

Statistical Eco(-toxico)logy

Improving the Utilisation of Data for
Environmental Risk Assessment

Eduard Szöcs

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Environmental Risk Assessment and Monitoring

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Sustainable use
2009/128/EC

Water Framework
2000/60/EC

Environmental
Risk
Assessment

Environmental
Monitoring

Environmental Risk Assessment and Monitoring

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Effects

Exposure

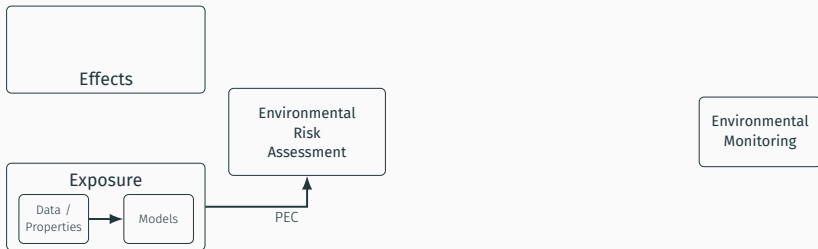
Environmental
Risk
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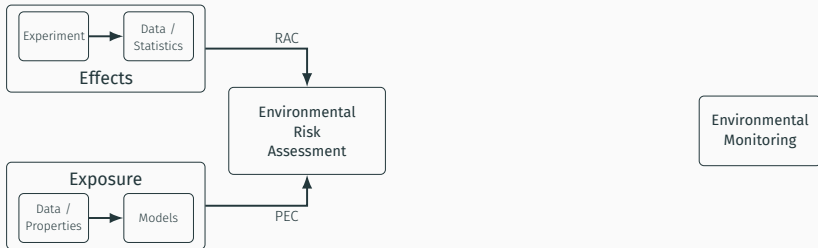
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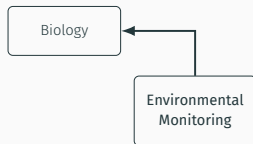
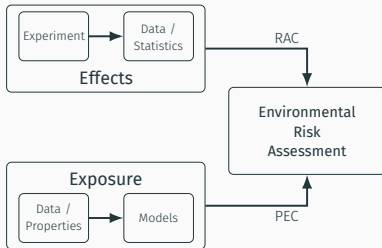
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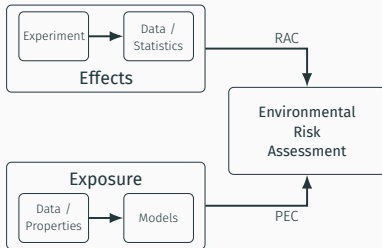
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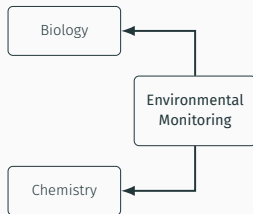


