EASAC

Collective voice of the National Academies of Science of the EU member states

Established 2000, 28 members (includes Norway and Switzerland and all EU Academies)

Source of *independent* scientific analysis and advice for policy-makers

- Independence
-scientific excellence
-transparent processes

EASAC's structure

European Academies
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Science Advisory Council
Scier

Council
(Full Assembly)

Bureau
(President & Vice-Presidents)
Secretariat & Brussels Office

Activities with other science academy networks

"Science-Policy-Dialogue" Workshops of academies

Steering Panel Biosciences

Director Biosciences

Working Groups Biosciences

Steering Panel Energy

Director Energy

Working Groups Energy

Steering Panel Environment

Director Environment

Working Groups Environment

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EASAC Report: Ecosystem services, agriculture and neonicotinoids

Professor Michael Norton
EASAC Environment Programme Director

November 15 2018, Pretoria

European Academies

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Science Advisory Council

Ecosystem services, agriculture and neonicotinoids

EASAC policy report 26

April 2015

ISBN: 978-3-8047-3437-1

This report can be found at
www.easac.eu

building science into EU policy

European Academies

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Science Advisory Council

nature International weekly journal of science

ARTICLE PREVIEW

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NATURE | CORRESPONDENCE

Ecosystem services: Academies review insecticide harm

Peter Neumann

Nature **520**, 157 (09 April 2015) | doi:10.1038/520157a

Published online 08 April 2015

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The European Academies Science Advisory Council (EASAC) will next week release its report

Why this study by EASAC?

Neonicotinoids = new generation of systemic pesticides
Widely used in agricultural practices in Europe

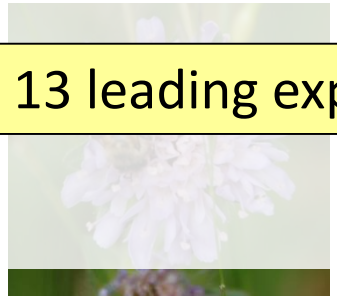
Seeds are treated

Bee fatalities led to EU restrictions in 2013, but industry and farmers opposed. Scientific results continue, but disputes between stakeholders continue over their interpretation.

EASAC decided to conduct a detailed review and to study effects on organisms providing ecosystem services critical to sustainable agriculture

Pesticides also in nectar, pollen and

EASAC nominated 13 leading experts to form an Expert Group



Chances for non-target effects

Structure of the report

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Science Advisory Council

1 INTRODUCTION AND SCOPE OF THIS REPORT

2 ECOSYSTEM SERVICES AND AGRICULTURE

- 2.1 What are 'ecosystem services' and how can they be valued?
- 2.2 How are ecosystem services important to agriculture?
- 2.3 Putting an economic value on Ecosystem Services for agriculture

3 TRENDS IN ECOSYSTEM SERVICES IMPORTANT TO AGRICULTURE

- 3.1 Types of ecosystem services considered
- 3.2 Pollinators and trends
- 3.3 Natural pest control and trends
- 3.4 Soil ecosystem services and trends
- 3.5 Biodiversity and trends
- 3.6 Potential factors affecting agricultural ecosystem services

4 NEONICOTINOIDS AND ORGANISMS PROVIDING ECOSYSTEM SERVICES FOR AGRICULTURE

- 4.1 Context
- 4.2 Methods and reviewing the evidence
- 4.3 Sources and assessing the data
- 4.4 Key Information
- 4.5 Impact on non-target organisms

5 IMPLICATIONS FOR EU POLICIES

6 CONCLUSIONS

70 pages,
>300 references

Ecosystem services

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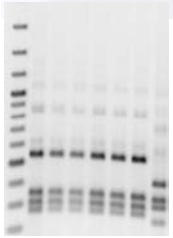
Benefits people obtain from ecosystems:

