Smart traps for vegetable crops

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Focus SmartProtect

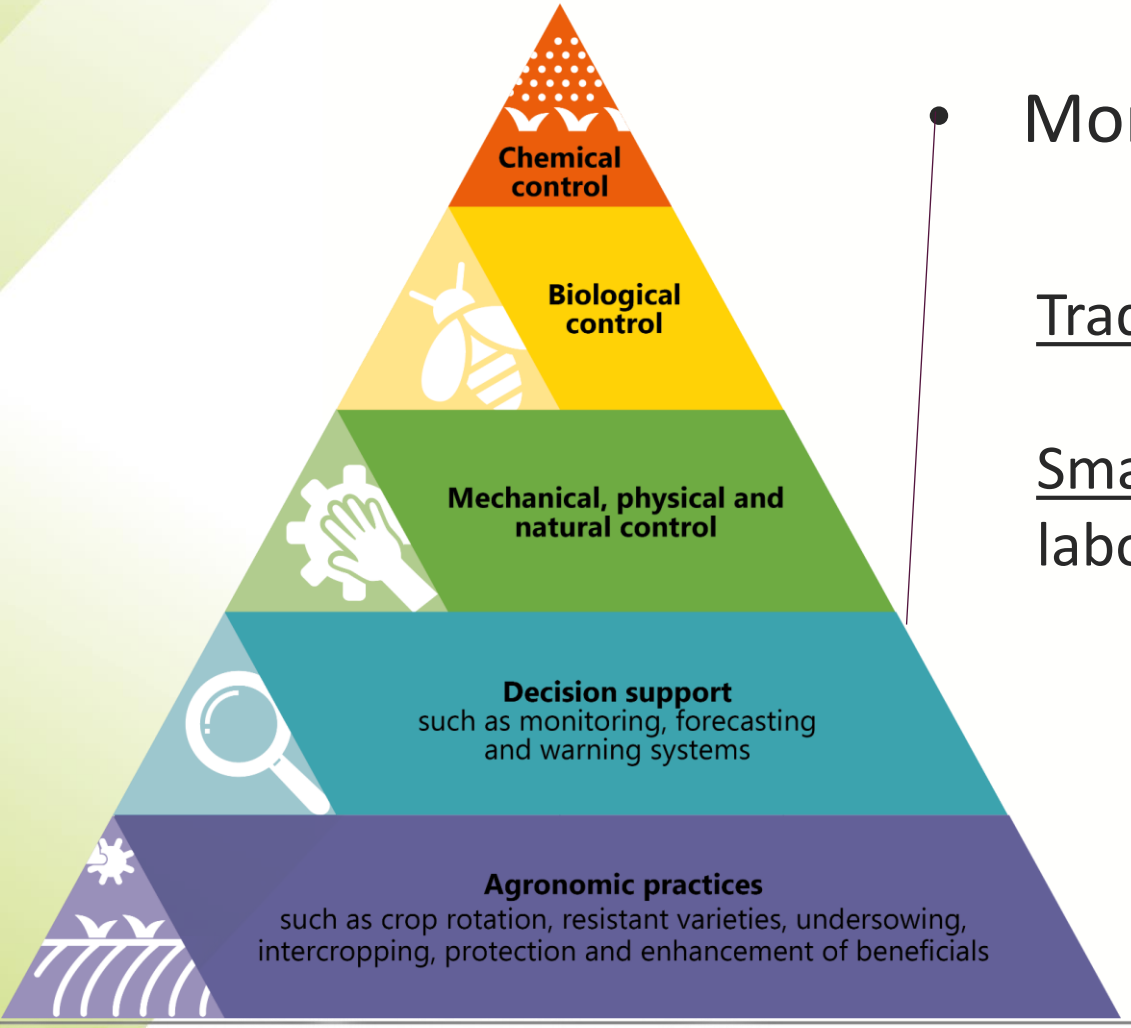
Implementing **SMART IPM** methodologies for innovative **vegetabele crop** protection

Cross regional knowledge sharing

Crop oriënted: brassica’s, carrots, alliums, lettuce, cucumber, tomato and peppers

Cross pollination outdoor - greenhouse

Why smart monitoring?



