

Lentil Production Technology



सत्यमेव जयते

Government of India

Ministry of Agriculture & Farmers Welfare

Department of Agriculture Cooperation & Farmers Welfare

Directorate of Pulses Development, Bhopal (M.P.)



Swasth Dhara, Khet Haraa



एक कदम स्वच्छता की ओर



Per Drop, More Crop

M-kisan portal - <http://mkisan.gov.in>

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Kisan Call Centre (KCC)-Toll Free No.-1800-180-1551

LENTIL



- Botanical Name - *Lens culinaris* (L.)
Synonym - Masur, Malka (bold seeded),
lentil
Origin - Turkey to South Iran

Introduction

It is a valuable human food, mostly consumed as dry seeds (whole decorticated, seed decorticated and split). In Indian sub-continent mostly consumed as 'Dal' by removal of outer skin and separation of cotyledons, snacks and soup preparation etc. It is easy to cook and easily digestible with high biological value, hence also referred to patient. Dry leaves, stems, empty and broken pods are used as valuable cattle feed.

Nutritive Value

Protein	- 24-26%	Carbohydrate	- 57–60%
Fat	- 1.3%	Fibre	- 3.2%
Phosphorus	- 300 mg/100 g	Iron	- 7 mg/100 g
Vitamin C	- 10-15 mg/100 g	Calcium	- 69 mg/100g
Calorific value	- 343 Kcal/100g	Vitamin A	- (450 IU)

Crop Status

India ranked first in area and second in the production with 39.79% and 22.79% of world area and production respectively. The highest productivity was recorded in Croatia (2862 kg/ha) followed by New Zealand (2469 kg/ha). Canada rank first in production (41.16%) due to very high level of productivity (1633 kg/ha) as compared to India (611 kg/ha). (*FAO State., 2014*)

During Twelfth Plan (2012-15) the country's area under Lentil was 14.79 lakh hectares with a production of 10.38 lakh tonnes. Madhya Pradesh ranks 1st in acerage i.e., 39.56% (5.85 lakh ha) followed by UP 34.36 % and Bihar 12.40%. While in terms of production UP ranks 1st at 36.65% (3.80 lakh tonnes) followed by Madhya Pradesh (28.82%) and Bihar (18.49%). The highest yield was recorded by the state of Bihar (1124 kg/ha) followed by W.B. (961 kg/ha) and Jharkhand (956 kg/ha). The National yield average was (753 kg/ha). The lowest yield was observed in the state of Maharashtra (379 kg/ha), C.G. (410 kg/ha) followed by and M.P. (634 kg/ha) (*DES., 2015-16*).

State-wise recommended varieties

S.No.	States	Recommended Varieties
1.	Bihar	Pant L 406, PL 639, Mallika (K-75), NDL 2, WBL 58, HUL 57, WBL 77, Arun (PL 777-12)
2.	M. P. & C.G.	Malika (K-75), IPL-81 (Nuri), JL-3, IPL-406, L-4076, IPL-316, DPL 62 (Sheri)
3.	Gujarat	Malika (K-75), IPL-81 (Nuri), L-4076, JL-3
4.	Haryana	Pant L-639, Pant L-4, DPL-15 (Priya), Sapna, L-4147, DPL-62 (Sheri), Pant L-406
5.	Maharashtra	JL 3, IPL 81 (Nuri), Pant L 4
6.	Punjab	PL-639, LL-147, LH-84-8, L-4147, IPL-406, LL-931, PL 7
7.	Uttar Pradesh	PL-639, Malika (K-75), NDL-2, DPL-62, IPL-81, IPL-316, L-4076, HUL-57, DPL 15
8.	Rajasthan	IPL 406 (Anguri), Pant L-8 (PL-063), DPL-62 (Sheri)
9.	Uttarakhand	VL-103, PL-5, VL-507, PL-6, VL-129, VL-514, VL-133,
10.	Jammu & Kashmir	VL 507, HUL 57, Pant L 406, Pant L 639, VL 125, VL 125

Source: Seednet GOI, Min. of Agri. & FW, & ICAR-IIPR, Kanpur

Climate Requirement

Lentil requires cold climate. It is very hardy and can tolerate frost and severe winter to a great extent. 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 Type and Field Preparation

Well drained, loam soils with neutral reaction are best for lentil cultivation. Acidic soils are not fit for growing lentil. The soil should be friable and weed free so that seeding could be done at uniform depth. On heavy soils, one deep ploughing followed by two to three cross harrowing should be done. After harrowing, the field should be levelled by giving a gentle slope to ease irrigation.

