Extract from the German magazine „Innovation“

GRASSLAND CONSULTATION – THE REAL KEY TO SUCCESS

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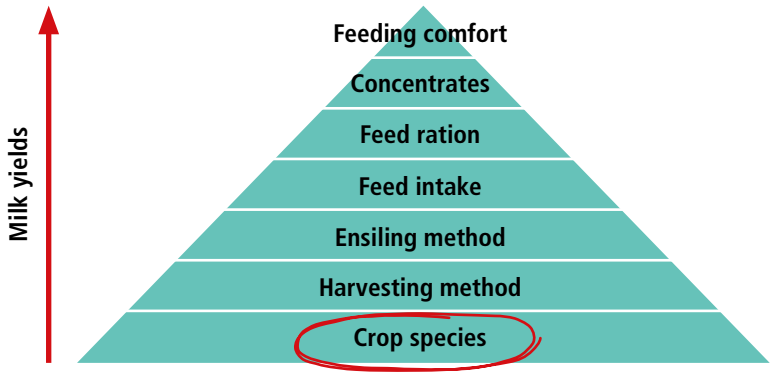
Farming permanent grassland is often far more complex than farming arable crops, because it is a permanent crop made up of a diverse range of plant communities. Unfortunately, the subject of grassland seems to have been neglected in the education of farmers, which leaves them ill-equipped to reliably distinguish the key species of grass, herbs and legumes in grassland farming. Yet is important to have a good understanding of the different species, their characteristics and their function as an indicator in order to "read" the crop and detect management errors to avoid them in the future. Every species in permanent grassland is either supported or suppressed by specific factors such as the timing and height of the various cuts.

It is clear from the numerous species of grass just how complex the grassland system is. As such, it is impossible to make a standard recommendation for the management of all grasslands, because this has to be tailored not just to the region and the individual farm, but right down to the individual field. Grassland always reflects the way it is managed. To take targeted measures, farmers have to be able to "read" the plant population so that they can nurture the crop in a way that helps achieve the aims of the farm. Farmers are often more familiar with the quality of their soil in their arable crop fields, because unlike grassland, the soil is cultivated more frequently. Furthermore, arable farmers can respond to the specific needs of their fields (nearly) on a year-to-year basis and select and rotate the proper crop or variety to maximise the profitability of each field. In grassland, however, it makes no sense to use one individual mix or specific crop; it simply wouldn't be practical. Nonetheless, like in arable farming there is the right solution and the right mix of grasses for every grassland site. Blanket recommendations

Fig. 1: Effects on milk yield



Source: chamber of agriculture lower saxony amended

and reseeding with perennial ryegrass alone, for example, is not the answer.

Control undesirable species – encourage desirable ones

Rough-stalked meadow grass (*Poa trivialis*) is one of the most important weeds in grassland. This grass grows in dense but loose clumps and has a low shear strength. It is an extremely aggressive gap filler that is capable of spreading several metres a year via its above-ground runners. While the first cut yields reasonable volumes, dry matter yields fall sharply in the following cuts. Furthermore, the forage quality of this grass does not meet today's standards, because the dense clump is often mouldy and unpleasant-smelling so that cattle often spit it out, especially in summer. What's more, it is not possible to boost yield levels in the following cuts simply by applying fertiliser. On the contrary, this can adversely affect the fertiliser balance, because the nutrients are not taken up and converted to higher yields. Harrowing can help control and suppress rough-stalked meadow grass. Provided the harrow is set up correctly and weather conditions are suitable, the implement can remove significant amounts of the loose clumps from the grass sward. Another useful approach is to take active steps to encourage desirable species in order to suppress the rough-stalked meadow grass. One solution is to cut at a height of at least 6 cm, ideally at 7–8 cm.

Valuable grass needs nutrients

Cutting or grazing removes a large amount of nutrients from the soil which as a result has to be replenished consecutively. The nutrient requirements of grassland vary depending on the type of soil, weather conditions, species growing here and how the land is used. A first step towards boosting yields is to know the exact nutrient requirements of the grassland.

Macro nutrients

The amount of nutrients removed from a pasture or grassland is down to a number of factors – expected yield levels, the frequency of cuts or grazes and animal excrements. The table shows the nutrients that are most commonly removed from grassland by cutting and grazing. The levels of lost nutrients are down to expected yields.

	N	P_2O_5	K_2O	MgO	CaO	S
2 cuts/pastures	120	45	165	20	68	15
3 cuts/pastures (9 t DM/ha)	190	90	270	40	126	20
3 cuts/pastures (10 t DM/ha)	230	100	320	50	145	25
4–5 cuts/pastures (12 t DM/ha)	360	120	420	60	180	50

Example of average nutrient requirement levels in grassland depending on land use in southern Germany

Good animal health correlates to a sufficient supply of nutrients and a well-balanced availability of these. A balanced supply of nutrients is critical. If certain levels and ratios are exceeded, animals may start suffering symptoms of deficiency. The table shows the optimum ranges and limits.

