



endure

diversifying crop protection

FOOD
QUALITY
AND
SAFETY



ACTA



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun Svizra
Swiss Confederation

Agroscope Changins-Weinenswil Research Station ACW
Agroscope Liebefeld-Posieux Research Station ALP
Agroscope Reckenholz-Tänikon Research Station ART

Consiglio Nazionale delle Ricerche



Danish Agricultural Advisory Service

bba
Biologische Bundesanstalt
für Land- und Forstwirtschaft



IBMA
International Biocontrol
Manufacturers' Association



INRA



INRA Transfert
Filiale de l'INRA



Universitat de Lleida



ROTHAMSTED
RESEARCH



Scuola Superiore
Sant'Anna
di Studi Universitari e di Perfezionamento



Novus Lusitania University



WAGENINGEN UR
For quality of life



SIXTH FRAMEWORK
PROGRAMME



Innovative diagnostic tools and precision spraying

Exploitation of innovative technologies for implementing crop protection strategies.

- Putting the bricks together to build a crop protection system

Carolien Zijlstra, PRI

November 2010, Paris



Overview

Innovative techniques for monitoring environmental data, weeds, beneficials, pests and diseases

- Macro-scale monitoring followed by micro-scale monitoring
- Monitoring in pre-symptomatic phase

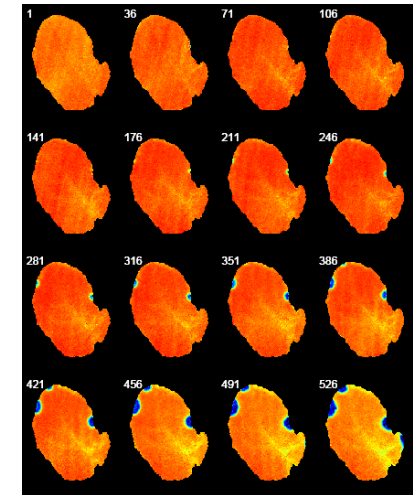
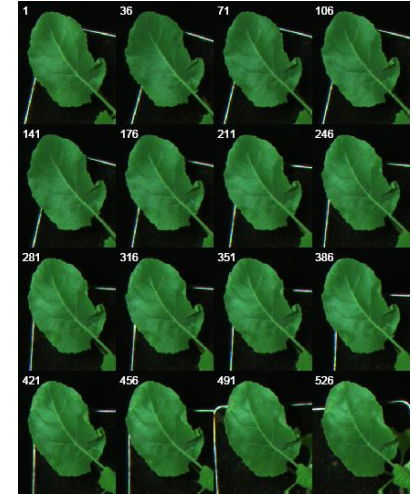
Examples

- Vision techniques
- Detecting volatiles
- Detecting sounds
- Sensors
- Molecular and serological techniques

