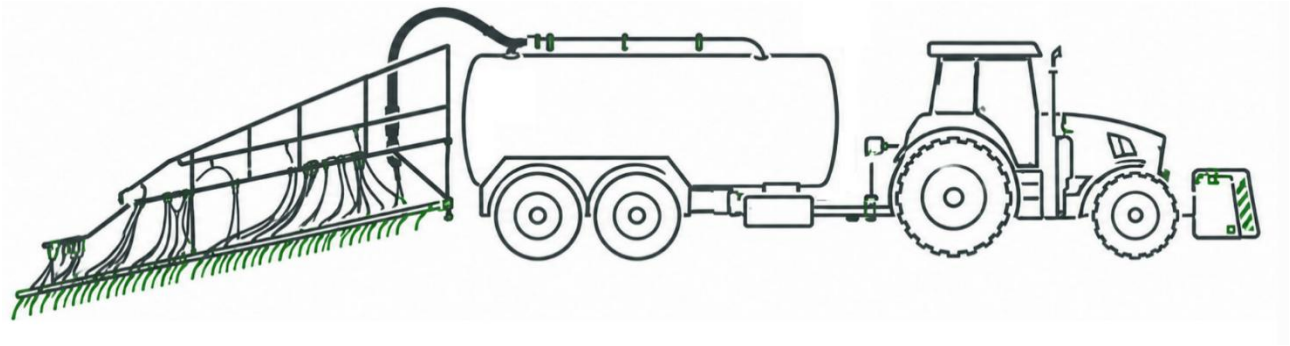
Säure+ im Feld

Emissionen senken - Effizienz steigern

Results and findings after three growing seasons



As part of the model and demonstration project, demonstration plants and/or strips were set up in all regions. In each case, a use with and without acid (conventional) was compared. To exclude sulphur effects, the non-acid variant was fertilized with mineral sulphur fertilizers according to the plant's needs. A final evaluation and recommendation for action based on the project experience will follow after the end of the current practical year.

Hypothesis:

Optimal use of acidification reduces ammonia emissions and thus increases nitrogen availability from agricultural fertilizers, which is indirectly reflected in higher yields and/or improved product quality.

Question:

What is the optimal use of acid, from the point of view of

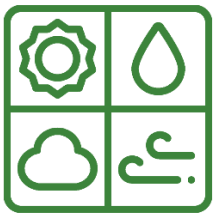
- Agriculture?
- The environment?
- Of crop production?

What parameters influence the optimal use of the acid?

Results:

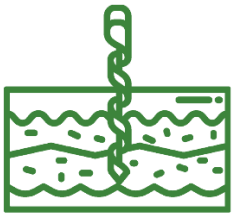
The potential for crop cultivation with acidification technology could be demonstrated in many comparisons of the project. In other cases, low-carbon weather conditions at the time of application or an overall good basic supply of the soil meant that acidification did not provide any added value to the company. Soil heterogeneity and other yield-limiting factors have also sometimes led to negative results, but these cannot be attributed to a yield-reducing effect of acidification.

The following results must be understood under these conditions, and also negative or almost measurable differences between the variants are important results for obtaining knowledge for optimal use. The following list shows the sensible conditions for acid consumption that originate from the previous project years:



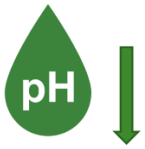
Weather

- High temperature, high wind, high solar radiation
- No precipitation



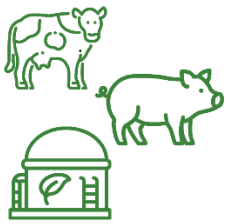
Site and soil characteristics

- Yield and quality can no longer be significantly increased above a certain N level



Amount of acid

- First litre acidity: Strongest pH reduction = significant reduction in ammonia emissions



Amount of fertilizer

- With reduced fertiliser: High possibility of increasing yield and/or quality through acid consumption

Acid use in arable crops

In seven federal states, comparative varieties were created in seven different arable crops over a period of three years. Demonstration plants in winter wheat dominated, followed by winter barley. Figure 1 shows the yield differences per field. A positive result describes an extra yield in the variant with acid compared to conventional use

with a drag hose or trailing shoe. A combination of different conditions (see list above) led to an increase in yield in the acidic variant in about 60% of cases.

