

“Honey bees and agriculture”

Archie Murchie



The honey bee, a unique insect

The honeybee, *Apis mellifera*, is a 'farmed' insect

Lives in perennial societies with a Queen and 20,000 - 40,000 workers (sterile females)

It is a native species but has been (semi) domesticated and bred for productivity, disease resistance and docility
(Italian bee, Buckfast bee, Carniolan bee, etc)

Increasing interest in using native Irish black bee



Honey bees produce:

Honey

Honey bees collect nectar from flowers, mix and digest in the 'honey stomach' or 'honey sac' and regurgitate to form honey

Placed in the honeycomb and sealed

Traditional sweetener – mainly fructose, glucose, with some vitamins and minerals

Honey derived from certain plants has a distinctive flavour (e.g. heather honey, mānuka honey, ivy honey, etc.)

Other hive products

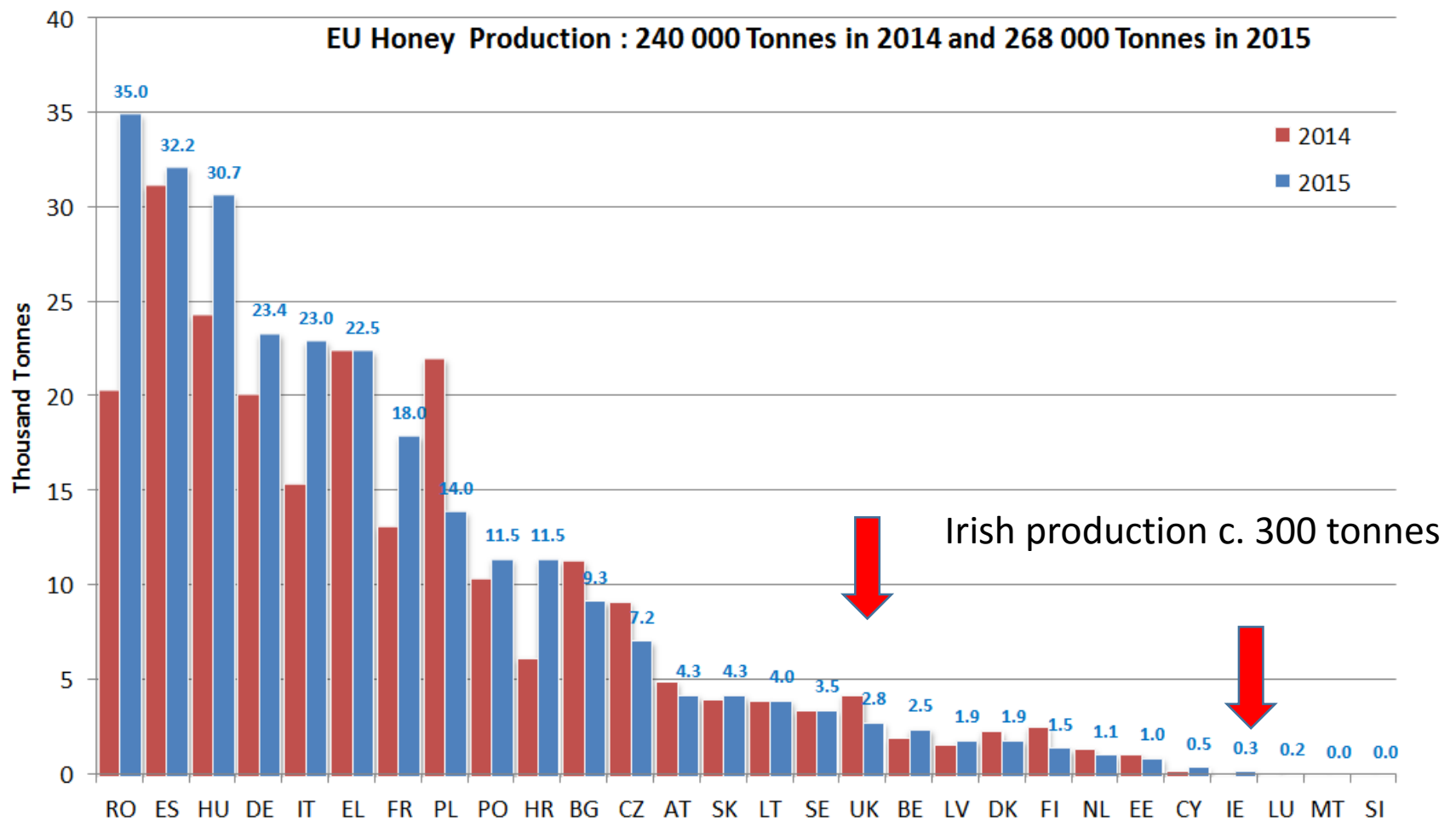
- 🐝 Wax – candles, polish, cosmetics
- 🐝 Royal jelly – **secretion (royalactin) that triggers Queen production.** Health supplement.
- 🐝 Propolis – **or bee resin.** Health supplement.