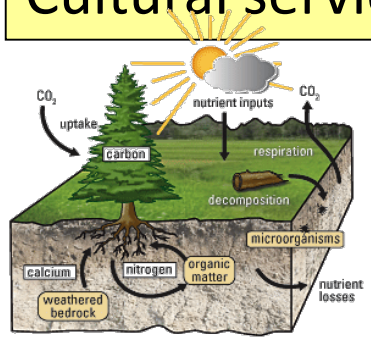
Supporting services

Provisioning services

Regulating services

Cultural services





Ecosystem services and agriculture

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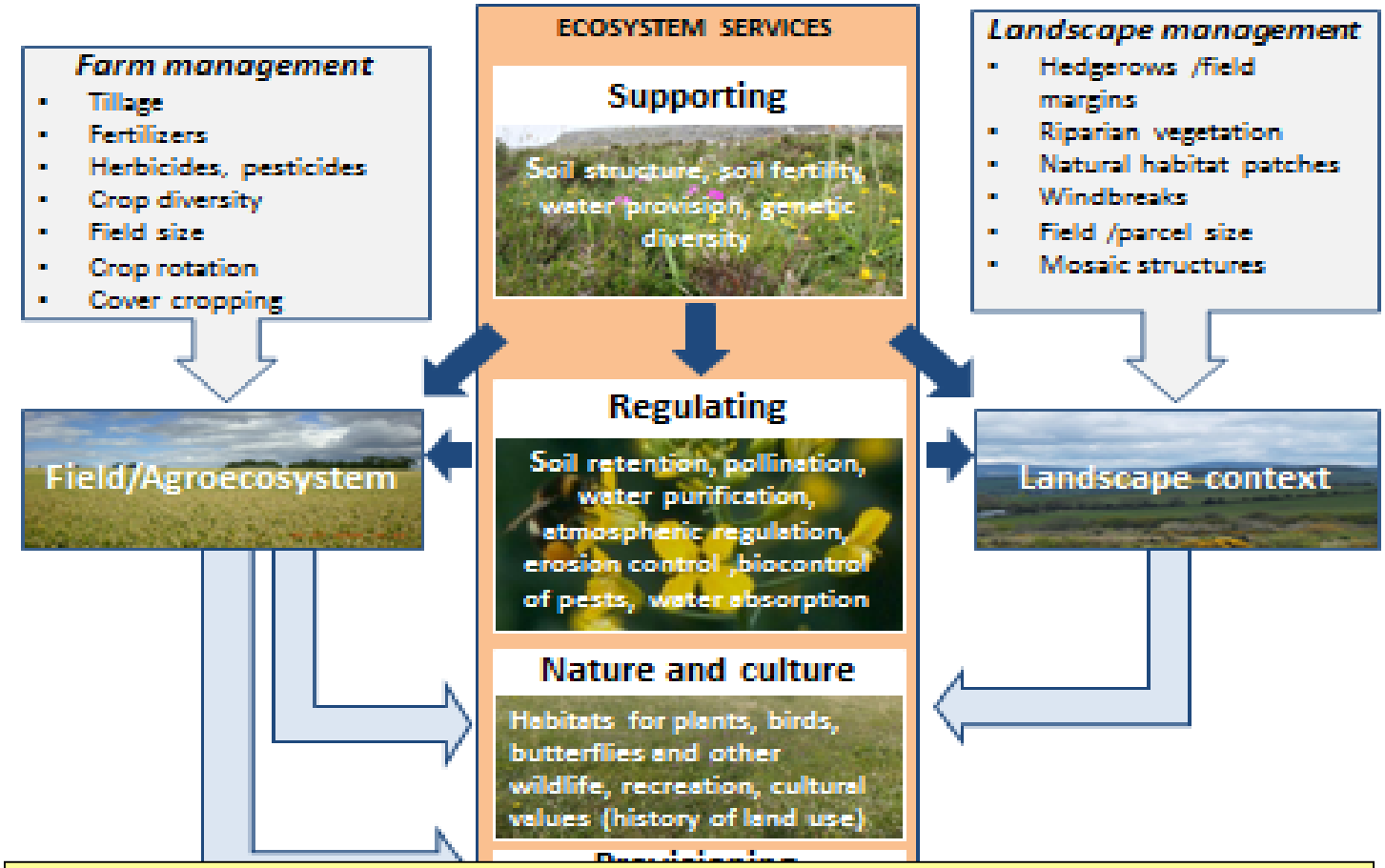

Focus on key ecosystem services for agriculture

Ecosystem services and agriculture

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Natural pest control

€91 billion p.a. (globally)

Soil organisms

€22.75 billion p.a. (globally)

Pollination

€14.6 billion p.a. (Europe alone)

Biodiversity is positively interlinked with supply of these ecosystem services

Honey bee colony losses

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Winter

Data show elevated losses of honey bee colonies (>10%)

Not available

Socio-economics main drivers of managed colony numbers

Are honey bees in general special?

