

Production guidelines for Lettuce



**agriculture,
forestry & fisheries**

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***Production guidelines
for Lettuce***

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Part i: General

1. Classification

Scientific name: *Lactuca sativa* L.

Common names: Lettuce, Tshilai

Family: *Asteraceae/Compositae*

2. Origin and distribution

Lettuce probably originated from Asia, where it was grown for centuries and its early forms were used in Egypt around 4500 BC. The Romans grew types of lettuce resembling the present romaine cultivars as early as the beginning of the Christian era. The crop was also used in China by the 7th century A.D. Lettuce is now one of the world's most important salad crops and is grown worldwide.

3. Production levels and areas

3.1 South Africa

Productions levels are increasing in South Africa.

4. Description of the plant

The plant is a lactiferous herb.

4.1. Stem

Lettuce has a shortened fleshy stem 10 to 15 cm tall. The stem elongates and branches in a paniculate manner during the reproductive phase. Each branch terminates in a homogamous capitulum with ligulate, hermaphrodite pale yellow leaves.

4.2 Leaves

It produces a rosette of smooth, radical, spirally arranged leaves.

5. Cultivars

Lettuce is grouped into four classes, namely loose-leaf, cos or romaine, butter head and crisphead or head lettuce.

5.1 Crisphead or Iceberg lettuce

This type is widely grown in the country and it is characterised by firm heads and crisp, curly leaves. The outer leaves are dark green, while the inner ones are pale and lack chlorophyll. Cultivars in this group include Great Lakes, Del Rio, Del Oro, Frosty, Wintercrisp and Winter Supreme that are cold tolerant. Aviram, Commander, Tropical Emperor, Empire 2000, Summer Gold and Victory are cultivars within this group that are better adapted to warmer conditions. The cultivars are also well adapted for field growing and for long-distance shipments.

5.2 Butterhead lettuce

The butterhead lettuce forms a head that is somehow similar to that of cabbage in shape and has soft, waxy, flexible leaves. It is sensitive to hot weather. Cultivars in this group include Kragramer Sommer and All Year Round. Butterhead lettuce is more popular in Europe and is less adapted to field growing or long distance shipments.

5.3 Loose-leaf lettuce

This group does not form heads and is characterised by soft leaves. It is represented by cultivars such as Grand Rapids. It grows well both in the open field and under protection and can be shipped over longer distances.

5.4 Cos or romaine lettuce

The cos lettuce has a loose head with narrow, soft leaves. The outer leaves are dark green, coarse and have heavy ribs while the inner foliage is lighter.

It is more resistant to cold than the other groups. This type is usually grown in open fields.

6. Climatic requirements

6.1 Temperature

Lettuce is a cool season crop that grows best within a temperature range of 12°C to 20°C. It does not suffer from light frosts and winter cold except near maturity. Severe frost before harvest can scorch leaves and heads. Temperatures above 27°C affect head development and plant edible quality and also promote premature seed stalk development. High temperatures also inhibit germination and can cause a high incidence of tipburn.

6.2 Rainfall

The crop has high moisture requirements and not more than 50% of the available water in the root zone should be depleted before irrigation.

7. Soil requirements

The plant grows well on a wide variety of soils ranging from light sand to heavy clay, however, best results are obtained on fertile loams that are rich in organic matter. A pH between 5,5 and 7 is optimum. Lettuce should be grown on soils with a high water-holding capacity and proper drainage for good root growth and plant performance.

Part ii: Cultivation practices

1. Propagation

Lettuce is propagated from seed.

2. Soil preparation

Lettuce seed is small and as such requires soils that are not prone to crusting. The soil should be worked to a fine tilth, without clods and it should be as level as possible in order to ensure a more uniform emergence.

3. Planting

Raised beds are ideal for lettuce production and they help prevent damage from soil compaction and flooding. They also improve air flow around the plants, resulting in reduced disease incidence. Plant populations range from 60 000 to 100 000 per hectare.

Lettuce is regularly sown directly in the field to a depth of 10 to 15 mm. The seedlings are later thinned out to the desired spacing and they are sometimes used for transplanting. Seedlings for transplanting may also be raised in seed-trays or seedbeds and transplanted about five weeks after sowing.

4. Fertilisation

Fertiliser applications should be based on soil analysis. Overfertilisation with nitrogen may result in increased susceptibility of the crop to various diseases or disorders. Generally, a 2:3:4 (30) fertiliser mixture at a rate of 500 to 1 000 kg/ha can be applied, depending on soil fertility. A side dressing of 150 to 250 kg LAN per hectare can then be applied at four weeks. Lettuce also responds well to organic fertilisers.

5. Irrigation

Lettuce has a shallow root system and as such requires frequent but lighter irrigations. The roots penetrate the soil to a depth of only 300 mm. Water should be applied throughout the growing period and reduced when the heads become full. A water shortage tends to promote bolting.

6. Weed control

Weeds are controlled mechanically, manually or chemically. Mechanical weed control can only be practised before planting because of close spacings. Weeds are removed by hand hoeing or pulling between plants in the rows. Chemical control can be achieved through the application of propyzamide shortly after sowing, which can last 12 months and longer in the soil.

7. Pest control

Cutworms *Agrotis* spp.

Cutworms may be problematic during the seedling stage. They are usually found two to five cm below the soil surface in the vicinity of cut-off plants. Cutworms are active during the night and they cut the stems just above or below the soil surface.

CONTROL

- Baits
- Chemical sprays

Aphids

Heavy populations of aphids can result in stunted growth of young plants. Their presence may also contaminate the heads, thereby affecting the appearance of the heads. Aphids act as vectors of some viral diseases.

