

Nutikad lahendused aiandustootmises

11.12.2024



Päevakava:

10.00 – 11.00. Ülevaade uudsetest lahendustest aiandustootmises: külvist saagikoristuseni. *Priit Põldma, Eesti Maaülikool*

11.00 – 12.00. Kastmise automatiseerimine ja kastmisvajaduse prognoos katmikalal.

“Digital Greenhouse” projekti esmased tulemused.

Juhtmevabad andurid taimede kasvukeskkonna tingimuste seireks.

Tomatikasvuhoone automatiseerimisest tootja vaatenurgast. *Tamar Nassar (Tami Automatics OÜ) ja Mirko Metsaoru (Weiss Aiand OÜ)*

12.00 – 12.40 Lõunapaus

12.40 – 14.00 Taimekahjustajate seire nutikad lahendused ning haiguste prognoosimudelid erinevatel kultuuridel avamaal. *Priit Põldma*

14.00 – 15.10 Erinevate seireseadmete ja ilmajaamade demonstratsioon. Arutelu, kohapeal tekkinud küsimused.

Nutikad lahendused aiandustootmises

11.12.2024



Taimekahjustajate seire nutikad lahendused ning haiguste prognoosimudelid erinevatel kultuuridel avamaal.

Priit Põldma



- 16 partnerit
- 12 riigist






















smartprotect-h2020.eu

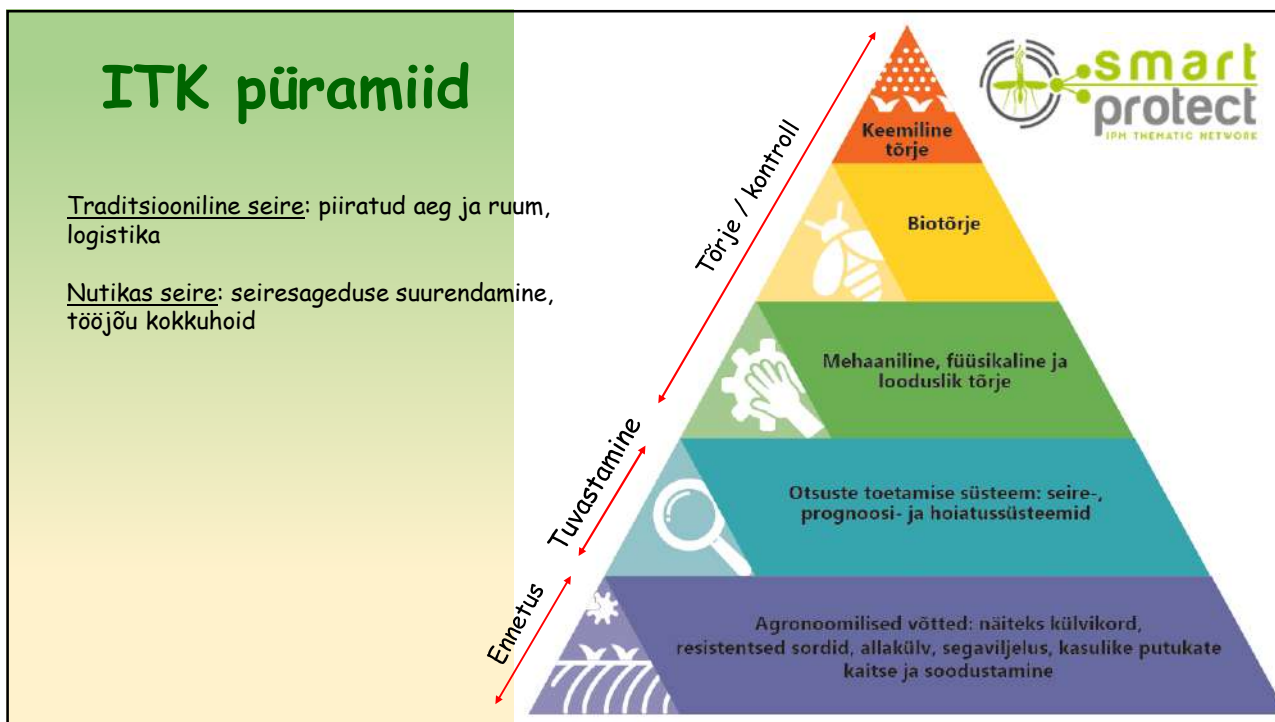
 @SmartProtectIPM
  @SmartprotectIPM

 @SmartProtect IPM

<https://platform.smartprotect-h2020.eu/>




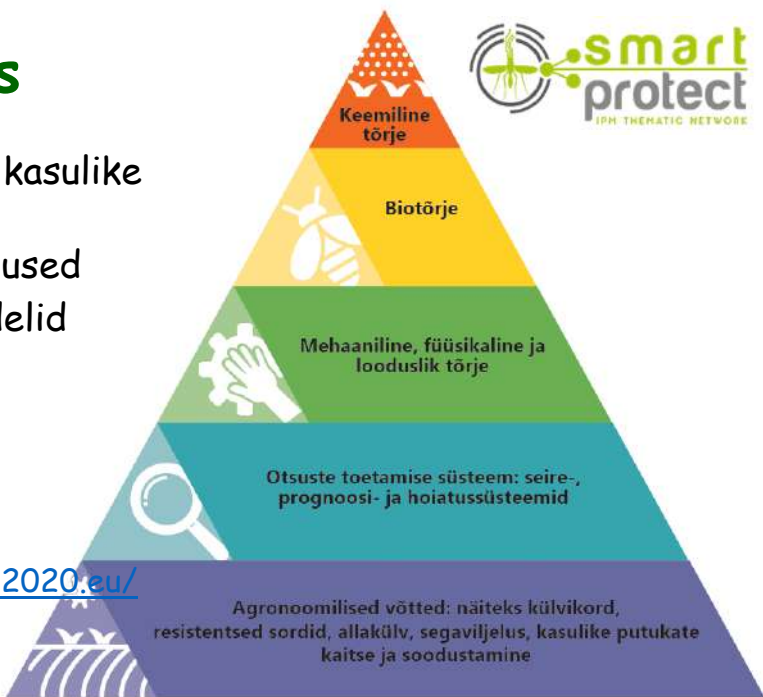
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 862563.



