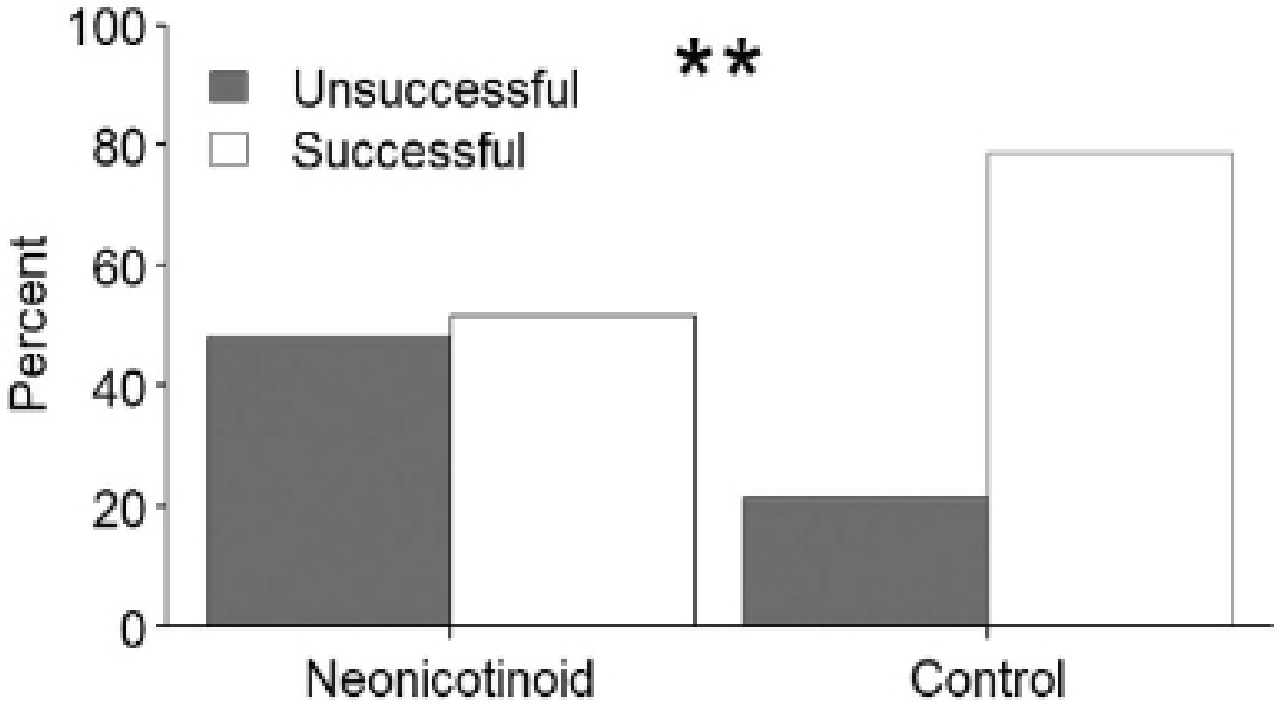
Clothianidin also negatively impacts honey bee learning and memory.

(Matsumoto et al. 2012)



(Tison et al, 2019)

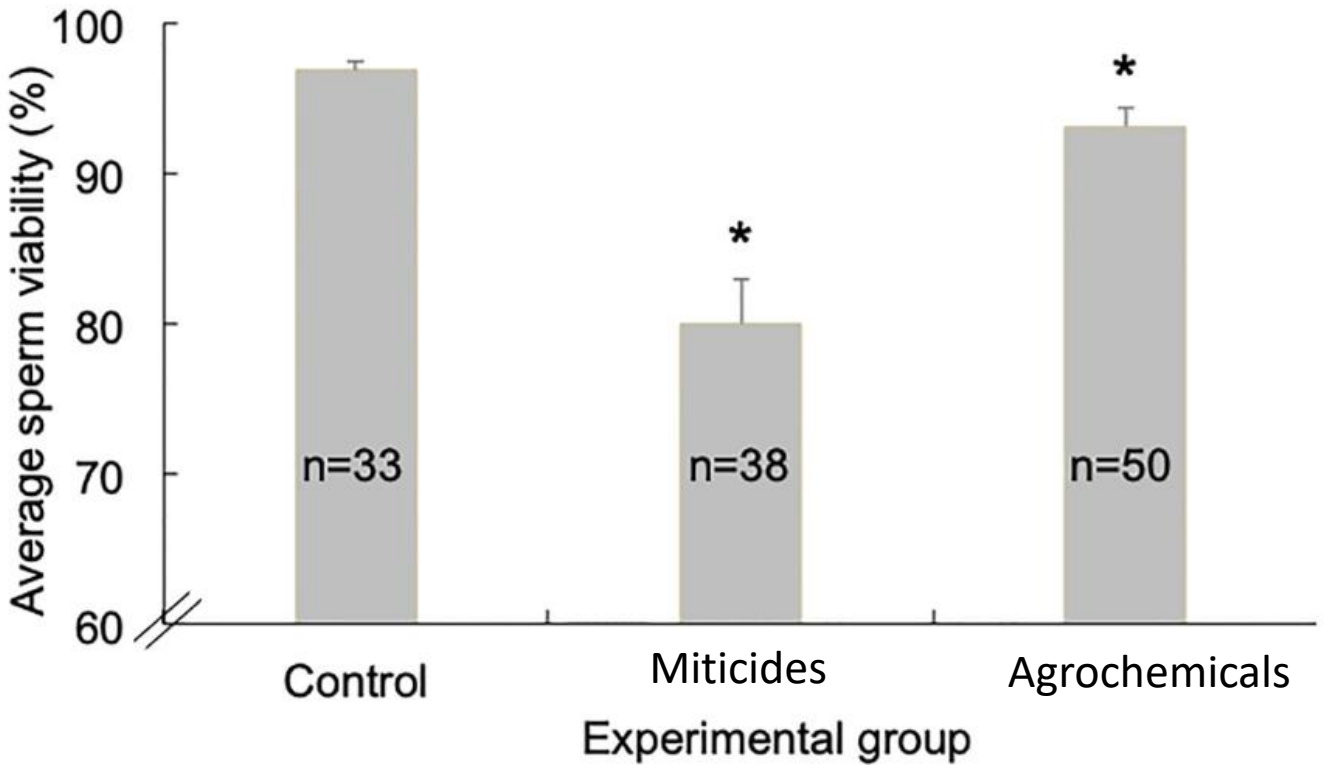
Exposure to thiamethoxam and clothianidin can negatively impact queen success



