

LETTUCE

BOTANICAL	: <i>Lactuca sativa</i> L.
FAMILY	: Compositae
CHROMOSOME NUMBER	: $2n=2x=18$
ORIGIN	: Asia Minor, Iran and Turkistan

AREA AND PRODUCTION

- Lettuce is one of the most important vegetable crops in temperate countries.
- However, it occupies an important position for its cultivation in tropical and subtropical countries also.
- In the world, the largest consumer and producer is USA.
- Large areas of lettuce are also grown in South Eastern Australia, Japan, China, Israel, Northern Mexico, Chile, Argentina, Brazil and Peru.
- Area under lettuce is 0.12 million hectares with a production of 0.79 million tones (FAO, 2009).

ORIGIN AND HISTORY

- Lettuce is originated in Mediterranean region, Probable ancestors of Lettuce is *Lactuca serriola* L.
- Lettuce is cultivated about 4500 B.C.
- The crop was spread throughout the Mediterranean region during Greek and Roman eras and from there to rest of Europe.
- It was recorded as being grown in new world long back in 1494.

NUTRITIVE VALUE (per 100g of edible portion)

Energy (kcal)	14	Vitamin-A (IU)	900
Moisture (%)	95.1	Thiamine (mg)	0.06
Protein (g)	1.2	Riboflavin (mg)	0.06
Fat (g)	0.2	Niacin (mg)	0.
CHO (R)	2.5	Ascorbic acid (mg)	8

USES

- Lettuce is rich in vitamin A and minerals like Ca and Fe.
- Its tender leaves are chopped and used as salad with salt and vinegar.
- Lettuce is known to be sedative, diuretic and expectorant.

SOIL

- It grows well in light, well manured, well drained soils with adequate moisture.
- It is slightly tolerant to acid soil (pH 6.0 -6.8) but highly susceptible to acidic soil.

CLIMATE

- It requires cool temperature.
- It thrives best at higher altitude in tropics and sub tropics.
- The seed germinate quickly at 21-24°C.
- But lower and higher temperature is harmful for germination.
- Temperature above 22°C promotes bolting causing bitterness in leaves and accelerates the development of tip burn and rot.
- Seeds become dormant and fail to germinate when the soil temperature is above 22-30°C.

VARIETIES / HYBRIDS

□□ Varieties are grouped on the basis of morphological characters.

Head type:

1. Crisp Head:

- Under this group the cultivars are heading types with wrinkled non wrapper leaves, round, large head (up to 1kg), brittle textured and tightly folded, with green outer and white or yellowish inner leaves.
- Examples are New York 515, Imperial 44, 152, 456, 615 and 847.

- Great Lakes and Pennlake are commercial cultivars.
- 2. **Butter Head:**
 - The cultivars form relatively small, loose heads with broad oily, crumbled, soft textured leaves.
 - Both crisp and butter head belongs to head lettuce i.e. var. *capitata*
 - Examples are Borough Wonder, Cobham Green and Avondeiance

Non-heading type:

1. Cos or Romaine (var. *longifolia*):

- The cultivars have elongated leaves forming a loaf shaped head.
- Outer leaves are dark with heavy ribs, inner leaves are finer and lighter in colour coarse in appearance but eating quality is quite good.
- Examples are Eiffel Tower, Paris Island and Paris White

2. Leaf or Bunching (var. *crispa*):

- The cultivars are non-heading or leaf type. Colour, heat sensitivity and quality vary but all produce a rosette of leaves.
- Best example is Black-seeded Simpson, Prizehead, Australian and Salad Bowl for outdoor and Grand Rapids for greenhouse production

3. Asparagus or Stem (var *asparagina*):

- Also known as celery lettuce
- The cultivars have thick stem which is peeled and eaten raw e.g. Celtuce
- The leaves are also edible but inferior in quality than other types.eg Lettuce

Latin:

- It resembles butter head in forming loose head but the leaves are elongated and similar to Cos.
- Grown in Mediterranean countries.
- The cultivar Gallega, Criolla, Verde, Criolla Blanca and Madrilene are best examples.

Some of the important varieties are

Punjab Lettuce No.1:

- Released from Punjab Agricultural University, Ludhiana
- Leaves light green, shiny and crisp.
- It is a non- heading variety with loose leaves, takes about 45 days from sowing to first harvest.
- Average yield is 88q/ha.

Great Lakes:

- Recommended by IARI, New Delhi, crisp head type having large firm heads with green leaves, outer leaves are blistered, resistant to tip burn but susceptible to powdery mildew.

Alamo-1:

- It is a head type variety released from Dr Y S Parmar University of Horticulture and Forestry, Solan.
- Leaves are crisp, cup shaped, bending and dark green in colour.
- Heads solid, weighing from 500-800gram
- Ready for harvesting in 80-90days.
- Average yield 235q/ha.
- Few other varieties are Slowbolt (Leaf type), Chinese Yellow (Leaf type), Imperial 859 (Crisp Head type), White Boston (Butter Head type), Dark Green (Cos type), Alamo 1 (Head type), Simpson Black Seeded (Leafy type), Eves Wonder (Heading type) and Ruby (Leafy & purple coloured).

