

Ubiquitous contamination by pesticides (beekeeping perspective)



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4 march 2017

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Just pesticides?

Pesticides or Plant Protection Products – used for improvement of plant health



Veterinary product – used for improvement of animal health



Biocide – used for control unwanted organisms that are harmful to human or animal health, but not PPP or medicines



Active substances
(e.g. Fipronil)

Bees and beekeeping products = bioindicators



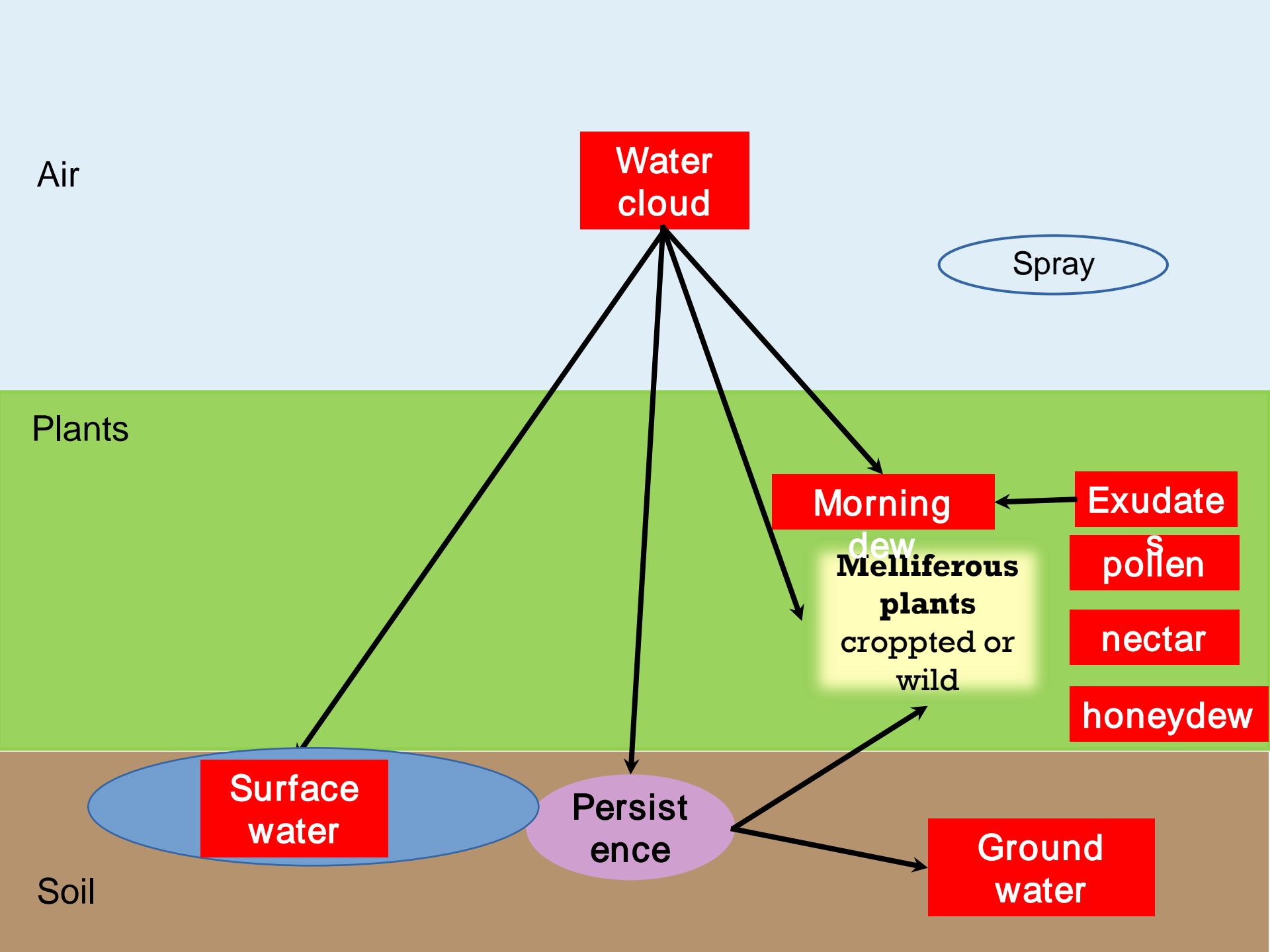
Pesticide exposure

Beekeepers are often the discoverers of new paths of exposure to pesticides in an empirical way and suffering the consequences (e.g. dust of treated seeds)

The concept of culture non-attractive to bees for the determination of risk to pesticide is completely WRONG

