THE IMPACTS OF INVASIVE ALIEN SPECIES ON EUROPE'S NATURE AND LIVELIHOOD

Piero Genovesi

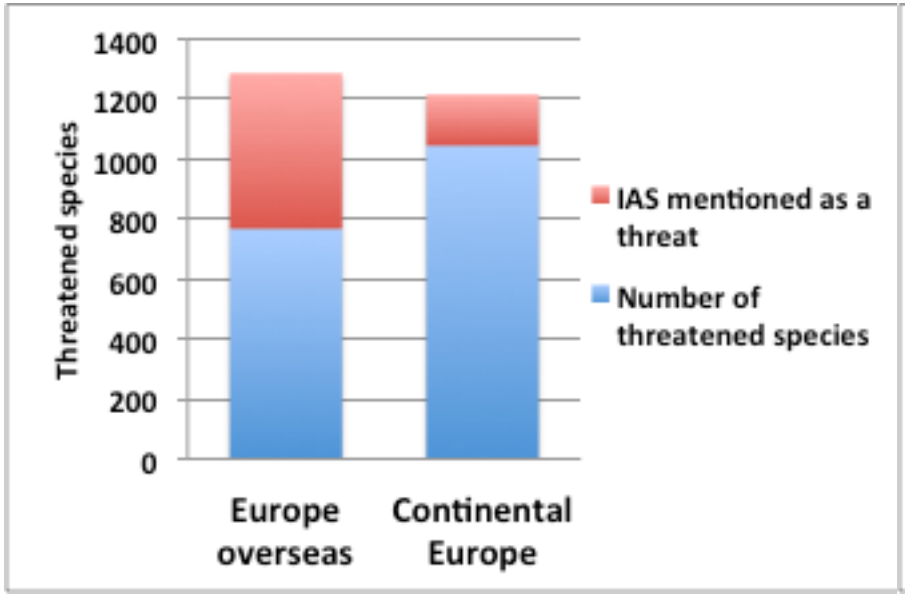
ISPRA and Chair IUCN Invasive Species Specialist Group

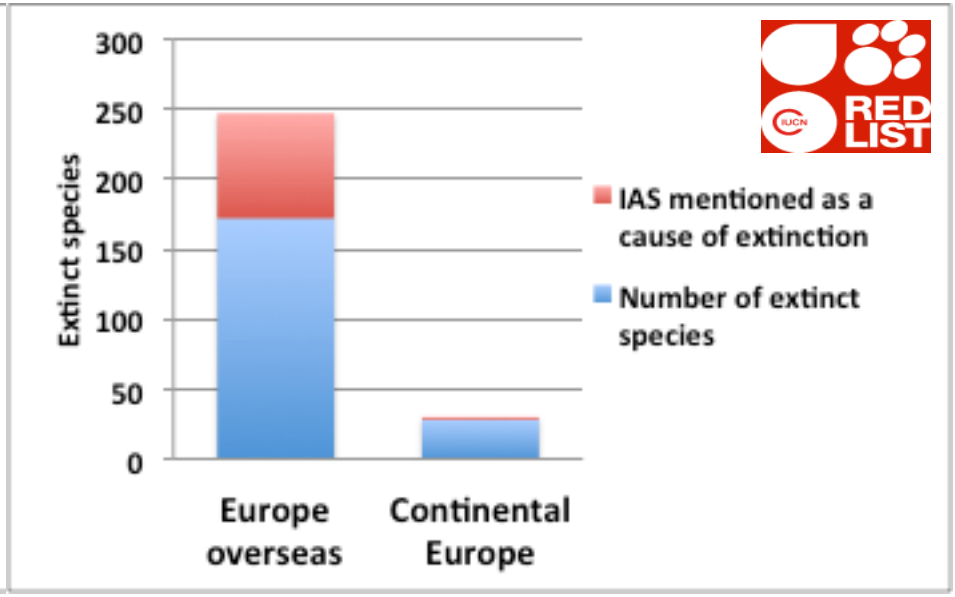
MAJOR DRIVER OF BIODIVERSITY LOSS

- Second driver of biodiversity loss
- Invasives impact 33% of threatened amphibians, 25% of birds, 24% of mammals, 22% of reptiles, 20% of fish
- Key factor in 54% of known animals extinctions. Only factor of 20% of extinctions

MAJOR DRIVER OF BIODIVERSITY LOSS

- Particularly severe on islands, that host 40 % of all critically endangered species
- 80% of all known extinctions occurred on islands, 50%-67% caused by IAS

