

Pollinators & Pesticides



THE SUNDAY TIMES BESTSELLER

DAVE GOULSON



Silent Earth

AVERTING THE INSECT APOCALYPSE

'A wake-up call for the world'

ISABELLA TREE,
AUTHOR OF WILDING

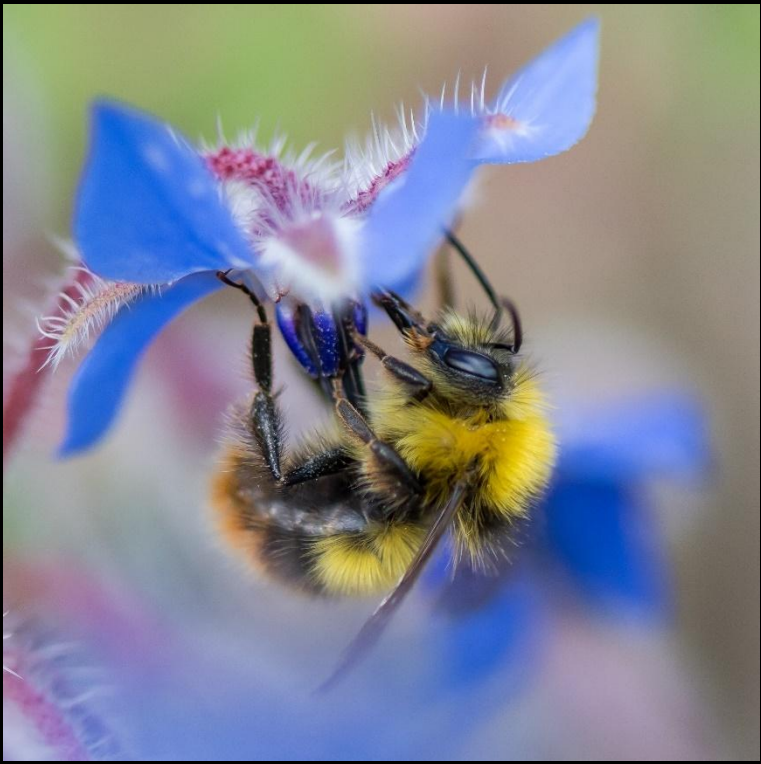
University of Sussex
@DaveGoulson

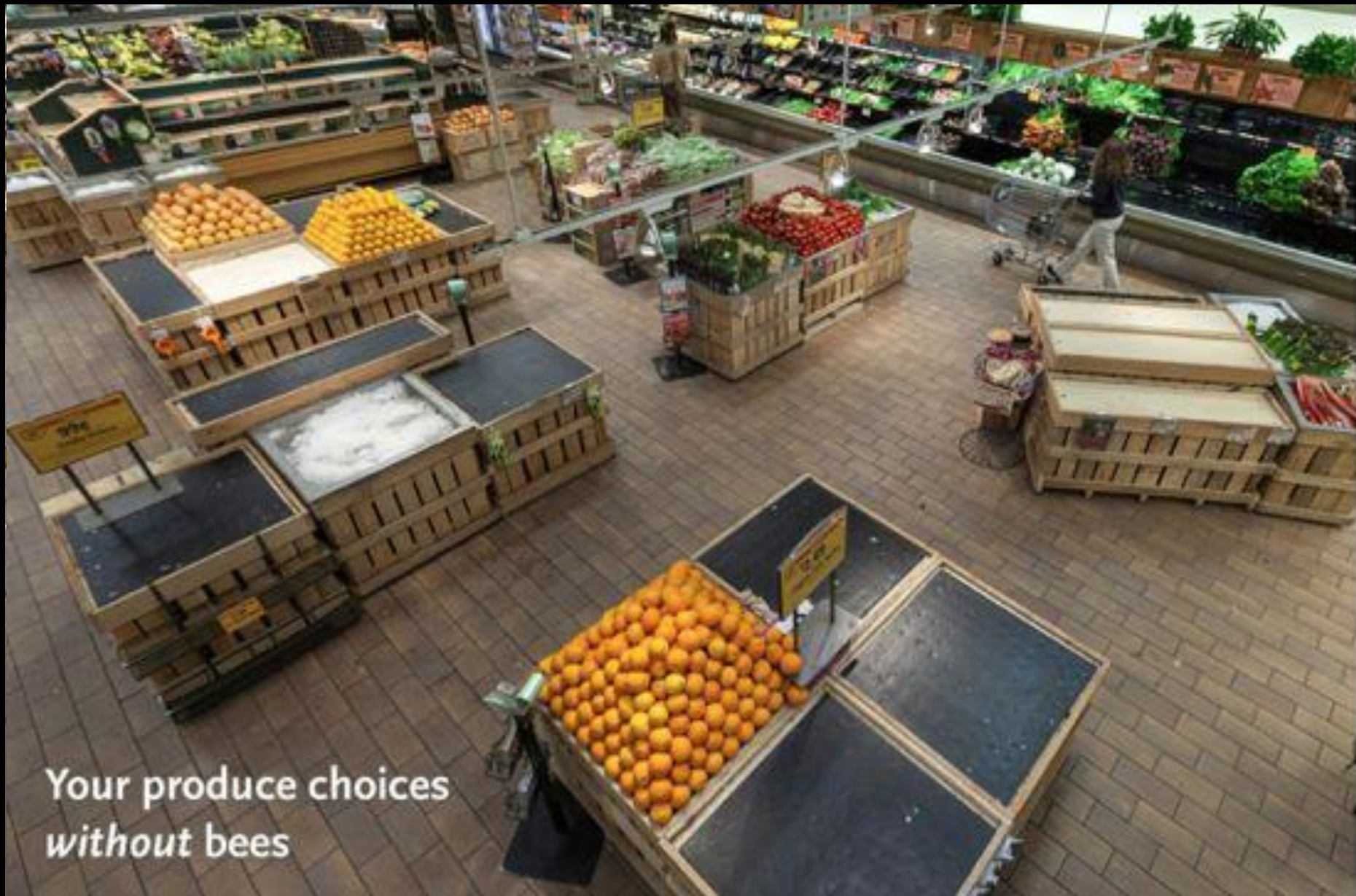






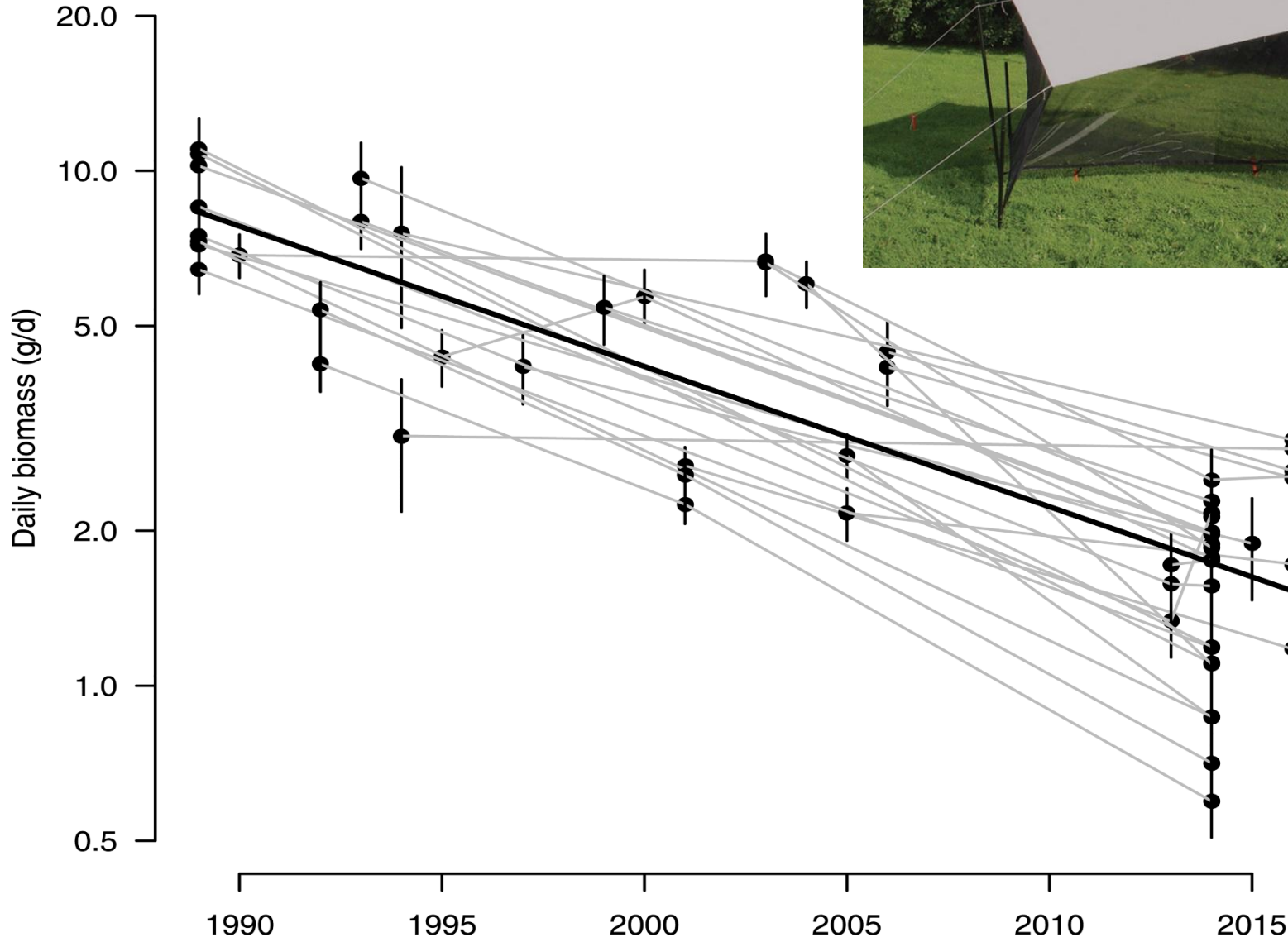


