

Spotlight on Agriculture

Ministry of Agriculture, Water and Forestry, Directorate of Agricultural Research and Training, Private Bag 13184, Windhoek

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LUCERNE (*Medicago sativa* L)

Lucerne or Alfalfa (*Medicago sativa* L), often called the “Queen of Forages”, is widely known and accepted as the world’s most important forage crop as it is a high quality feed for all types of livestock. Lucerne is a vigorous perennial legume with a well-developed taproot system (3 to 5 m) that enables it to obtain water and nutrients from a large volume of soil. The plant is highly productive, yielding 8 to 10 hay cuttings per annum under optimum growing conditions. One tonne of lucerne hay contains 24,49 kg of nitrogen (N), 5,44 kg of phosphorus (P), 22,68 kg of potash (K), 13,61 kg of calcium (Ca), 2,27 kg of magnesium (Mg) and sulphur (S) plus micronutrients.

Lucerne is a versatile crop that can be used for pasture, hay production, silage and soil fertility improvement. The leaf extract contains proteins and vitamins A, B, D and K. Due to its high nutritional value, lucerne is also eaten by humans; the young shoots are enjoyed as a vegetable. Medicinal uses include the treatment of allergies, arthritis, pregnancy sickness, stomach ulcers, bad breath; it is used to stimulate kidneys, neutralize body acids, thin blood and improve the appetite; and it allegedly lowers cholesterol.



The “Queen of Forages”, lucerne or alfalfa (*Medicago sativa* L)

GROWTH REQUIREMENTS

Breeders have classified lucerne cultivars on a scale of 1 to 9, where 1 is highly dormant and adapted to very cold areas and 9 is extremely non-dormant, adapted to warm, favourable conditions and highly productive.

Lucerne is deep rooted and prefers deep (1,2 m) and well-drained sandy loam soils with a clay content of less than 35%. Poorly drained soils promote root and crown diseases, prevent nitrogen fixation and reduce winter survival. The soil pH should be within the range of 6,5 to 7,5. It is advisable to have soil samples analysed in the laboratory to determine the pH before sowing lucerne.

Lucerne is a crop that requires low humidity, is relatively drought tolerant and grows well within an annual rainfall of between 500 mm and 1200 mm.

LAND PREPARATION

Primary land preparation includes ripping to break up compaction layers and mould board ploughing to mix organic material, fertilizer and seeds of weeds deep into



Lucerne is deep rooted

the soil. Secondary cultivation includes disc harrowing and cultivation for a fine tilt.

FERTILISERS

Application of any quantity of fertilisers should be based on soil test results that indicate pH level and available plant nutrients. If the soil pH is below 6,5 lime should be applied

three to six months before sowing lucerne, to correct the pH. The quantity of lime to be applied depends on the soil pH. Potassium sulphate lowers the pH and can be used on brackish soils.

Research has shown that the most important fertility factor in the establishment and maintenance of high yield and high quality is liming. Lime is needed:

- in the production of optimal yield as it lowers the soil pH;
- to increase availability of other plant nutrient elements such as phosphorus, magnesium and calcium;
- in the reduction of iron and aluminum toxicity;
- to improve the establishment stand by lowering the pH;
- to increase the productive lifetime of the lucerne stand;
- to ensure that the nitrogen-fixing bacteria are more active;
- to improve the soil texture and tillage as it loosens clay soils.

Nitrogen fertilizers should be applied as basal dressing on a new establishment to assist in the early stages of growth. Lucerne is biologically able to fix its own nitrogen from the air. Supplements in the range of 25–30 kg/ha of nitrogen can improve lucerne establishment and survival in the first year of the stand.

Phosphorus is the most limiting plant nutrient in the soil for optimum lucerne production. An optimum quantity of phosphorus in the soil increases establishment success by improving root growth and enhancing flower formation and seed production. For soils with a high phosphorus content (> 22 ppm), a minimum of 10 kg/ha is recommended while in soils with a low phosphorus content (< 15 ppm) a heavy basal dressing of 80–100 kg/ha should be applied and ploughed into the soil. Correction of phosphorus concentration in soils with low to moderate levels before planting is up to twice as effective as when applied as top dressing after planting.



Medicago sativa L



Potassium is vital for maintaining a productive stand and shoot regrowth of lucerne. At planting, more especially in sandy soils (< 15 % clay) no more than 100 kg/ha should be applied and another 100 kg/ha should be spread on the soil surface as top dressing after planting.

Other nutrients which are important in lucerne cultivation include sulphur (for protein synthesis) to be applied between 30–40 kg/ha at planting time, calcium (for root development and nitrogen fixation), magnesium and molybdenum (routinely applied to lucerne seed as molybdenum trioxide). Research has indicated that although micronutrients such as zinc and molybdenum improve the development of forage crops, yield limitations due to deficiencies are rare.

WEEDS

Fields to be grown under lucerne should be free from both annual and perennial weeds. Liming of the soil three to six months before sowing enhances the germination of weed seeds and this is a good strategy for combating weeds in conjunction with other cultivation activities such as ploughing, disc harrowing and cultivation.

PLANTING OF LUCERNE

A sowing density of 3–7 kg/ha (1 kg = 440 000 seeds) for dry land and 18–20 kg/ha under irrigation is recommended with a sowing depth of 5–10 mm for clay soils and 10–20 mm for sandy soils.

Inoculate lucerne seeds with Nitrogen-fixing bacteria (*Rhizobium*) before sowing.

Avoid sowing lucerne on fields with poor surface drainage and where the water table is high (0,76 m to 0,9 m of the soil surface) during most of the growing season. Avoid fields infested with perennial or noxious weeds. Avoid consecutive sowing of lucerne in the same field, as lucerne leaves produce a toxin called medicarpin that accumulates in the soil and prevents the germination of lucerne seeds.