



# TEN YEARS OF PESTICIDE MULTIRESIDUE ANALYSIS OF ITALIAN FRUIT AND VEGETABLES AT PRE-HARVEST: MANAGING AND INTERPRETING A BIG DATA



**GRIFA**

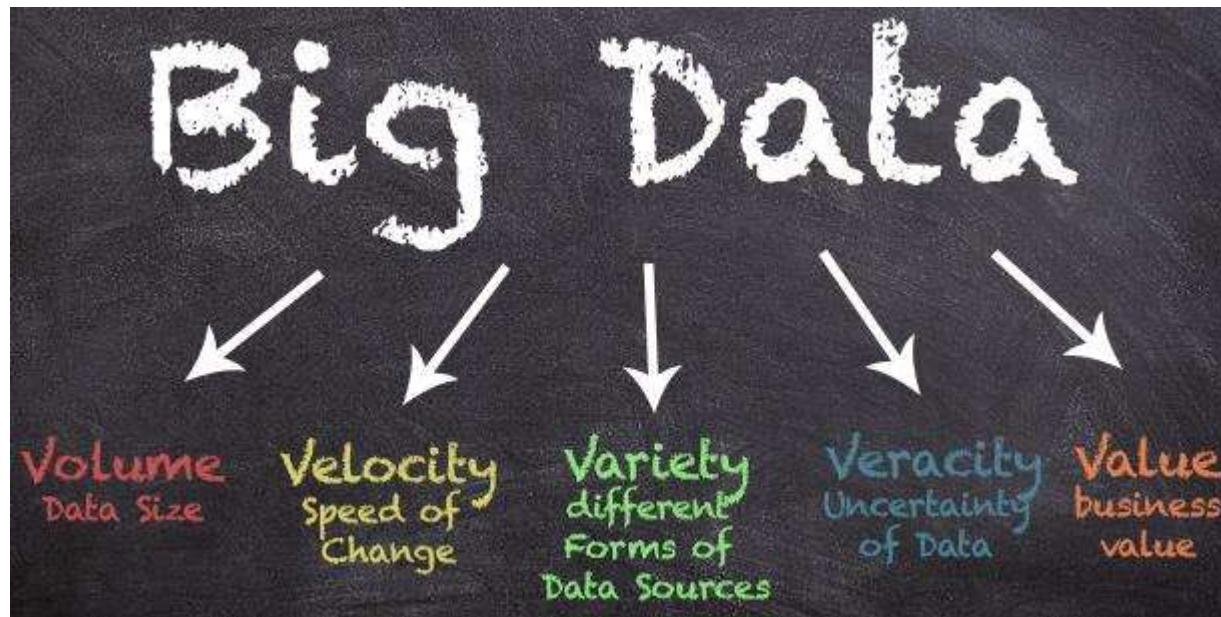
Sonia Blasioli<sup>1,2</sup>, Renzo Boni<sup>1,2</sup>, Katia Di Prodi<sup>2,3</sup>, Ilaria Braschi<sup>1,2</sup>

*<sup>1</sup>Department of Agricultural and Food Sciences, University of Bologna (Italy);*

*<sup>2</sup>GRIFA: Italian Research Group on Pesticides and Environment (Italy);*

*<sup>3</sup>Conserve Italia Soc. Coop. Agric. (Italy)*





UNI CEI EN ISO/IEC 17025:2005



# THE DATA SET

**Time lapse:** 2007-2016

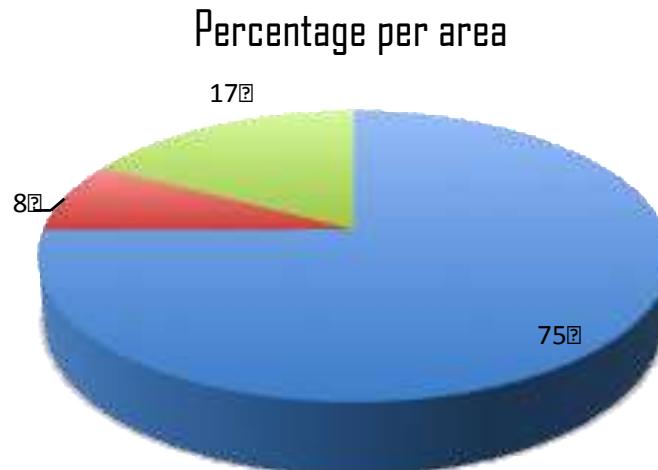
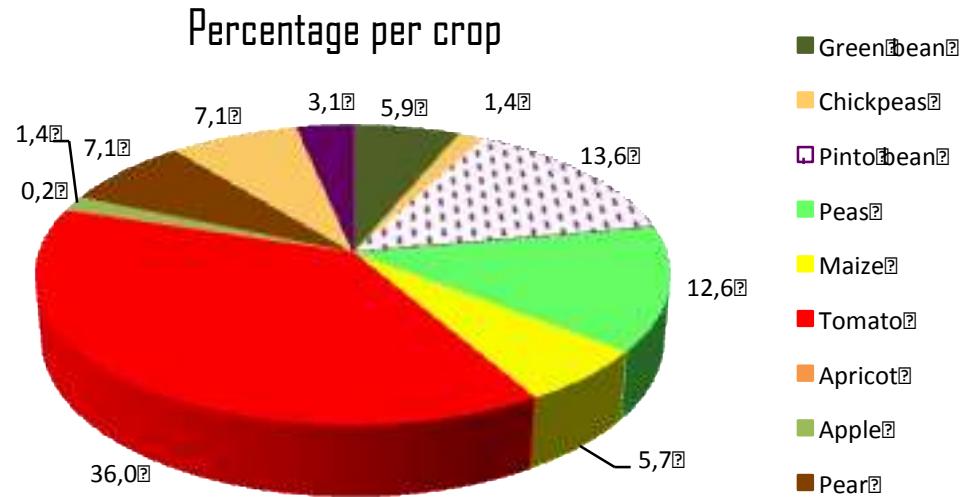
**No of samples:** 5638

**No of data >2 ML**

**Italian origin** of vegetable/fruit samples

Multiresidual analysis at pre-harvest on:

- Green bean plant
- Chickpea plant
- Pinto bean plant
- Corn with husk
- Tomato
- Pea plant
- Apple
- Pear
- Apricot
- Peach
- Plum



North

Center

South

# MANAGING THE BIG DATA



## Agrochemical class

- Insecticide/Fungicide/Herbicide

## Year

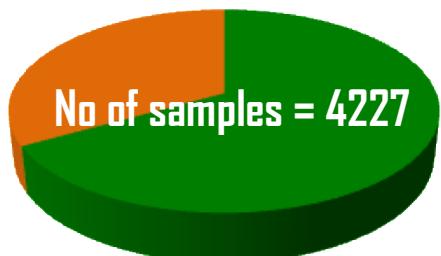
- Average concentration
- No of agrochemical detected per sample

## Geographical origin (Northern/Center/Southern Italy)

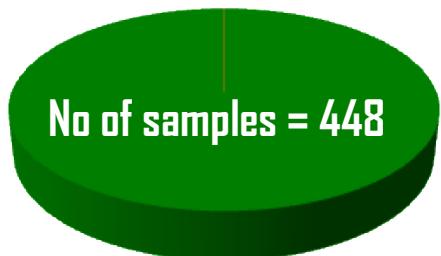
- Average concentration
- No of agrochemical detected per sample

## Agrochemicals most frequently detected

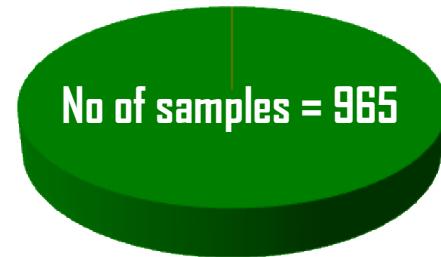
North



Center

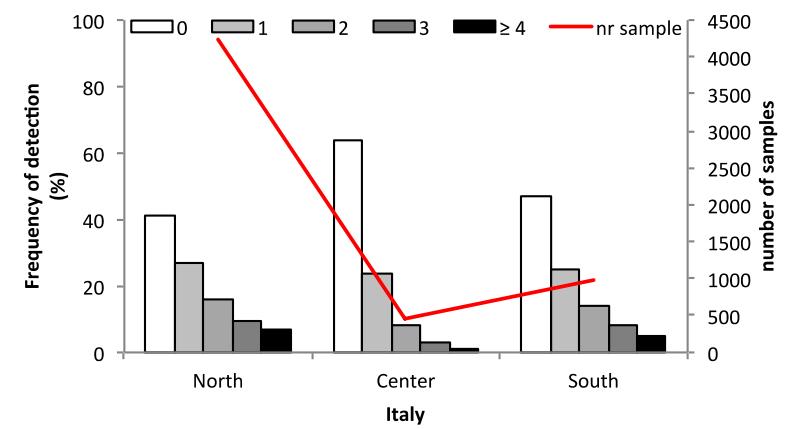
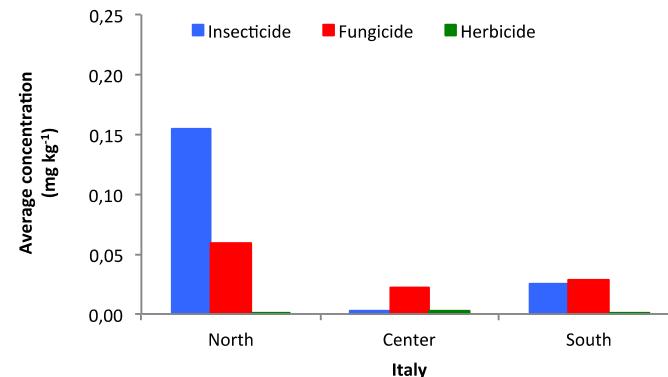