Example of nutrient ratio(s)	Optimum	Critical
K : Na	10–20 : 1	> 100 : 1
Ca : P	1–3,5 : 1	> 5 : 1
K : Mg	10 : 1	> 15 : 1
N : S	12 : 1	> 15 : 1

Micro nutrients

A balanced diet is essential for achieving high yields. The most important micro nutrients in grassland are copper, manganese and zinc. In addition to these, grazing animals also require sodium, copper and zinc. The soil's nutrient requirements are down to the intensity of grazing or frequency of cuts.

Intake of micronutrients (g/ha/a)

	Intensive grassland use for dairy cattle	Extensive grassland use for beef cattle
Fe	3.000	150
Mn	1.000	60
Zn	6.000	45
Cu	150	15
B	150	9
Mo	40	0,3
Se	10	0,15
Co	2,5	0,15

Intake of micronutrients by grassland and in various types of use in Great Britain
Source: Yara/Ole Walter Jacobsen 07/2014

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Cocksfoot is easy recognisable through the extremely flattened stem base.

Yorkshire fog (*Holcus lanatus)* is another major weed in grassland which does particularly well on acid sites that are poor in nutrients. Cattle tend to avoid it due to its hairy stems and leaves. Yorkshire fog has a low nutritional value and provides little nourishment. It is an early maturing grass which spreads easily, especially if cut or grazed (too) late in the season so it is allowed to set seed. This grass yields high levels of dry matter but the quality is poor. Due to its low sugar content, high proportions of Yorkshire fog in the forage can cause ensiling issues and lead to poor fermentation. This species can be controlled through the balanced use of fertiliser and application of lime tailored to demands, which in turn encourages desirable species. An early cut also helps to suppress this grass as it prevents shedding.

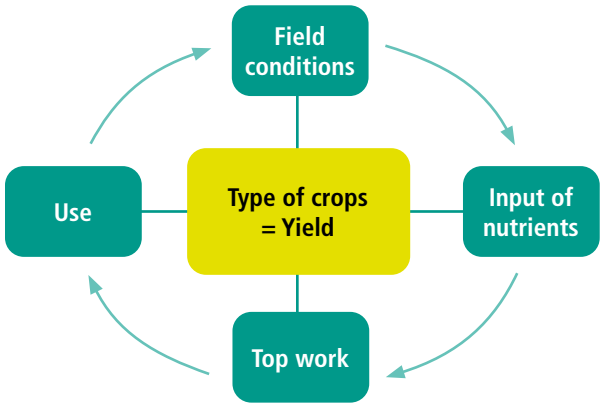
Couch grass (*Elymus repens*) is an undesirable grass which many farmers recognise in their arable crops from its underground runners (rhizomes) – but not in permanent grassland. Couch grass spreads very quickly, especially where there is a fertiliser imbalance, excess nitrogen or patchy cover. Cattle eat it when it is very young, but tend to avoid it possible later in the season. Large quantities of couch grass are very difficult to control effectively without using a broad-spectrum herbicide.

Moving from grass weeds to desirable grasses, there are desirable species that can supply high-quality forage but this requires a proper management of cuts or grazes. These grasses include meadow foxtail (*Alopecurus pratensis*) is commonly found in damp grassland and is used in some grassland mixes. Unlike all other grasses, it flowers extremely early. This can be a problem for forage production, because meadow foxtail has laid down large amounts of lignin and become woody by the time the other forage species transition to the generative phase. This leads to a sharp decline in forage quality. Fields with high levels of meadow foxtail must be cut very early (early to mid-April) to ensure a good forage quality or prevent this species from shedding.

Cocksfoot (*Dactylis glomerata*) is a very dense, tussock-forming top grass, which works very well as a drought-tolerant species. It is regarded as desirable on some sites because it can supply reliable yields and good forage quality if properly managed. Although palatable when young, it very quickly becomes coarse and woody and so rapidly loses its forage quality. If cocksfoot is cut or grazed too late and allowed to set seed, it can become the dominant species in just a few years since it forms very dense tussocks, which suppress other species.

Grassland farmers cannot simply rely on blanket recommendations, advertising claims and quality seals; instead, they should arrange for a grassland consultant to visit the farm and offer expert advice and create a tailored grassland management strategy. Expert consultants can tell from the species growing in the pasture how the grassland was managed in the past and identify any failings. Quick tests can also be performed on the site. For example, soil pH levels can be determined with a Hellige pH meter; or hydrochloric acid can be used to determine the presence of free lime in the soil. The key objective of the consultation is to establish grassland that produces nutritionally valuable forage grasses and then to maintain this level of grassland quality. This is the only way to ensure a long-lasting and cost-effective use of the grassland. This also includes targeted reseeding and diagnosing conditions where reseeding makes no sense. Examining and analysing the results in the clamp provides vital information for proper grassland management. Low protein levels in the forage may be an indicator of low nitrogen levels or shortage of sulphur or molybdenum. Lack of these nutrients adversely affects the protein synthesis of the plants.

Fig. 2: Effects on grassland quality



Source: chamber of agriculture lower saxony amended

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