8, 000 year old cave painting from Spain

By fr:Utilisateur:Achillea [GPL
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https://ec.europa.eu/agriculture/honey_en

Irish honey consumption about 2,000 tonnes per annum

Average 0. 48 kg/per capita/per annum = 1 to 2 jars

Value of honeybees in Northern Ireland

800 -1,000 beekeepers in Northern Ireland with c. 4000 colonies.

Most beekeepers have <5 hives

Direct revenue from honey, hive products and pollination fees is approximately £220,000 per annum

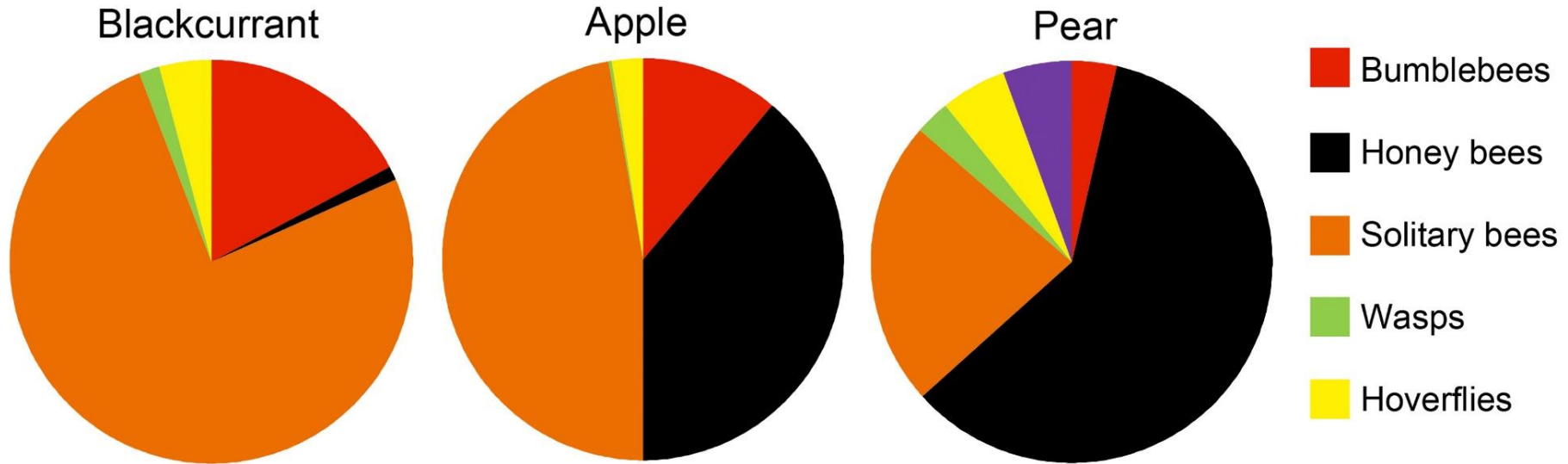
| Crop | Dependency on Insect Pollination | Market Value of Crop (5yr Ave.) £ | Market Value of Insect Pollination (5yr Ave) £ |
|---|----------------------------------|-----------------------------------|--|
| Apples* | 0.9 | 7,820,000 | 7,038,000 |
| Strawberries | 0.1 | 329,000 | 33,000 |
| Beans and other proteins | 0.2 (Ave) | 134,000 | 26,800 |
| Oilseed Rape | 0.1 | 222,000 | 22,175 |
| Raspberries | 0.1 | 139,000 | 13,900 |
| Currants | 0.9 | 3,000 | 2,700 |
| Other soft fruit | 0.1 | 21,000 | 2,125 |
| Total | | | 7,138,700 |
| Proportion of insect pollination due to honeybees | | | 0.8 |
| Total value of honeybee crop pollination in NI | | | 5,710,960 |

