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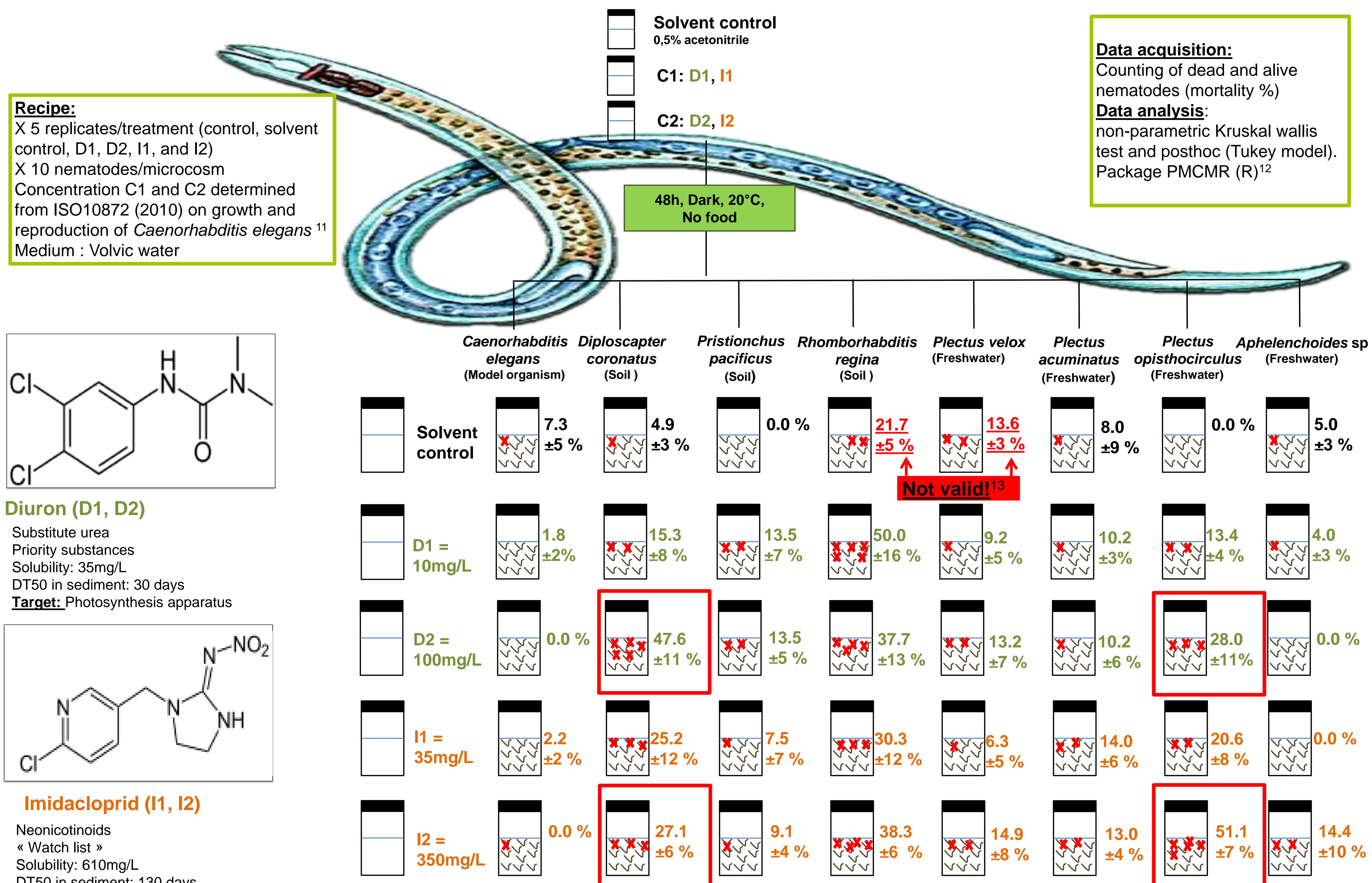
Variability in the sensitivity of nematodes species towards imidacloprid and diuron

Julie Neury-Ormanni¹, Caroline Doose^{1,2}, Nabil Majdi^{4,5}, Jacky Vedrenne¹, Soizic Morin¹, Sebastian Höss³, Walter Traunspurger⁴

¹ Irstea-Bordeaux, UR EABX-CARMA, 50 avenue de Verdun 33612 Gazinet-Cestas, France; ² INRS ETE, 490 rue de la couronne, G1K 9B8 Qc Québec, Canada; ³ ecossa, Giselastr. 6, 82319 Starnberg, Germany; ⁴ Bielefeld University, Animal Ecology, Konsequenz 45, 33615 Bielefeld, Germany; ⁵ Université de Toulouse, EcoLab, UMR 5245 CNRS, INP, UPS, ENSAT, 118 route de Narbonne, 31062 Toulouse, France.

Introduction

To assess the lethal effects of diuron (herbicide) and imidacloprid (insecticide) on ubiquitous organisms at the basis of food webs, we performed multispecies toxicity tests using nematode species commonly found in soil and freshwater benthic ecosystems. These pesticides are amongst the most frequently detected pesticides in European rivers and both are known to affect many aquatic organisms^{1, 2, 3, 4}. Free living nematodes are the most abundant and species-rich organisms of meiofauna in aquatic sediments and soils^{5, 6}. In ecotoxicology, the model species *Caenorhabditis elegans* is widely used to assess and predict the risk of chemical substances towards ecosystems⁷. Single-species bioassays leave aside the existing variability of sensitivity between species⁸, potentially leading to an underestimation of the consequences of toxic exposure at the scale of the nematode community in nature. In fact, there are evidences of changes in nematode community structure after imidacloprid and diuron exposure that may be related to trade-offs between sensitivity to toxicants and changes in competitive abilities of the species^{9, 10}.



Discussion

- Rhomborhabditis regina* need huge amounts of bacteria in culture¹⁴ → Mortality ++ even in the control.
- Pristionchus pacificus* is an entomopathogen nematode. It is not sensitive to imidacloprid because entomopathogen nematodes are regularly used in combination with imidacloprid against beetles in field¹⁵.
- Diploscapter coronatus* and *Plectus opisthocirculus* are significantly more sensitive to diuron and imidacloprid than the six other species.
- Insect nicotinic receptors are different than those of nematodes. Differences also exists between nematode nicotinic receptor¹⁶. Imidacloprid affect diversely nematodes species according to their nicotinic receptors.
- Sensitivity to chemical substances can depend on nematodes cuticle thickness and ornamentation. Diuron and imidacloprid are large hydrophilic molecules which cannot penetrate easily through nematode cuticle¹⁷.
- Sensitivity is not connected with environmental distribution because one terrestrial species and one freshwater species are affected by diuron and imidacloprid.

Conclusion

- Variability in nematode sensitivity against diuron and imidacloprid in natural ecosystem can disrupt species diversity and competitive capacities.
- Nematodes are usually less impacted by these chemical substances than other meiofauna organisms^{18, 19}. At the long term, that can unbalance structure community.