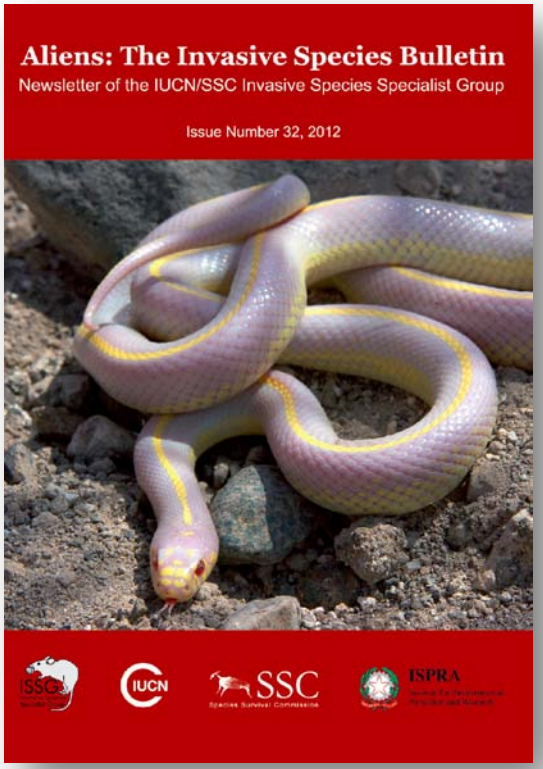


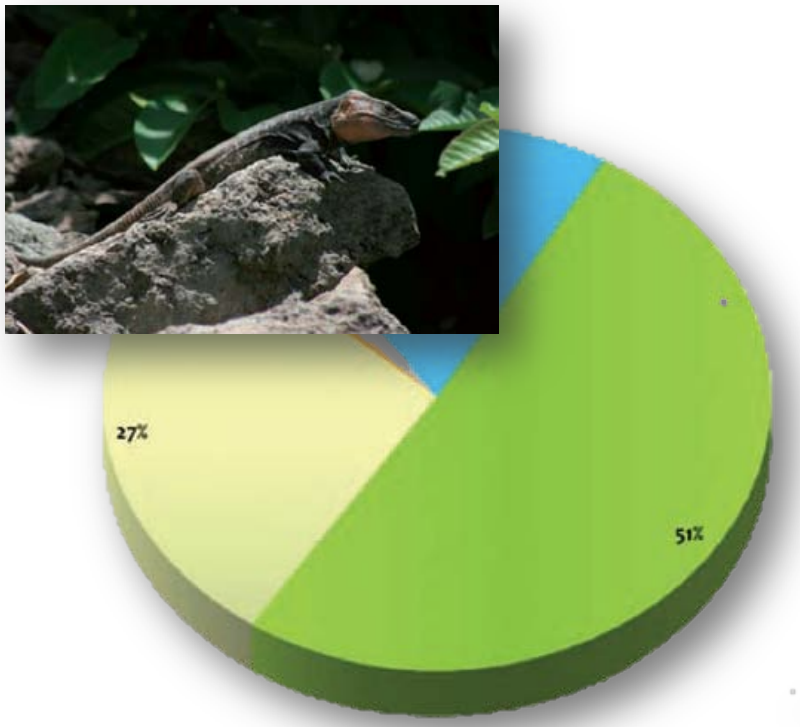


source: IUCN French Committee/AFD Invasive Species project - Global component

MAJOR DRIVER OF BIODIVERSITY LOSS

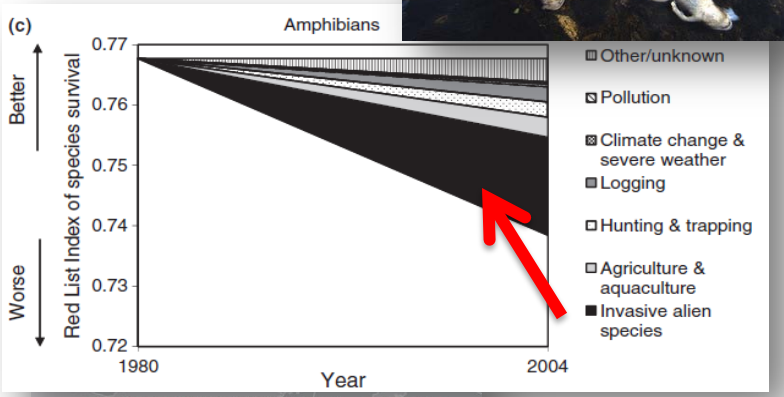
- The California kingsnake heavely preys on the critically endangered Gran Canaria Giant lizard, *Gallotia stehlini*

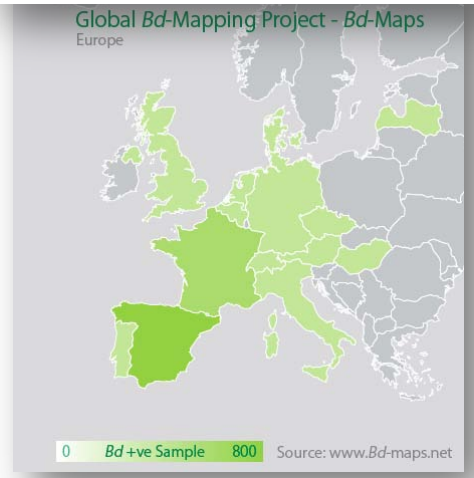




CHYTDID FUNGUS IMPACT ON AMPHIBIANS

- Responsible for **several extinctions of amphibians.**
- Dramatic population and community declines on **four continents**.
- Detected in **17 EU countries**, including Mediterranean islands.
- Europe hosts 88 amphibian species and **75% are endemic** to it.





AFFECT OUR HEALTH

- More than 100 known cases of invasive species with effects on health

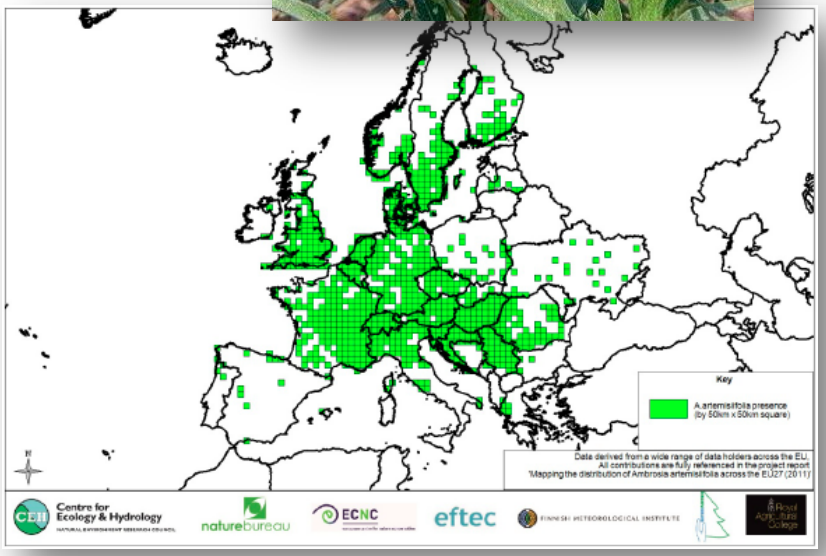
Tiger mosquito

- transmits 20 pathogens, including Dengue, West Nile, Chikungunia

AFFECT OUR HEALTH

Ragweed

- Impacts up to 50% of patients with pollen allergy (1/4 of all Europeans)
- Allergy reactions at > 200 km from sites where the plant occurs
- Sanitary costs for hundreds of millions/year

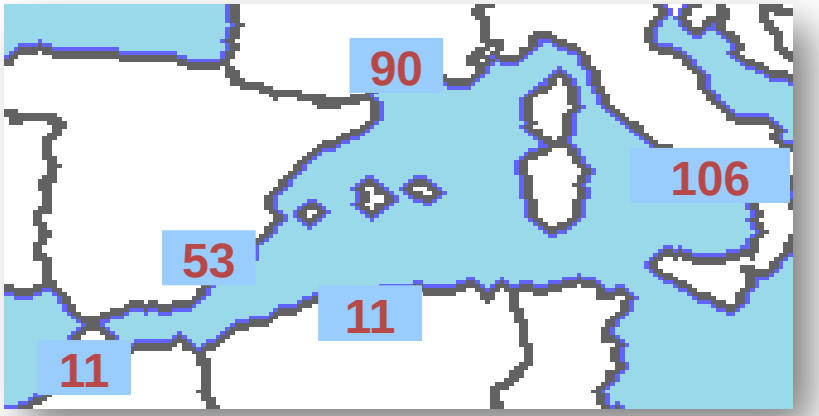


ALL ENVIRONMENTS AT RISK

- Over 1000 alien species in European waters

West Mediterranean

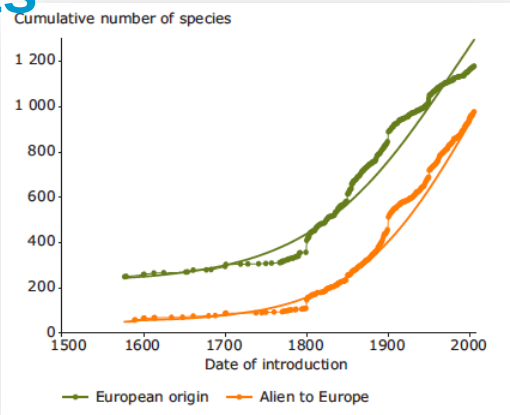
- More than 180 multicellular species; dramatic impacts on native species, benthic assemblages and landscapes



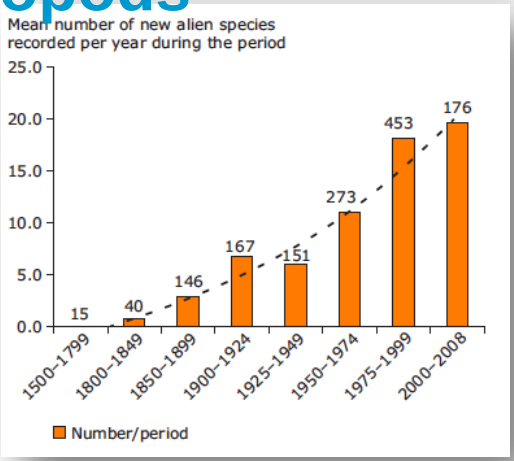
source: EC FP7 Programme VECTORS – AQUANIS