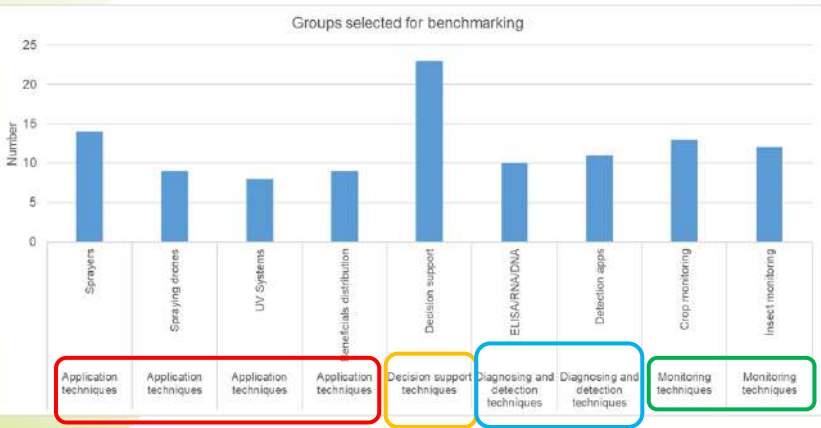
Peamine fookus

- Kahjurite ja haiguste ning kasulike putukate määramine
- Innovaatilised seirelahendused
- Kahjustajate ennustumudelid (hoiatus- ja otsustamise abisüsteem)
- Innovaatilised biotõrje tehnoloogiad

<https://platform.smartprotect-h2020.eu/>





1. Info kogumine: 279 → 197 tehnoloogiat



Group	Number
Sprayers	14
Spraying stations	9
UV Systems	8
Pesticides distribution	9
Decision support	23
ELISA/RNA/DNA	10
Detection apps	11
Crop monitoring	13
Insect monitoring	12

Application: 45
Decision support: 43
Diagnosing + detection: 72
Monitoring: 37



SmartProtect platform [Smart Protect - Home \(smartprotect-h2020.eu\)](https://smartprotect-h2020.eu) Keele valik

Technique Types

- Application techniques : 48
- Decision support techniques : 43
- Diagnostic and detection techniques : 72
- Monitoring techniques : 38

Application Range

- Bacteria 43**
Sprayer vision
Hybrid 2.1 Agricultural spr...
Hybrid 2.1 Agricultural spr...
- Beneficials 22**
Alumaster 2.0
Bovablaizer
Burdota App
Ecoation
Bio-prender

4 tehnoloogia rühma

SmartProtect platform [Smart Protect - Home \(smartprotect-h2020.eu\)](https://smartprotect-h2020.eu)

Application Range

	Bacteria 43 Sprayer vision Hybrid 2.1 Agricultural spr... Spray Assist app Innok - Spraying Robot SPE... Greenhouse sprayer OPRE...		Beneficials 22 Alumaster 2.0 Bovablaizer Burdota App Ecoation Bio-prender
	Fungi 10 Agri Tech App Cropfly Sprayer vision Hybrid 2.1 Agricultural spr... Burdota DNA Auto spore tr...		Insects 11 Sprayer vision Hybrid 2.1 Agricultural spr... Spray Assist app FOODINPROUD - BugSmartTr... Trailed sprayer WHRUMM...
	Mites 48 Sprayer vision Hybrid 2.1 Agricultural spr... Spray Assist app Trailed sprayer WHRUMM... Innok - Spraying Robot SPE...		Nematodes 25 Innok - Spraying Robot SPE... Drooling Hord 350 Undercover Burdota App FutuCrop
	Viruses 43 Burdota App Agri - Kempri/ARV VBT Ecoation Vargaret Campodest		Others 25 Drooling Hord 350 Undercover Dublet Wipe sprayers CropSurfer™ - Silexium Vargaret

199 Smart Tools dividend in 8 Application ranges

SmartProtect platform [Smart Protect - Home \(smartprotect-h2020.eu\)](https://platform.smartprotect-h2020.eu/)

← Otsingu funktsioon

Filters

Technology Readiness: Clear

Production System: Clear

- Greenhouse
- Open field

Technique Type: Clear

- Application techniques
 - Sprayers
 - Spraying drones
 - UV-systems
 - Distribution systems for beneficials
 - Others
- Decision support techniques

Application Range: Clear

- Bacteria
- Beneficials
- Fungi
- Insects
- Mites
- Nematodes
- Viruses

Active Filters

Production System: Greenhouse X Production System: Open field X Technique Type: Application techniques X

Technique Type: Monitoring techniques X

UV-C 'Dragon' unit

The Dragon delivery system is mounted to a tractor and pulled at a precise speed through the field to deliver the required dose. The optimal dose and schedule will vary for different crop and pathogen systems. When designing for a new crop/pathogen system, the optimal procedure is determined through a combination of laboratory and field studies to ensure that disease severity is reduced while minimizing damage to the crop. This is being developed by the Lighting Research Center (LRC) in the USA. Information online at: <https://lightandplanthealth.org/dragon.html>. The LRC is part of a university and not a manufacturer, hence we are selling these units. The website includes plans which farmers could construct their own units to use and evaluate if they wish, and the arrays are being used and tested in ongoing research with farmers.