South



Big data

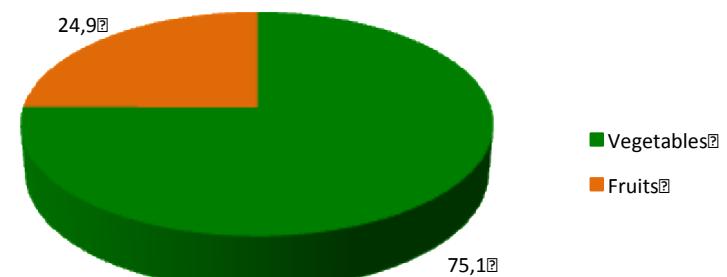
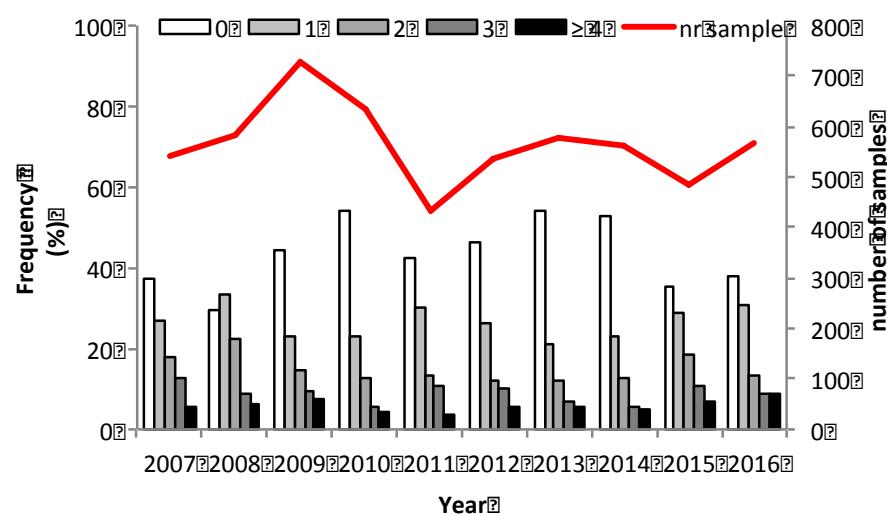
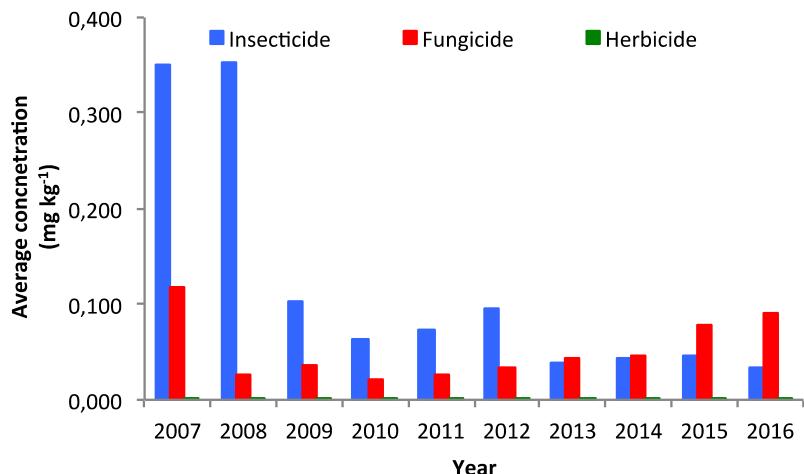
Geographical distribution  
No of samples = 5638



- Geographical distribution of the grouped data is numerically not homogeneous

Big data

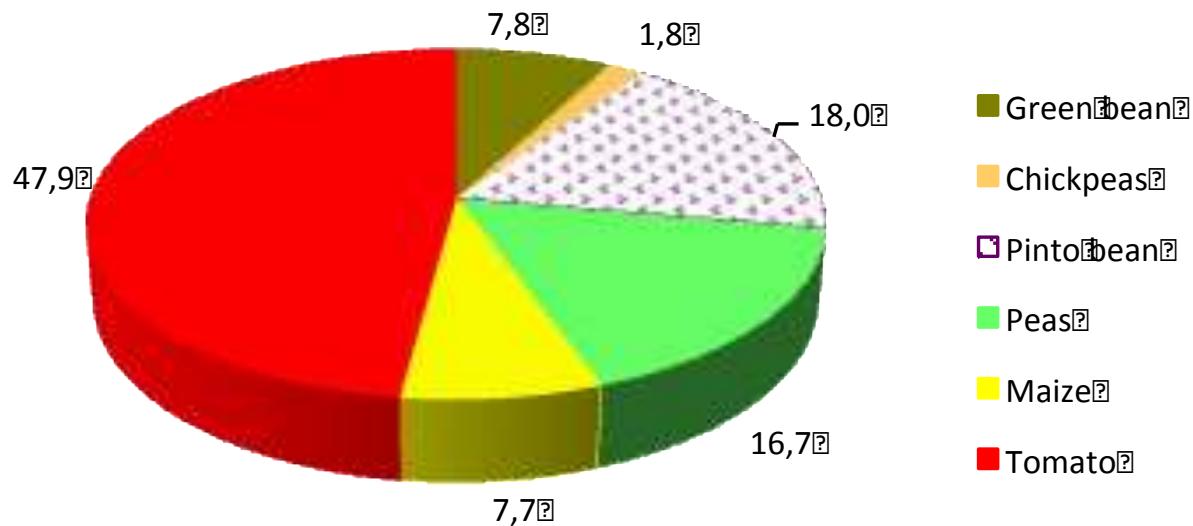
Distribution per year  
No of samples = 5638



## Vegetables

No of samples = 4235

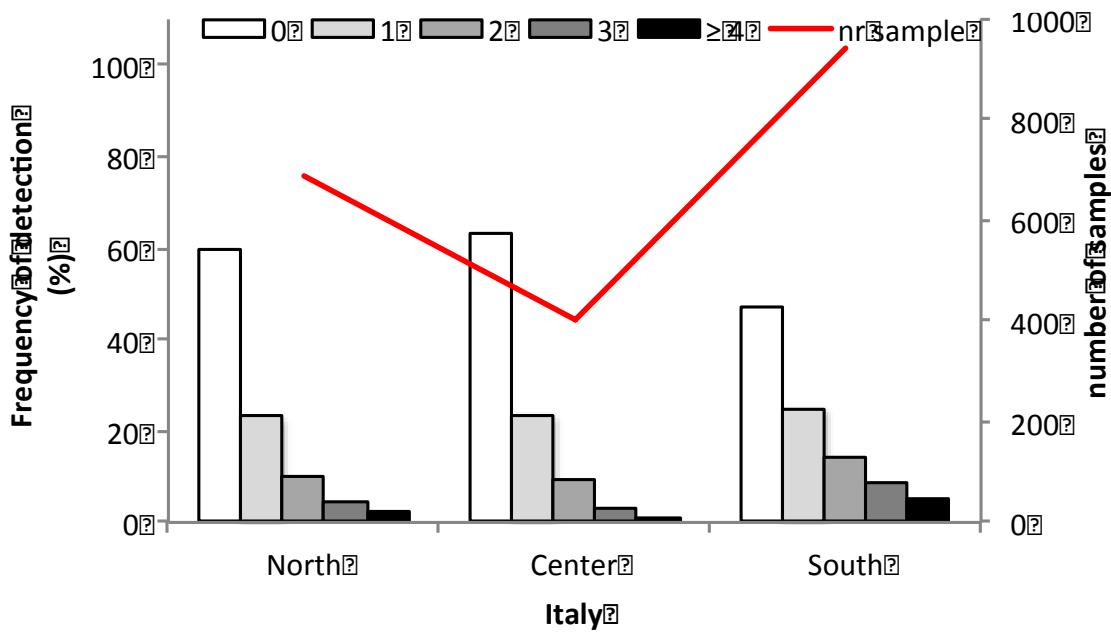
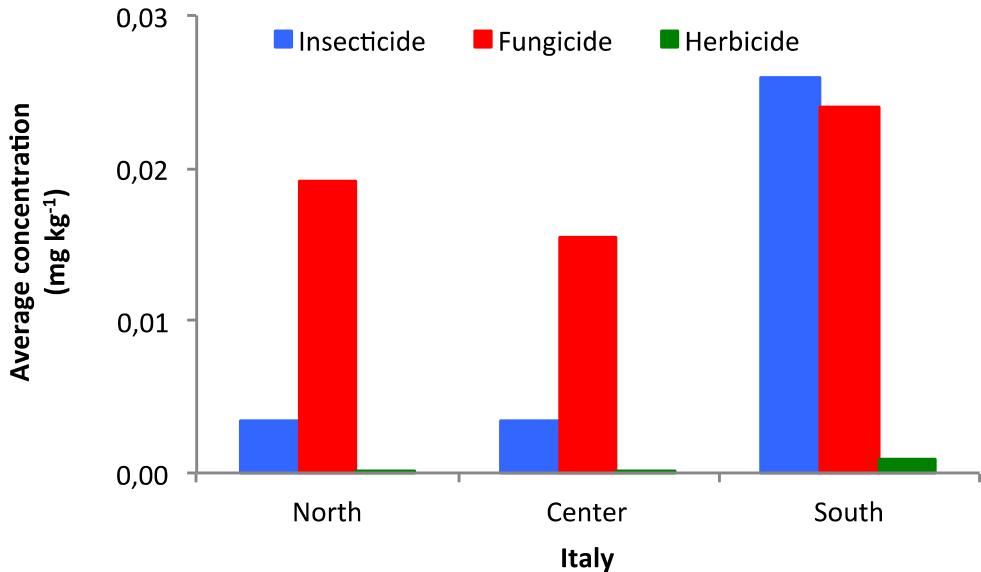
% Distribution per vegetable



# Tomato

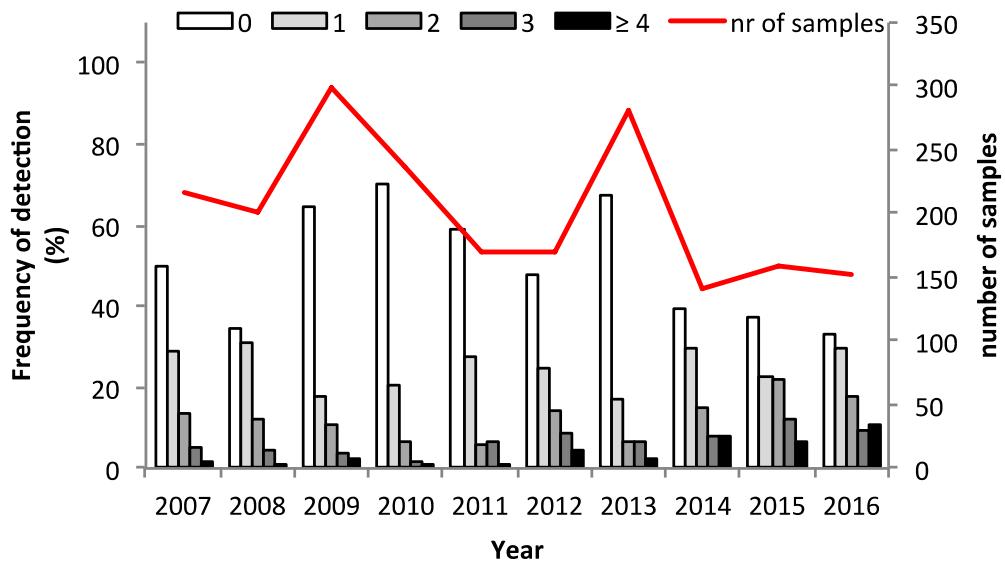
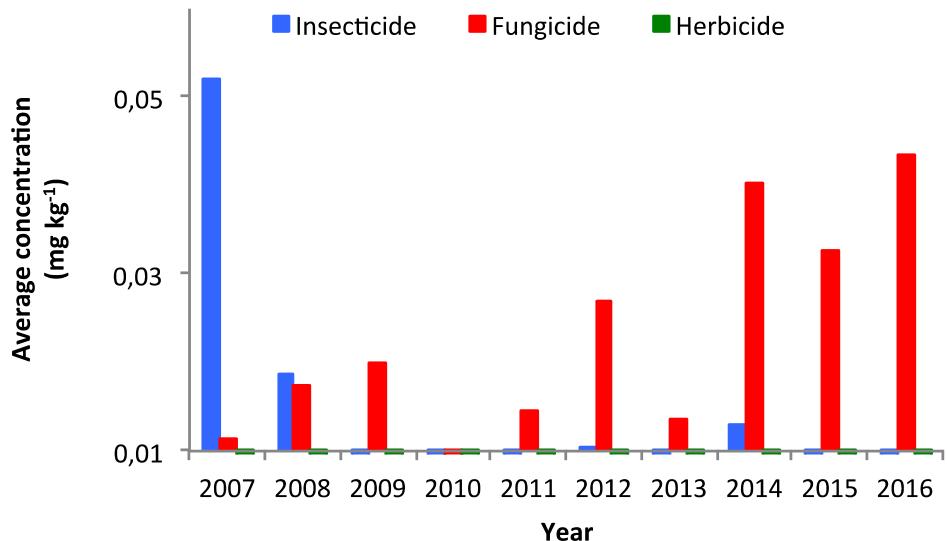
## Geographical distribution