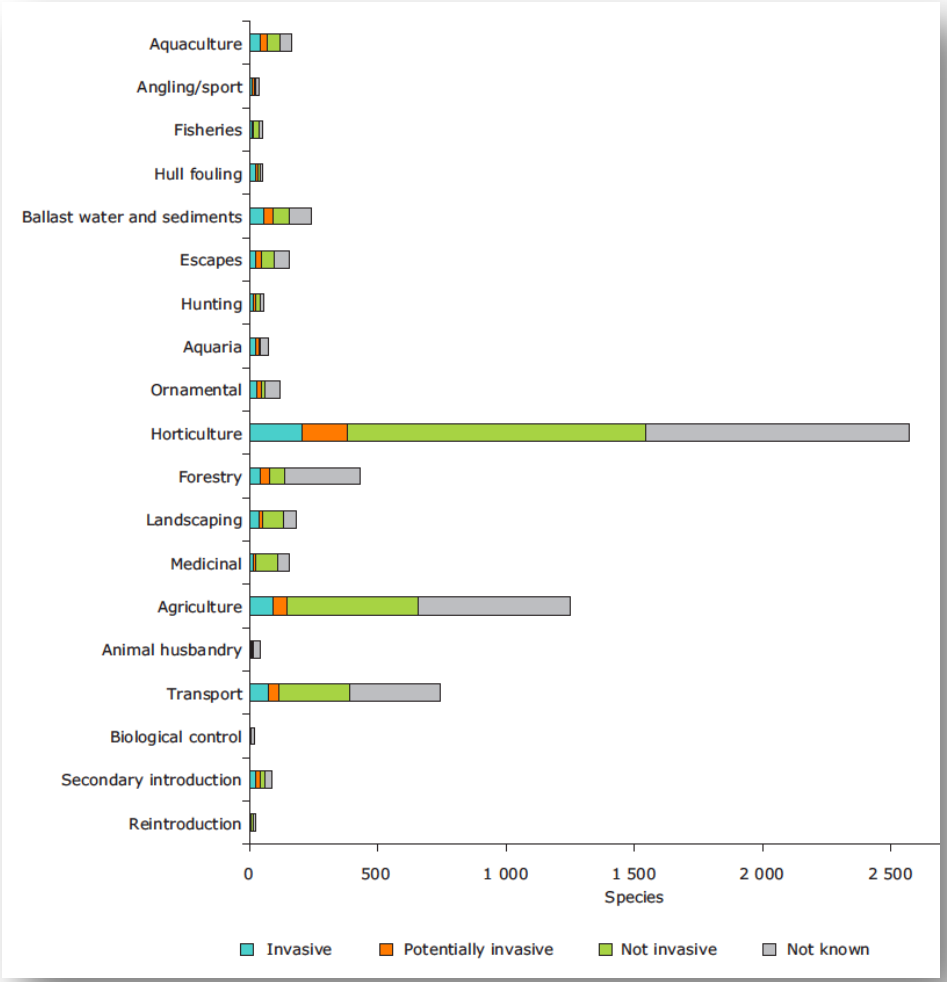
INCREASING IN ALL TAXONOMIC GROUP

Plants



Arthropods





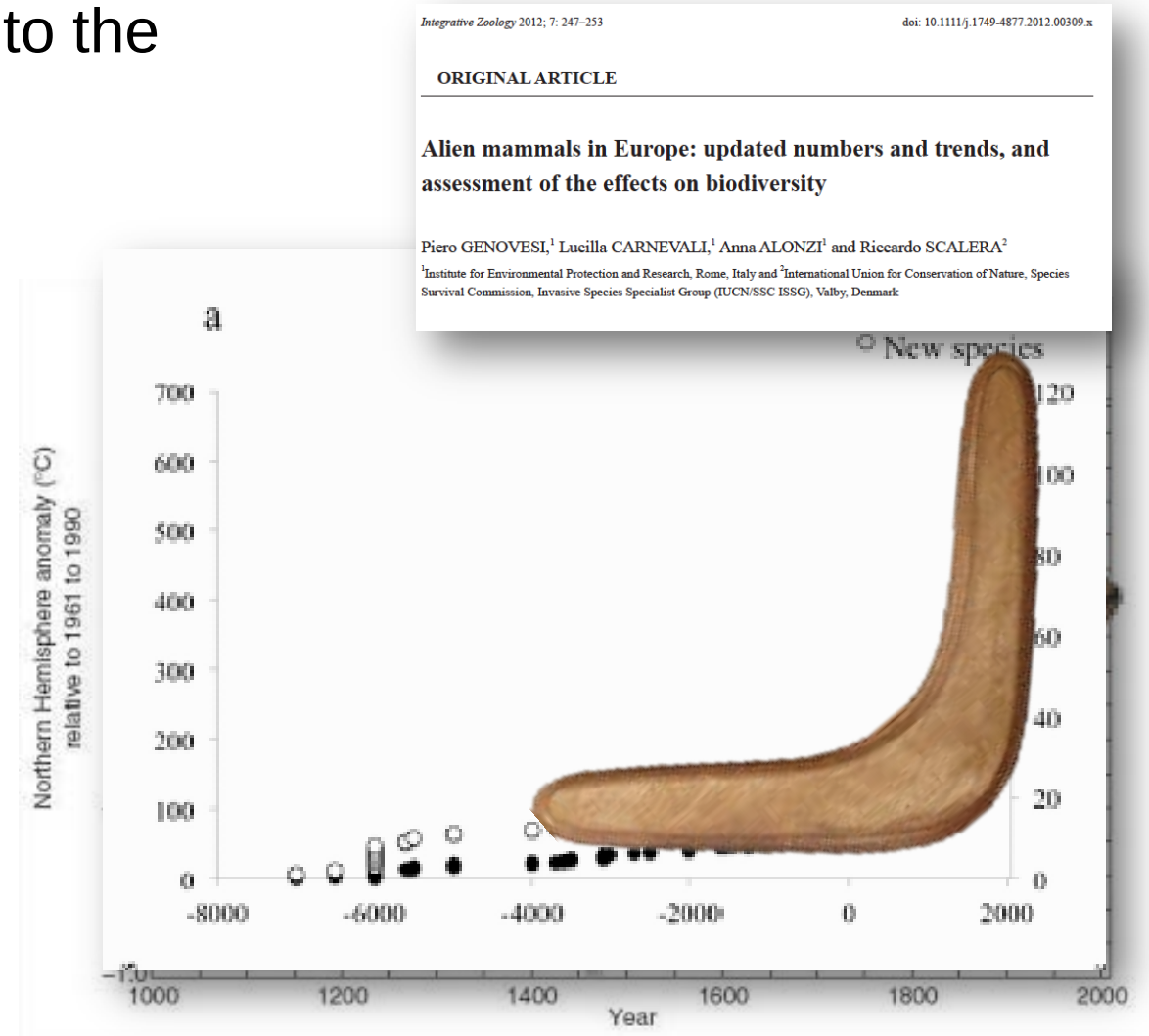
source: Rabitsh et al. 2012. EEA Technical report 15/2012

based on DAISIE and NOBANIS datasets

INCREASING IN ALL TAXONOMIC GROUP

- Increase correlated to the globalisation of the economies

are we facing a boomerang effect?