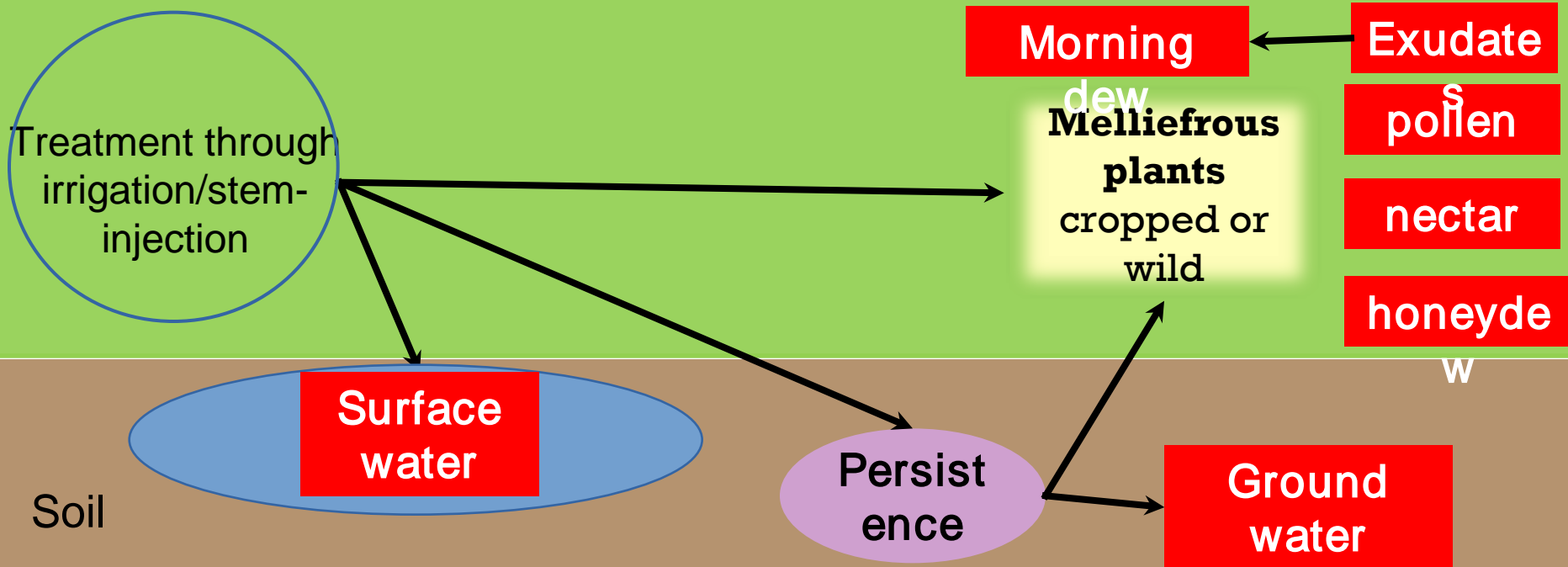
The physic-chemical characteristics of pesticides (e.g. persistency, water solubility, systemicity, etc.) and their level of use are the parameters determining exposure

Attention to the multiplication of nutritional sources for pollinators favoured by the CAP – INSECT TRAPS