The focus on honey bees

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Honey bees

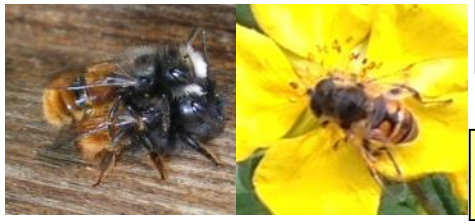
Eusocial, large colonies, overwinters

Buffering capacity

What are the overall trends?

Bumblebees

Colonies smaller, only future queens hibernate



Solitary bees and other pollinators

Each counts for reproduction

Protection of managed honey bees is not sufficient to protect pollination or other ecosystem services

Ecosystem Services and biodiversity

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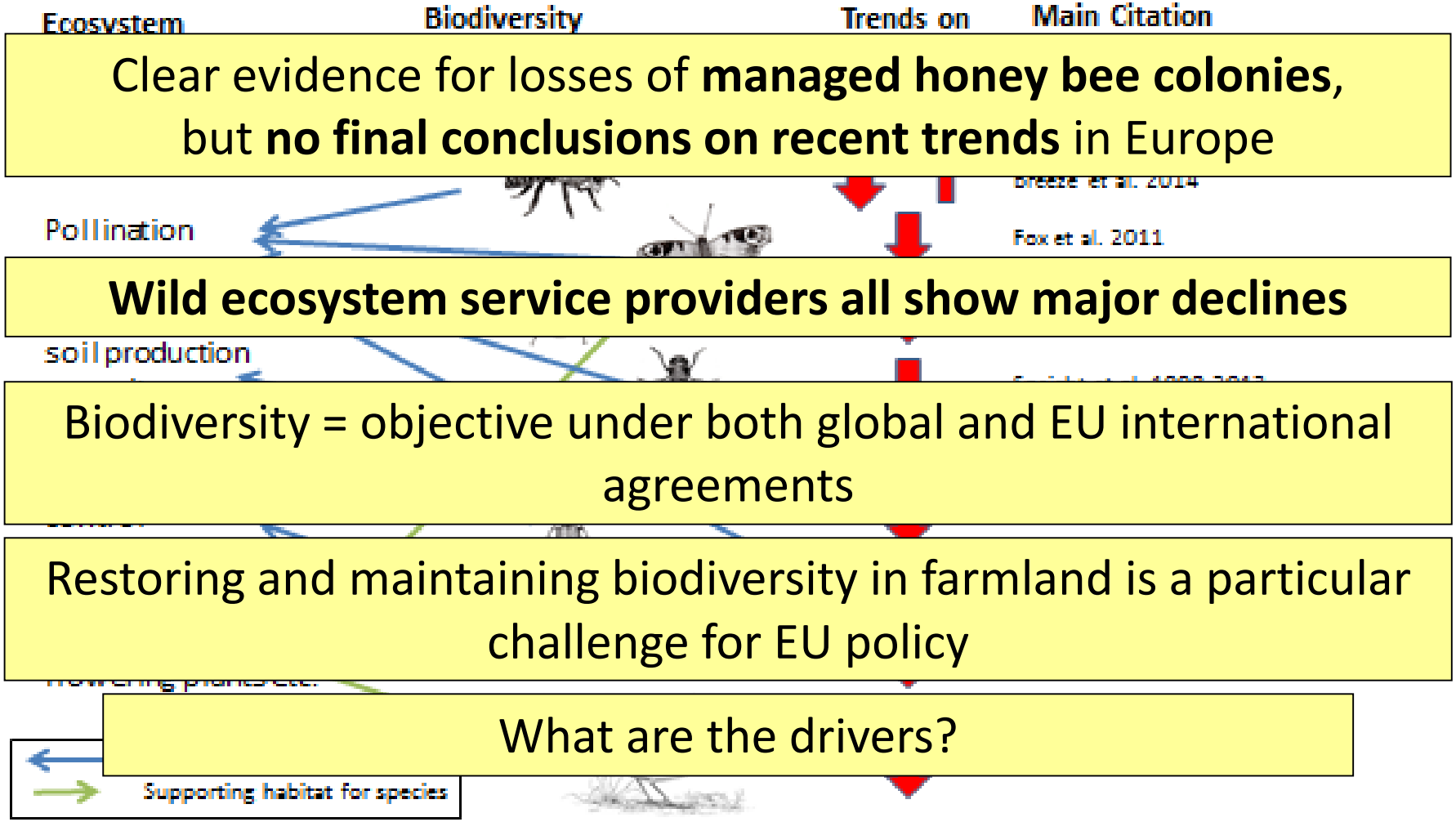