- Monitoring as part of a decision support system

Traditional monitoring: limited time and space, logistics

Smart monitoring: increase monitoring frequency, labour savings

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Types of monitoring systems

- Camera sensors (combined with image recognition)
- Acoustic sensors
- Measuring resistance/impedance
- Reflection of electromagnetic spectrum (light, infrared, radio waves, other) (LIDAR, RADAR …)
- …

- System with onboard processing vs cloud processing
- Powerful tool combined with forecasting

Overview

System	Technology	Sensor	Implementation	Production system	Focus	Number of reported pests / system	Focus level of detail	Accuracy
Captrap	Image	Pi camera	Trap	Field	Large	1	Genus, Species	+++
CropVue	Image	Pi camera	Trap	Field	Large	1	Genus, Species	+++
Futurcrop	Image	Smartphone	Sticky plate	Field	Large, Small	Many	Genus, Species	+
KU Leuven	Image	Smartphone	Photobox	Field	Small	Many	Species	+++
Semios	Image	Camera, Weather stations	Trap	Field	Large, Small	Few	Genus, Species	++
Xarvio	Image	Smartphone	Sticky plate	Field	Large, Small	Many	Genus, Species	+
e-Gleek	Image	Pi camera	Sticky plate	Field	Large, Small	Few	Genus, Species	++
Scoutbox	Image	SLR camera	Photobox	Greenhouse	Small	Few	Species	+++
Trapview	Image	Pi camera	Trap	Field	Large	1	Genus, Species	+++
Smapp Lab	Image, Weather	Camera, Weather stations	Trap	Field	Large	1	Species	+++
Faunaphotonics	Wingbeat	Laser	In field sensor	Field	Large, Small	Lots	Genus	+
iMetos iScout	Image	Pi camera	Trap	Fiels	Large	Many	Genus	++
Pats-C	Image	Camera	Sensor + Drone	Greenhouse	Large	Few	Species	++
Pats-C/Biobest Trap-Eye	Image	Pi camera	Sticky plate	Greenhouse	Large, Small	Few	Genus, species	++
Spyfly	Image	Camera	Sticky plate	Field	Small	Few	Species	++
EyeTrap	Image	Camera	Sticky plate	Field	Large	Few	Genus	++
iMetos	Weather	T, RH, irradiation	Weather station	Field	Variable	Many	Species	--

Overview - traps tested at inagro

CapTrap

Delta trap tested for *Plutella xylostella* (diamondback moth)

Cap2020 offers 3 connected traps designed for trapping different kinds of pests. To count pests, performant algorithms using deep learning are used and integrated into the trap.

+ plug and play out of the box
+ similar design as conventional delta trap
- algoritm for moth not trained
- platform in French

Overview - traps tested at inagro

Trapview

Open trap tested for *Plutella xylostella* (diamondback moth)

TRAPVIEW is an automated pest monitoring system that can be used to monitor remotely any kind of insect that can be lured into an insect trap.

+ sticky roll with automatic tweaks
+ bleutooth connection, app and good cloud platform
- bycatch
- some installation work to get it ready

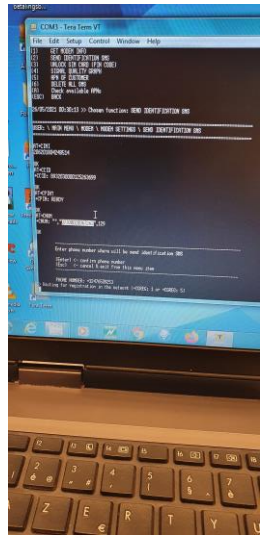
Overview - traps tested at inagro

iScout

Delta like trap tested for *Plutella xylostella* (diamondback moth)

iSCOUT® is an insect trap with integrated electronics (camera system, modem, power source with solar panel) and sticky plate.

