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A worm story

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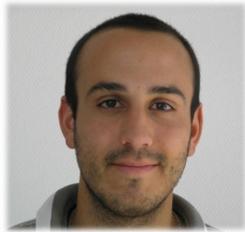
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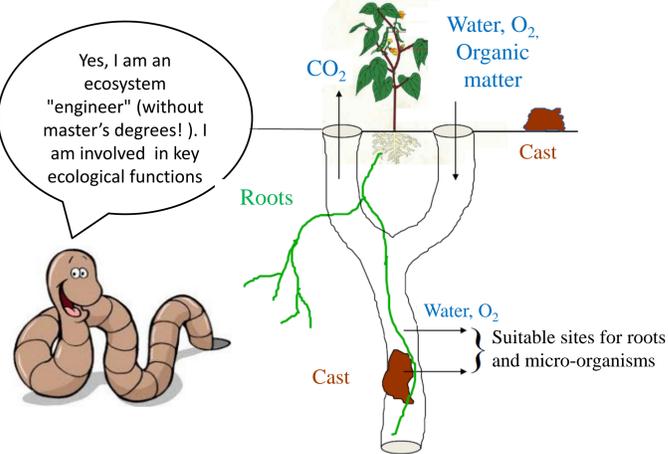
A WORM STORY

by Sylvain BART,

But also Joël Amossé, Alexandre Péry, Christian Mougin and Céline Pelosi
UMR ECOSYS, INRA, AgroParisTech, Université Paris-Saclay, 78026, Versailles, France



Once upon a time, earthworms were masters of the world ...of soils! They worked days and nights to fertilize and aerate the soil ... for the greatest happiness of plants!



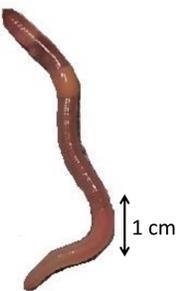
However, the intensification of agricultural practices passed through ... and in particular the use of pesticides, which endangered their jobs ...



Thus, an earthworms species, very common in cultivated fields, volunteered to represent its colleagues.

I commit myself to represent you in the best way and to respect my program !

Aporrectodea caliginosa
(Savigny, 1826)



Impacts of pesticides on an earthworm population

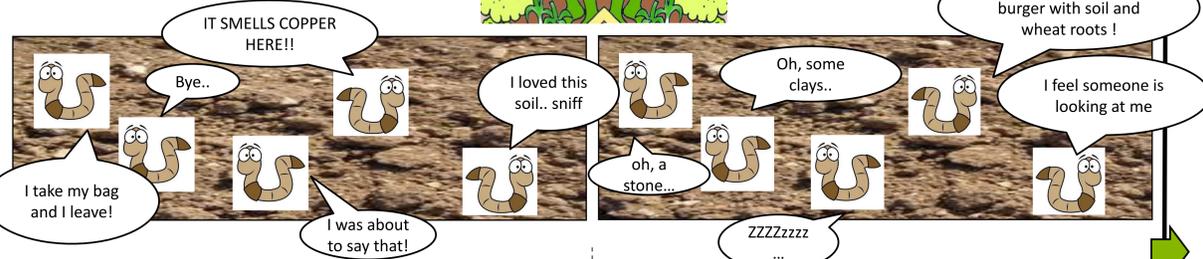
Do they avoid pesticides?

Which impacts on growth?

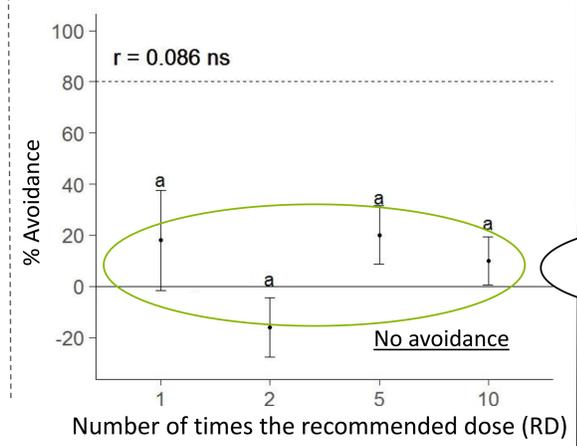
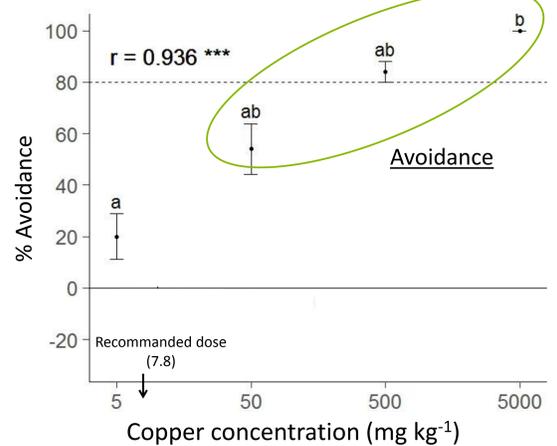
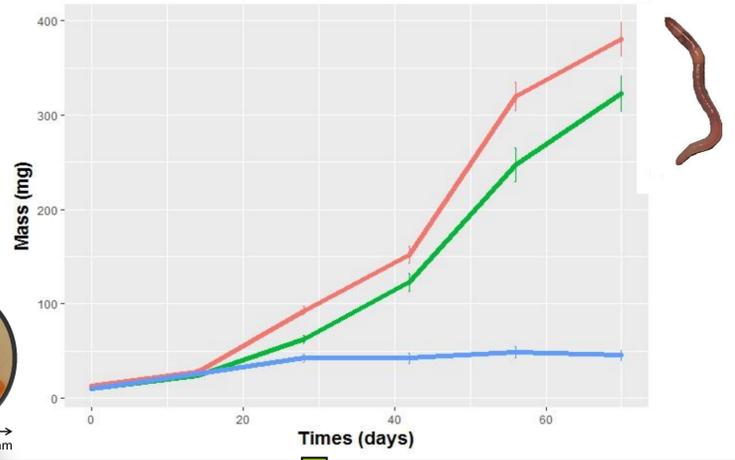


