

Interreg 2 Seas Mers Zeeën
INNO-VEG

inagro Delphy ARVALIS ADAS

Framework conditions for innovation



INNO-VEG project
First results – 31st October 2019

#INNOVEG

INNO-VEG 2019 field experiments

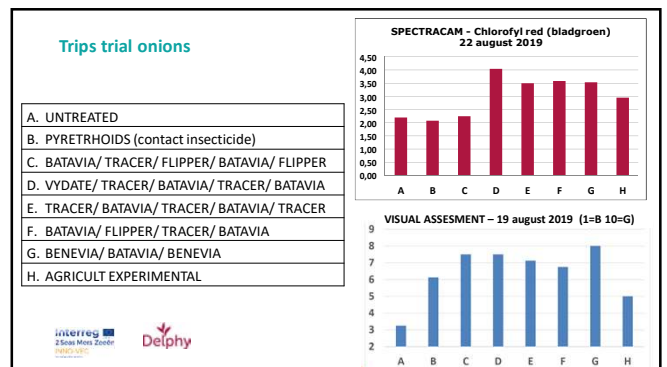
	UK	Belgium	Holland	France	Total
Brassicás	Cauliflower (3)	Sprouts or Cabbage (3)	Sprouts (3)		9
Alliums	Onions (1) Leeks (2)	Onions (2) Leeks (1)	Onions (3)		9
Root crops	Carrots (3)	Carrots (3)	Carrots (3)		9
Leafy salads	Lettuce (2) Spinach (1)	Lettuce (1) Spinach (2)			6
Vining peas	Vining peas (3)				3
Cucurbits	Courgettes (3)				3
Potatoes		Main crop (3)	Main crop (3)	Main crop (3)	9
Total	18	15	12	3	48

Trials in The Netherlands

POTATOES	ONIONS	BRUSSEL SPROUTS
PLANT DENSITY	DRIP IRRIGATION	VARIETIES
SEED POTATO SIZE	VARIETIES	PLANTING TIME
LEAF FERTILIZER TREATMENTS	TRIPS TREATMENTS	
SOIL VARIABILITY		



- Results**
- 4 scans during growing season for each crop with the SpectraCam
 - Marketable yield, quality, dry matter, canopy length, etc.
 - No yield numbers yet.
 - Still on the field or in storage



UK Field experiments

Experiment location

- Leeks
- Onions
- Cauliflowers
- Carrots
- Lettuce
- Spinach
- Vining peas
- Courgettes

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Crop reflectance measurements (UK)

- Hand held FieldSpec 2 sensor
- Hyperspectral – wavelength range 325-1075 nm
- Four measurements during growing season per crop type (two for leafy salads)
- Calculate a range of vegetation indices and correlate with measured yield
 - Total yield & marketable yield
 - N uptake (N response experiments)

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Harvest assessments

- Method of harvest depends on crop type
- Measurements of -
 - Total yield
 - Marketable yield
 - Total crop N uptake (N response experiments)

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Provisional results - carrots

- Planted 10th Feb
- Harvested 2nd Jul
- Within field yield variation
- Yields 17-75 t/ha
- Scans
 - 06/06/19 ($R^2=0.68$)
 - 27/06/19 ($R^2=0.73$)
 - 02/07/19 ($R^2=0.57$)

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Provisional results – leafy salads (spinach)

- Planted 21st Aug
- Harvested 16th Sep
- Planting density
- Yields 10.7-13.2 t/ha
- Scans
 - 02/09/19 ($R^2=0.65$)
 - 16/09/19 ($R^2=0.43$)
- But, initial results have not shown a good relationship between NDVI and whole head lettuce

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BE Field experiments



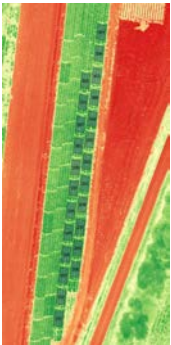
Experiment location

- Leeks
- Onions
- Cabbage
- Cauliflower
- Sprouts
- Carrots
- Lettuce
- Spinach
- Potatoes

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Crop reflectance measurements (BE)

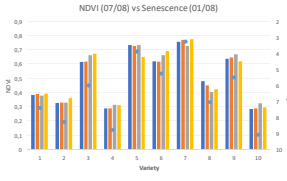
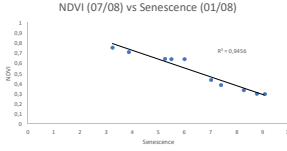
- MicaSense RedEdge MX sensor
 - Drone mounted sensor
 - Multispectral – blue (475 nm), green (560 nm), red (668 nm), red edge (717 nm), near-IR (840 nm)
- Multiple drone flights during the growing season
- Calculate a range of vegetation indices and correlate with measured yield

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Provisional results - potatoes

- Planted 19th Apr
- Harvested 3rd Oct
- Yield (to be processed)
- Senescence
- Droneflights
 - 07/08/19
 - 28/08/19

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French Field experiments




Experiment location: Potatoes

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Sensors measurements - France



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Description

- Sensor boom
- Towed or worn
- One driver
- Max crop height max 1.3 m

Available traits 2019

- ✓ Cover: Fraction of cover
- ✓ IV: NDVI, PRI, MCARI2...
- ✓ GF: Green Fraction

To be elaborated during the project

- ✓ Height average
- ✓ Height per stratum
- ✓ GPAI: Green plant area index
- ✓ ALA Index: Average leaf angle
- ✓ Fipar: fraction of intercepted radiation
- ✓ FAPAR: fraction of absorbed radiation
- ✓ CHL: Chlorophyll content
- ✓ Integrated variable curve parameters (AUC)

Experimental design

- Parallel walkways of seedlings
- Seedlings recorded at GPS RTK
- Max 800 uplots
- ACC: 400 uplot/ha

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2019 protocols


Location: Villers Saint-Christophe (France, ARVALIS research station on potatoes)

Measurements:

- Sensor measurements: 14 acquisition dates with at least IV (NDVI, MTCI), MCARI2 and Green Cover. Test on GPAI and Chlorophyll content
- Classical measurements: soil characteristics, aboveground biomass and N content, foliar and tuber disease assessment, final yield

Topics - Treatments:

- Cultivars testing and N nutrition: 5 cultivars tested under 2 N fertilizer rates
- Late blight disease: 5 to 10 different fungicide/biocontrol products

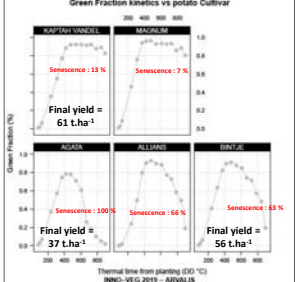


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Provisional results – Cultivar evaluation

Green Fraction kinetics vs potato Cultivar

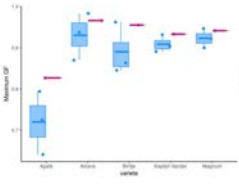


Senescence: 13%, 7%, 100%, 66%, 63%

Final yield = 61 t.ha⁻¹, 37 t.ha⁻¹, 56 t.ha⁻¹

Yield and aboveground biomass results still in processing (provisional yields)

Example of Green Fraction [14 dates]



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