Recently developed Lettuce cultivars:

- Cultivars 9547 and 9542, Salma, Svetlana (Nathasha), Impact, Magnum, Marksman, Diamond, Elisa and Florida Buttercrisp,

SOWING TIME

- In the plains, the seeds are sown in the nursery beds in September to October.
- At high altitude, the sowing is done from March-June/July.

SOWING METHODS

- It can be sown directly in the field or by raising the nursery beds.
- In the nursery beds, the seedlings are transplanted after 4-6 weeks of sowing.

SEED RATE

- About 400 to 500 gram seed is required for one hectare area.

SPACING

- Seedlings are transplanted at a spacing of 45×45, 45 ×30 or 30 ×30cm depending on soil type and cultivars.

NUTRIENT MANAGEMENT

- For getting good yield, 100-150q of well rotten Farm Yard Manure should be incorporated during land preparation.
- Besides this apply 50 kg each of N and K₂O and 90 kg of P₂O₅.
- Entire quantity of Farm Yard Manure, P K and half nitrogen is applied in the field at the time of field preparation. The remaining nitrogen is top dressed one month after first application at the time of hoeing/earthing up.

IRRIGATION

- When sufficient moisture is not present in soil, a pre-sowing irrigation is done for seed germination in directly sown crops.
- Soon after transplanting, the lettuce crop should be irrigated.
- Subsequent irrigation is done at 8-12 days interval.

INTERCULTURAL OPERATIONS

- Shallow hoeing and weedings are essential to keep the field free from weeds and to maintain proper aeration.
- About 3-4 hand weedings at 15-21 days interval are sufficient.
- Pre-transplant application of Fluchloralin @ 1.0-1.5 kg/ha effectively controls most of the weed.
- Herbicides like Propyzamide @ 1.5 kg/ha when applied as pre-planting proved effective for the control of weeds.

USE OF GROWTH REGULATORS

- The plant fresh weight increase with IBA and NAA at 50 to 100 ppm, the use of GA₃ @ 10 mg/l stimulate respiration in lettuce seedling when applied at active stage of growth and development.

HARVESTING

- Harvesting depends upon the type and the purpose for which it is grown.
- Head lettuce for market is allowed to develop a solid head.
- The leafy variety become ready for harvesting within 50-60 days of sowing and harvested when the leaves attain full size but remain tender.
- Head type variety takes 60-70 days to harvest. Heads are harvested when they attain a good size and become solid.
- For home consumption the lettuce leaves can be harvested at any time, but for market it is allowed to develop a full size.

YIELD

- Green yield varies from 100-140 quintals/ha.

STORAGE

- Lettuce can be stored for about 3 to 4 weeks at 0°C with 90 to 95 % relative humidity and the freshness of lettuce is maintained by the pre harvest spray of butaric acid at 5 to 10 ppm.

DISEASES

Fungal Diseases

Damping off: Same as cabbage

Root rot

- This disease is characterized by severe stunting and rosetting followed by wilting and death of the plant.
- Lateral roots and cortical tissues of the tap root are severely rotted.

Control measures:

- Removal and destruction of affected crop and follow crop rotation.

Downy Mildew

- Light green to yellow areas develop on the leaves which later become brown.
- Excess moisture enhances this disease.
- Cos and butter head cultivars are more susceptible than crisp head and leaf types.

Control measures:

- Spraying of 0.2 per cent zineb can control this disease.

VIRAL DISEASES**Big Vein of Lettuce**

- Yellow discoloration of veins is the primary symptom of big vein.
- Later, entire leaves become thickened and crinkled.
- Plants remain stunted and do not form heads.

Control measures:

- Avoid moist condition of soil and planting susceptible cultivars.
- Fumigation of the soil with chloropicrin checks this disease.

PESTS**Cabbage Semilooper**

- It prefers lettuce for oviposition and prefers young plants.

Control measures:

- Apply malathion (0.05 %) and repeat after 10 days.

Aphids

- These are small in size.
- Both adults and nymphs suck sap from plant tissues due to which, the plant become weak.

Control measures:

- Spray malathion (0.05%) or oxy-demeton methyl (0.025 %).

PHYSIOLOGICAL DISORDER**Tip burn**

- The disorder may be caused due to the prevalence of high temperature, light intensity and long duration, excess of nitrogen, deficiency of Ca and B, antigenic age of plant, high Mn and soil moisture content and high endogenous level of IAA.
- It is characterized by the appearance of tip burning of lateral margins of inner leaves of mature heads.

Correction:

- Increase the dark period and relative humidity.
- Spray the crop with CaCl₂ @ 0.5 per cent on the standing crop.