# Precision Farming
# GINGER
## With Jain Technology™

Jain Irrigation Systems Ltd.
*Small Ideas. Big Revolutions.®*

**Ginger** *(Zingiber officinale)* is one of the important spices grown in India. Ginger of commerce is the dried rhizome. It is marketed in different forms such as raw ginger, dry ginger, bleached dry ginger, ginger powder, ginger oil, ginger oleoresin.

Ginger is a biennial or perennial reed-like herb, grown for the pungent, spicy underground stems or rhizomes. The stems reach a height of 3 feet, with lanceolate, smooth leaves up to 8 inches long.

## Climate and Soil

Ginger is cultivated in almost all states in India. Kerala is the major ginger growing state. Other major ginger growing states are Orissa, Meghalaya, Himachal Pradesh and Karnataka. Ginger grows in warm and humid climate.
It is mainly cultivated in the tropics from sea level to an altitude of above 1500 MSL and it can be grown both under rainfed and irrigated conditions. Ginger thrives best in well drained soils like sandy or clay loam, red loam or latteritic soil.
A friable loam rich in humus is ideal.The crop cannot withstand waterlogging and hence soils with good drainage are preferred for its cultivation.
It is a shade tolerant crop with shallow roots and therefore suitable for intercropping and as a component in the homesteads where low to medium shade is available.

## Seed

The plants are propagated by small divisions of the rhizomes. Carefully preserved seed rhizomes free from pests and diseases are selected.
The seed rate varies from 1500- 2500 kg/ha.

## Seed treatment

Soak the selected rhizomes for 30 minutes in a solution of mancozeb and malathion to give terminal concentration of 0.3% for the former and 0.1% for the latter.
Dry the treated rhizomes in shade by spreading on the floor.

## Preparation of land

Clear the field during February-March and burn the weeds, stubbles, roots etc. *in situ*. Prepare the land by ploughing or digging. Prepare beds of convenient length , 1 m wide, 25 cm high with 40 cm spacing between the beds. Provide drainage channels, one for every 25 beds on flat lands.

## Season and method of planting

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.

Plant rhizome bits of 15 g weight in small pits at a spacing of 20 x 20 cm to 25 x 25 cm and at a depth of 4-5 cm with at least one viable healthy bud facing upwards.

## Mulching

Immediately after planting, mulch the beds thickly with green leaves @ 15 t/ha. Repeat mulching with green leaves twice @ 7.5 t/ha first 44-60 days and second 90-120 days after planting.

Grow green manure crops like daincha and sunhemp in the interspaces of beds, along with ginger and harvest the green manure crop during second mulching of ginger beds.

## Irrigation management

Microirrigation is ideal for ginger. The suitable irrigation systems are minisprinkler, microjet and drip. All these 3 types of systems are very appropriate for the very shallow root system of ginger crop.

### Water requirement of Ginger

**Planting month-April.**

| Month | Water requirement | |
|---|---|---|
| | Mm/day | Lt/ha/day |
| April | 1.56-1.77 | 15600-17700 |
| May | 2.86-3.39 | 28600-33900 |
| June | 3.21-3.77 | 32100-37700 |
| July | 3.00-3.81 | 30000-38100 |
| August | 3.89-5.30 | 38900-53000 |
| September | 4.90-5.53 | 49000-55300 |
| October | 4.61-5.51 | 46100-55100 |

