



Utveckling av metodik för gradering med drönare

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Projekt

Förbättrad utvärdering av officiella fältförsök genom bildanalys av drönarfoton
med maskininlärning

2021-2023

Project Partners



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Funded by  **Stiftelsen
Lantbruksforskning**

An aerial photograph of a large agricultural field. The field is divided into numerous rectangular plots of varying sizes. Some plots are a vibrant green, while others are a darker, more muted green or brownish-green, suggesting different crop treatments or stages of growth. The plots are arranged in a somewhat regular grid pattern, though some are irregular. The surrounding area is a uniform light green, likely a different type of crop or a fallow field. The overall image has a slightly grainy, high-resolution quality typical of drone photography.

Can drones be used to evaluate official field trials?

Evaluation often is done manually



Drone measurements

Ground Cover

Greenness

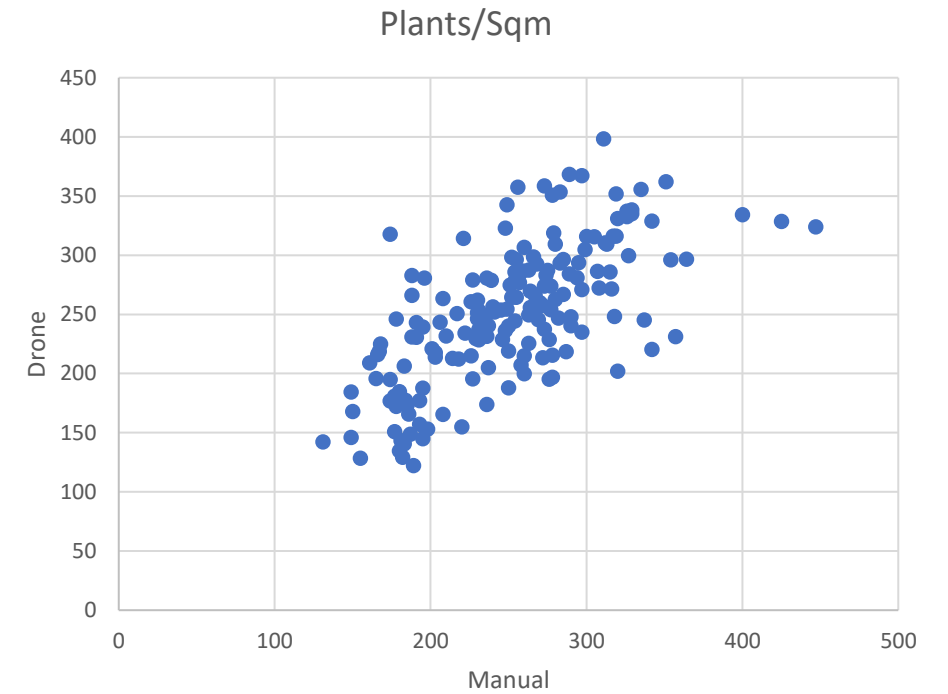
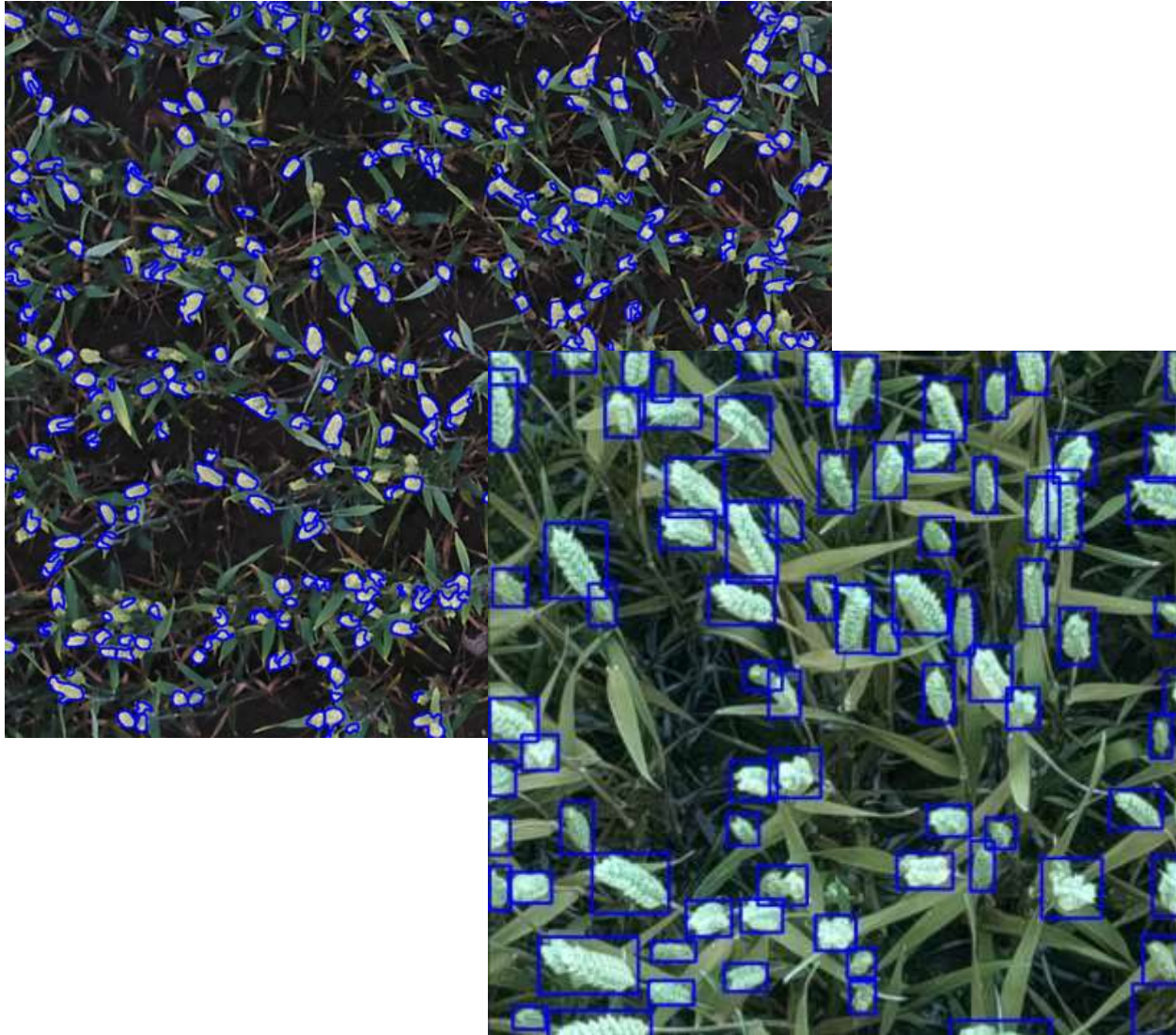
Plant Height

