



GETTING FERTILISER APPLICATION RIGHT ON GRASSLAND

All dairy farmers want higher milk yields from their forage. But this entails increased levels of grassland fertilisation. Fertiliser planning has to take account of factors such as field location, soil type, water supply and management intensity. Individual German federal states issue official fertiliser recommendations which take into consideration different local conditions.

Calculating nutrient removal

The nitrogen requirement of grassland is determined by yield and crude protein levels. By estimating the yield of a particular site, farmers can calculate the nutrient removal rates and use them for predicting the fertiliser requirement (Table 1). For grassland this total requirement is down to use and anticipated yield. Grassland used exclusively for grazing has a significantly lower maximum nitrogen requirement of 130 kilograms per hectare, since a substantial proportion of nutrients taken up by the grass is returned to the land via dung and urine. As well as nitrogen, grassland requires phosphate, potassium and magnesium. Grassland with no or very few slurry inputs in particular requires supplementary mineral fertilisers. A complete NPK fertiliser with sulphur can be very helpful in such cases.

Complying with the Fertiliser Ordinance

According to the current German Fertiliser Ordinance, grassland should receive a maximum 170 kilograms of nitrogen per hectare and per year

from farmyard manure. The application of fertilisers with a high concentration of available nitrogen is prohibited from 15 November to 31 January. This includes organic and organo-mineral fertilisers with an ammonium content above 10% and a total nitrogen content above 1.5%. The ammonia nitrogen fraction in the slurry is taken up by the grass and offset in full by herbage growth in the season of application. The remaining organic nitrogen fraction becomes part of the supply of soil nitrogen, where it is released over several seasons. Therefore it must be allocated to the following years. Potassium and phosphate are fully offset in the long-term.

State recommendations

In addition to the statutory requirements, individual German federal states issue fertiliser recommendations which are geared towards local conditions and uses. For instance, North Rhine Westphalia and Lower Saxony have produced useful recommendations on the splitting of nitrogen applications.

Tab. 2: Examples of split N inputs according to usage type and intensity for mineral soils and sites with average yield potential

	N fertilisation recommendation				Total
	N uptake				
	1.	2.	3.	4.	
Permanent pasture	50	40	30	–	120
Strip grazing	60	40	30	30	160
1 cut, deferred grazing	80	30	30	30	170
2 cuts, deferred grazing	80	60	30	30	200
3 cuts, deferred grazing	80	60	60	30	230
4 cuts	80	60	60	40	240

Source: Landwirtschaftskammer Niedersachsen, Stickstoffdüngung im Dauergrünland, 2010 (Lower Saxony Chamber of Agriculture, nitrogen fertilisation in permanent grassland 2010)

Allowing for sulphur

Applying sulphur leads to more forage with a higher protein and energy content. Sulphur levels can be verified by analysing the forage. The optimum nitrogen to sulphur ratio lies between 10:1 and 12:1. It can be assumed that there is a sulphur deficiency if the nitrogen to sulphur ratio is above 15:1. In North Rhine Westphalia a sulphur input of 10 to 20 kg per hectare at each cut is recommended. The amount of sulphur provided by farmyard manure ranges from 8 to 12 kg per hectare. However, since most of this is organically bound it only becomes available to the grass slowly as the soil warms up in the spring and later in the season if there is sufficient moisture. For this reason it is advisable to provide supplementary sulphur with each nitrogen application.

Tab. 1: Example of nutrient removal rates from grassland (kg/ha) in Mecklenburg-Western Pomerania

		pro 1t DM or 5t WM	Example 1: 7.5 t DM/37.5 t WM per hectare	Example 2: 12 t DM/60 t WM per hectare
Nitrogen	10% crude protein	16	120	–
	12.5 % crude	20	150	240
	16 % crude protein	25	192	270
Phosphate (P ₂ O ₅):		10	75	120
Potassium (K ₂ O):		30	225	360
Magnesium (MgO):		3	25	40

Source: Fertiliser application – Guidelines and recommended rates for agricultural practice, the Federal State of Mecklenburg-Vorpommern

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