



SF Environment

Our home. Our city. Our planet.

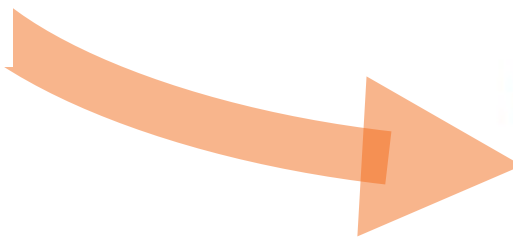
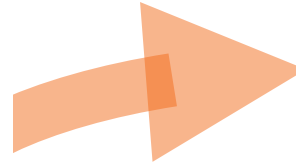
A Department of the City and County of San Francisco

Neonicotinoids, pollinators, and street trees

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Dependence on pollinators



Honeybees



A close-up photograph of many bees on a honeycomb. The bees are densely packed, and their yellow and black striped bodies are clearly visible. The honeycomb cells are a warm, golden color. The text "44% lost" is overlaid in the center of the image in a bold, black, sans-serif font.

44% lost

Native bees



Long term pollinator decline



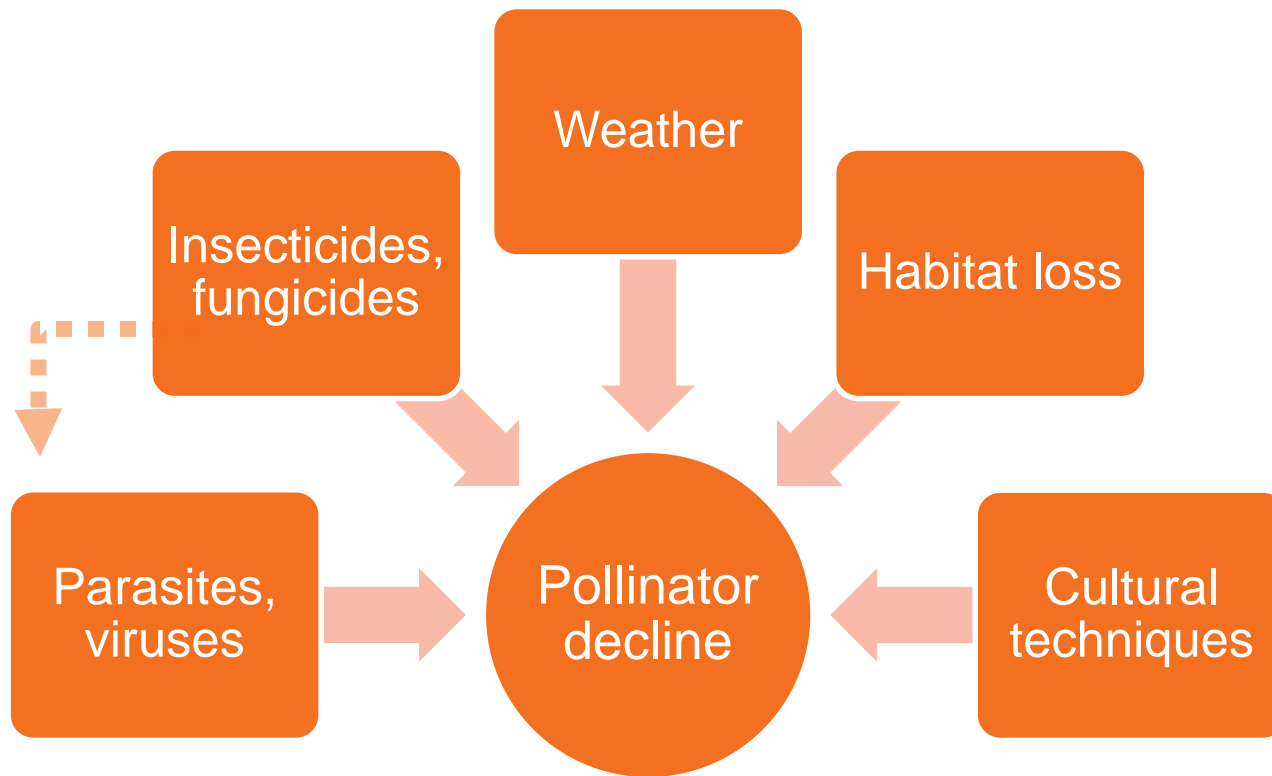


Long term pollinator decline



24%

Causes?



Limited / monotonous floral resources

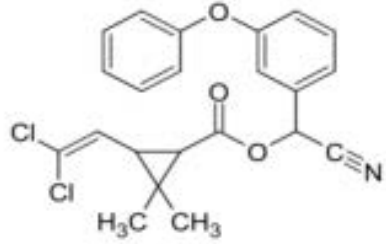
Lack of alternative forage may increase exposure to pesticides