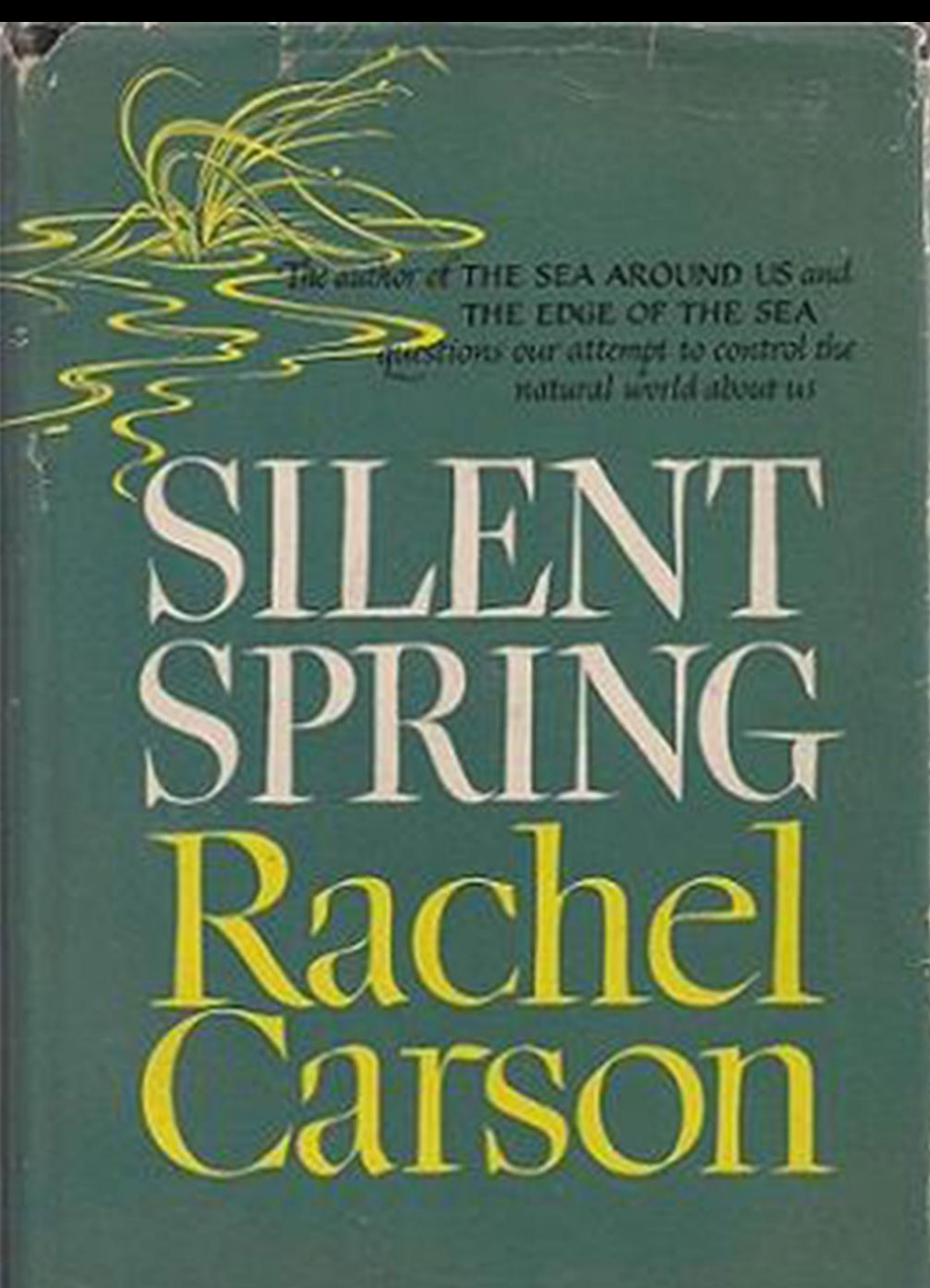




Your produce choices
without bees

A







Pesticides

3 million tons / yr globally and rising...