(Williams et al, 2015)

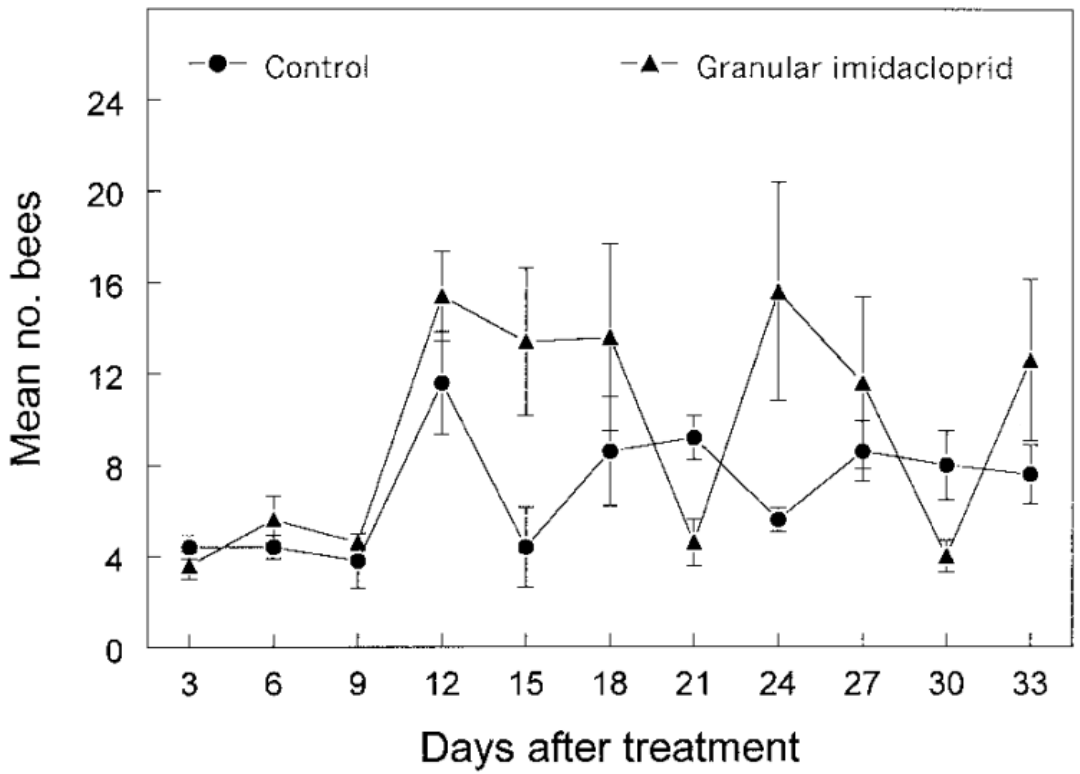
Beeswax 101

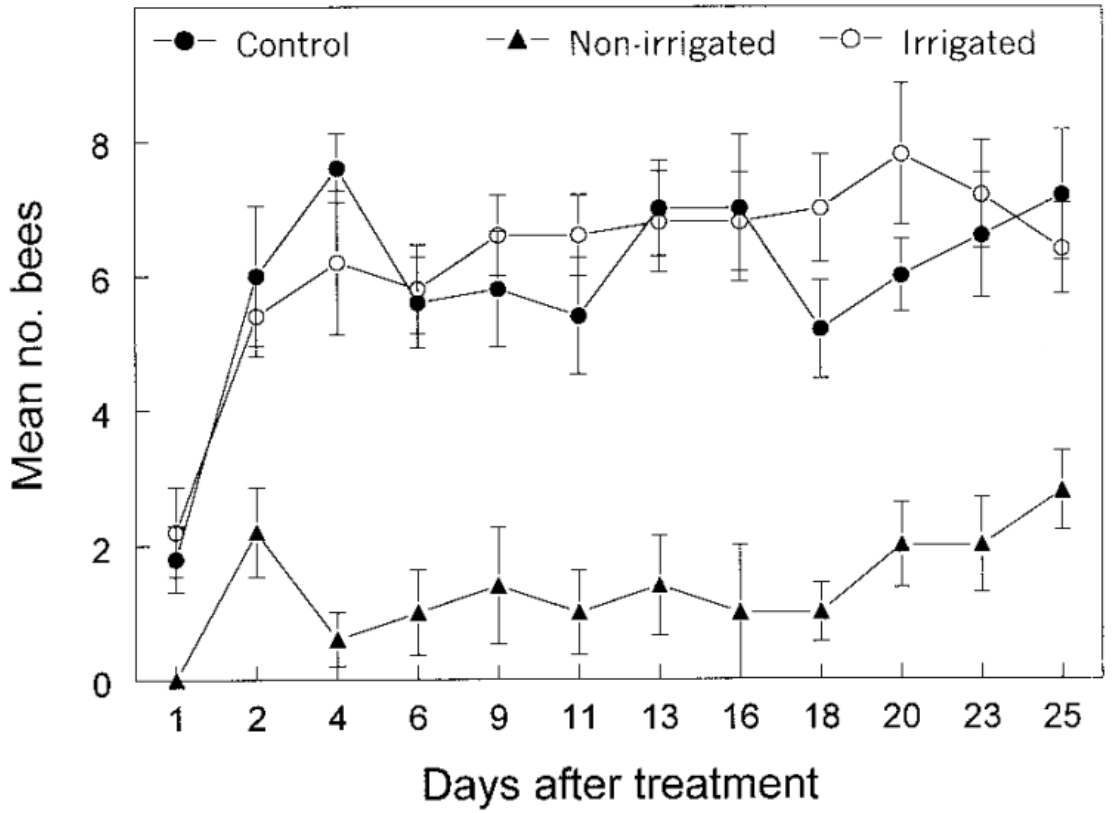
Chronic exposure through wax decreases sperm viablity.