Maturity Start

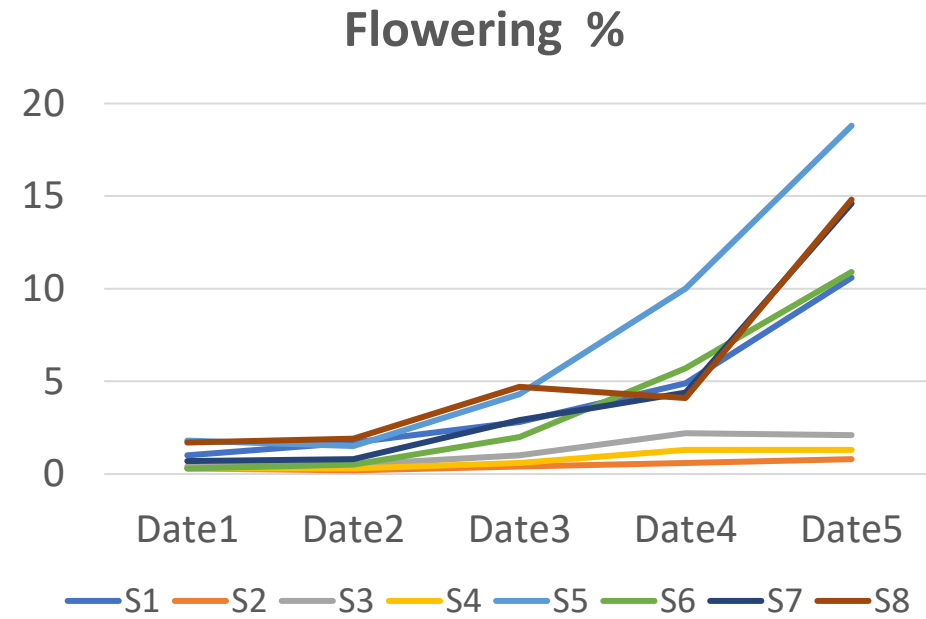
Maturity End

Maturity Length

Wheat spikes counting



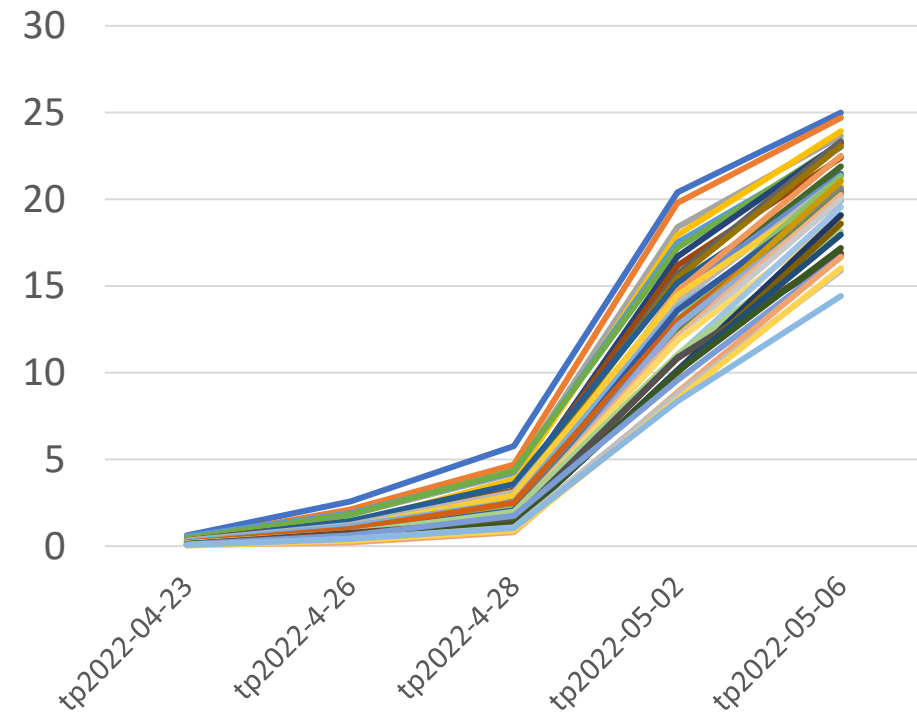
