

How drones contribute to plant breeding?

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2nd NFTN Conference, 8th Feb 2024, SLU Uppsala



Benefits of Drones in Crop Field Trials

Time Efficiency: Rapid data collection, reduced labor requirements

Spatial Coverage: Overcoming limitations of ground-based observations, covering large areas

Data Accuracy: High-resolution imagery, precise measurements, improved analysis



Drones For Plant Breeding

Crop Monitoring: Trial establishment, spatial analysis, environmental monitoring

Genotype Selection: Trait assessment, diversity analysis, screening

Breeding Program Management: Decision support, resource optimization, breeding strategies



Our Research Focus

Drone Selection: Drone model, flight time, camera specifications

Sensor Integration: RGB, Multispectral, thermal

Drone operation: Altitude, overlap

Data Processing: Image analysis, GIS tools, machine learning algorithms, storage

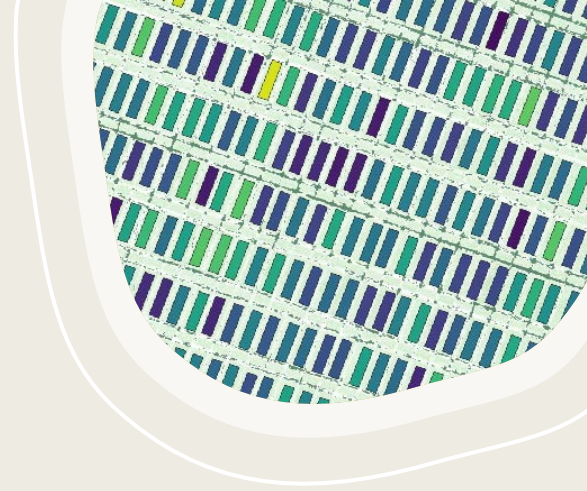
Skill Requirements: Training personnel for drone operation, data analysis, and interpretation



Drone Traits

Depends on crop, growth stage, image quality, user preferences

- Vegetation indices
- Plant height, Ground cover, biomass
- AI traits (counting, senescence, disease scoring etc)



Case Studies

Research Projects:

- Automated Phenotyping, 5 years, *SLU Grogrund*
- 6P, 9 years, *PPP*
- Evaluation of field trials, 3 years, *SLF*
- Forages for drought, 3 years, *Lantmännen research foundation*

Analysis with Phenoyard Pysel software



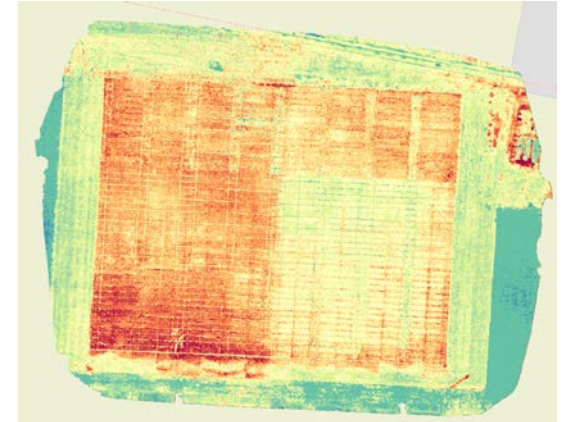
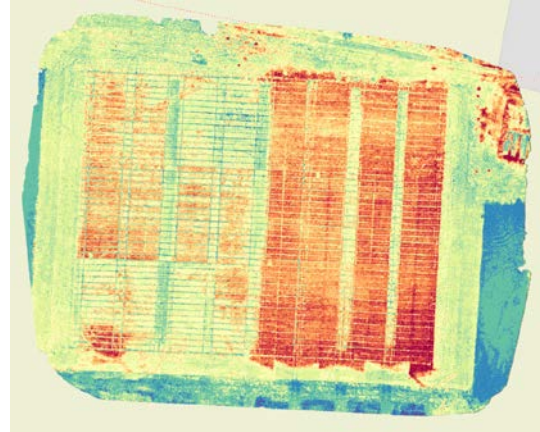
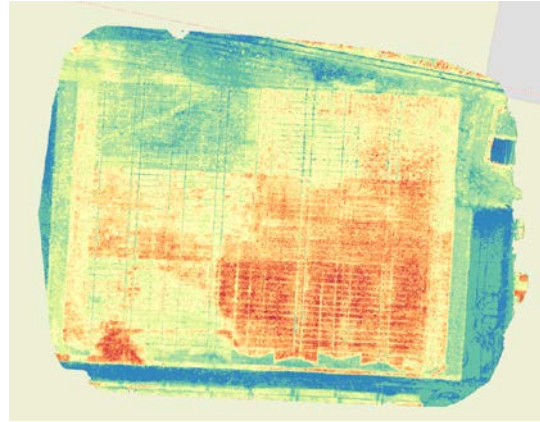
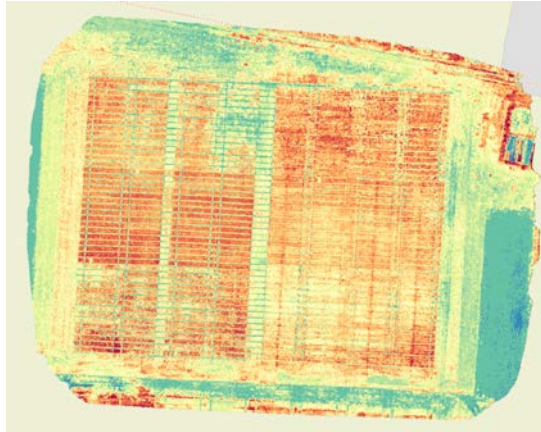
Monitoring trial