No of samples = 2028



Tomato

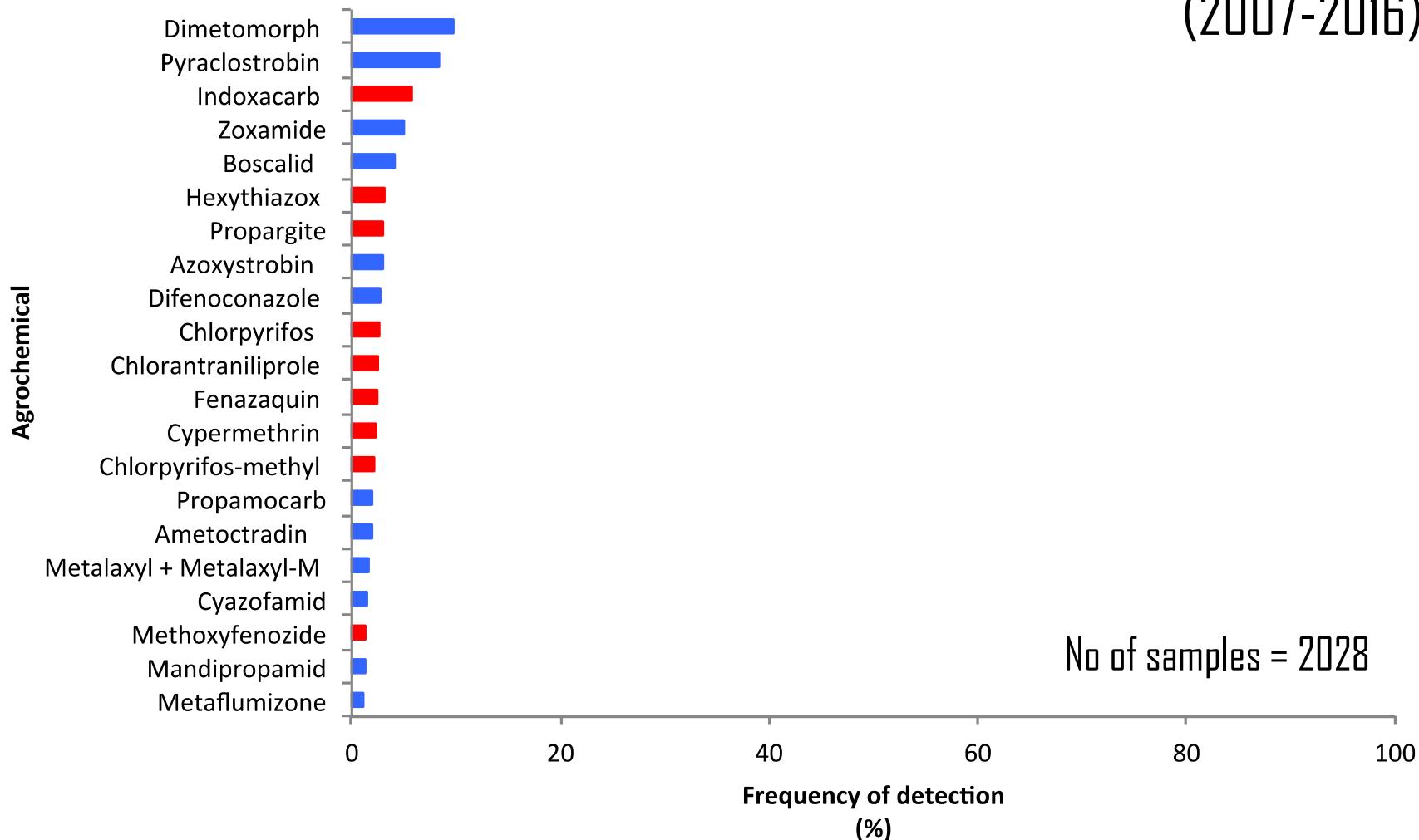
Distribution per year  
No of samples = 2028





Tomato

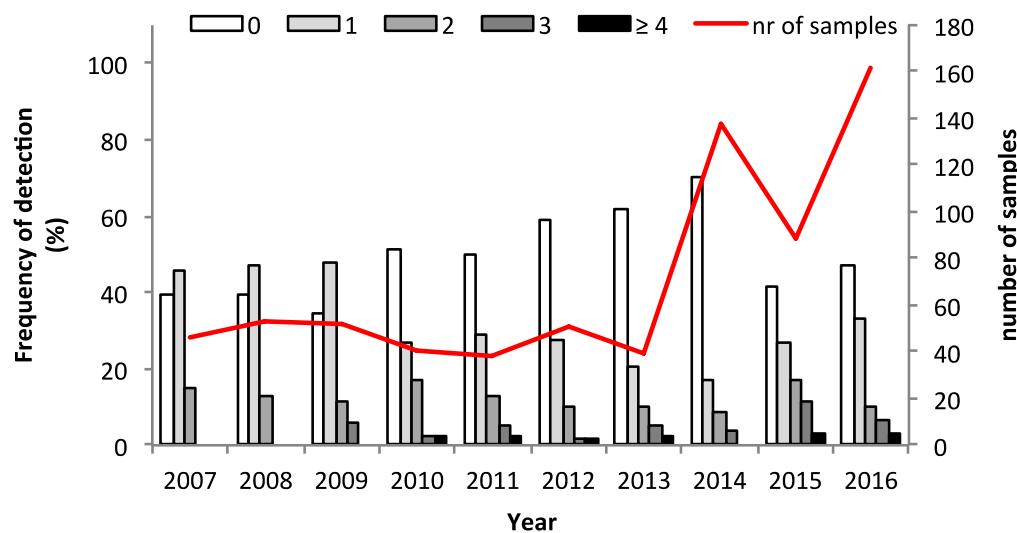
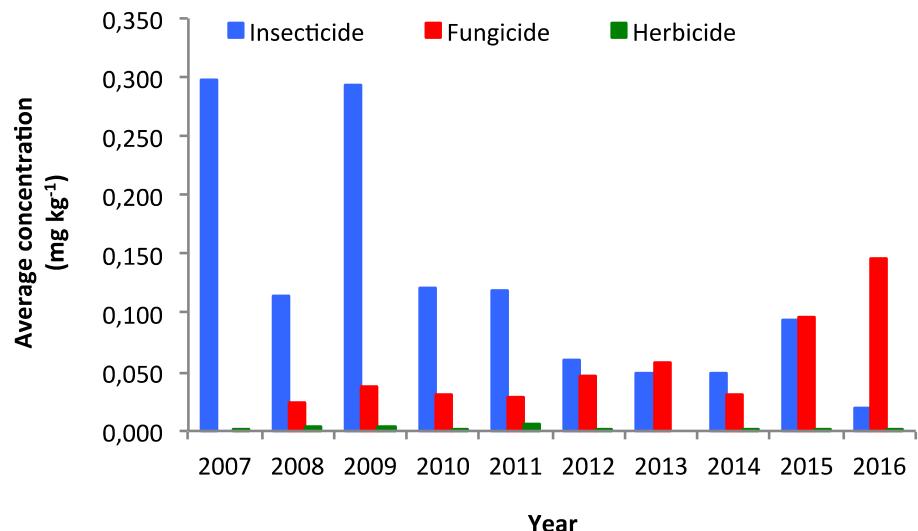
## Agrochemicals most frequently detected (2007-2016)



# Pea plant

## Distribution per year

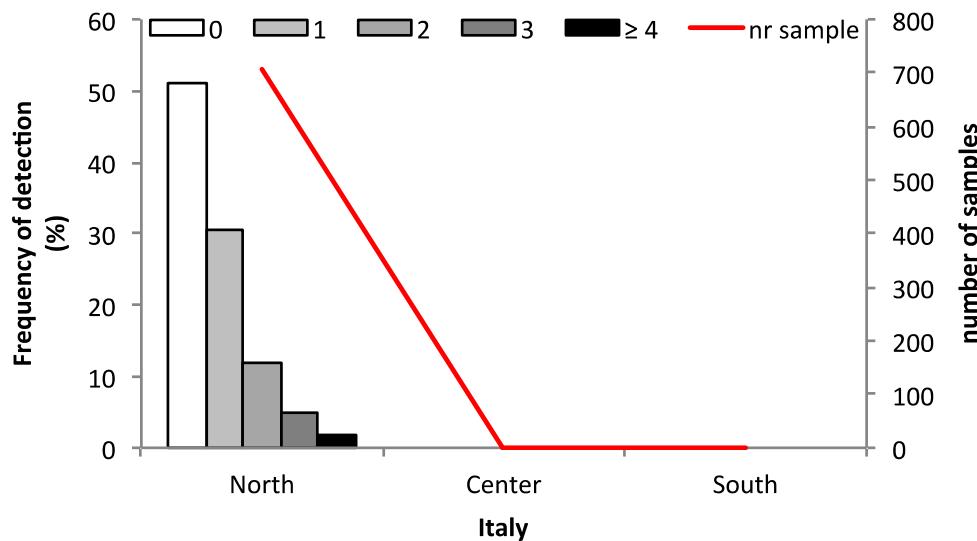
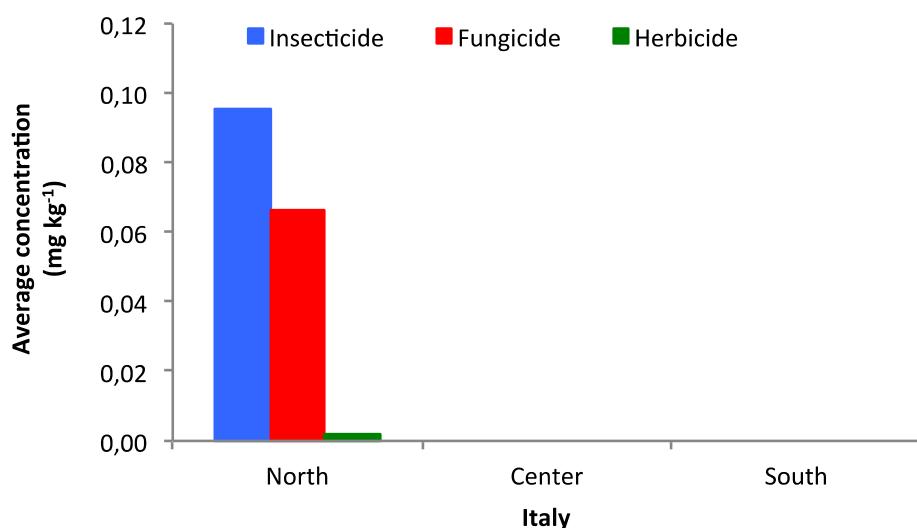
No of samples = 709



