

Fertilising practices to reduce nitrous oxide emissions from managed grasslands

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Hazardous cocktail

Fertiliser and manure application on grassland comprise all ingredients for potentially high nitrous oxide (N_2O) losses. Grasslands generally contain relatively high levels of easy degradable carbon (C). Fertiliser is a source of nitrate (NO_3) and ammonium (NH_4), while manure provides NH_4 as well as C. We assessed several strategies to reduce N_2O emissions, either by reducing the amounts of available NO_3 and NH_4 , or by preventing the simultaneous availability of fertiliser NO_3 and manure C.



Smart fertilising

Three mitigation strategies were field-tested during three consecutive years.

- (i) application of NH_4 -based fertilisers,
- (ii) split fertiliser applications, and
- (iii) separate application of fertiliser and manure.

The N_2O concentrations were measured in the headspace of vented PVC flux chambers, using a Brüel and Kjær photo-acoustic spectroscopic infrared gas analyser.



It works...sometimes

The observed N_2O emissions of the standard fertiliser (CAN) were rather low, especially in the second and third year. The tested strategies only showed an emission reduction in the first year. None of the mitigation strategies resulted in a lower emission in the second and third year. We conclude that choice of fertiliser type and timing can reduce N_2O emissions, but solid recommendations on when to apply these strategies are still lacking.

Emission factor (kg N_2O -N per kg applied N) for all treatments. Different colours indicate a significant difference ($P < 0.05$).