Clear evidence for losses of **managed honey bee colonies**, but **no final conclusions on recent trends** in Europe

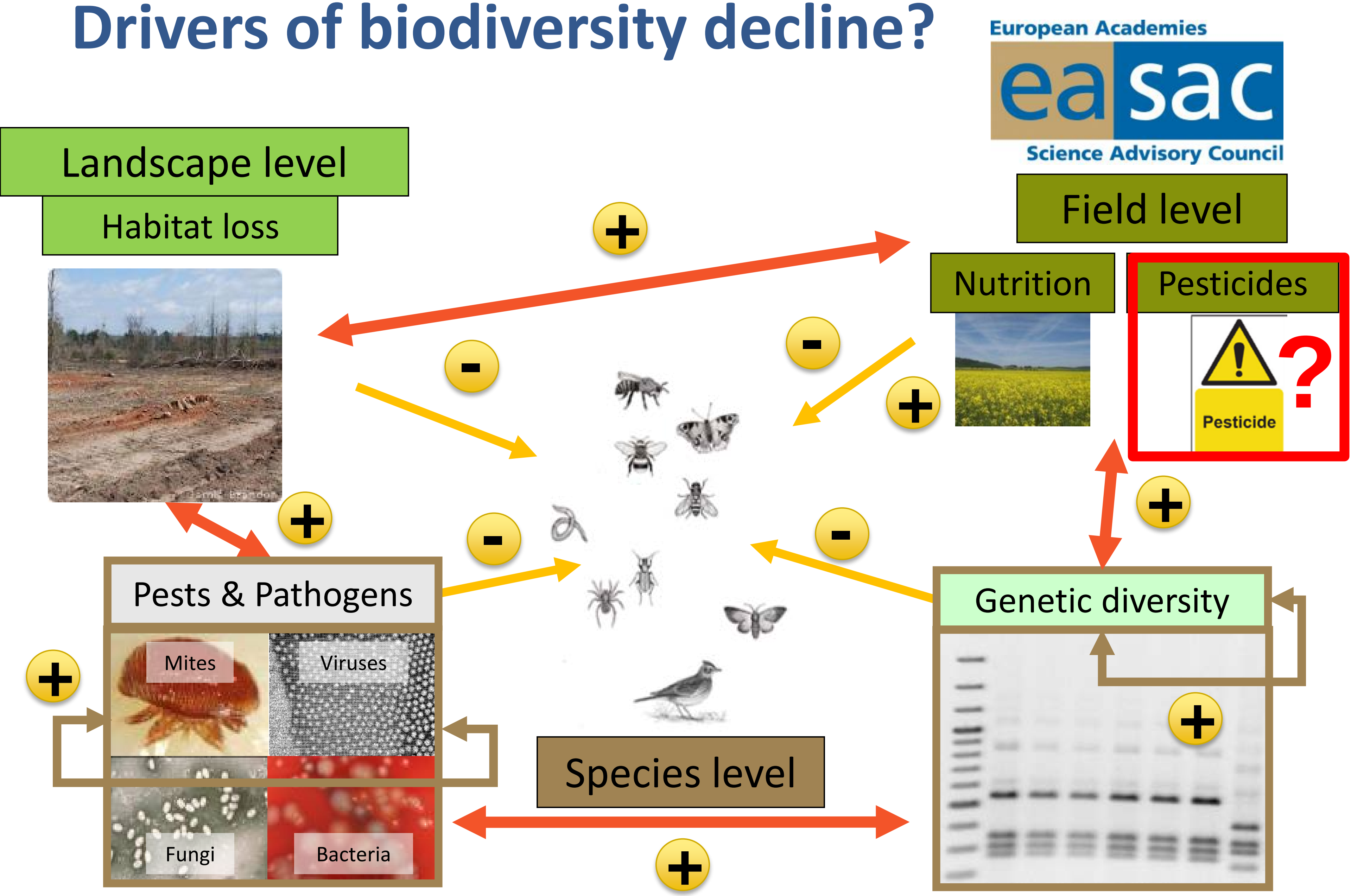
Wild ecosystem service providers all show major declines

Biodiversity = objective under both global and EU international agreements

Restoring and maintaining biodiversity in farmland is a particular challenge for EU policy

What are the drivers?

