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Robotteknologi i bærproduktionen – Status og hvad bringer fremtiden?

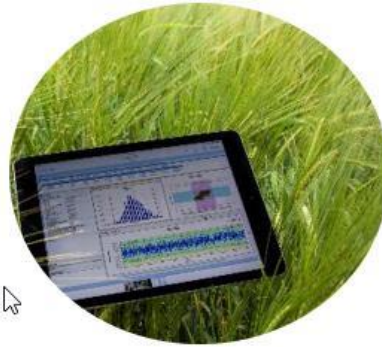
Thomas Nitschke, Teknologisk Institut





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- Planteavlstekniker
- Faglig leder i Teknologisk siden 2016
- Fokus på droner, sensorteknologi, markrobotter og præcisionsteknologi





From Smart Farming towards Unmanned Farms

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Unmanned farms: *“A new production mode, which does not require labor force but adopts diverse novel technologies such as IoT, Big Data, AI, fifth-generation (5G) technology and robots, for performing all farm production operations through remote control, whole process automatic control of its facilities, equipment and machinery or autonomous control by robots.*

The unmanned farm is the ultimate form of intelligent agriculture and the highest standard of agricultural production” 10/02/2021

- National Innovation Center for Digital Fishery, China Agricultural University, Beijing
- Beijing Engineering and Technology Research Centre for the Internet of Things in Agriculture, Beijing
- Key Laboratory of Agricultural Information Acquisition Technology, Ministry of Agriculture, Beijing
- College of Information and Electrical Engineering, China Agricultural University, Beijing



Hvilke teknologier – og hvordan vil de ændre bærproduktionen (og landbruget)?

- Droner giver information
- Robotter sparer mandetimer
- Visionanalyse og AI giver nye muligheder
- Helt nye produktionssystemer

■ Wingtra testflyvning



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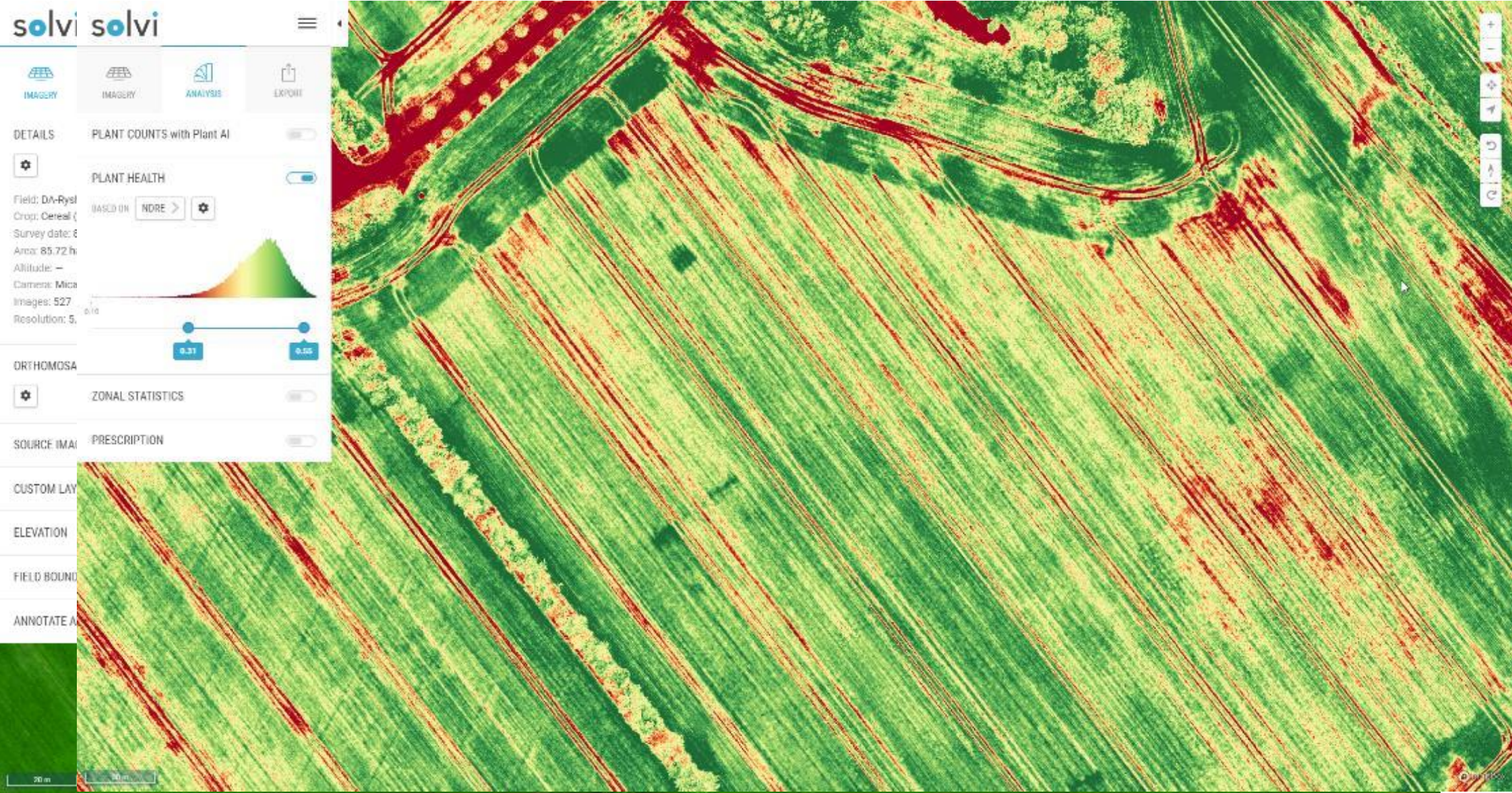