Innovative biological/alternative control

Innovative precision application techniques

Innovative techniques for monitoring: vision

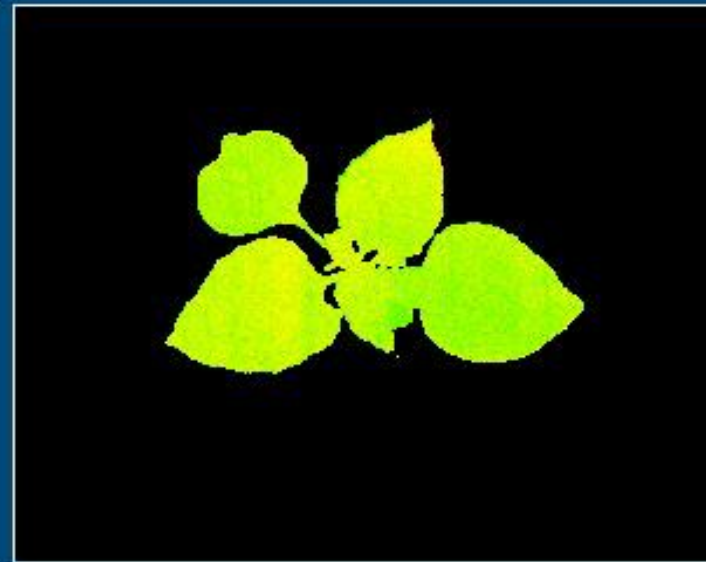


Innovative techniques for monitoring: vision



Sencor
Metribuzin

0% 25% 50% 75% 100%



0 hrs



0 hrs

Innovative techniques for monitoring: volatiles

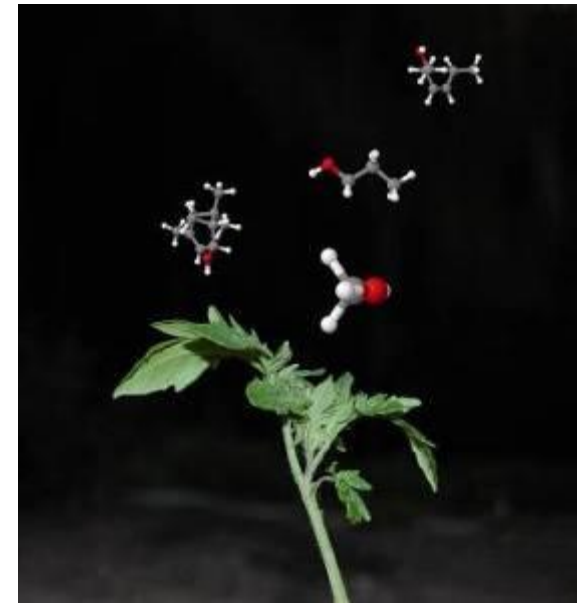


- ❁ **All (!) plants produce volatiles when they are attacked by fungi or insects:**

Quantitative: the heavier the attack the more is produced

Qualitative: specific products are produced

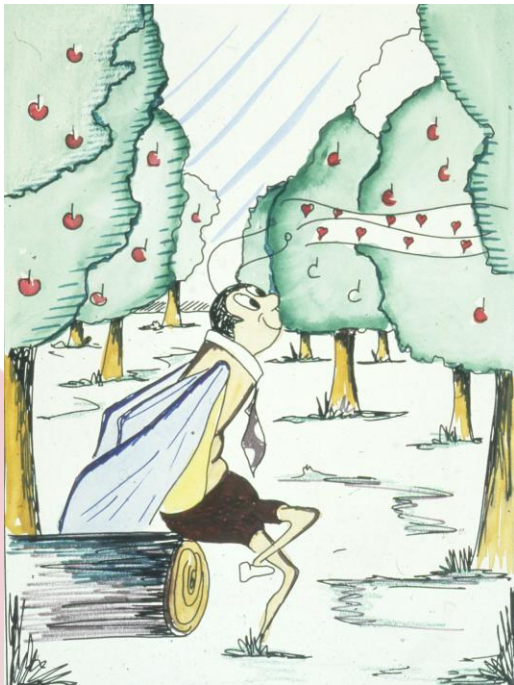
- ❁ **These volatiles can be measured using GC-MS/e-noses**