May

July

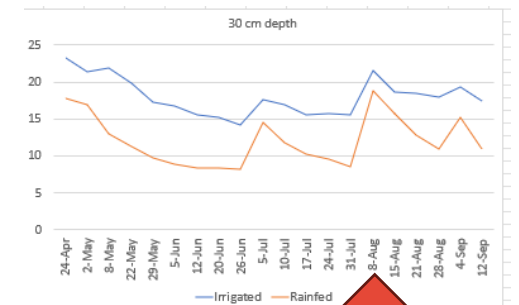
Aug 1

Aug 14

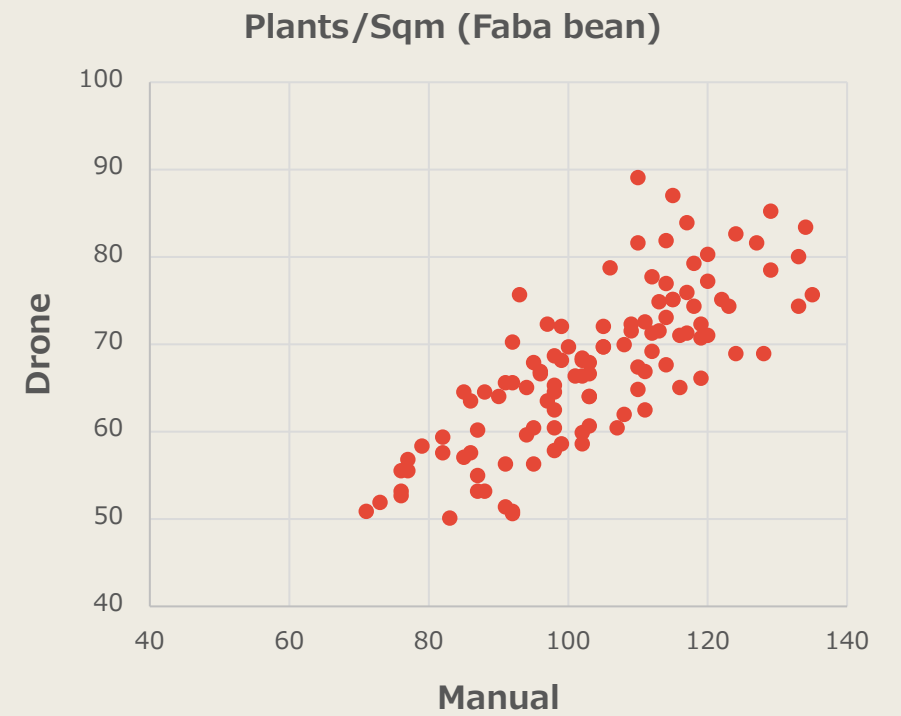
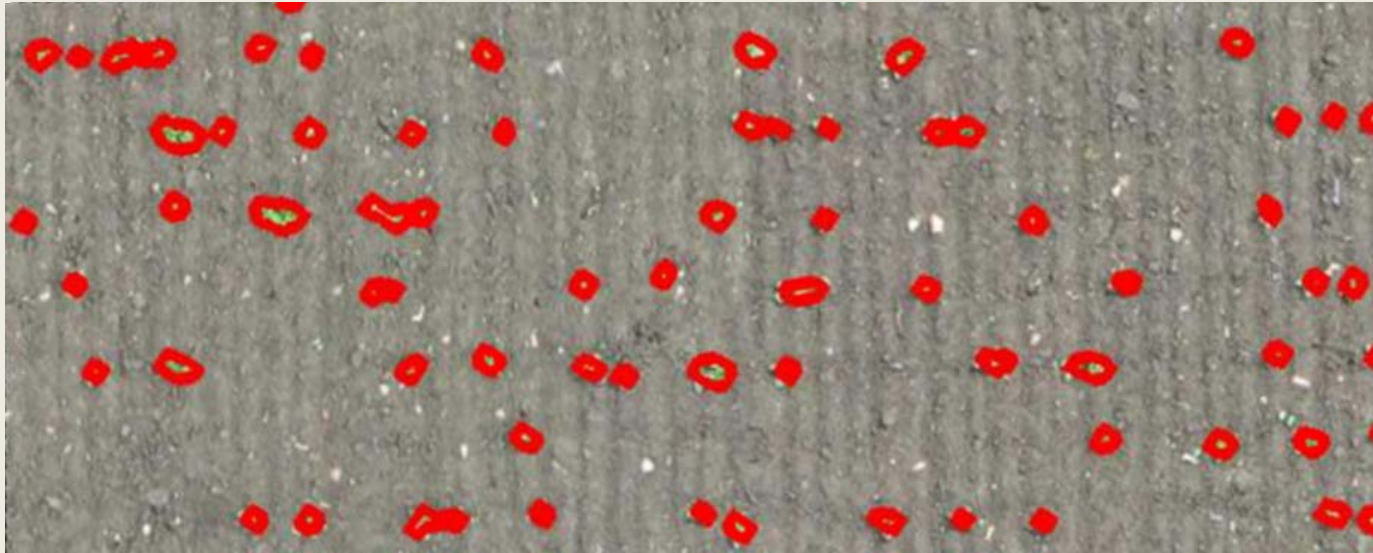


