What are the obstacles to using population models in ecological risk assessment of pesticides?

Valery E. Forbes

Obstacles to using population models

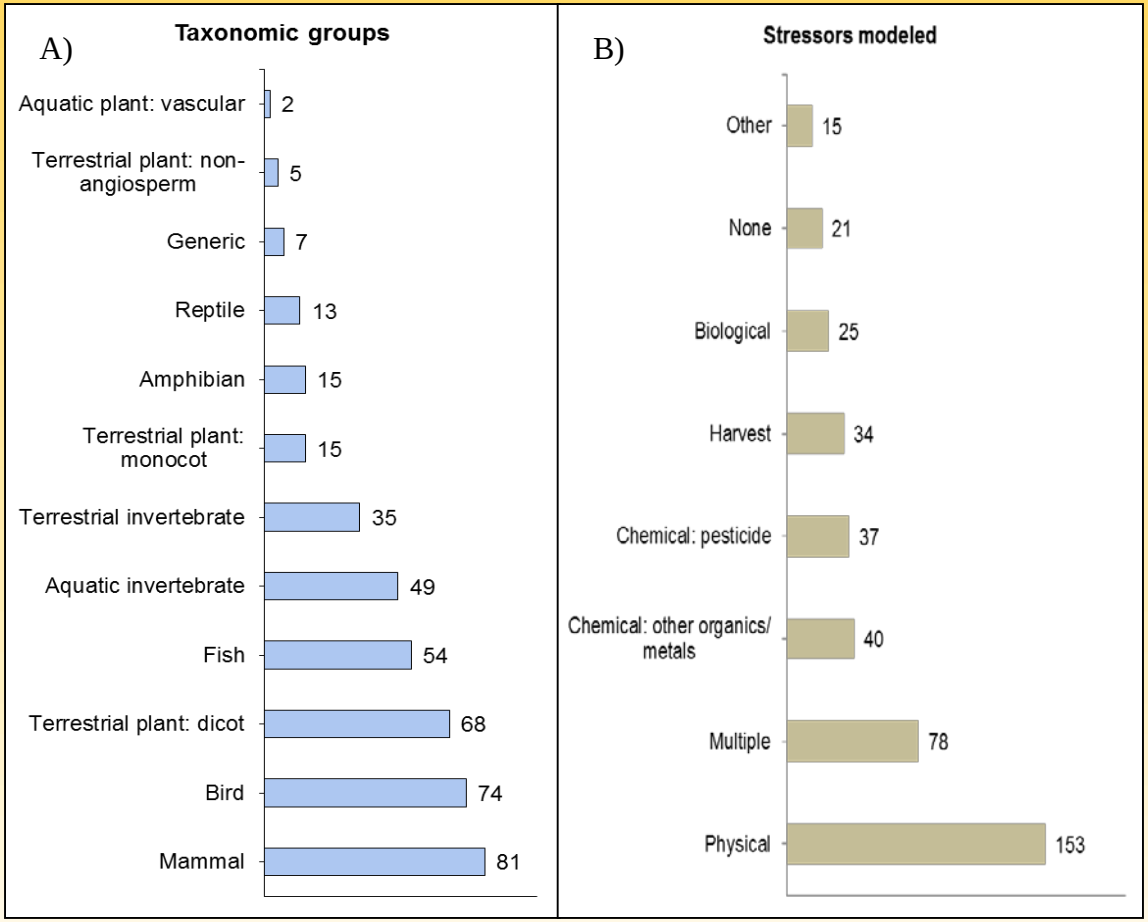
- Lack of data
- Lack of tools
- Lack of guidance
- Lack of case studies
- Lack of resources
- Inertia

Lack of data

- **A problem for ERA generally**
- **Techniques exist for filling in missing data**
  - **Life-history theory, traits-based approaches (Rueda-Cedial et al. in prep)**
- **Models can help inform which data are needed and with what precision**
  - **Dalkvist et al. 2009. Population-level impacts of pesticide-induced chronic effects on individuals depend more on ecology than toxicology. EES 72: 1663-1672**
  - **Reducing the NOEL from 50 to 1.56 mg/kg had almost no effect on risk whereas vole behavior had a major impact.**

Lack of tools

Forbes et al. 2016 ET&C 35: 1904-1913



The value of models that link organism-level impacts to the responses of a population in ecological risk assessments (ERAs) has been demonstrated extensively over the past few decades.

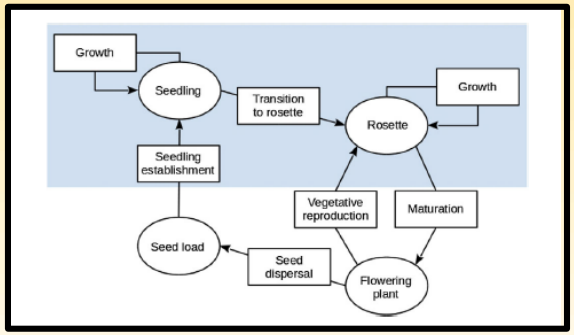
Raimondo et al. 2018

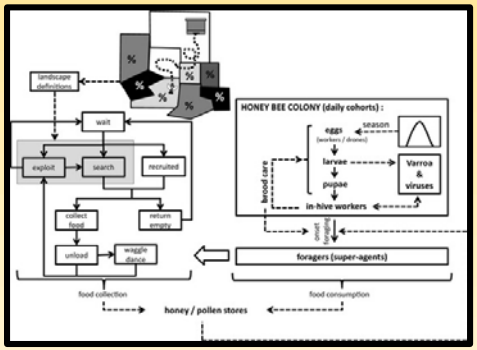
Lack of guidance

- **ODD and TRACE for model documentation– Grimm and colleagues**
- **EFSA PPR Panel, 2014. Scientific Opinion on good modelling practice in the context of mechanistic effect models for risk assessment of plant protection products**
- **Decision Guide for model development (Schmolke et al. 2017)**
- **Framework for linking population model development to ERA (Raimondo et al. 2018)**

Lack of Case Studies

- CREAM
- Modelink
- BEEHAVE
- Schmolke et al. 2017, in press
- More needed?





Lack of resources

- Need to make the modeling
  - Less time-consuming
  - Transparent
  - Consistent
  - Robust
- Need to get a priori agreement and buy-in on models and scenarios from stakeholders

Inertia

- **We need to add modeling in a way that does not increase resource needs, but rather makes risk assessments more efficient.**
- **We need to identify and articulate a strong case to change current practice.**