Drivers of biodiversity decline?



What role for Neonicotinoids?

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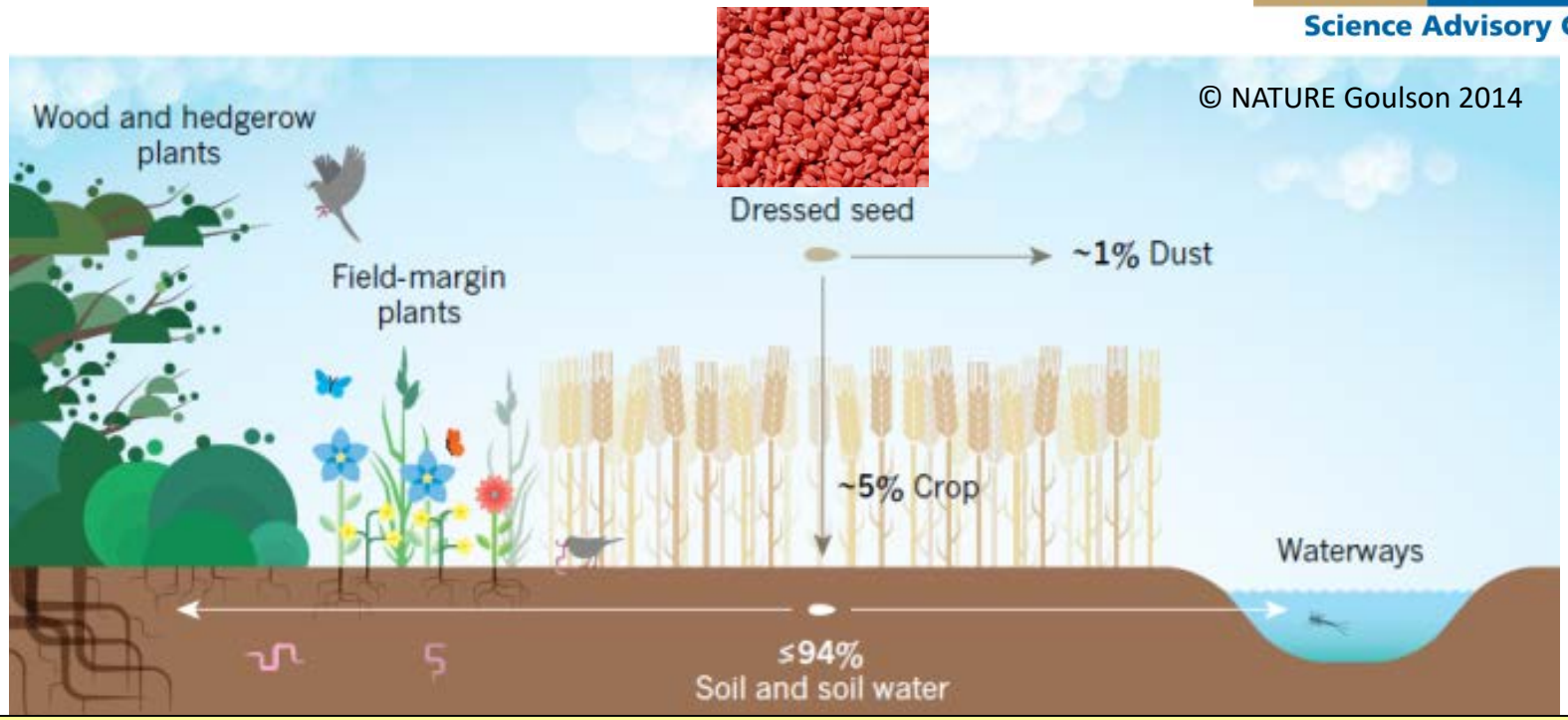

