



Artemis

Natuurlijk

Meeting Cropmix

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July 4, 2024



Artemis

A hand is shown from the top right, pouring water onto a small green plant with two leaves and a budding stem, which is growing out of a mound of dark soil. The background is a soft, out-of-focus green. The word 'Artemis' is written in large white letters on the left, with a small green butterfly icon above the 'i'. Below it, the word 'Natuurlijk' is written in yellow. A white arrow points from the text towards the plant.

Natuurlijk

Artemis is the association for producers and distributors of biological controllers and pollinators, plant protection products of natural origin and biostimulants in the Netherlands

“Resilient plants and sustainable cultivation systems in agri- and horticulture with biology as basis”

- 
- A hand is shown from the top right, holding a small amount of water. The water is falling in a stream onto a small green plant with two leaves and a tiny flower bud, which is growing out of a mound of dark soil. The background is a soft, out-of-focus green and white gradient.
- ✓ Working with nature
 - ✓ Biological Buffering / Standing Army
 - ✓ Natural protection of crops
 - ✓ Inspiration for a healthy future for:
society | the environment | farmers & growers

Global developments



Population-growth



climate-change



Technical developments



Food safety & -security



Green & healthy living environment



Transparency



Crop protection is not a

PRODUCT

Beneficial
insects

B.bees

Mites

Insects

Synthetic
pesticides

insecticides

fungicides

adjuvants

herbicides

Monitoring

Sticky
traps

feromons

scouten

Data

Data

Data

Application
technique

Spraying

Dripping

Bio
stimulants

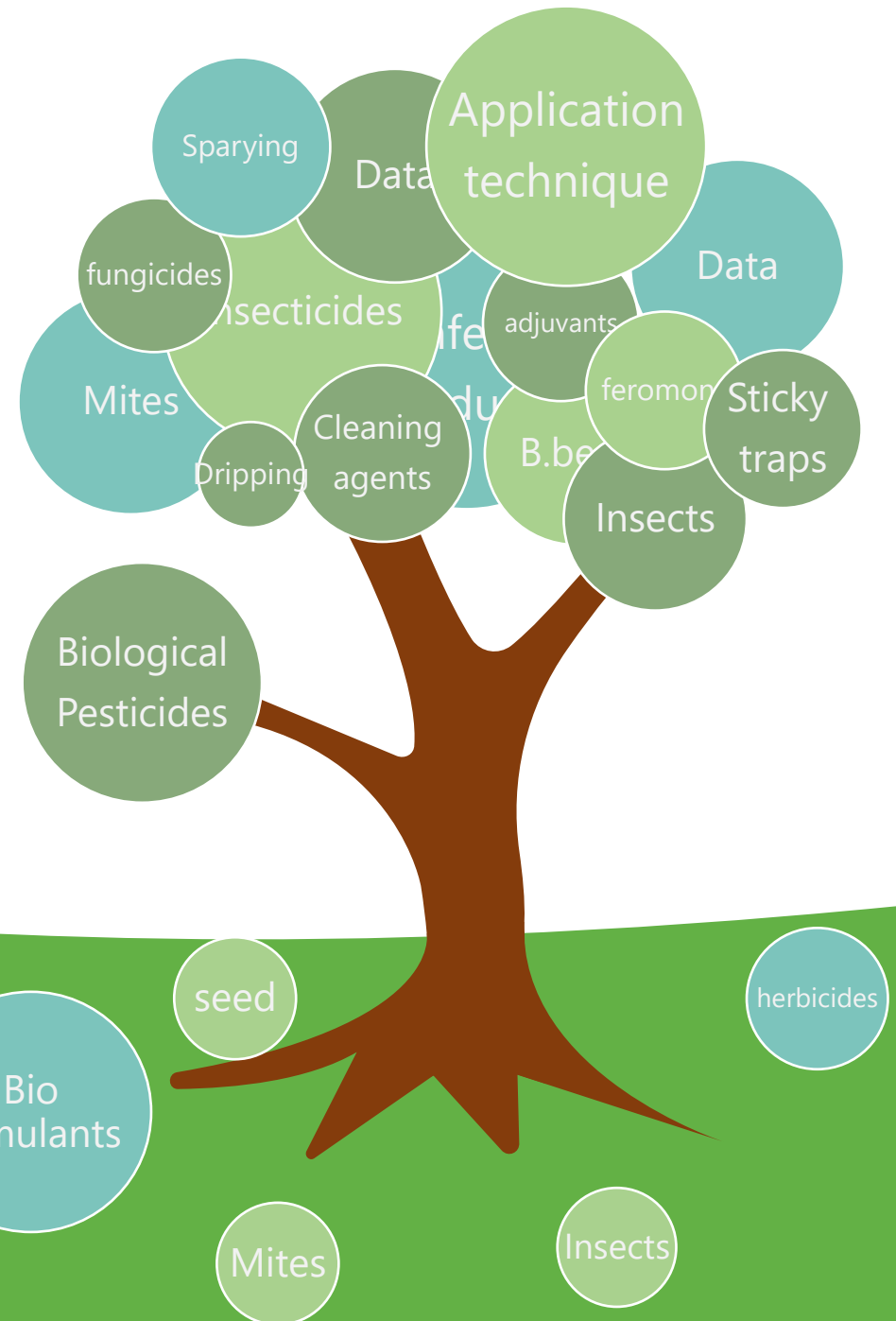
Disinfection
products

Cleaning
agents

~~PRODUCT~~

...we need to move towards a

SYSTEM APPROACH



Consultant Specialist

Transition to resilient plants and cultivation systems



Biology as basis

The transition, based on biology, is essential to meet societal demands for sustainability



Alternatives

Chemical Plant Protection Products cannot be fully replaced by one alternative



System approach

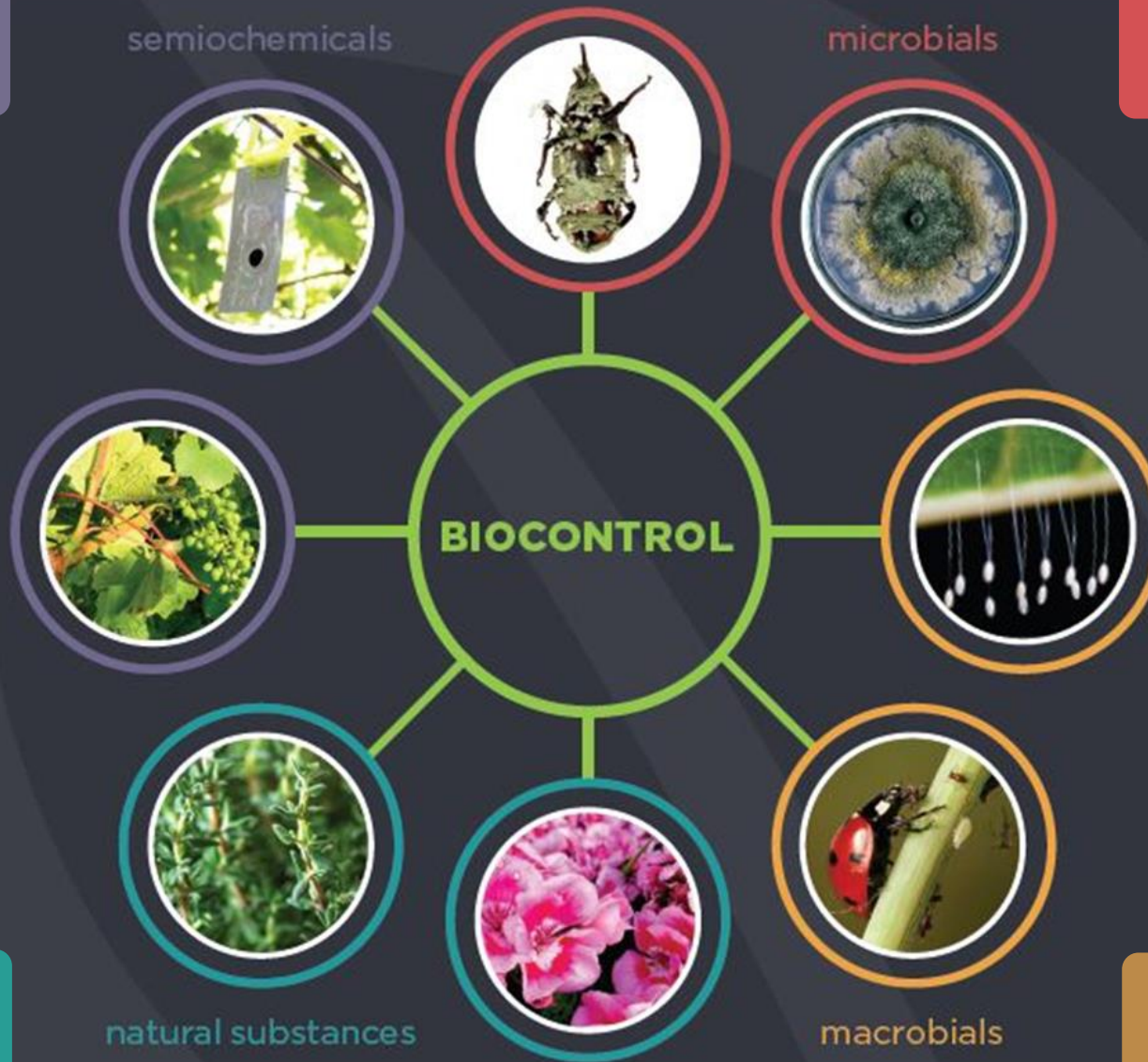
Resilient Plants in combination with biology and technology