Air

Plants



Soil

Air

Dust cloud

Water cloud

Spray

Plants

Morning dew

Exudate

pollen

nectar

honeydew

Melliferous plants
cropped or wild

Treatment through irrigation/stem-injection

Surface water

Treatment of seeds, bulbs, roots, soil or irrigation

Persistence

Ground water

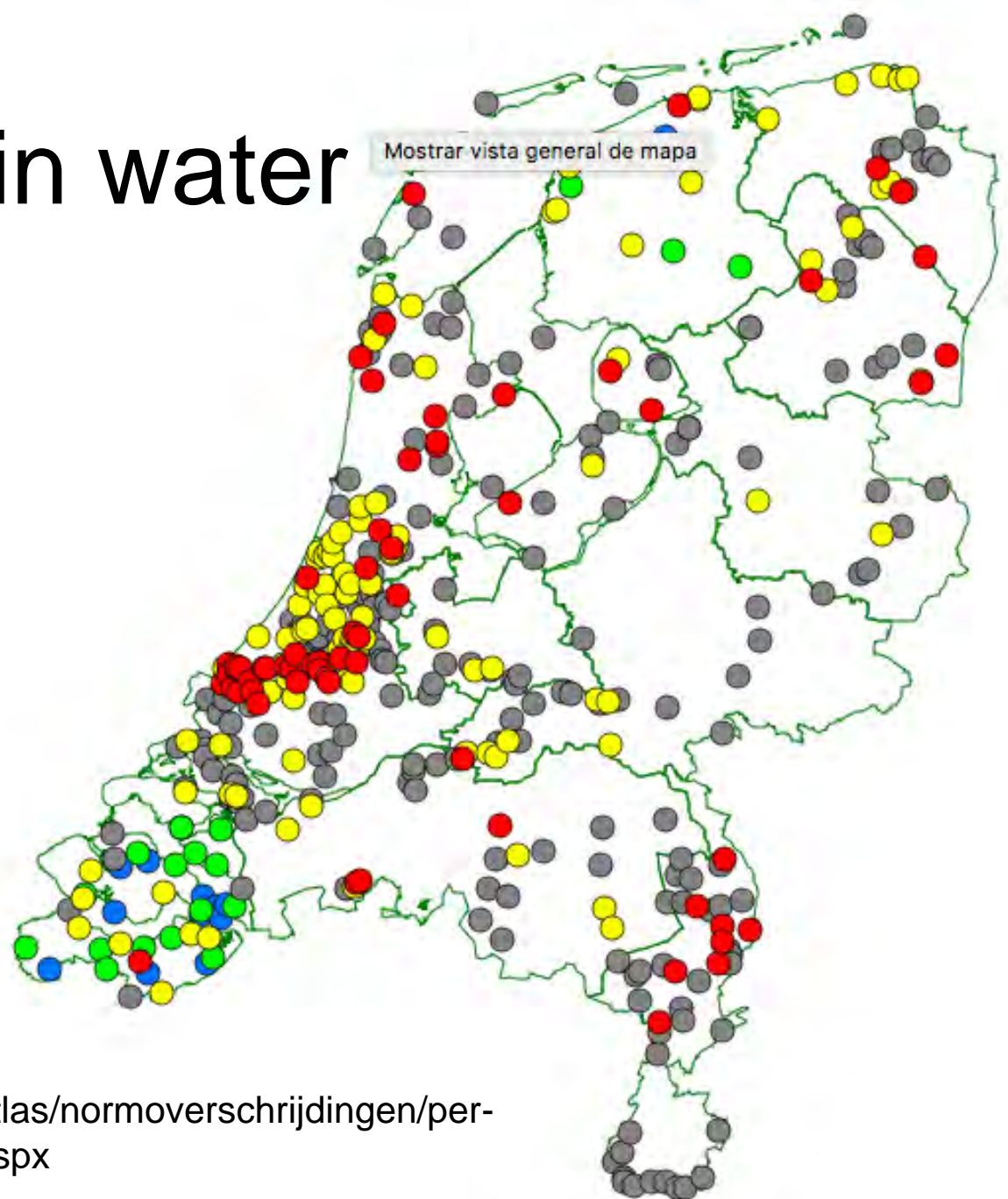
Soil

Pesticides in water

Locaties

-  niet aangetroffen
-  aangetroffen
-  niet toetsbaar
-  > norm
-  > 5*norm

Provincies



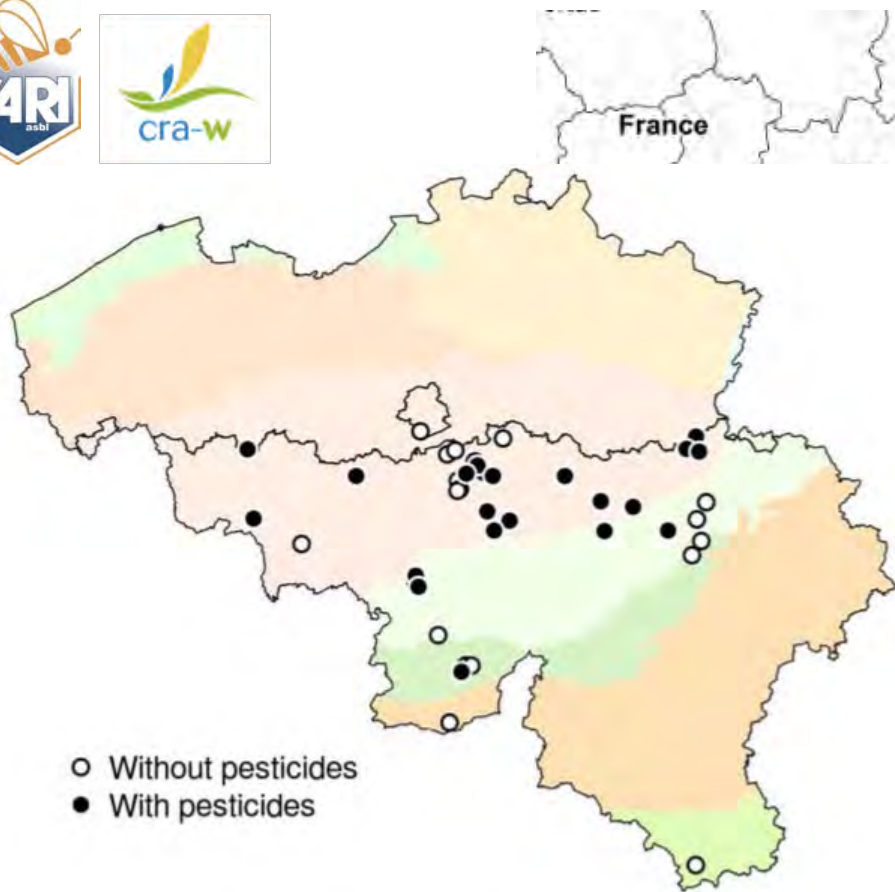
Data:
imidacloprid in
2015

<http://www.pesticidesatlas.nl/atlas/normoverschrijdingen/per-stof/mate-van-overschrijding.aspx>

