

Practical fertilization in maize using catch crops and organic fertilizers

Problem

Maize is one of the most important crops, especially on dairy farms. Because dairy farms are so nutrient-rich, they are often associated with nitrate leaching (DeBoer, 2017).

Solution

To avoid N leaching during the winter period, the implementation of catch crops is important. Together with root fertilization and organic fertilizers, nitrogen can be used very efficiently and mineral fertilizers can be replaced.

Advantages

The combination of catch crops and organic root fertilization stabilizes yields, reduces costs for mineral fertilizers and reduces necessary storage for slurry or manure. At the same time, N-losses in the environment are reduced.

Practical recommendation

Catch crop:

- Apply ~60 kg N/ha after harvest of main crop, followed by sowing of 25 kg/ha catch crop (e.g., mustard/oil radish)
- Mulch growth in March, followed by first application of organic fertilizers and intense grubbing

Maize:

- Reduce planned N-fertilization by 20-30 kg N/ha (catch crop, depending on climate)
- Inject organic fertilizer (up to 25m³/ha) with marking of track 5-7 cm deeper than planned sowing depth
- Sow maize in strips placed directly over the injected slurry lines
- Finish N fertilization early, with calcium ammonium nitrate for example
- For dryer conditions, low P contents or other less suitable conditions, reduce organic fertilization and add mineral NP-fertilizers for root application in the same amount



Picture 1: Sowing catch crop combined with tillage (Photo: Markurs Cordsen, CALS); Picture 2: Injecting organic fertilizers before maize sowing (Photo: Wolfgang Ehrecke, CALS)

Applicability box

Theme

Soil quality and fertility, Nutrient management, Yield stability

Geographical coverage

>80mm precipitation in early autumn, at least 8 weeks of vegetation after harvest of main crop, sandy to loamy soils (good warming in spring)

Application time

After harvest of main crop for catch crop + April, May

Required time

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Period of impact

Actual crop with increasing benefits over the years

Equipment

Slurry injection, single-grain seeder (GPS control)

Best in

Maize

Table1: Example for fertilization strategy maize with catch crop

Strategy	N [kg/ha]	P ₂ O ₅ [kg/ha]
Demand (45t/ha fresh matter)	200	90
Release catch crop	-25	-20
Release soil	-35	
1. organic fertilization (70% N-availability)	-65	-38
2. organic root fertilization (70% N-availability)	-65	-38
Mineral fertilization	-15	
Nutrient balance	-5	-6

Further information

Further reading

- de Broer, H. (2017). *Nitrate leaching from liquid cattle manure compared to synthetic fertilizer applied to grassland or silage maize in the Netherlands*. Wageningen: Wageningen Livestock Research

Weblinks

- Results of field trials regarding water protection, Chamber of Agriculture Lower Saxony (<https://www.lwk-niedersachsen.de/index.cfm/portal/77/nav/1667/article/22261.html>)
- Project "Optimizing of nitrogen- and phosphate-efficiency of liquid organic fertilizers by "depot-application" to minimize environmental impacts" (https://fisaonline.de/projekte-finden/projekte-nach-fachgebieten/details/?tx_fisaresearch_projects%5Bp_id%5D=8299&tx_fisaresearch_projects%5Baction%5D=projectDetails&tx_fisaresearch_projects%5Bcontroller%5D=Projects)

About this factsheet and DiverIMPACTS

Publishers

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Permalink: 10.5281/zenodo.1320143

This factsheet was elaborated in DiverIMPACTS project, based on the EIP AGRI practice abstract format.

DiverIMPACTS: The project is running from June 2017 to May 2022. The overall goal of DiverIMPACTS - Diversification through Rotation, Intercropping, Multiple Cropping, Promoted with Actors and value-Chains towards Sustainability - is to achieve the full potential of diversification of cropping systems for improved productivity, delivery of ecosystem services and resource-efficient and sustainable value chains.

Project website: www.diverimpacts.net

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The project DiverIMPACTS - "Diversification through Rotation, Intercropping, Multiple Cropping, Promoted with Actors and value-Chains towards Sustainability" is supported by the European Union's HORIZON 2020 research and innovation programme under Grant Agreement no 727482 and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 17.00092. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the EC and the Swiss government. Neither the European Commission/SERI nor any person acting behalf of the Commission/SERI is responsible for the use which might be made of the information provided on this factsheet.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727482 (DiverIMPACTS)



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