

Organic Package of Practices for Ginger

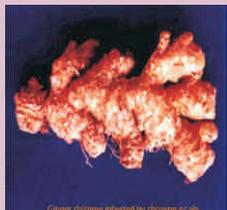
	Bacterial Wilt	<p>appear. Numerous black dot-like bodies formed on the surface of the leaves.</p> <ul style="list-style-type: none"> High elevated well drained site should be selected for planting, seed rhizome can be treated with bio-control agents like T.harzianum, six sprays of Bordeaux mixture @ 1% at 15 days interval before the onset of heavy rain are required for reasonable control. <p>This disease occurs during south west monsoon when the crop is young. Water soaked spots appear at the collar region of the pseudostem and progresses upwards and downwards, followed by drooping and curling of leaf margins. Yellowing starts from the lowermost leaves which gradually progresses to the upper leaves. The affected pseudostem and rhizome when pressed gently extrudes milky ooze from the vascular strands.</p> <ul style="list-style-type: none"> Drenching of cow urine without rouging to check the spread of bacterial wilt was found effective to control the disease, soil amendments including bio-control agents such as Pseudomonas fluoresces, T.harzianum and Bacillus combinations; crop rotation with non-host plant like cereals such as rice, maize, wheat, etc.
9	Harvesting	For fresh ginger, the crop should be harvested before attaining the full maturity means when rhizomes are still tender, low in pungency and fibre content, usually from fifth month onwards after planting. Harvesting for the preserved ginger should be done after 5-7 months of planting while harvest for dried spices and oil is best at full maturity, i.e. between 8-9 months after planting when leaves start yellowing. Rhizomes to be used for planting material should be harvested until the leaves become completely dry.
10	Storage	Ginger is stored in pits which should be covered with 20 cm layer of well dried sand/ saw dust alternating every 30 cm layer of rhizomes. These pits should be dug under a thatched roof to protect the rhizomes from rain, water and direct sun. The walls of a pits may be coated with cow dung paste. Fresh ginger should be stored at 10-12°C and 90% humidity in cold room. Storage of fresh ginger in polyethylene bags with 2% ventilation prevents dehydration and mould development.
11	Yield	Average yield varies from 12-15 t/ha. However recovery of dry ginger varies from 20-22%.



Common Insects and Diseases of Ginger Crop



Shoot Borer



Rhizome Scale



White Grub



White Grub

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Organic Ginger Cultivation

S.No.	Organic Activity	Details
1	Selection and preparation of land	<p>Sandy or friable soils with a pH range of 5-6.5 and more than 1% of organic carbon are well suited for ginger cultivation. It is required to test the soil once a year to check the levels of pH, organic carbon, macronutrients (NPK) and microbial population in the field.</p> <p>If the organic carbon content is less than 1%, apply 25-30 tons/ha of FYM and plough the field 2-3 times to mix the manure thoroughly.</p> <p>Adequate buffer zone must be provided between certified organic fields and non-organic fields at a distance of about 5-10 meters from non-organic fields to prevent drift of prohibited materials on to certified organic fields.</p> <p>While preparing the land, minimum tillage operations may be adopted. Usually beds of 1.0 m width, 15 cm height and 3-6 m in length with 30 cm wide channels between beds are made. Solarization of bed is beneficial for checking the multiplication of pests and disease causing organisms.</p>
2	Sowing season and time	The best time for planting ginger is during the first fortnight of April, after receipt of pre-monsoon showers. For irrigated ginger, the best-suited time for planting is middle of February.
3	Variety Selection	Carefully preserved seed rhizomes, free from pests and diseases, collected from organically cultivated farms should be used for planting. Seed material from high yielding local varieties should not be treated with any chemicals. Keep the seed rhizomes in the sun for a period of 20-30 days before planting and the rhizome sets should be treated with cow-dung and urine preparation such as amrut pani/jeevamrut/panchgavya/cow pat pit etc. Most promising varieties of ginger are Nadia, Maran, Rio-de-Janeiro, China, Wynad Kuruppampadi, Ernad, Suprabha, Suruchi, Varad and Himgiri.
4	Seed rate and spacing	A seed rate of 15-20 quintal/ha is considered to be optimum for planting. The spacing for planting of the ginger should be kept 25-45 cm between rows and 15-20 cm between plants.
		<p>Well rotten cattle dung or compost @ 25-30 t/ha should be applied at the time of planting. The amount of fertilizers ranges between 100-120 kg N, 75-80 kg of P₂O₅ and 100-120 kg K₂O should be given as a basal dose. An additional application of neem cake @ 2 t/ha is advisable. Rest of the nitrogen should be applied as a top dressing in two equal doses at 45 and 90 days after planting.</p> <p>Mulching is essential as it enhances sprouting, increases infiltration and organic matter. First mulching should be done at the time of planting with quick rotten green leaves at the rate of 10-12t/ha or with dry leaves @ of 5-6 t/ha which is repeated after 45-90 days after planting. Any locally available mulch material like coconut leaves, green leaves, tree leaves, banana leaves, dry grass, paddy straw or cane trash etc. can be used for ginger cultivation. Cowdung slurry or liquid manure may be poured on the bed after each mulching to enhance microbial activity and nutrient availability.</p>
6	Irrigation and Water Requirement	Water requirement of ginger has been estimated between 1320-1520 mm. The crop raised in the month of April-May needs 2-4 initial watering at an interval of 7 days depending upon the soil types. After this, the crop receives monsoon rain and comes up well till end of September. Subsequently the crop has to be given watering commencing from middle of Oct and the end of