# Pea plant

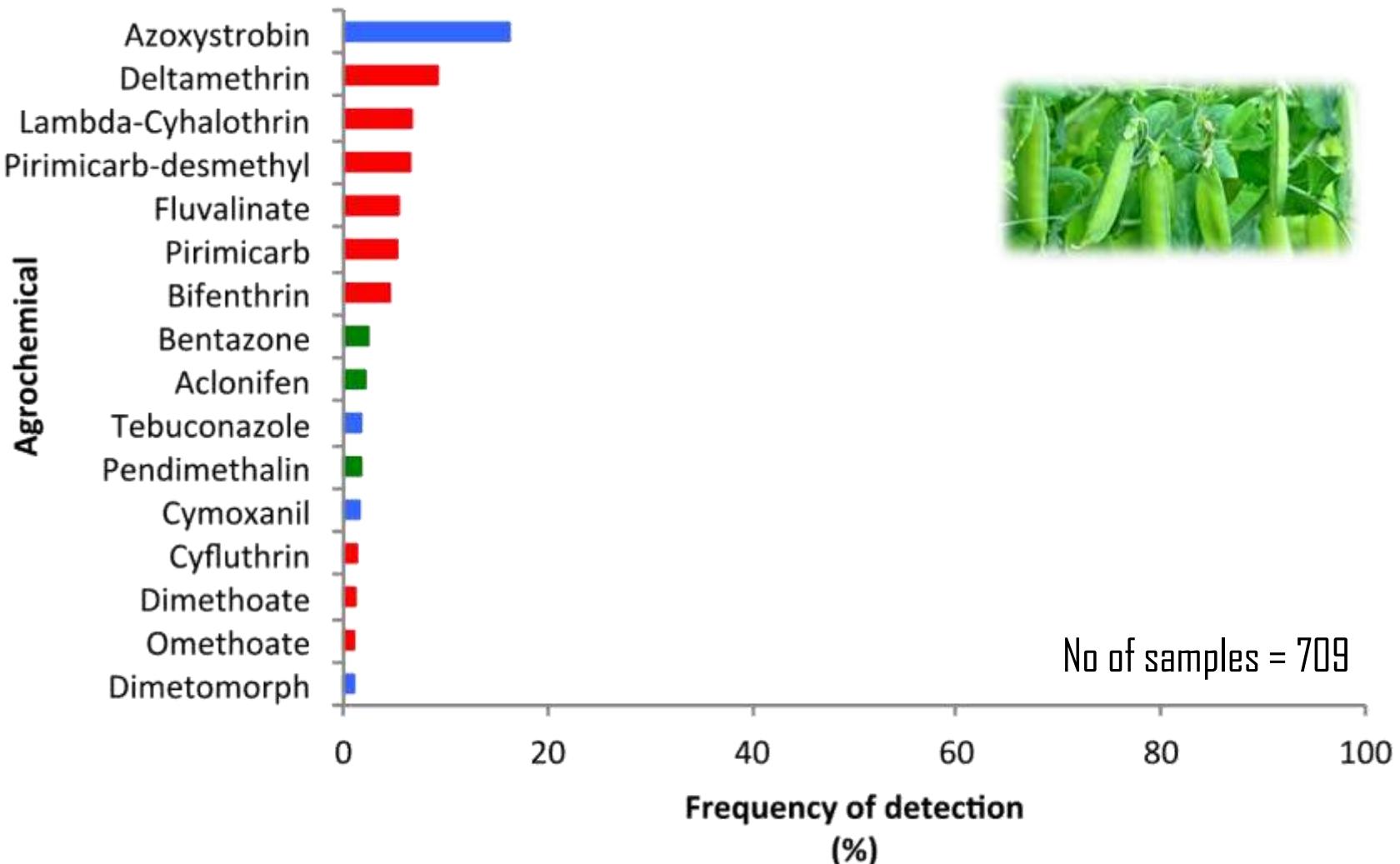
## Geographical distribution

No of samples = 709



Pea plant

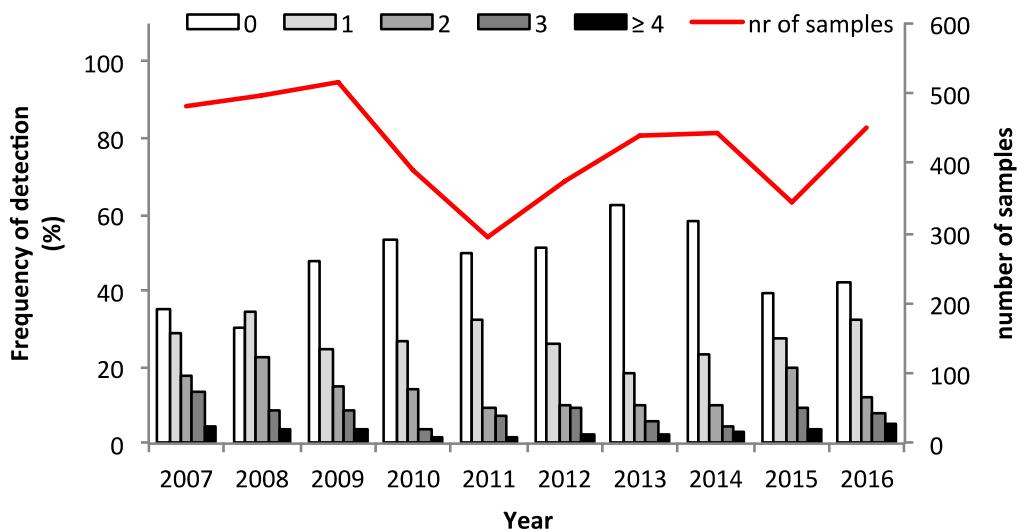
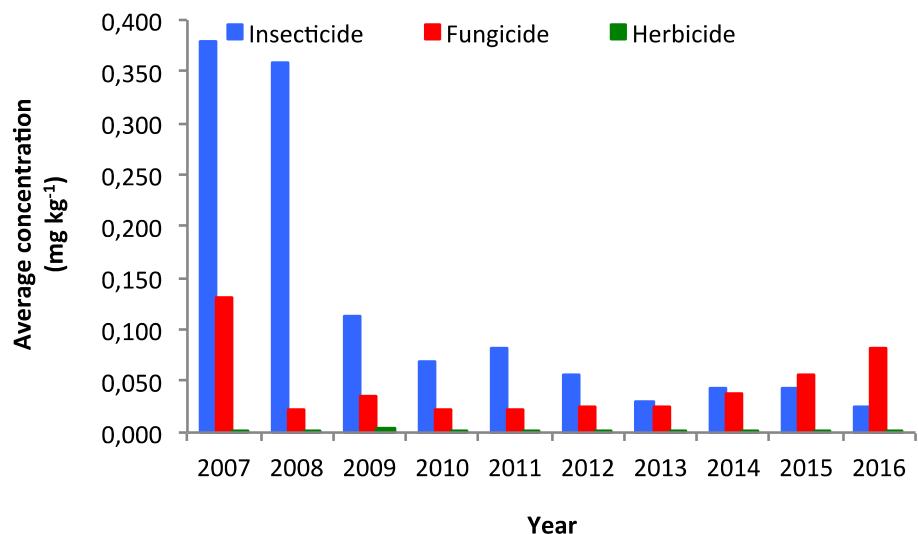
## Agrochemicals most frequently detected (2007-2016)



# Grouped vegetable samples

## Distribution per year

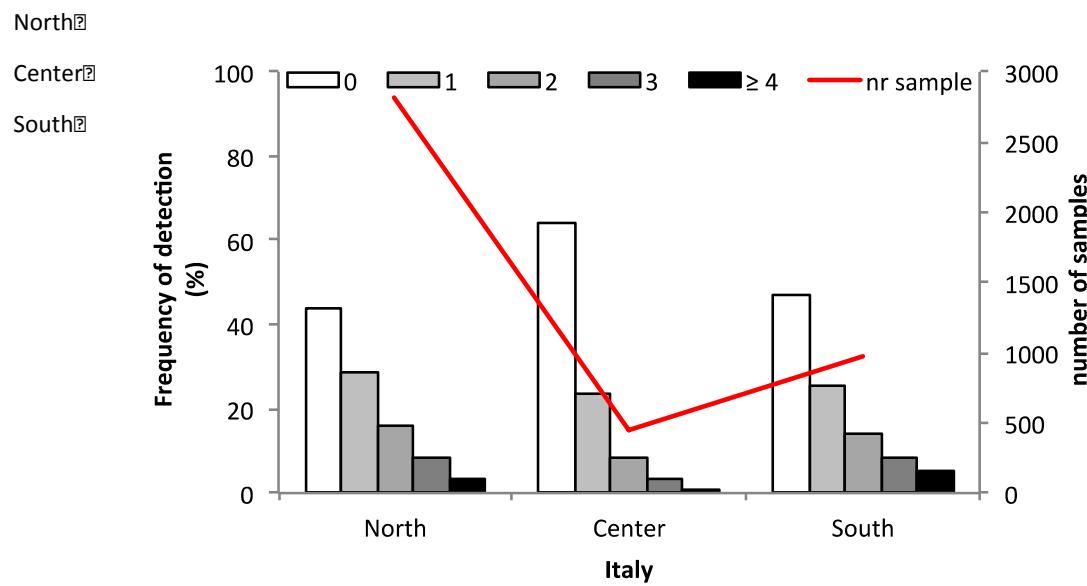
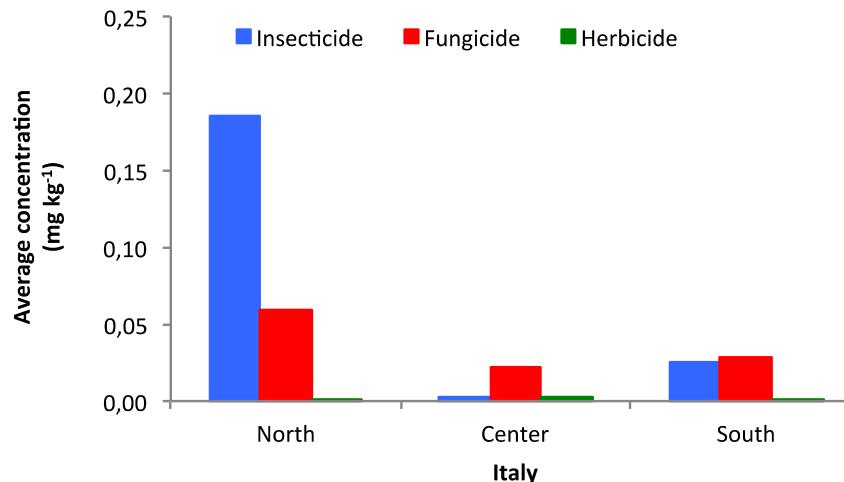
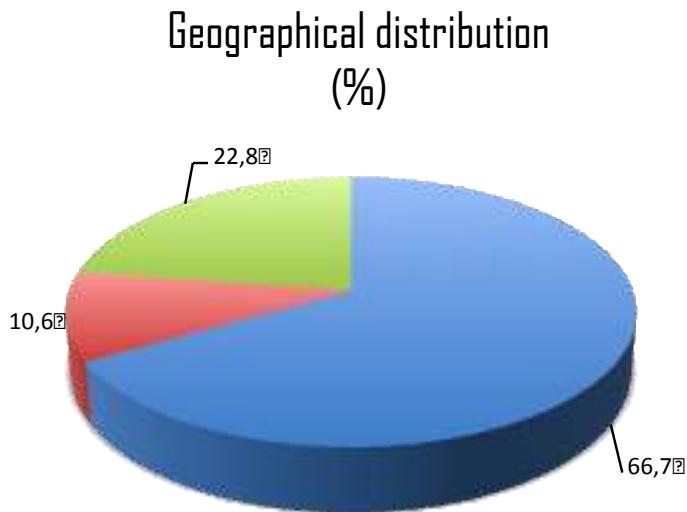
No of samples = 4235