Biology as basis

Semio-Chemicals:
feromonen en
vluchtige stoffen



Natuurlijke en
natuuridentieke stoffen
Plantenextracten



Micro-organismen
Schimmels, bacteriën en
virussen



Macro-organismen:
Insecten, mijten &
nemathoden





Biological controllers in greenhouses

- 1920 Whitefly in tomato => *Encarsia formosa*
- 1960 Integrated crop protection Spider mite control in cucumber => Predatory mite *Phytoseiulus persimilis*
- 1980 Mass production biocontrol with bran and prey mites
- 1990 Expansion of biocontrol with various types of biological control
Specialists and generalists => multiple pests
Building up and establishment in the absence of the pest via supplementary feeding with e.g. mites, pollen and shrimp eggs
- 2020 Approx 350 biological controllers worldwide and more than 200 registered microbial BCA's





Biological controllers in greenhouses

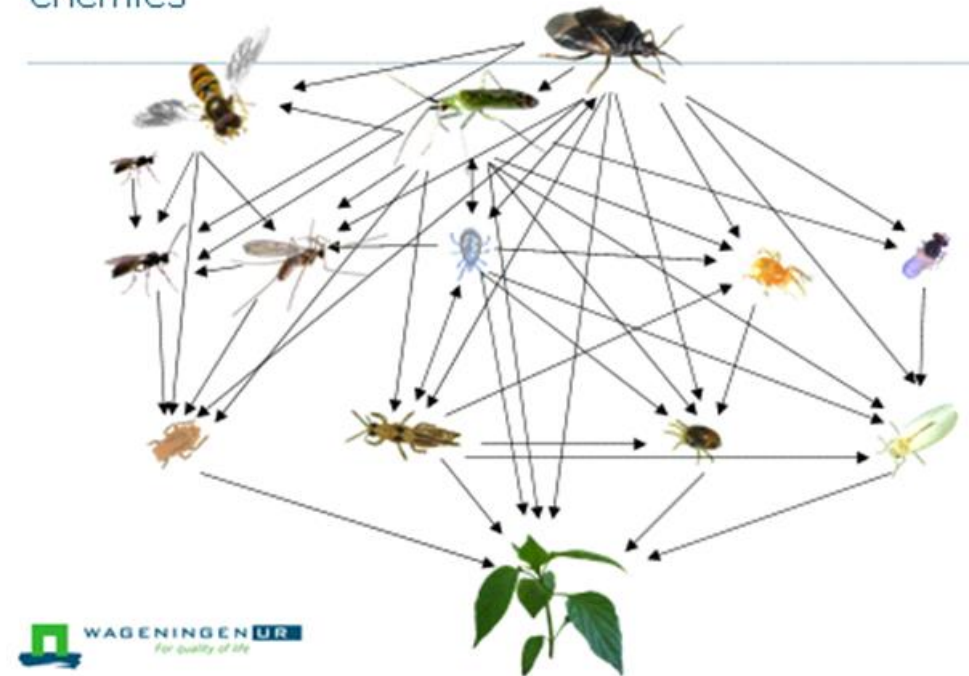
Standing Army of biological controllers

- => From curative to preventive
- => Macro and micro organisms
- => Ecosystem with food and hiding places

Technological developments:

- => Real-time data collection
- => Data-driven IPM / ICM
- => Robotisation

A food web with 4 pest species and their natural enemies



 WAGENINGEN UR
For quality of life



Biological controllers in open field



Bron: Studie UvA



Biological controllers in strip cropping

Natural biological control

Biological control (BC)