BEE PEST PREVENTION (NORTHERN IRELAND) ACT 1945.

COMPARISON OF OPERATIONS FOR YEARS 1945/6/7/8.

| Item | 1945/6 | 1946/7 | 1947/8 | 1948/9 |
|--|--------------------|-----------------|--------|--------|
| Total number of Bee-keepers registered | 4,949 | 5,841 | 4,543 | 6,096 |
| Total number of Stocks of bees registered | 18,144 | 20,100 | 16,399 | 18,791 |
| (1) Total number of Bee-keepers visited | 1,296 | 1,773 | 1,949 | 1,398 |
| (2) Total number of stocks examined and | 4,500 ^M | 5,088 | 4,470 | 3,593 |
| Total number of empty hives examined | - | 1,373 | 2,876 | 1,336 |
| (3) Total number of Bee-keepers ordered to destroy stocks/hives | 300 | 316 | 171 | 98 |
| (4) Total number stocks destroyed | 632 | 595 | 220 | 176 |
| Total number of empty hives disinfected | Not recorded | Not recorded | 216 | 53 |

Combined value of multiple pollinators



Research from East Malling Research Institute
www.emr.ac.uk/projectposts/key-fruit-crop-insect-foragers/

STATUTORY RULES OF NORTHERN IRELAND

2007 No. 246

BEE DISEASES

**The Bee Diseases and Pests Control Order (Northern Ireland)
2007**

Made - - - -

18th April 2007

Coming into operation -

21st May 2007

The Department of Agriculture and Rural Development(a), in exercise of the powers conferred by Article 3 of The Bees (Northern Ireland) Order 1980(b) makes the following Order:

Citation and commencement

1. This Order may be cited as The Bee Diseases and Pests Control Order (Northern Ireland) 2007 and comes into operation on 21st May 2007.





Varroa destructor

Haemolymph-feeding parasitic mite native to *Apis cerana*



Virus vector, e.g. Deformed Wing Virus

Treated with pyrethroid and thymol acaricides



Varroa destructor was first detected in England in 1992, in Rol in 1998 and Northern Ireland in 2002.