Red clover flower counting



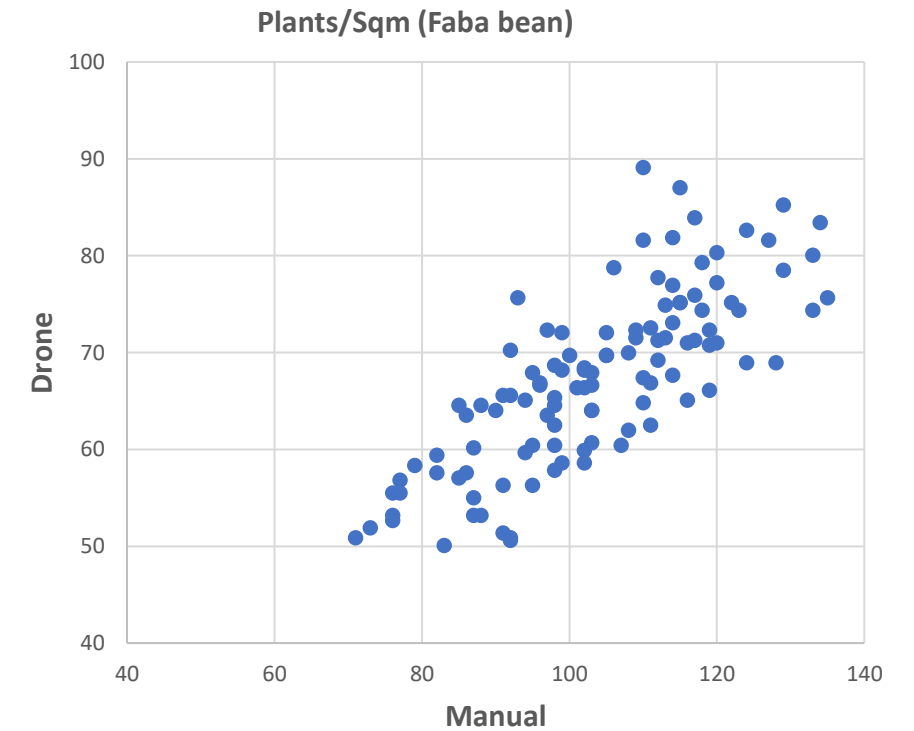
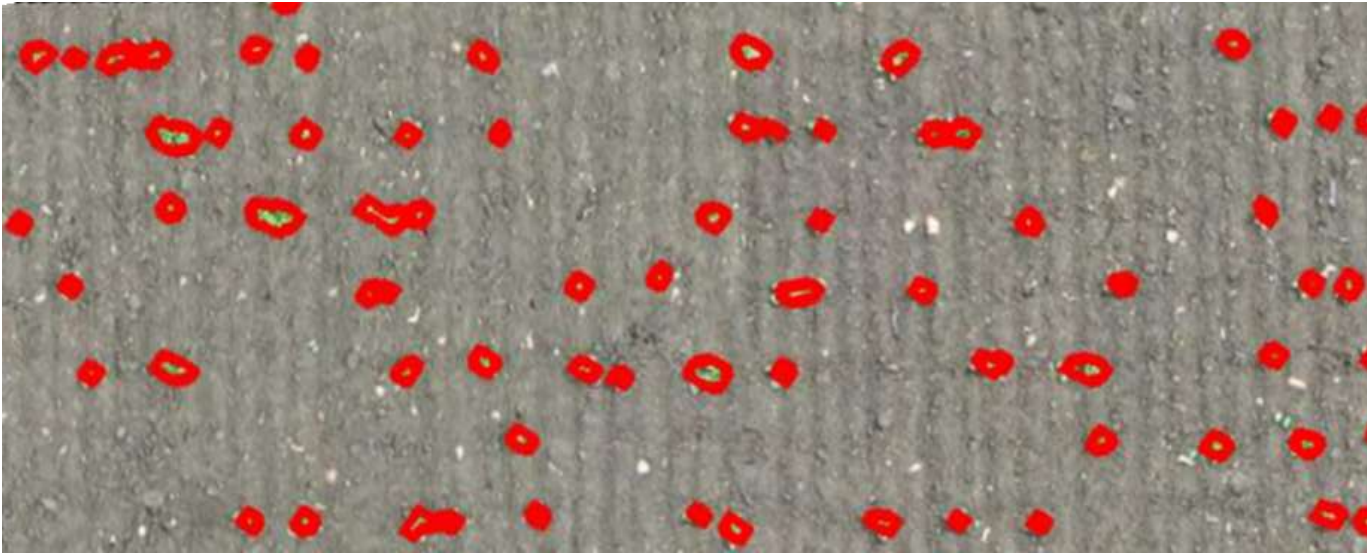
Rapeseed flowering time



