

# Automatic Dock Detection and Control in Grassland





#### Name of the Organisations Involved

- Allgäu Automation a start-up company, Germany
- Supported by Innovation Farm in Wieselburg, Austria

## Challenges Identified

Blunt-leaved dock (Rumex obtusifolius) stands out as one of the most persistent weed challenges in grasslands. Its robust growth displaces valuable grasses and herbs, and the longevity of dock seeds—persisting in the soil for up to 50 years—poses an enduring issue in grassland management. In conventional farming, dock control typically involves manual-selective methods or widespread herbicide application. In organic farming, mechanical or thermal treatments are employed. The extensive use of herbicides, in particular, demands considerable labour from farmers and may inadvertently harm desirable weeds and legumes.

## **Goals and Solution**

To address these challenges, the German startup company Allgäu Automation developed and introduced an innovative camera-based system for the automatic selective control of dock weeds using image processing, named RumboJet. Production commenced in 2021, with one of the latest models being the RumboJet 880. The software of the RumboJet 880 distinguishes this machine from conventional field sprayers. It relies on six multispectral cameras that generate substantial data at a frame rate of 90 images per second. The computing unit processes these images to determine whether a dock is present under the spray bar. These components dictate the opening of the solenoid valve for nozzle activation and spraying. The software employs a conventional image processing program, detecting docks based on their outline and leaf structure. Additionally, the system considers the size of the dock, activating multiple nozzles if necessary. To prevent wind drift and ensure consistent lighting conditions, each of the three sections is enclosed with a tarpaulin. This guarantees that the spray liquid reaches its intended target.

## **Actions Taken**

In 2022, the "Innovation Farm" assessed the feasibility, potential cost savings, and efficiency of automated selective dock control in various grassland environments. The RumboJet 880, serving as an innovative system for selective dock control, has undergone testing for multiple parameters. The evaluation includes an assessment of the system's user-friendliness, a comparison of user protection against drift compared to conventional methods, and a focus on detecting and controlling dock. The trial analysed factors such as growth, stage, and hit rate, with a determination of the resulting impact on the quantity of plant protection products and labour required.

AgriSkills: Cultivating Knowledge Across Borders in Five Languages! e-Learning Platform: <u>https://training.agriskills40.com</u>



Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union no rEACEA can be bed responsible for them. Project number: 2021-1-DE02-KB2D-VFT-000034651





## **Benefits and Impact**

The pictures show two dock plants 10 days after treatment with the RumboJet 880. By using selective herbicides, only the dock is controlled, and the grasses in the immediate vicinity of the dock remain undamaged.



Picture: RumboJet 880 and the results, Source: Innovation Farm and Allgäu Automation website: <u>https://allgaeuautomation.de/index.php</u>

The RumboJet 880 from Allgäu Automation provides significant savings through individual plant control. This not only reduces costs for plant protection products but also saves valuable working time, especially during the often-stressful peaks of agricultural tasks. In Bavaria, the State Institute for Agriculture (LfL) has recommended the use of RumboJet 880 for 'non-area-wide application' in grasslands. The Innovation Farm also supports this assessment with regard to the test results from 2022. However, it should be noted that, especially in machine communities, it is recommended that the control only be carried out by knowledgeable and trained personnel.

With regard to the Green Deal, which requires farmers to save around 50% of the amount of chemicalsynthetic pesticides used by 2050, the RumboJet 880 can also make a significant contribution with its selective sorrel control. With its RumboJet, the company Allgäu Automation demonstrates how digitalization can help achieve these goals and generate a double advantage for the farmer, both economically and ecologically. (<u>Report of Innovation Farm</u> from 07.12.2022)

#### **Contact Information**

Fabian Butzenlechner

Email: f.butzenlechner@josephinum.at

Allgäu Automation Website: <u>https://allgaeuautomation.de/</u>

Innovation Farm Website: <u>https://www.innovationfarm.at/projekte/automatische-ampferdetektion-und-bekaempfung-im-gruenland/</u>

#### Prepared by

Wolfgang Eisenreich (WIN)

Application Area

Digital Technology in the Value Chain ⊠ Agricultural Inputs and Services

Digital Technologies

🛛 Big data

AgriSkills: Cultivating Knowledge Across Borders in Five Languages! e-Learning Platform: <u>https://training.agriskills40.com</u>



Co-funded by the European Union Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be bedire renorsible for them. Project number: 2021-1...EPG2-K272-047E-00034651