Acaricide (pyrethroid) resistance detected in England in 2001



...in Northern Ireland in 2012



Honeybee Husbandry Survey

Questionnaire-based survey - paper copy or on the web

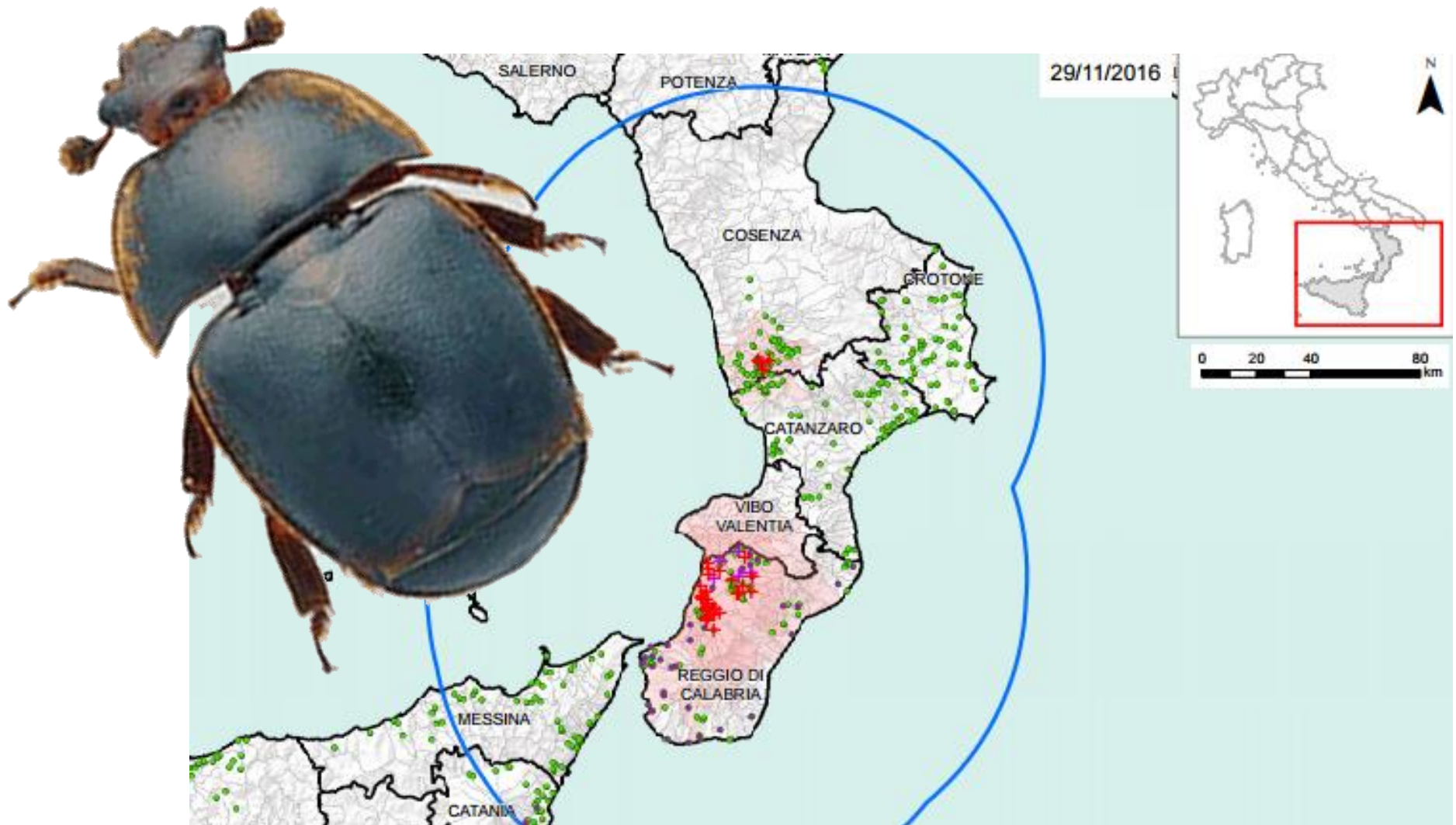
Annual overwintering losses in Northern Ireland
for the past 7 years

| Year | Overwintering loss | n | Mean colonies (autumn) | Typical colonies (autumn) | Range |
|------|--------------------|-----|------------------------|---------------------------|-------|
| 2009 | 23% | 94 | 7.8 | 3-5 | 1-49 |
| 2010 | 13% | 134 | 4.9 | 1-2 | 1-24 |
| 2011 | 16% | 130 | 4.4 | 1-2 | 1-25 |
| 2012 | 19% | 116 | 5.5 | 2-3 | 1-35 |
| 2013 | 43% | 97 | 6.0 | 1-2 | 1-45 |
| 2014 | 8% | 83 | 5.0 | 1-2 | 1-24 |
| 2015 | 13% | 88 | 5.8 | 2-4 | 1-43 |

*2012 summer and autumn poor for bees

Aethina tumida Small hive beetle (SHB)

Found in Italy September 2014



So, what is the problem?

With African bees, not much.

African bees have— strong housekeeping and defensive traits.

