Perennial leys for dairy cows: soil and plant attributes, yield and botanical composition with long-term low and high N input

Tatiana Rittl and Anne-Kristin Løes, NORSØK.

Results

Despite the double amount of manure, cumulative ley yield (2011-18) was only 17% higher (p<0.001) in the intensive as compared to the organic treatments. In 2018, yield levels were affected by drought.

NUE was 140% for the organic treatment, suggesting that more N was removed by ley yields than it was applied with manure. Intensive treatment had a NUE of 82%. Low NUE indicates excessive use of fertiliser that may cause environmental pollution.

Fig. 3. Fertilization supports early growth. Photo April, 2016: «OR» = organic; «IN» = intensive; «C» = control.

Fig. 4. Average ley yield, 2011-2018.

As expected, after 7 years, AL-extractable phosphorous (P) and potassium (K) concentrations in soil were significantly (p=0.002) higher in the intensive treatments than in the organic treatments.

Fig. 5. Extractable soil potassium concentration over the years (2011-2018).

Botanical composition was affected by N application rates, with significantly less clover (p=0.008) and more grass (p=0.003) in the intensive treatment.

Fig. 8. Botanical composition of the grass-clover ley in 2015.

Conclusion

Overall, our findings indicate that in the long-term, high N input farming systems do not necessarily translate in significant gains of ley yield when compared to low N input systems. NUE and clover content of the ley will be reduced with higher N input.