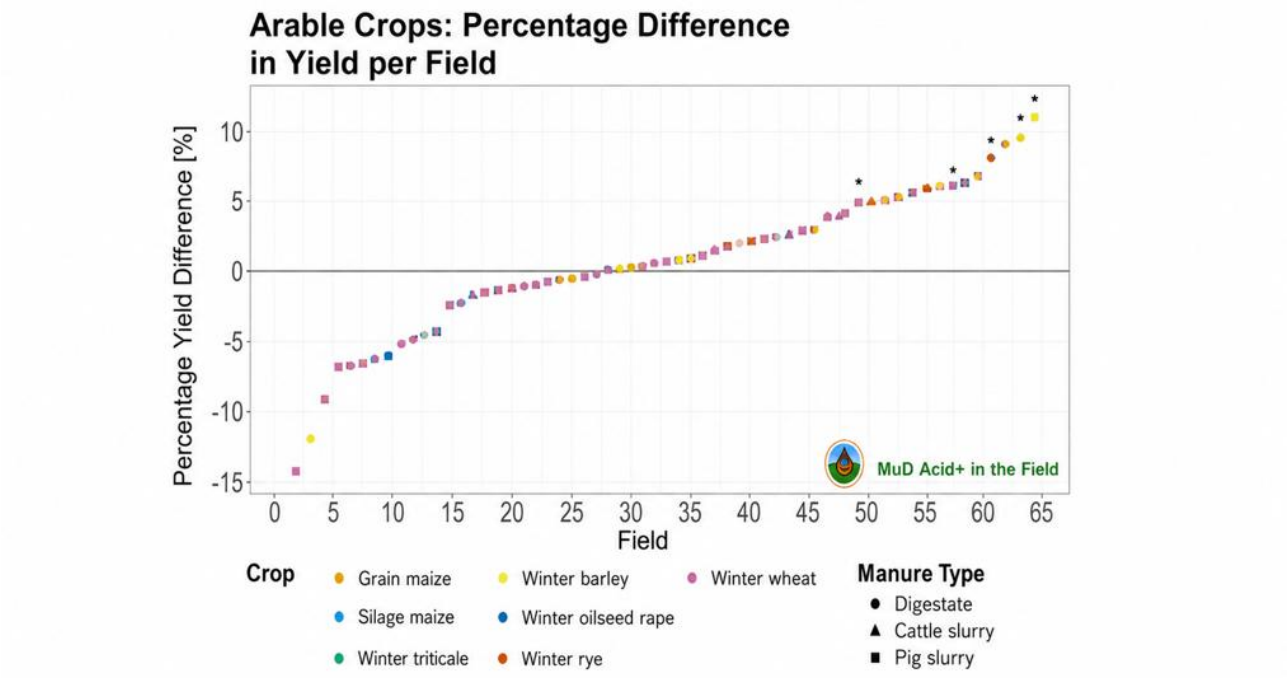


Figure 1: Percentage difference in yield between the variant with acid compared to the variant without acid per field;
* = significant result with $p<0.05$.

Nitrogen savings due to acidification can have a positive effect on protein content in addition to yield, especially if the nitrogen supply is already good. As the protein content of both baking wheat and feed grains decreases, increased quality is also a desirable goal in crop production. Here, too, we were able to demonstrate the benefits of acidification when acid was used sensibly (Figure 2). To illustrate nitrogen uptake, Figure 3 shows the calculated cereal N content in the comparisons in cereal crops.

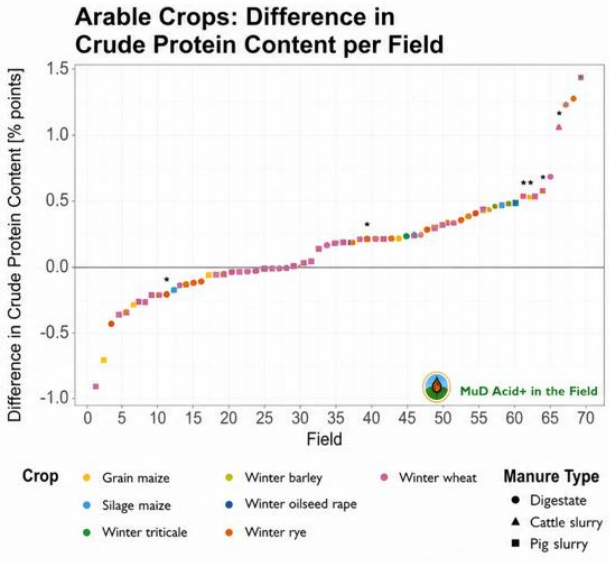


Figure 2: *Difference in crude protein content in percentage points between the variant with acid compared to the variant without acid per field; * = significant result with p<0.05.*

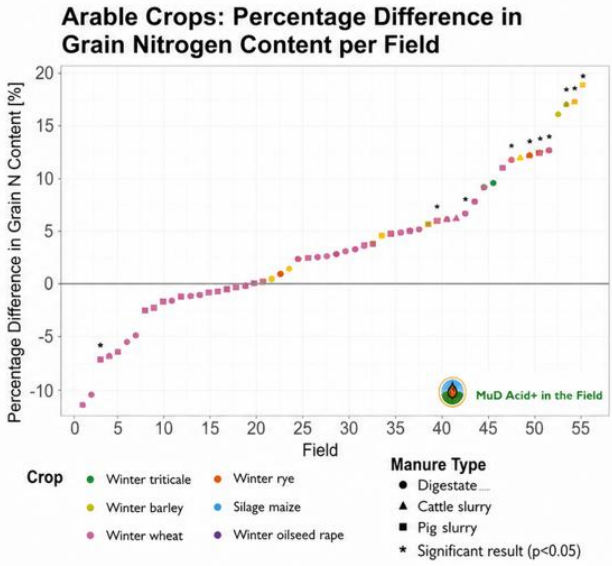


Figure 3: *Percentage difference in calculated grain nitrogen content between the variant with acid compared to the variant without acid per field; * = significant result with p<0.05.*