Lumion UV-C robot

The company, actron (merged with Private Kompani in 2021) makes robotic platforms. Their xenon robotic platform equipped with UV-C lights is called Lumion. Lumion helps to manage powdery mildew on strawberries using UV-C light. The fungus specific DNA absorbs the UV-C light, thus avoiding damage to the crop. It is a robot that can move around the crop. The platform can operate on rails or tires.

<https://platform.smartprotect-h2020.eu/>

Filters

Technology Readiness: Clear

Production System: Clear

- Greenhouse
- Open field

Technique Type: Clear

- Application techniques
 - Sprayers
 - Spraying drones
 - UV-systems
 - Distribution systems for beneficials
 - Others
- Decision support techniques

Application Range: Clear

- Bacteria
- Beneficials
- Fungi
- Insects
- Mites
- Nematodes
- Viruses
- Others

Active Filters

Application Range: Fungi X

Nippon Gene LAMP products

LF-8 Plus® is a device that can perform a variety of measurements related to the LAMP method, including gene polymorphism analysis, turbidity measurement, gene amplification analysis using fluorescent substances, and reassociation curve analysis. It was originally developed as a genetic polymorphism analysis device using the LAMP-FLP method. Different primer sets are available. https://nippongene-analysis.com/en/detection_nlp/

LOEWE - Plant Pathogen ELISA Kits

Complete kits contain all the components to perform an ELISA assay, i.e. IgG and AP-conjugate solution, positive and negative controls, ELISA buffers and chemicals, substrate tablets, and high-binding ELISA plates or stripe modules. Tests for plant viruses, fungi and bacteria. Starting in 2022 the company will release new diagnostic kits for molecular and serological detection of plant pathogens.

Plant Pathogen test Kits from Ephyra Biosciences Inc.

The company carries all Agritech, Pocket Diagnostic, Mirena Biotech, BioTNA and Loewe innovative products for the detection of plant pathogens. Also available are Ephyra Biosciences testing services which provide a full range of diagnostic assays for the detection of bacteria, viruses, fungi and phytoplasma using ELISA or PCR methods, to provide customers with rapid and rigorous testing for accurate and reliable results.

IKOS DSS

This product consists of IoT equipment with real time readings of humidity, temperature, leaf temperature, VPD and solar radiation for disease diagnosis.

Information on platform

platform.smartprotect-h2020.eu/en/view/prn/164
🔍 🔗

Official website Guidance Log in

📱 🌐 📧
📱 🌐 📧

Lumion UV-C robot

Technology Readiness Level: **TRL 9**

Farm Scale Types: Big scale, Small scale

Description

The company's partner (merged with Finis to Kompanio in 2021) makes robotic platforms. Their vision robotic platform equipped with UV-C lights is called Lumion. Lumion helps to manage powdery mildew on strawberries using UV-C light. The fungus specific DNA absorbs the UV-C light, thus avoiding damage to the crop. It is a robot that can move around the crop. The platform can operate on rails or tires.

[Visit Website](#)

Crops Used

- ☑️ Cucumber
- ☑️ Strawberry

Crops Possible

- ☑️ All

Countries Used

- ☑️ Belgium
- ☑️ Canada
- ☑️ Germany
- ☑️ Netherlands

Countries Not Suitable

- ☑️ No Countries

Species

- ☑️ Range of species

Tech Requirement Comment

- ☑️ System on rail or concrete path > 2.4m needed

Training Comment

Information on platform

CapTrap

Technology Readiness Level: **TRL 9**

Farm Scale Types: Big scale, Small scale

Production Systems: Greenhouse, Open field

Technique Types: Decision support techniques, Monitoring techniques, Insect monitoring (Monitoring techniques)

Application Ranges: Insects

Company Name: Cap2020

Country Origin: France

[Visit Website](#)

Description

Cap2020 offers 2 connected traps designed for trapping different kinds of pests. The funnel trap is suitable for trapping noctuids, but also other pests such as the boxwood borer. Thanks to the attractiveness of the pheromone and the analysis of the movement of the insect in the trap, only the target insect is counted. The second trap is an ideal tool for monitoring populations of corn pests including the European corn borer; the Creel trap has for several years proven its worth in mass trapping of this pest. This trap works with a specific pheromone. The vision trap as third system is a multiple pests trap. The CapTrap Vision system was designed to identify and enumerate pests on sticky plates. To count pests, performant algorithms using deep learning are used and integrated into the trap. The counts are sent directly to your Captrap account, allow real-time monitoring of the presence of the pest and optimal interventions.

Crops Used

- ☑️ All
- ☑️ Brussels sprouts
- ☑️ Cabbage
- ☑️ Cauliflower
- ☑️ Corn
- ☑️ Head cabbage (white, red, savoy)
- ☑️ Maize

Crops Possible

- ☑️ All

Countries Used

- ☑️ France

Species

- ☑️ Autographa gamma
- ☑️ Plutella xylostella
- ☑️ Agrotis segetum
- ☑️ Range of species

Information on platform

Technique Types
Decision support techniques, Monitoring techniques, Insect monitoring (Monitoring techniques)

Application Ranges
Insects

Company Name
Cap2020

Country Origin
France

Contact Person
contact@cap2020.fr

Special Requirement

Need for a special agricultural landscape

Need Special Training

Crops Possible
All

Countries Used
France

Species

- Autographa gamma
- Plutella xylostella
- Agrotis segetum
- Range of species
- Tuta absoluta

Tech Requirement Comment
The traps are completely autonomous, because they are connected to solar panel. They are geolocated to a GPS location. The aim-cards are multi-operators communicating in the world that will always be able to communicate with you on all continents. An optional weather forecast for a temperature and humidity is available.


