

## Practice abstract #3.4

# Automated mechanical weeding and intercropping



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### CHALLENGE

The use of herbicides is limited in intercropping systems which are often composed of a cereal and a legume whereas herbicides are mostly used against either monocots or dicots. Furthermore, intercropping is often suggested as a suitable strategy in organic farming, where herbicides are not an option to begin with.

Mechanical weeding poses an alternative weed management strategy, however repeated mechanical weeding operations involve the risk of damaging the crop(s) if this is not performed with sufficient precision.

### SOLUTION

Automated weeding by a robot could tackle these challenges to obtain a proper weed management.

We tested the farming robot Robotti's ability to perform weeding in various intercropping experiments. Robotti is equipped with an RTK GPS, an internet connected computer and a standard frame for fixating tools. Operations and plans are pre-programmed, uploaded and then executed in the field.

## OUTCOME

We found that the main challenge with the automated setup was to calibrate the various equipment parts, so that they are aligned with each other. The crop was sown with a specialized sowing machine (not Robotti), and presumably because of minor differences in the GPS systems and non-perfect symmetry of the rows relative to the AB-line, the driving direction of the robot became critical when weeding to avoid crop damage.



## PRACTICAL RECOMMENDATIONS

Based on our experiences, we suggest to streamline all operations and equipment pre-sowing, so that the same machine and program (plan) can be reused for all operations throughout the growing season.

### About CROPDIVA

CROPDIVA wants to put 6 underused arable crops back in the fields: oats, hull-less barley for human consumption, triticale, buckwheat, faba beans and lupins. 27 European partners are joining forces to enhance agrobiodiversity in Europe. They will achieve this by focusing on crop diversity and creating local value chains. The project is running from September 2021 to August 2025.



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# Automatiseret mekanisk ukrudtsbekæmpelse og samdyrkning

## UDFORDRING

Brugen af herbicider er begrænset i samdyrkningsystemer, der ofte består af korn og bælgeplanter, mens herbicider for det meste anvendes mod enten enkimbladede eller tokimbladede arter. Desuden foreslås intercropping ofte som en passende strategi i økologisk landbrug, hvor herbicider ikke er en mulighed til at begynde med.

Mekanisk ukrudtsbekæmpelse er en alternativ strategi til brugen af ukrudtsmidler, men gentagne ukrudtsharvninger indebærer en risiko for at skade afgrøderne, hvis de ikke udføres med tilstrækkelig præcision.

## LØSNING

Automatiseret ukrudtsbekæmpelse ved hjælp af en robot kan løse disse udfordringer for at opnå en god ukrudtsbekæmpelse.

Vi testede landbrugsrobotten Robotti's evne til at udføre ukrudtsbekæmpelse i forskellige samdyrkningsforsøg. Robotti er udstyret med en RTK GPS, en computer med internetforbindelse og en standarddrumme til fastgørelse af redskaber. Operationer og planer er forprogrammeret, uploadet og derefter udført i marken.

## RESULTAT

Vi fandt, at den største udfordring med den automatiserede opsætning var at kalibrere de forskellige maskiner, så de er afstemt med hinanden. Afgrøden blev sået med en specialiseret såmaskine (ikke Robotti), og formentlig på grund af mindre forskelle i GPS-systemerne og ikke perfekt symmetri af rækkerne i forhold til AB-linjen blev robotens kørselsretning kritisk, når der skulle luges for at undgå skader på afgrøden.

## PRAKTISKE ANBEFALINGER

På baggrund af vores erfaringer foreslår vi, at man strømliner alle operationer og alt udstyr før såning, så den samme maskine og det samme program (plan) kan genbruges til alle operationer i hele vækstsæsonen.

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