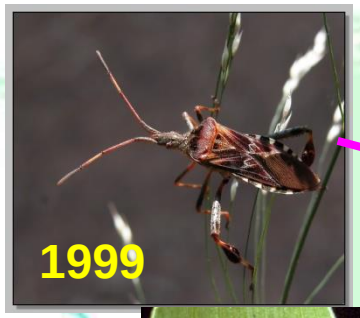
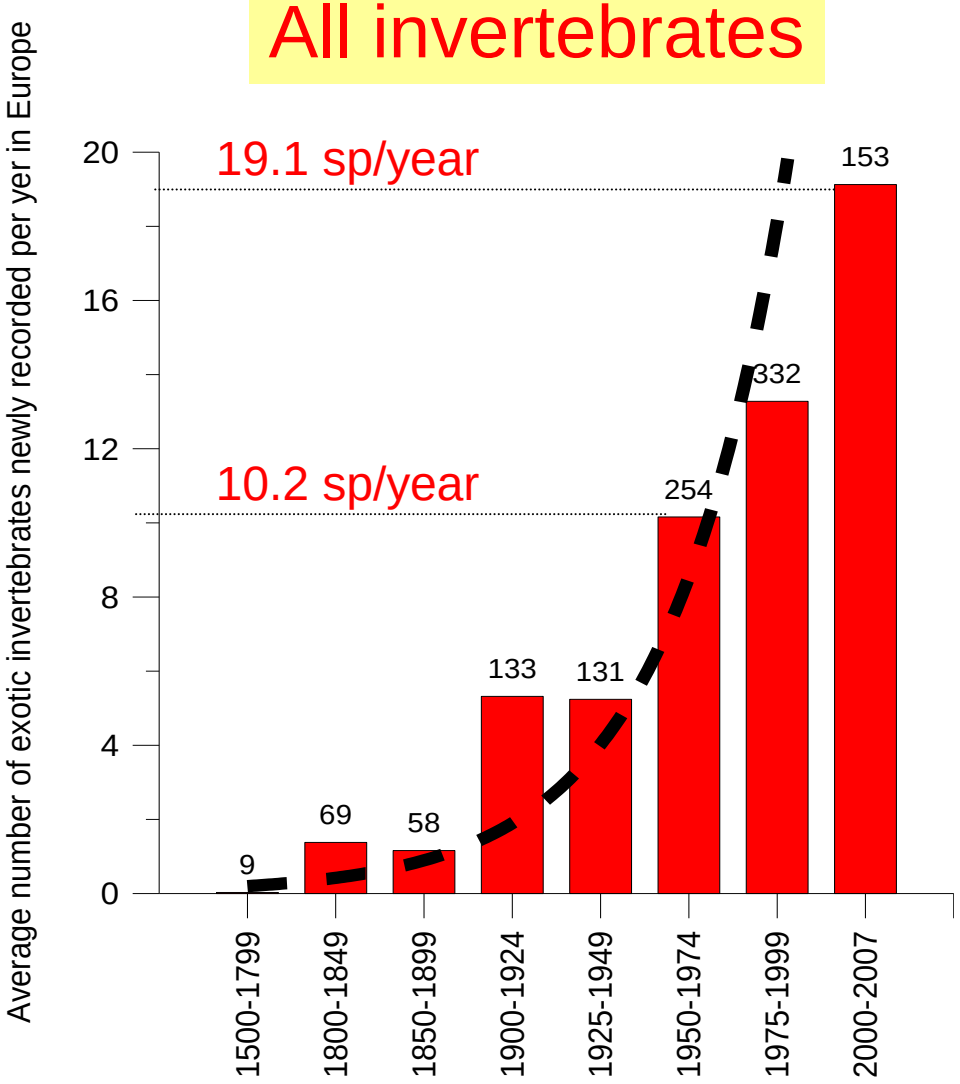
2. Invasive alien species