Cost Detail
Buy a trap : from 500 €
Rent a trap : between 200 and 400 € per season (depends on the trap and the duration)


Example Cases/Additional information
Meligethes aeneus, Mamestra brassicae, Striacosta albicosta, Comptosia humilis, Sesamia nonagrioides, Lathraea botrana, Bupalus piniarius, Cryptobates gribbelli, Drosophila fovealis, Geococcyxvitrinella, Cydia pomonella, Cydia funebrana, Thaumetopoea pityocampa

Support
Free central support

Media Files

Youtube Videos





Liimpüünised

- Ühtlaselt laiali kasvahoones
- Eelkõige seireks
- Seireks: 0,5- 1 /100 m²
- Kahjustaja väljapüügiks: 1 püünis/5-20 m²









Liimpüünised - rullis

- Kogu rivi pikkuselt
- Kurgil, tomatil 20 cm kõrgusel taime ladvast
- Salatitel, ürtidel nt laudade all



Liimpüüniste analüüs on töömahukas



<https://www.koppert.com/pherodis/>



Feromoonid liblikaliste, koide, mardikate seireks/väljapüügiks nii kasvuhoones kui avamaal
 Liigispetsiifilised (60+ liiki)

- *Autographa gamma* – Lina-tähtöölane

The McPhail Trap



Feromoonpüünis + (seebi)vesi

<http://www.biobestgroup.com>

Mobiilirakendused

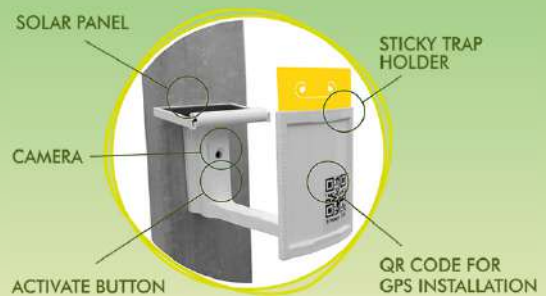
- Koppert Natutec Scout mobiili- rakendus aitab kiiremini kahjureid identifitseerida
- Hetkel: kasvuhoone karilane, ripslased



<https://www.koppert.com/natutec-scout/>

Biobest Trap-Eye

- Autonomous glue trap



<https://www.biobestgroup.com/products/trap-eye>

Kahjurite seire automaatsed süsteemid

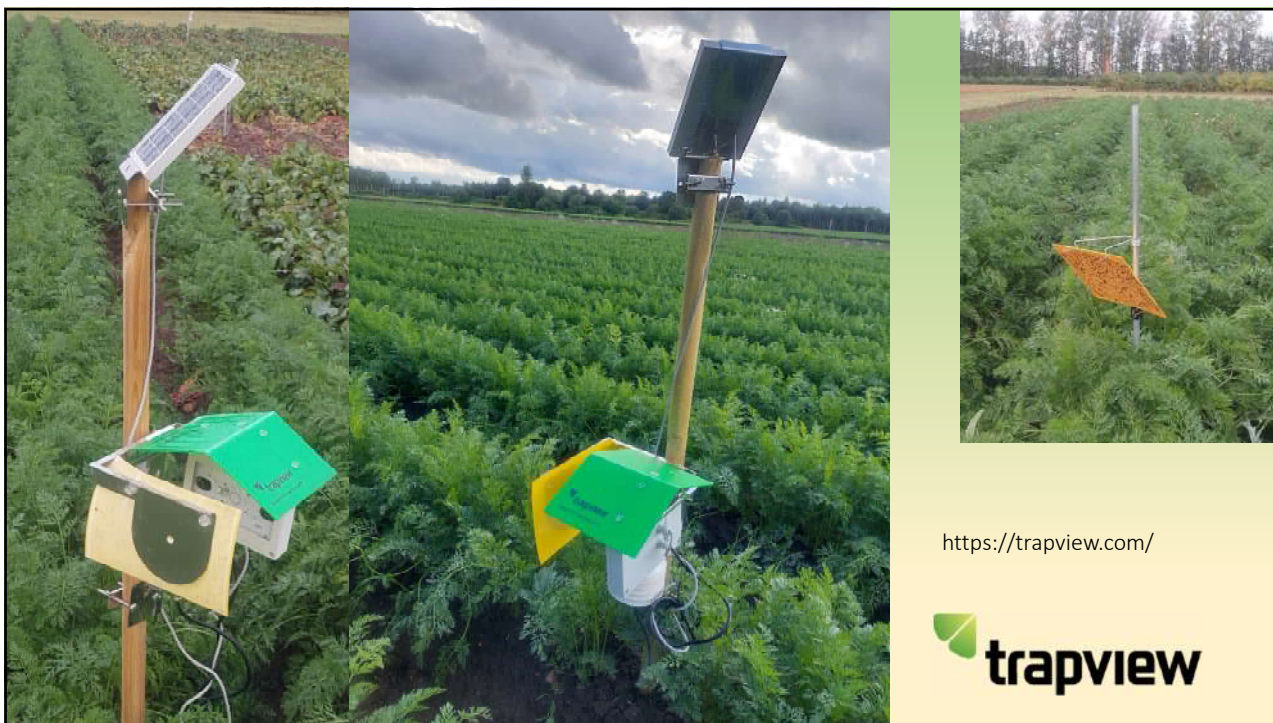


Autonoomne kaameraga feromoonpüünis putukaid meelitava valgusega

→ saadab info arvutisse või mobiili

- Kapsad, porgand, tomat, õunapuud jpt.
- Saab lisada ka temperatuuri ja õhuniiskuse andmed