Acid consumption in grasslands

In grasslands, the risk of acidity becomes even more apparent. Depending on the region, 3–5 pieces are harvested per year in permanent grassland and field grasses and fertilized in advance (with agricultural fertilizers). Some of the applications take place in the summer and thus under weather conditions that result in high emissions and thus also large N losses. The comparisons of varieties in the demonstration plants differ in part from those in the arable crops. Since several pieces can be fertilized and harvested, varieties were created in some places that were seurified up to three times. The comparison variants were then conventional fertilization and varieties that were acidified only once and fertilized for the following cuts without acidification. In Figure 4, this is color-coded. The graph shows the yield difference for the dry matter as a percentage of the variant with acid compared to the variant without acid (conventional). In many cases, the cultivation potential of the lilac could be demonstrated. However, it has also been noted that the positive effects can be added to factors such as water scarcity, especially at later times of the year when the use of acid has a particularly high potential for effect.

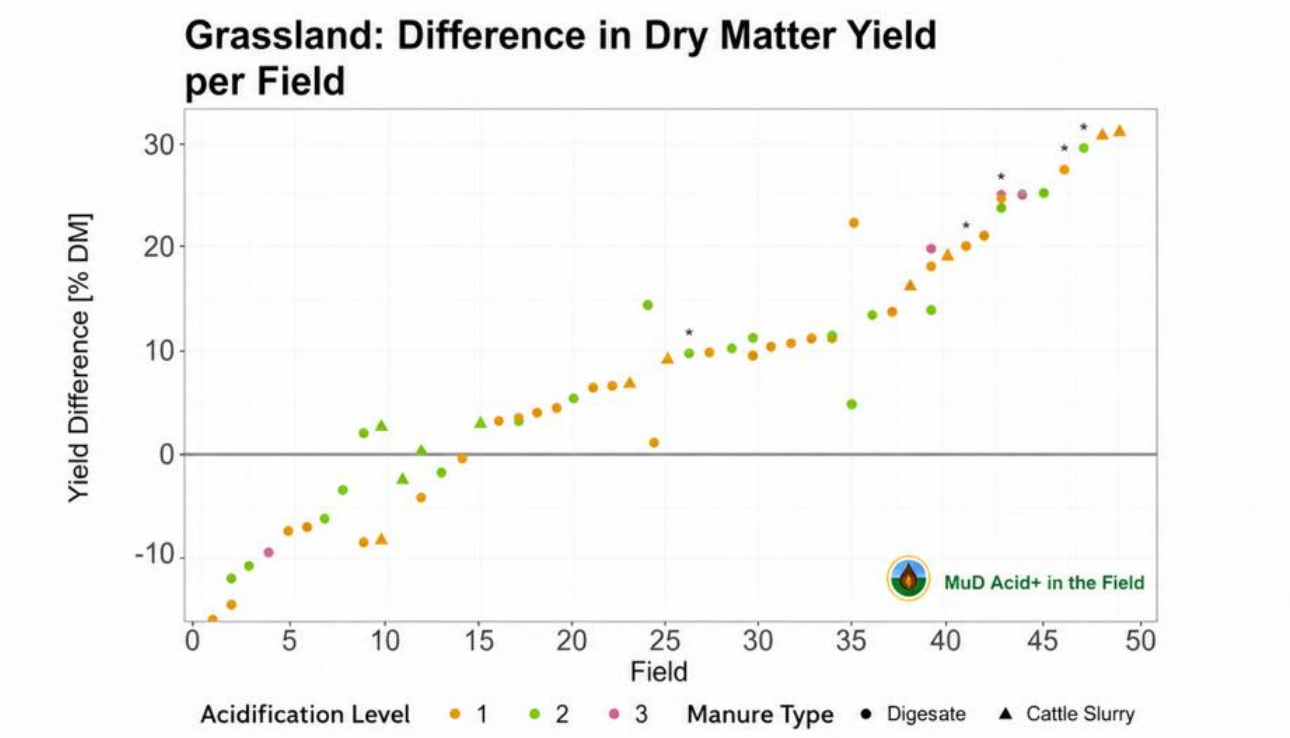


Figure 4: Percentage difference in fresh matter yield between the variant with acid compared to the variant without acid per field; * = significant result with p<0.05.

Link: [Ergebnisse - Säure+]