Poor diet compromises immunity

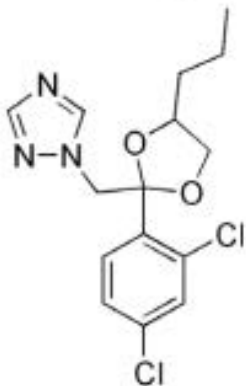
Immune response energetically costly

Pyrethroids



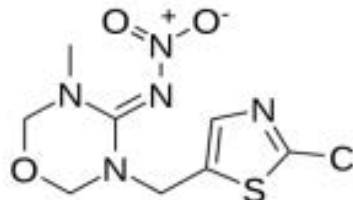
Fungicides increase toxicity

EBI Fungicides



Fungicides act synergistically to increase toxicity

Neonicotinoids



Pesticide exposure affects disease tolerance and susceptibility

Parasites + Pathogens

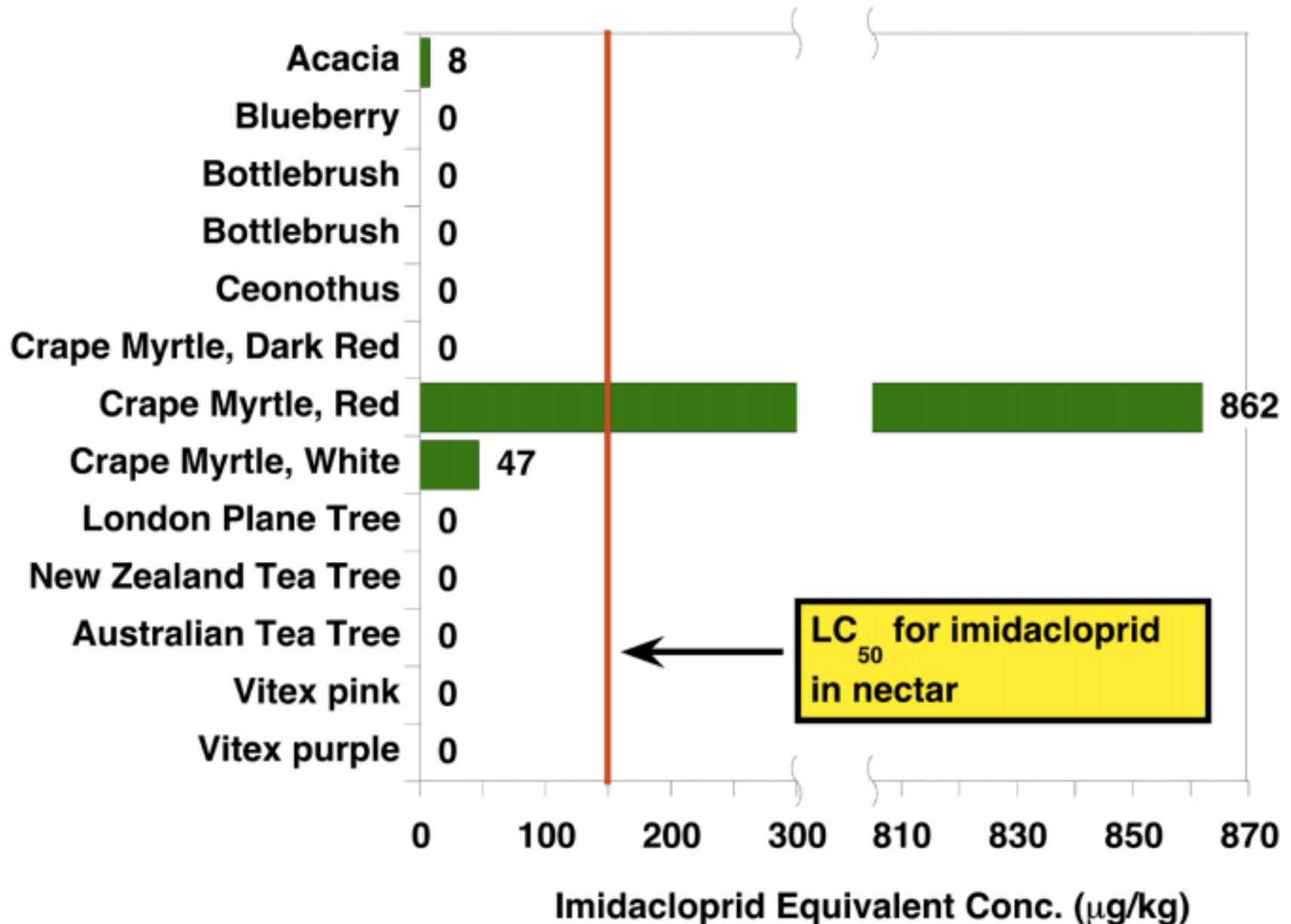


GARDENERS **BEWARE**

2016 Bee-Toxic Pesticides Found In "Bee-Friendly"
Plants Sold at Garden Centers Across the U.S.



Neonicotinoid Insecticide Residues Found in Flowering Trees, Spring 2016



Other tree data...



- *Rhododendron blossoms soil treated at label rate:*
 - *Imidacloprid residues of 27–850 ppb 175 days after treatment (Doering et al. 2004b).*
 - *Imidacloprid up to 19 ppb 3–6 years after treatment (Doering et al. 2004c).*
- *Eucalyptus trees soil treated at label rate:*
 - *Imidacloprid in oral nectar at 286 ppb alone, or 660 ppb including its metabolites (Paine et al. 2011).*
- *Horse chestnut trees (Aesculus hippocastanum) at label rate:*
 - *Imidacloprid levels below the threshold of detection (5 ppb) at 412 days after treatment (Maus et al. 2004a). Measurements at earlier dates unknown because they were not taken during this study.*



- Pesticides are not sole cause of pollinator decline, but may be part of it
- Systemic pesticides – especially neonicotinoids – affect pollinator populations directly & indirectly
- Neonics are used in tree nurseries, and have been detected at biologically relevant levels
- Soil drench and injection can leave some trees' blossoms with biologically relevant levels of neonics 3-6 years after treatment

What we don't know



- Which tree species are typically treated? How many of them are insect pollinated?
- How much residue remains after seed treatments or sprays?
- What are the levels of pesticides at planting time and at 1-2-3 years afterwards?
- If only neonics are banned from tree nurseries, would there be “regrettable substitutions?”



Thank you!