(Bischoff, et al. 2023; Fisher II & Rangel, 2018)

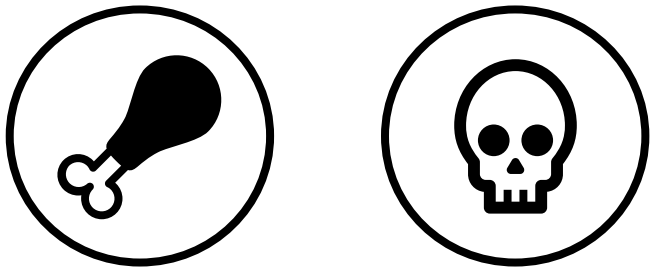
Granular application and post treatment irrigation decrease hazard to bumble bees

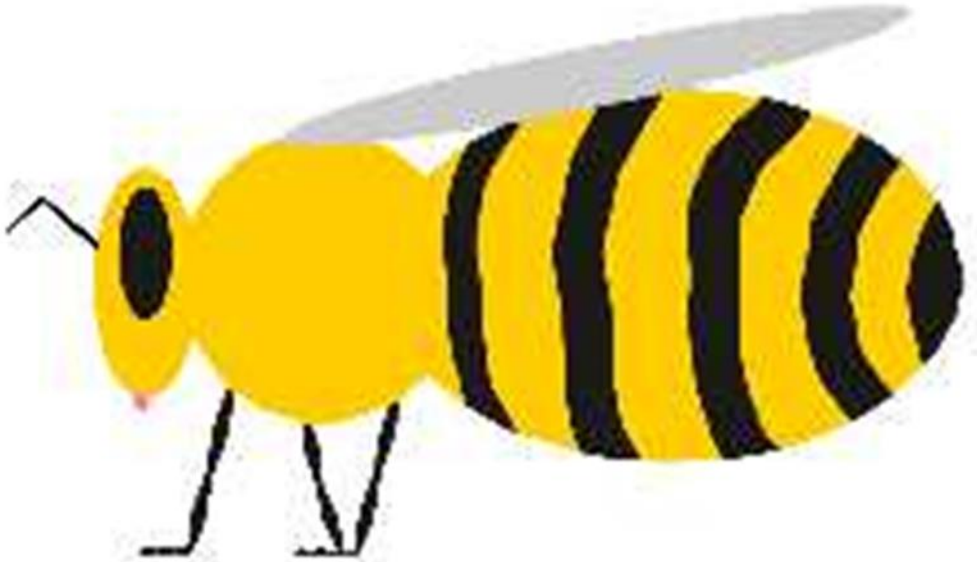




(Gels et al., 2002)

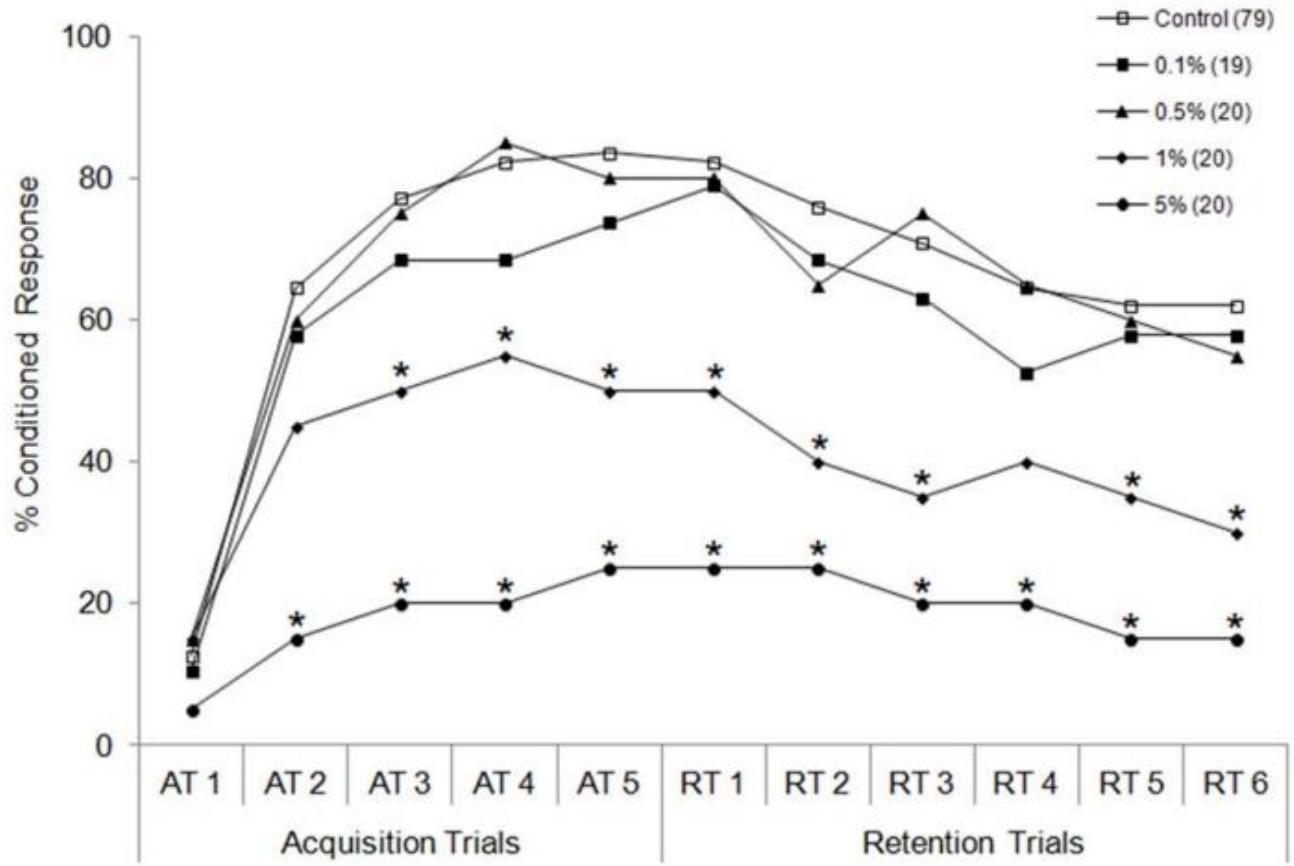
Bees mistake microencapsulated pesticides for pollen, storing it in their hives.