<http://www.trapview.com/en/>

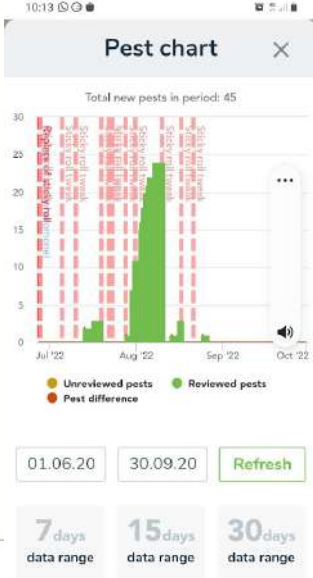



<https://trapview.com/>


 **trapview**

Kapsakoi (*Plutella xylostella*)









Kahjurite seire automaatsed süsteemid

CapTrap






<https://www.cap2020.online/>



<https://www.cap2020.online/>

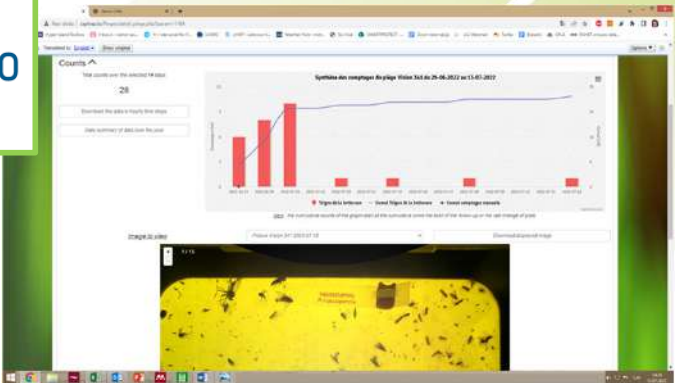



Evolution des comptages sur la période sélectionnée



Accéder au détail des comptages de ce piège

Fermer



- nn. Plug and Play
- Lülitis käima ja töötab
- Vajab mobiilset internetti
- Tulemused arvutis
- Liimpüünise vahetamine käsitsi



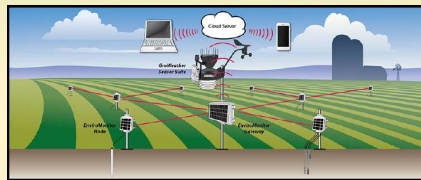
Putukaseire automatiseerimine



METOS ISCOUT® TRAPS



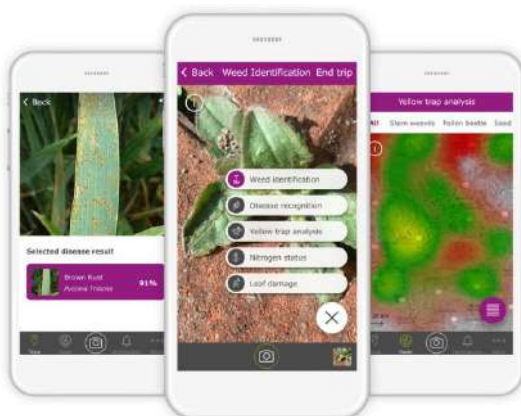
Metos iScout



<https://metos.at/iscout/>



Mobiilirakendused



Crop-Scanner App



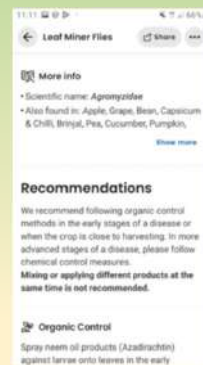
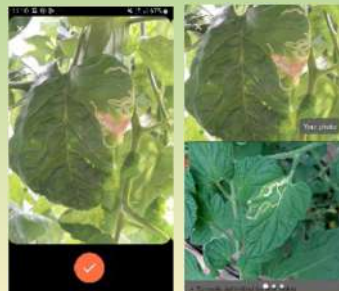
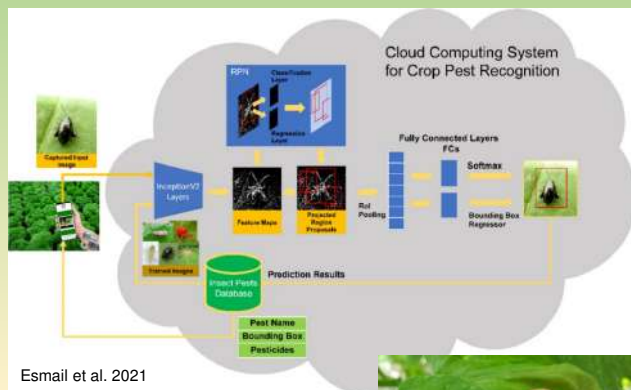
<https://www.crop-scanner.com/>

Plantix



Mobiilirakendused (AI baasil)