European honey bees have few natural defences against this parasite resulting in:

- ❖ **Successful reproduction of beetle**
- ❖ **Large numbers of larvae burrowing through the brood combs consuming brood and stores**
- ❖ **Honey spoilage**
- ❖ **Comb collapse and absconding of colony**



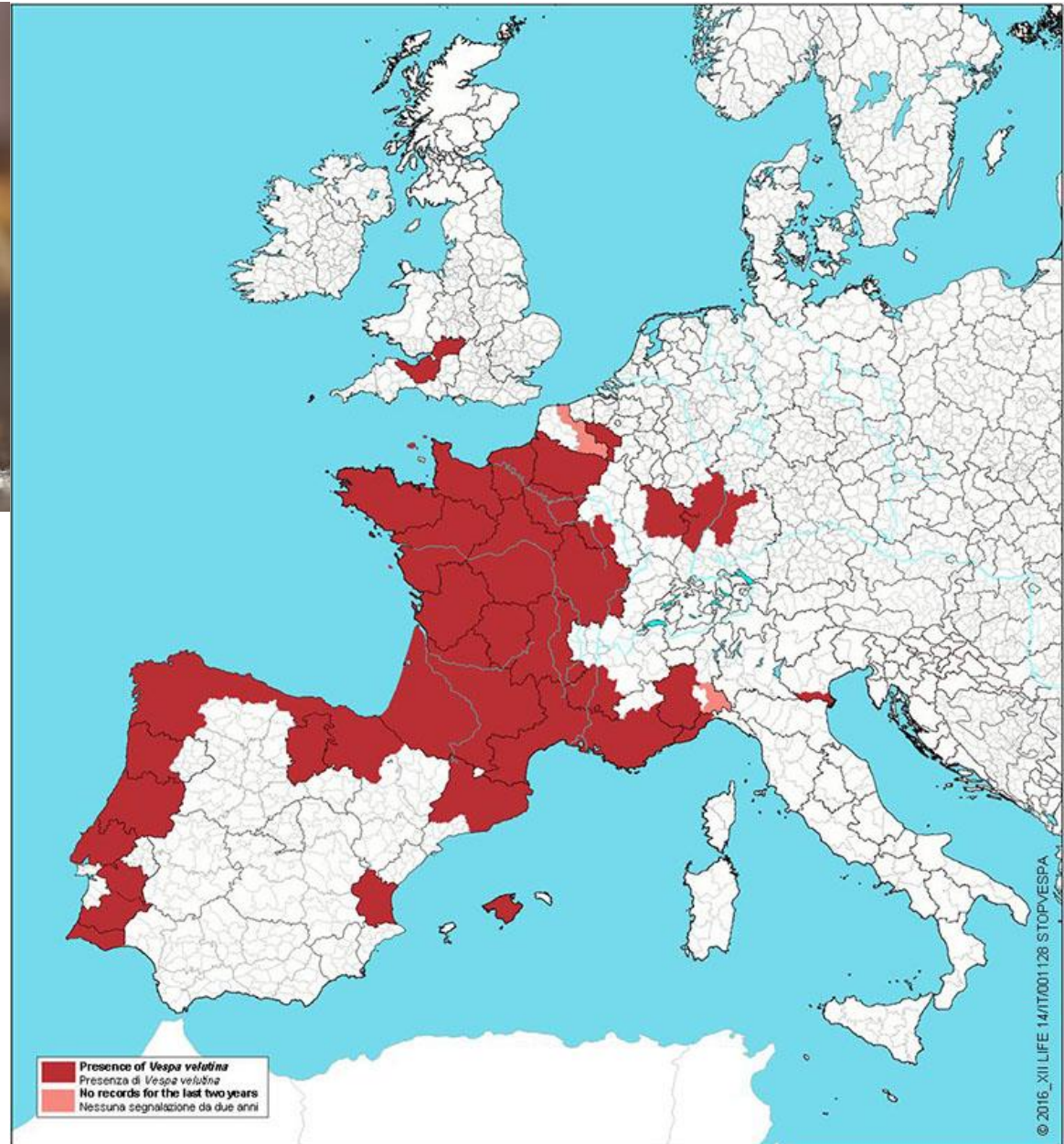
The Asian or Yellow-legged hornet *Vespa velutina*



Native to south-east Asia

Established in France 2004
(single Queen on pottery)