(Burgett & Fisher 1980)

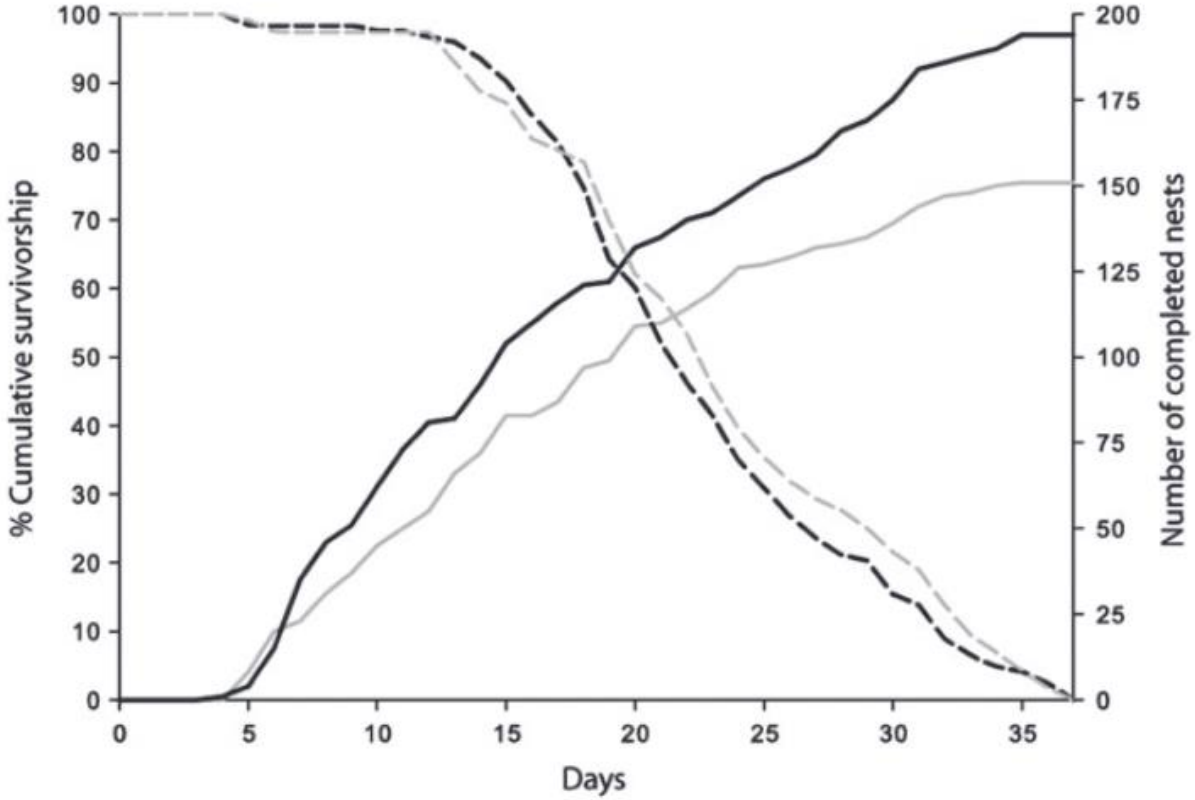
Organosillicone surfactants negatively impact honey bee learning.



(Ciarlo et al., 2012)

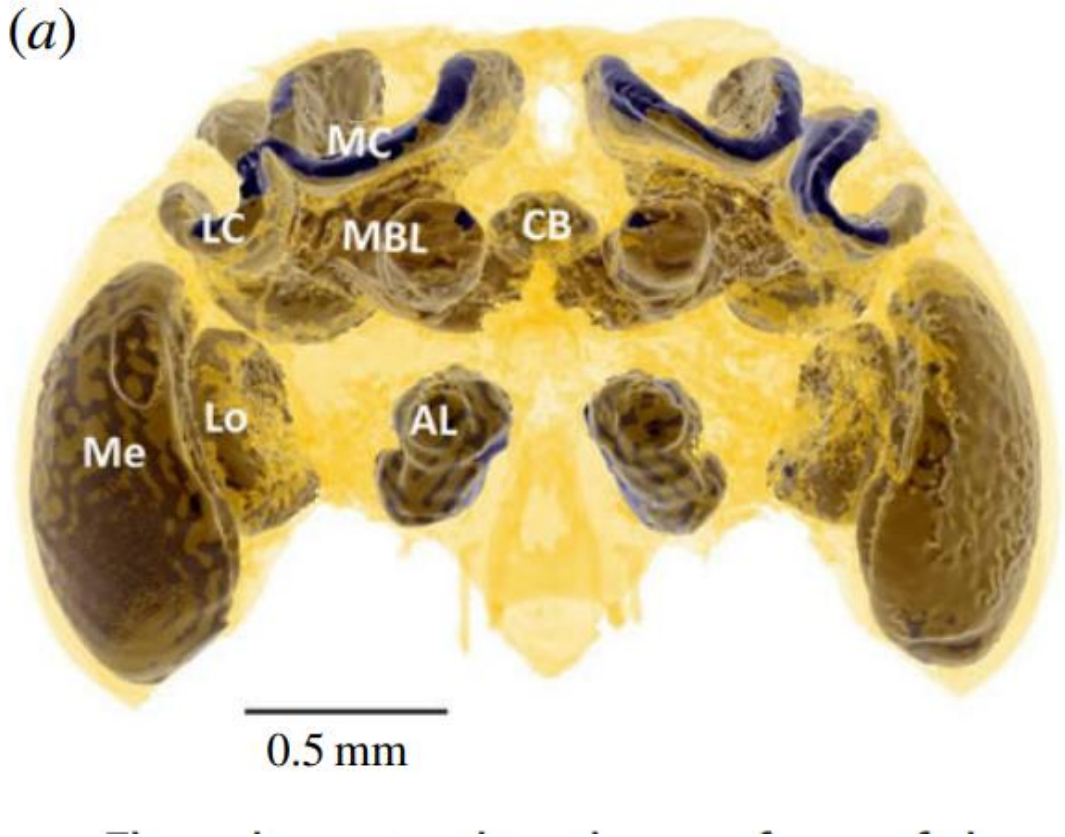
Red mason bees exposed to neonicotinoids have less reproductive success