220 ha i en overflyvning



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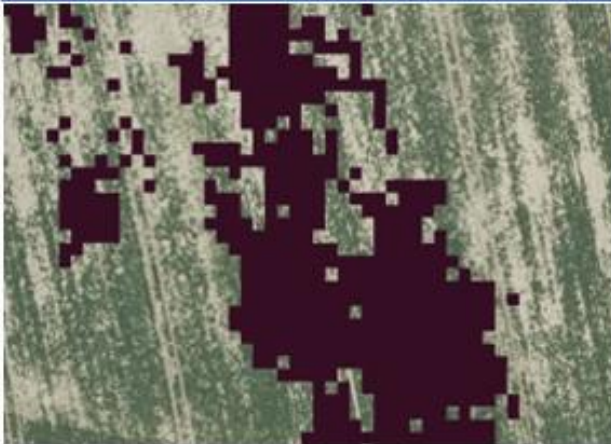
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Spotsprøjtning

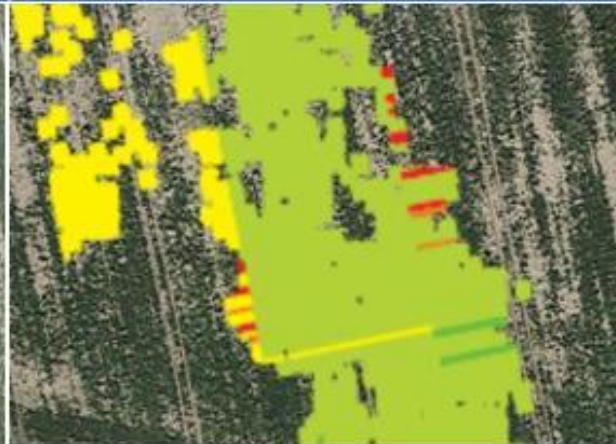
- Teknikken på sprøjterne virker
- Ned til 0,8 m² felter i marken