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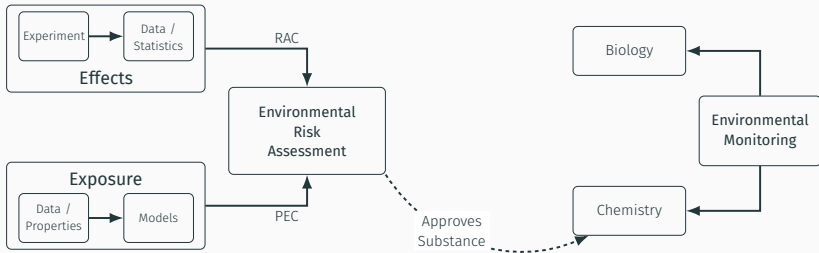
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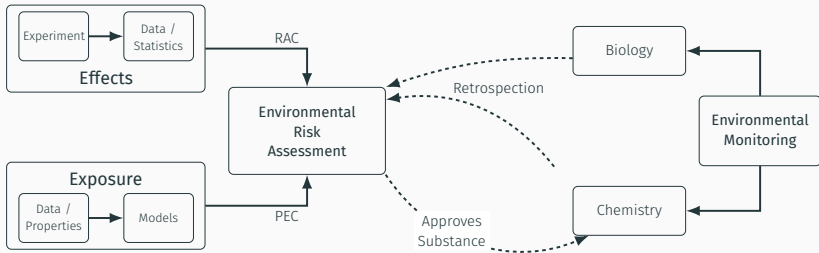
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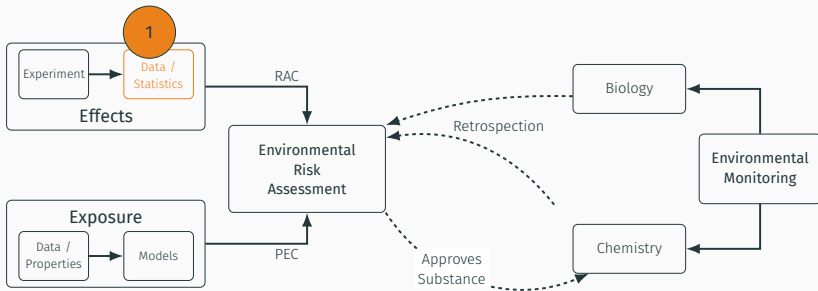
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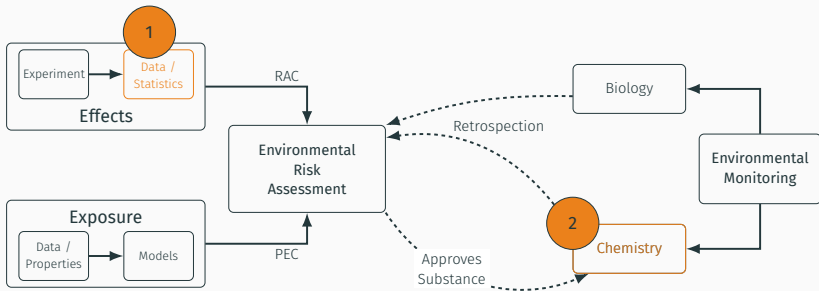
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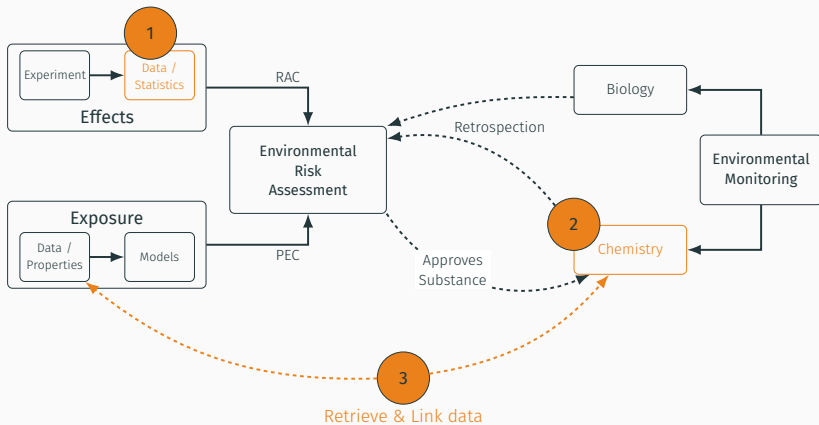
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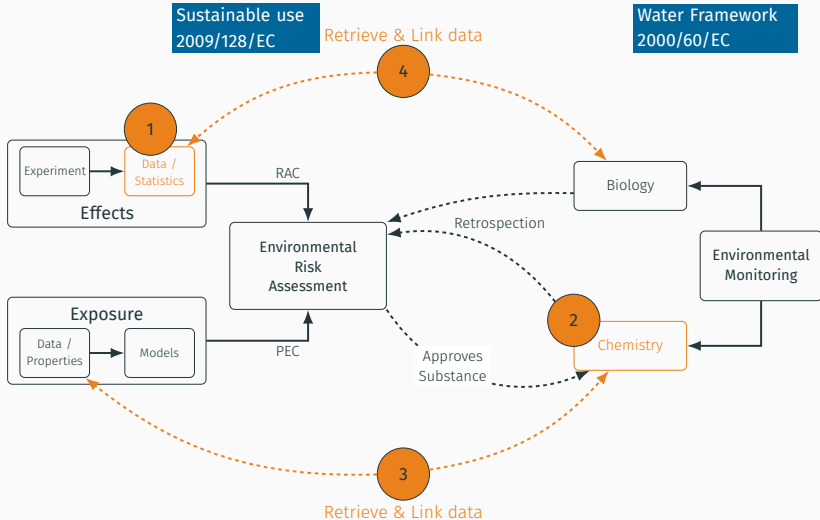
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Environmental Risk Assessment and Monitoring



Improving Statistics in ERA

Ecotoxicology is not normal

A brief history of GLM (uncomprehensive)

Statistical Power is unacceptably low

Generalized Linear Models (GLM) can do better

What we learned

Where are we now?

Exploring Monitoring Data for ERA

What we learned

Solutions for Linking Data in ERA

Biologists & Chemists face the same problems

Names

Osmia rufa, *Osmia bicornis*, *Osmia ruffa*, *Osmia unilandaui*, *Osmia spec.*

Chlorpyrifos, Chlorpyrifos, Chlorpyrifos, Chlorpyrifos-ethyl, Chlorpyrifos

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Hierarchies

Hymenoptera/ Apoidea/
Megachilidae/ *Osmia*/ *rufa*

organophosphate, ester, insecticide

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Wing length, Mass, Season

Mass, K_{OW} , LC_{50}

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Identifiers

NCBI, ITIS, EOL, ...

2921-88-2, Clc1c(OP(=S)[...],
InChI=1S/C9H11C[...], SBPBAQFW[...],
CSID,...