Innovative techniques for monitoring: volatiles



principles of sex pheromones



detecting



source locating

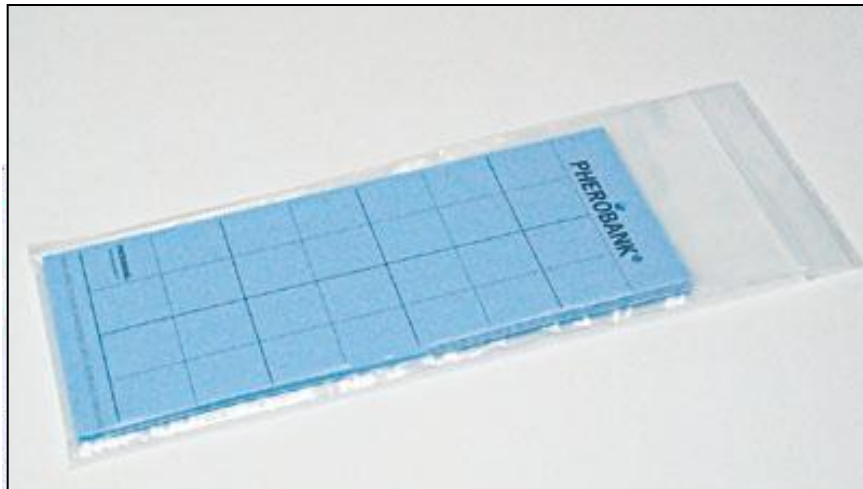


landing

Innovative techniques for monitoring: volatiles



FOOD QUALITY AND SAFETY

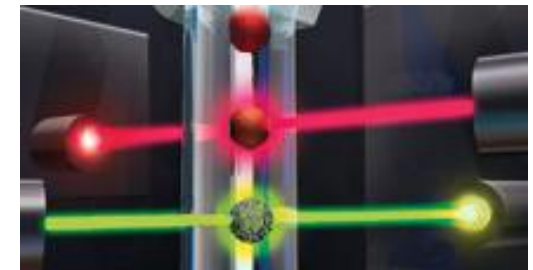
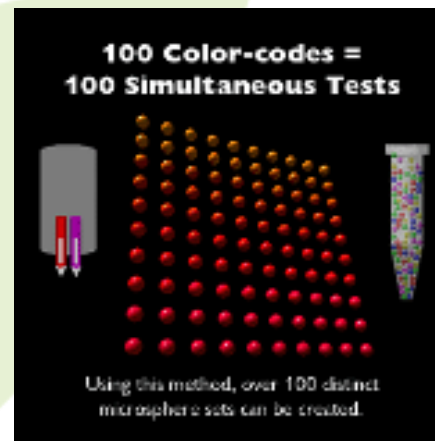
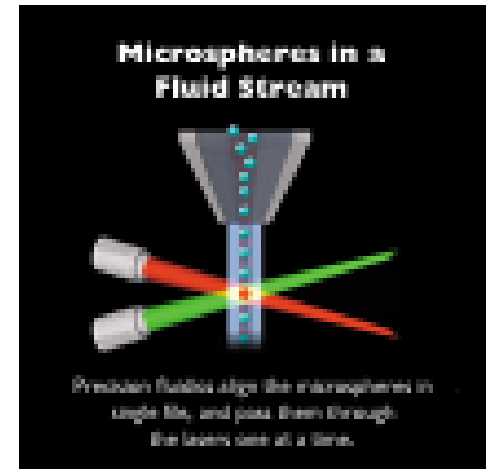
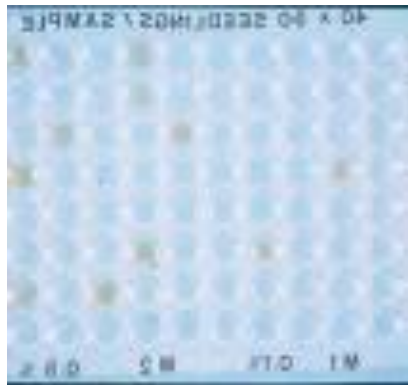


bestrijding met mivc en zijn PPO-
agv en PPR op zoek naar een andere
aanpak. Dit is een geleide bestrijding
geworden, waarmee niet de ritmoal maar
de kniptor wordt opgespoord en bestreden.