+ expandable system with other sensors
+ good platform
- not plug and play in our case
- battery life



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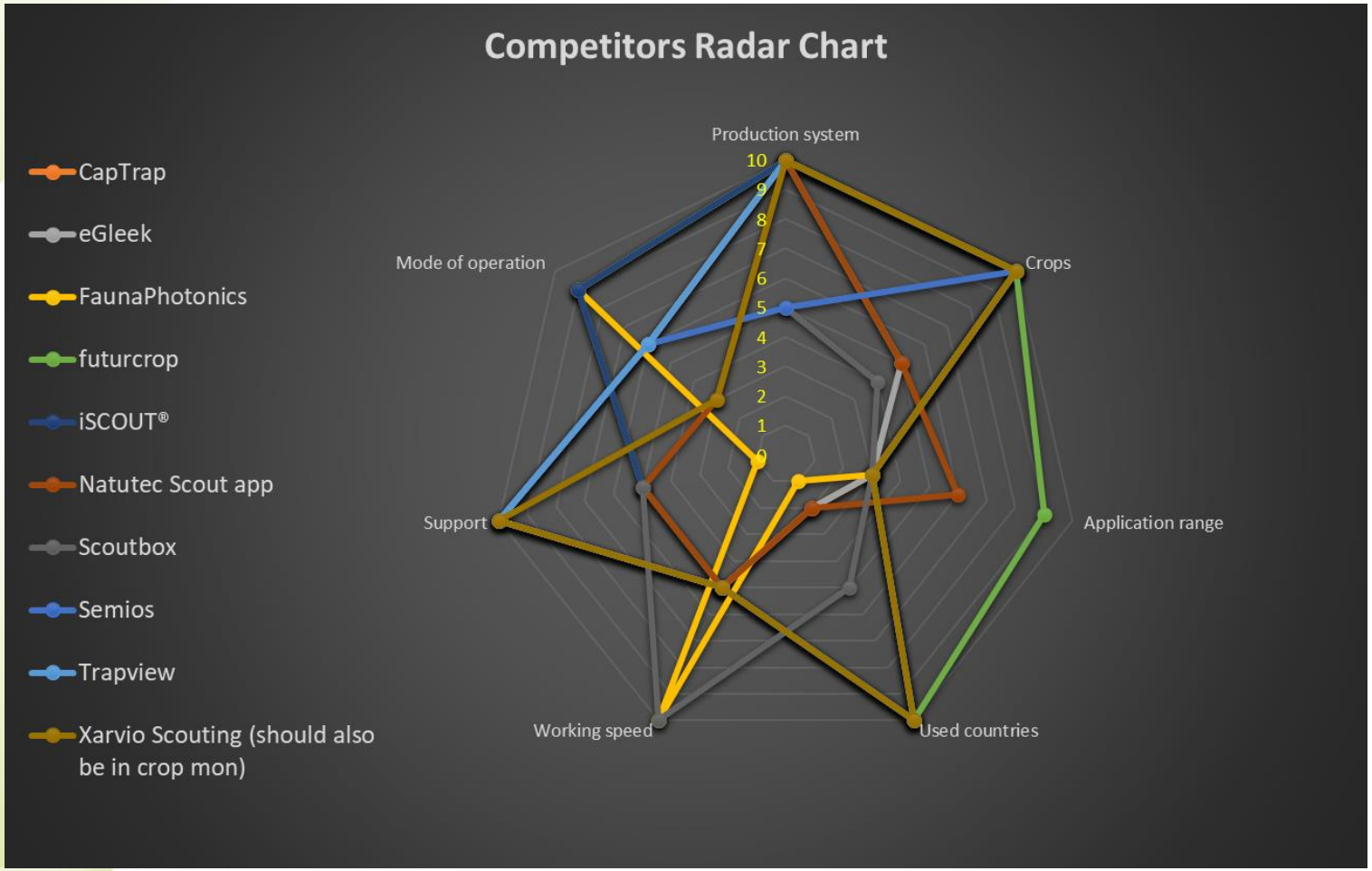
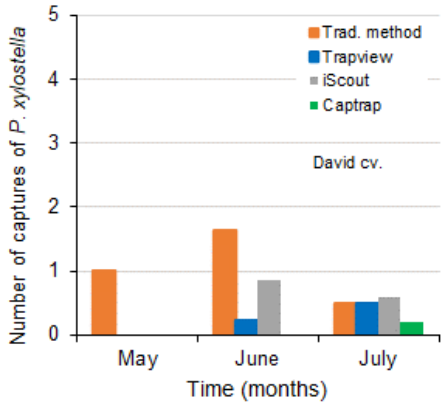
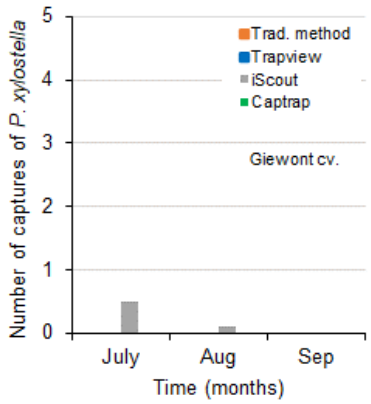
Benchmarking - theory