Rainfed

Irrigated



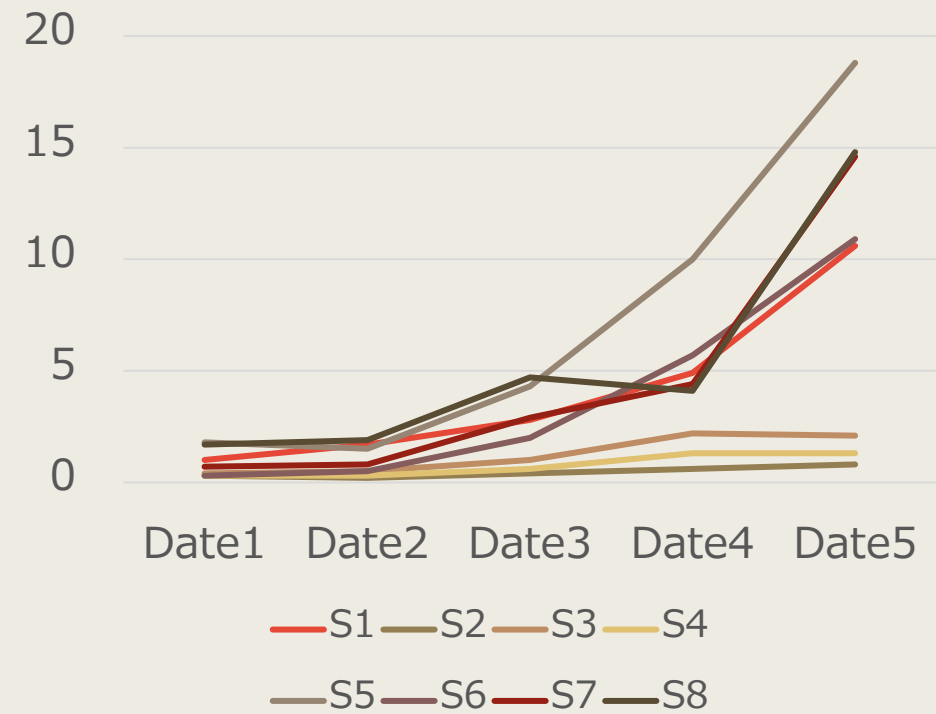
Faba bean plant counting



Red clover flower counting



Flowering %



OS7-027-2022-006. Höstraps. Sort x Behandling



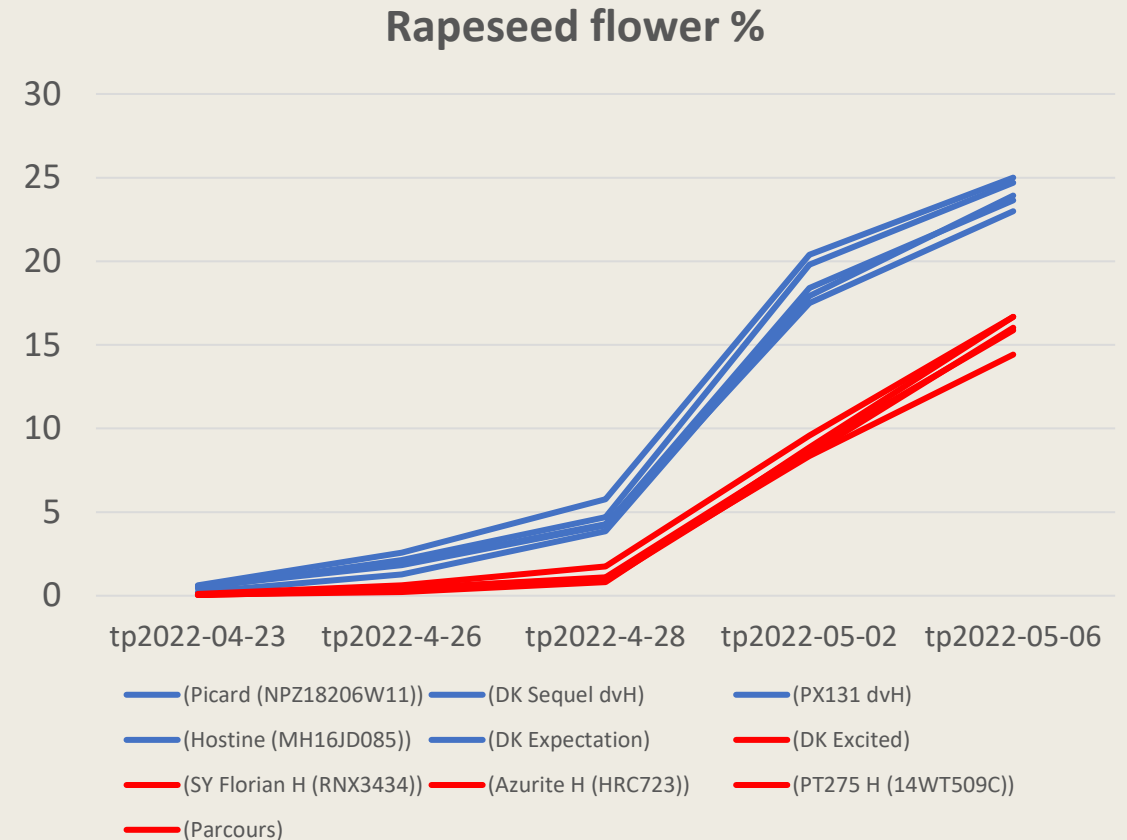
Early

(Picard (NPZ18206W11))
 (DK Sequel dvH)
 (PX131 dvH)
 (Hostine (MH16JD085))
 (DK Expectation)

