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# Biodiversity and health as a framework for assessing pesticides in agriculture

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# ➤ Biodiversity and health as a framework for assessing pesticides in agriculture

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## ➤ Pesticides : useful and dangerous?

- The use of pesticides in agriculture is part of the agricultural practices that aim to ensure sufficient quantity and quality of food products.
- They influence organisms antagonistic to agricultural production, by reducing their populations and their impacts.
- They also disrupt populations of pest control organisms.
- Through their actions, pesticides can have direct and indirect unwanted effects on human health and the environment.
- The advantages and disadvantages of pesticides are assessed within the regulatory framework



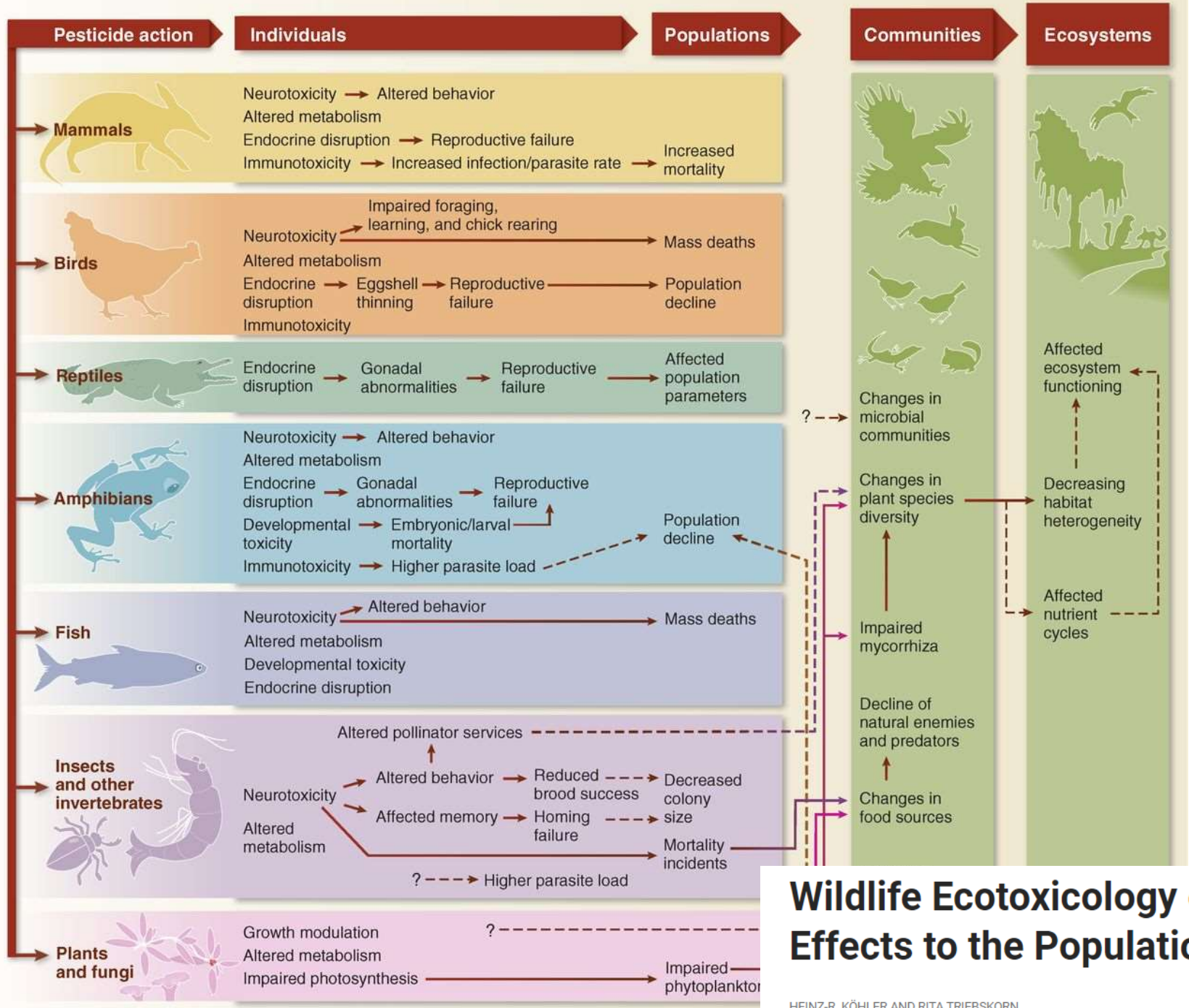
## ➤ Biodiversity under evaluated

But the effects on biodiversity are poorly assessed due to their complexity

- Direct effects linked to exposure (incidental contact with pesticides)
