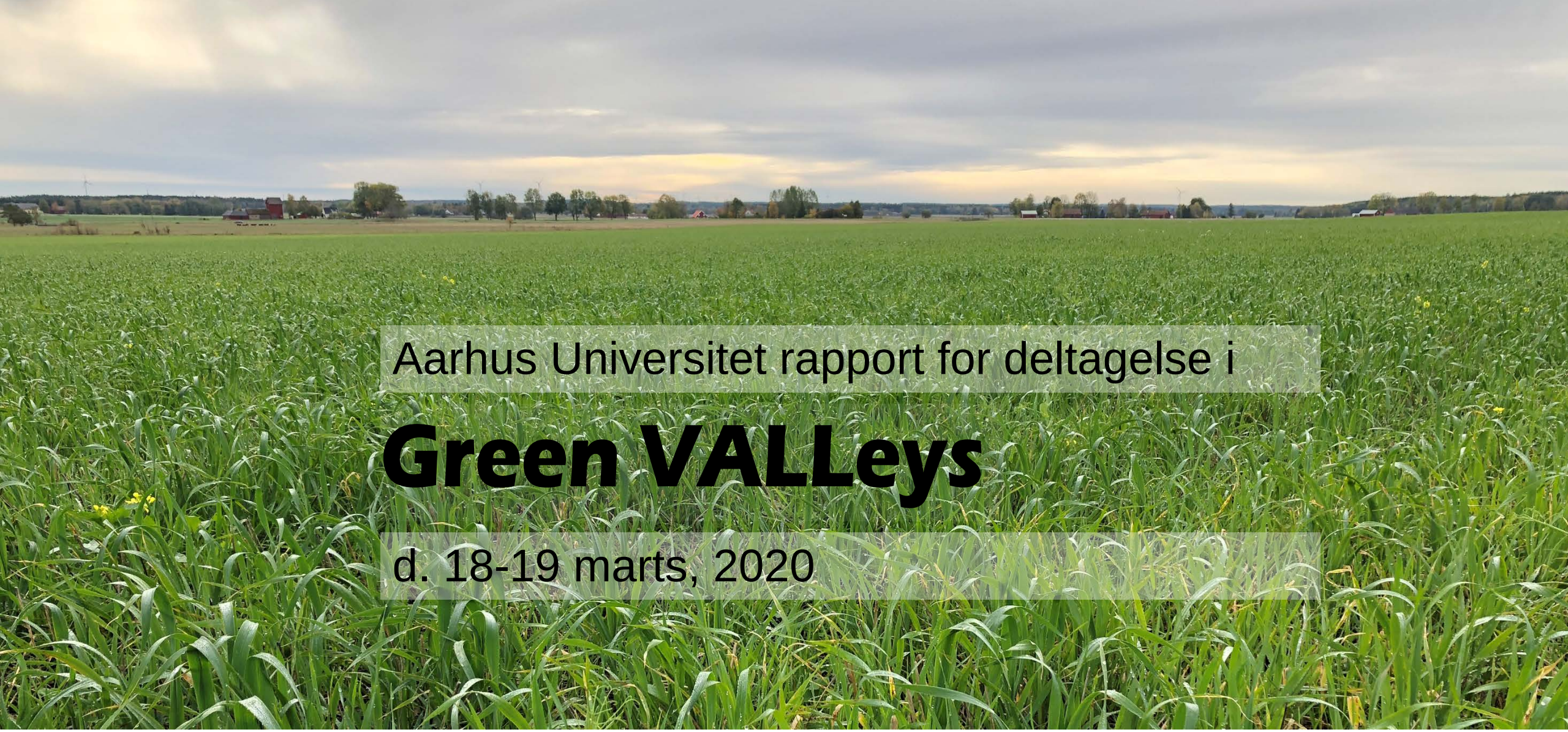

Aarhus Universitet rapport for deltagelse i

Green VALLeys

d. 18-19 marts, 2020

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Aim

Activity 4: Testing and optimization of processes in green biorefinery

Sub-activity 4.1: New methods of cultivation and harvest of grasses for optimal yield and radiation utilization