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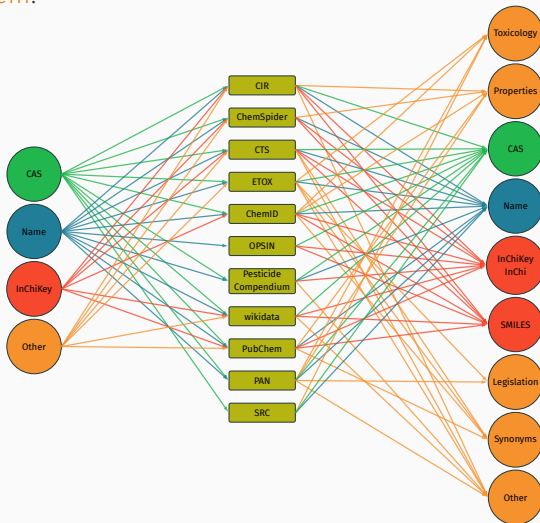
Amount of data

2993 taxa

489 pesticides
(+ 590 other organics)

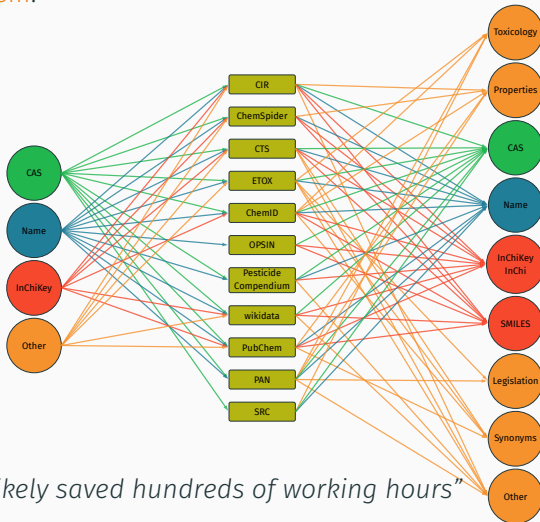
Instead of wasting time...

... use **webchem!**



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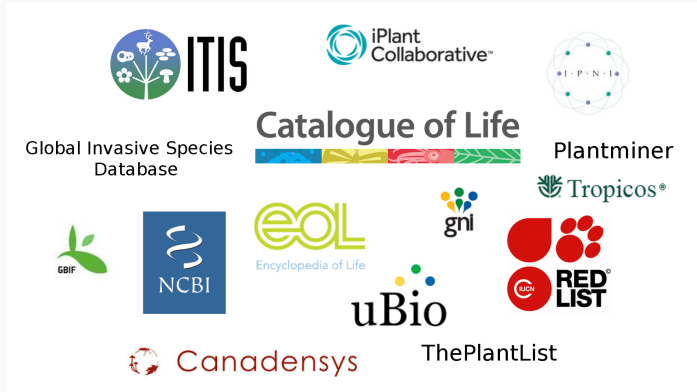
... use **webchem**!



"webchem ...likely saved hundreds of working hours"

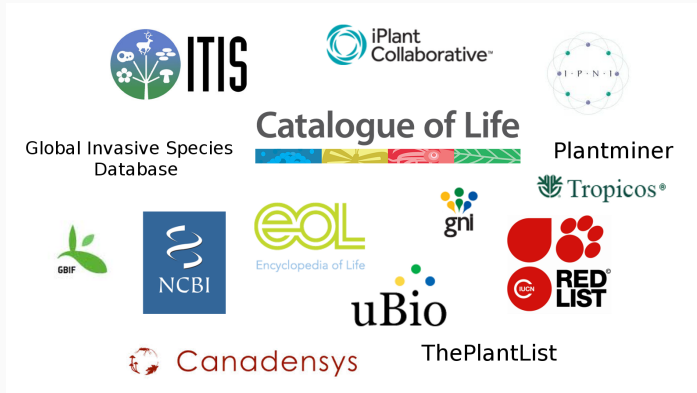
Instead of wasting time...

... use **taxize!**



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... use **taxize!**



*"Days of searching done during my morning coffee. Amazing. **taxize.**"*

Recap

What we learned

✓ Improving Statistics in ERA

- Change your model, not your data
- Ultimately ban NOEC
- Take LOQ into account

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✓ Exploring Monitoring Data for ERA

- Pesticide Dynamics
- Agricultural small streams at risk
- Neonicotinoids
- Feedback for ERA

What we learned

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✓ Exploring Monitoring Data for ERA

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✓ Solutions for Linking Data in ERA

- Handling big eco(toxico-)logical data not easy
- Now easier


Statistical Ecotoxicology

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 <http://edild.github.io/>

 @EduardSzoecs

 https://github.com/edild/phd_defense

 https://github.com/edild/phd_thesis



Statistics?

ZAGA what...?

Comparison with Stehle / Knauer?

Mixtures => mainly one compound

ecology / biota?