

CyberGrass I final seminar on Wednesday 21.9.2022 Seinäjoki , Frami B

CyberGrass I Introduction to remote sensing and
artificial intelligence assisted silage production



Programme for 21.9.2022

9:30-10:00 Coffee

10:00-10:10 Opening (Markku Niskanen, Luke)

10:10-10:15 Efficient grass silage production is key factor in dairy and beef production farm (Terhi Korpi, ProAgria Etelä-Pohjanmaa)

10:15-10:25 Brief of activities in Sweden in CyberGrass I project (Sanna Bergqvist, SLU)

10:25-10:35 Brief of grass sward yields in Ostrobothnia and in Västerbotten and in sampling on pilot farms and experiments (Oiva Niemeläinen, Luke)

10:35-10:50 Silage sward yield estimation by drone imaging (Roope Näsi, Finnish Geospatial Research Institute)

10:50-11:05 Sward yield estimation by satellite data (Julien Morel, SLU)

11:05-11:15 Break

11:15-11:25 Development of D-value and yield prediction models (Panu Korhonen, Luke and David Parsons, SLU)

11:25-11:40 Decision support systems concept for grass sward management (Jere Kaivosoja, Luke)

11:40-11:50 Info of the new Interreg Aurora programme (Anna-Mari Ruisniemi, Länsstyrelsen Norrbotten & Interreg Aurora)

11:50-12:00 Discussion

Cross-border cooperation is important in Interreg projects



Research partners:

Natural Resources Institute Finland (Luke)

- Markku Niskanen, Oiva Niemeläinen, Jere Kaivosoja, Panu Korhonen

Finnish Geospatial Research Institute (FGI)

- Eija Honkavaara, Roope Näsi, Jonas Edström

ProAgria Etelä-Pohjanmaa

- Ronja Kuorikoski, Terhi Korpi

Swedish University of Agricultural Sciences (SLU)

- David Parsons, Julien Morel, Sanna Bergqvist, Junxiang Peng

Hushållningssällskapet Norrbotten-Västerbotten

- Benjamin Bollhöner

Duration : 1.5.2021-31.10.2022

Budget : 314 560 €

Problem and how to solve it

The grass harvest is growing and the quality is changing rapidly, especially in the spring

Assessing the quantity and quality of the yield per hectare is difficult because

- the dry matter content has a large effect on the dry matter yield
- crop sampling is laborious and sample processing is laborious

The quantity and quality of the harvest is of great importance to the economy of livestock farms

-> the need to develop methods for estimating the yield of grass crops from growing grass. Remote sensing methods make it possible.

The CyberGrass project develops remote sensing and artificial intelligence:

- Evaluation of the dry matter yield and quality of grass harvest from the sward
 - Field measurement
 - Drone and satellite images from the field and trials
- Develops prediction models for the grass yield and quality estimation based on remote sensing (by satellite and drone) and grass growth models
- Decision Support system
 - Integrate the estimation and prediction techniques to real farming process
- The ultimate goal of the project is that farmers have access to practical and useful services utilizing modern technology (remote sensing and artificial intelligence) to help in their silage production management.



Work Packages

WP 1. Test sites , satellite and drone measurments and estimations

WP 2. Developing prediction models for yield quantity and quality estimation

WP 3. Decision Support System for grass silage swards management

WP 4. Dissemination

WP 5. Project Management

In the development of the method, it is important to obtain traditional yield quantity and quality results from the fields. The field trials give it good material. Drone shooting allows you to shoot small frames. Larger areas are already needed for satellite tracking.



In research, the use of equipment is sometimes very demanding, but the goal is an easy-to-use method to practice. Different hardware is needed for different purposes.



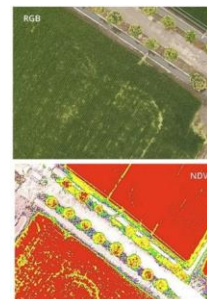
DRONE AND SENSOR EQUIPMENT USED BY FINNISH GEOSPATIAL RESEARCH INSTITUTE (FGI)



DJI Matrice 600 Pro



DJI Matrice 300 RTK



DJI 4 Pro,
DJI 4
Multispectral
al RTK



Senop hyperspectral camera,
500-900 nm



Specim AFX10 and AFX17
hyperspectral camera, 400-
1700 nm,



Zenmuse P1



Micasense Altum Multispectral
camera, 5 VNIR channels,
thermal channel

The evaluation of the plant species composition of hay and legume grasses with the help of image data is also being tested



Info of reference group

CyberGrass I Reference Group in Sweden:

Lars Ericson, Länsstyrelsen Västerbotten; Inger Edlund, Dairy farm in Hössjö

Elin Lindén, Lantmännen; Annika Höjer, Norrmejerier

CyberGrass I Reference Group in Finland:

ProAgria Österbotten, Margareta Slotte; ProAgria Keski-Pohjanmaa, Jouni Ingalsuo

Seinäjoen University of Applied Sciences, Taru Mäki and Juha Tiainen;

Juhani Soiluva, Sovellusyhtiö Sirppi; Ville Sillanpää, pilot farmer, Kauhava; Juha and Liisa Vuorela, Koskenojan pilot farm, Jalasjärvi; Juho Kotala, pilot farm, Lapua;

ProAgria Grass production special advisors Jarkko Storberg and Anu Ellä; Atria/ Nautasuomi Essi Tahvola; Valio /MaitoSuomi, Sari Perälä; Valio/ Pohjolan Maito, Jari Korva; Valio, Laura Nyholm.

Collaboration: Mika Isolahti and Pertti Pärssinen, in Boreal Plant Breeding collaboration, Mikko Himanka, Centria AMK; x, University of Vaasa