

Lettuce (*Lactuca sativa* L.)

French: Laitue; Spanish: Lechuga; Italian: Lattuga; German: Kopfsalat

Under Temperate Conditions

Crop data

Plant with a short cycle and very adaptable to different conditions. Grows at relatively low temperatures; high temperatures and long days promote the bolting.

Plant density: (heading cultivars) 7 and 12 plants/m². Yield between 20 and 40 t/ha.

Prefers soils in good physical condition, rich in organic matter and rather neutral.

Nutrient demand/uptake/removal

Low in comparison to that of other vegetable crops; average nutrient uptake (different planting season, soil fertility, open air or protected cultivation) in kg/t of yield: N = 1.5-3; P₂O₅ = 1-1.5; K₂O = 4-7; MgO = 0.2-0.4, CaO = 1-1.5; Total uptake for medium yield level (kg/ha): N = 50-100; P₂O₅ = 30-50; K₂O = 120-200.

70 % of main nutrients are taken up during three to four weeks before harvesting.

Reliable index of satisfactory nutritional N-status could be given by the N-NO₃ level in the veins of outer leaves: it should be about 8 000 ppm and never below 4 000 ppm.

Fertilizer recommendations

In soil containing more than 3 % of organic matter and in open-air applications of 100 kg/ha N and 50-100 kg/ha P₂O₅ are advisable. K₂O, up to a maximum of 150-200 kg/ha, depending on soil status.

N doses to be increased for winter season crops. 1/3 of N is given before planting, 1/3 a month after transplanting and 1/3 a month before harvesting.

The plant accumulates nitrate N in its leaves up to concentrations near to safety limits set in some countries (3 000-4 000 ppm). NO₃ accumulation is also enhanced by microelement deficiencies involved in N metabolism (mainly B, Mn, Mo, Cu).

Under Tropical/Subtropical Conditions

Crop data

Annual. Harvested part: leaf. Usually transplanted in cooler or highland areas. Harvested: 70 (early) to 85 (late) days after planting. Plant density: 33 000 to 60 000 plants/ha. Grows well in well-drained organic or mineral soils with pH 6 - 6.5. Not tolerant of acid conditions. The

crop is adapted to cool and dry environments. Target marketable yields in intensive commercial production: 30 - 34 t/ha.

Nutrient demand/uptake/removal

Nutrient uptake/removal - Macronutrients					
Yield t/ha	kg/ha				
	N	P2O5	K2O	MgO	CaO
18	68	21	130	8	20
Source: various					

Plant analysis data

Plant analysis data - Macronutrients (optimum fertility conditions)							
Plant part	Growth stage	% of dry matter					
		N	P	K	Mg	Ca	S
Young mature leaf	Head	2.8	0.48	4.2	0.32	0.92	0.1
Source: various							

Plant analysis data - Micronutrients (optimum fertility conditions)							
Plant part	Growth stage	ppm of dry matter					
		Fe	Mn	Zn	Cu	B	Mo
Young mature leaf	Head	128	51	38	8	19	0.03
Source: various							

Fertilizer recommendations

Adequate fertilizer levels are needed to hasten development, improve quality and reduce bolting in bolting-prone cultivars. The P requirement of lettuce is high in comparison with most vegetable crops. Best results are obtained if the cultivated volume of soil solution is brought to 0.2 - 0.4 mg/l P. If the P fertilizer rate is below optimum, efficiency is increased when banded in strips 8 cm wide and 5 cm below the seeds. Banding N together with P may also help to improve yields and the efficiency of fertilizer use.

Present fertilizer practices

USA (Florida)

Apply starter fertilizer to transplants. On mineral irrigated soils apply 120 kg/ha N, 160 kg/ha P2O5, and 280 kg/ha K2O. At planting broadcast in the bed or band all the P2O5 and one-quarter of the N and K2O. The remainder of the N and K2O is given in split dressings early in the growing season.

Senegal (Camberene)

In a light sandy soil in a semi-arid area apply 5 t/ha of organic manure, 125 kg/ha N, 180 kg/ha P2O5, and 280 kg/ha K2O. Before planting broadcast all the organic manure, 40 % of the P2O5 and 25 % of the N and K2O. At 30 days after planting apply 40 % of the P2O5 and 25 % of the N and K2O. At 50 days after planting band 25 % of N and K2O and the remaining 20 % of the P2O5. At 75 days after planting apply the remaining 25 % of the N and K2O.

Brazil (Minas Gerais)

General recommendations are, firstly, 30 kg/ha N, 120 kg/ha P₂O₅ and 90 kg/ha K₂O incorporated in the soil at planting and, secondly, 60 kg/ha N broadcast in three applications 15 and 30 days after planting and during heading closure. An alternative is to apply 50 t/ha organic matter incorporated into the soil two or more weeks before planting.

Further reading

GUZMAN, V.L.; SANCHEZ, C.A.; BEVERLY, R.B.: Soil and foliar Ca effects on diseases and disorders which affect the quality of lettuce. *Proc. Interamer. Soc. Trop. Hort.* 31, 10-20 (1987)

SANCHEZ, C.A.; SWANSON, S.; PORTER, P.S.: Banding to improve fertilizer use efficiency of lettuce. *J. Amer. Soc. Hort. Sci.* 115, 581-584 (1990)