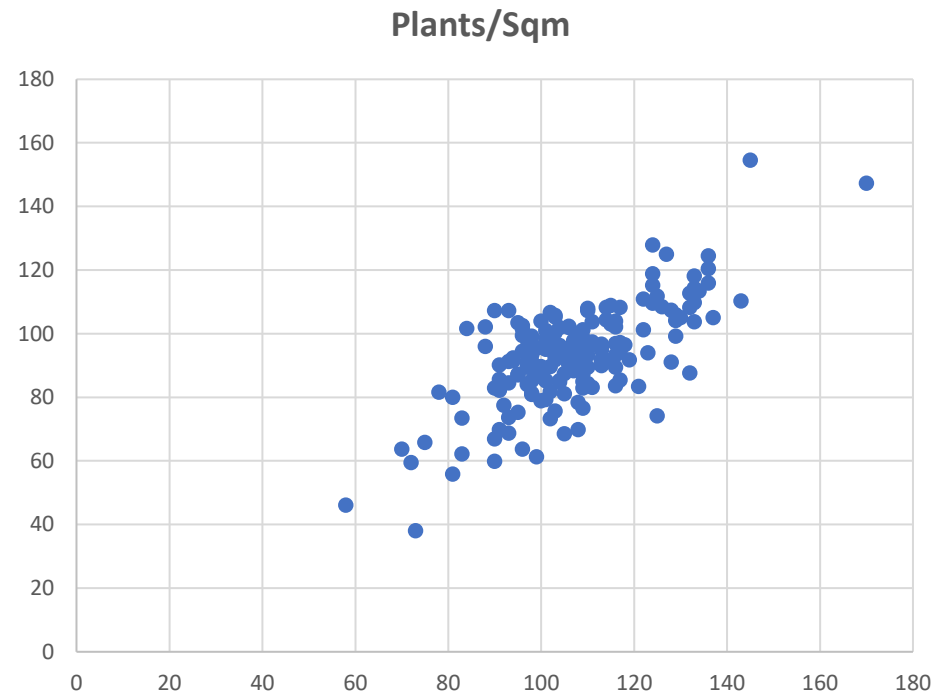
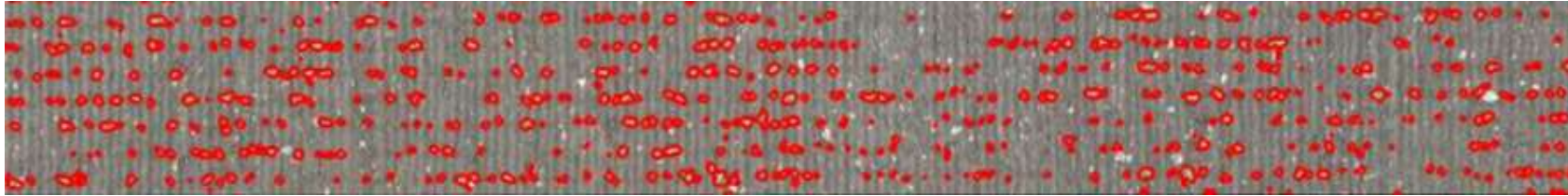
Rapeseed flowering %



Faba bean plant counting



Green Pea plant counting



Which drone?