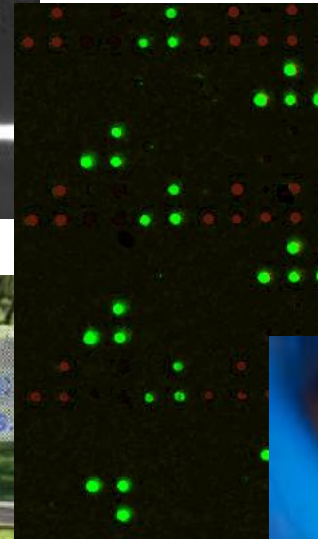
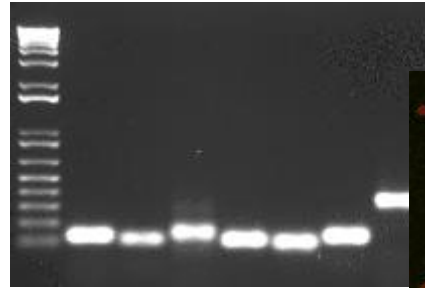
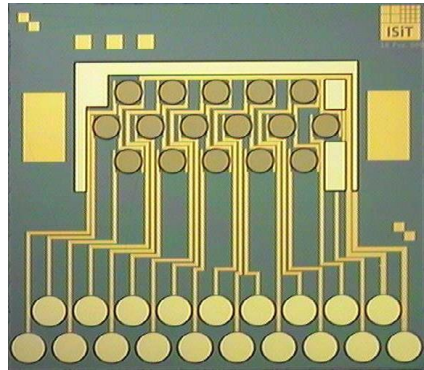
De kniptor is een kleine, donkere
vlieg die op de kniptor. De
gevoelige antenne heeft een
reuk, een teken die uitroep is voor
de kniptor, zoals de kniptor. Maar
het is een kleine, donkere vlieg
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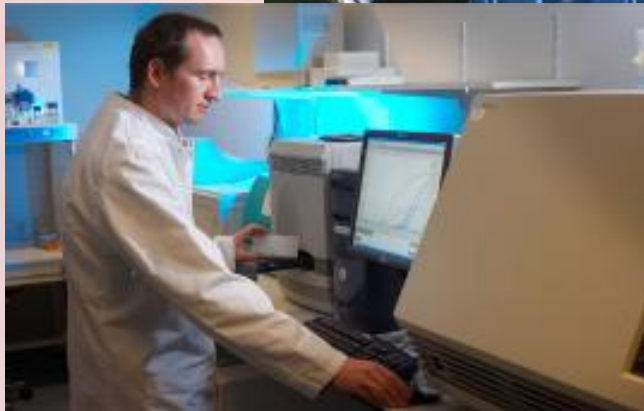
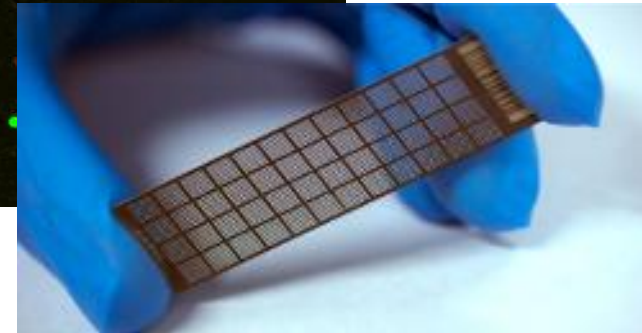
Innovative techniques for monitoring: serological



Innovative techniques for monitoring: molecular



Quality of diagnosis and new diagnostic methods for plant pests: current status and future prospects.



Innovative biological / alternative control



- Use vacuum cleaner: developed to suck up insects
- Laser beam killing
- UV treatment
- Biological control agents (Trichogramma against ECB)
- Stimulation of AMF
- Control of weeds by burning, high pressure air, finger hoeing
- Control using pheromones:
 - Mating disruption
 - Mass trapping
 - Lure and kill