Species whose arrival is mediated directly or indirectly by man

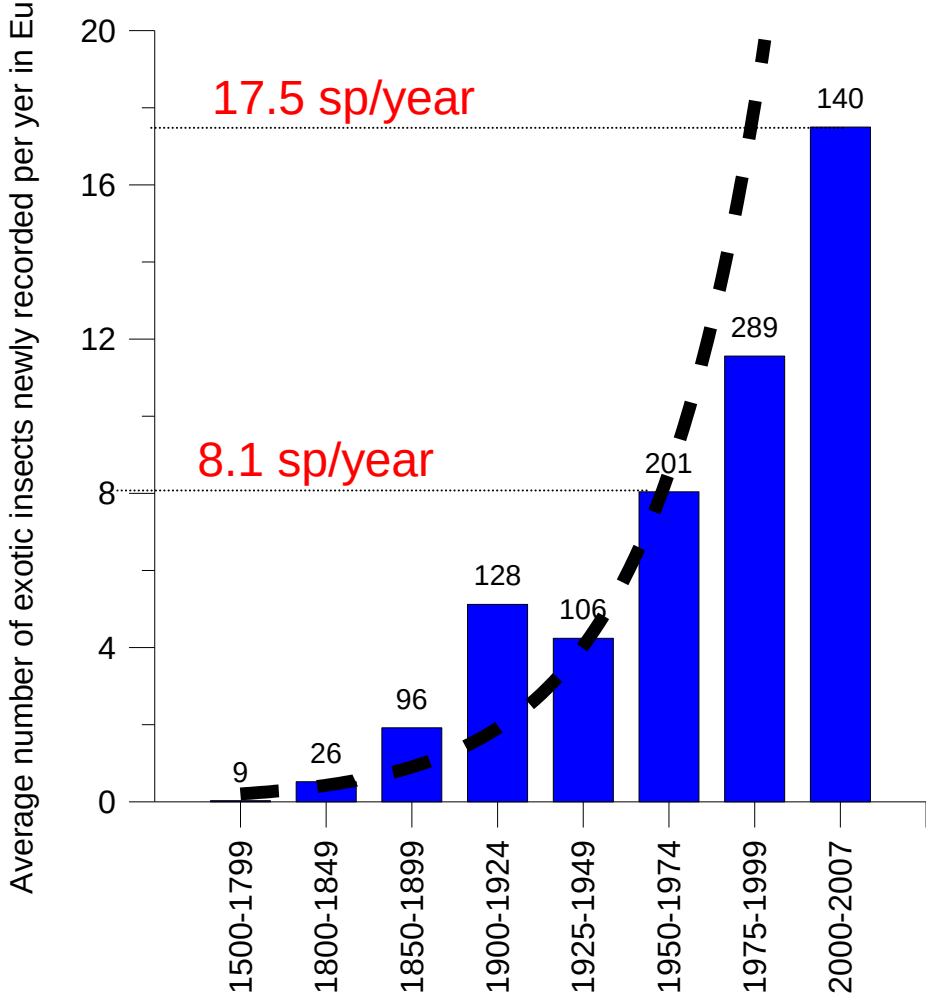


Exponential increase with globalization

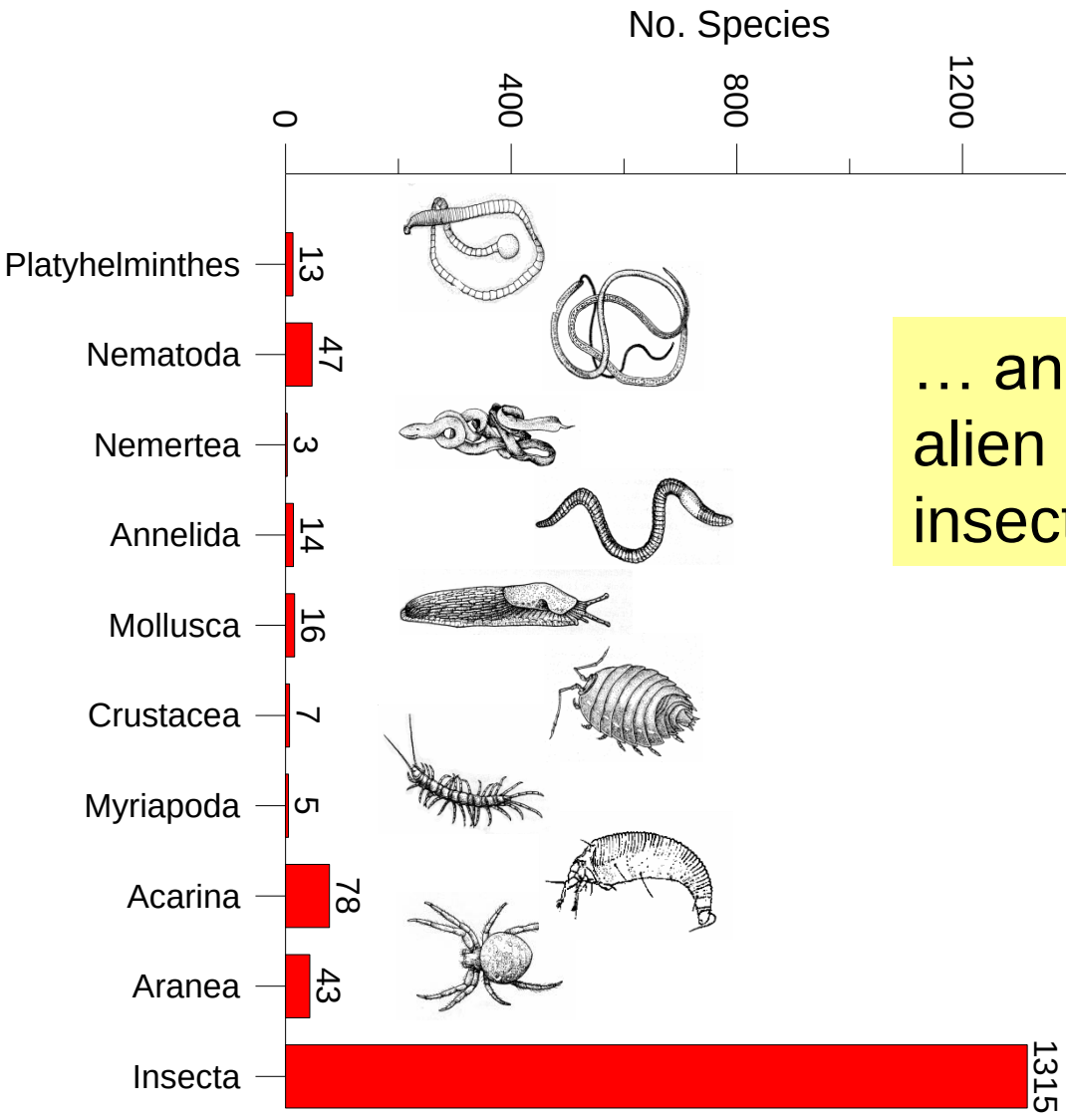