- Effects linked to 'cocktails' of different molecules
- Indirect effects related to population changes of other species, including pests

While biodiversity can also contribute to ensuring levels of agricultural production (via crop pest predators) and influence human health





## Wildlife Ecotoxicology of Pesticides: Can We Track Effects to the Population Level and Beyond?

# ➤ How can we better assess the multiple effects of pesticides on biodiversity in order to adjust their use for a better agricultural production and a healthier environment?



Policy Brief | [Open Access](#) | [Published: 03 April 2019](#)

## Future pesticide risk assessment: narrowing the gap between intention and reality

Ralf B. Schäfer [✉](#), Matthias Liess, Rolf Altenburger, Juliane Filser, Henner Hollert, Martina Roß-Nickoll, Andreas Schäffer [✉](#) & Martin Scheringer



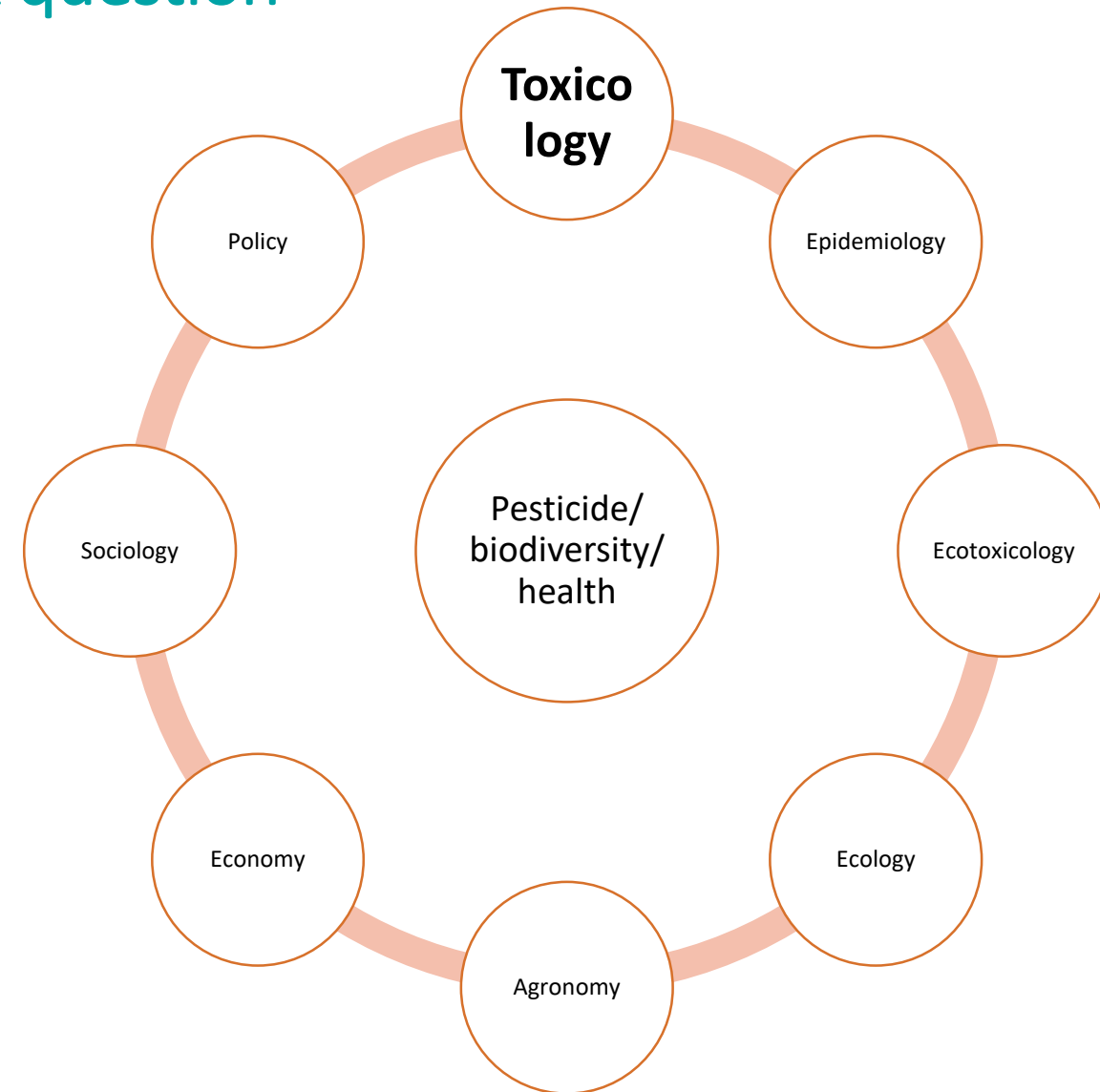
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Biodiversity and health as a framework for assessing pesticide  
14-06-2022 / Alternet (Gent) / Deconchat Marc & Pierre Fab