Pesticides in beekeeping products

BELGIUM

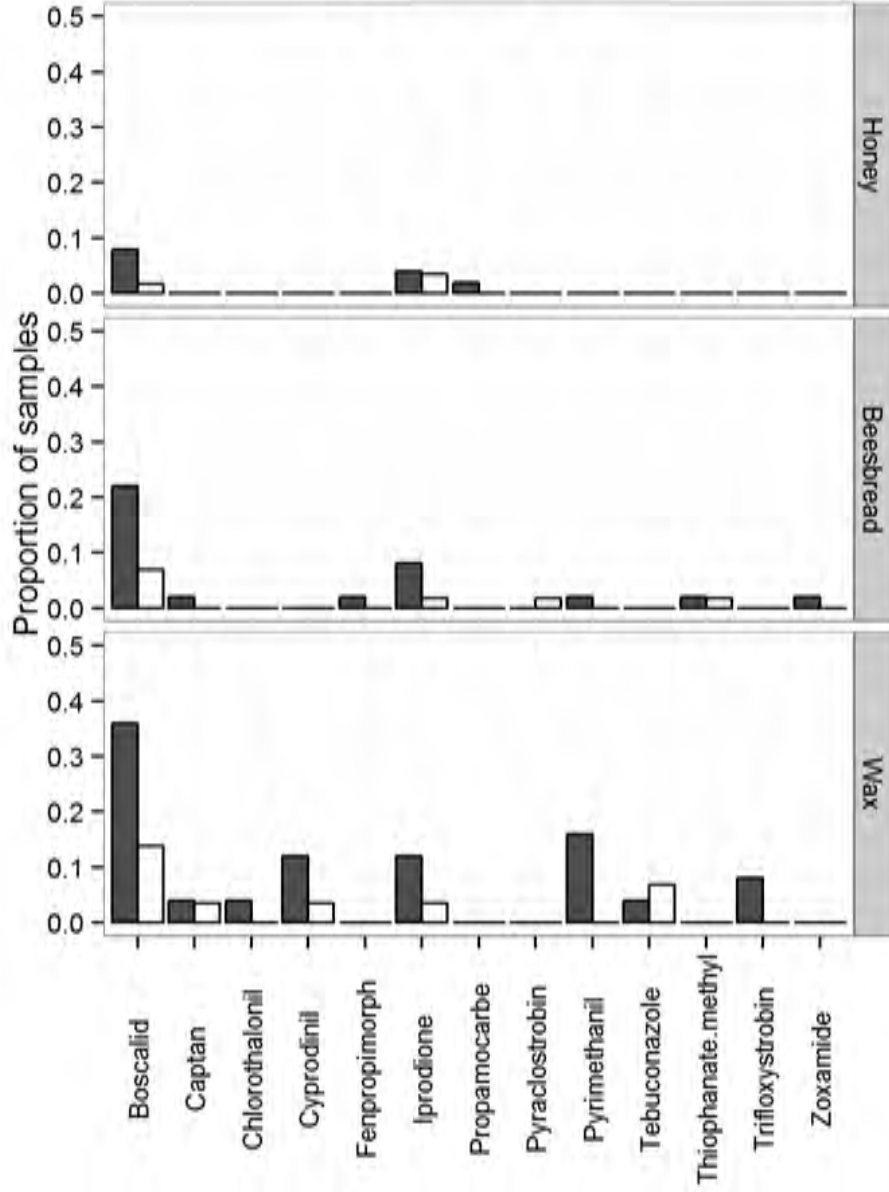
ITALY





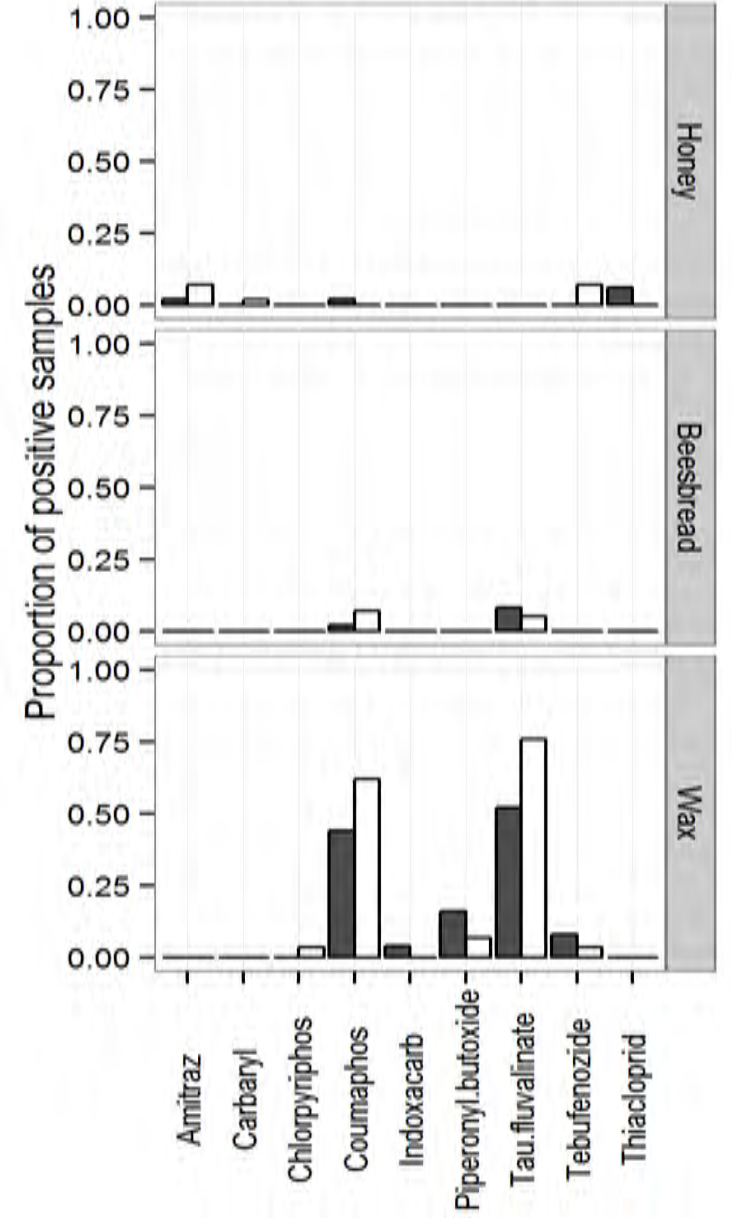
Fungicide

Group disorders healthy



Insecticides/Acaricide

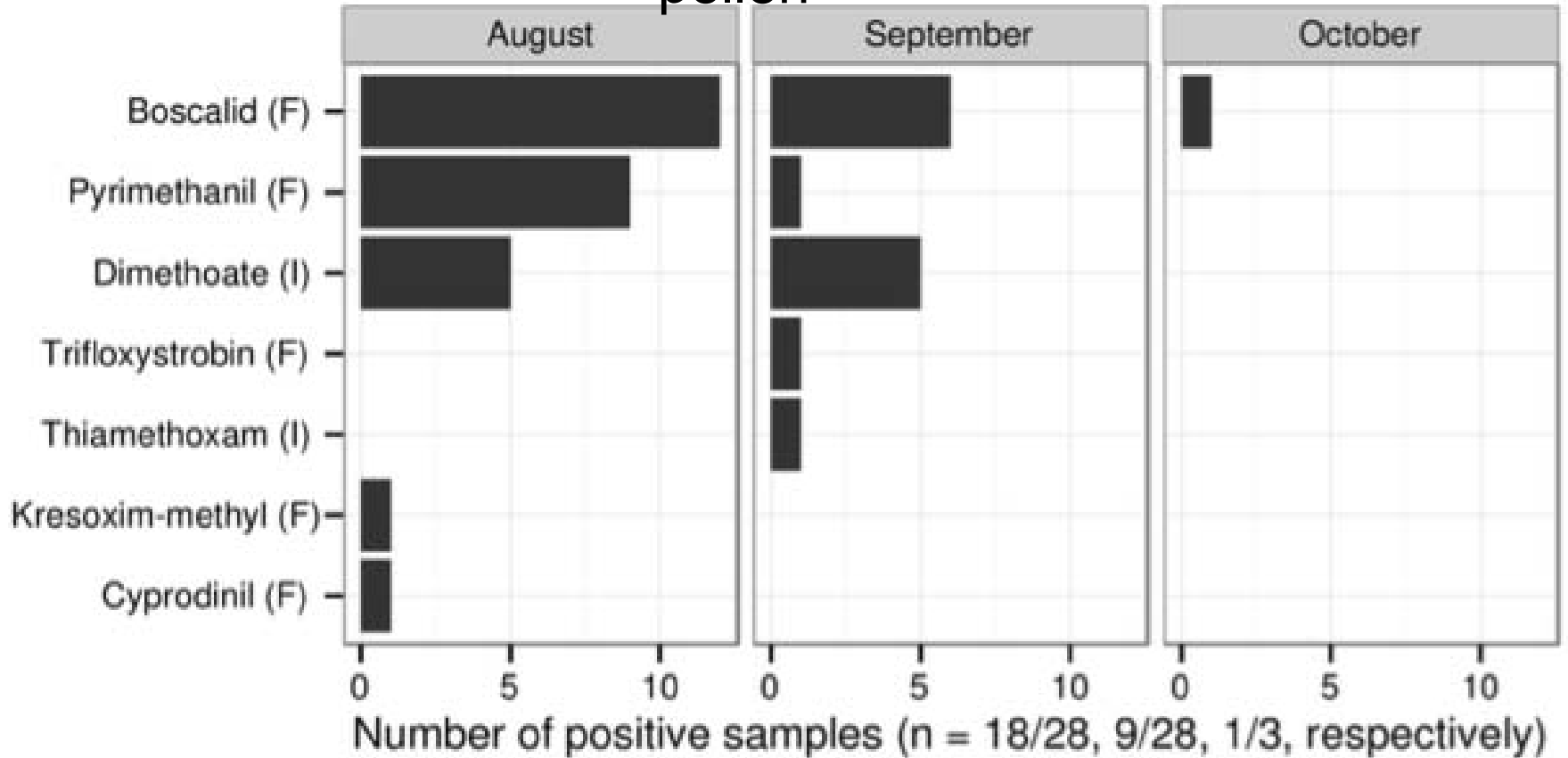
Group disorder healthy

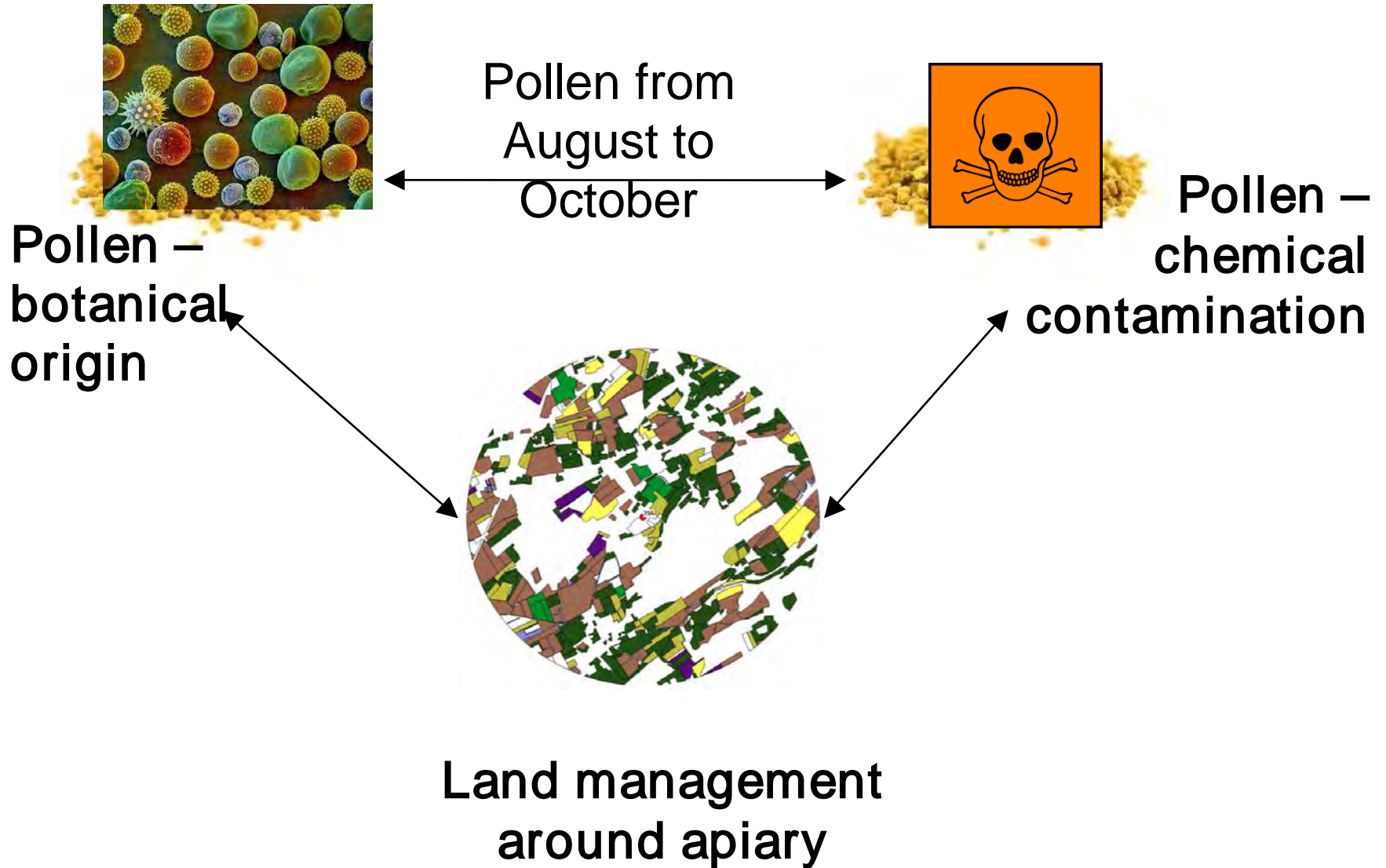