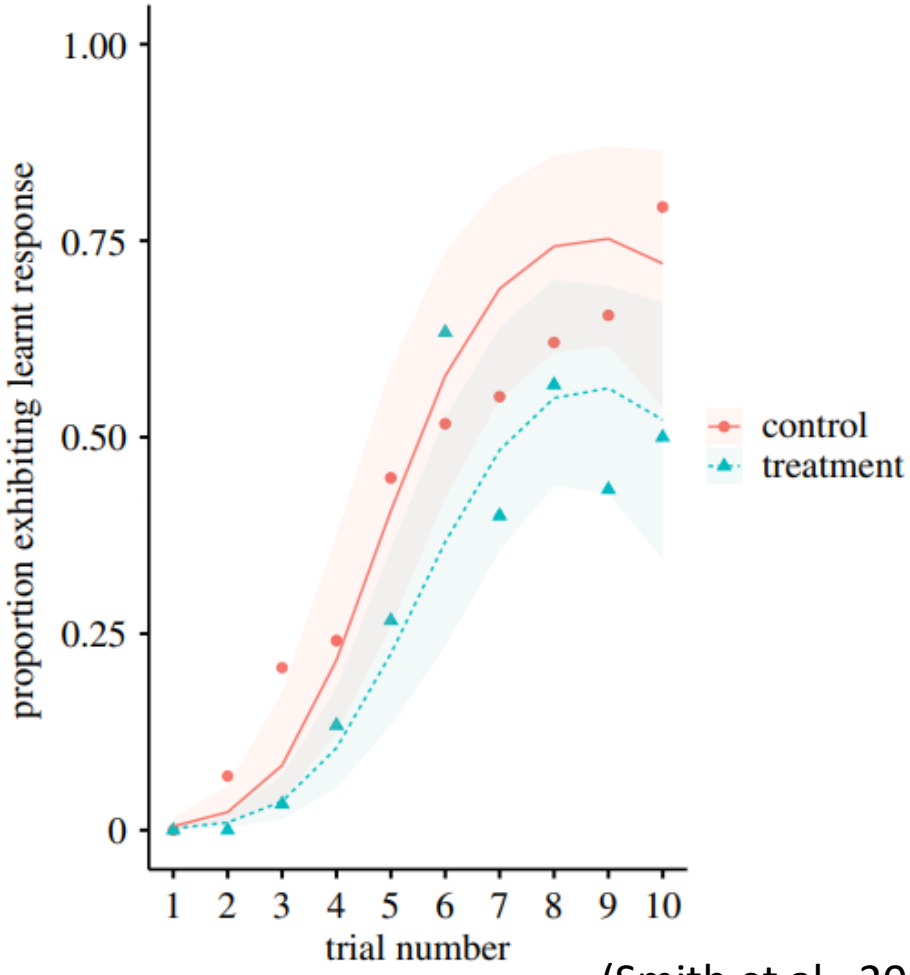
Photo courtesy of https://www.gardenia.net/guide/mason-bees



(Sandrock et al, 2014)

Imidacloprid exposure reduces bumble bee learning and brain volume.