AIR 2S



13 000 sek

M3 ENTERPRISE RTK



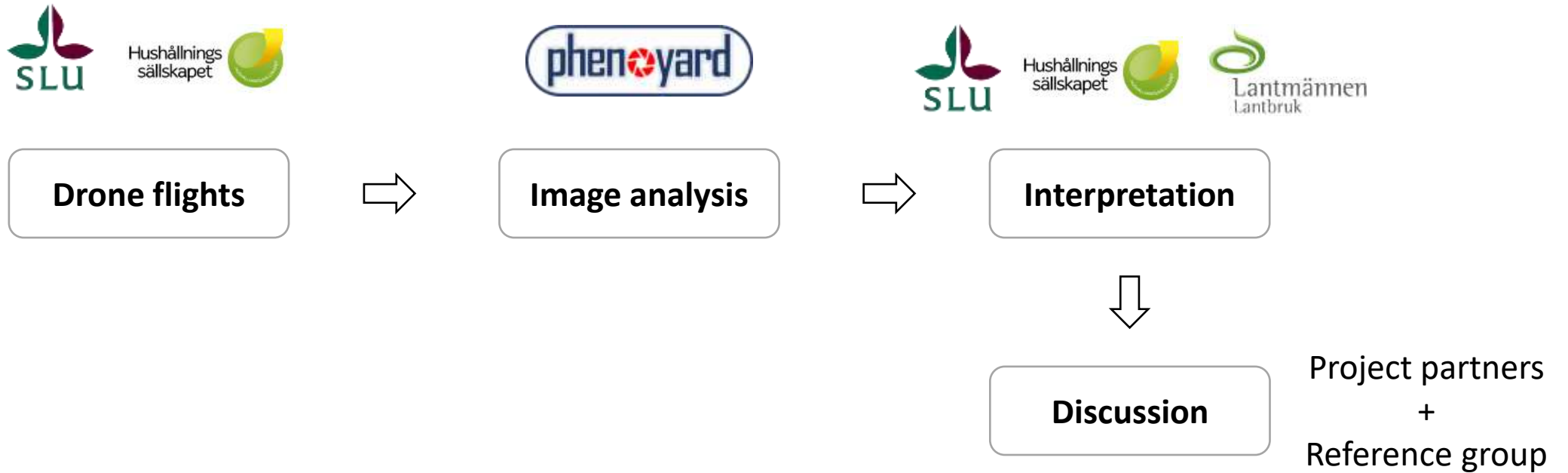
46 000 sek

M3 MULTISPECTRAL RTK



51 000 sek

Analysis workflow





Results so far

Training for 10 people each from HS Skåne and Lantmännen

50-60 flights in 2021 and 2022

Höstvete

Vårvete

Höstraps

Rågvete

Höstkorn

Vårkorn

Malkorn

Havre



Winter wheat

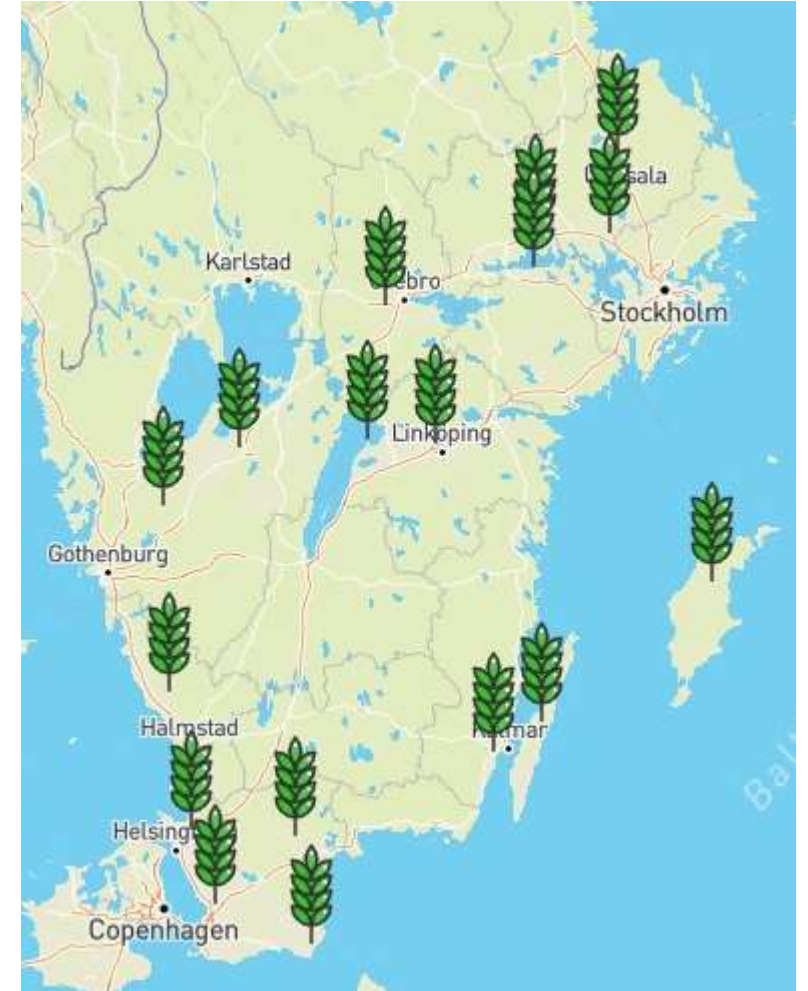
L7-0101-2022 Höstvete. Sort * behandling