		Dec at 15 days interval. In ginger cultivation sprouting, rhizome initiation and rhizome development are critical stages of irrigation. A proper drainage channel in between the bunds to drain off stagnant water is advisable to ensure optimum drainage for better plant stand
7	Cultural Practices and Weed Management	Crop rotation, green manure cropping and inter cultivation between rows are best practices to control weeds and to get higher yield. Mixed cropping is practiced with maize, chilli, brinjal, papaya, cucumber, pumpkin, yam, tomato, tapioca and different types of leguminous crops in jhum. Ginger is intercropped with maize and pineapple. Two weeding are generally given to the ginger crop. First weeding should be done just before the second mulching which is repeated at an interval of 45-60 days. During hoeing, every care should be taken so that the rhizomes should not be disturbed, injured or exposed.
8	CROP PROTECTION	
	Insect Mgmt. Shoot Borer	<ul style="list-style-type: none"> The larvae bore into pseudostems and feed on internal tissues resulting in yellowing and drying of leaves of infested pseudostems through which frass is extruded and the withered and yellow central shoot is a characteristic symptom of pest infestation. The shoots infested by the borer are cut open and the caterpillars are handpicked and destroyed. Grow neem trees along with ginger crops to repel the pest. This infests rhizomes in the field (at later stages) and in storage. They feed on sap and when the rhizomes are severely infested, they become shrivelled and desiccated affecting its germination. Discard and do not store severely infested rhizomes, collect and destroy damaged leaves, select healthy rhizomes free from scale infestation for seed materials, storage of rhizomes in dried leaves of Strychnos nux-vomica+ saw dust in 1:1 ratio helps in keeping the seed rhizomes free of scale infestation, among the parasites Phycus comperie brought down the population of the rhizomes scale by 80% and a predatory beetle Cocobius spp also found to be effective, apply well rotten sheep manure @ 10 t/ ha in two splits or poultry manure in 2 splits.
	Rhizome Scale	The larvae of this beetle feed upon the feeder roots and the rhizomes. Collection of adult beetles and killing during their breeding season manages this pest, application of entomophagus fungus Metarrhizium anisopliae mixed with fine cow dung is effective for the management of the pest.
	White Grub	Initial symptom of the disease appears as light yellowing of the tips of lower leaves which gradually spreads down to the leaf blade and leaf sheath along the margin followed by drooping, withering and drying. The collar region of the pseudo-stem shows pale translucent brown colour which becomes water soaked, due to destruction of parenchyma tissues. <ul style="list-style-type: none"> Proper drainage in sandy loam soil for cultivation ensures healthy crop, uprooting and burning of diseased plant, use of disease free rhizomes for planting, soil solarisation. Trichoderma harzianum, T. harmatum, T.virens and bacterial isolates Bacillus and Pseudomonas fluorescens have been reported to suppress this pathogen of ginger.
(b)	Disease Management	
	Soft Rot	This disease is noticed on the leaves from July to Oct. Oval to irregular water soaked spots developed on the leaves. Leaves become papery and shot holes
	Leaf Spot	