Objectives

- *to establish systems* comprised of different perennials (grasses, legumes and their mix)
- to *measure* above- and bellowground parameters (destructive and undestructive)
- to *process data* in order to point on system performance and optimization prospects

AU team: Uffe Jørgensen, Kiril Manevski, Ji Chen, Søren S. Petersen

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Experimental design

Location: AU research station Foulum, Denmark
Climate: temperate, wet and cool, mean temp. and precip., respectively, 9.1 and 600 mm
Soil: free-draining loamy sand (cla, silt and sand of, respectively, 8, 11 and 79%)
Management: sowing in early May, first harvest in early August
irrigation - none
P-K-S fertilization and pests and diseases - according to legislation

	System	N fertilizer (kg N ha^{-1} y^{-1})	Harvest interval (weeks)	Harvest height (cm)
G1	**Perennial ryegrass** (*Lolium perenne*) var. Betty	300 or 500	2 or 4 or 6 (i.e., 4, 3 and 2 harvests in establishment year 2019)	7-9 or 12-14
G2	**Tall fescue** (*Festuca arundinacea*) var. Swaj	300 or 500		
L1	**Alfalfa** (*Medicago sativa*) var. SW Nexus	0		
L2	**Red clover** (*Trifolium pratense*) var. Taifun	0		
L3	**Grass-legume mixture** (G1 + G2 + L1 + L2)	300		

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Measurements

Soil: Topsoil carbon (C) and nitrogen (N) contents at start of experiment

Plant: Canopy reflectance throughout the growing period
Aboveground biomass production at each harvest
Nitrogen/protein content at each harvest

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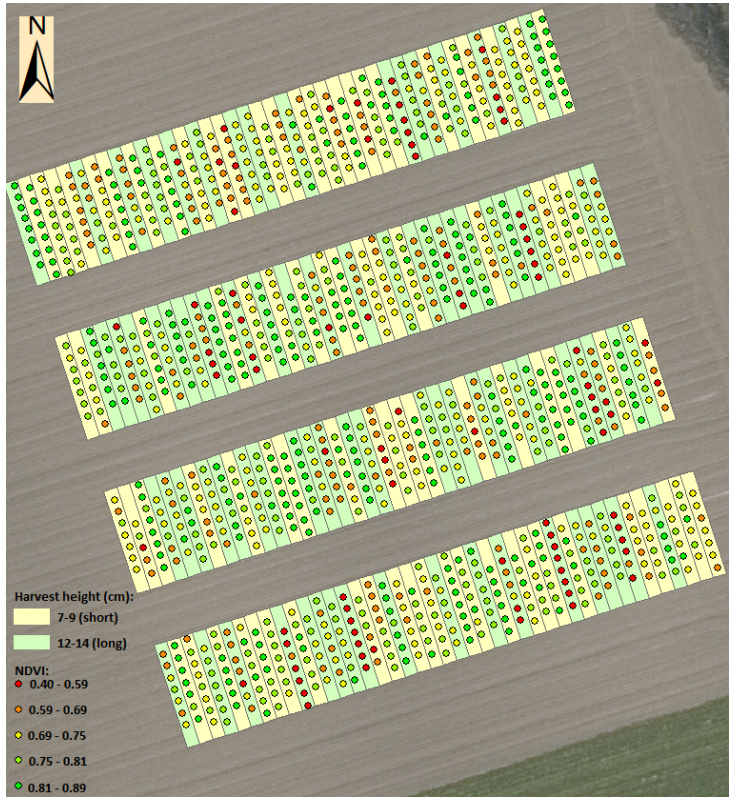
Results 2019

Small within-plot variability, for which those few harvest plots will be corrected accodingly