Integrative Zoology 2012; 7: 247–253 doi: 10.1111/j.1749-4877.2012.00309.x

ORIGINAL ARTICLE

Alien mammals in Europe: updated numbers and trends, and assessment of the effects on biodiversity

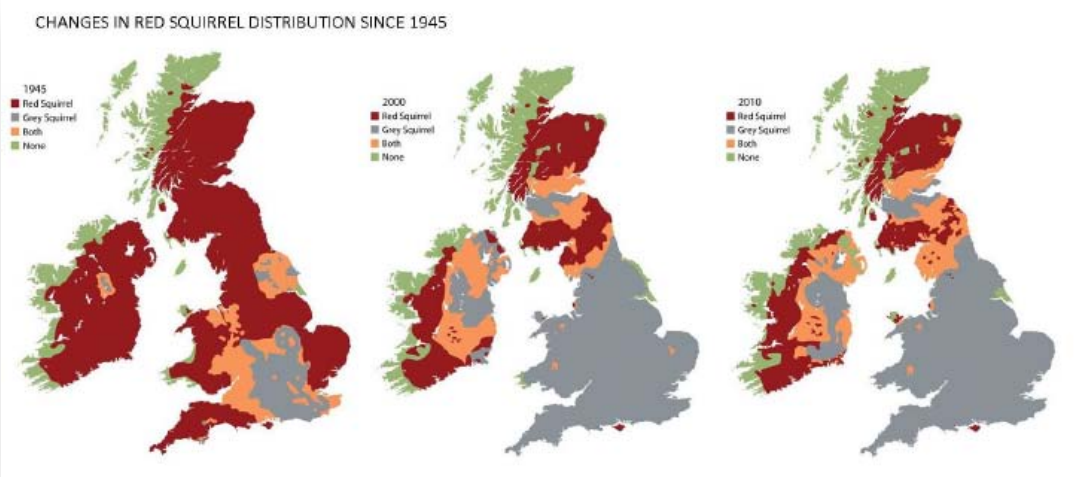
Piero GENOVESI,[1] Lucilla CARNEVALI,[1] Anna ALONZI[1] and Riccardo SCALERA[2]

[1]Institute for Environmental Protection and Research, Rome, Italy and [2]International Union for Conservation of Nature, Species Survival Commission, Invasive Species Specialist Group (IUCN/SSC ISSG), Valby, Denmark

NEED OF A SUPRANATIONAL APPROACH

American grey squirrel

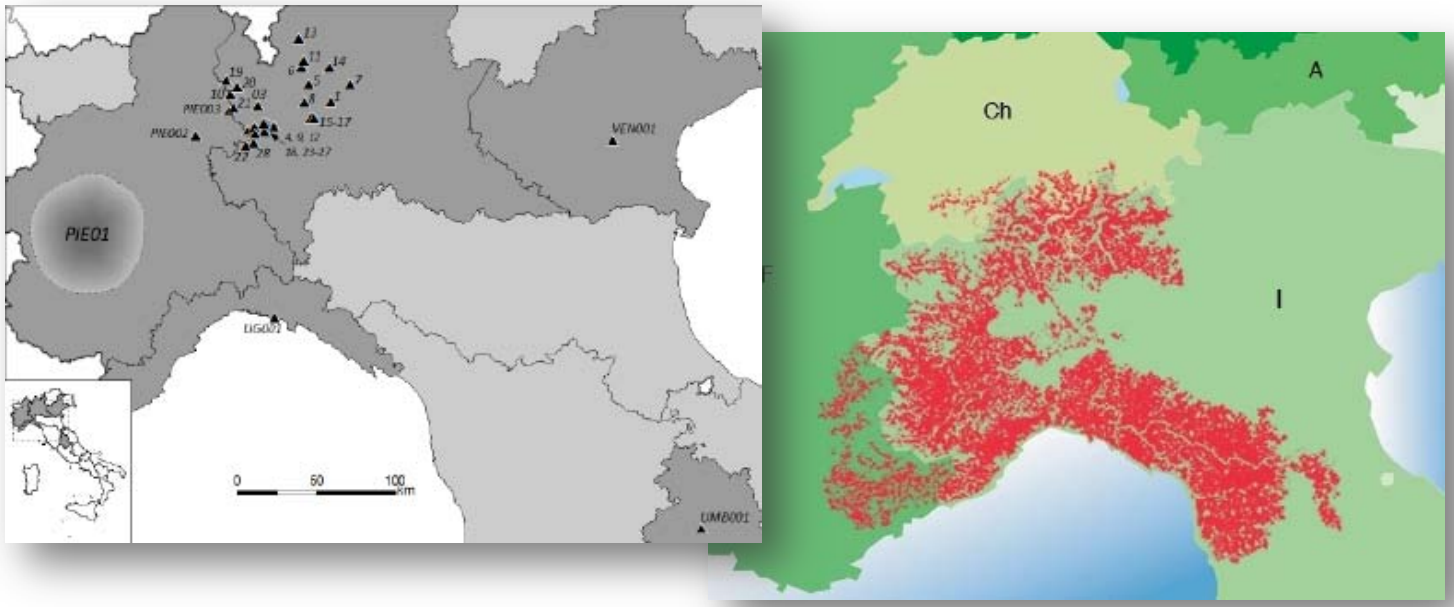
- Outcompetes the native red squirrel
- Significant impacts on timber production



NEED OF A SUPRANATIONAL APPROACH

American grey squirrel

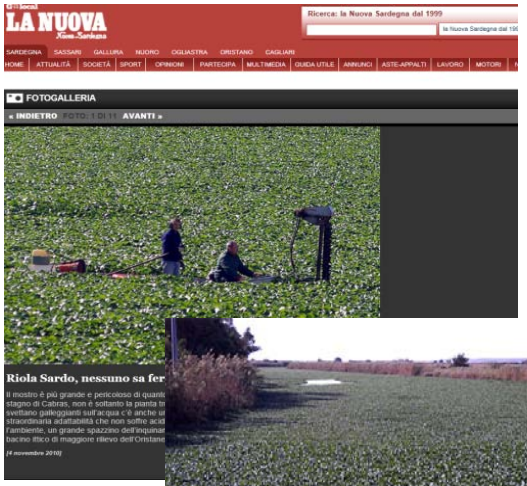
- Ongoing eradication within a LIFE programme
- Only recently Italy adopted a ban of trade and possession

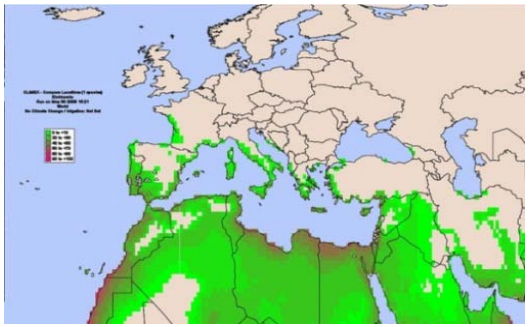


NEED TO ADDRESS TRADE

Water hyacinth

- Causes losses for over € 4 Mln/yr.
- Climate change could facilitate invasion of large areas of southern Europe