Neonicotinoids

25% of global insecticide market

Clothianidin

Thiamethoxam

Thiacloprid

Imidacloprid

Acetamiprid

Nitenpyram

Mainly used as seed dressing on arable crops.

Also sprayed on top fruit, soft fruit, and as a soil drench or granular formulation for turf / pasture.

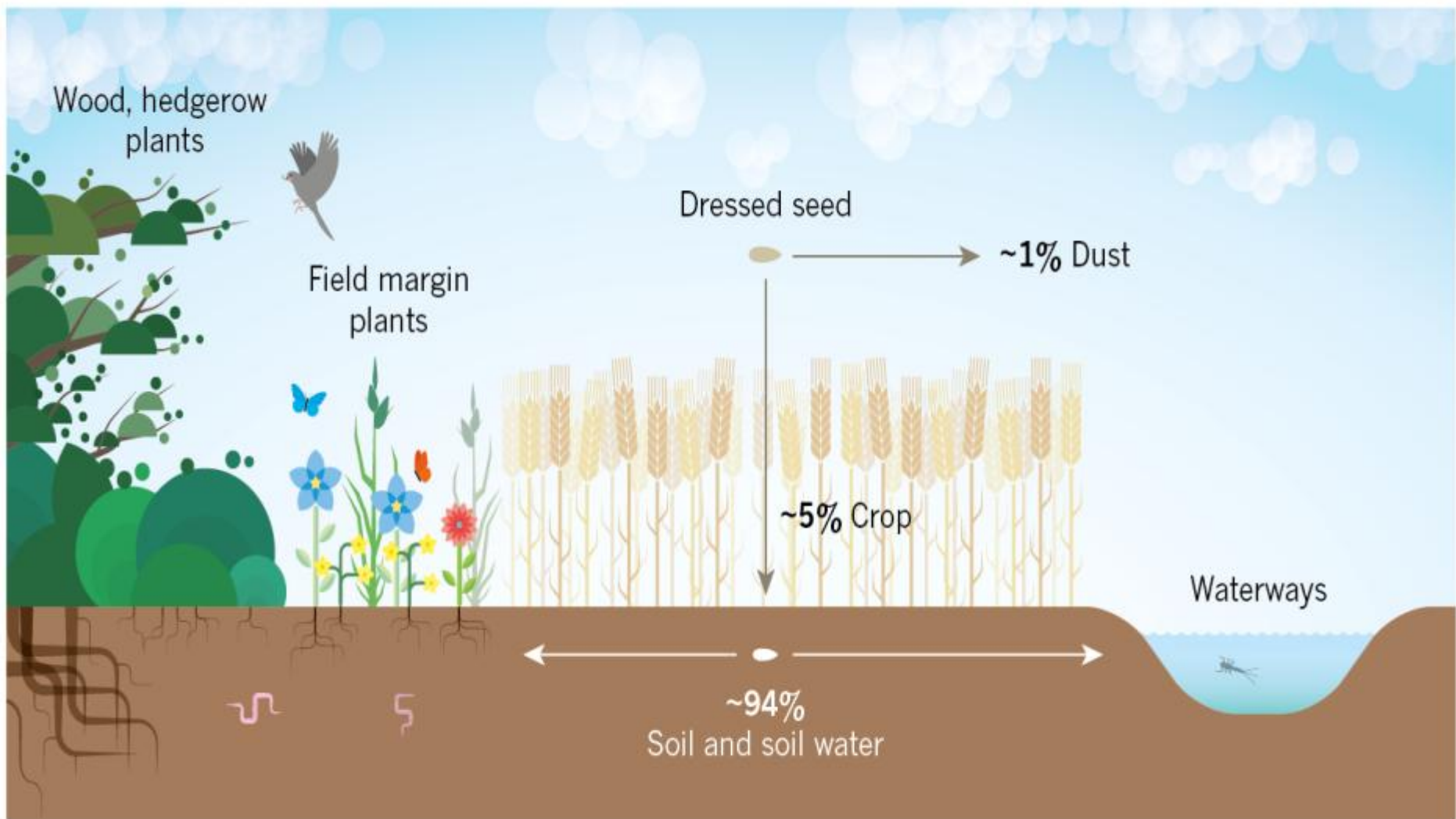


Toxicity

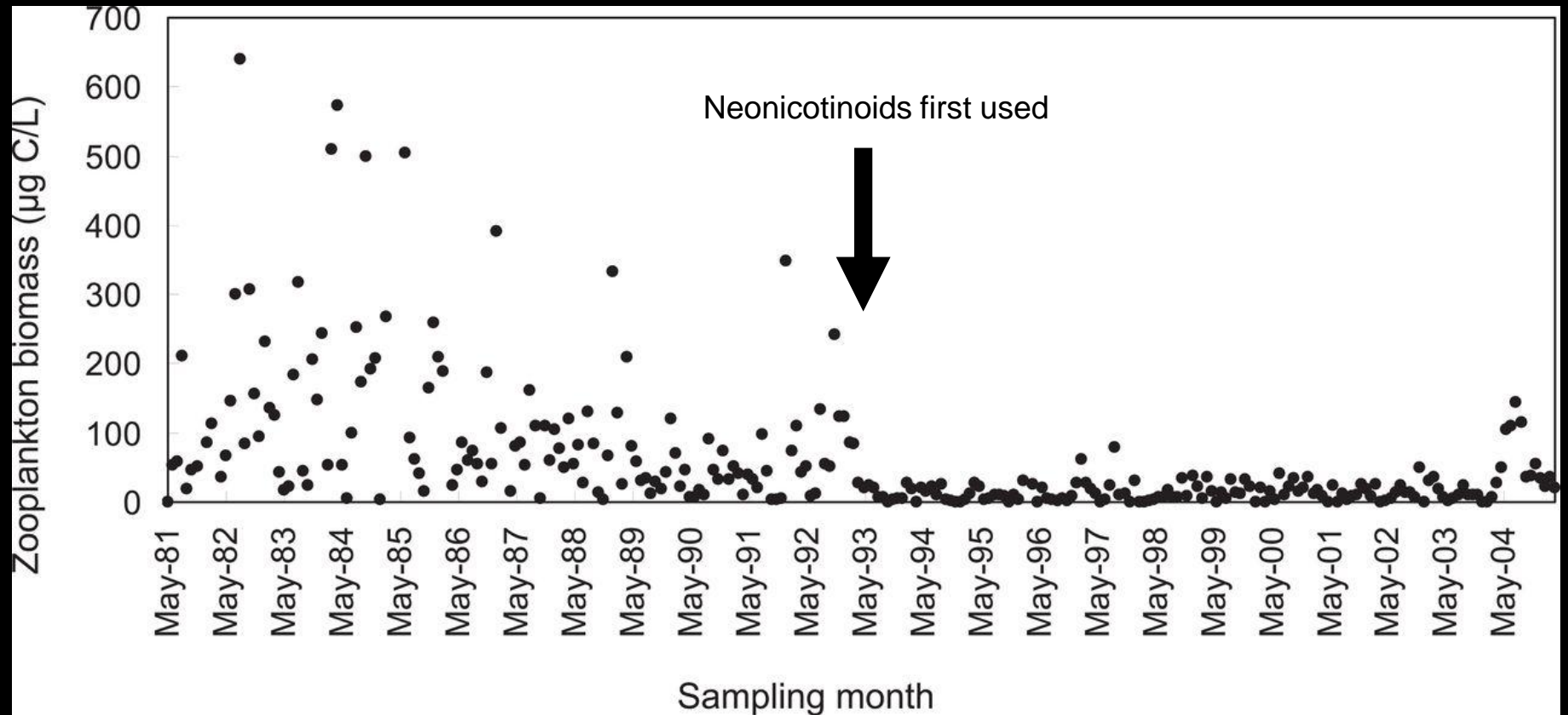
Compound	<u>LD50 in honeybees</u>
Imidacloprid	4 ng/bee (\approx clothianidin \approx thiamethoxam)
Cypermethrin	160 ng/bee
Dimethoate	191 ng/bee
DDT	27,000 ng/bee



