

PRODUCTION PACKAGE FOR LENTIL

History

Lentil (*Lens culinaris* Medik.) may have been one of the first agricultural crops grown more than 8,500 years ago. Production of this cool season annual crop spread from the Near East to the Mediterranean area, Asia, Europe and the Western Hemisphere. It grows well in limited rainfall areas of the world. Lentil is a pulse (grain legume) crop, popularly known as Mahsur Dal or Musuri Dal in the Indian subcontinent.

Uses

Lentil is a protein/calorie crop. Protein content ranges from 22 to 35%, but the nutritional value is low because lentil is deficient in the amino acids methionine and cystine. Lentil is an excellent supplement to cereal grain diets because of its good protein content. It is used in soups and various other preparations. Sometimes they are difficult to cook because of the hard seed coat that results from excessively dry production conditions. Lentil can be used as a green manure crop as well.

Growth Habits

Lentil plants are slender, semi-erect annuals with compound leaves (4 to 7 pairs of leaflets) with a tendril at the tips. Plants normally range from 30-50 cm tall, the taller plants resulting from cool growing season temperatures, good moisture and good fertility. Plants can have single stems or many branches depending upon the population in the field. Flowering begins on the lowest branches, gradually moving up the plant and continuing until harvest. Each flower produces a short pod containing one or two lens-shaped seeds. Flowers can be white or pale blue in color and are self-pollinated. At maturity plants tend to lodge because of their weak stems.



Environment Requirements

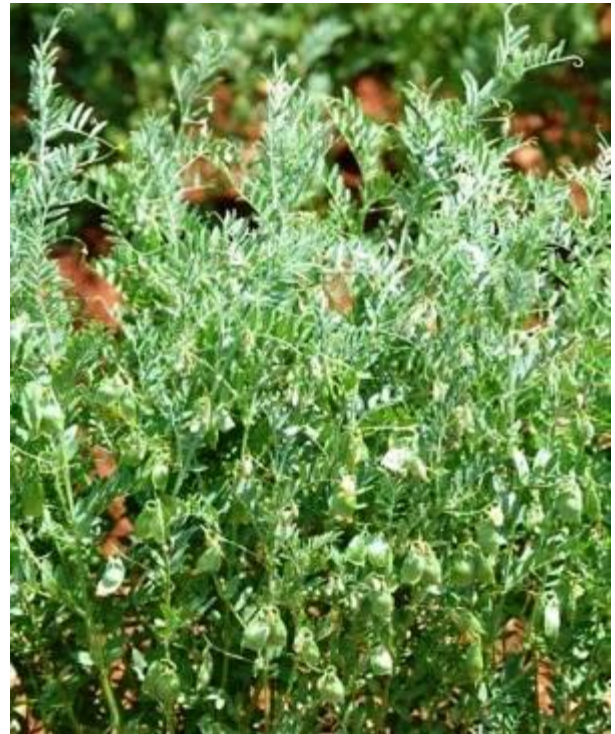
Climate

Lentil is adapted to cool growing conditions. It is sown as a winter season crop. It is very hardy and can tolerate frost and severe winter to a great extent. In our context, its range of cultivation is from tropical to semi-tropical conditions, up to an altitude of 1400 m. it can be grown with the moisture conserved in the soil during the rainy season. It requires cold temperature during its vegetative growth and warm temperature at the time of maturity. The optimum temperature for growth is 18-30°C.

Soil

Lentil is adapted to all soil types, from sand to clay loam, if there is good internal drainage. Lentil does not tolerate flooded or waterlogged soils, and does best on deep, sandy loam soils high in phosphorus and potassium. Good drainage is required, because even short periods of exposure to waterlogged or flooded field conditions kill plants. A soil pH near 7.0 is best for lentil production.

Unless nodulated field pea or lentil has been grown recently on a field, the seed should be inoculated with *Rhizobium* spp just prior to planting (within 24 hours). Good quality lentil seed does not need to be treated with insecticides or fungicides, because it germinates rapidly and seedlings emerge quickly. Seed treatment compounds can interfere with the nodulation process.



Cultural Practices

Field Preparation

A firm, smooth seedbed with most of the previous crop residue incorporated is best for lentil. Uneven surfaces, large clods, rocks or protruding crop residue can interfere with seed placement and germination. On heavy soils, one deep ploughing followed by 2-3 cross harrowing should be done. Light soils may require less tillage and harrowing. There should be proper moisture in the soil at the time of sowing for good germination.

Sowing Time and Seed rate

Lentil should be sown after the harvest of rice in the wetland system from November to December. A seed rate of 30-40 kg per hectare is recommended depending on the seed size (varieties). It can be broadcast sown; if planted in line, a row spacing of 30 cm is recommended. Lentil should be planted at a shallow depth (3-4 cm). Because of the small seed size of some varieties, lentil cannot emerge if planted too deep or if the soil has formed crust. Lentil has hypogeal emergence, which means that the growing point emerges but the cotyledons remain in the soil.

Manures and Fertilizers

Generally, lentil is grown without fertilizers and manures. Inoculation with the proper *Rhizobium* will provide the nitrogen requirements of lentil. However, if available nitrogen is low (organic matter less than 2%), an early nitrogen supplement (starter dose) will help. Care should be taken not to provide too much nitrogen, which could inhibit nodulation and produce excessive vegetative growth at the expense of seed yield. As for most legumes, sulfur needs are medium to high, and responses may be seen on light colored sandy soils where manure has not been applied. Phosphorus and potassium are recommended for maximum yields on soils testing medium

or low. In the wetland system, Zinc may often be deficient and application of Zinc Sulfate may be required. For acidic soils, liming should be done.

Varieties

Lentil is a new crop for Bhutanese farmers, as it is not one of the crops grown in the traditional farming systems. However, there is a good scope for its cultivation in the low to medium altitude areas given the ease of cultivation and high price in the market. Research centres have recently introduced several varieties from Nepal and India. These varieties are currently tested in the farmers' field for their suitability or adaptability in our conditions. Once identified, a few varieties will be formally released. So far, there are no released or recommended varieties of lentil. Researchers consider maturity, growth habit, seed size and color as well as yield potential when selecting a variety of lentil.

Weed Control

Normally, weeds are not a big problem in lentil cultivation if uniform germination is achieved. However, major weeds in the lentil field can be *Chenopodium album*, *Vicia sativa*, *Lathyrus* spp, *Fumaria parviflora* and *Melilotus alba*. The period from 30-60 days after sowing is critical for weed competition. Hand weeding should be done at 25-30 days after sowing.

Diseases

Because most of the lentil production occurs in the dryer, less humid environments, the crop is relatively free from major diseases. However, *Ascochyta* blight, *Sclerotinia*, *Fusarium* root rot and *Rhizoctonia* root rot are possible disease problems for lentil. Crop rotation is the most effective method of preventing a disease problem. Avoid beans, field pea, mustard, soybean and potato in too close a rotation, because these crops are susceptible to the same diseases. Maize and small grains are good rotation crops in conjunction with lentil.

Harvesting

Lentil should be harvested when plants begin to turn yellow and the lower pods become brown to yellow-brown in color. Pods can readily shatter, therefore harvesting should not be done during hot, dry periods of the day. Lentil has a weak stalk and tend to lodge badly. This means that low cut is required in order to minimize losses. Lentils are considered dry at 12% moisture content for storage.



Yield Potential

Yields vary with variety, management and environmental conditions. Under good management and excellent growing conditions, lentil can yield about 2 t/ha.

