ALFALFA – THE QUEEN OF FORAGES

Alfalfa *(Medicago sativa)* is one of the world's most important perennial forage crops. Its high mass and protein yields make it an optimal domestic protein supplier. Particularly in times when dry periods occur at increasingly shorter intervals, alfalfa can be advantageous due to its deep roots and can provide high-quality forage.

To ensure that the ‚queen of forages', alfalfa, can reach its full potential, its requirements in terms of location, climate and nutrient supply should be taken into account.

Location and climate

Compared to other forage crops, alfalfa has a high tolerance to drought. Water consumption per kg of dry matter is around 600 mm. For comparison: In intensive grassland, water consumption per kg of dry matter is about 800 mm (source: after Geisler, 1988 and Opitz von Boberfeld, 1994). This drought tolerance gives the impression that alfalfa is a rather undemanding crop. However, it should not be underestimated! Although soil type is generally less important for alfalfa, the condition of the soil is crucial. It is important that the soil is deep, permeable, easily warmed and well aerated. When conditions are optimal, alfalfa can develop its deep taproot and nodule bacteria and provide the benefits mentioned above. In addition, the pH of the soil, as with most legumes, is an important factor for successful cultivation. The optimum pH is between 6.0 and 6.5. In addition to lime, a balanced nutrient supply is also important.

Nutrient supply of alfalfa

With a dry matter yield of 100 dt/ha, approximately 85 kg phosphate/ha, 390 kg potassium/ha and 42 kg magnesium/ha are removed. In addition to these nutrients, **sulphur** (S) and **molybdenum** (Mo) play an important role for the symbiotic nitrogen collector: the macronutrient sulphur is involved in protein synthesis and promotes nitrogen utilisation. The micronutrient molybdenum is also important for nitrogen fixation. This nutrient is mainly responsible for nitrate reductase. Especially on sites with a low pH (below 6.0), molybdenum fertilisation is important to support the functioning of the nodule bacteria. Particularly on sites with a long break in cultivation, efficient symbiosis of the nodule bacteria is more difficult due to the absence of species-specific nodule bacteria. This will ultimately lead to lower yields. It is therefore advisable to use seed that has been treated with species-specific nodule bacteria. Deutsche Saatveredelung AG (DSV) offers this type of seed treatment with Dynaseed®. Dynaseed® Legume Maxx is specially formulated for alfalfa: Biostimulants are intelligently combined with other nutrients for better root growth and faster youth development. The species-specific rhizobia and the nutrient molybdenum promote nodule formation and thus nitrogen fixation capacity.

In contrast to the large number of forage plants, nitrogen fertilisation is of secondary importance for alfalfa due to its own atmospheric nitrogen fixation. In pure alfalfa crops, a nitrogen application of 20–40 kg N/ha is only recommended in the first stage of development. At this stage, the nodule bacteria are not sufficiently developed and the crop needs an external nitrogen source to establish itself. Up to 40 kg N/ha can be applied in mixed cropping systems with alfalfa in the 40–70 % range. If the proportion of alfalfa is less than 40 %, the amount can be increased to 50 kg of nitrogen per hectare (source: LfL Bayern „Luzerne Anbau – Konservierung – Verfütterung, 2nd edition July 2016 page 7). Current soil test results must be consulted for precise fertilisation planning.

Utilisation

The intensity of use of an alfalfa crop varies from farm to farm. Typically it varies between 3–6 cuts per year. 4-cut utilisation gives the highest protein content and yields. The 3-cut system gives the highest mass yield but lower quality. To maintain high yields in intensive systems, alfalfa must flower at least once a year. The persistence of alfalfa is greatly influenced by the storage of reserves.

Successful ensiling of alfalfa

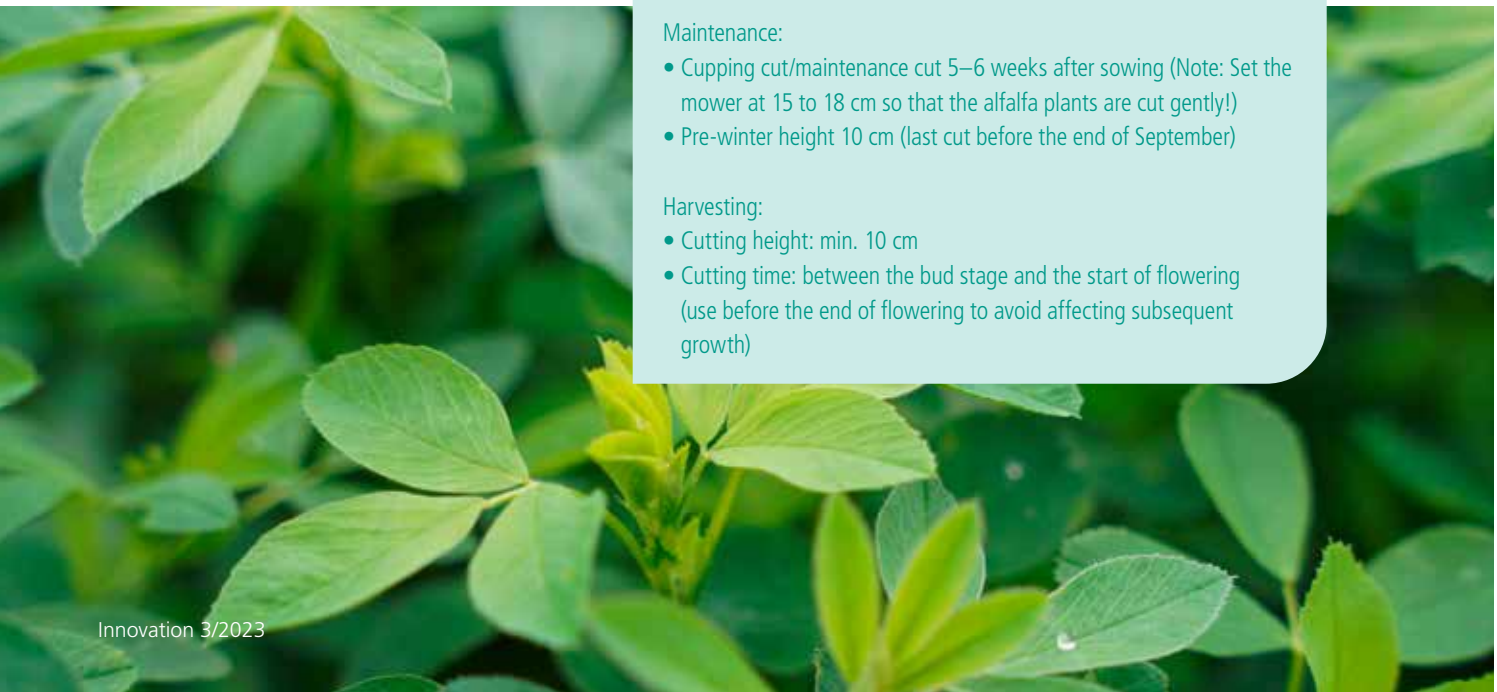
Another important consideration when growing or feeding alfalfa is the preservation of the alfalfa growth. Alfalfa has a

