

Growing Lucerne for Livestock Feeding



Farmers Information Brochure

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What is Lucerne?

Lucerne (Alfalfa) is a perennial high yielding legume, able to produce forage throughout the year under adequate rainfall or irrigation. Lucerne forage is good quality and highly palatable to most livestock. It fixes nitrogen which in turn promotes soil fertility. Lucerne can be used as hay, cut and carry forage in stall feeding cattle or incorporated in concentrate formulations as a source of protein. Growing own Lucerne on the farm reduces spending on protein concentrates. It can be used in making silage together with grasses.

Where can Lucerne grow?

- Elevation: 435 - 800 m above sea level
- Rainfall: minimum of 350 mm, optimal rainfall of 600 – 1000 mm
- Minimum day time temperature: 5 °C with an optimum range of 15 – 25 °C
- The crop can tolerate night temperatures of 2 – 5 °C.
- Prefers deep, well drained, highly fertile loamy soils
- Requires neutral soil pH of between 6.2 -7.8.
- It does not tolerate water logging and compacted soil conditions
- For acidic soils, occasional liming and use of organic manure is required

Varieties of Lucerne grown in Kenya

Table 1. Lucerne varieties in the market include:

Variety	General Information
Sequel	Suitable for all AEZs under irrigation, good producer, resistant to root rot disease
CUF101	Suitable for low rainfall, average production, has more stems than leaves
Sirivia	Suitable for low rainfall, average production, short, has more stems than leaves , susceptible to virus
Trifecta	Hybrids, suitable for all AEZs under irrigation, high producer, average stem/leaf ratio
Aurora	Hybrids, suitable for all AEZs under Irrigation, high producer, has more leaves than stem

There are many other varieties of Lucerne available from different companies with different trade names and attributes, please choose the suitable variety for your area.

Establishment and management practices

Land preparation

- Plough and harrow to eliminate perennial weeds and compact layers/ clogs
- Requires weed free, moist seedbed relatively free of surface trash
- Use non-selective pre-emergent herbicide herbicide such as glyphosate

Soil liming

- In acid soils, application of lime at a rate of 6 tons/ha, at planting is recommended
- Where Calcium and Sulphur are deficient, apply gypsum at 200 kg/ha

Fertilizer and manure application

- Use fertilizers rich in phosphate and potash e.g. 30 kg P₂O₅ and 12 kg K₂O per ha (12 kg P₂O₅ and 12 kg K₂O per acre. Broadcast the fertilizer and work it into the top 75 -100 mm of soil through ploughing and create a fine, even seedbed.
- Top-dress using compound fertilizers above after the first cutting, and again after every second cutting.
- Apply directly after harvest to avoid scotching the regrowth.
- Avoid top-dress application of fertilizer to wet foliage.
- Well-decomposed manure is recommended at the rate 5 - 7.5 tons/ha (2-3 tons/acre) broadcast before ploughing the seedbed.
- Broadcast and work into the soil before onset of rains mix with the soil before seed planting

Seed rates

The table 2 below gives a summary on region, rainfall and seed rate to apply.

Region	Rainfall amount	kg/ha
Marginal dryland	350 – 450 mm	4 – 6
Dryland	450 – 600 mm	6 – 8
Favourable dryland	600 – 800 mm	10 –12
High rainfall/irrigated	>800 mm/ irrigated	15 – 25

Seed inoculation

- Use a seed coating that includes the live rhizobium inoculant, fungicides and some micronutrients before sowing
- In case rhizobium bacteria is not available, soil from existing Lucerne, peas and beans can be scooped and used to inoculate the seed
- Coat seeds with sugar first, then soil
- Avoid planting seed which has been held between seasons unless the seed has been tested and proved to have viable rhizobium

Seed sowing

- Lucerne is best grown as pure stand
- It is not desirable to establish a new crop of Lucerne within an existing crop because toxicity of mature plants affects the germination of the new seeds
- Lucerne is sensitive to shading
- Using a seed drill, sow the freshly inoculated seed in shallow furrows 15 - 30 cm apart.



