Scottish Wildlife Trust

buglife

Moving beyond neonicotinoids

Kindly sponsored by Graeme Dey MSP for Angus South

#ScotNeonics

Dr Nick Birch,
James Hutton
Institute

#ScotNeonics

IPM research into practice:

A long time coming

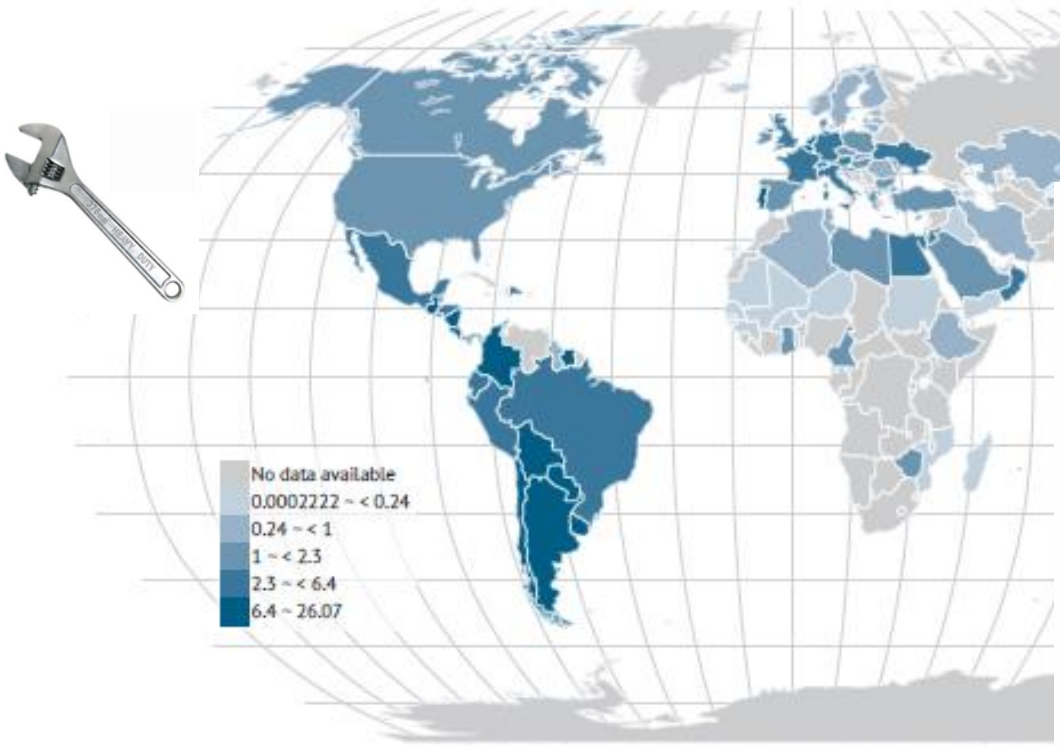
The James Hutton Institute

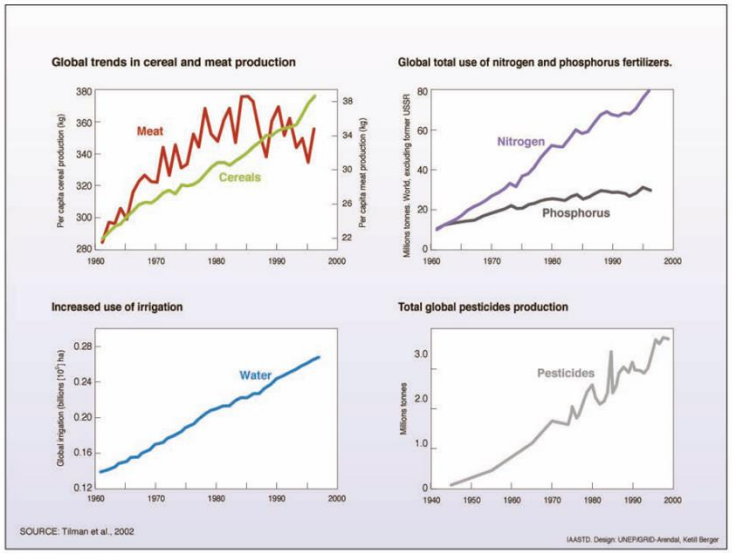
Nick Birch, Agroecology Group, Dundee

UK and EU = high pesticide users

FAO Statistical Pocketbook 2015

The James Hutton Institute





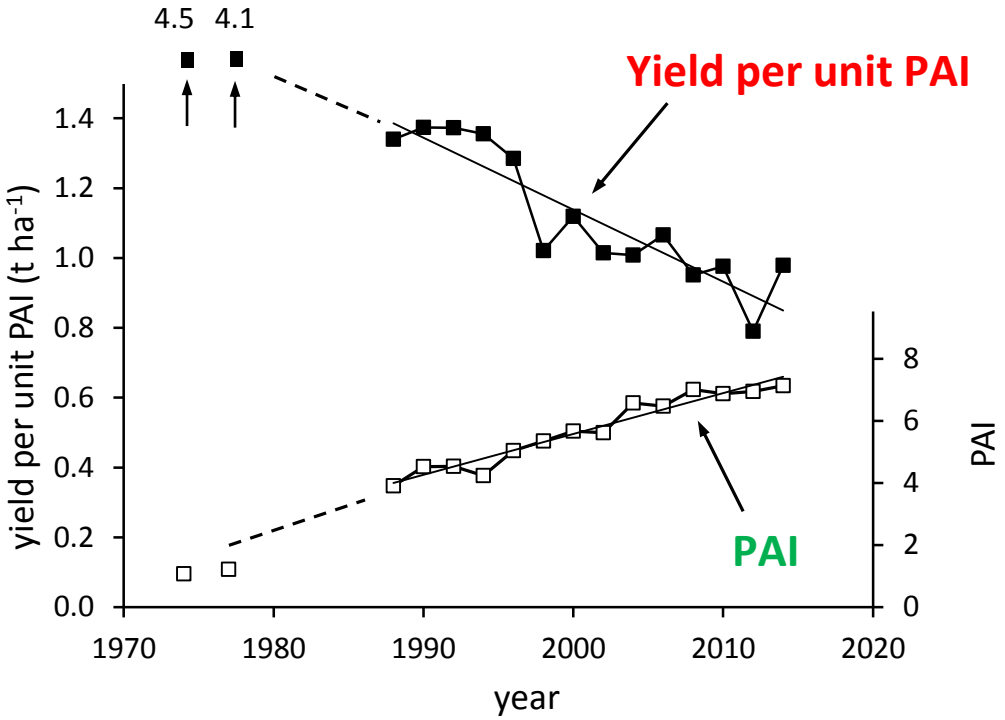
EU is world's largest producer, user and exporter of pesticides. **$10.42 billion = a third of the global market (Eurostat).**

Declining yield return from pesticides: Scottish cereals (1970-2015)

The James Hutton Institute

- **Pesticide applications (all) increasing.**
- **Yield level (40+ years)**
- **Yield per unit pesticide decreasing over 50 years.**

All cereals, Scotland



Original pesticide data from SASA reports :
PAI (pesticide area index) = area treated with all formulations / area sown with crop

Squire et al. (paper in preparation)

Choosing IPM tools for the toolbox:

