

Organic Package of Practices for Large Cardamom

Clump rot or rhizome rot	On the infected leaves, water soaked lesions appear first followed by rotting and shredding of leaves along the veins which emits a foul smell and subsequently shed.
Cercospora leaf spot	Decay of the tillers starting from the collar region and toppling of tillers. Affected tillers can be pulled out with little force and the discoloration of the basal portion of clump can be seen. The symptoms appear on the leaves as water soaked linear lesions which in advanced stages, become grayish brown in colour and later dry off. Control measures of all: <ul style="list-style-type: none"> ● Avoid excess shade during monsoon season to restrict the spread of the disease. ● Pre-monsoon application of Trichoderma enriched organic manure and spraying, drenching with Pseudomonas 2% PGPR mix II are effective. ● Mulching and application of biocontrol agents can be coupled to protect the cardamom plants against pathogen infection. ● Prophylactic foliar spray and drenching with 1% Bordeaux mixture before onset of monsoon two-three times upto Nov-Dec according to the intensity of the disease.
Harvesting	Harvesting season is in August-September, peak harvest is during Oct-Nov. Capsules are harvested at an interval of approx. 20-30 days and harvesting completed in about seven-eight rounds. Harvesting of large cardamom is carried out by cutting the spike with a special sickle that is sharpened at both sides of the end tip. The harvested spikes are heaped and the capsules separated and dried immediately after harvest.
Storage	The hand-picked fruits are dried in special curing chambers under controlled temperature to retain the delicate flavor and green colour. The capsules are also dried by direct heating with smoke or sunlight for 15 days. The dried capsules are rubbed on a coir mat/gunny cloth/wire mesh for cleaning and for removal of the tail. Traditionally, cardamom is dried on bamboo mats.
Yield	The yield of large cardamom varies from 800-1000 kg/ha.



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Organic Practices for Large Cardamom

S.No.	Organic Activity	Details
1.	Selection and Preparation of Land	Deep well drained soils with loamy texture, medium availability of phosphorus and potash with a pH range of 4.2-6.8 and more than 1% of organic carbon are well suited for large cardamom cultivation. It is required to test the soil once a year to check the levels of pH, organic carbon, macronutrients (NPK), micronutrients and microbial load in the field. If the organic carbon content is less than 1%, apply 20-25 tons/ha of FYM and plough the field 2-3 times to mix the manure thoroughly. Adequate buffer zone must be provided between certified organic fields and non-organic fields at a distance of about 5-7 meters from non-organic fields to prevent drift of prohibited materials on to certified organic fields.
2.	Sowing Season and Time	Planting is done during June-July when there is enough moisture in the soil.
	Variety selection	Seed selection is an important step in organic large cardamom production. Seeds should be carefully selected from the certified organic farms or from farmers' own field which is raised organically. The seeds (which are not treated with chemicals) from local high yielding varieties can also be used in the absence of organically produced seeds. Select disease resistant and locally demand varieties. The three main varieties of large cardamom cultivated are Ramsey, Sawney, Varlangey, Gosley (Dzongu), Green Golsley. Other varieties also cultivated are Bebo, Bharlangey and Ramla. Besides these, there are several sub-varieties or strains, which are named in the local dialect of Lepchas, Bhutia and Nepalese in the cardamom growing areas of Sikkim and adjoining areas.
	Seed rate	The seed rate of large cardamom is 4000 Suckers/ha or 1kg seed/ha.
	Seed treatment	The seeds are mixed with sand and rubbed with the hand. Then they are washed in water to remove the mucilage completely. Then the seeds are mixed with wood ash for 30 minutes, dried in the shade and sown in the primary nursery. The seeds may be sown immediately after extraction, for maximum germination. Seed treatment with a bioenhancer cow pat pit/ amrutpani /jeevamrut/ panchgavya. Field preparation Seeds are generally sown in January in nurseries and covered with fine soil and paddy straw mulch (10–15 cm thick).
	Nursery raising	Seedbeds of 15–25 cm height, 1 m width and convenient length are prepared in a well drained soil. The soil is tilled to a depth of about 30 cm and left for three to four weeks for weathering. Well decomposed cattle manure is mixed with the soil and the surface of the bed is prepared to a fine tilt. About 80–100 gm of seed per bed is sown in lines across the bed at a distance of 10 cm and the bed is mulched with local plant material. Watering (sprinkling) is done at regular intervals to keep the surface of the bed moist. The germination of seeds commences around 25–30 days after sowing.
	Seed spacing (nursery)	Pits of size 30x30x30 cm are prepared on the contour of the hill at a spacing of 1.5 x1.5 m after the onset of monsoon showers. A wider spacing of 1.8x1.8 m is recommended for robust cultivars like Sawney, Varlangey, Ramsey, etc
	Seedling treatment	Usually farmers don't use any treatment to the suckers or seeds.
	Soil fertility management	It is estimated that an average of 5-8 tonnes of dry leaves fall from shade trees annually in a hectare of land in cardamom plantations adding 100-160 kg of N, 5-8 kg P, 100-160 kg potassium, 10-16 kg calcium and 25-40 kg magnesium per hectare. Application of organic manures such as FYM, cowdung or compost @ 5 kg/plant or neem cake @ 1-2 kg/plant and 100 g bonemeal/plant may be done during June-July and during September/October. Application of Azospirillum and phosphate solubilizing bacteria @ 50 g/plant or PGPR mix I along with 5 kg of FYM was found to be effective in enhancing the yield.