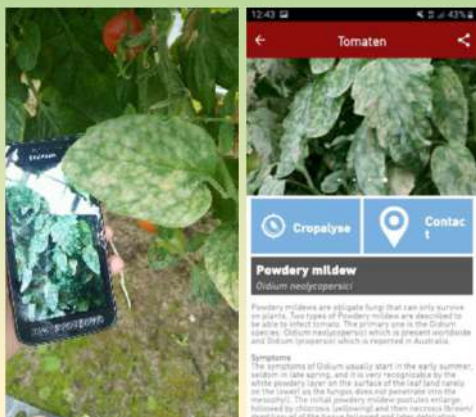
➤ Tehisintellekti abil pildipangast ja mobiiliga tehtud pildi automaatne võrdlus



➤ nt, Plantix App

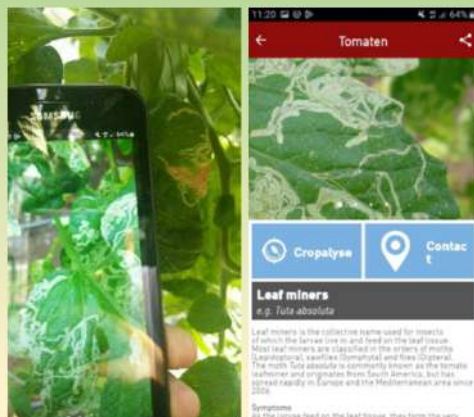
Mobiilirakendused (nn käsitsi)

➤ Pildipangas olevate piltide võrdlemine (põllul, kasvuhoones)



Haigused

➤ Cropalyse App



Kahjurid

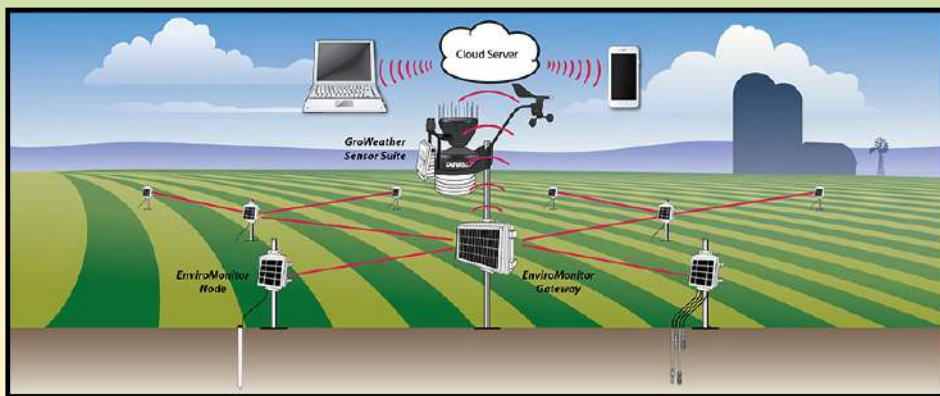


Ilmajaama põhised haiguste ja kahjurite leviku prognoosimudelid

iMetos
UC Davis



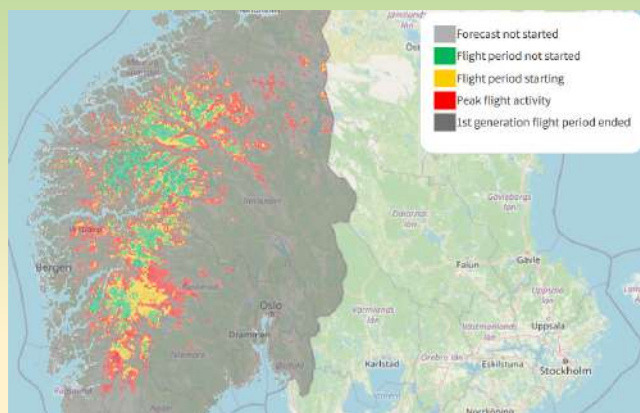
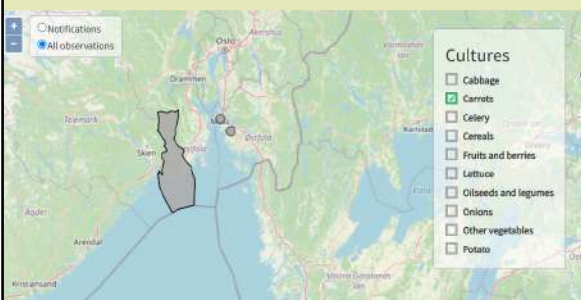
<https://www.vips-landbruk.no/>



Ilmajaama põhised haiguste ja kahjurite leviku prognoosimudelid

RimPro mudelid

- Teraviljad, Õunapuu
- Porgand, Sibul
- Kartul, Kapsad
- Salatid
- Maasikas
- jm