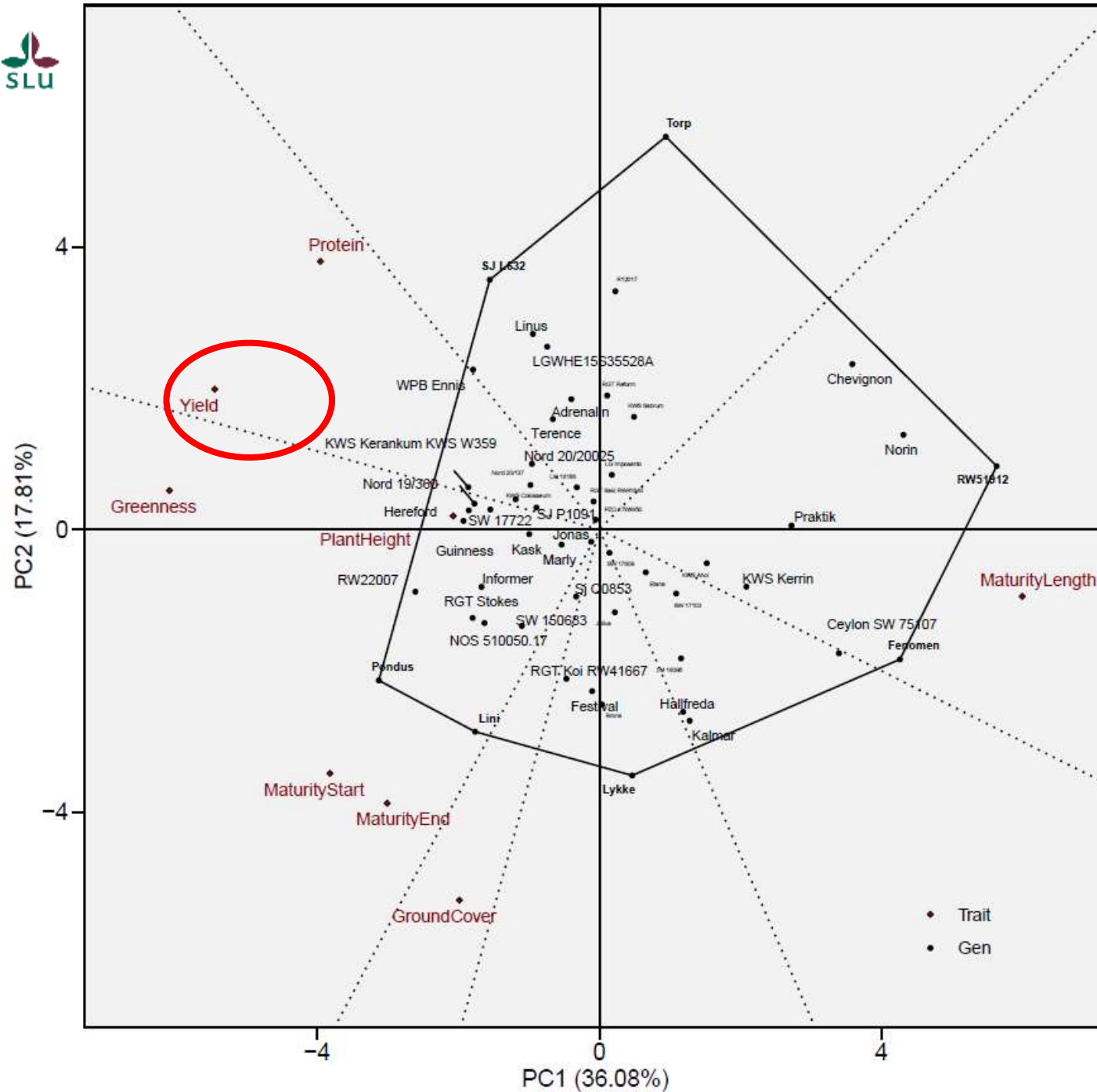
Drone image analysis of the winter wheat trial in
Väståkra, Sandby and Nyvång