Found in England 2016
and colony eradicated





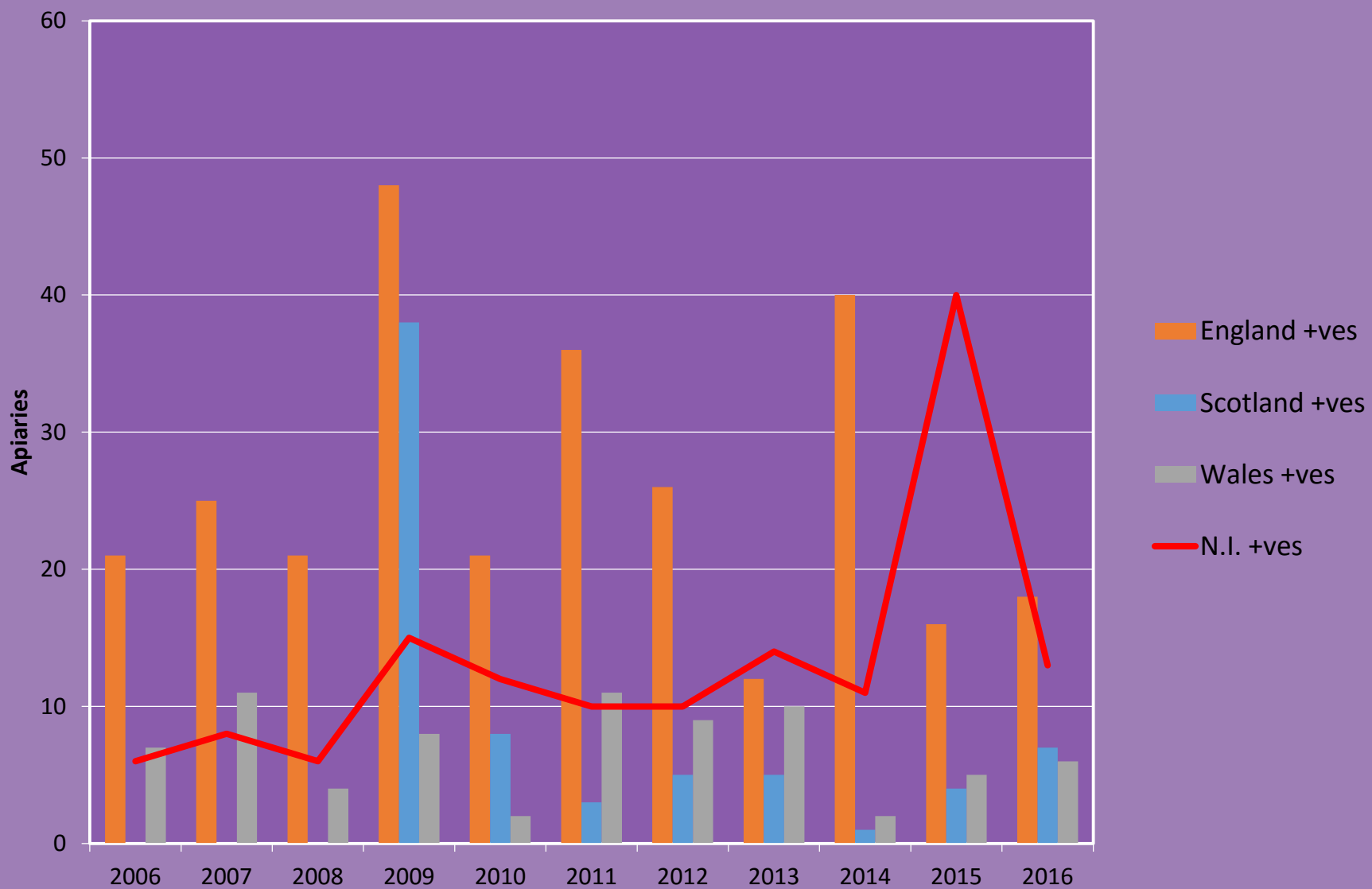
Direct predator of honeybees

Severe impact on honey bee colonies
have been recorded in France
especially in late summer/autumn

However, European hornet, *Vespa crabro*, is not found in Ireland

American foulbrood *Paenibacillus larvae*
(spore forming bacteria)





