

Drugs and Spices

Arecanut [*Betelnut*] (*Areca catechu L.*)

French: Noix d'arec; Spanish: Areca; German: Betelpalme

Often grown on soils of low fertility but, because selection has been based on tolerance to adverse growth conditions, many trees are relatively unresponsive to higher rates of fertilizer application.

Nutrient demand/uptake/removal: uptake around 80 kg/ha N, 30 kg/ha P₂O₅, 75 kg/ha K₂O; potential return by leaf recycling 85 kg N, 25 kg P₂O₅ and 90 kg K₂O per 10 t/year fresh leaves. Recycling may be assisted by addition of small amount of N and P to promote microbial breakdown. A regular minimal NP supply is also beneficial where mulch crops and green manure crops may compete for scarce nutrients.

General fertilizer recommendations: 160 kg/ha N, 60 kg/ha P₂O₅ and 180 kg/ha K₂O, with 10 - 20 t/ha farmyard manure per year. N should be given in split dressings, P and K once a year.

Cinchona (*Cinchona spp.*)

French: Cinchone, quinquina; Spanish: Quinoa; Italian: Albero di China; German: Chinarindenbaum

Bark, which is source of drugs quinine and quinidine, is obtained first from young thinned trees and finally from larger trees at remaining plant density of 3 000 trees/ha. Indonesian practice is to start with 5 000 trees/ha and to coppice after 7 - 8 years. Fungal diseases (e.g. stripe cancer, caused by *Phytophthora cinnamomi*) and nematodes are troublesome in Zaire. Final production from a well managed plantation may reach 10 t/ha bark. Quinine content depends on plant type.

Plant analysis data: Typical leaf nutrient content is 2.0 % N, 0.04 % P, 0.60 % K, 0.57 % Ca, 0.12 % S.

General fertilizer recommendations: upwards from 70 kg/ha N per year. NPK compound with a relatively high P₂O₅ content (e.g. 15-15-15) may be given in P-retaining acid oxisols. Where there is a lack of available Ca, the crop responds to application of a calcium salt.

Nutmeg (*Myristica fragrans Houtt.*)

French: Noix muscade; Spanish: Nuez moscada, miristica; Italian: Noce muscata; German: Muskatnuß

Dioecious perennial tree, 5 - 13 m high, normally planted 1 male to 10 females, spaced about 9 m x 9 m. Reproduction of high-yielding trees by grafting increases production. Yields range from less than 1 000 fruits/tree to 2 000 fruits/tree per year (fruit weight 8 g nut, 2 g mace). Young roots need protection against damage, waterlogging, drought and acidity. Young plants need an evenly distributed nutrient supply and should be protected against excessive sunlight.

General fertilizer recommendations:

General fertilizer recommendation, dependent on age			
Age (years)	g/tree/year		
	N	P2O5	K2O
5	100	90	250
10	200	180	500
15	300	270	750
≥20	400	360	1 000

On deep, fertile, volcanic soils, application may be limited to 200 g/tree N per year.

Clove (*Syzygium aromaticum* (L.) Merr. et Perr.)

French: Clou de girofle; Spanish: Clavo de especia; Italian: Claventino, Garofano; German: Gewürznelke

Flower buds and fruit have a wide range of flavouring and medicinal uses. Plant spacing from wider than 8 m x 11 m in mixed cropping to 6 m x 6 m. Yields from less than 1 to several kg/tree/season; seasonal production may be rather irregular and both internal and external stresses cause wide variation in annual production. The root system is very sensitive and must be protected, particularly in the case of young plants.

General fertilizer recommendations: similar to, or slightly less than, those for nutmeg. Application should be regular, amounts depending on mulching and litter recycling practices and use of compost and/or farmyard manure.

Black Pepper (*Piper nigrum* L.)

French: Poivre; Spanish: Pimiento; Italian: Pepe; German: Pfeffer

Yields from a few hundred kg/ha berries at a common plant density of 1 370 vines/ha up to about 8 000 kg/ha from 5 000 intensively managed vines. Needs pruning, both to promote fruit-bearing laterals and to guide vigorous outgrowth. The crop is very responsive to intensity of management and nutrient supply. The root system is very sensitive to salt injury. Reports from S.E. Asia and Brazil indicate that fungal disease attack associated with excessive nutrient supply may shorten production potential. A reduction of disease incidence by mixed cropping has been reported from India.

Nutrient uptake by a full, vigorous crop of about 1 750 vines/ha: around 250 kg/ha N, 35 kg/ha P₂O₅, 205 kg/ha K₂O, 20 kg/ha MgO and 45 kg/ha CaO.

Typical leaf nutrient content: 3.1 - 3.4 % N; 0.16 - 0.18 % P, 3.4-4.3 % K, 0.44 % Mg, 1.67 % Ca.

General fertilizer recommendations: 100 g N, 40 g P₂O₅ and 140 g K₂O per vine per year. N should be given in split dressings, P and K once a year. These amounts may be doubled under intensive management where there is abundant water and sunshine. A small amount of Mg may be beneficial. Regular application of a compound NPKMg fertilizer, e.g. 12-12-17-2(MgO), is a good alternative. If soil pH is low, lime may be applied every 2 years at a rate of 200 - 500 g/vine.

Further reading

BOSE, T.K.: Fruits of India. Naya Prokash, Calcutta, India (1985)

ECK, P.; CHILDERS, N.F. (eds.): Blueberry culture. Rutgers Univ. Press, Quinn and Boden Co. Inc., N.J., USA (1966)

KRONENBERG, H.G.: Twelve years of research on small fruit, 1953 - 1965 (Dutch, English Summary). Inst. of Hort. Plantbreeding Meded. 205, Wageningen, The Netherlands (1966)

TANDON, H.L.S.: Fertilizer management in plantation crops, a guide book. Fertiliser Development and Consultation Organisation, New Delhi, India (1988)

Author: P.D.J. van der Vorm, Department of Soil Science and Plant Nutrition, Agricultural University Wageningen, The Netherlands