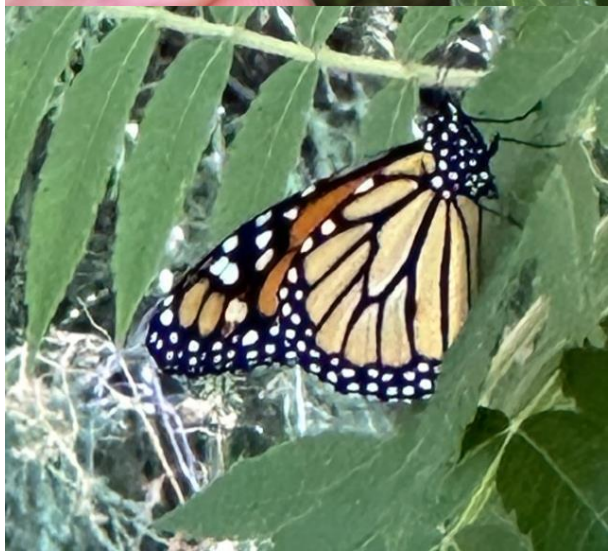


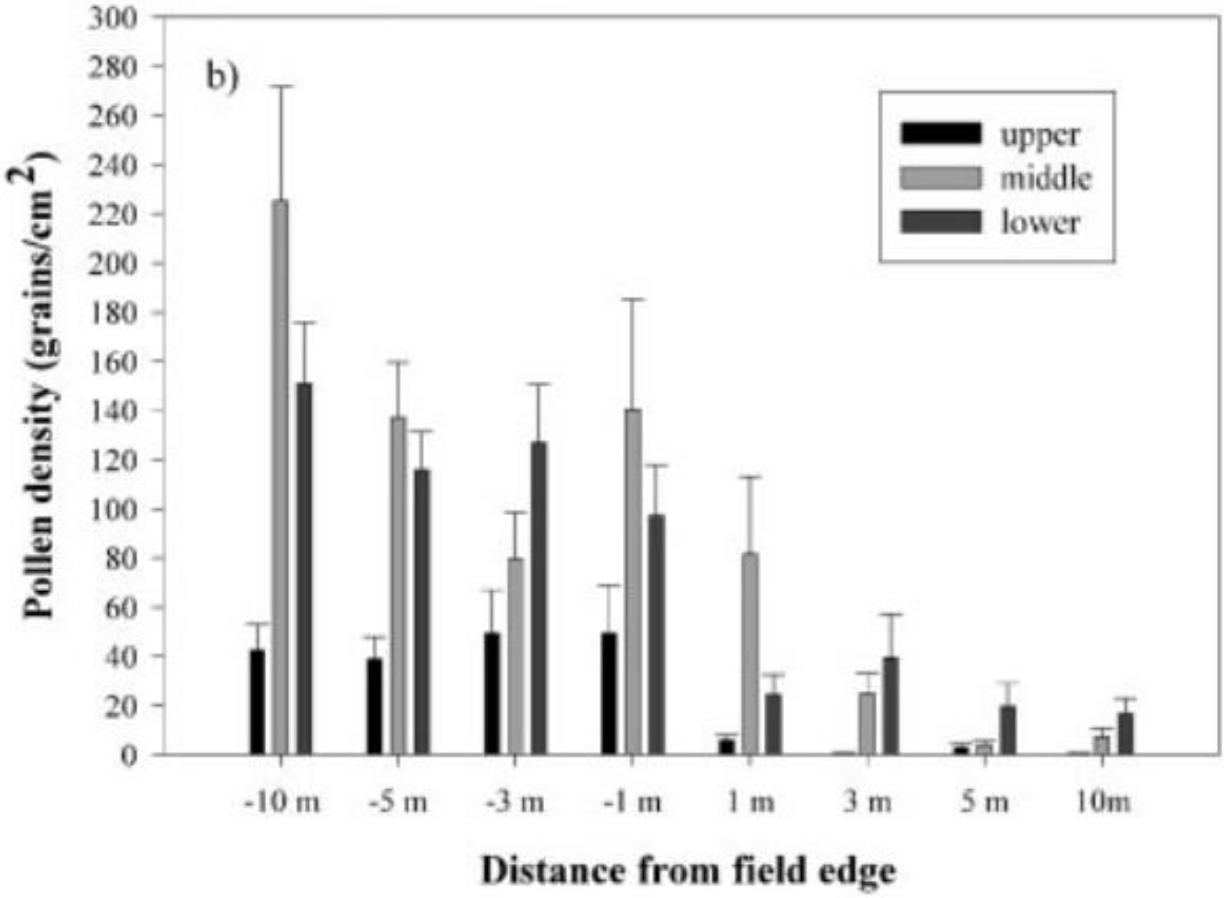


(Smith et al., 2020)

Does Bt corn kill Monarch caterpillars?

No.



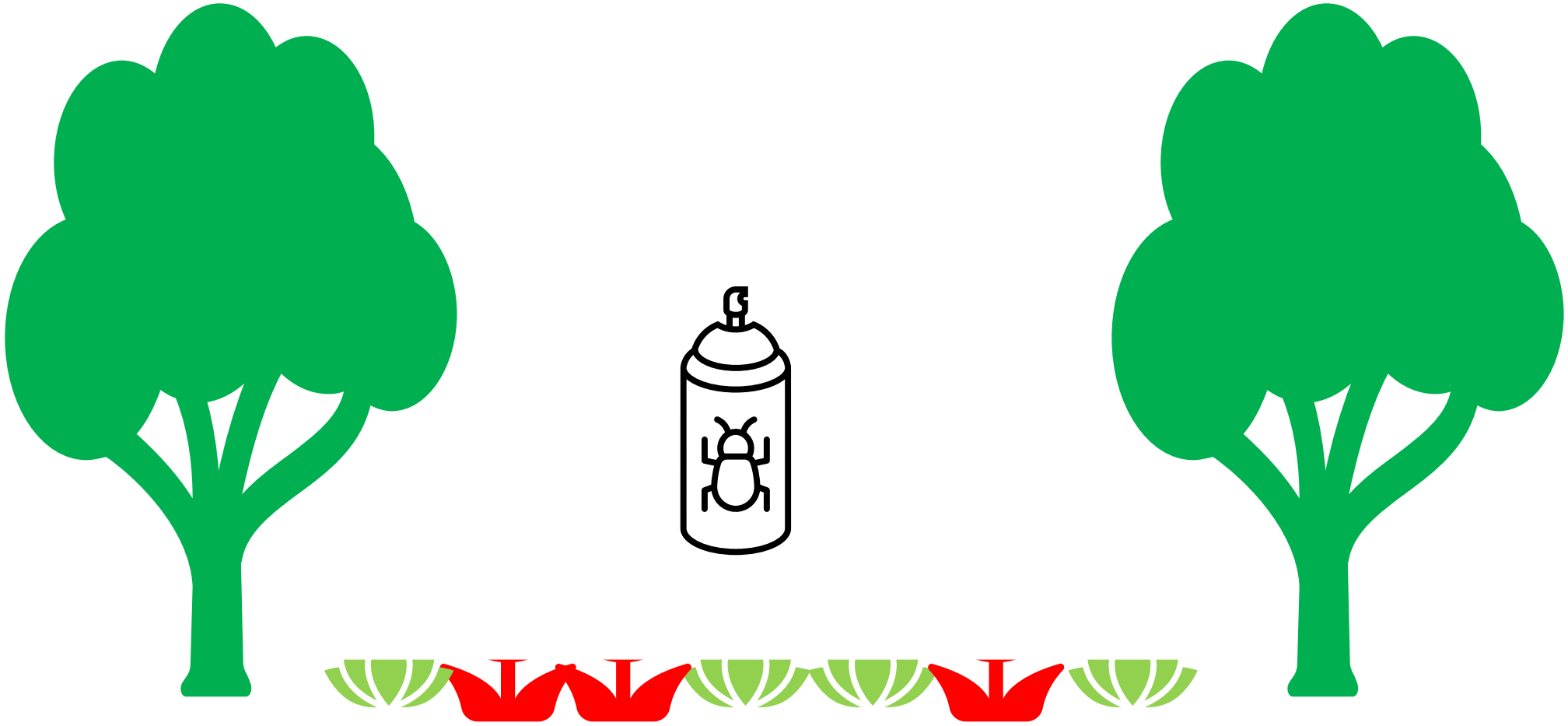


(Pleasants et al, 2001; Sears et al, 2001)