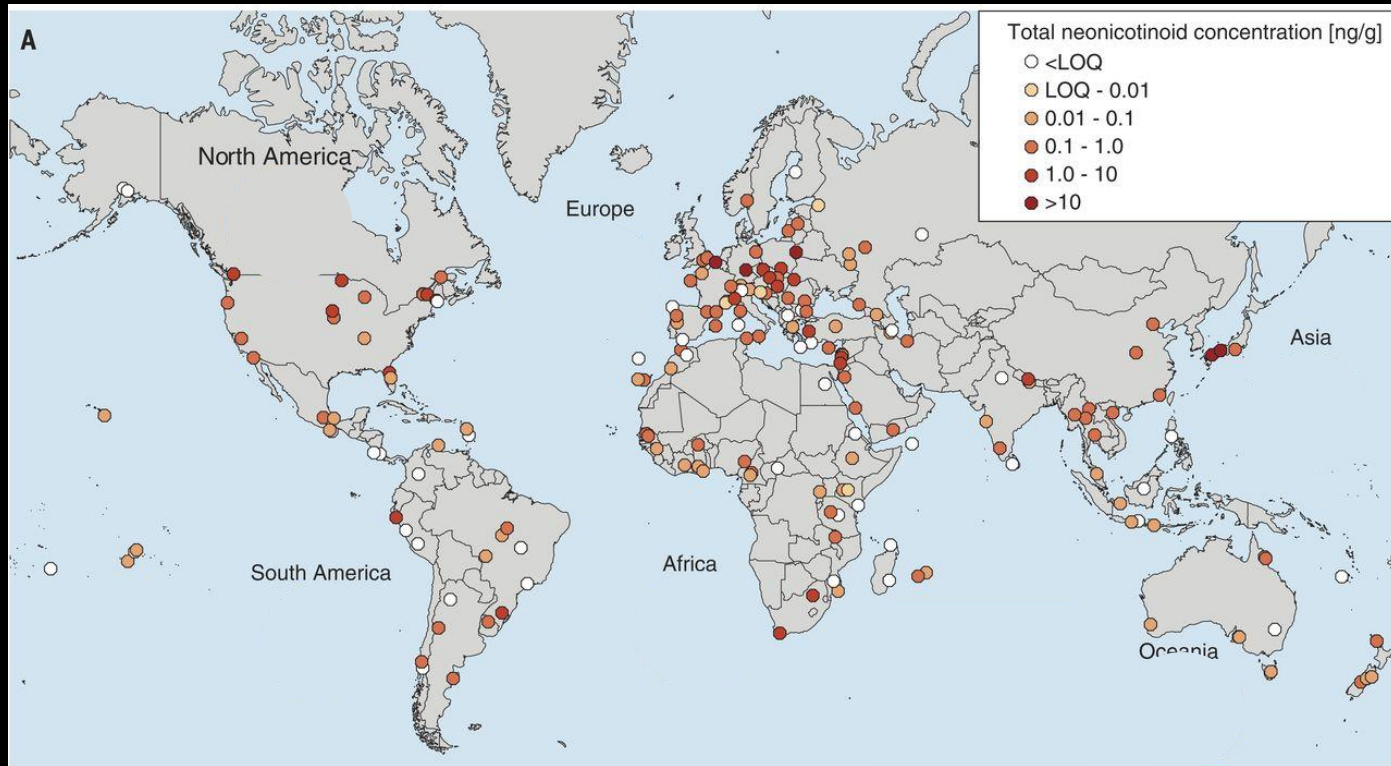
Environmental fate of neonic seed dressings



Zooplankton in Lake Shinji, Japan



Neonicotinoid insecticides in honey



Mitchell et al. 2017 Science 358: 109-111



Whitehorn et al, *Science* 2012



Simulated bumblebee nest being near rape field:

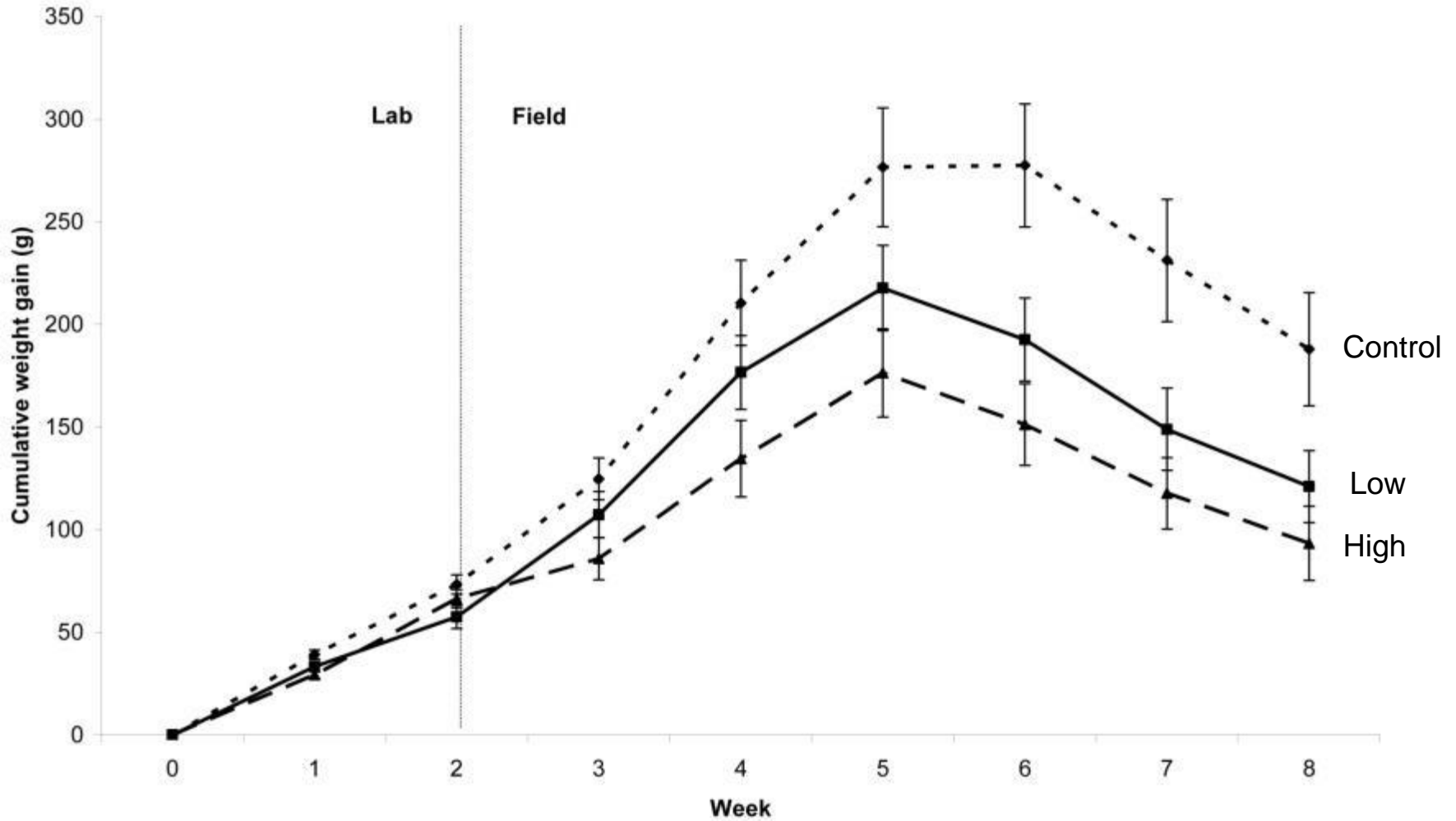
Dosage: Imidacloprid, 0.7ppb in nectar, 6ppb in pollen

Fed bumblebee nests for 2 weeks on:

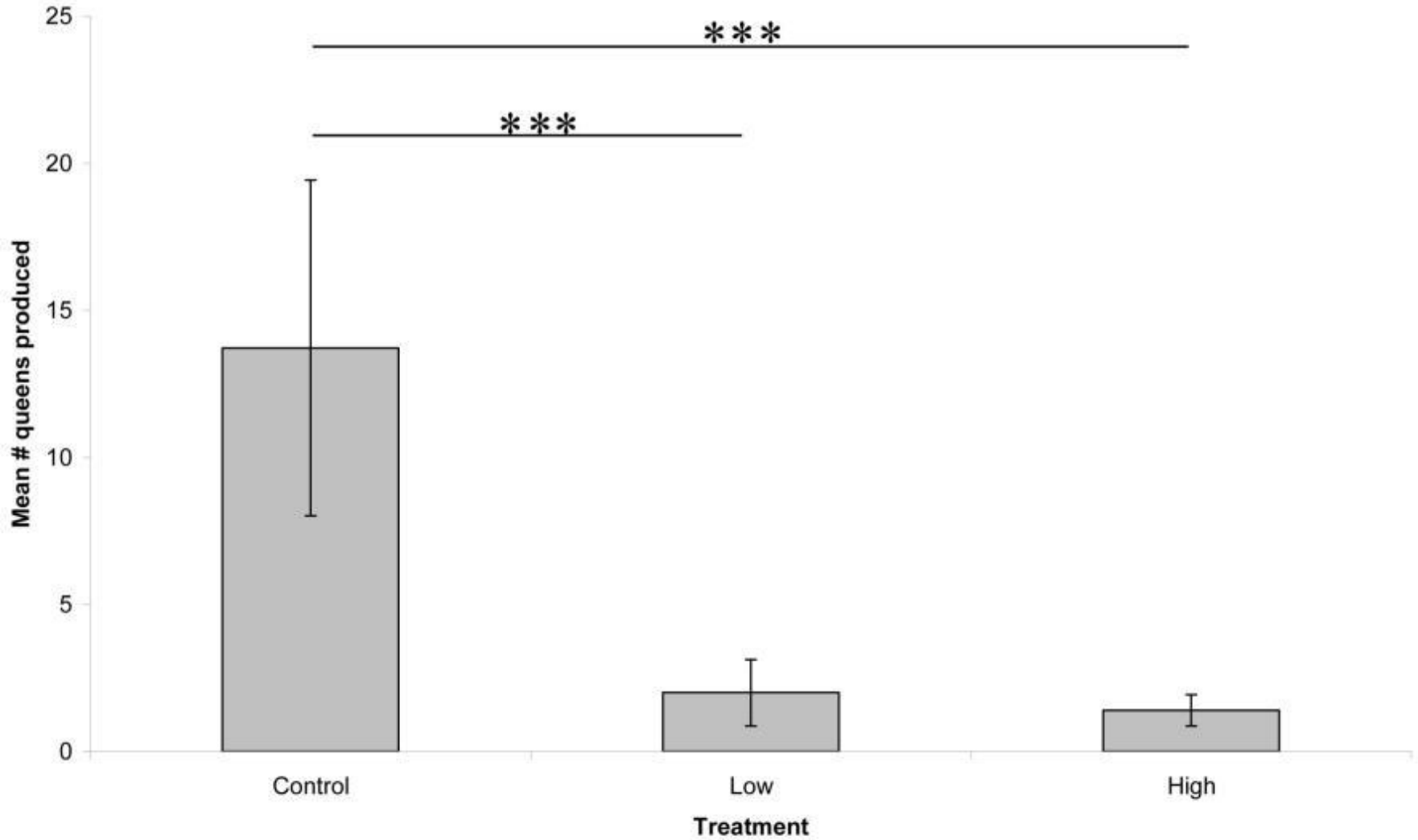
- a) Nectar, pollen (control)
- b) Nectar, pollen + field realistic imidacloprid (low)
- c) Nectar, pollen + 2 x field realistic imidacloprid (high)

After 2 weeks, nests placed in the field.....

Whitehorn et al, *Science* 2012



Whitehorn et al, *Science* 2012



Neonicotinoid usage/ pollution levels strongly correlate with:

- Declines in diversity and abundance of aquatic invertebrates in Netherlands - Van Dijk et al. (2012)
- Rates of insectivorous bird decline in Netherlands - Hallmann et al. (2014)
- Frequency of death of honeybee colonies in UK - Budge et al. (2015)
- Rates of decline of UK wild bees Woodcock et al. (2016)
- Rates of decline of farmland butterflies in UK & California, Gilburn et al. (2015); Forister et al. 2016.





Talk: The plight of insects,
and how you can help (May...

3.5K views • 5 months ago

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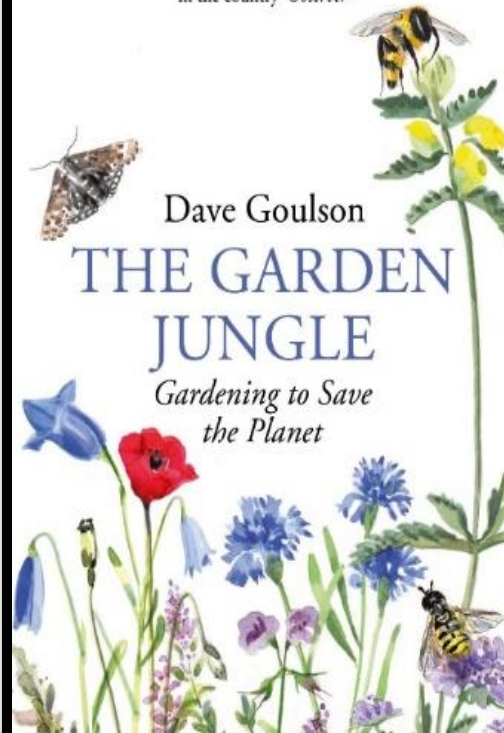
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'Exquisite...should be read by every gardener
in the country' *Observer*



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THE GARDEN JUNGLE

Gardening to Save
the Planet



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GARDENING for
BUMBLEBEES

*A Practical Guide
to Creating a Paradise
for Pollinators*



The Sunday Times bestseller



A Sting in the Tale Dave Goulson



My Adventures with Bumblebees



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