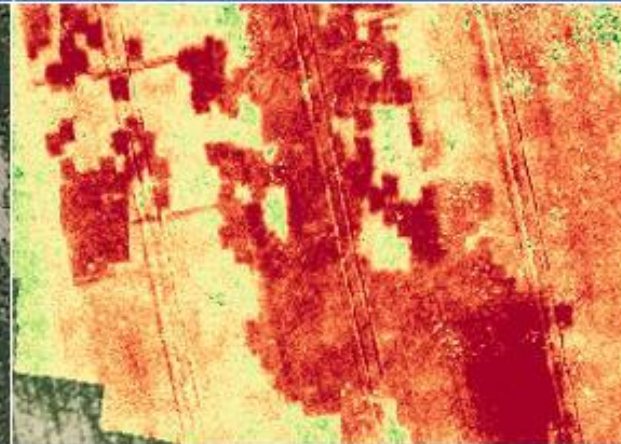
Tildelingskort fra Thistle Tool



Ass Applied fil fra sprøjten



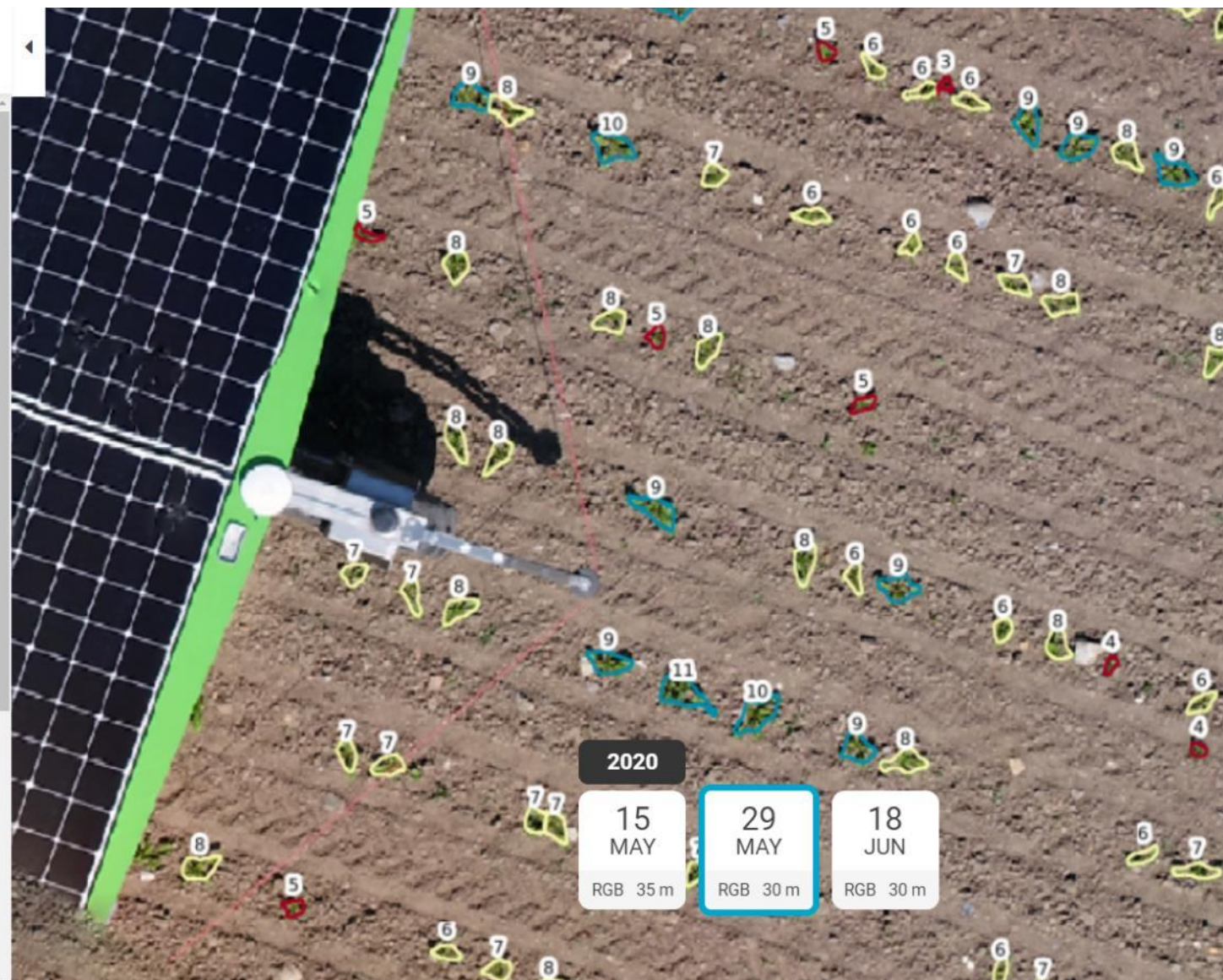
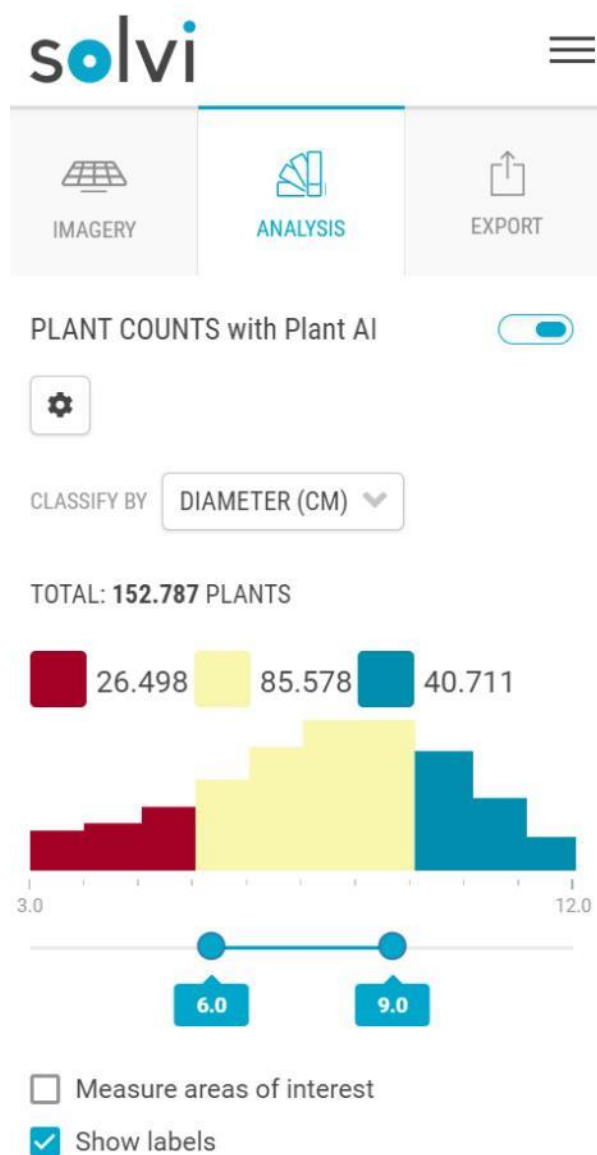
Den røde farve på marken