All invertebrates



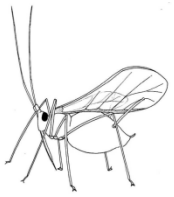
Insects



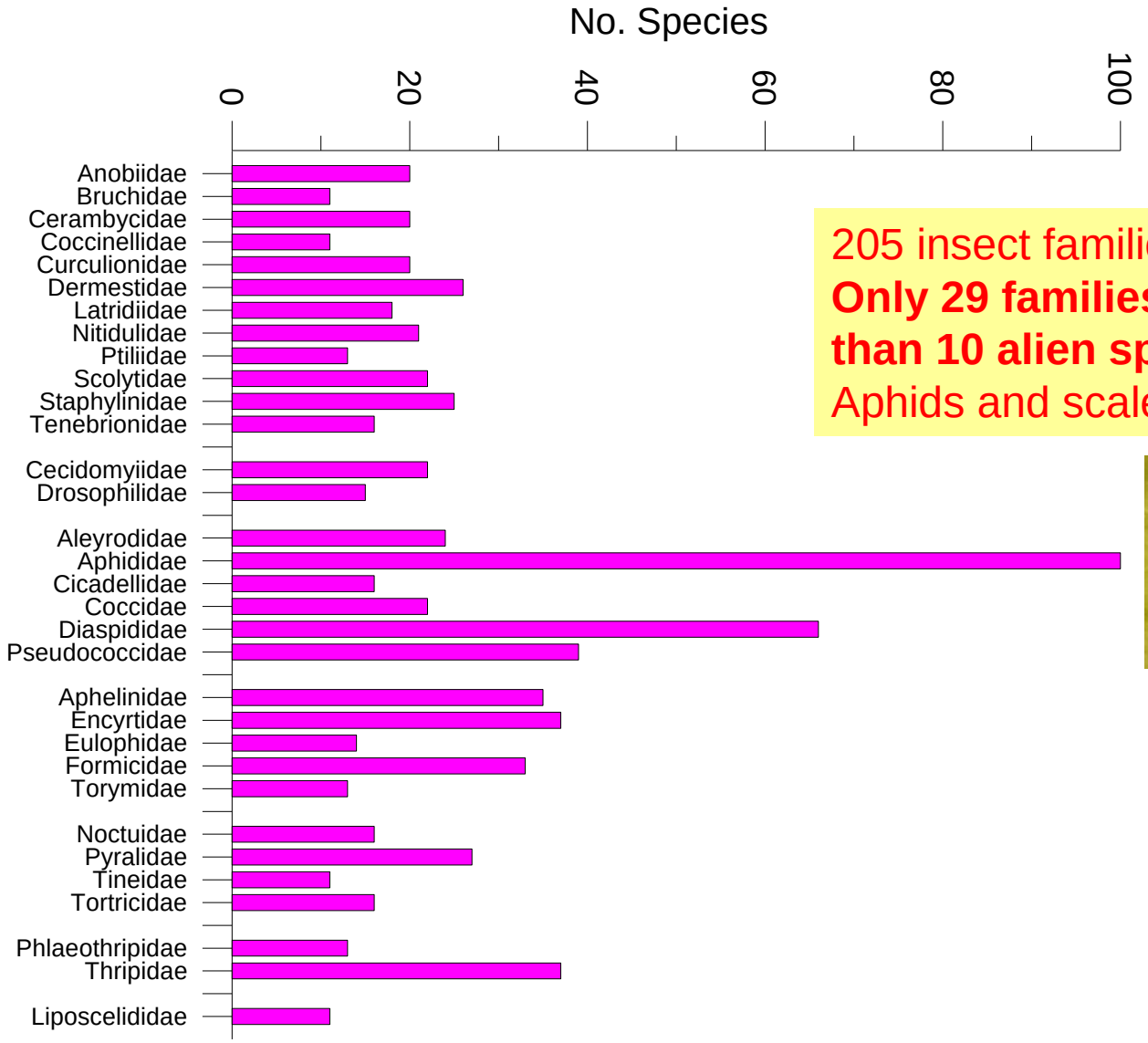
1541 species of alien invertebrates already present in Europe ! …… 94% are arthropods