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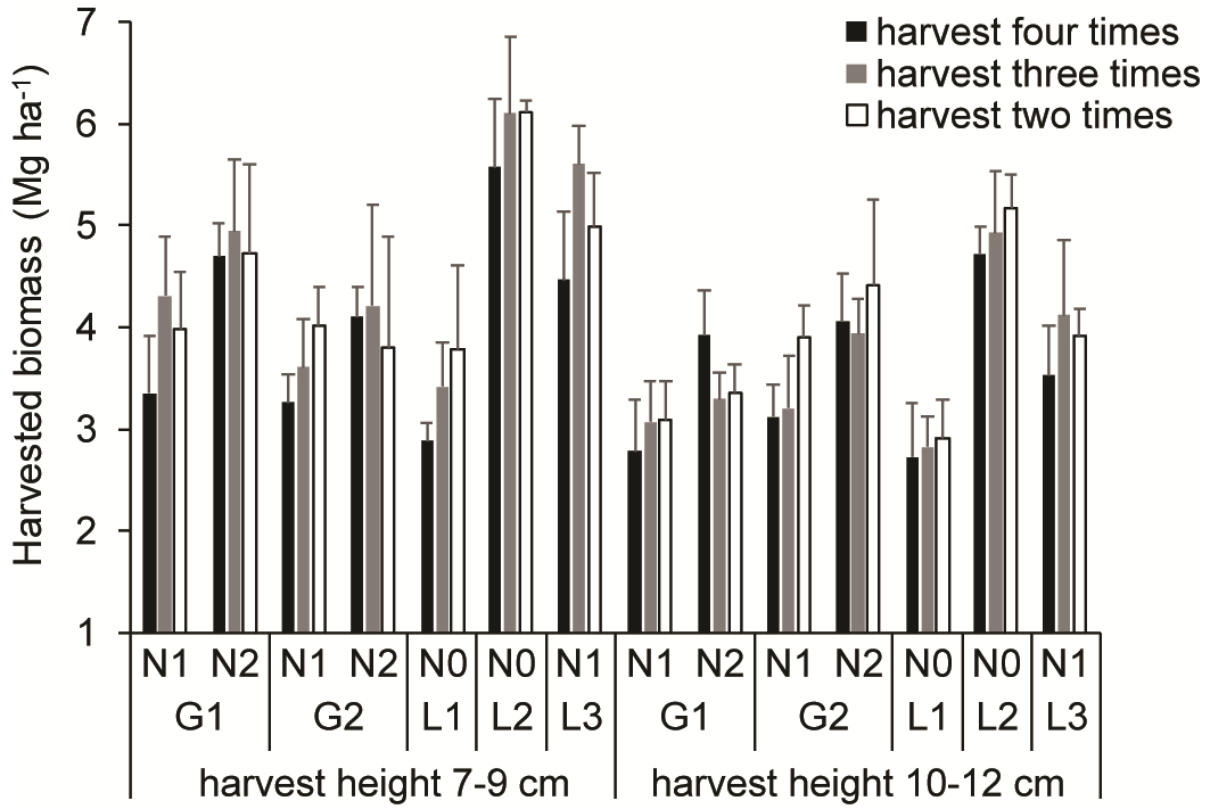
Results 2019

Sum of harvesed aboveground biomass:



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Work goes on..

2020 measurements and calculations

Continious canopy reflectance, harvest sampling for aboveground biomass and N contents

? Root biomass and detailed soil C flows – if funded by a project (already applied)

Calculation and comparision of canopy radiation use, aboveground biomass and N contents between the systems

Some considerations:

Border effects

Alfalfa unsustained growth at low harvest height (so it was thought..)

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Cooperation and outreach

- *28th European Grassland Federation Conference*, 22-25 June, Helsinki (paper accepted)
- *Results supplied to Activity 5* (System analysis of the green biorefinery concept) for calculation of the most efficient systems
- *Results evaluated together with VG* in order to select the optimal grass, clover and management combinations for Söderåsen
- *Results made available* for interested external stakeholders (e.g., DSV Seed and other seed companies), Ausumgård (establishes biorefinery this summer), etc.
- ? Formal end of activity 4 is late May, while results from 2020 full season are essential

Thank you all!

“Hooray! Hooray! The end of the world has been postponed!”
— Hergé, The Shooting Star