The James Hutton Institute

Flexible: crop and region specific options

IPM tools: complementary

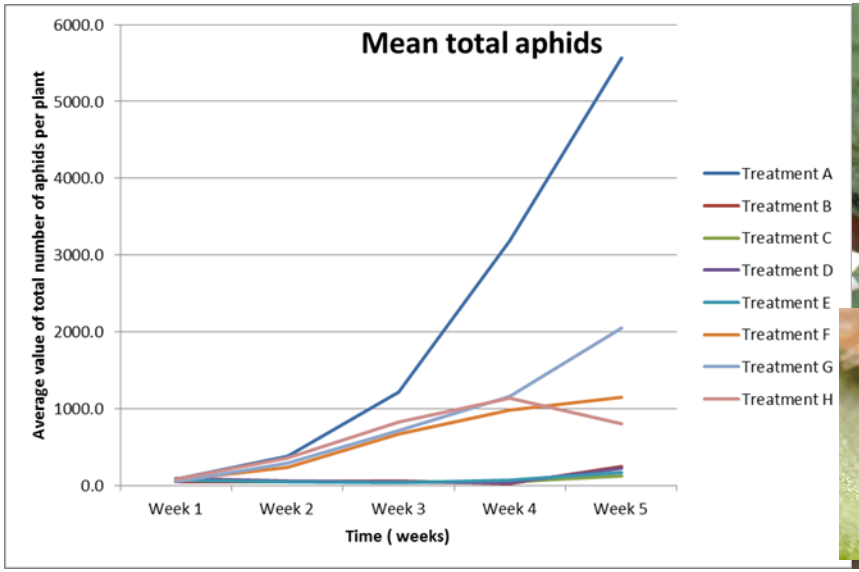
- Resistant crops
- Biopesticides
- Biocontrol
- Traps + thresholds
- Decision Support apps
- Pest forecasting

Some ‘spanners in works’

IPM toolbox with multiple tools:

Adding biopesticides and biocontrol to R cvs

- How to make pest resistant crops more durable in the system?
- Add biopesticides with biocontrol (parasitoid wasp release),
- Used in combination = as effective as current insecticide.



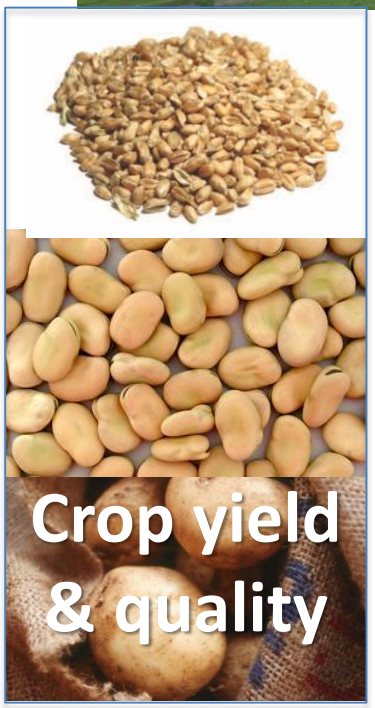
Hortlink SCEPTRE, glasshouse trials AHDB Horticulture.

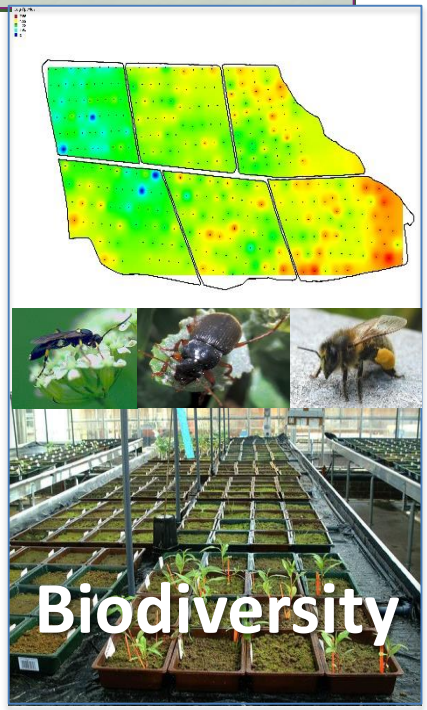
Parasitoids released weekly can achieve 40% (F)-90% (GH) control of raspberry aphids (with Koppert Ltd and Viridaxis Ltd)

The Centre for Sustainable Cropping, JHI

The James Hutton Institute

A whole-systems approach for optimising crop production and environmental health for long term food security.





IPM: A leap of faith or a confident step?

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IPM Gaps:

- UK 'IPM lite' v EU
- Robust on-farm trials (independent).
- Cost:benefit IPM versus pesticides (DK taxation model?).
- Regulatory barriers.
- Niche markets too small.
- More independent crop advisors.
- Farmer training schools (IPM skills).
- Scientists rewarded for papers, not on-farm solutions.