## ➤ Difficulties to tackle such a complex question

- A complex and wide-ranging issue with compartmentalised approaches
  - Toxicology: effect of pesticides on human beings
    - Mostly in controlled conditions
  - Epidemiology: effect of pesticides on human health in real conditions
    - Few spatialised information
  - Ecotoxicology : effect of pesticides on non-human populations
    - Little information mobilised on the links between species and their own dynamics
  - Ecology: Dynamics of biodiversity
    - Little consideration given to the diversity and level of exposure to pesticides
  - Agronomy: practices and production
    - Homogeneity rather than diversity
  - Economy: incomes, costs and benefits
    - Difficulty to estimate indirect effects
  - Sociology: how people think
    - A matter of ethics

**How can we get the scientific communities to work together?**



## ➤ Science design



- INRAE has all the necessary skills
- But they are not used to work together: how to promote a high level interdisciplinarity?
  - More than another « 4 years multidisciplinary research project »
- To build an internal research program able to open new perspectives
  1. To gather scientific communities
  2. To share knowledge, methods, questions
  3. To build a (or several) shared **conceptual framework(s)**
  4. To identify key questions
  5. To propose new research projects



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➤ Our question for Alternet is:



Do you know any other similar program with similar objectives about pesticides/biodiversity/health relationships?

• If yes: contact us, please...



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## ➤ Innovation and collaborative design



[https://www6.inrae.fr/ideas-agrifood\\_eng/](https://www6.inrae.fr/ideas-agrifood_eng/)

- IDEAS works on the creative and reasoning processes surrounding design, to simultaneously generate innovation-related knowledge and concepts
- A broad picture of the questions (2p)
- Information and call for interest
- Interdisciplinary workshop (INRAE and invited scientists)
  - Identify 3-5 groups (consortia) ready to investigate parts of the questions
- 3-5 workshops organized by consortia to share knowledge and to build concepts
- 1-2 research projects (2024)



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## ➤ Framing

- Address the diversity of organisms and their interactions with the diversity of pesticides and usage practices.
  - Develop a systemic approach taking into account these diversities
- In the conceptual framework of One health
  - Human health
  - Plant/crop health
  - Animal/livestock health
  - Health of the environment and its components (soil, water, air)



## ➤ Questions to fuel imagination/innovation

- Some ideas:

- How can we characterise (map) the exposure of biodiversity components to pesticides in and around crops?
- Which data are needed to study the direct and indirect effects of pesticides on biodiversity?
- How can health concepts help to better account for the overall effects of pesticides and their uses on biodiversity?
- How to account for joint effects on human health and biodiversity?
- How to account for Benefit/risk and cost/benefit assessment of pesticide use by integrating effects on biodiversity and effects on human health?



Comments, ideas, questions?

➤ Thank you