Besides residues in pollen/nectar, the goes into the soil and water

Potential for effects on other ecosystem services

Research methods strengths and weaknesses

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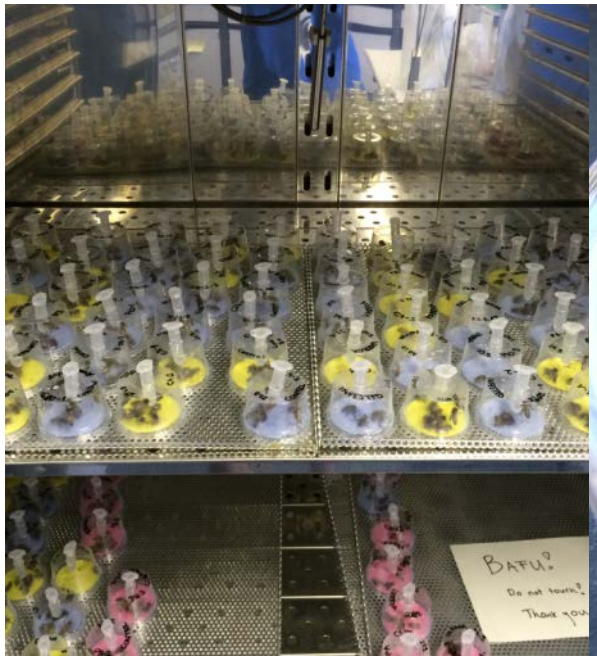
Laboratory studies



Advantage: controlled environment

Disadvantage: difficult to apply outside

Research methods and their strengths and weaknesses

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Laboratory studies

Field studies

Advantage: non-controlled environment

Disadvantage: non-controlled environment

Research methods and their strengths and weaknesses

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Laboratory studies

Field studies

Semi-field studies

Advantage: restricting variables, more realistic conditions than in the laboratory

Disadvantage: may not be real field conditions

Conclusions on research methods

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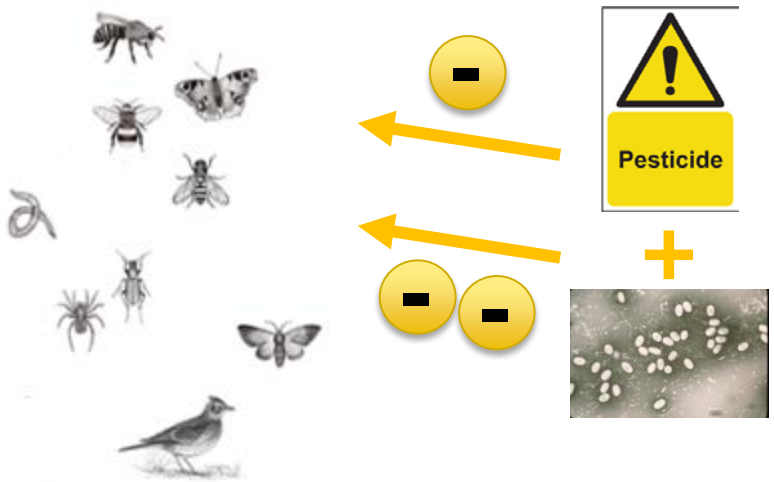
All scientific approaches face strengths and weaknesses

Studies are often assessed in isolation, weaknesses will be emphasized when stakeholders disagree with the results

The totality of the evidence has to be considered and how far results from one approach are supported or consistent with evidence from other approaches

Results

Increasing body of evidence that the widespread prophylactic use of neonicotinoids has severe negative effects on non-target organisms, which provide ecosystem services, incl. pollination and natural pest control



Effects alone and/or in combination with other factors, e.g. pathogens and/or food stress

Results

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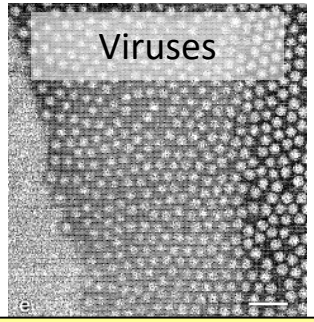
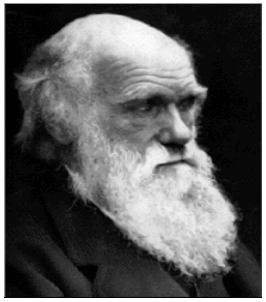
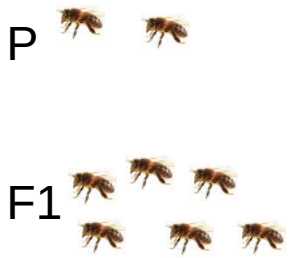
Increasing body of evidence that the widespread prophylactic use of neonicotinoids has severe negative effects on non-target organisms, which provide ecosystem services, incl. pollination and natural pest control