Cuprafor micro®:
Copper oxychloride (50%)

Swing Gold®:
Dimoxystrobin (133 g L⁻¹)
Epoiconazole (50 g L⁻¹)



Nom: *A. caliginosa*
Prénom: Paul / Snoopy / Woomy
Control / Swing Gold (3x RD) / Copper (78 mg kg⁻¹)



Percentage of avoidance of *A. caliginosa*, exposed to different Cuprafor micro® concentration (copper, left) and Swing Gold® (right). (Bart et al., 2017)

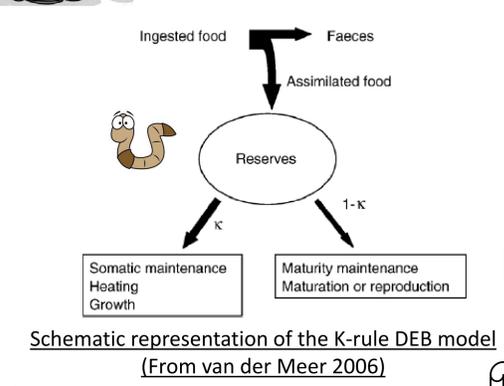
And on reproduction?



A. caliginosa, as all earthworms, is hermaphrodite. He produces 1 - 2 cocoons per week in our laboratory.

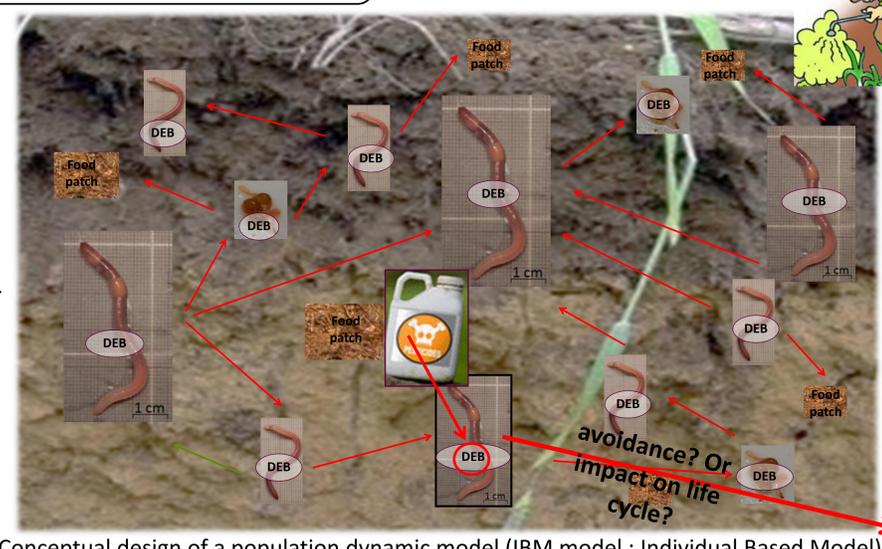
We will assess the impact of copper and Swing Gold® on cocoon production, but also on the cocoons themselves (time and percent of hatching).

What to do finally?



Schematic representation of the K-rule DEB model (From van der Meer 2006)

Based on experimental data, we will calibrate a Dynamic Energy Model (DEB), which will simulate the life cycle (growth, reproduction) of *A. caliginosa*.



Conceptual design of a population dynamic model (IBM model : Individual Based Model)

From the DEB model and avoidance data, we will calibrate an Individual Based Model (IBM) to predict effects of pesticides on population dynamics in field conditions. This model will account for interactions of individuals with their environment (food, temperature, moisture,...) and between each other, as represented by the red arrows.

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