# Vegetable plant samples

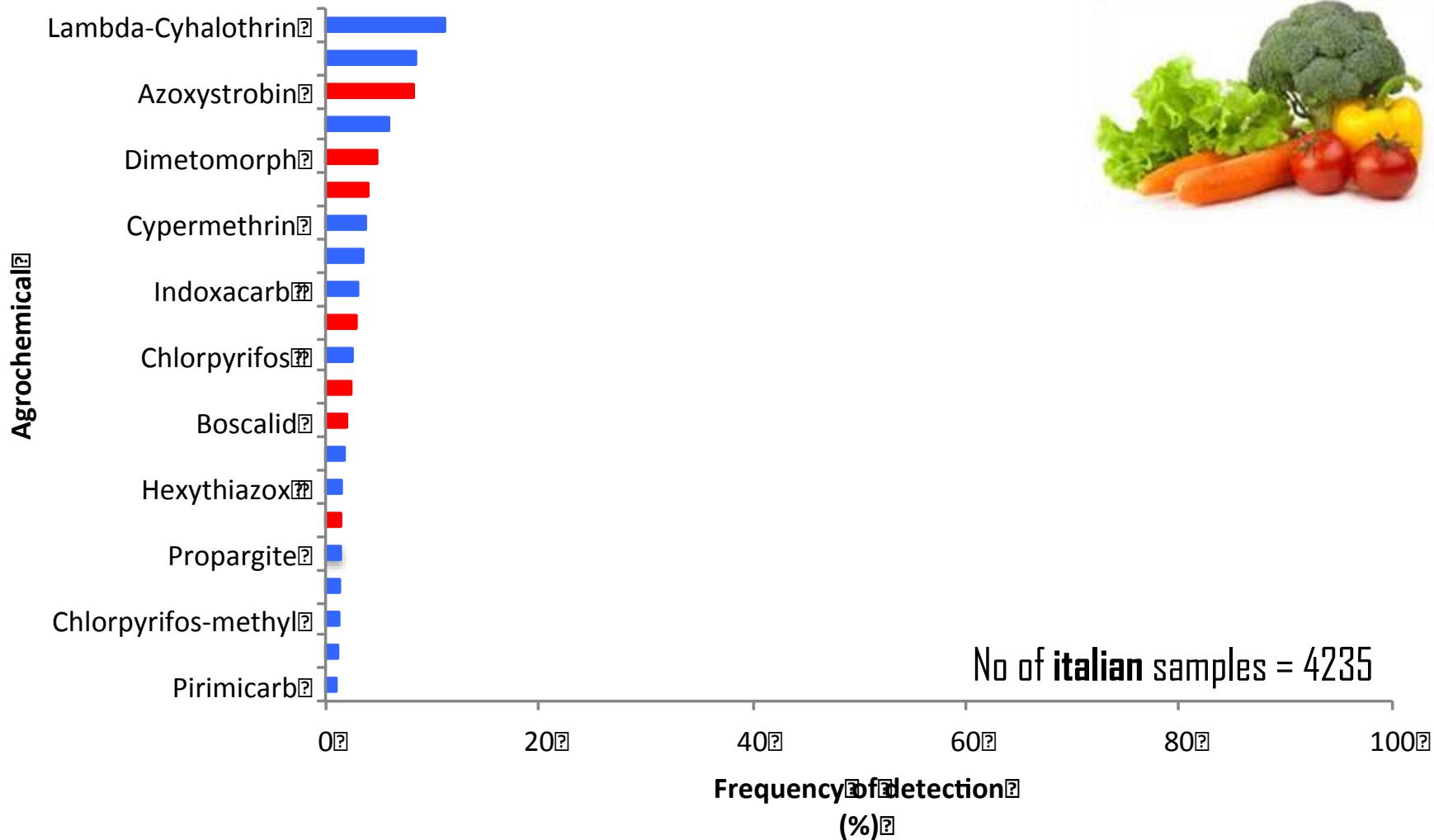
## Geographical distribution

No of samples = 4235



# Vegetable plant samples

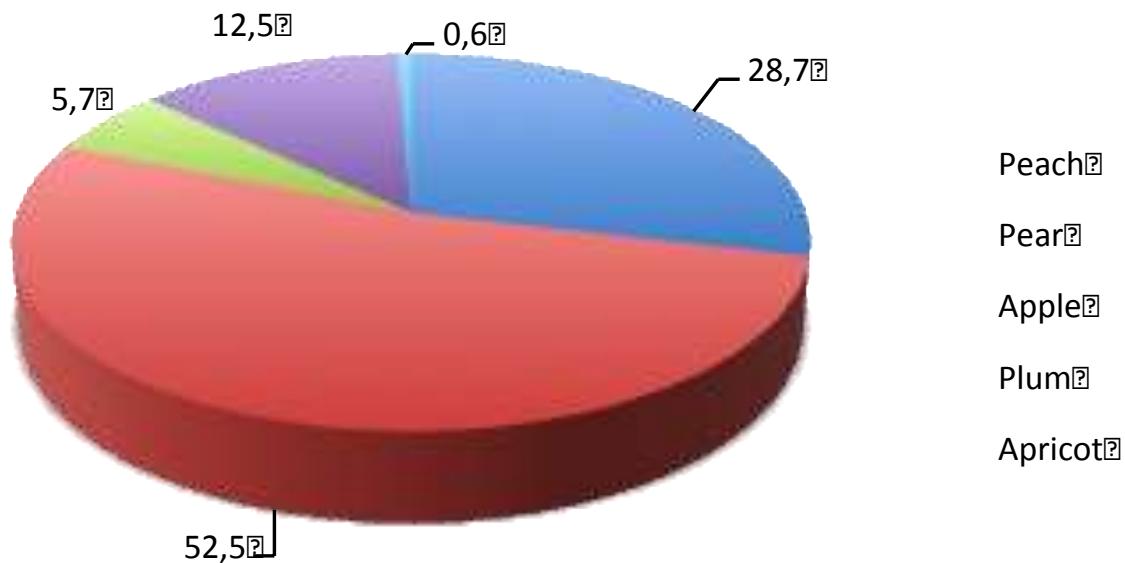
Agrochemicals most frequently detected  
(2007-2016)