Clear evidence for sublethal effects of neonicotinoids







Very low levels can have severe effects, e.g. activating latent viruses

Results

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Increasing body of evidence that the widespread prophylactic use of neonicotinoids has severe negative effects on non-target organisms, which provide ecosystem services, incl. pollination and natural pest control

Clear evidence for sublethal effects of neonicotinoids

Balance between risks and benefits for neonicotinoids appears to have shifted and requires reassessment

Large scale preventive pesticide usage against occasional or secondary pests targeted. Is this a sustainable approach?

Wider aspects of EU Policy

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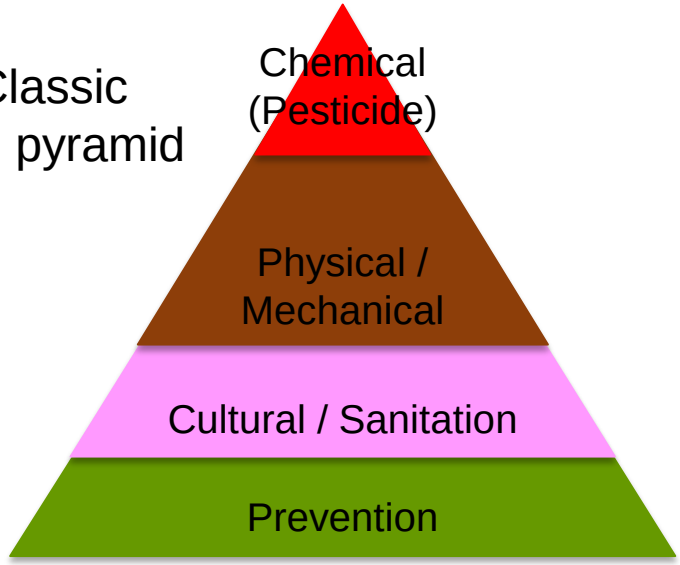
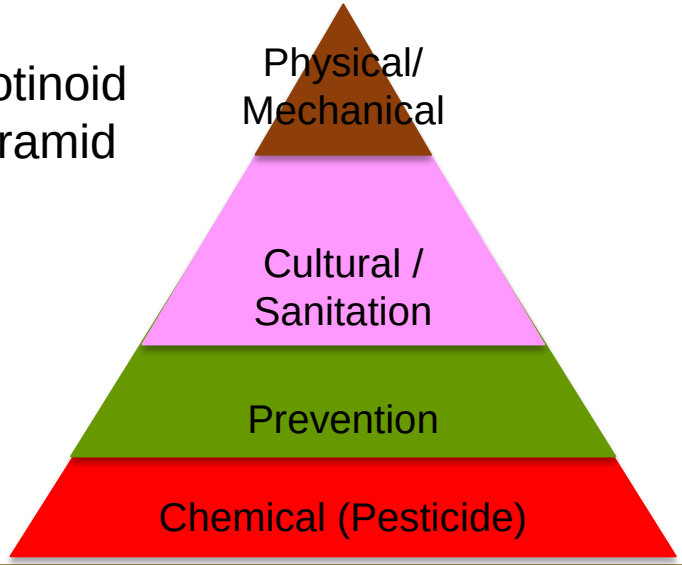
Sublethal effects of neonicotinoids are not sufficiently addressed in the present EU approval procedures

Prophylactic usage of neonicotinoids inconsistent with basic principles of Integrated Pest Management as expressed in the EU's Sustainable Pesticides Directive (2009/128/EC)

Classic IPM pyramid



Neonicotinoid IPM pyramid



Media Response

https://storify.com/EASACnews/easac-study-on-neonicotinoids

- Major media coverage across the world
- Major national press – e.g. New York Times

SECTIONS HOME SEARCH The New York Times

Pesticides Linked to Honeybee Deaths Pose More Risks, European Group Says

By DAVID JOLLY APRIL 8, 2015

PARIS — An influential European scientific body said on Wednesday that a group of pesticides believed to contribute to mass deaths of honeybees is probably more damaging to ecosystems than previously thought and questioned whether the substances had a place in sustainable agriculture.