Ideas → Co-innovation → Research → Prototypes → On-farm trials → Farmer Training → **UPTAKE!**

(Min. development time = 5-10 years)

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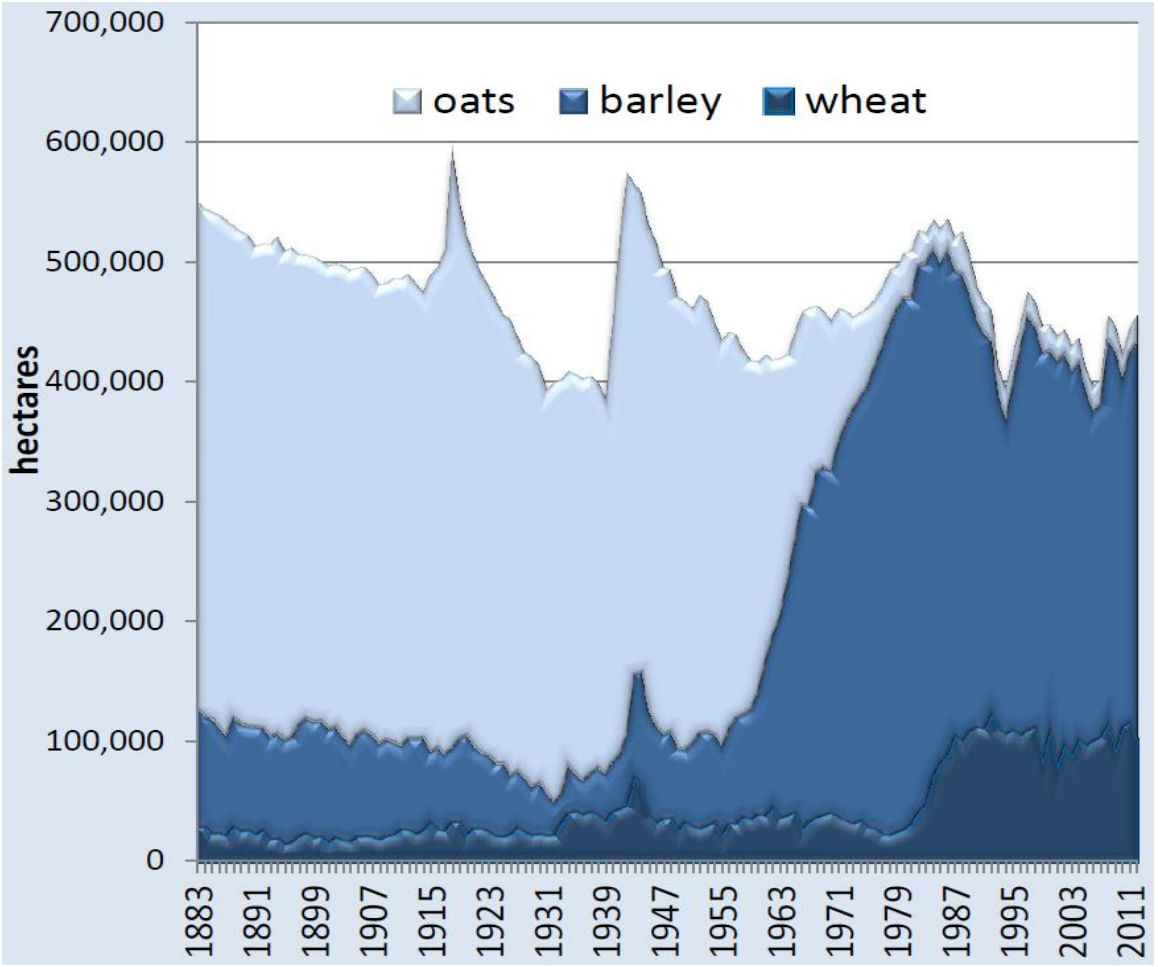
Andrew Bauer,
National Farmers Union Scotland