Sold at Lidl…

EARLY WARNING RAPID RESPONSE

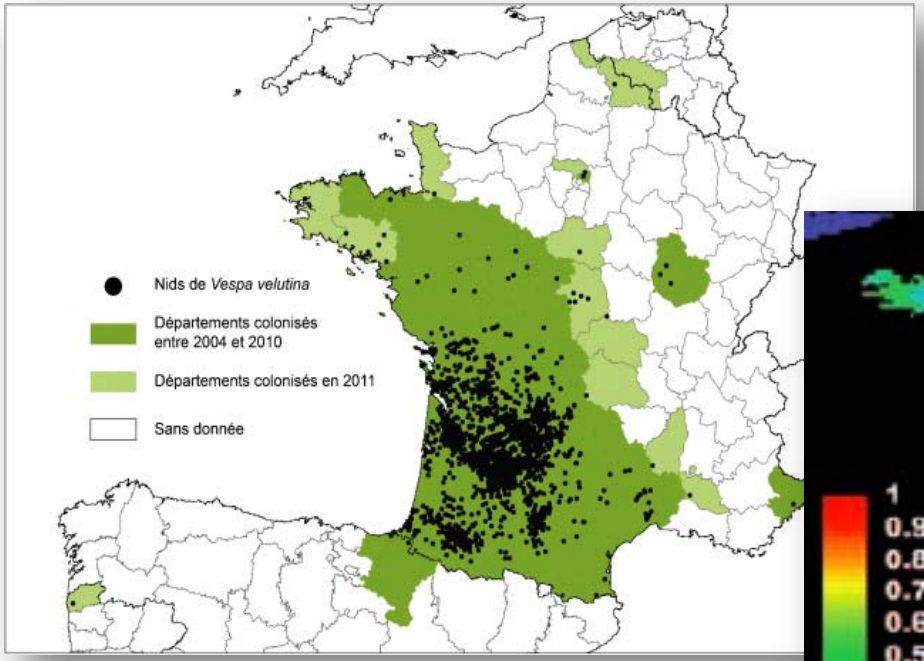
Yellow-legged hornet *Vespa velutina nigrithorax*

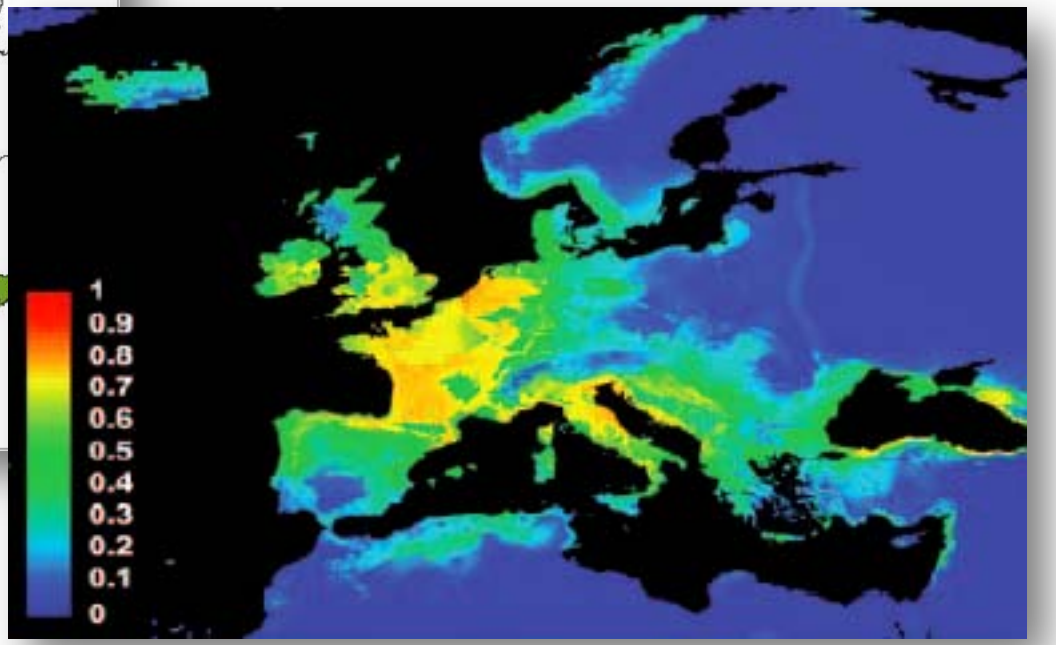
- Arrived in France 2005, rapidly detected. 89% of diet bees, wasps and other pollinators

EARLY WARNING RAPID RESPONSE

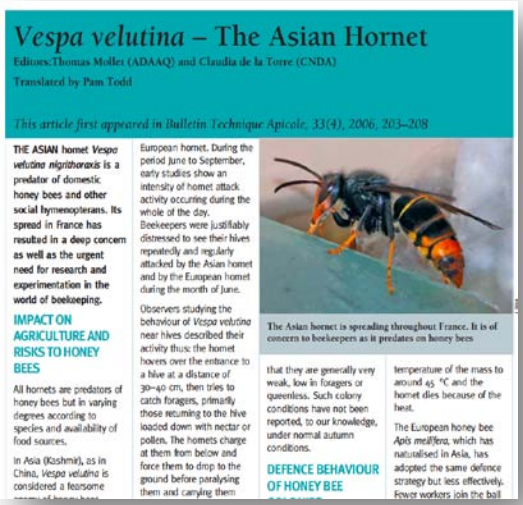
Yellow-legged hornet *Vespa velutina nigrithorax*

- Ongoing expansion to Italy Spain, Portugal and Italy





EARLY WARNING RAPID RESPONSE



Vespa velutina – The Asian Hornet

Editors: Thomas Mollet (ADAAQ) and Claudia de la Torre (CNDA)

Translated by Pam Todd

This article first appeared in Bulletin Technique Apicole, 33(4), 2006, 203–208

THE ASIAN hornet *Vespa velutina nigrithorax* is a predator of domestic honey bees and other social hymenopterans. Its spread in France has resulted in a deep concern as well as the urgent need for research and experimentation in the world of beekeeping.

IMPACT ON AGRICULTURE AND RISKS TO HONEY BEES

All hornets are predators of honey bees but in varying degrees according to species and availability of food sources.

In Asia (Kashmir), as in China, *Vespa velutina* is considered a fearsome

European hornet. During the period June to September, early studies show an intensity of hornet attack activity occurring during the whole of the day. Beekeepers were justifiably distressed to see their hives repeatedly and regularly attacked by the Asian hornet and by the European hornet during the month of June.

Observers studying the behaviour of *Vespa velutina* near hives described their activity thus: the hornet hovers over the entrance to a hive at a distance of 30–40 cm, then tries to catch foragers, primarily those returning to the hive loaded down with nectar or pollen. The hornets charge at them from below and force them to drop to the ground before paralysing them and carrying them

The Asian hornet is spreading throughout France. It is of concern to beekeepers as it predates on honey bees

that they are generally very weak, low in foragers or queenless. Such colony conditions have not been reported, to our knowledge, under normal autumn conditions.

DEFENCE BEHAVIOUR OF HONEY BEE

temperature of the mass to around 45 °C and the hornet dies because of the heat.

The European honey bee *Apis mellifera*, which has naturalised in Asia, has adopted the same defence strategy but less effectively. Fewer workers join the ball

National Bee Unit

How to make an Asian hornet trap

fera

The Food and Environment Research Agency

The Asian Hornet, *Vespa velutina*, is an aggressive predator of honey bees and other beneficial insects. It has recently extended its geographical range from Asia to mainland Europe following an accidental introduction to France, is now also present in Spain and Belgium. Adult hornets are highly mobile; the rate of spread across France is approximately 100 km/year. There is now great concern that this exotic insect will reach the UK, either by hitching a ride on imported goods or simply by flying across the channel. This sheet explains how to make an Asian hornet trap. Hanging this simple device in your apiary will allow you to monitor for pest arrival and, if necessary, help to protect your colonies from attack. These are especially effective if used in spring.

