

Eggplant [Aubergine] (*Solanum melongena* L.)

French: Aubergine; Spanish: Berenjena; Italian: Melanzana; German: Aubergine

Under Tropical/Subtropical Conditions

Crop data

The crop is well adapted to the tropics. Optimum temperature for seed germination is in the range of 21 - 24° C and for growth 21 - 29° C. The most satisfactory environments are in lowland coastal areas with relatively little temperature variation. Temperature extremes can diminish the activity of root systems and interfere with plant nutrition. The crop develops a strong taproot with a branched root system that does not spread widely but responds positively to well drained soils of medium texture that are moderately deep. Good aeration is essential.

World production averages 14 t/ha. Experimental plots have yielded more than 90 t/ha and some commercial growers produce 74 t/h but 30 t/ha should be considered an acceptable yield.

Nutrient demand/uptake/removal

The harvest extends over a long period of time in the tropics and the crop produces many fruits. As a result it requires fertilizers in large quantities especially nutrients that are easily released from the soil. In general its nutrition resembles that of tomato.

Nutrient uptake/removal - Macronutrients						
Plant part	kg/40 t crop					
	N	P2O5	K2O	MgO	CaO	S
Fruit	75	27	108	12	4	5
Total plant	207	46	340	-	-	15

Source: Paterson, 1989

The figures given for S are not derived from actual data but are estimates based on typical N:S ratios in plants. The amount of S required in fertilizer is generally about 10 % of the N requirement minus the S supplied in rainfall and irrigation water and that taken up from the soil.

Plant analysis data

The table demonstrates the generally high concentration of nutrients in vegetative tissues especially N and K (for S, see remarks above).

Plant analysis data - Macronutrients (good plant nutrition and fertilizer practices)						
Plant part/ conditions of growth	% of dry matter					
	N	P	K	Mg	Ca	S
Leaves*: well fertilized and limed; recently matured						
not mulched	4.9	0.45	4.6	0.65	1.6	0.4
mulched	5.2	0.6	5.0	0.55	1.3	-
5th leaf, 60 days**	2.73	0.42	3.9	-	-	-
Fruit***	2.1	0.31	3.0	0.23	0.12	-
* Paterson, 1989; ** Subbiah et al., 1987; *** Tindall,n.d. Paterson, 1989; Mortensen & Bullard; n.d.; Valenzuela, 1991						

Plant analysis data - Micronutrients (good plant nutrition and fertilizer practices)					
Plant part	ppm dry matter				
	Fe	Mn	Zn	Cu	B
Leaves: well fertilized and limed; recently matured					
not mulched	250	70	-	11	30
mulched	300	100	-	14	75
Source: Paterson, 1989					

Fertilizer recommendations

Fertilizer practices (recommended rates of fertilizer application for acceptable yields)				
Geographical area	Nutrient use recommended kg/ha			
	N	P ₂ O ₅	K ₂ O	Other
USA, East Coast 1)	200	185	190	Lime
Japan 2)	245	345	250	
Tropics/subtropics 3)	145	45	85	1 200 tree ash Lime
Brazil, Sao Paulo 4)	240	405±200	240±80	Lime (upto 70 % base saturation)
Brazil 5)	200	365±90	145±50	
Hawaii 6)	200	640	120	10 Zn; Lime
Puerto Rico 7)	400	205	240	
<p>1) Sandy soils, temperate and subtropical climates.</p> <p>2) General recommendation; soils generally influenced by volcanic ash.</p> <p>3) For 39.5 t/ha crop. N and K mostly supplied in wood ash.</p> <p>4) Recommendations are for soils with moderately high P sorption capacity, of medium P and K status. 20 % of N applied before planting, remainder in 4 equal applications 10, 25, 40 and 55 days after planting. P all applied before planting; K two-thirds before planting and remainder in 4 applications with the N. For low or high soil P, add or subtract 200 kg P₂O₅ before plantings. For low or high soil K, add or subtract 80 kg K₂O before planting.</p> <p>5) Recommendations based on general experience rather than substantial research.</p> <p>6) The P requirement was such as would give 0.3 mg P/l soil solution. For soils in which iron and aluminium oxides dominate, typical P fertilizer requirements to attain 0.3 mg/l are in the range 690 - 2 750 kg/ha P₂O₅. Soil was high in non-exchangeable K.</p> <p>7) The high application rate of fertilizer N seems to indicate a fertilizer efficiency of 50 % with a very small contribution from the soil. The rate of P fertilizer employed was not sufficient to match the high requirement for maximum production in this high P-sorbing Oxisol.</p>				

The table is a summary statement of fertilizer either used in experimental plantings or being recommended in several areas. They are not all in the tropics. The recommended rate for N (except in Puerto Rico) is around 200 kg/ha. The fertilizer requirement depends more on soil properties than on plant uptake. On sandy soils (USA, East Coast) the recommendation is

185 kg/ha P₂O₅; for moderately high P absorbing soils of Brazil the requirement is twice as great; for very high iron content (basalt) soils of Hawaii 3 to 4 times as great; and for soils developed on weathered volcanic ash it will be even greater. Virtually all recommendations emphasize the need for relatively high base saturation/low aluminum saturation, pH 6 - 7 (lime or wood ash application).

Further reading

FUSAGRI: Tomate, pimentón, aji y berenjena. Fundación Servicio Para el Agricultor; Serie Petróleo y Ag. No. 3, Caracas, Venezuela (1983)

PATERSON, J.W.: Eggplants. In: PLUCKNETT, D.L.; SPRAGUE, H.B. (eds.): Detecting mineral nutrient deficiencies in tropical and temperate crops. Westview, Boulder, CO, USA (1989)

VALENZUELA, H.: Eggplant production guidelines. Dept. of Horticulture, Univ. of Hawaii, Honolulu, Hawaii, USA (1991)