#ScotNeonics

NFU Scotland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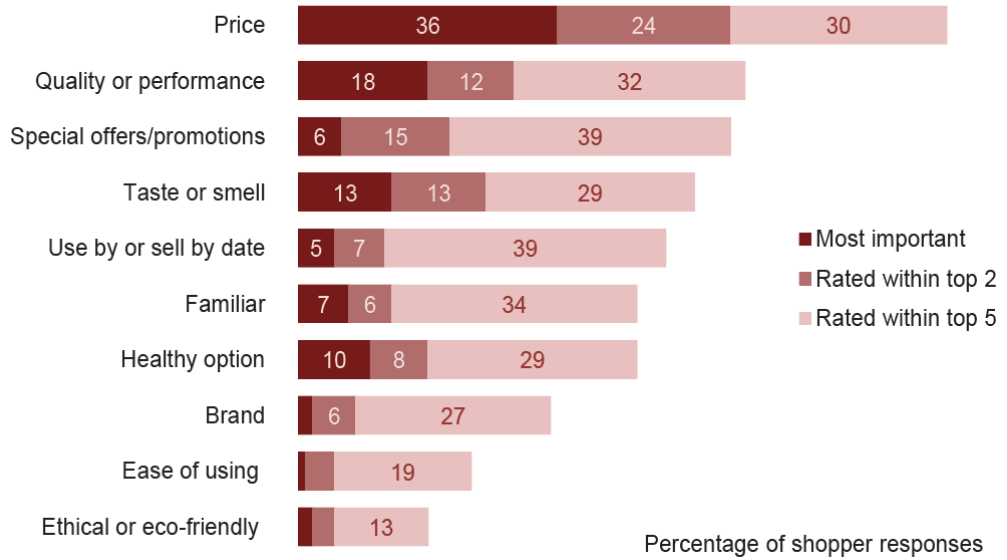
Factors influencing consumer product choice[8]




RISK


HAZARD

Question: Where next?
Answer: Strike a balance

1. High quality advisors
2. Integrated Crop Management
3. Precision technology
4. Risk rather than hazard
5. 'Imperfect' food
6. Greening and SRDP
7. Payments for ecosystem services

“Our major obligation is not to mistake slogans for solutions.”

Edward R Murrow

NFU Scotland

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Dr Penelope Whitehorn, Stirling University

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Impact of neonicotinoids on beneficial insects