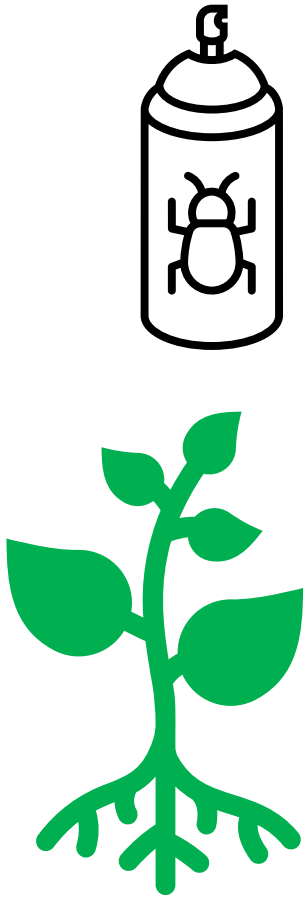
How to protect the bees

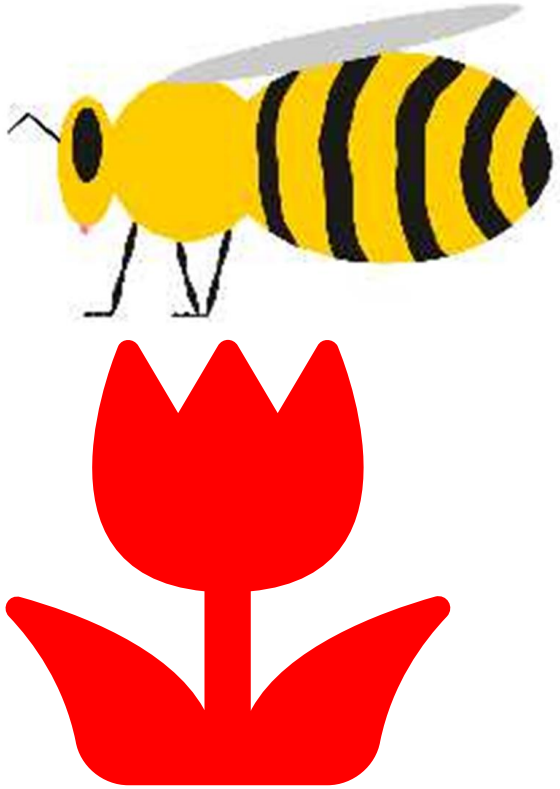
Disclaimer: These are all just general suggestions and not applicable to all pesticides or situations, always consult the label to make sure you are following the law and staying safe!

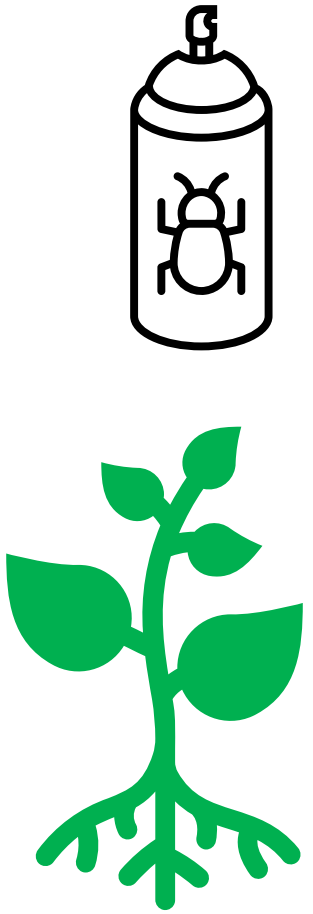
Remove flowers before applying a pesticide.



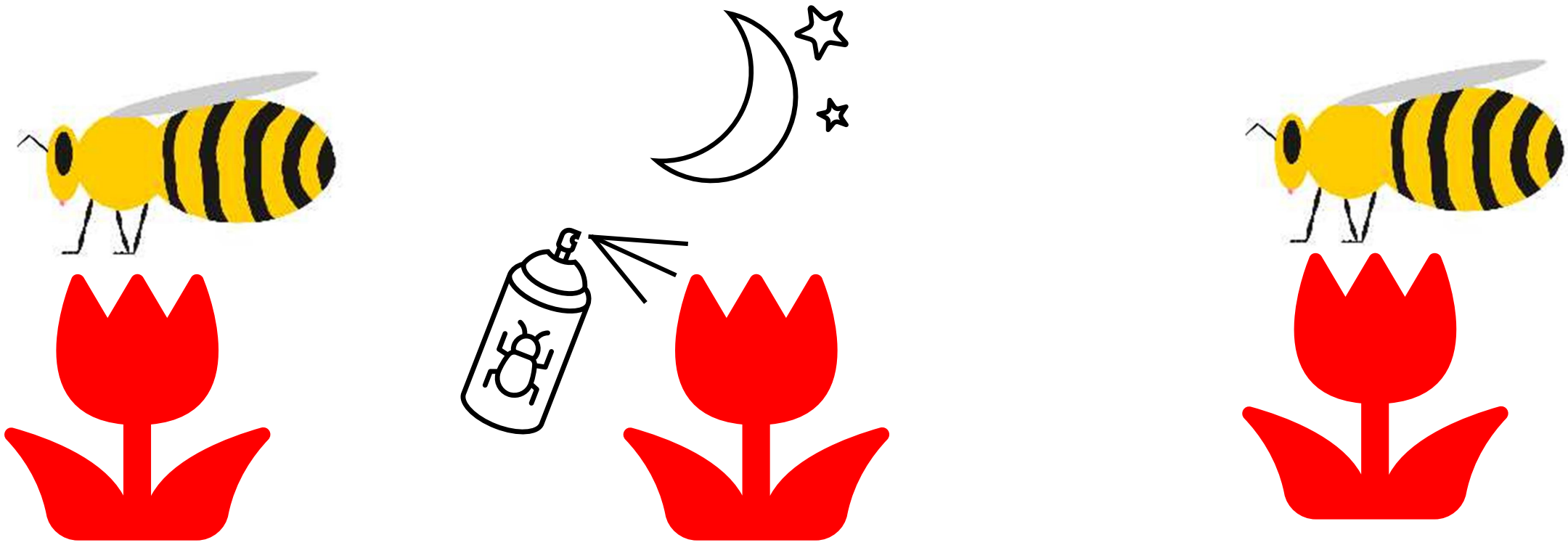
Try to apply pesticides before or after bloom.