■ Plantetælling



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IMAGERY



ANALYSIS



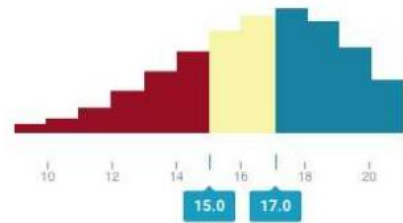
EXPORT

PLANT COUNTS with Plant AI



CLASSIFY BY

DIAMETER (CM) ▾



% of Total

Plants

✓		39%	32,835
✓		28%	23,227
✓		33%	27,545

TOTAL: 83,607 PLANTS

+ ADD CATEGORY

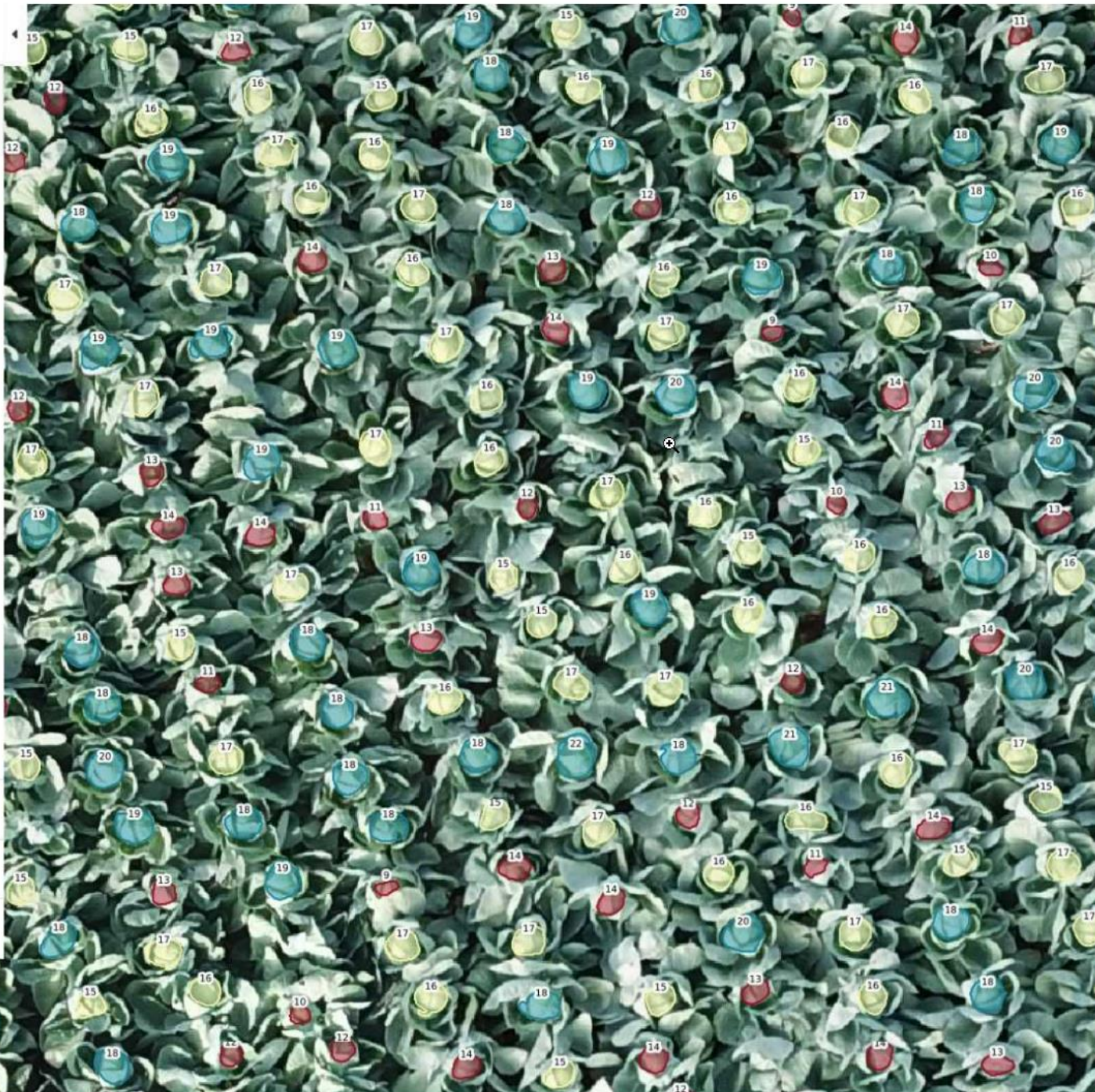
PLANT HEALTH



ZONAL STATISTICS



PRESCRIPTION

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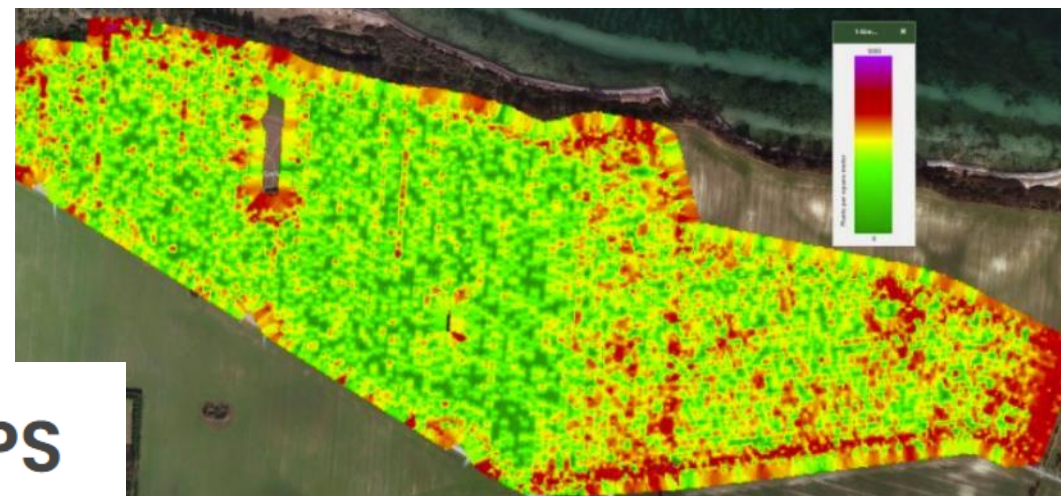


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HECTO DRONE

- Drone til mapning af ukrudt og spotsprøjtning
- Bygget til BVLOS flyvning (Beyond Visual Line of Sight)
- RoboWeedMaps – Machine Learning genkendelse af ukrudtsarter og tildelingskort



RESEARCH

RoboWeedMaPS

Robotter sparer mandetimer



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Tom Christensen, Dyrehøj vingård
8-10 gange årligt
2 km/t. 50 km. rækker



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SAVOY CABBAGE
WEEDING





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Foto: Niels Enggaard Klausen, HortiAdvice





- Ole Green: Det mest centrale teknologispring bliver kunstig intelligens, AI:

»Vores erfaring som landmænd bygger på viden og overlevering fra ældre generationer. Men AI dør aldrig, og med nettet går intet tabt. Alt bliver dokumenteret, og med træning af de neurale netværk kan robotter pleje og dyrke planter med en viden og indsigt, der er os mennesker langt overlegen,« siger Ole Green.





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Visionanalyse og AI giver nye muligheder





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Markrobot test





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WORLD
ECONOMIC
FORUM

**This robot can pick
raspberries without
squashing them**

Footage:



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Helt nye produktionssystemer



Perennial Crops



Wind breaks



Strip Cropping





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it's all about innovation..

Spørgsmål?

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