- Close spacing is suitable for irrigated crop, while wide spacing is used when rainfed
- Optimal soil depth ranges from 6 - 12 mm on clay and loam soils and 12 - 25 mm on sandy soils
- Sow at the start of the rains, cover the seeds lightly with soil

Field management practices

Weeding

- Weed control is essential for successful establishment and subsequent productivity of the Lucerne stand. Weeds reduces the quality of Lucerne
- Apply selective herbicides depending on weed species and amount
- Repeated mowing suppresses weeds by depleting their root reserves. Manual weeding is also possible but expensive especially where the crop is dense



Blue green aphids

Spotted Lucerne

Water requirements and drought tolerance

- Lucerne is renowned for its drought tolerance but is very responsive to water
- In areas where rainfall is low, Lucerne will benefit from one or two irrigations between cuts

Pests and Diseases Management



Green lopper larva with droppings Damage caused by Sitona

Table 3. Common pests and their control

Pest	Symptoms	Control
Aphids	Yellowing, wilting and growth suppression.	Use resistant varieties, spraying and integrated pest management.
Spotted alfalfa aphids	Yellowing, premature water stress, flower and/or leaf drop.	Spray using non-selective insecticides when one aphid is found per seedling.
Stem Nematode	Patches of stunted plants, crowns of infected plants are swollen, discoloured, and spongy and produce few stems.	Good agricultural practices, clean implements.
Sitona Weevil	The larvae consume the roots and nodules of Lucerne while adults eat the leaves. U-shaped notch in the edge, then skeletonize.	Spray using non-selective insecticides.

Green Looper	Series of small holes in the leaves and may leave the upper epidermis intact (windowing).	Not of major concern.
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Table 4. Common diseases and their control

Disease	Symptoms	Control
Phytophthora Root Rot	Kills both seedlings and established plants in wet or poorly drained soils.	Plant on well drained seed bed
Verticillium Wilt	Progresses until all leaves are dead on a green stem. Invades the crown and the plant dies over a period of months	Plant resistant cultivars
Fusarium Wilt	Plants wilt and appear to recover overnight, leaves turn yellow then become bleached, often with a reddish tint only on one side of a plant.	Use resistant cultivars such as Trifecta
Crown Rot	Caused by a range of fungi either acting alone or together with bacteria and nematodes. Plants develops asymmetrically due to the death of buds on the affected portion of the crown.	Avoid grazing or harvesting when soils are wet and maintaining adequate soil nutrient levels (especially potassium).

Damping off (pythium)	Roots of seedlings rot off within a few days of emergence. Leaves often turn red or purple. Plants shrink, then shrivel and die.	Sow into well-drained soil and use fungicide seed dressings. Avoid sowing in cool, wet conditions.
Bacterial wilt	Small pale green leaves after cutting and stunted plants.	Monitor and control leaf hoppers. No control is available. Crop rotation with a cereal crop.

Yield and quality

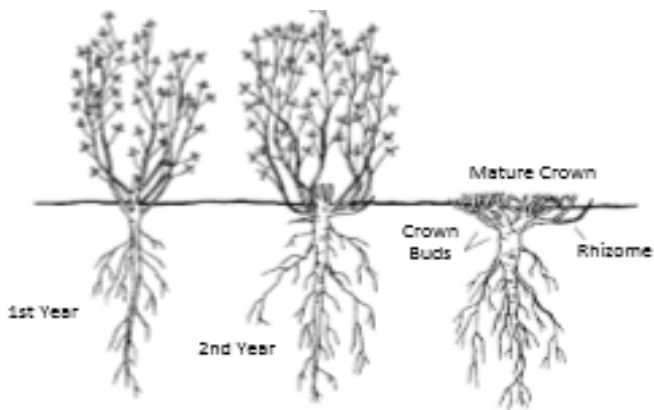
- For optimum yield and quality, make the first cutting at bud stage or earlier
- Second cutting 35 - 42 days later or at 10% bud. Up to 10 cuttings are possible per year
- Under irrigation, it can produce 16 t/ha -20 t/ha with production reduced to 8 - 15 t/ha DM in the 3rd year