<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0103073>



Trapped pollen







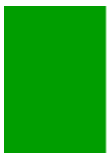
Results: e.g. boscalid

Contamination can be explained only if we consider the crops around **3 km** from the apiary

Beets (Not authorised), **cereals** and **potatoes** are crops that explain the best the presence of boscalid in pollen

All crops confounded explain the presence of boscalid better or as good as only the Authorized Crops

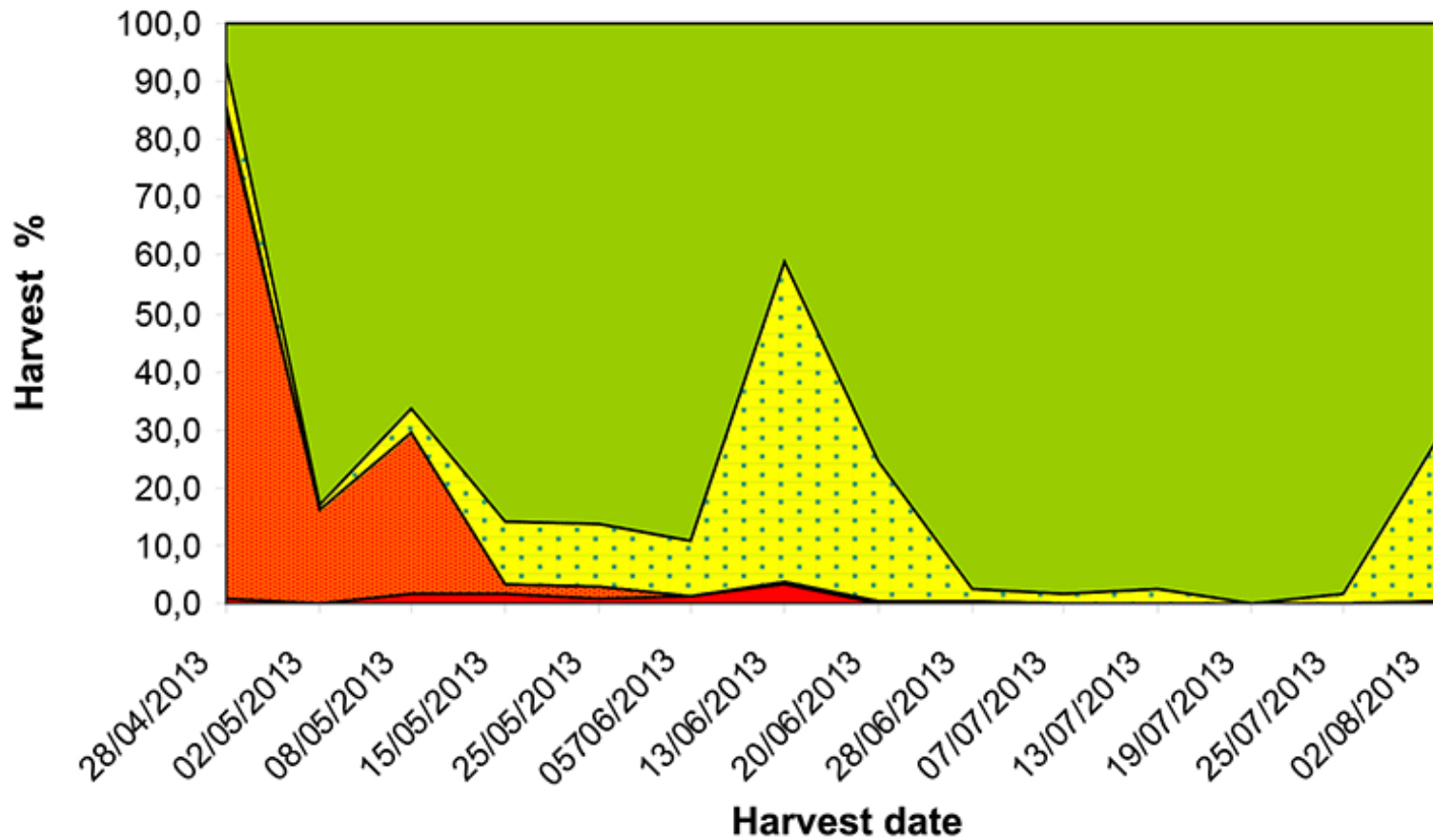
Phacelia and **rosacea** are the pollen types better predicting boscalid contamination