=> Conservation BC

=> Classical BC

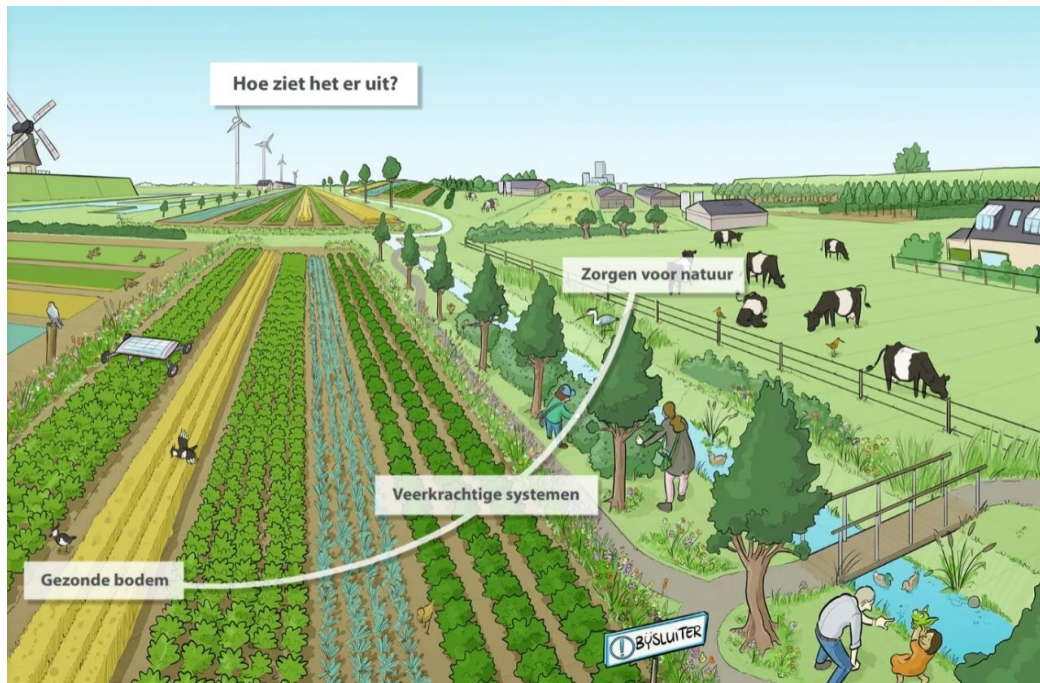
=> Augmentative BC

=> Inundative BC

=> Inoculative BC

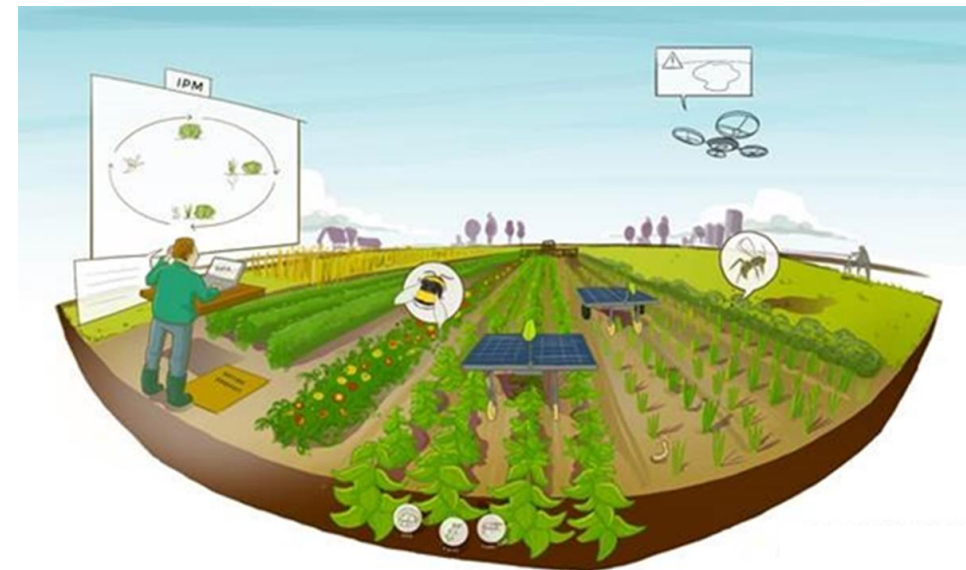


Transition to resilient cultivation systems



Natuurinclusieve landbouw

Bron: WUR



Agro ecologie met hightech
ondersteuning Bron: WUR



Artemis

Natuurlijk

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A close-up photograph of a hand pouring water onto a small green plant growing in soil. The water is captured in mid-air, creating a series of droplets and streams that fall onto the plant's leaves and stem. The background is a soft, out-of-focus green, suggesting a natural, outdoor setting. The overall mood is fresh, clean, and nurturing.

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