002 Österlen, 9 flights

003 Nyvång/Bjuv, 7 flights

004 Väståkra, 13 flights





Väståkra behandlat

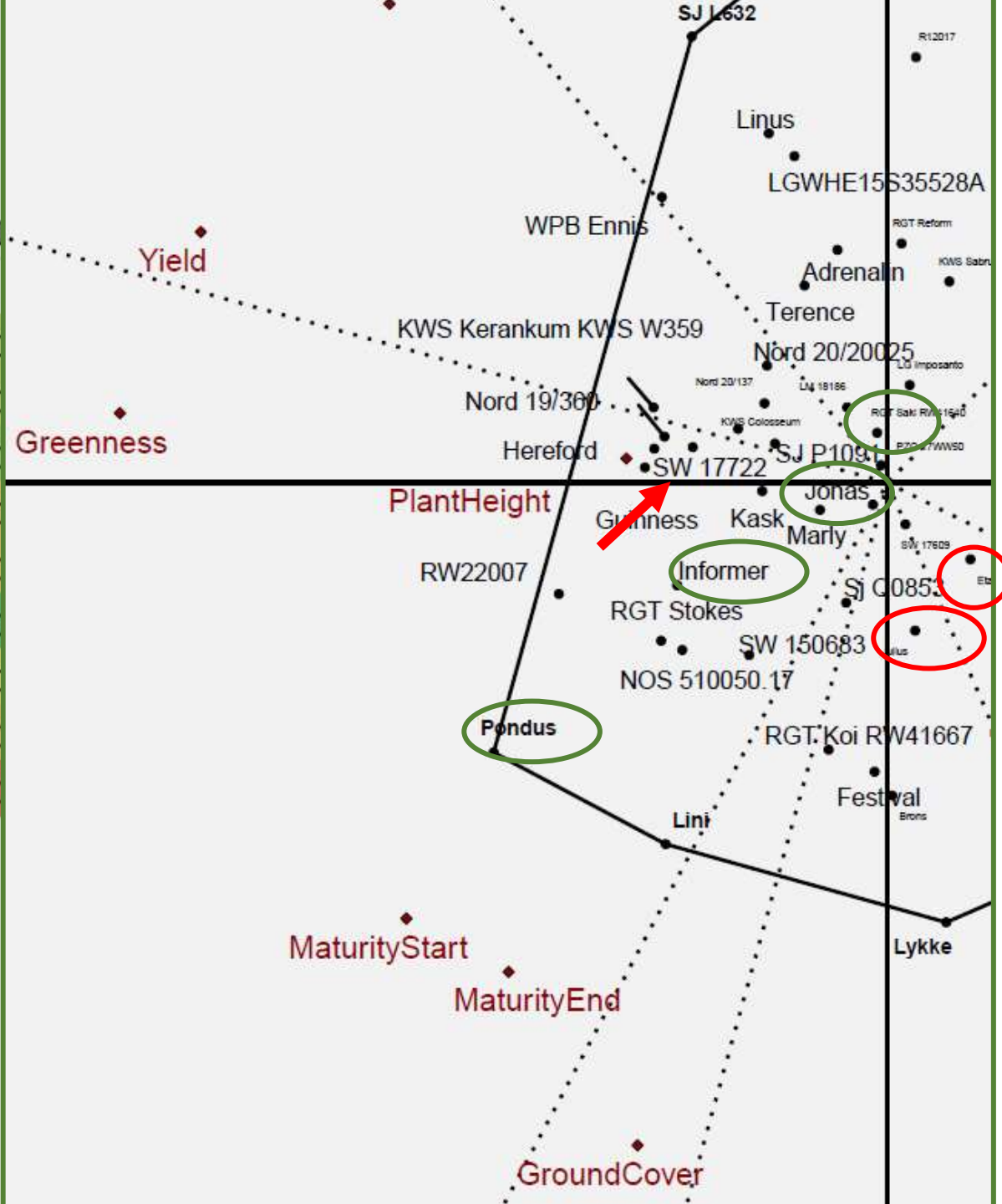
High yielding

Variety	Greenness	GroundCover	MaturityEnd
RW22007	✓	✓	L
WPB Ennis	✓		M
Guinness	✓	✓	M
Hereford	✓		M
Marly	✓	✓	M
Nord 19/360	✓		M
SJ P1091	✓		M
Pondus	✓	✓	L
SJ L632			E

Low yielding

Variety	Greenness	GroundCover	MaturityEnd
Festival		✓	L
Chevignon			E
Brons			M
SW 17103			
Kalmar		✓	M
Praktik			E
Julius		✓	M
RW51912			
Ceylon SW 75107			M
Norin			E

Grain yield L7-0150A2022-001					
	A	B	C	D	E
10 Pondus (NOS 511192.01)	59.7	105.8	124.4	135.5	
8 RGT Saki (RW41640)	54.9	99.1	122	128.2	
5 Informer (Br 10101p83)	51.3	95.2	121.4	129	
6 Jonas (SW 35077)	56.1	98.3	118.6	127.6	
7 KWS Kerrin (KWS W257)	59.1	95.8	118.3	123	
9 Terence (Br 10092p91)	52.5	90.7	118.1	129.6	
3 Halfreda (SW 15646)	48.1	90	117	123.8	
2 Etana	49.4	83.8	107.2	118.3	
1 Julius	48.7	82	99.1	107.1	