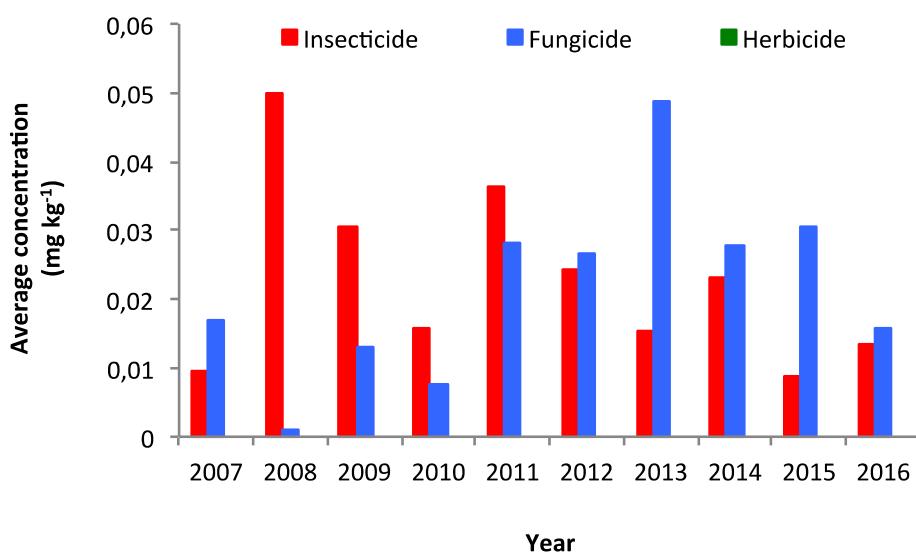


Fruit

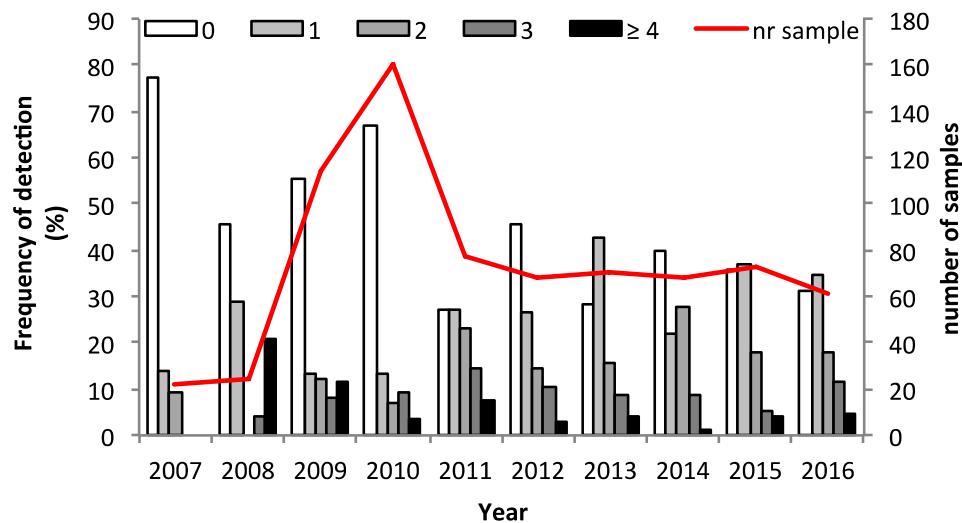
No of samples = 1403

% Distribution per fruit





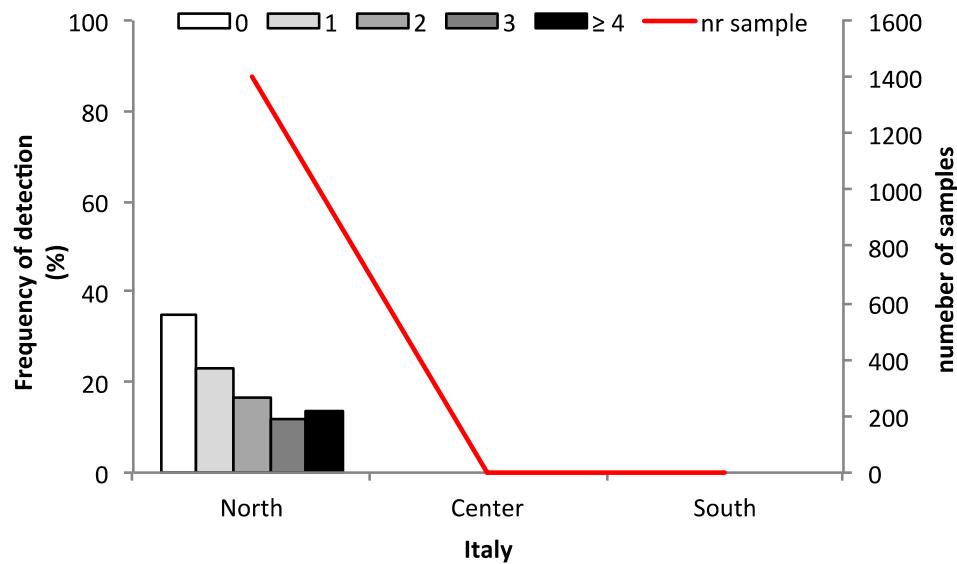
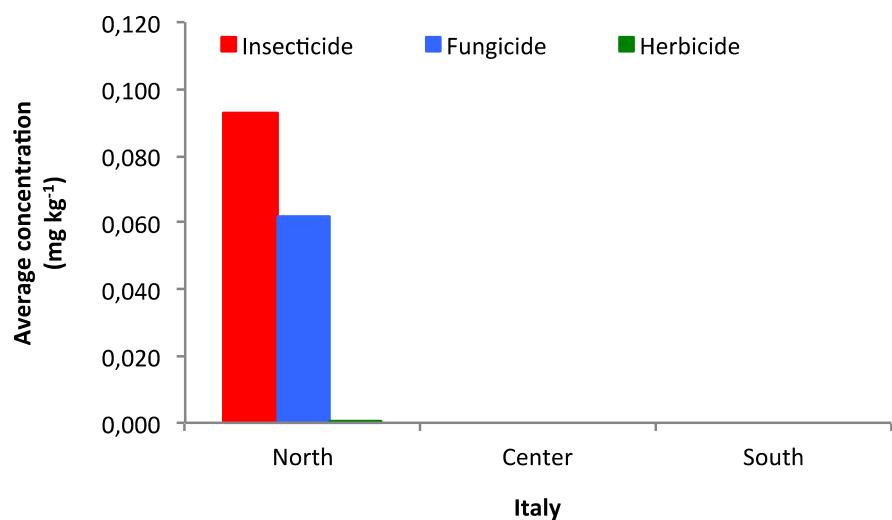
Pear fruit  
Distribution per year  
No of samples = 737



# Fruit

## Geographical distribution

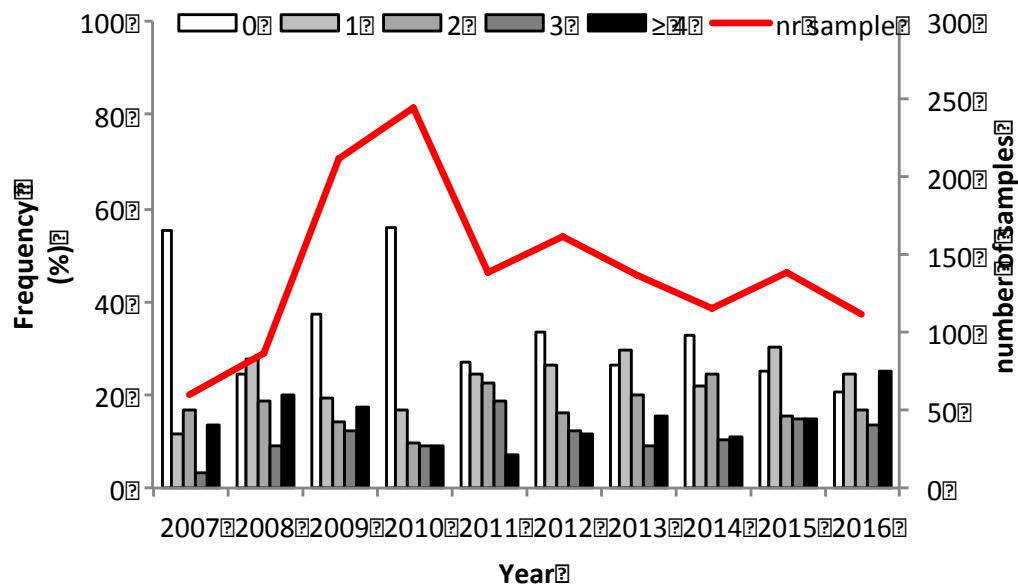
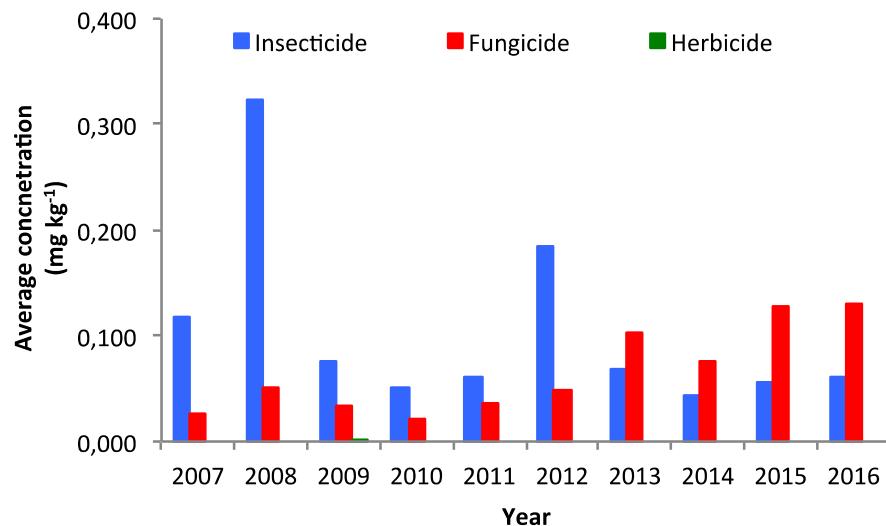
No of samples = 1403



