“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.
Irish honey consumption about 2,000 tonnes per annum

Average 0.48 kg/per capita/per annum = 1 to 2 jars

Irish production c. 300 tonnes

https://ec.europa.eu/agriculture/honey_en

www.cbi.eu/market-information/honey-sweeteners/trade-statistics
## 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

<table>
<thead>
<tr>
<th>Crop</th>
<th>Dependency on Insect Pollination</th>
<th>Market Value of Crop (5yr Ave.) £</th>
<th>Market Value of Insect Pollination (5yr Ave) £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples*</td>
<td>0.9</td>
<td>7,820,000</td>
<td>7,038,000</td>
</tr>
<tr>
<td>Strawberries</td>
<td>0.1</td>
<td>329,000</td>
<td>33,000</td>
</tr>
<tr>
<td>Beans and other proteins</td>
<td>0.2 (Ave)</td>
<td>134,000</td>
<td>26,800</td>
</tr>
<tr>
<td>Oilseed Rape</td>
<td>0.1</td>
<td>222,000</td>
<td>22,175</td>
</tr>
<tr>
<td>Raspberries</td>
<td>0.1</td>
<td>139,000</td>
<td>13,900</td>
</tr>
<tr>
<td>Currants</td>
<td>0.9</td>
<td>3,000</td>
<td>2,700</td>
</tr>
<tr>
<td>Other soft fruit</td>
<td>0.1</td>
<td>21,000</td>
<td>2,125</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>7,138,700</strong></td>
<td><strong>0.8</strong></td>
</tr>
<tr>
<td></td>
<td>Proportion of insect pollination due to honeybees</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total value of honeybee crop pollination in NI</strong></td>
<td></td>
<td><strong>5,710,960</strong></td>
</tr>
</tbody>
</table>
### BEE PEST PREVENTION (NORTHERN IRELAND) ACT 1945.

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

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

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

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

*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

![Graph showing spray hectares over years for different crops]

- maincrop potatoes
- seed potatoes
- oilseed rape
- spring barley
- winter barley
- spring wheat
- winter wheat
- spring oats
- winter oats

If we die, we're taking you with us.
Thank You for your attention
Acarine – *Acarapis woodi*