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.

**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.

<table>
<thead>
<tr>
<th>Pre-crop</th>
<th>Crop</th>
<th>Yield response (kg grain per kg ammonium-N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Applied amounts of ammonium-N from livestock manure (kg/ha)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0-50</td>
</tr>
<tr>
<td>Cereal</td>
<td>Winter crop</td>
<td>20</td>
</tr>
<tr>
<td>Clover-grass*</td>
<td>Winter crop</td>
<td>20</td>
</tr>
<tr>
<td>Cereal</td>
<td>Spring crop</td>
<td>20</td>
</tr>
<tr>
<td>Clover-grass</td>
<td>Spring crop</td>
<td>5</td>
</tr>
</tbody>
</table>

* 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.

<table>
<thead>
<tr>
<th>N-need</th>
<th>Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatest need</td>
<td>Grass seed</td>
</tr>
<tr>
<td></td>
<td>Winter rape</td>
</tr>
<tr>
<td></td>
<td>Winter crop (precrop: cereal)</td>
</tr>
<tr>
<td></td>
<td>Winter crop (precrop: clover grass)</td>
</tr>
<tr>
<td></td>
<td>Spring crop (precrop: cereal)</td>
</tr>
<tr>
<td>Smallest need</td>
<td>Spring cereal (precrop: legumes)</td>
</tr>
<tr>
<td></td>
<td>Spring crop (precrop: clover grass)</td>
</tr>
</tbody>
</table>

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

Use the comment section on the Farmknowledge platform to share your experiences with other farmers, advisors and scientists! If you have any questions concerning the method, please contact the author of the practice abstract by e-mail.

Further information

Further readings

- [www.landbrugsinfo.dk/udfasning](http://www.landbrugsinfo.dk/udfasning) (Danish website)
- [www.landbrugsinfo.dk/Oekolog/Planteavl/Filer/udnyttelse_kvaelstof_fakta.pdf](http://www.landbrugsinfo.dk/Oekolog/Planteavl/Filer/udnyttelse_kvaelstof_fakta.pdf) (Danish factsheet)

Weblinks

- Check the Farmknowledge tool database for more practical recommendations.

About this practice abstract and OK-Net Arable

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