… and 90% of the alien arthropods are insects (1315)



Large diversity in alien insect families but aphids and scales are the major invaders



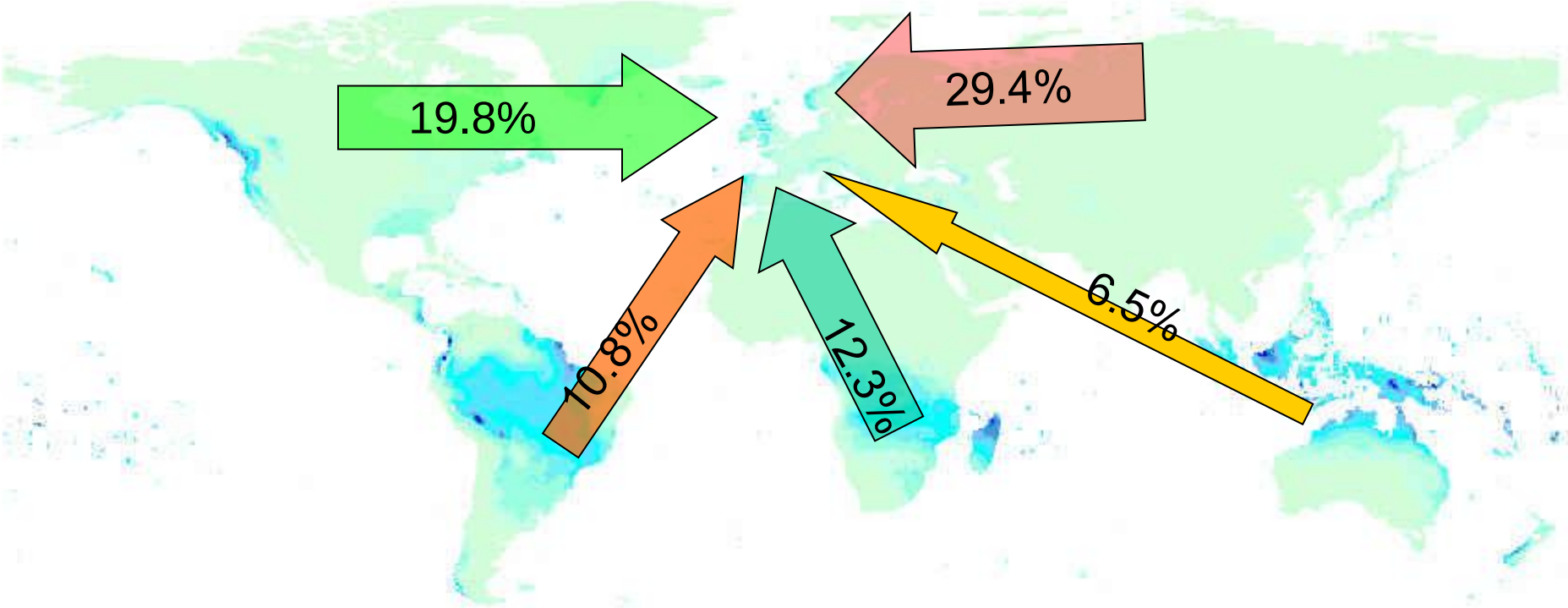
205 insect families involved

Only 29 families contribute for more than 10 alien species

Aphids and scales predominant

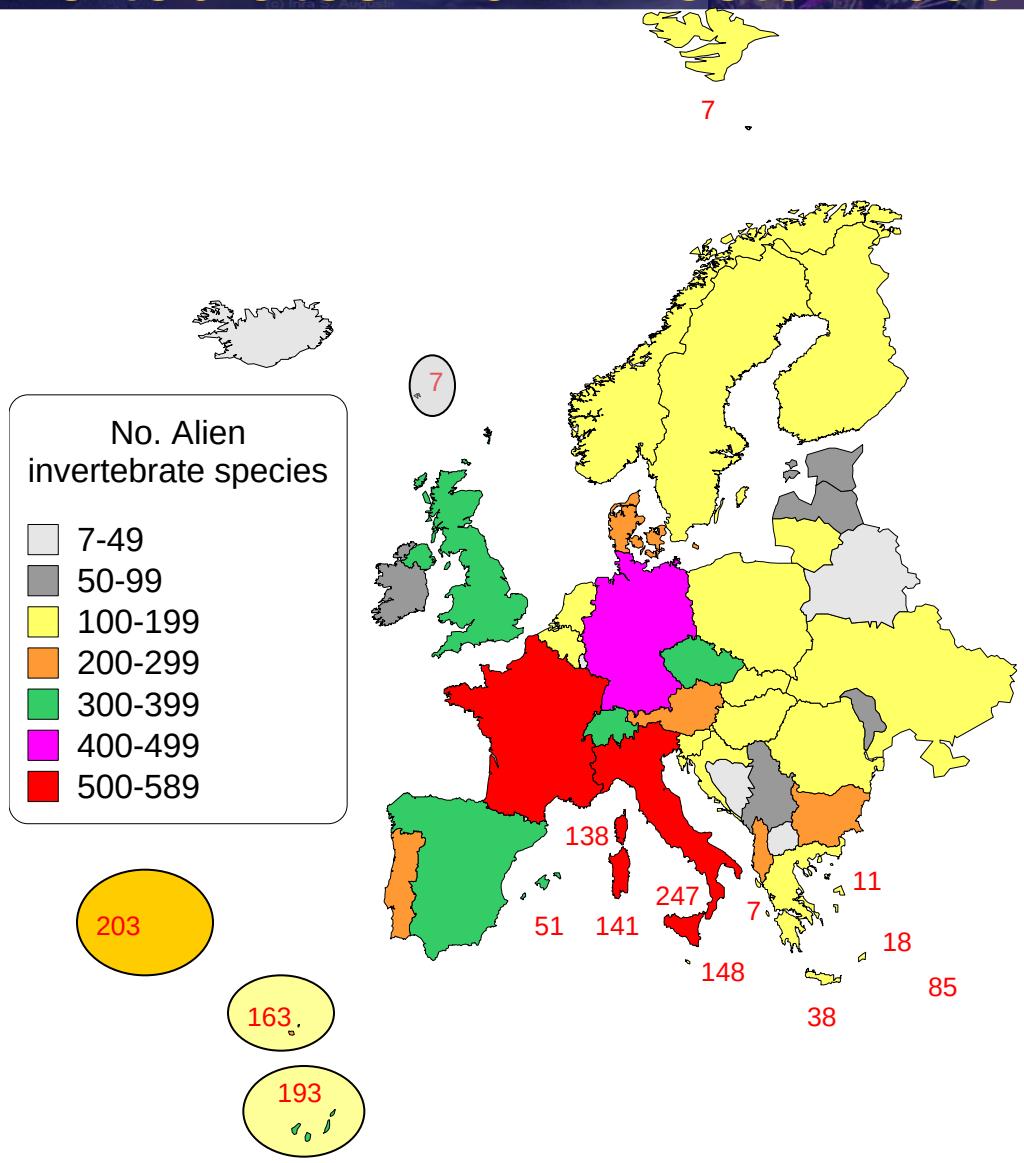
Asia became the major supplier of alien invertebrates

6.7% tropical/ subtropical
14.5% cryptogenic



Contribution of tropical and subtropical areas up to 37% !

European countries largely differ in the number of alien invertebrates “rich” Western countries the most colonized



Sampling efforts ?
Taxonomic expertise ?

Invasive species: main issues

1. Pathways of introduction

Many and very different according to organisms. For forest insects, we focus on

- Wood packing material: Asian longhorn beetles
- Plants for planting: chestnut gall wasp