The efficiency of hanging traps

A variety of traps are available for catching adult hornets "on the wing", including Asian hornets. Comparisons of various designs for use against *V. velutina* have shown that funnel traps work best. Although field trials show that these capture considerable numbers of adult hornets (~400 hornets/week/trap), they cannot be expected to reliably eliminate *V. velutina* from an affected apiary. However, they are very useful as a first line of detection, for controlling hornet numbers and limiting damage, so thus have crucial roles in monitoring for arrival and, should Asian hornets arrive in the UK, in reducing impact and spread. Reports from France suggest that in areas where spring trapping has been used, subsequent numbers of Asian hornet nests are reduced by as much as 97% (2 or 3 nests in trapping areas *versus* >70 nests where no traps have been hung).

Trap design

Hornet traps can be purchased over-the-counter, but French beekeepers are frequently resorting to home-made equivalents, like the own shown in the photograph. Most of these share the same basic design: a plastic flask or bottle, containing a food attractant/bait, over which is inverted a funnel; the insects enter the funnel and crawl/drop into a capture chamber from which they are unable to escape. The following design is closely based on that produced and field tested by ADAAQ*

Water primrose *Ludwigia grandiflora*

Water primrose *Ludwigia grandiflora*

Total cost of eradicating the outbreaks estimated at **£73,371**

Once widespread conservative estimate of costs **£241,907,556**

(Williams et al. 2010 – CABI)

IUCN SSC Species Survival Commission ISSG Invasive Species Specialist Group

NNSS
GB non-native species secretariat

EFFICACY OF BIOSECURITY

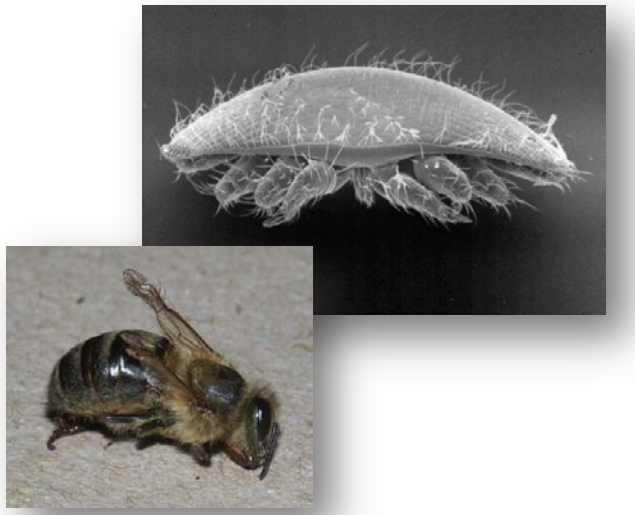
Australia's biosecurity

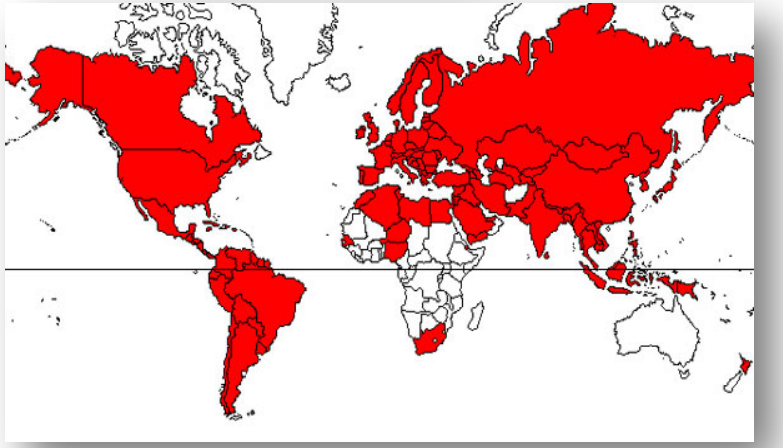
- Department of Agriculture, Fisheries and Forestry DAFF
- 2012-13 Budget provides $524.2m in new funding.

EFFICACY OF BIOSECURITY

Australia's biosecurity: the case of the Varroa mite

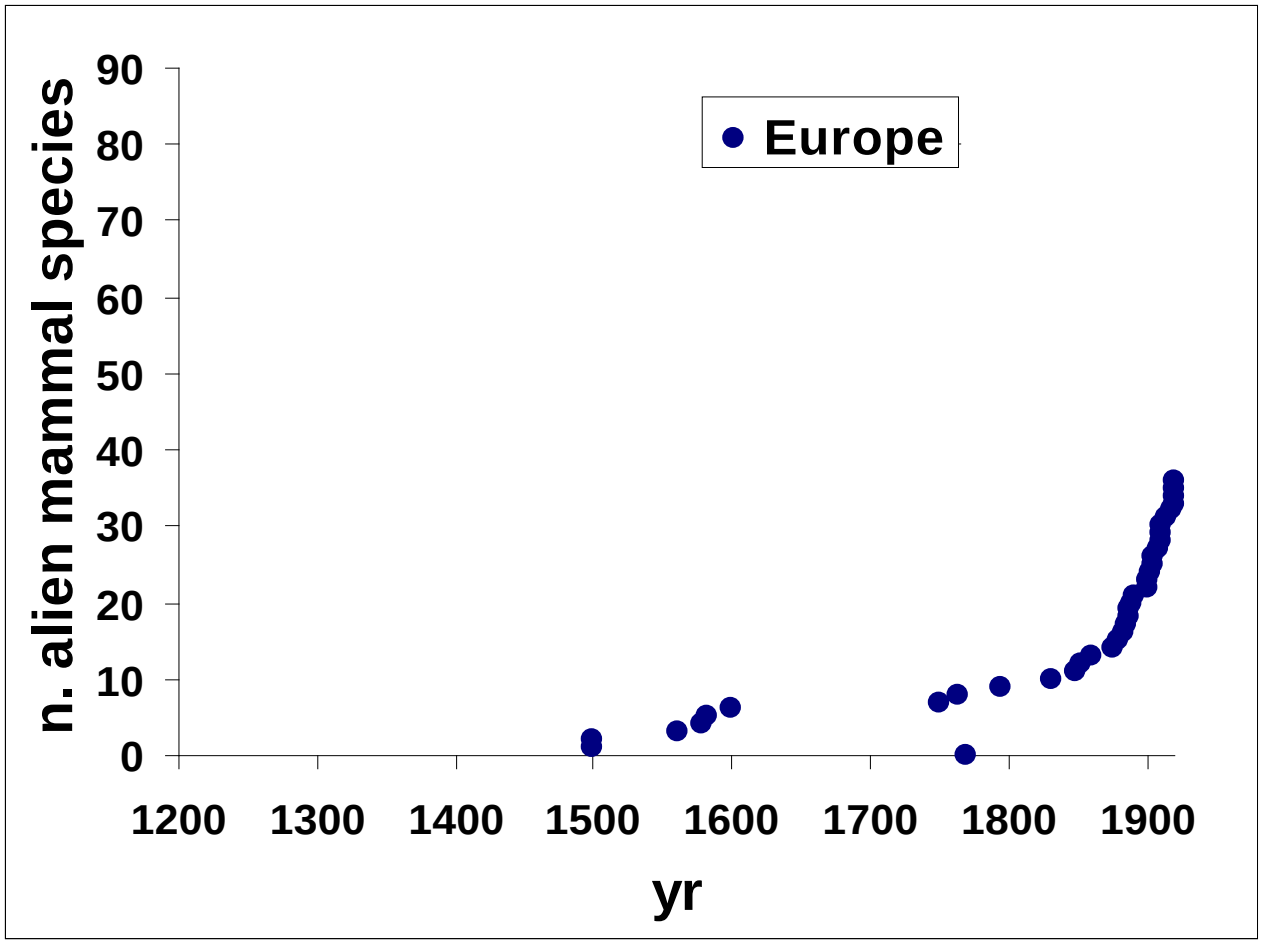
- Live bees can't be imported into Australia without strict quarantine measures.
- Visitors must declare all bee and honey products for inspection
- Prevented losses for $21.3-50.3 million/year over thirty years, due to honey production, reduced pollination