# Fruit samples

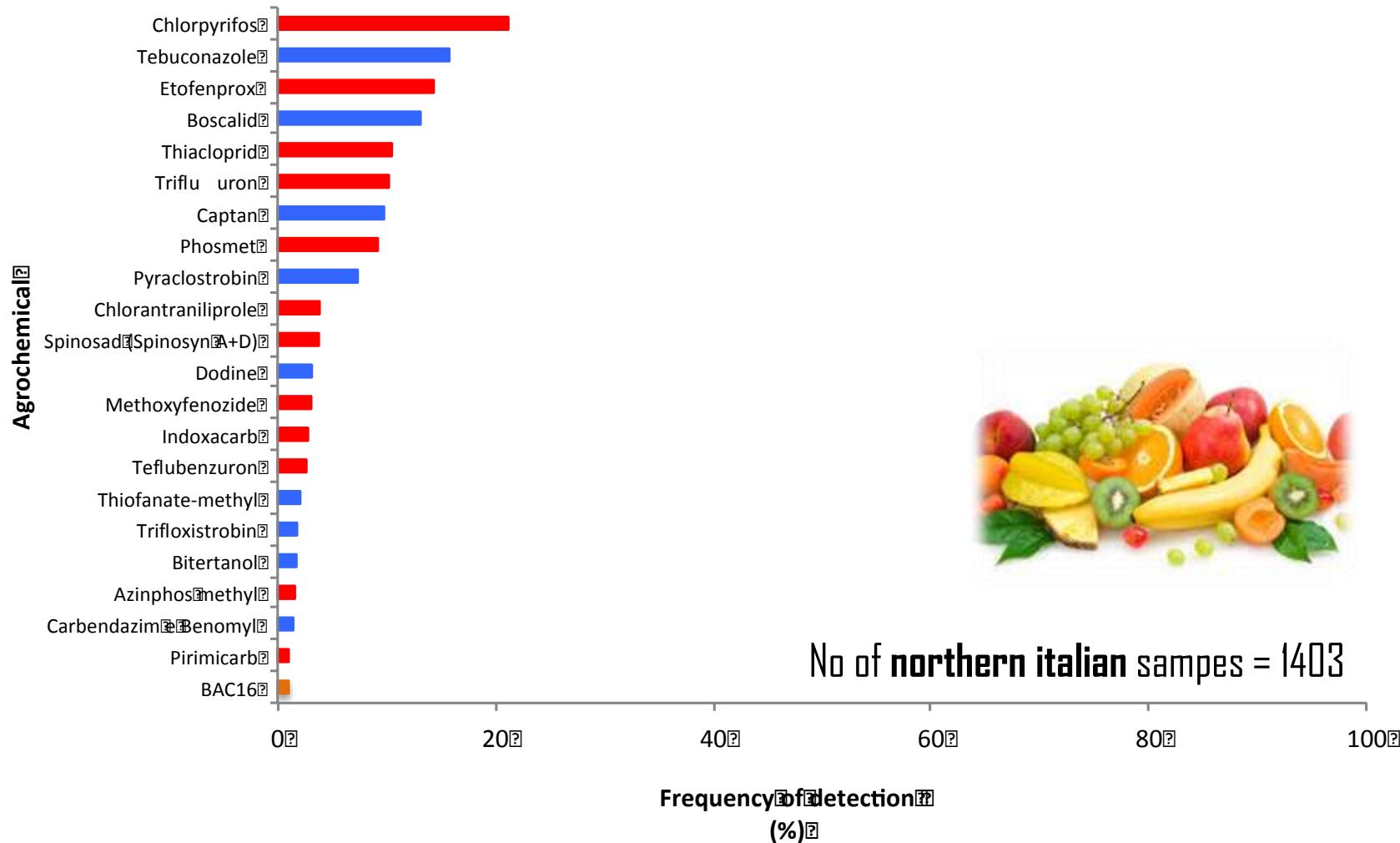
## Distribution per year

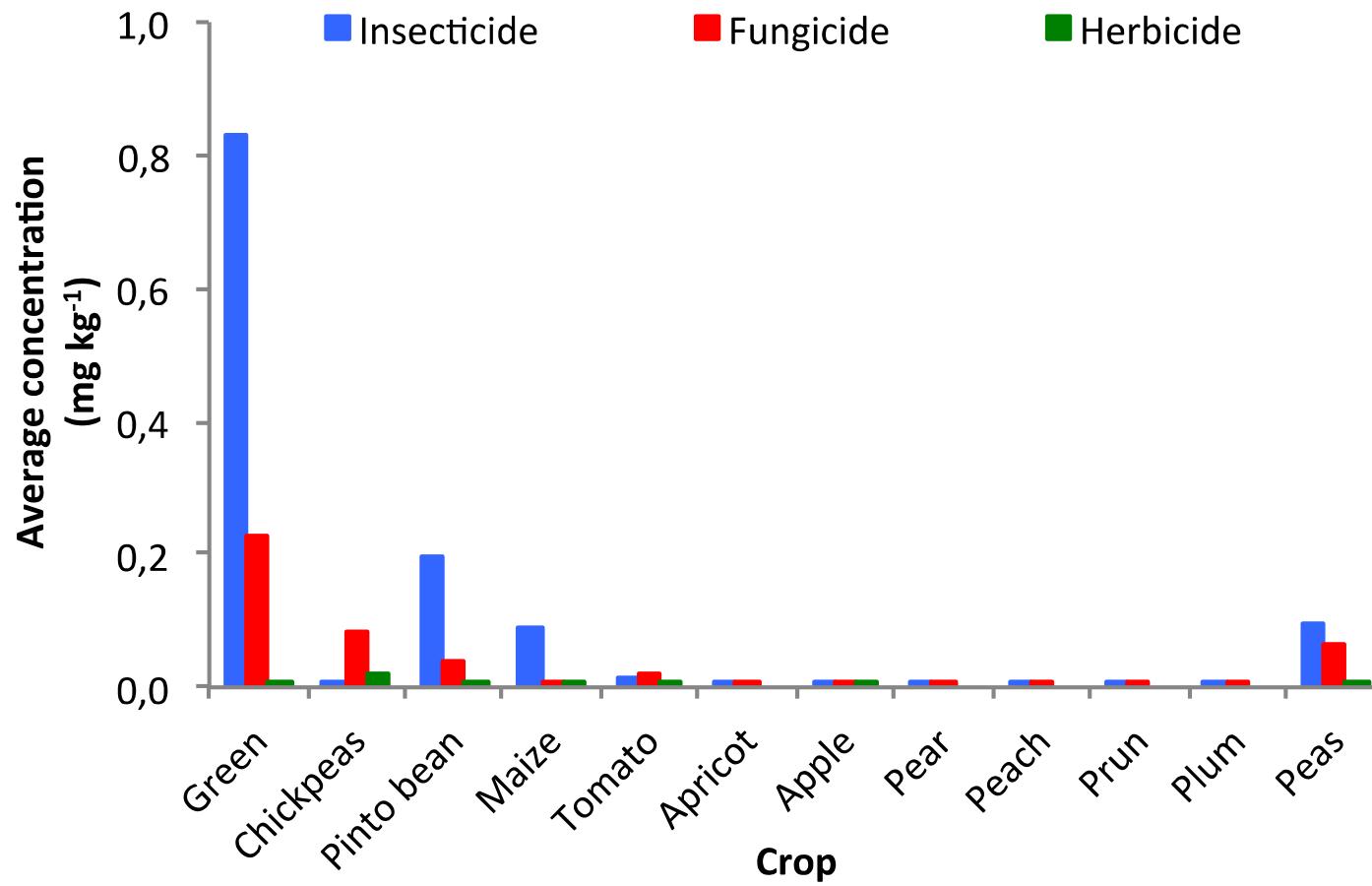
No of samples = 1403



# Fruit samples

Agrochemicals most frequently detected  
(2007-2016)

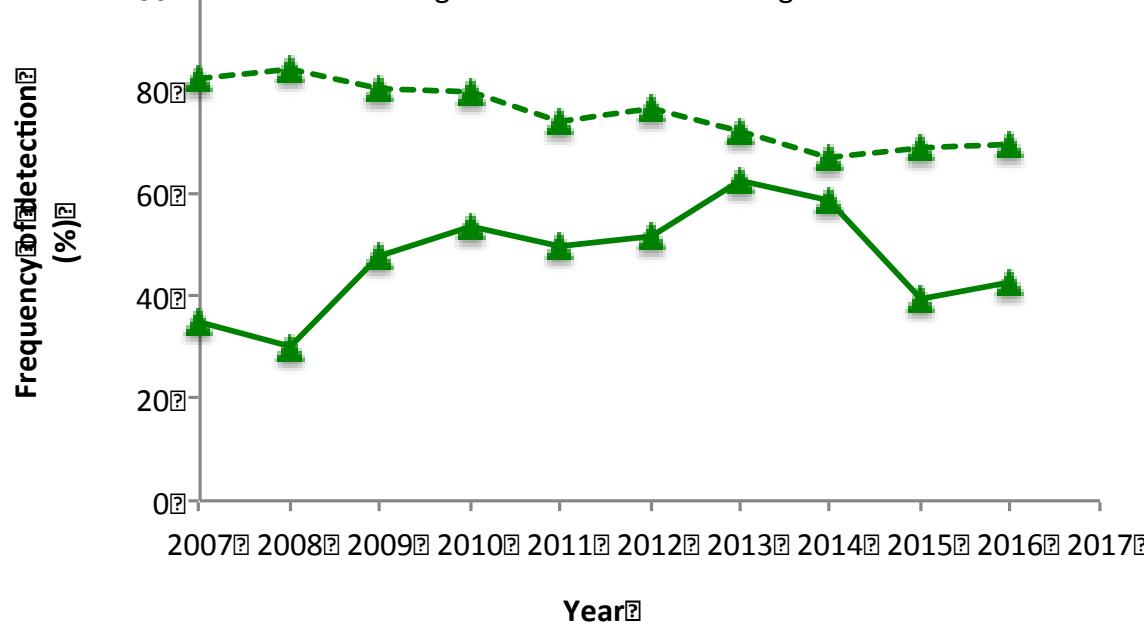
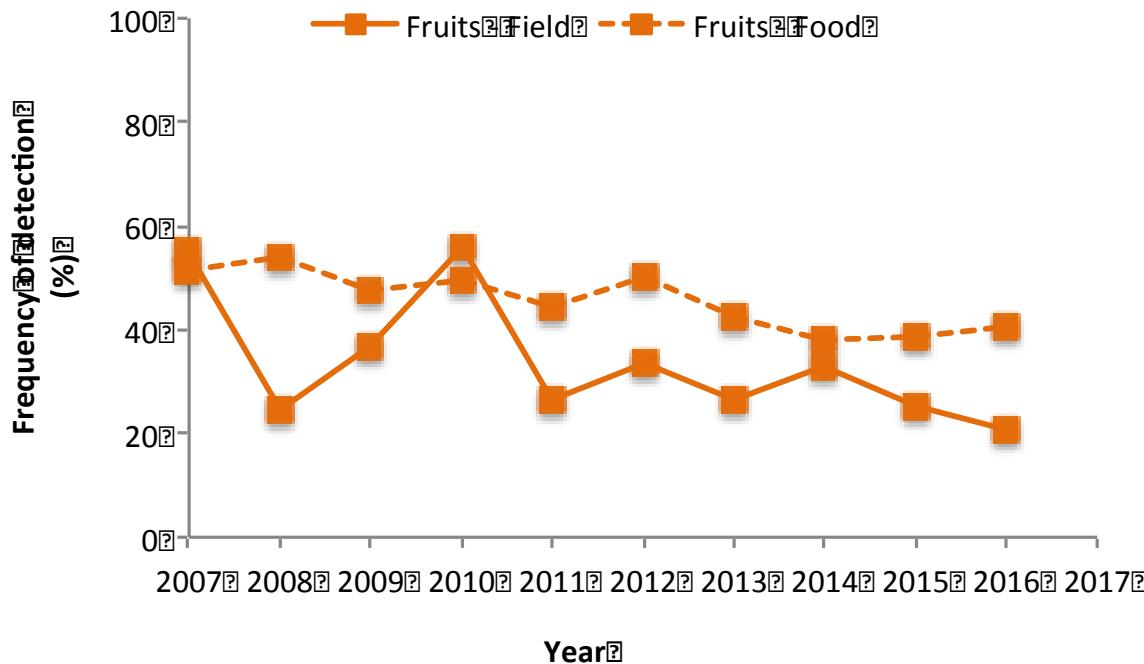




A.I. average concentration:

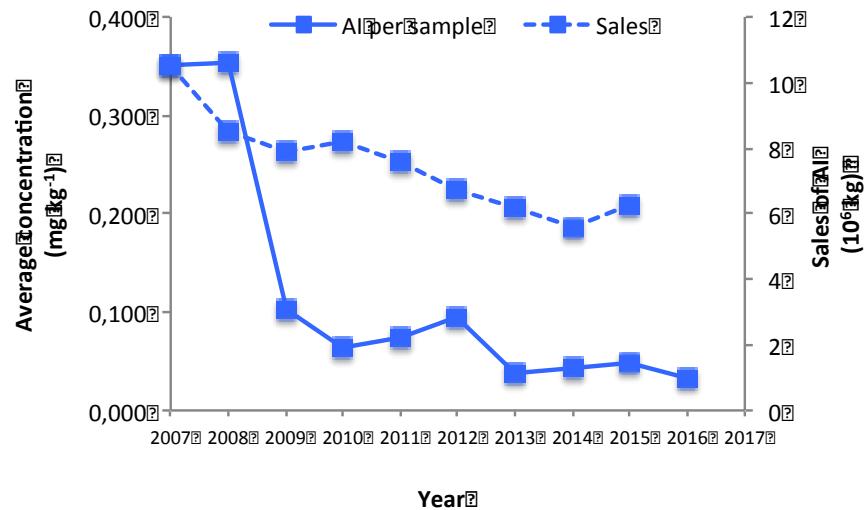
Green bean plant > Pinto bean plant > Pea plant > Chickpea plant > Corn with husk > Tomato