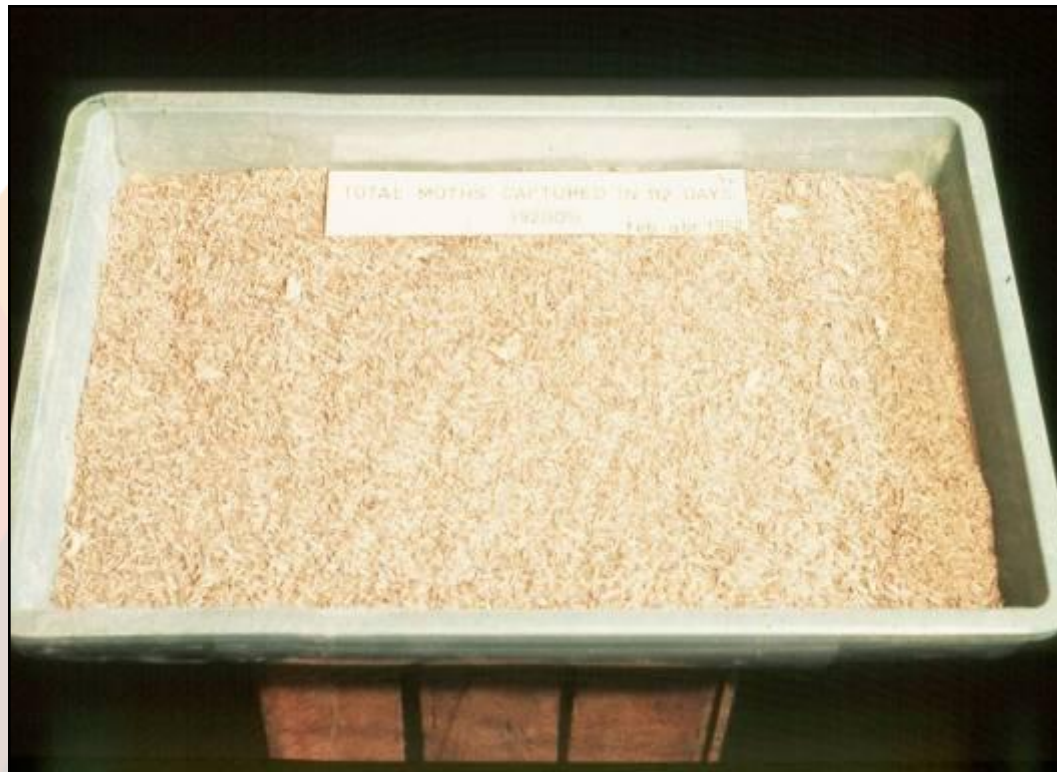


Mating disruption



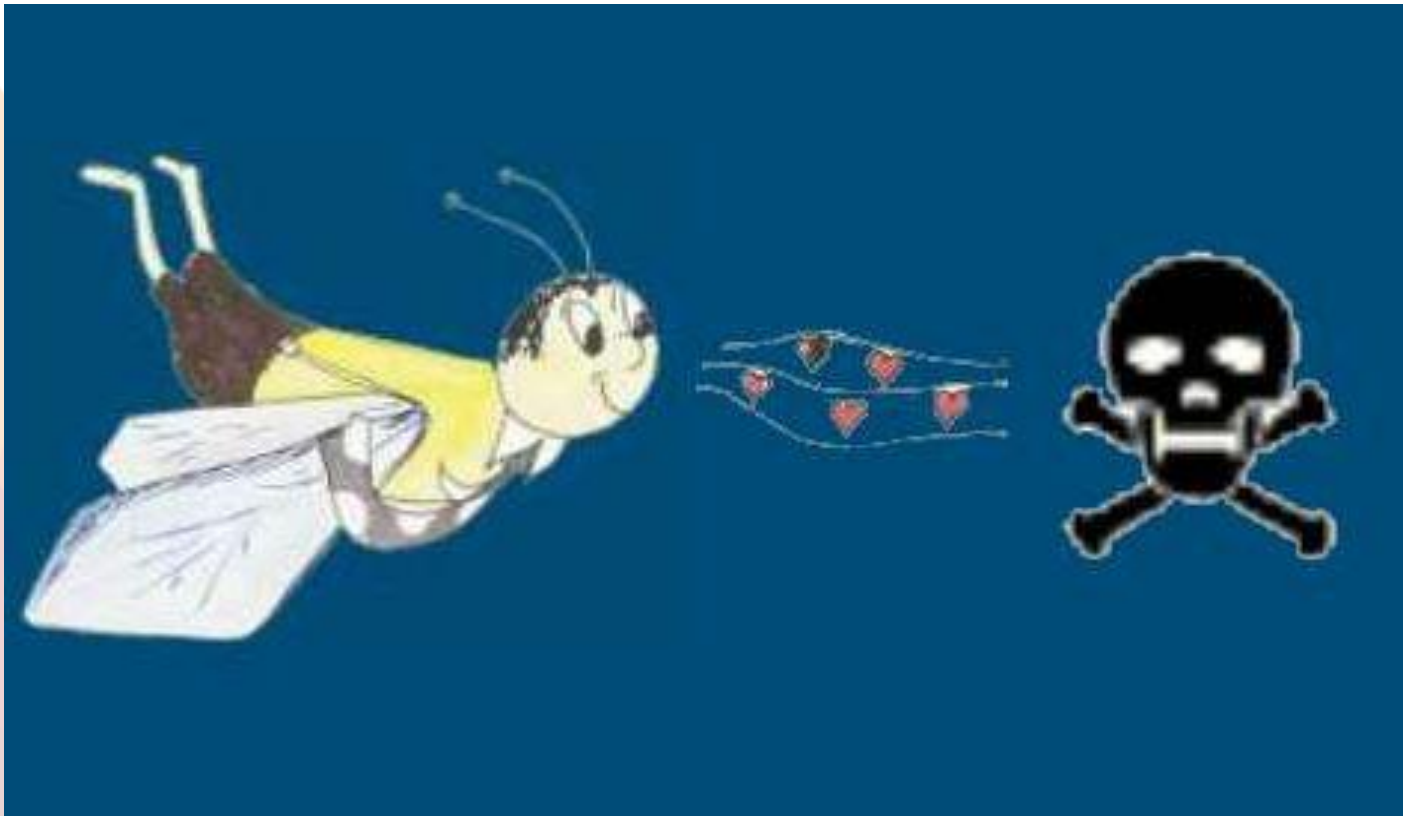


Mass trapping





Lure and kill





Spray application

With high precision to reduce the spread of agrochemicals to the surroundings while obtaining good biological efficacy:

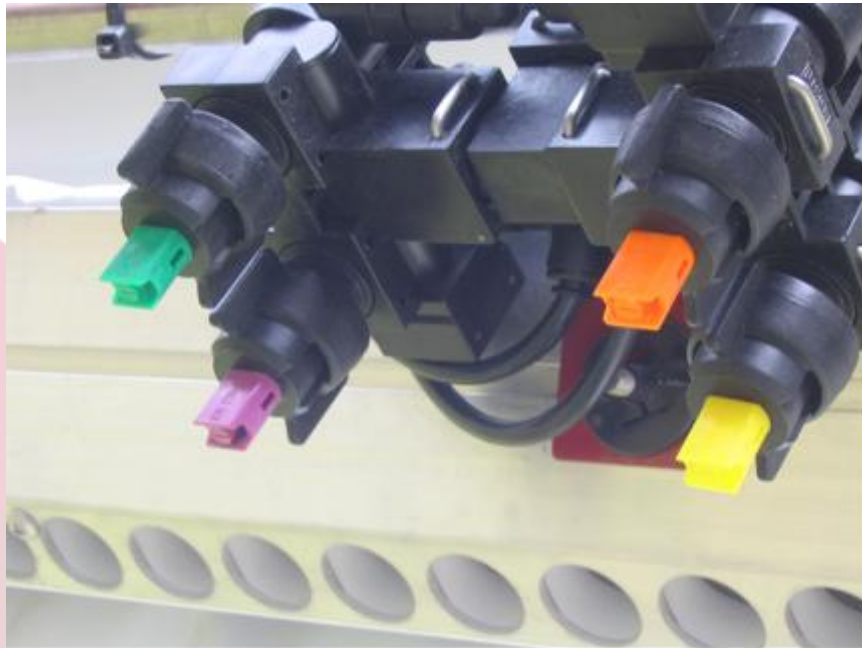
Examples:

- Pesticides can be automatically applied using programmed spray volumes and required doses of pesticides in combination with a GPS system and a spraying robot
- Canopy density dependent spraying
- Precision spraying combined with vision technology (for individual weed plant control)

Innovative precision application techniques



🌿 Precision spray technology



Innovative precision application techniques



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Conclusions



- ✿ Innovative monitoring techniques and precision spray techniques have potential for practical use, but still a lot of research is required before they can be implemented in an innovative crop protection system.
- ✿ Whether the innovative techniques will be implemented in the future depends on several factors such as the context in which the farmer is going to operate i.e. the development of markets, public concern on pesticide use and policy making in general.