EFFICACY OF BIOSECURITY

Alien mammals in Europe and New Zealand



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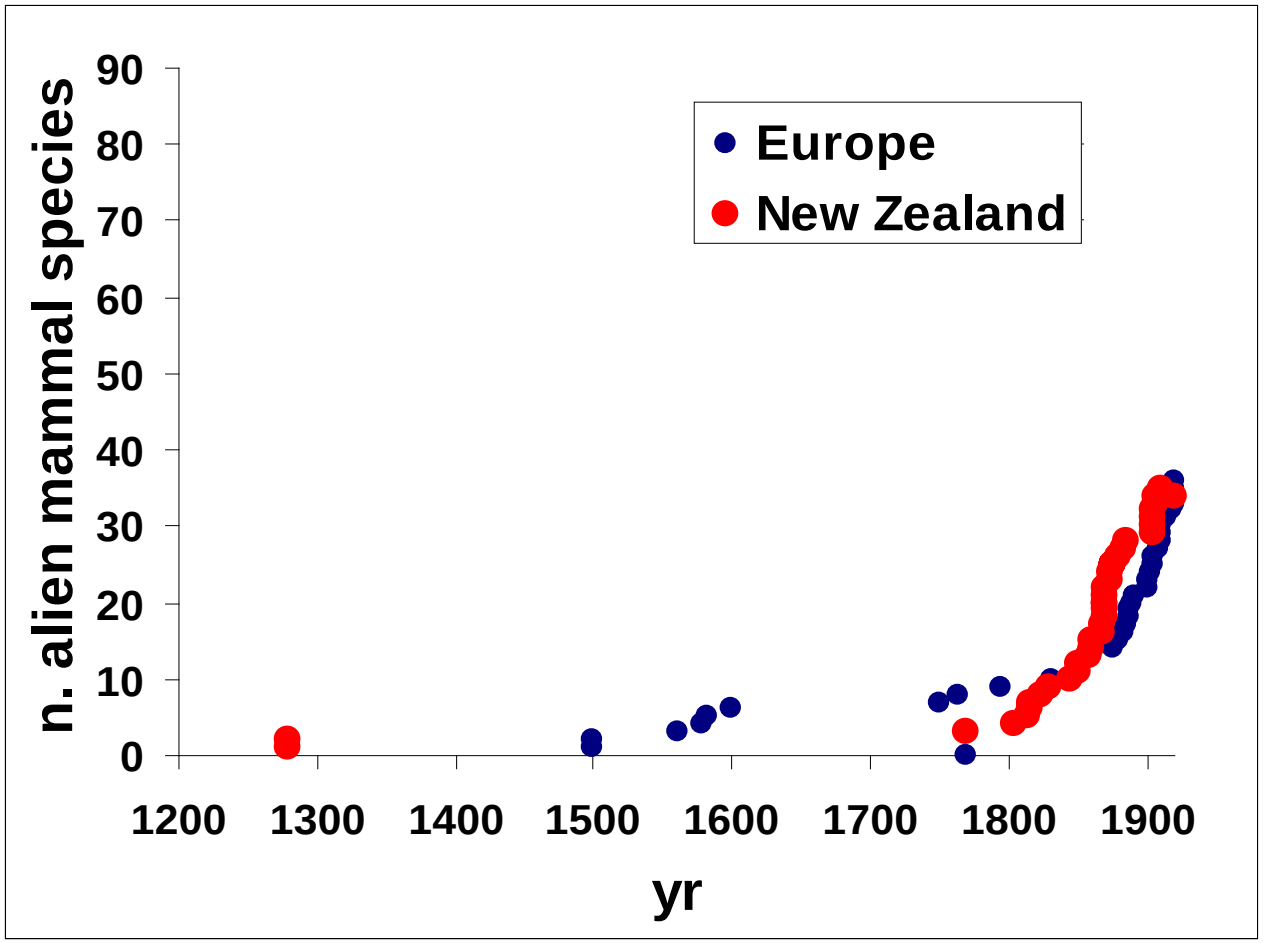

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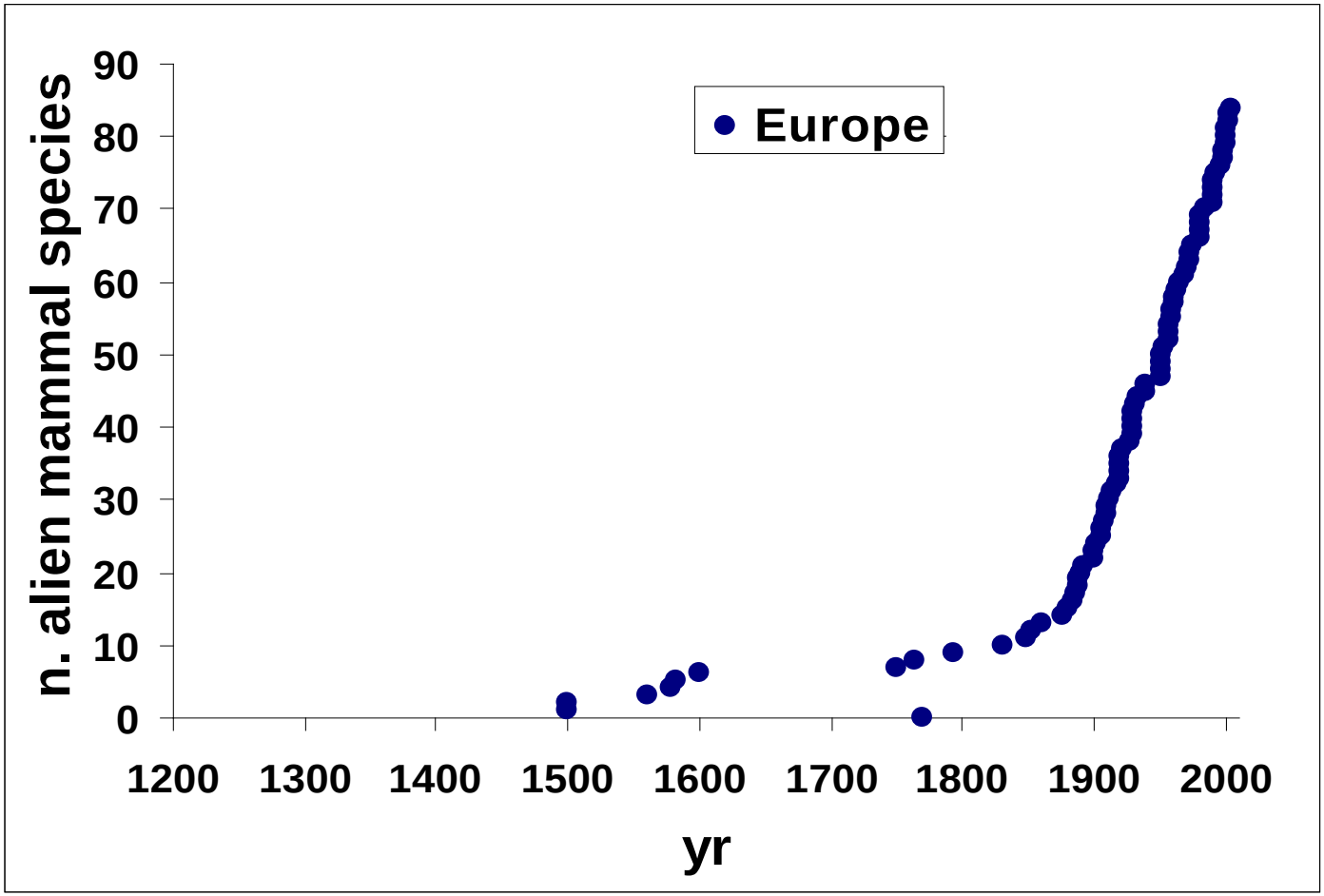