	Transplanting and spacing(main field)	The land selected for planting is cleared of all undergrowth for new plantations and if the land has been used earlier for large cardamom, all the old plants should be removed. Pits having a size of 30 x 30 x 30 cm are prepared on contour terraces, at a spacing of 1.5 m x1.5 m (1.8 m x 1.8 m for robust cultivars) after the onset of monsoon showers. If the crops are planted too close, the leaves – instead of branching out – will stand erect and little space will be left for the capsule to develop to full size. The pits are left for weathering for a fortnight and thereafter filled with topsoil.
	Irrigation and water requirement	Irrigation is necessary during summer months as large cardamom plants do not tolerate drought. Constant maintenance of optimum soil moisture level ensures early fruit bearing. Irrigations are done once in every 10 days during December–April. Drip irrigation or sprinkler irrigation is most efficient.
	Cultural practices and weed management	Cardamom is a surface feeder, therefore two-three rounds of weeding is necessary in a year. The first round of weeding is to be carried in May-June, the second in August-September and third in December-January and weeds can be used as mulch. Normally slash weeding is performed in cardamom plantations. Trashing consists of removing senile and dried shoots of plants once in a year with the onset of monsoon. Trashing facilitates better sunlight penetration and aeration, thereby promoting good tiller initiation and growth as well as reduction in thrips and aphids population. Earthing up of plant base and root zone with top soil is recommended during Oct-Dec. While doing this operation, care should be taken to ensure that only top soil is used and it is evenly spread at the base covering only half of the bulb portion of the rhizome.
	CROP PROTECTION	
	a.)Insect mgmt. Shoot and capsule borer	The caterpillars bore into stem of seedlings, young tillers, panicles and capsules leading to drying up of entire panicle and empty the capsules, affecting the xylem vessels interrupting the passage of food materials to the growing parts and lead to the drying of central leaf known as 'dead heart symptom'. <ul style="list-style-type: none"> ● Removal and destruction of alternate hosts such as castor, ginger, turmeric in the immediate vicinity. ● Roguing and destruction of infested tillers during Sep-Oct. ● Use of pheromones in the monitoring of the pest and therefore correct timing of application of biorational shall be recommended. Application of Bacillus thuringiensis when early-instar larvae are found in capsule or panicle or unopened leaf buds i.e. within 20 days of adult moth emergence.
	Root grub	The grub congregating on the root zone of cardamom clumps feed and cause irregular patch on the roots. As a result, reduction in uptake of nutrients leading to crop loss ranging from 29-66%. <ul style="list-style-type: none"> ● Use entomopathogenic fungi Metarrhizium anisopliae and entomopathogenic nematode Heterorhabditis indica @ 100 IJ/grub. ● Mulching of plant base with leaves of wild Helianthis sp. to prevent egg laying of adult beetles.
	White fly	<ul style="list-style-type: none"> ● Ensure adequate shade of 65-70% in endemic areas and irrigate the crop before attaining critical period.
	b.)Disease mgmt. Capsule rot	Colonies of nymphs and adult desap the lower surface of the leaves. Chlorotic patches appear initially on leaves, which in turn become yellow and necrotic in the advanced stages. <ul style="list-style-type: none"> ● Monitoring and trapping the adults using yellow sticky traps coated with viscous castor oil. The traps can be placed between rows of cardamom plants or on the shade trees. ● Application of 0.5% neem oil on the undersurface of the leaves. Spray fluid need not be applied on the panicles and cardamom stem.