Interpretation:

Treatment A:

- High yielding genotypes have 8% higher ground cover and higher greenness,
- High yielding genotypes start to mature 10 days later than low yield genotypes,
- End maturity 3 days later than low yield genotypes and

Treatment B:

- High yielding genotypes have 7% higher ground cover in early spring and higher greenness,
- High yielding genotypes start to mature 10 days later than low yield genotypes,
- End maturity 4 days later than low yield genotypes and



Ground cover

Lini – 79%

Norin – 56%



Maturity End

Lini – 284 days from sowing

Norin – 277 days

Rapeseed

OS7-027-2022-006. Höstraps. Sort x Behandling (Bomullsmögel)



Early

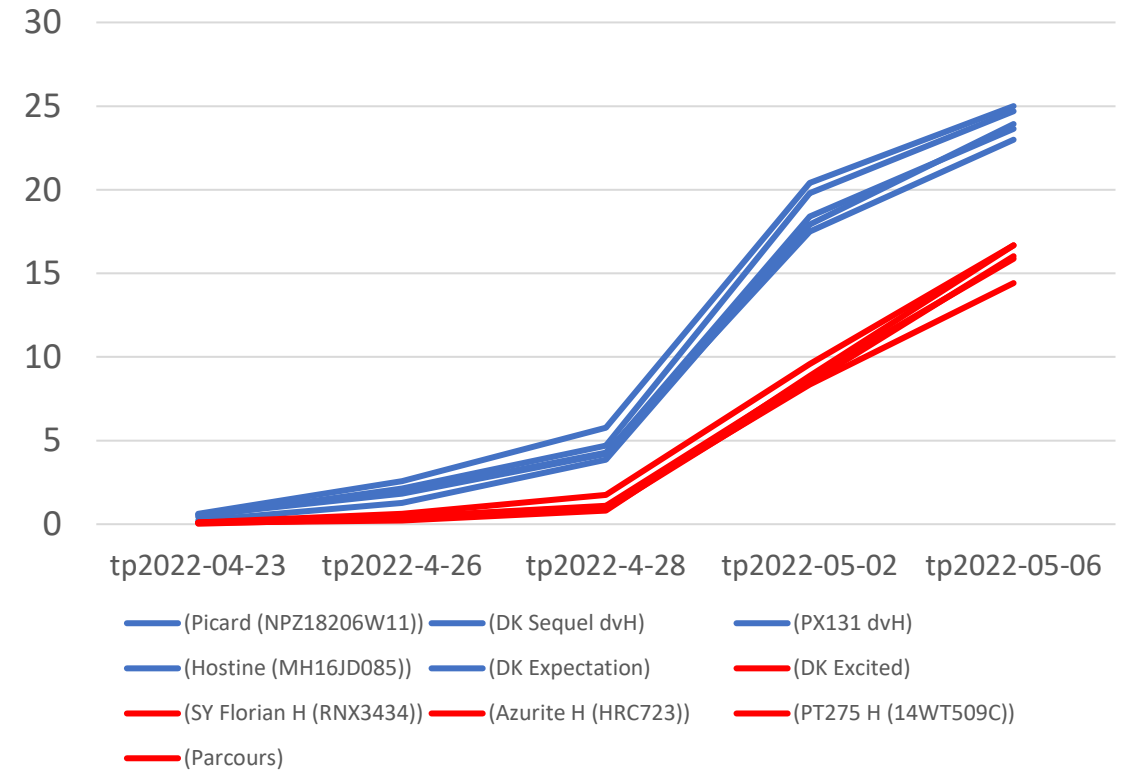
(Picard (NPZ18206W11))
(DK Sequel dvH)
(PX131 dvH)
(Hostine (MH16JD085))
(DK Expectation)

Late

(DK Excited)
(SY Florian H (RNX3434))
(Azurite H (HRC723))
(PT275 H (14WT509C))
(Parcours)

Early and late flowering genotypes

Rapeseed flower %



Summary 1/2

For cereal variety trials, drones can be used to:

- Identify varieties that compete better against weeds.
- Identify varieties with better nutrient uptake.
- Identify varieties with early, intermediate or late maturity

For rapeseed variety trials, drones can be used to

- Identify varieties with early or late flowering time in addition to properties described above

Summary 2/2

- Several field trials evaluated with drones in this project
- Identify varieties that promote sustainable agriculture
- Next focus is on getting input from the advisors
- Get in touch if you like to contribute to the project
- Bringing the benefits of drones and AI to breeders, advisors and farmers