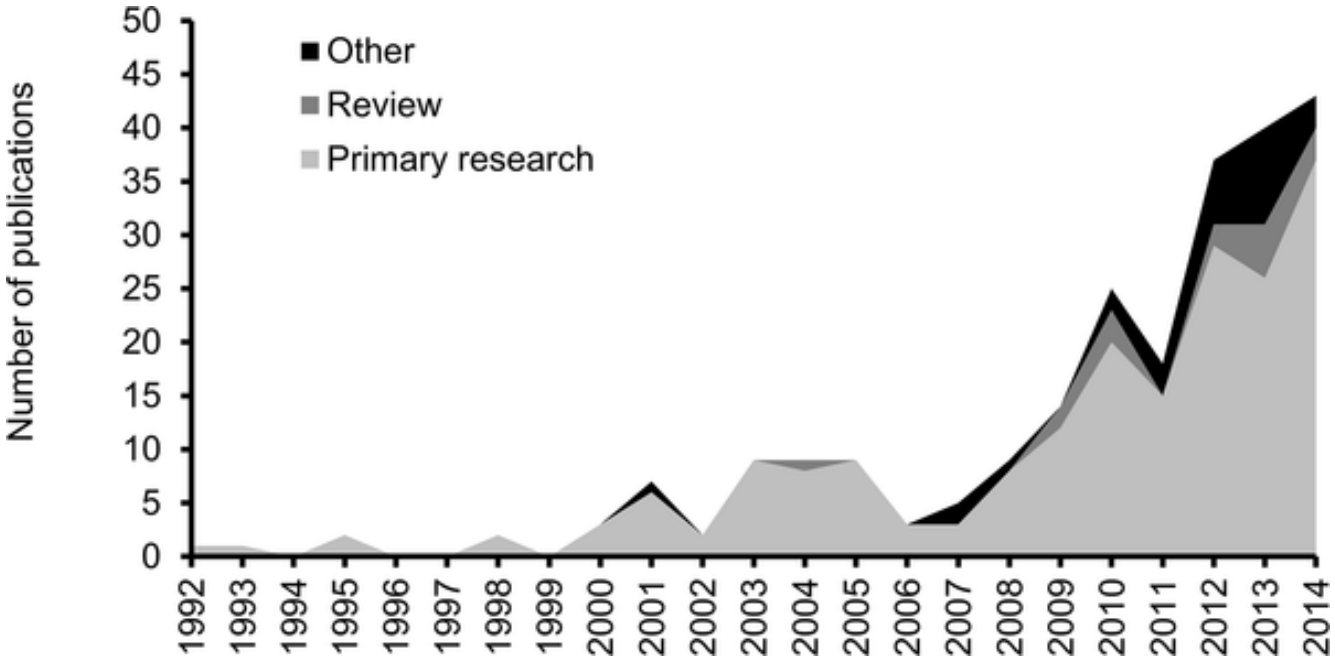


Dr Penelope Whitehorn

Research Fellow, University of Stirling

The Task Force on Systemic Pesticides

- Over 50 scientists from 4 continents reviewed over 1100 scientific papers
- A wide range of beneficial species in soil, vegetation, aquatic and marine habitats are being negatively affected



Lundin O, Rundlöf M, Smith HG, Fries I, Bommarco R (2015) Neonicotinoid Insecticides and Their Impacts on Bees: A Systematic Review of Research Approaches and Identification of Knowledge Gaps. PLoS ONE 10(8): e0136928. doi:10.1371/journal.pone.0136928

- 75 bumblebee colonies
- Field realistic doses of imidacloprid
- Foraged naturally for 6 weeks

Treated colonies:

- Grew more slowly
- 85% reduction in Queen production

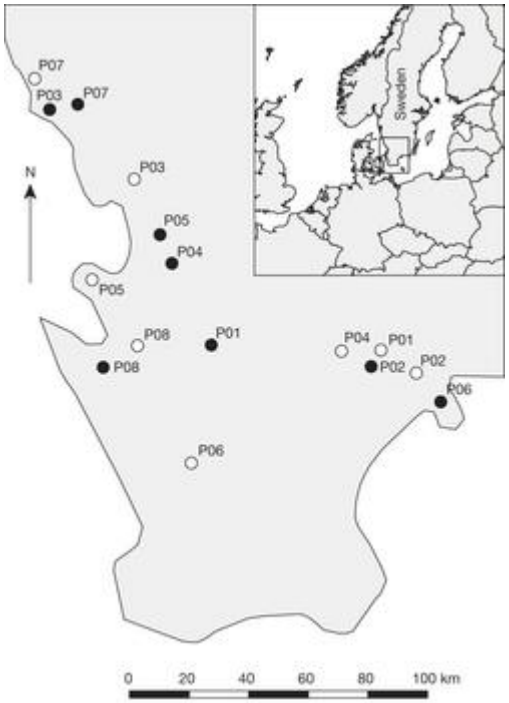
Whitehorn PR, O'Connor S, Wackers FL & Goulson D. 2012. *Science* 336: 351-352.

- Henry *et al.* 2012. A common pesticide decreases foraging success and survival in honeybees. *Science.*

- Gill *et al.* 2012. Combined pesticide exposure severely affects individual and colony level traits in bees. *Nature.*

- University of Dundee – Chris Connolly
  Neonics cause impairment of honeybees brain cells.

Seed coating with a neonicotinoid insecticide negatively affects wild bees, Rundlöf et al (2015) Nature.



- 16 oil seed rape fields – 8 control and 8 treated with Elado (active ingredient Clothianidin)

- Reduced density of wild bees
- Reduced nesting of a solitary bee species
- Decreased bumblebee colony growth and reproduction
- No significant effect on honeybee colony strength

Impacts of neonics extends to other beneficial species

- *Nasonia vitripennis* - parasitoid wasp.
- Important natural enemies of many agricultural pests.
- Neonics disrupt crucial reproductive behaviour causing significant fitness loss.

- Farmland butterflies in England declined by 47% between 2000 and 2009
- Recent modelling links these decines with neonic usage.

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Matt Shardlow, Buglife

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Neonicotinoids and Pollinators

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Buglife is a registered charity at Bug House, Ham Lane, Orton Waterville, Peterborough, PE2 5UU
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