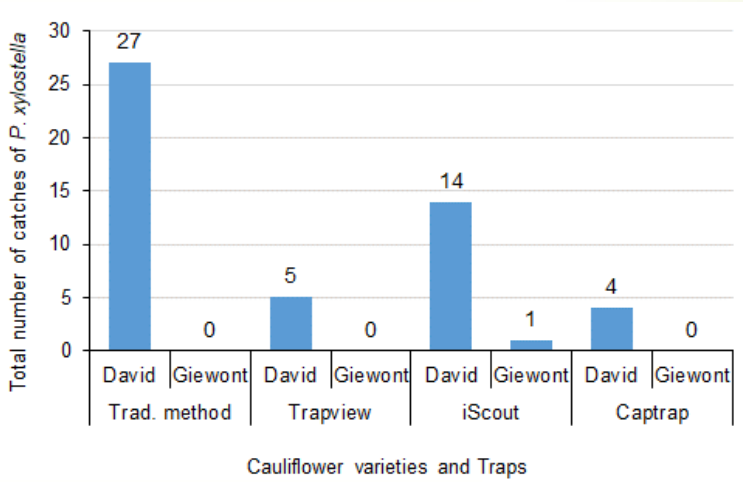


- Generalization
- Weighted scoring system
- Expert opinion
- Limited information

Benchmarking - practical







SWOT analysis

Strengths

S2. Most technologies can be used on a wide variety of crops.

S6. Most of the technologies can be used in all types of terrain (adaptability of the technology to the terrain).

S8. Most of the technologies speed up work.

S9. Great time efficiency.

S11. Some technologies enable wide-area monitoring.

SWOT analysis

Weaknesses

W5. Cost of technologies may pose a limitation to purchase by the farmer.

W6. Mistrust – Misinformation (overpromise) given by some of the technologies and not delivering on promises builds distrust in users and impedes adoption of technology among majority of the users.

W7. Some technologies lack of precision - less interest, more mistrust in using these technologies.

W8. Most technologies can monitor only insects and beneficials. There is lack of technologies for smaller pests and diseases.

W11. When using large number of devices on a larger scale, making decisions becomes more complex and difficult. Most technologies do not provide analytical features on a larger scale.

SWOT analysis

Opportunities

O2. In most of the countries (EU), there is agricultural funding to finance the purchase of these technologies.

O4. Setting the price of the technology in line with the value added for the grower.

O5. Global agricultural and legislation policies are supporting greener technologies (e.g. EU Green deal).

O6. Price flexibility - dialogue - (possibility to have tailor-made prices - buying interest from farmers).

O7. Growth of alternative/biological PPP market – These PPP require more precise application timing.

O11. Lack of work force in agriculture pushes farmers to optimize workloads – looking for technologies that simplify or reduce work.

SWOT analysis

Threats

T1. Barrier to selling the product in countries using conventional pesticides (e.g. US, Brazil).

T4. Large multinational companies (especially chemical and seeds companies) are consolidating the technologies (buying smaller companies) making access to technology harder for smaller farmers.

T5. Long sales cycles of the technology – if beginning of the season is missed, the technology will most likely be adopted only next season.

T6. Increasing average age of the farmers – Older farmers are less inclined to adopt new technologies.

T7. Dependence of the farmer on third parties.

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Thank you!

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