

Practice abstract #3.5

The importance of including an autumn catch crop in the rotation



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KEY WORDS

Catch crop, nitrogen,
leaching

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CHALLENGE

Cropping systems can result in substantial soil nitrogen accumulation by the time of harvest and consequently a high risk of nitrate leaching. High nitrate loads to the aquatic environment cause eutrophication, especially in coastal areas. Nitrate leaching into groundwater reserves degrades the quality of this resource as drinking water. Nitrogen is a valuable nutrient within the cropping system, giving the farmer an economic incentive to keep it there.

SOLUTION

One way to reduce the risk of nitrate leaching is to establish autumn nitrogen catch crops which have the purpose to take up available soil nitrogen before it is leached due to high precipitation.

Growing a catch crop after the main crop has multiple benefits. The catch crop can take up excess soil nitrogen and thereby reduce the risk of leaching, which benefits the aquatic environment. In addition, a catch crop strategically placed within a good crop rotation has the potential to release nitrogen in a mineralized form, once it is incorporated into the soil, which could be potentially used by the following crop, reducing the need for additional fertilizer. Finally, adopting a catch crop could be a suitable option for SOC sequestration.

We tested two different catch crops, phacelia (*Phacelia tanacetifolia*) and oil radish (*Raphanus*

sativus L.) in our oat-faba bean intercropping experiments to evaluate their soil coverage effect which is a measure for their ability to establish and grow and consequently take up excess soil nitrogen.

OUTCOME

The two autumn nitrogen catch crops were established on September 14 and the percentage area of the soil coverage by the catch crops was measured using RGB images from a UAV on October 12. The area of the soil covered by the catch crops varied from 8 to 77 percent which shows that for some combinations there was a substantial amount of nitrogen in the soil after harvest of the main crops.



PRACTICAL RECOMMENDATIONS

The use of autumn nitrogen catch crops is an important tool to secure that excess nitrogen is kept in the cropping system and not leached to the aquatic environment. Establishment of the catch crops is, however, expensive and it should be further investigated when a catch crop is efficient and necessary. The best effect of the catch crop evaluated on the soil coverage is to establish it as early as possible after harvest of the main crop.



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.



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement N°1010000847

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Vigtigheden af efterafgrøder i sædskiftet

Udfordring

Dyrkningssystemer kan medføre ophobning af betragtelige mængder kvælstof efter høst, og dermed en stor risiko for udvaskning af nitrat. Udvasning af store mængder kvælstof til vandmiljøet medfører eutroficerings, især i kystnære områder såsom fjorde. Udvasning af nitrat påvirker desuden drikke kvaliteten af grundvandet. Kvælstof er et værdifuldt næringsstof i marken, så landmanden har et økonomisk incitament til at beholde det der.

Løsning

En metode til at reducere risikoen for kvælstofudvaskning er etablering af efterafgrøder, som optager det plantetilgængelige kvælstof inden det udvaskes af overskudsnedbør i vinterhalvåret.

Dyrkning af efterafgrøder har flere fordele. Det forbedrer vandmiljøet ved at tilbageholde kvælstof, der ellers ville blive udvasket. Det kan mindske behovet for tilførsel af handelsgødning ved at frigive det tilbageholdte kvælstof til næste års hovedafgrøde via mineralisering. Desuden vil marker grønne af efterafgrøder fiksere CO₂ i stedet for at frigive det, og dermed kan de tilføre jorden humus til gavn for både jordkvalitet og klima.

Vi afprøvede to forskellige efterafgrøder i vores samdyrkningsforsøg med havre og hestebønne: honningurt (*Phacelia tanacetifolia*) og olieræddike (*Raphanus sativus* L.). Formålet var at evaluere deres evne til hurtigt jorddække, hvilket er en indikator for deres evne til at optage og tilbageholde kvælstof.

Resultat

De to efterafgrøder blev sået 14. september og deres procentuelle jorddække blev estimeret vha. RGB dronebilleder d. 12. oktober. Efterafgrødernes jorddække varierede mellem 8 og 77%, hvilket indikerer en stor variation i plantetilgængeligt kvælstof mellem de forskellige behandlinger i forsøget.

Praktisk anbefaling

Brugen af efterafgrøder er et vigtigt redskab til at sikre at overskydende kvælstof forbliver i dyrkningssystemet og ikke udvaskes til vandmiljøet. Imidlertid er etablering af efterafgrøder bekosteligt, og det bør undersøges grundigere hvornår en efterafgrøde er effektiv og nødvendig. Den bedste måde at sikre en god etablering af efterafgrøden er ved så tidlig såning som muligt efter høst af hovedafgrøden.

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