2. Economic impacts

How much they cost to human society

3. Ecological impacts

How deep they modify the ecosystems

4. Management measures

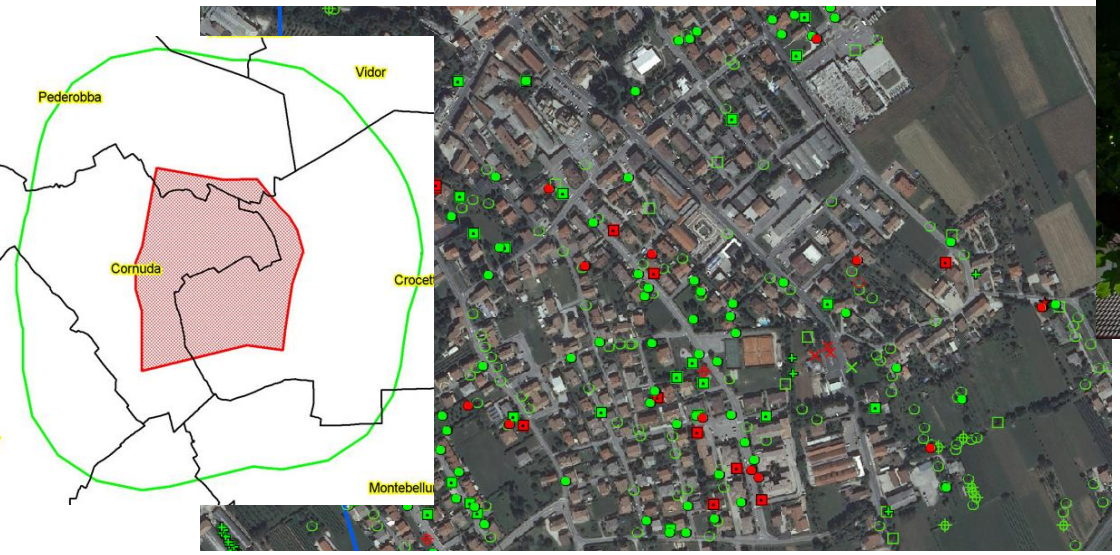
How to deal with them before, during, and after the arrival

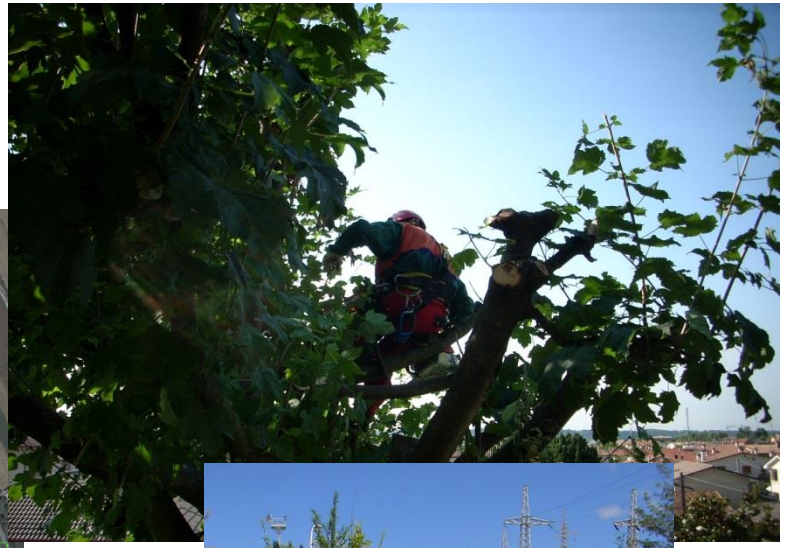
Invasive species: Asian longhorn beetle
Anoplophora glabripennis (Coleoptera Cerambycidae)