## Pre-harvest vs Food below LOQ

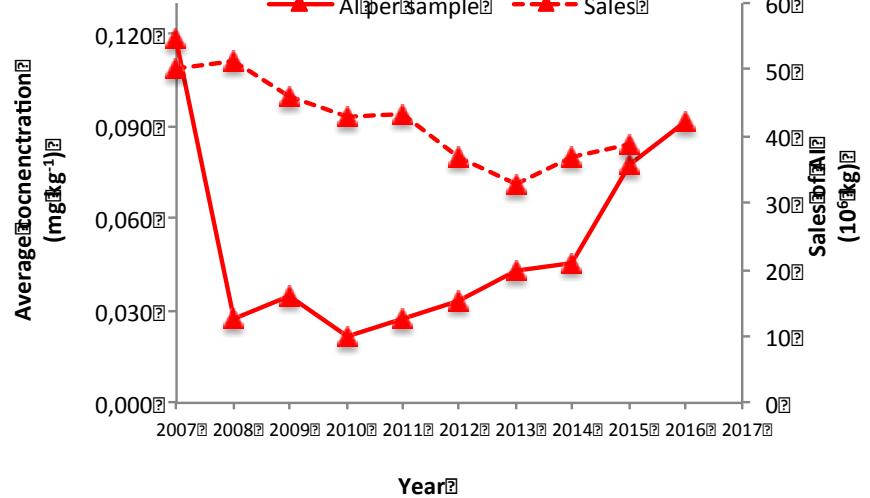


# Average concentration: Post-harvest vs A.I. Sales

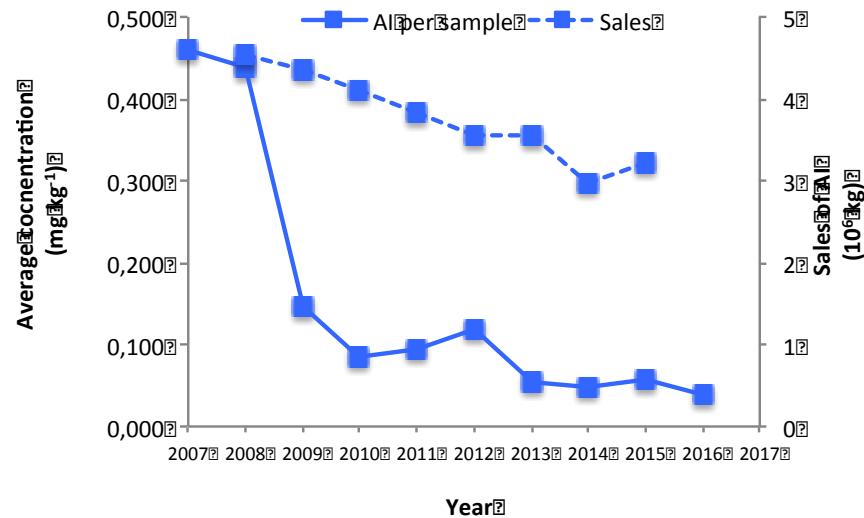
Insecticide - IT



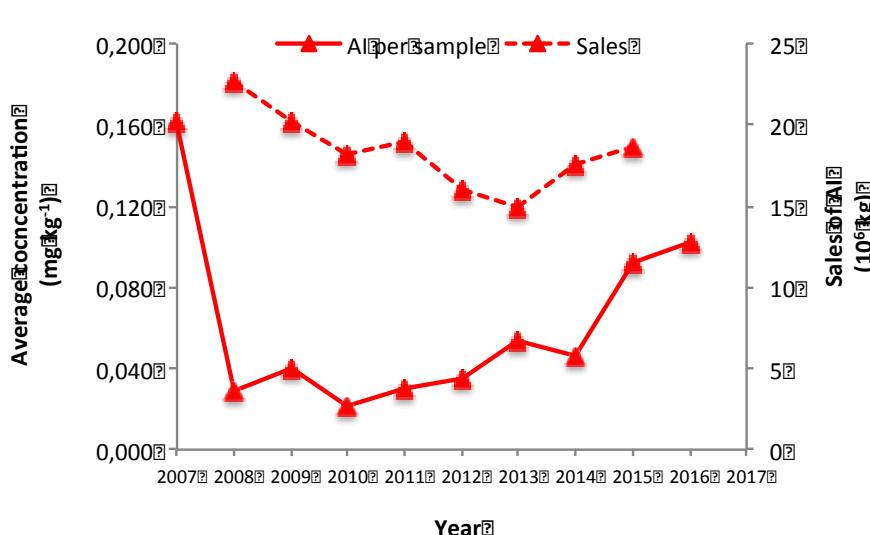
Fungicide - IT



Insecticide - North IT

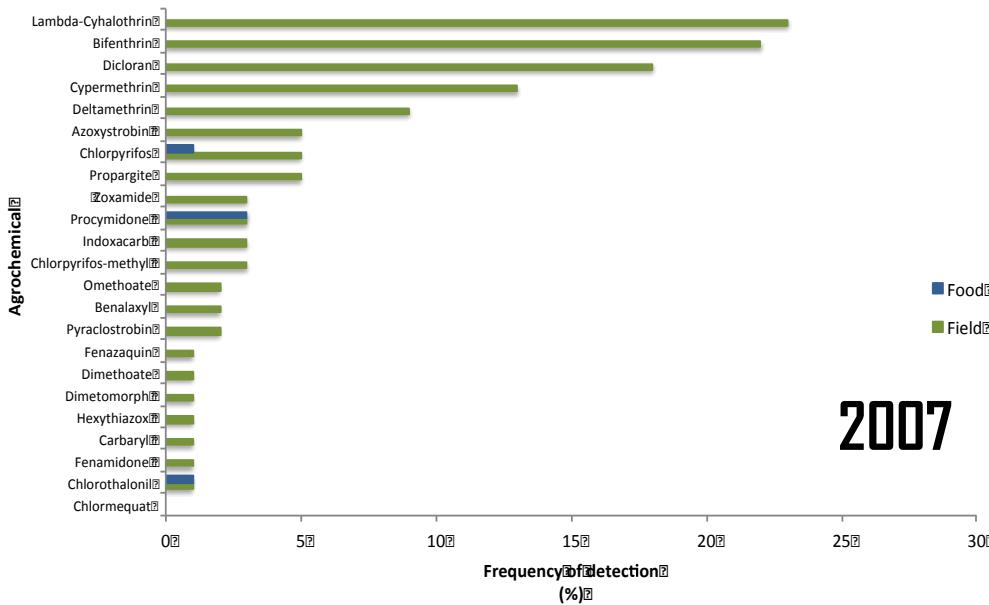


Fungicide - North IT

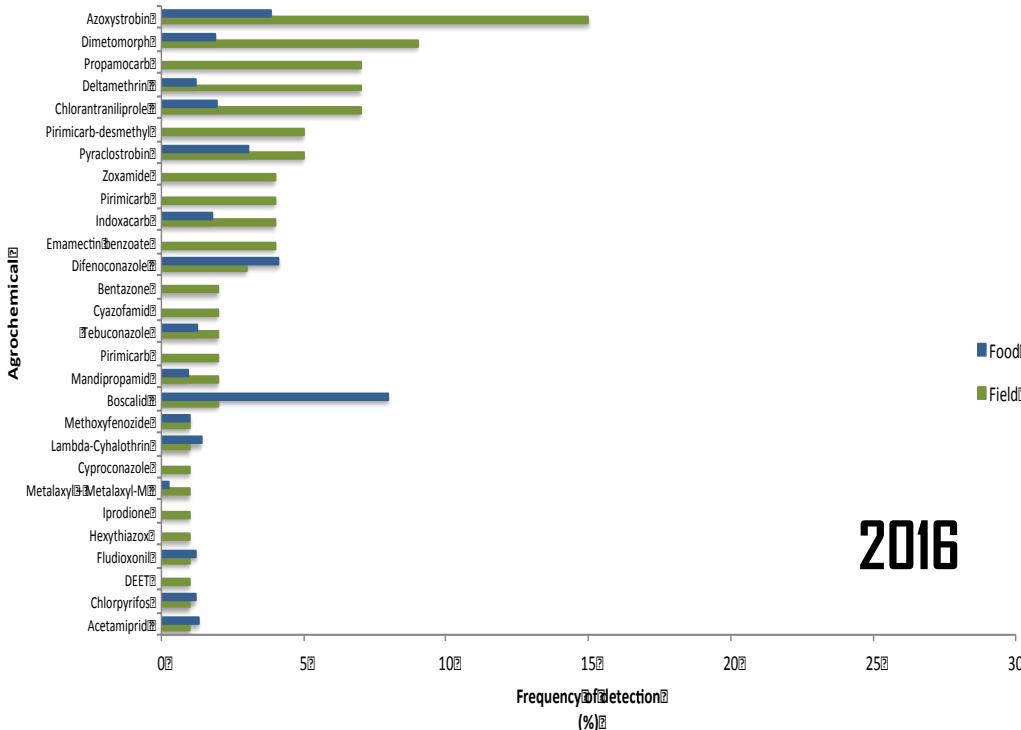


A.I.  
most frequently  
detected

2007

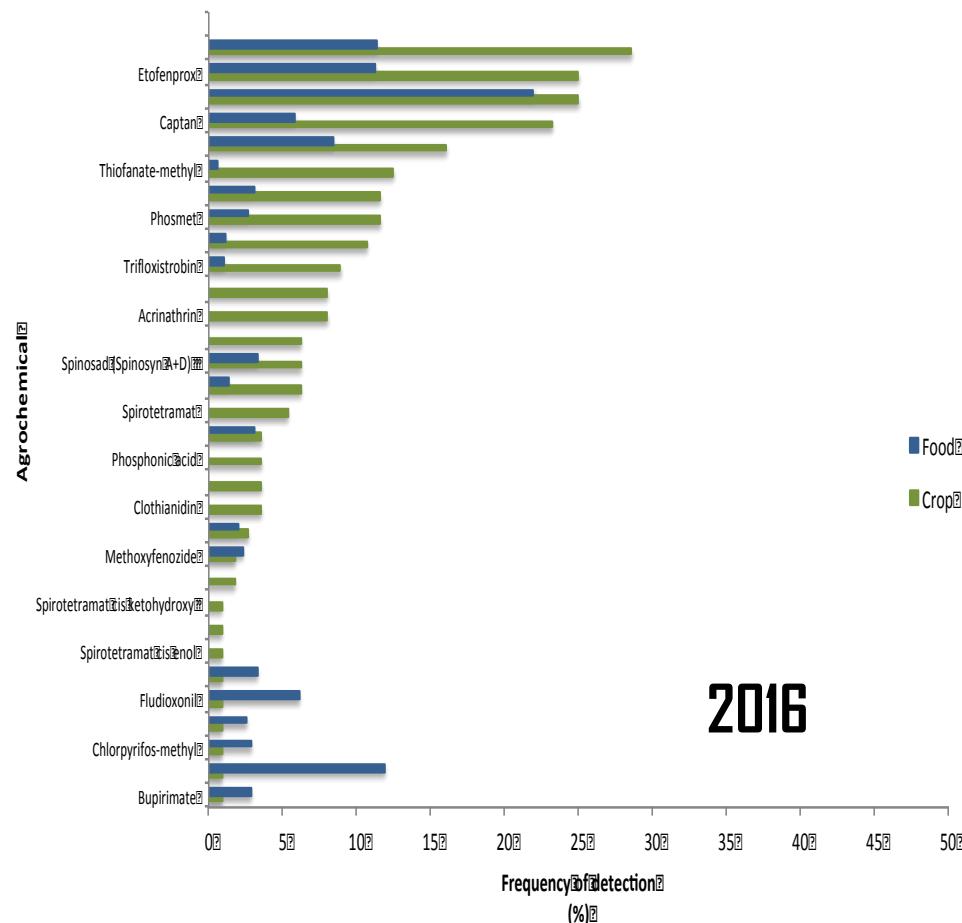
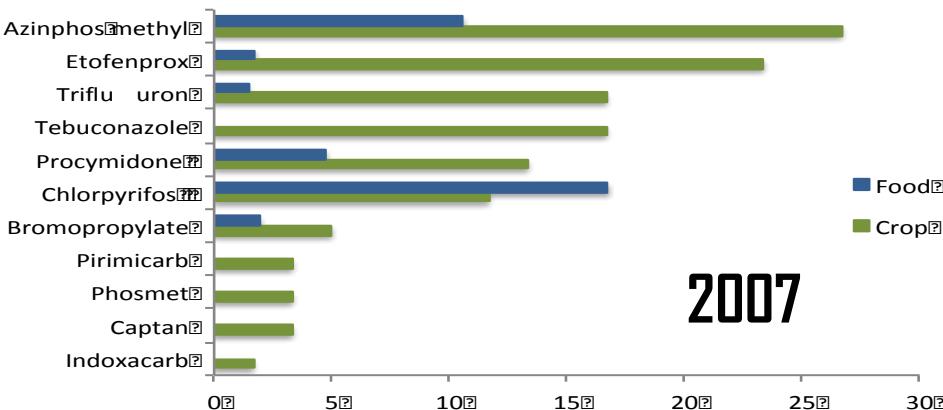


2016



A.I.  
most frequently  
detected

2007



# INTERPRETING THE BIG DATA

- Elaborated data on single crop at pre-harvest can give information on use/misuse of pesticides (admitted/not admitted)
- Correlation between trend of A.I. average concentration in 10 years to trend of A.I. sale in the same time period
- In 10 year time lapse: higher number of A.I. at lower concentration detected on crops at pre-harvest (lower DT<sub>50</sub>, best practice?)
- NEXT STEP: Possible correlation with A.I. DT<sub>50</sub>, average temperature, precipitation