American bollworm

Larvae penetrate at the bottom of leaves and eat their way into the heads.

CONTROL

- Chemical spray when the pest is noticed

8. Disease control

Septoria leafspot (*Septoria lactucae*)

The disease is widespread and damaging in hot weather. Infected plants have small, yellowish spots on the outer leaves. These spots grow and become large, irregular and brown. The centre of the spot is pale creamy brown with many black dots.

SYMPTOMS

The disease is characterised by spots or patches of white to grayish, talcum-powder like growth. Tiny, pinhead sized, spherical structures that are first white, later yellow-brown and finally black, may be present singly or in groups.

CONTROL

- Spraying with copper hydroxide

Downy mildew (*Bremia lactucae*)

Downy mildew occurs frequently during cool, moist weather in spring or early autumn and in cool, humid areas in summer.

SYMPTOMS

Light green or yellow lesions on the upper surface of the leaves are first noticed on older leaves. The lesions later become necrotic, limited by veins and angular. A white downy mould is also noticed on the lower leaf surface.

CONTROL

Planting resistant cultivars. Use disease-free seeds. Always practise crop rotation.

Powdery mildew (*Erysiphe cichoracearum*)

The disease occurs frequently and it reduces the quality of the crop.

SYMPTOMS

The disease is characterised by spots or patches of white to greyish, talcum-powder-like growth. Tiny, pinhead-sized, spherical structures that are first white, later yellow-brown and finally black, may be present singly or in group.

CONTROL

- Crop rotation, especially with non-host crops. Use disease-free seeds and always try to plant disease-resistant cultivars.

Sclerotinia rot

SYMPTOMS

Infected plants initially wilt on hot days. A severe wet rot is seen on the stem near the soil. This rot spreads to the roots and into the head, which becomes wet and slimy. A white, cottony mould develops on rotted tissue. Hard, irregular, black sclerotia can be seen in the white mould and rotted tissue. The outer leaves wither and drop flat, followed by the inner ones, if the base of the leaf has rotted.

CONTROL

- Rotation with non-host plants such as onions. Always strive to plant disease-resistant cultivars. Use only registered chemicals.

Bacterial rot complex

The disease is caused by a combination of bacteria that occur on the leaf surfaces without causing damage. The bacteria get into the leaves and cause rotting when the plant is stressed or damaged.

SYMPTOMS

Symptoms are leafspots which start off under water-soaked conditions and later turn brown, before developing soft head rot and dying.

CONTROL

Use disease-free seeds and always try to plant disease-resistant cultivars. Discard infested plants and remove these from the field. Always keep your field free of weeds.

Lettuce mosaic virus

The disease is seed-borne and is transmitted by the green peach aphid.

SYMPTOMS

Vein clearing followed by mottling, recurving of the leaves and increased marginal frilliness results from early infections. Infected, mature plants are yellow and stunted and cannot be harvested.

CONTROL

Use disease-free seeds and always try to plant disease-resistant cultivars. Always keep your field free of weeds.

Part ii: Other cultivation practices

9. Harvesting

9.1 Harvest maturity

The heading types are harvested when the heads are fully grown and firm while the loose-leaf types are picked when the leaves have reached the required size.

9.2 Harvesting methods

Lettuce is harvested by hand by cutting off the plant just above the soil surface to keep most of the outer leaves around the head. Harvesting should be done very early in the morning because lettuce wilts rapidly.

Part iii: Post-harvest handling

Lettuce contains more than 95% water and has a short shelf life. Therefore the crop should be moved into a cool, airy, shady area free from strong winds directly after harvesting.

1. Sorting and grading

Leaves that are loose, discoloured, damaged, soiled and diseased are removed. The butt ends are cut cleanly for packing. Leaf, butterhead and cos types are cut, trimmed and tied into compact bundles before being placed in cartons. Lettuce is graded according to head size. Good quality lettuce is free from wilting, seeding or bitter taste and is firm, fresh, clean and crispy.

2. Packing

Packing may be done in the field or in a packing shed. Lettuce is packed in two- or four-layered crates or cartons and packed according to head-size groups.

3. Storage

Lettuce can be stored for three weeks if kept at 0,5 °C to 4 °C and 95% relative humidity. It should not be stored with products that give off ethylene, such as apples, pears or cantaloupes, because ethylene increases russet spotting. The crisp head and cos lettuce types have a longer shelf life than the butter head and the loose-leaf types.

4. Transport

Lettuce should be transported in refrigerated vehicles. A controlled atmosphere of 2% carbon dioxide and 3% oxygen is recommended if lettuce has to be shipped to long-distance markets for a month. It is said that the reduction in decay achieved by 2% carbon dioxide outweighs the danger of damage.

5. Marketing

Lettuce is marketed in the fresh produce markets or directly to retailers.

Part iv: Utilisation

ACTIVITIES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Soil sampling	X	X					X					X
Soil preparation	X	X	X				X	X	X			
Planting			X	X				X	X			
Fertilisation			X	X	X			X	X			
Irrigation			X	X	X				X	X		
Pest control			X	X	X				X	X		
Disease control			X	X	X				X	X		
Weed control		X	X	X	X							
Leaf sampling												
Harvesting					X	X	X				X	X
Marketing					X	X	X			X	X	X

Part v: Utilisation

Lettuce is used mainly in salads but the leaves may even be boiled like spinach. It is also commonly used in sandwiches. In some parts of the world, the leaves are used to make a cigarette that does not contain nicotine. Seeds of a primitive form found in Egypt are used to manufacture some edible oil. A sleep-inducing medicine is manufactured from latex found in *Lactuca virosa* L.

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Notes

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