Harvesting

- Develop a harvesting schedule to determine yield, quality and persistence
- Harvesting early will result in high quality Lucerne but yields will be lower and stand life will be reduced
- If harvesting for maximum persistence, cut Lucerne between first flower and 25% flowering. This is approximately 35 - 40 days between cuttings

Cutting and raking

- Cut at 2-4 cm above the ground being careful not to damage the crowns
- Cutting the Lucerne when ground conditions are dry may increase the rate of drying
- Let the hay lie on the ground until it reaches the same dryness as the ground
- Rake while the crop is still wet and pliable in order to retain leaves
- If possible, subsequent turning should be done in the late evening or early morning when there dew reduces leaf shatter



Hay making losses

- Harvest and storage losses in making Lucerne hay range from 20 - 40%.
- Mainly from leaf shattering during mechanical handling, raking and baling
- Nutrients leached by rain and plant respiration during storage

- The optimum dry matter content for baling hay is 82 - 85%. Baling at higher moisture contents minimizes mechanical leaf loss and reduces the risk of rain damage because of the shortened wilting and drying period. However, baling at moisture levels above 20% generally increases storage losses from excessive heating and moulding of the hay.

Baling

Besides dry matter and quality loss, other problems associated with slow hay removal from the field include:

- Trampling by vehicles damages the Lucerne regrowth
- Bleached hay
- Damage to regrowth from shading plants

Quality of Lucerne hay

Good Lucerne hay is green, leafy, soft to touch, fresh smelling and free from mould, dust, weeds and other foreign material.

Lucerne hay quality will be reduced by the following factors:

- Fields with grasses and weeds and stems are coarse and hard
- Weather damage leading to loss of green colour, leaf shattering from handling
- Over-mature at cutting resulting in hard and fibrous stems, loss of leaf and faded colour
- Over-drying causing severe leaf shattering, brittle stems and bleaching

- Baling when too wet causing heating from the fermentation process, mould and stuffiness

Feeding

- Lucerne can be stall fed to cattle when fresh or directly grazed
- Lucerne does not tolerate closed grazing, and a rotational grazing system with 35 - 42 day “rest” periods is essential for productivity and longevity of Lucerne
- Graze the stand for 5 - 7 days to avoid animals eating the new regrowth
- If possible, Lucerne should not be grazed during the wet season due to trampling and cracking. If fed fresh, cut Lucerne materials must be left to wilt for 3 - 4 hours before feeding
- It can also be mixed with grasses.

Limitations of Lucerne as a feed

Bloat

- Grazing of fresh Lucerne at vegetative or mid-bud stage may cause bloat in cattle and sheep
- Restrict access to Lucerne by feeding cattle before they come into the sward
- Strip grazing is also recommended
- Supplementing cattle with grass, cereal grains or anti-foaming agents (such as poloxalene) can alleviate this problem

- Access to anti-bloating agents (drenching, addition to the water supply, rumen capsules, spraying) is essential in intensively grazed fields
- Forage cut at flowering time and dried in the field rarely causes bloating

Conservation of Lucerne silage

Lucerne can be conserved in form of silage. Grasses should be incorporated during the silage making process. Harvesting and conserving Lucerne as silage has a number of benefits over hay which include:

- Low leaf loss resulting in more nutrients for feeding
- Consistent forage quality
- Prevailing weather has minimal effect on silage as opposed to hay making.

Wilting Lucerne for hay and silage

- Freshly cut Lucerne will normally have a dry matter content of 15 - 20%
- It is essential to wilt plants after harvesting so that run-off reduced and a desirable fermentation can be achieved
- The wilt time will depend on the wind, humidity, heat and sun but is normally between 12 and 24 hours

For more information, contact:

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2. County Livestock Production Office