

Biocontrole

- **Actual context:**

- **What is a pesticide ?**

A substance, usually chemical, intended to destroy one or more species of living beings. E.g.: herbicides (against weeds), insecticides (against insects), fungicides (against fungi).

- **Why are they causing problems?**

→ A health hazard: depending on exposure and substance, can cause serious consequences on the body (infertility, cancers, intoxication, damage to the foetuses, etc.).

→ An environmental hazard: causes direct or indirect poisoning of organisms leading to a reduction in the supply of food (insects, weed seeds), a loss of habitat for certain organisms, a degradation of biological diversity, and an imbalance in ecosystems.

→ A loss of effectiveness of certain substances, due to the appearance of resistance of certain pathogens to the treatments in place.

- **Wat is the result?**

→ Stoffen die vaak nodig zijn om gewassen tegen ziekteverwekkers te beschermen en voor een goede productieopbrengst te zorgen.

→ Maar gevaren die meer en meer een maatschappelijke en legislatieve druk veroorzaken (in 2018: verbod op het gebruik van pesticiden van het type metam-natrium op sla en veldsla; in 2019: verbod op het gebruik van epoxiconazool op tarwe) die aandringen op een overgang naar andere middelen voor de behandeling van ziekteverwekkers.

→ Substances that are often necessary to protect crops from pathogens and ensure good production yields.

→ But dangers that increasingly fuel social and legislative pressure (In 2018, ban on the use of pesticides such as metam sodium on salads and and lamb's lettuce; in 2019, a ban on the use of epoxiconazole on wheat) pushing for a transition to other means of pathogen treatment.

- **An alternative solution: biocontrol**

- **What is biocontrol?**

- "Biocontrol is a set of plant protection methods based on the use of natural mechanisms. Alone or in combination with other means of plant protection, these techniques are based on the mechanisms and interactions that govern the relationships between species in the natural environment. Thus, the principle of biocontrol is based on the management of pest population balances rather than their eradication.*

- **What are the possible biocontrol agents??**

- *Macro-organisms: Insects, mites, nematodes.*
 - *Chemical mediators: Pheromones, kairomones, allomones.*
 - *Microorganisms: Bacteria, fungi, viruses.*
 - *Natural substances: of plant, animal, mineral, or microbial origin.*

- **What are the advantages?**

- *Protection of plants against diseases and pests (substitute or support to traditional chemical treatments).*
 - *Use of natural mechanisms and interactions.*
 - *Management of natural balances of pest populations.*
 - *Protection of biodiversity.*
 - *Addresses all agricultural sectors.*

- **A blooming market**

- *A total of 506 registered biocontrol products as of 26/09/2019 (DGAL).*
 - *Biocontrol market dominated by the sale of insecticides (39%) and fungicides (32%).*
 - *Represents over 8% of the plant protection market in France in 2018.*
 - *+ 24% of sales of biocontrol products in France over 2018.*
 - *+ 16% increase expected each year on the global market.*

- **Future perspectives of biocontrol**

- **What are the barriers to be overcome?**

- *The cost/efficiency ratio is more important than for conventional products.*
 - *The delta of effectiveness compared to conventional treatments can have large impacts on yields depending on the sector.*

- ➔ *The use of living organisms is sometimes difficult to control and does not always give*
- ➔ *reproducible results.*
- ➔ *Some substances are sensitive to leaching, which limits their effectiveness.*
- ➔ *As for chemical substances, the toxicity of molecules, as well as their degradability must be systematically evaluated.*
- ➔ *Application methods are sometimes poorly known or defined. Training and adaptation time may be needed to allow farmers and other users to become familiar with these products/techniques.*
- ➔ *The current biocontrol market is mainly dominated by sulphur-derived products and there are finally too few registered active substances*

- **What will be the biocontrol product of tomorrow?**

- ➔ *Preferably a natural active substance of plant or microbial origin.*
- ➔ *Low production cost and good efficacy against the pathogen in order to obtain a cost/effectiveness ratio that can compete with current chemical treatments and to ensure at least the maintenance of the current production yield*
- ➔ *A formulation that allows the biocontrol treatment to be applied in the same way as current treatments are applied (by spraying)*
- ➔ *A substance that is sufficiently resistant to leaching so that it is not washed away from the first rains.*
- ➔ *A substance that is not or only slightly toxic to organisms (with the exception of the pathogen or pest) and with sufficient biodegradability, so that the agent does not end up permanently in the final product or in the soil.*