ALFALFA CULTIVATION PROGRAMME:

Sowing:
- Well settled, finely crumbled seedbed without compaction
- Sowing depth: 1–1.5 cm
- Seed rate: 20–25 kg/ha
- Sowing period: Mid-April to mid-August
- Cultivation breaks of 5–6 years

Maintenance:
- Cupping cut/maintenance cut 5–6 weeks after sowing (Note: Set the mower at 15 to 18 cm so that the alfalfa plants are cut gently!)
- Pre-winter height 10 cm (last cut before the end of September)

Harvesting:
- Cutting height: min. 10 cm
- Cutting time: between the bud stage and the start of flowering (use before the end of flowering to avoid affecting subsequent growth)



CANADIAN SUBSIDIARY IMPROVES SEED AVAILABILITY

Deutsche Saatveredelung AG (DSV) has acquired all shares in the Canadian company Northstar Seed Ltd, Neepawa/Manitoba. DSV is thus expanding its own seed multiplication areas (also for alfalfa) in Canada and North America. Northstar Seed Ltd. was established in 1982 by a group of alfalfa seed producers. Today, DSV Northstar Ltd. stands for quality, excellent service and innovative solutions: The company specialises in the production, marketing and distribution of seed for forage crops, turf, catch crops and grasses.

BEES SECURE SEED YIELDS

The alfalfa leafcutter bee is an annual insect used to pollinate alfalfa in North America. Due to the decline of natural pollinators in the 1950s, alfalfa yields had fallen sharply. Research led to the discovery of this particular species of bee, whose pollination services enabled more economical seed yields to be achieved, which are now 300-600 kg/ha. This led to the development of the controlled rearing of the alfalfa leafcutter Bee.

This works as follows:

Leafcutter bees build their nests in hollows. For this reason, when alfalfa is in bloom, nest tubes are placed in the fields for the bees to use. The bees carry round leaf cuttings from the alfalfa into these nest tubes. These form several cells and are filled with pollen and nectar. Eggs are then laid and the nest tubes are sealed with more leaf material. When pollination is complete, the nest tubes are removed from the field and the larvae are collected. These are stored in a cool place over the winter. By regulating temperature and humidity, the hatching date of the new generation is timed to coincide with the start of alfalfa flowering. Around 1 July, the larvae are taken to the field with the nest tubes. There the hatching and mating of the new generation of bees begins. This is followed by the pollination of the alfalfa and the re-nesting of a new generation of bees.

Conclusion

Alfalfa has high site and management requirements, but as a drought-tolerant forage crop, it provides high-quality, high-yielding and protein-rich forage. With its symbiotic nitrogen-fixing capacity, high structural effect and drought tolerance, alfalfa, the ‚queen of forages', has many advantages that farmers can exploit in the current climate.

strong buffering effect during ensiling. Due to the low content of water soluble carbohydrates and the high protein content, the acid producing capacity of lactic acid bacteria is inhibited. A low Z/PK quotient* (*quotient of water-soluble carbohydrate content and buffering substances content) of about 0.8 indicates that alfalfa is a difficult forage crop to ferment. In order to ensile alfalfa successfully despite this classification, a number of points should be observed:

- Withering of the growth to a DM content of 35–45%
- Clean harvest – avoid contamination

Growing alfalfa grass can help to optimise the ensiling capacity of alfalfa: By combining it with the easily fermentable forage grasses (Z/PK ratio between 2.0 and 3.5 depending on growth), the silage can be safely conserved!

Suitability for cow feeding

Alfalfa is ideal for feeding dairy cows and for fattening bulls. Due to its high protein content and good structural effect, its inclusion in the ration has positive effects on animal health in addition to high performance. The good structural effect optimises digestion and rumination, reducing the risk of rumen acidosis.

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