Carrot rust fly (*Psila rosae*) temperature model

Ilmajaama põhised haiguste ja kahjurite leviku prognoosimudelid

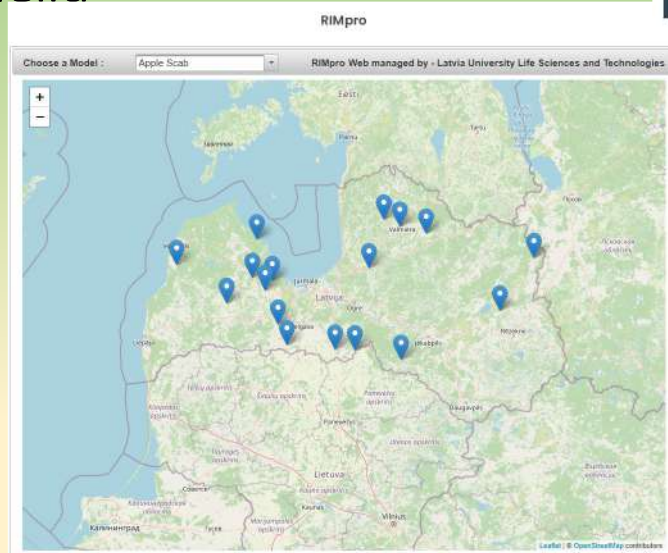


LĀTIS

RimPro mudelid

- Ūnapuu kärntõbi
- Tüvevähk
- Ūnamähkur

<https://agrihorts.lbtu.lv/lv/node/260>



Kahjustajate seire

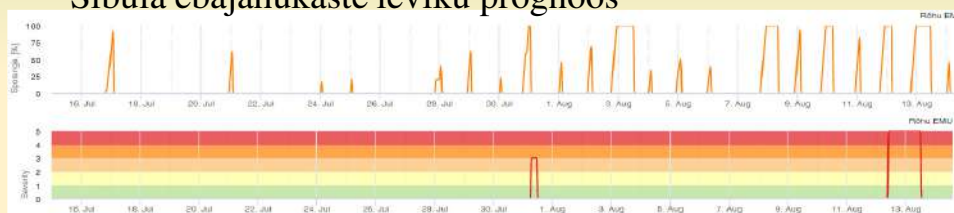
- Ilmajaamade prognoosimudelite järgi
- iMetos 3.3 (temperatuur, sademed, lehepinna niiskus jne)