1. Pathway of introduction

Invasive species: Asian longhorn beetle

2. Economic impacts
How much they cost to human society

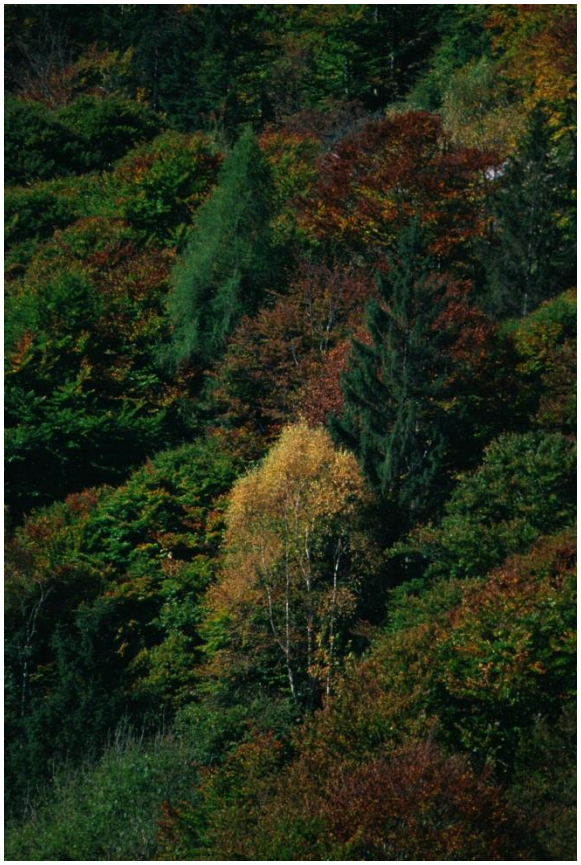




Invasive species: Asian longhorn beetle

3. Ecological impacts
How deep they modify the ecosystems

Alter tree composition of forest stands



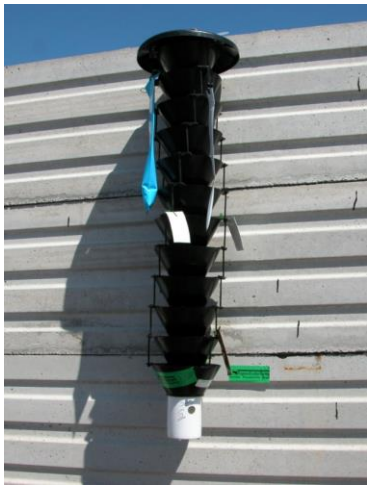
Affect indirectly the community of insects associated with trees: to be demonstrated

Invasive species: Asian longhorn beetle

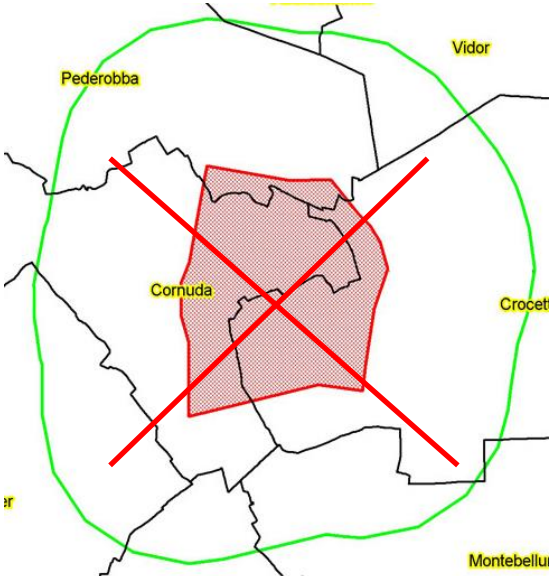
4. Management measures
How to deal with them before, during, and after the arrival

FAO ISPM 15

Surveillance: inspection
trapping



Eradication: removal of infested trees



Invasive species: chestnut gall wasp

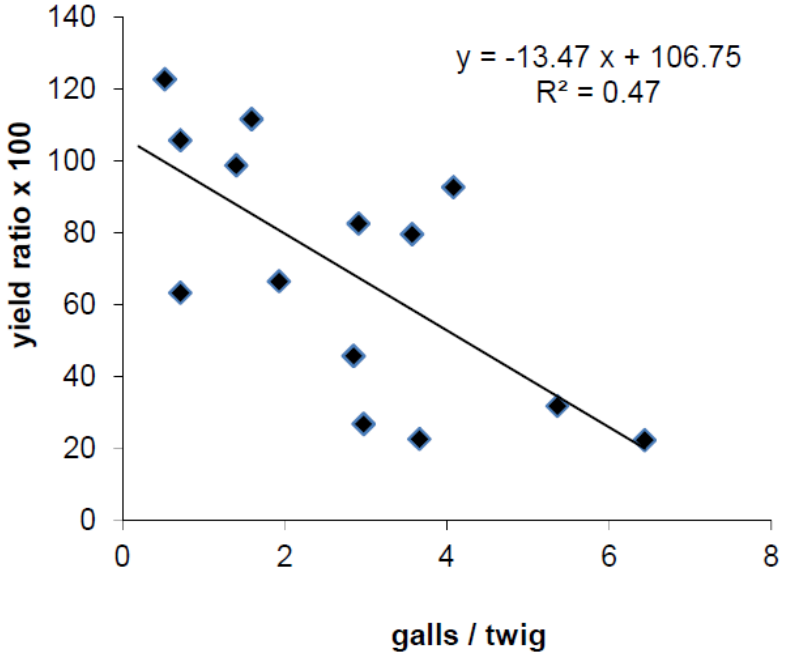
Dryocosmus kuriphilus (Hymenoptera Cynipidae)