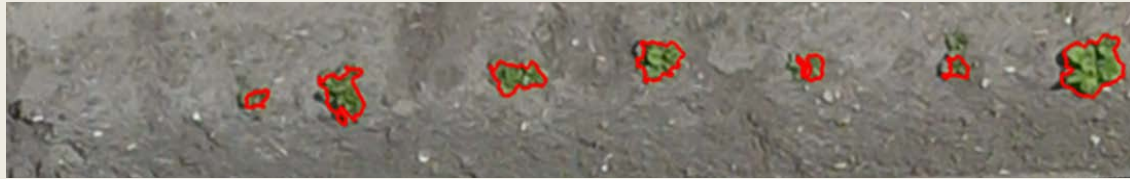
Late

(DK Excited)
 (SY Florian H (RN3434))
 (Azurite H (HRC723))
 (PT275 H (14WT509C))
 (Parcours)

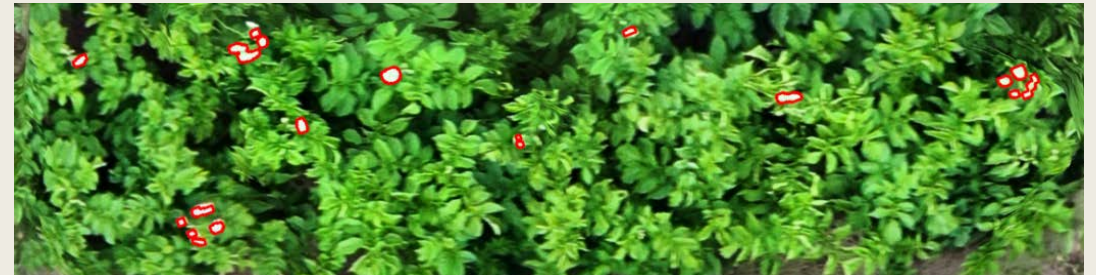
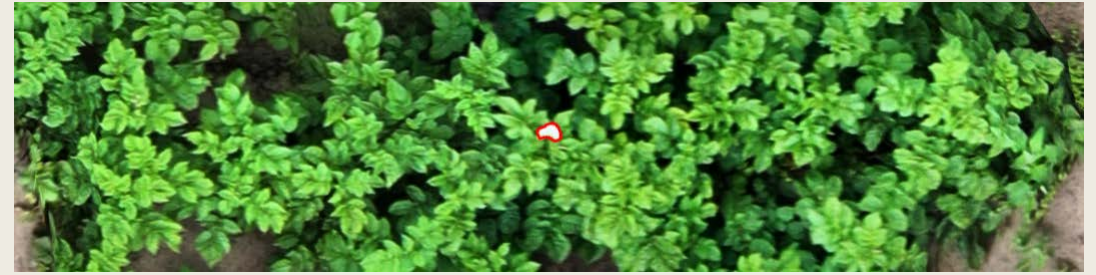
Early and late flowering genotypes



Plant counting and plant size



Flowering time



Late blight (1-9 scale)



LB trial size increased by 3 times

NY TEKNIK

Större försök men färre arbetstimmar

Danespo tredubblade ytan för sina potatisförsök, men hade ingen möjlighet att öka arbetsinsatsen i fält i motsvarande mängd. Lösningen blev drönare och bildanalys.

AV HELENA HOLMKRANTZ



Danespos försöksfält som numera kontrolleras av drönare.
Foto Aakash Chawade

Lantbrukets affärer N6. 6 2023

Wheat spike counting



Where To Begin?

1. Collaborate
2. Monitoring trials
3. Plot level analysis
 - a. Vegetation indices
 - b. Plant height
 - c. Advanced traits
4. Genotype/Variety selection
5. Advisory services/Breeding program management