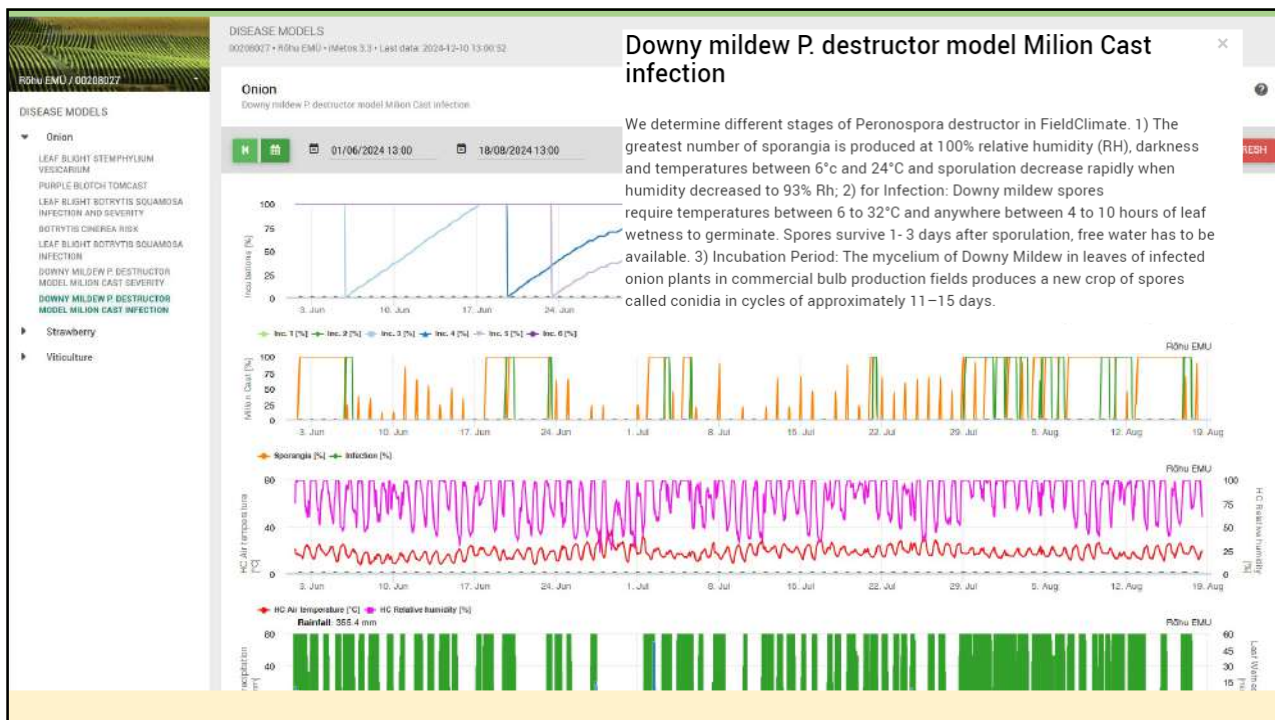


Sibula hahkhallituse leviku prognoos

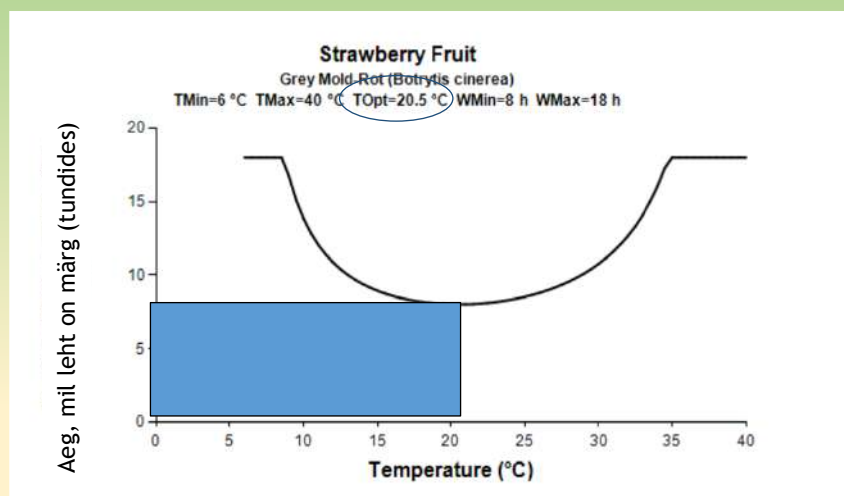


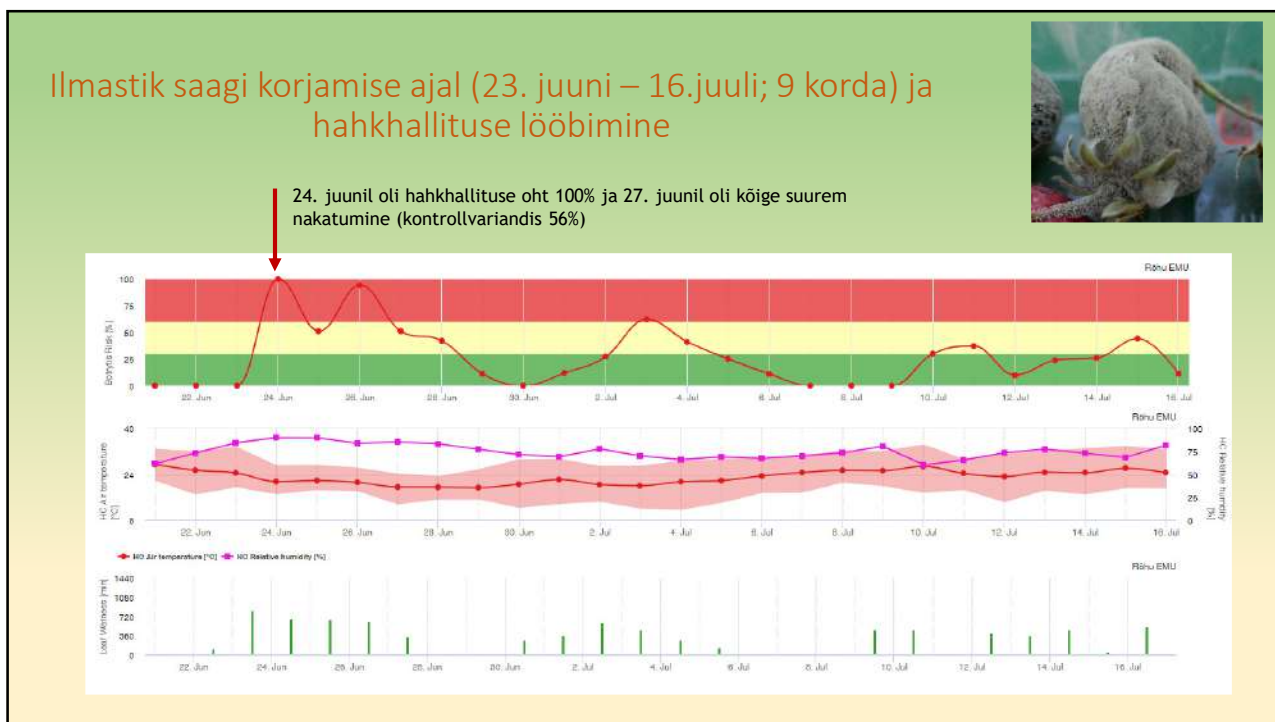
Sibula ebajahukaste leviku prognoos





Maasika hahkhallituse tõrje ilmajaama prognoosimudeli abil Bulgeri mudel arvestab aega, mil leht on märg (leaf wetness), temperatuuri ja õhuniiskust





TULEMUSED

Fotod: Ulvi Moor

Hallitanud viljade hulk ühel katselapil (20 taime) 30. juunil



KONTROLL

OSOONIVESI

TAVA (Switch-Signum-Switch)

Signum (1x, 60% õitest avanenud)

Ilmajaama- põhine (1 x Signum õitsemise lõpus)

ELISA, RNA ja DNA kits haigustekitajate seireks



Nt. kartuli lehemädanik

<https://www.pocketdiagnostic.com/products/plant-disease-tests/>

<https://platform.smartprotect-h2020.eu/>

Monitoring or plant protection works with drones

- Smart Crop Damage Identification
 - Damages by wild animals,
 - Flooded areas
 - Night frost damages
 - Other visible damages



<https://www.dronevolt.com/>

- Plant protection works
 - spraying
 - Spreading of biocontrol

Crop monitoring



Crop treatment

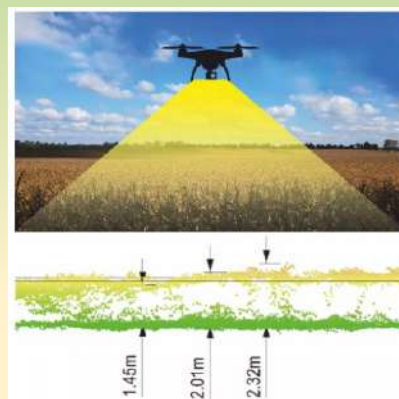


Droonid avamaal

- Smart Crop Damage Identification
 - Ulukikahjud,
 - Üleujutuste kahjud
 - Öökülmakahjud
 - jne. visuaalsed kahjud



- Analüüsib taimede kõrgust, värvust → võimaldab hinnata taimede toitumist või põuda/liigniiskust jne



<http://agrocompolska.pl/#scdi-intro>

Droonid avamaal

- Smart Crop Damage Identification
 - Ulukikahjud,
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 - Öökülmakahjud
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- Analüüsib taimede kõrgust, värvust → võimaldab hinnata taimede toitumist või põuda/liigniiskust jne



Täna kuulamast!

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