The finding could have repercussions on both sides of the Atlantic for the

News - United Kingdom

Farm leaders in backlash over EU report on neonicotinoids - Farmers Weekly

The argument surrounding the use of neonicotinoids has intensified following the publication of a new report that claims this class of pesticides is impact

PHILIP CASE

Mounting Evidence for Neonicotinoid Environmental Impact

EU - Evidence for the negative impact of neonicotinoid pesticides on the environment is rapidly increasing, according to a joint report from the European Academies of Science to the European Commission.

THE CROP SITE

Stinging verdict on bee-killers

Not surprisingly all this has provoked an angry reaction, with agrochemical firms even taking legal action against the EC. The industry and its supporters allege that the science behind the ban is "weak" and has been marshalled by pressure groups bringing together researchers to "create studies" on "a campaigning basis".

GEOFFREY LEAN

Lifting pesticide ban could harm pollinating insects | The Times

Pesticides temporarily banned because of fears that they kill honeybees could also damage populations of bumble bees, hoverflies, butterflies and moths, scientists claim. Neonicotinoid pesticides are subject to a two-year European Union ban that could be lifted in December. However, they could have "severe effects" on pollinating insects and overall biodiversity if reintroduced widely, a report says.

THE TIMES

Pesticides could lead to shortage of crop pollinators - EU report

EU restriction on neonicotinoids to be reviewed this year. * Value of pollination in Europe seen at 14.6 bln euros. By Barbara Lewis. BRUSSELS, April 8 (Reuters) - Evidence is mounting that widely-used pesticides harm moths, butterflies and birds as ...

REUTERS UK

sogenannten Neonicotinoiden gesammelt werden, teilte die EU-Kommission in Brüssel am Freitag auf Anfrage mit.

VON APA/DPA

Alarmierende EU-Pestizid-Studie zu Bienensterben: SPÖ fordert mehr Rücksicht durch Agrarwirtschaft

„Ohne Bienen geht es nicht - auch nicht für die Landwirtschaft. Deshalb muss es ein gemeinsames Interesse aller Beteiligten sein, die Ursachen des massiven Bienensterbens schonungslos aufzuarbeiten. Unabhängige Erkenntnisse wie die jüngste EU-Studie von EASAC zu den Auswirkungen von Neonicotinoid-Giftstoffen müssen Handlungsanleitung für die nachhaltige Bodenbewirtschaftung werden", fordert SPÖ-Klubvorsitzender Christian Makor.

SPÖ OBERÖSTERREICH

Thumbnail for Bienensterben: Studie bestätigt Ursache Pestizide

Bienensterben: Studie bestätigt Ursache Pestizide

Initiative für unbefristetes Verbot von Neonicotinoiden bei der Landesumweltreferentenkonferenz im Mai.

DIE GRÜNEN OBERÖSTERREICH

Kadenbach: EU-Studie bestätigt Bienensterben durch Pestizide

Wien (OTS/SK) - "In der gestern veröffentlichten Studie des europäischen Wissenschaftsnetzwerks EASAC wird einmal mehr bestätigt, dass Neonicotinoide für das Bienensterben mitverantwortlich sind", so SPÖ-EU-Abgeordnete Karin Kadenbach. Sie warnt seit langem vor den Bienengiften. "Das vor zwei Jahren in Kraft getretene Verbot besonders gefährlicher Insektizide muss ausgeweitet werden", fordert die Abgeordnete am Donnerstag gegenüber dem SPÖ-Pressedienst.

OTS

EU: Bienen sterben an Pestiziden - Wiener Zeitung Online

Brüssel. Wissenschafter in der Europäischen Union machen den Einsatz bestimmter Pestizide für das Bienensterben verantwortlich. Es gebe zunehmende Beweise für die negativen Auswirkungen auf andere Organismen durch Neoni-cotinoid-Insektizide, hieß es in einer am Mittwoch veröffentlichten Studie des EU-Wissenschaftsnetzwerkes Easac. In dem Bericht werden die Befunde einer Expertengruppe von 13 Forschern zusammengefasst.

NATUR - WIENER ZEITUNG ONLINE

Regulatory Response

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- Three neonicotinoids (**clothianidin, imidacloprid and thiamethoxam)** already restricted since 2013. Decision on future policy- new science review completed by EFSA at end 2017. Extended and indefinite restrictions agreed Apr 28 2018. These regulations completely ban the outdoor uses of the three substances and only the use in permanent greenhouses remains.

Thank you for your attention