Sowing Time

Recommended sowing time for *Rainfed*: First fortnight of October in Central and South India and second fortnight of October in North India; *Under irrigated conditions*- First fortnight of November in North India and for *Late sowing*: First week of December in rice fallows of NEPZ or on fields vacated very late by kharif crops under irrigated condition.

Seed Rate and Sowing

For small seeded: 40-45 kg/ha; *Bold seeded:* 45-60 kg/ha; *Late sown condition:* 50-60 kg/ha; *Utera cropping:* 60-80 kg/ha seed is recommended. Sowing should be done in rows 30 cm apart and it should be sown at a lower depth (3-4 cm). This could be done either by using a Ferti-seed-drill or by seeding behind desi plough.

Seed Treatment

Fungicide: Thiram (2 g) + Carbendazim (1g) or Thiram @ 3 g or Carbendazim @2.5 g per kg of seed; *Insecticide:* Chloropyrifos 20% EC @8 ml/kg of seed; *Culture:* *Rhizobium* + PSB, one packet each for 10 kg seed.

Cropping Systems

Sequential Cropping

The most common rotations under sequential cropping are:

- | | | |
|------------------|---|------------------------|
| i) Kharif fallow | - | Lentil (Rainfed areas) |
| ii) Paddy | - | Lentil |
| iii) Maize | - | Lentil |
| iv) Cotton | - | Lentil |
| v) Bajra | - | Lentil |
| vi) Jowar | - | Lentil |
| vii) Groundnut | - | Lentil |

Intercropping

Most common inter cropping systems are:

- i. Lentil + Sugarcane (Autumn) with two rows of lentil at 30 cm row spacing in between two rows of sugarcane
- ii. Lentil + Linseed (2:2)
- iii. Lentil + Mustard (2:6)

Irrigation

First irrigation should be given at 40-45 days of planting and second at pod filling stage. Most critical stage for moisture stress is pod formation followed by flower initiation. In absence of winter rains and where contribution of soil moisture is negligible viz. in Central India, two light irrigations may be applied for significant yield improvement. More irrigation may affect the crop performance adversely.

Plant Nutrient Management

Generally Nitrogen 20 kg Phosphorus 40 kg and 20 kg Sulphur per hectare in medium to low fertile soils as basal dressing.

Secondary and Micro Nutrients

1. Sulphur

In medium black soils and sandy loam soils apply 20 kg S/ha (equivalent to 154 kg gypsum/ phospho-gypsum/ or 22 kg bentonite sulphur) as basal to each crop. If S deficiency is diagnosed red sandy loam soils, apply 40 kg S/ha (equivalent to 300 kg gypsum/phospho-gypsum/or 44 kg bentonite sulphur) per hectare. This quantity is sufficient for one crop cycle.

2. Boron

In lentil grown in calcareous alluvial soils, apply 1.6 kg of B/ha (16 kg borax/ 11 kg di-sodium tetra borate penta-hydrate) as basal to each crop.

Weed Control

Two manual weeding, one at 25-30 days and another 45-50 days after sowing should be done. Weedicide like Pendimethalin 30% EC @ 0.75-1 kg *a.i.* per hectare may be used as a pre-emergence treatment. A weed-free period of early 45-60 days is important.

Plant Protection Measures

Disease

Seedling Mortality

Symptoms: It is caused by fungi. It appears within a month of sowing when the seedlings start drying up. The drying is mainly two types. (Seedling wilt)- Seedling first turn yellow and dry up. Collar rot- The seedling collapse while still green and then dry out.