Orchard

Valtellina April - August 2013

■ Herbaceous crops ■ Arboreal crops ■ Ornamental ■ Herbaceous ■ Shrubs/arboreal





18 pesticides found

11 fungicides:

- Azoxystrobin
- Benalaxyl
- Boscalid
- Fluopicolide
- Iprovalicarb
- Mandipropamid
- Metalaxyl
- Penconazole
- Spiroxamine
- Tebuconazole
- Trifloxystrobin

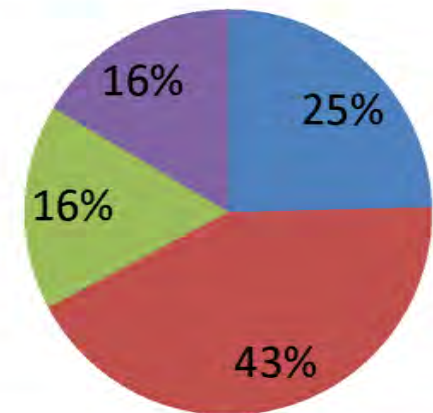
1 acaricide:

- **Chlorfenvinphos** Samples po

6 insecticides:

- **Carbaryl**
- Chlorpyrifos
- Dimethoate
- Imidacloprid
- **Phenthoate**
- Thiametoxam

