

Efficient use of nitrogen from livestock manure

Problem

Nitrogen is often a yield limiting factor in organic arable crops. Therefore, it is important to apply available nitrogen sources, such as livestock manure, efficiently based on crop-specific needs.

Solution

Optimum use of nitrogen from livestock manure requires knowledge on crop-specific nitrogen demand, yield optimisations and response of crops to different amounts of ammonium-N.

Outcome

Optimized application of nitrogen from livestock manure will reduce nitrogen losses and result in higher yields.

Applicability box

Theme

Nutrient management, Crop-specific measures

Geographical coverage

Cool, temperate climate

Application time

Depending on the crops

Required time

No additional time required

Period of impact

Actual and succeeding crops

Equipment

No special equipment required

Best in

Systems where nitrogen requirements are met by the use of livestock manure

Practical recommendation

Nitrogen application from livestock manure to winter and spring crops has different effects on crop yields depending on the pre-crop and the amount of ammonium-N provided.

Pre-crop	Crop	Yield response (kg grain per kg ammonium-N)		
		Applied amounts of ammonium-N from livestock manure (kg/ha)		
		0-50	50-100	100-150
Cereal	Winter crop	20	15	10
Clover-grass*	Winter crop	20	15	5
Cereal	Spring crop	20	10	0
Clover-grass	Spring crop	5	0	0

* Should only be practiced in areas with clayey soils and low rainfall.

Table 1: Yield responses of different quantities of ammonium-N applied with livestock manure to cereals in relation to different pre-crops.

The results above show that nitrogen availability from livestock manure is limited. Based on the results, the following recommendations can be made:

- If the pre-crop is not nitrogen-fixing, apply 20 to 60 kg of ammonium-N from livestock manure prior to sowing of crops.
- Livestock manure application to a spring crop after nitrogen-fixing clover-grass is not yield effective and may bear the risk of nitrogen losses.

- If livestock manure is difficult to access, choose cereals that are competitive against weeds. Spring oats and winter rye are the best options for spring- and winter crops, respectively.
- Where nitrogen is a limited resource, yield potential is higher in winter crops than in spring crops. If weeds are abundant and difficult to control in a poorly fertilized winter crop, spring crops might be the better option.
- Try not to compromise the nitrogen-supply of certain grass seeds, i.e. ryegrass, which need at least 100 to 110 kg of ammonium-N per ha for optimum growth.

The figure below shows that nitrogen demand varies according to the crop.

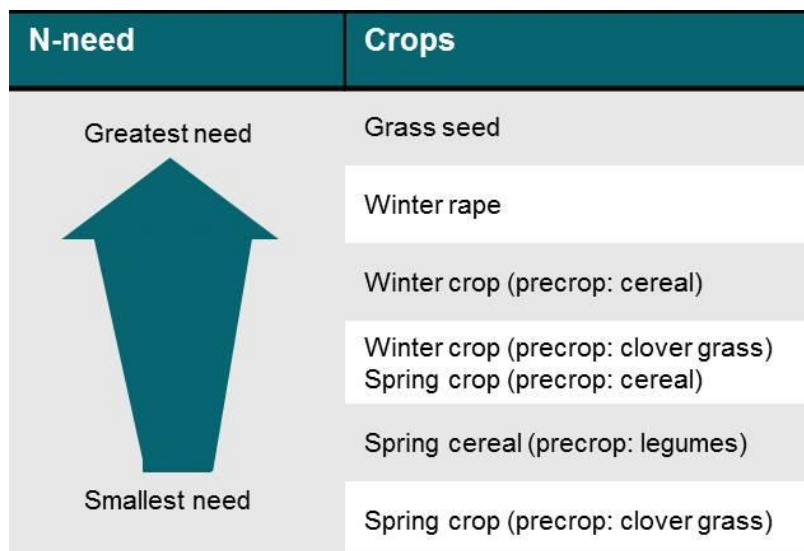


Figure 1: Order of major crops based on their nitrogen demand.

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Further information

Further readings

- https://orgprints.org/31131/12/askegaard-2016-ok-net-arable-leaflets-udnyttelse_kvaelstof_fakta.pdf (Danish factsheet)

Weblinks

- Check the [Farmknowledge tool database](#) for more practical recommendations.

About this practice abstract and OK-Net Arable

Publisher:

SEGES P/S, Agro Food Park 15, DK-8200 Aarhus N, Denmark
Phone +45 87 40 50 00, info@seges.dk, www.seges.dk

IFOAM EU, Rue du Commerce 124, BE-1000 Brussels
Phone +32 2 280 12 23, info@ifoam-eu.org, www.ifoam-eu.org

Author: Margrethe Askegaard, mga@seges.dk

Language editing: Simon Moakes (FiBL)

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