Control Measures

i) It can be reduced by delay planting until mid-November; ii) Treat the seed with systemic fungicide Carbendazim @ 2.5 g/kg of seed; iii) Plant resistant varieties like Pant L-406 etc.

Wilt

Symptoms: This is serious disease of lentil in which the growth of the plant is checked, the leaves start yellowing, plant start drying and finally die. The roots of affected plants remain under developed and look light brown in colour.



Control Measures

i) Keep the field clean and follow a three year crop rotation. This will help in reducing the disease incidence; ii) Use tolerant and resistant varieties like Pant Lentil 5, IPL-316, RVL-31, Shekhar Masoor 2, Shekhar Masoor 3 etc; iii) Seed treatment.

Rust

Symptoms: The disease symptoms start as yellowish pustules on the leaflets and pods. Later; light brown pustules appear on both the

surfaces of the leaves and other aerial parts of the plant. The pustules finally become dark brown. The plants give dark brown or blackish appearance visible as patches in the field.



Control Measures

i) After harvest, the affected plant trash should be burnt; ii) In NEPZ, normal and early sowing reduces intensity of rust disease; iii) Grow resistant/tolerant varieties like DPL-15, Narendra Lentil-1, IPL 406, Haryana masur 1, Pant L-6, Pant L-7, LL-931, IPL 316 etc.; iv) Spray the crop with Mancozeb 75 WP @ 0.2 % (2g/liter). 1-2 spray at 50 days after sowing are good for controlling rust.

Insect-Pest Management

Pod Borer

Nature of damage : The caterpillar defoliates the tender leaves and also bores the green pods and feeds upon the ripening grains. It damages almost all the pods in case of severe damage, but causes nearly 25-30% annual yield losses in India.



Control Measures

i) Spray neem seed extract (5%) @ 50 ml/ liter of water; ii) Spray of Profenofos 50 EC @ 2 ml/ liter or Emammectin benzoate 5 SG @ 0.2 g/ liter of water.

Aphids

Nature of Damage: Aphids suck the sap and in case of severe damage the growth is suppressed.



Control Measures

i) Spray of Dimethoate 30 EC @ 1.7 ml/liter or Imidacloprid 17.8 SL @ 0.2 ml / liter of water.

Harvesting, Threshing & Storage

Crop become ready for harvest when leaves begin to fall, stem and pod turn brown or straw in colour and seeds are hard and rattle with 15% moisture inside them. Over ripening may lead to fall of pods as well as shattering and seed cracking if seed moisture fall below 10% due to delay in harvesting.

The crop should be allowed to dry for 4-7 days on threshing floor and threshed by manually or bullock/power drawn thresher. The clean seed should be sun dried for 3-4 days to bring their moisture content at 9-10%. The seed should be safely stored in appropriate bins and fumigated to protect them from bruchids.

Yield

A well manage crop yields about 15-20 quintals of grain per hectare.

Recommendation to achieved higher production

1. Deep summer ploughing once in 3 years.
2. Seed treatment should be done before sowing.
3. Application of fertilizer should be based on soil test value.
4. Wilt resistant/ tolerant –RVL-31, IPL81 (Noori), IPL -316, Sekhar masoor-2, Sekhar masoor-2.
5. Rust resistant/ tolerant –IPL-406, WBL-77, Pant L-6, Pant L-7, Sekhar masoor-2, Sekhar masoor-2, IPL-316.
6. Adopt integrated approach for plant protection.
7. Weed control should be done at right time.

- For technical information of crop production please contact to district KVK/ nearest KVK.
- To avail benefit from Central and State Government running schemes for crop production (ploughing, fertilizers, micronutrient, pesticide, irrigation equipment), agricultural implements, storage infrastructure etc., please contact to your DDA/SADO office.

**- For more information also visit -
M-kisan portal - <http://mkisan.gov.in>
Farmers portal - <http://farmer.gov.in>
Kisan Call Centre (KCC)-Toll Free
No. - 1800-180-1551**

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