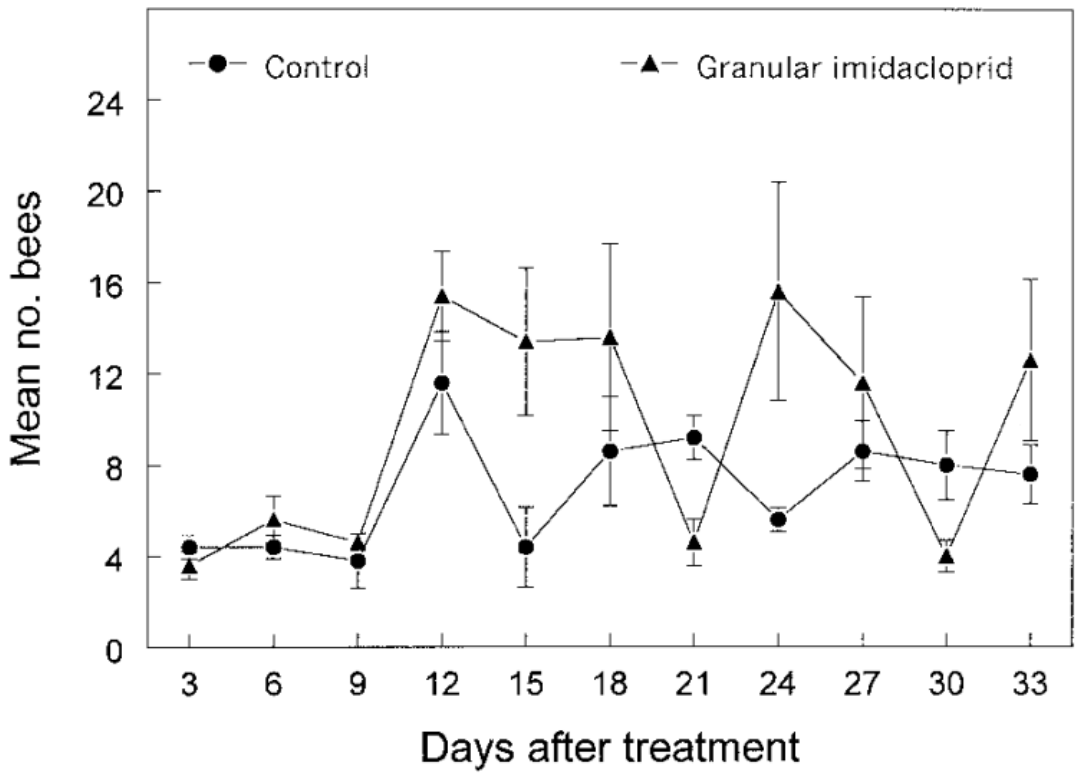


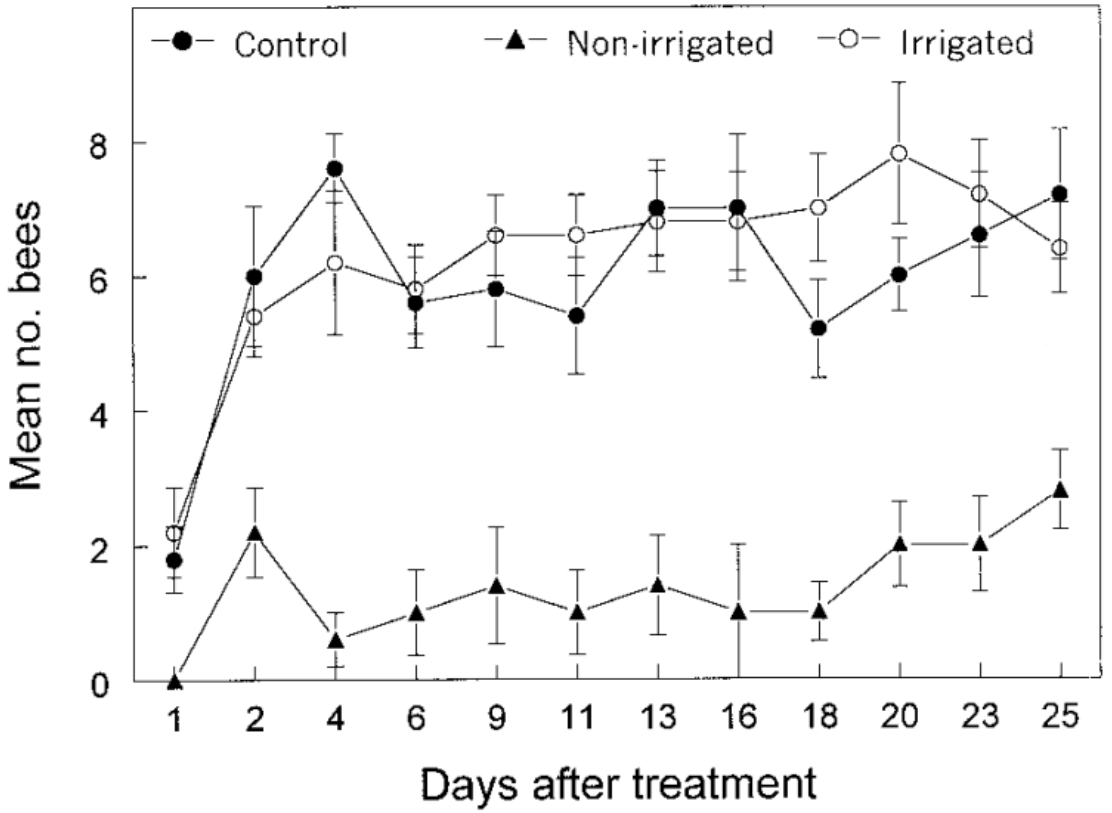


Apply pesticides at sunset or at night when pollinators aren’t active.



Utilize formulations that are safer for pollinators





(Gels et al., 2002)

Finally, communicate with beekeepers.

Photo credit:
Beeline Honey

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Questions?

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