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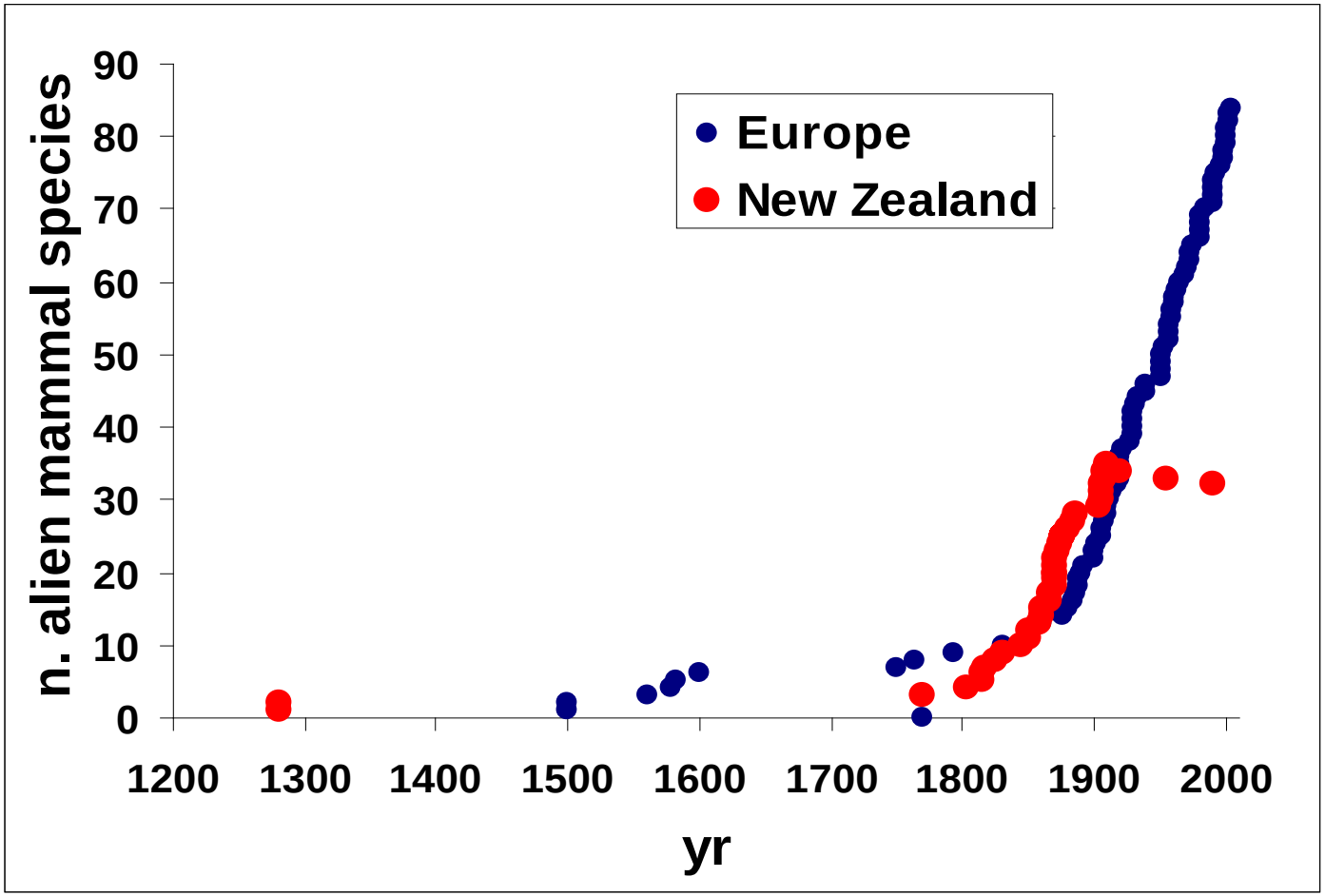
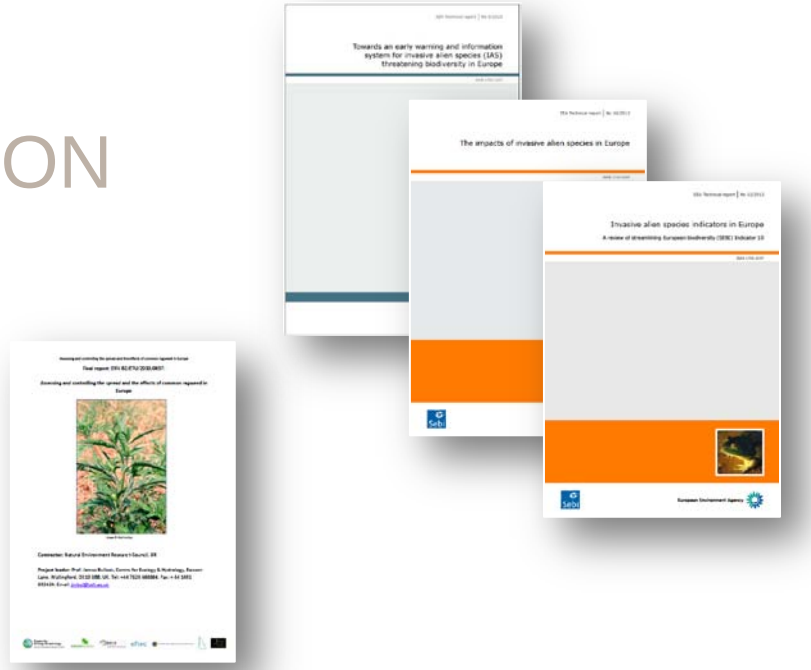
Alien mammals in Europe and New Zealand



SOURCES OF INFORMATION



- EEA reports: impact of invasive species, indicators, early warning
- Bullock et al. 2012. EC report ragweed in Europe
- DAISIE FP6
- VECTORS FR7
- IUCN French Committee
- asa amphibian survival alliance
- .. and Bella Gallil, Anna Occhipinti, Shyama Pagad, Riccardo Scalera...