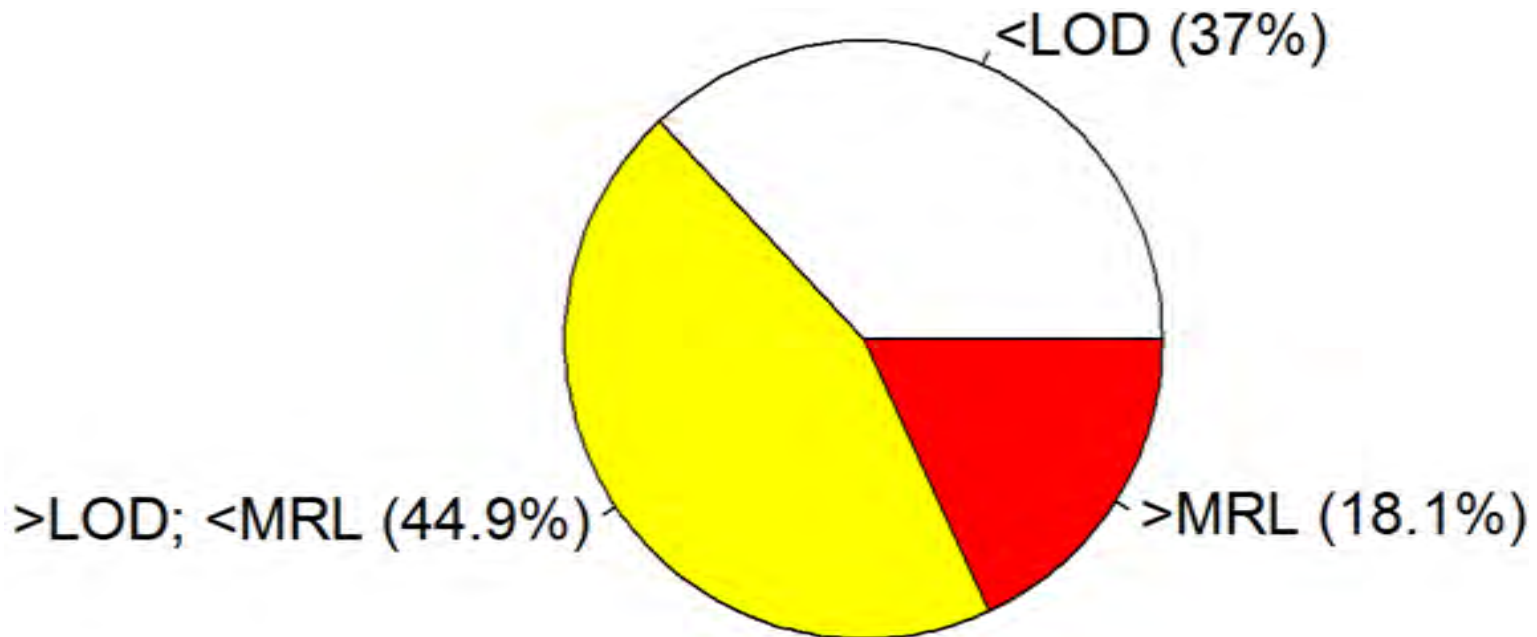
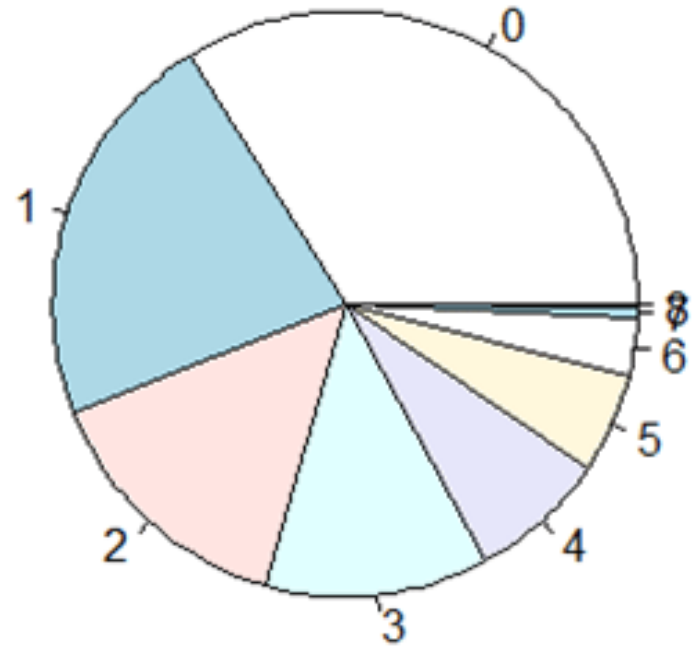
■ 100% ■ 50-99% ■ 1-49% ■ 0%





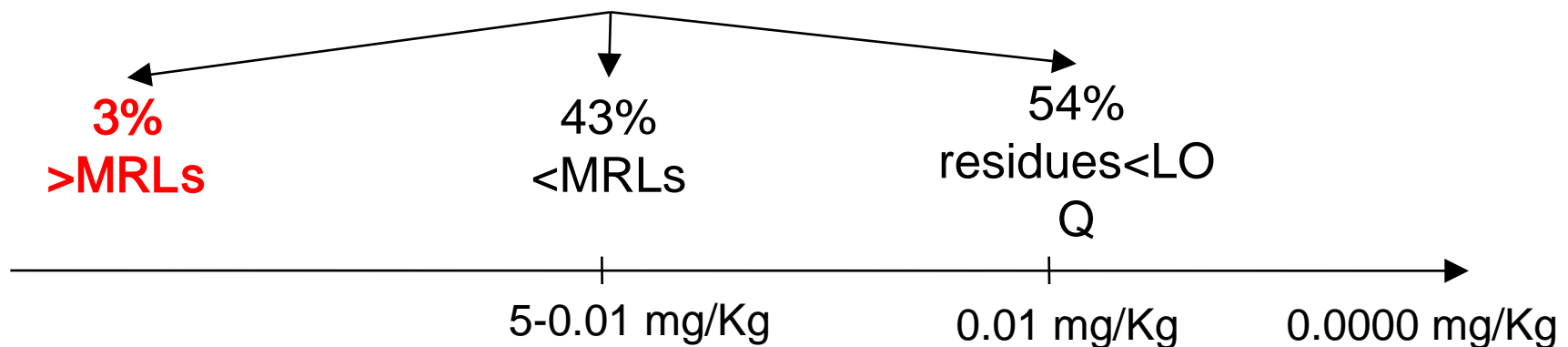
Number of residues per sample

18% samples with residues >MRL for at least 1 pesticide



Pesticides in human food

Number of samples = 82,649 (778 different pesticides)



- Most contaminated food (#>MRLs) = spinach > beans > mandarins > carrots and rice > pears > oranges and cucumbers
- Cocktail exposure = mandarins > oranges > pears > cucumbers > beans > spinach > carrots > wheat flour > rice > potatoes
- Babyfood = 92% < LOQ (2% exceeded legal limit)
- Organic products = 99% < MRLs

Conclusions and Recommendations

Bees = Environmental animals linked to what happens around them

Pesticides – more mobile in the environment as what we may think → difuse environmental contamination → consequences to bees and beekeepers (and any living being)

Crop non-attractive to bees (in terms of pesticide risk) is WRONG

Pesticides and food – risk for food safety also, but not only, affecting beekeeping products

Molte Grazie!

Bee Life

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Foto: CARI

Pesticides most frequently found in animal products