1. Pathways of introduction

- Plants for planting

Invasive species: chestnut gall wasp

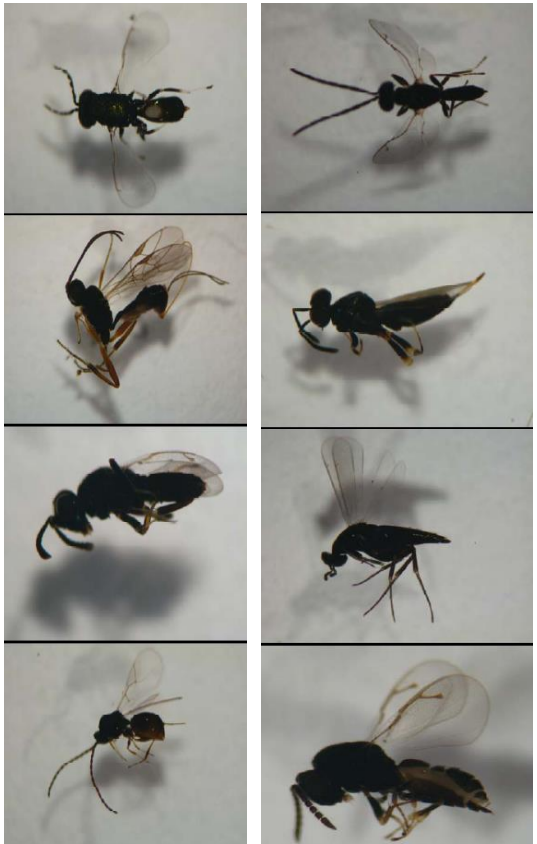
2. Economic impacts
How much they cost to human society: nut yield reduction in relation to gall density



Invasive species: chestnut gall wasp

3. Ecological impacts
How deep they modify the ecosystems

Suspected impact on the community of parasitoids associated with gall wasps on oak (Quercus spp.)



Invasive species: chestnut gall wasp

4. Management measures
How to deal with them before, during, and after the arrival

FAO ISPM 10 pest free production area

Surveillance: molecular test

Eradication not possible →Biological control

Torymus sinensis

Invasive species: Pest Risk Assessment

Process addressed to identify the risk before the arrival of the pest (quarantine lists) and to review measures to limit the risk

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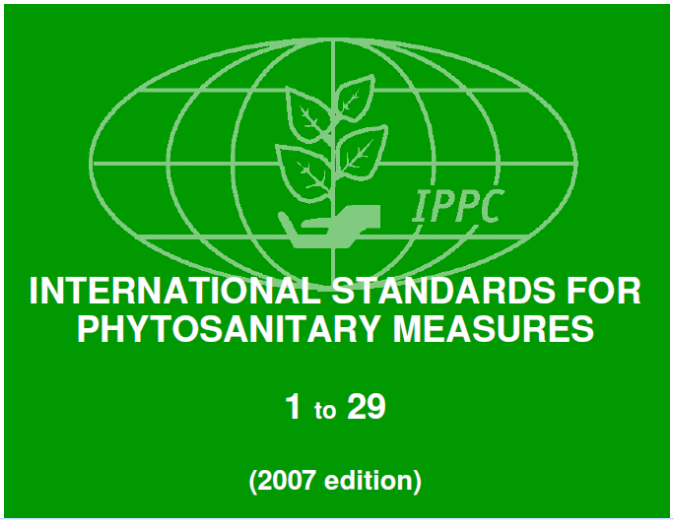
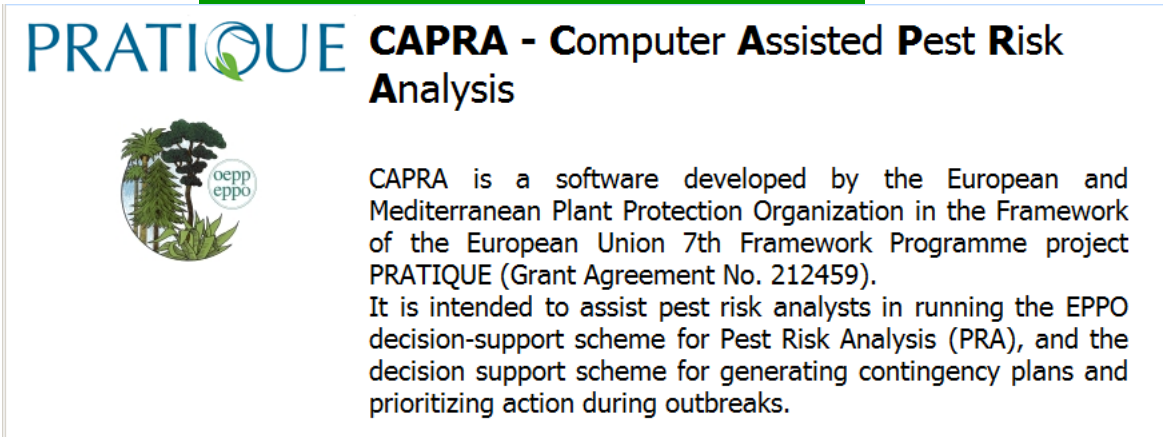


EPPO scheme

EFSA scheme



Invasive species:
Surveillance network for early detection