Neonicotinoid controversy



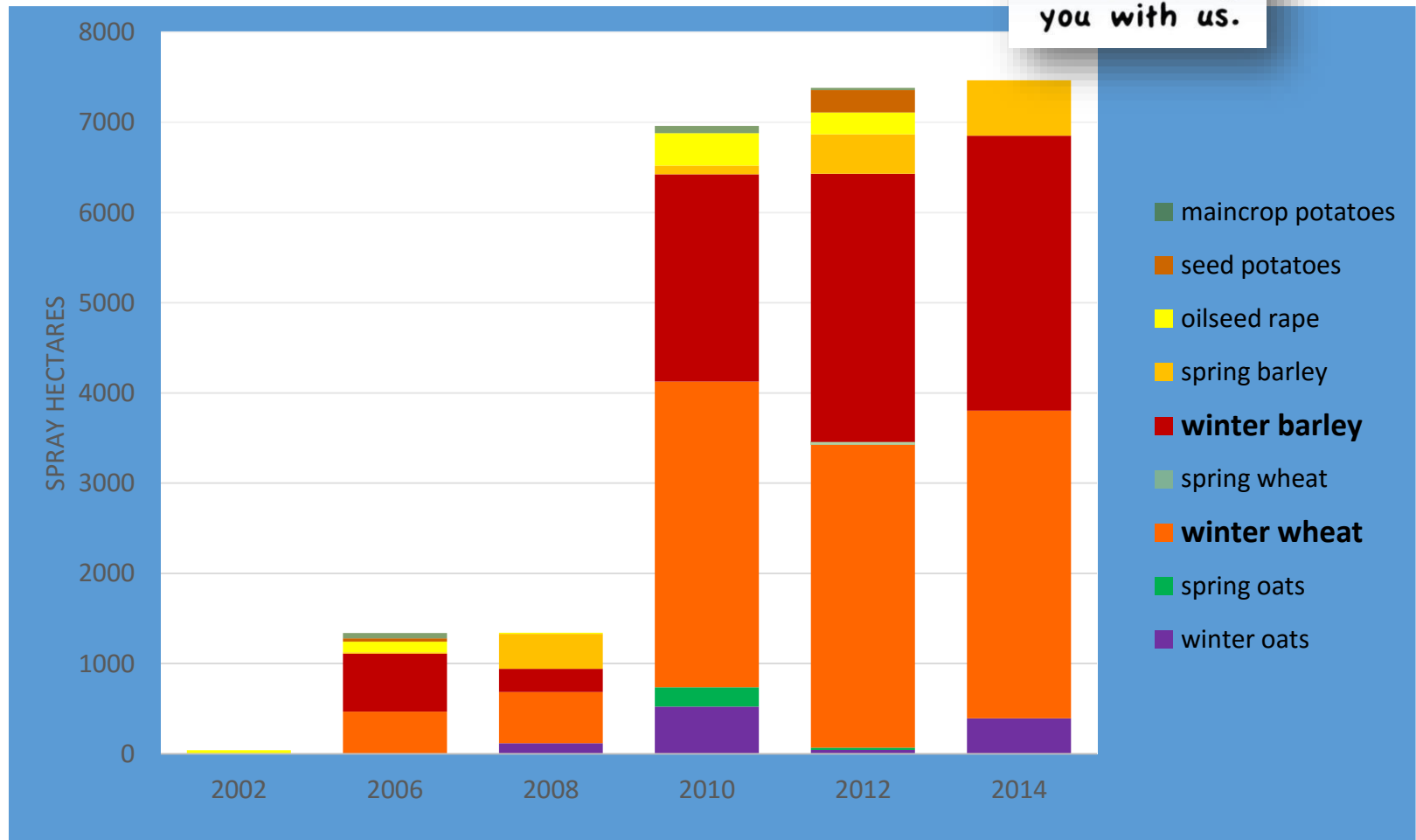
Sub-lethal impacts



Seed treatments



If we die,
we're taking
you with us.



Thank You for your attention



Acarine – *Acarapis woodi*