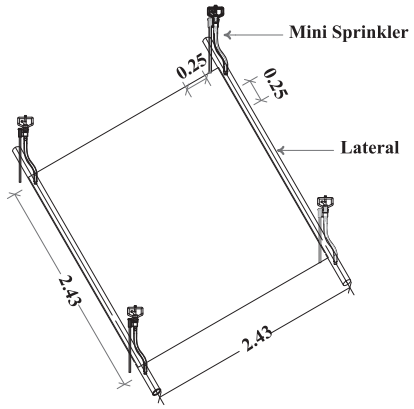
**Planting month-May**

| Month | Water requirement | |
|---|---|---|
| | Mm/day | Lt/ha/day |
| May | 1.59-1.88 | 15900-18800 |
| June | 2.05-2.44 | 20500-24400 |
| July | 2.64-3.34 | 26400-33400 |
| August | 2.91-3.97 | 29100-39700 |
| September | 4.65-5.25 | 46500-52500 |
| October | 4.61-5.51 | 46100-55100 |
| November | 4.50-5.23 | 45000-52300 |

The rainfall events are very erratic and therefore not adjusted on a daily basis. The general recommendation is that if rainfall exceeds 10mm in any one day, suspend drip irrigation for the next 2 to 3 days.

## Irrigation System lay out

Minisprinklers or Jets are installed on 2.43 m row spacing on 16 mm lateral with jets placed on short plastic stakes.
Inline drip system is also suitable for ginger. The drip laterals are spaced on a skip row basis i.e. at 80 or 100 cm spacing. In case of inline the entire strip are wetted by placing drippers at 60 cm or 75 cm (based on soil texture) along the drip line.




## Fertilizer Management

Apply manures and fertilizers at the following rates.

| Fertigation of Ginger | | | |
|---|---|---|---|
| Fertilizer Recommendation 75:50:50 kg/ha/yr | | | |
| SSP-312.5; 163 urea; 83 MOP kg/ha/yr | | | |
| Fertigation Schedule | | | |
| **Time** | **fertilizer** | **quantity** | **Rate of fertigation** |
| At planting | SSP<br>FYM | 312.5kg<br>30t/ha | One time as Basal<br>One time as Basal |
| 31-60 DAG | Urea<br>MOP | 15kg<br>10kg | 0.5kg/day for 30 days<br>0.25kg/day for 30 days |
| 61-120 DAG | Urea<br>MOP | 50kg<br>30kg | 0.8 kg/day for 60 days<br>0.5 kg/day for 60 days |
| 120-220 DAG | Urea<br>MOP | 118kg<br>43kg | 1.3kg/day for 90 days<br>0.5kg/day for 86 days |

## Intercultivation

Remove weeds by hand-weeding before each mulching. Repeat weeding according to weed growth during the fifth and sixth month after planting. Earth up the crop during the first mulching and avoid water stagnation.

## Plant protection

1. For control of shoot borer spray dimethoate or quinalphos at 0.05%.
2. For control of rhizome rot adopt the following measures:
   a. Select sites having proper drainage.
   b. Select seed rhizomes from disease free areas.
   c. Treat seed rhizomes with 0.3% mancozeb.
   d. When incidence of rhizome rot is noted in the field, dig out the affected plants and drench the beds with cheshunt compound or 1% Bordeaux mixture or 0.3% mancozeb.
   e. Inoculation with native arbuscular mycorrhiza, Trichoderma and Pseudomonas fluorescens at the time of planting is recommended as a biocontrol measure.
3. For controlling the leaf spot disease, 1% Bordeaux mixture, 0.3% mancozeb or 0.2% thiram may be sprayed.
4. For control of nematode in endemic area, apply neem cake @ 1 t/ha at planting and carbofuran 1 kg ai/ha at 45 DAP.

**Harvest and yield**

The crop is ready to harvest in about eight to ten months depending upon the maturity of the variety. When fully mature leaves turn yellow and start drying up gradually. Clumps are lifted carefully with a spade or digging fork and rhizomes are separated from dried leaves, roots and adhering soil.
The average yield of fresh ginger per hectare varies with varieties ranging from 15 to 25 tonnes.
For making vegetable ginger, harvesting is done from the 6th month onwards. The rhizomes are thoroughly washed in water twice or thrice after harvest and sun-dried for a day.
For preparing dry ginger the produce is kept soaked in water overnight. Rhizomes are then rubbed well to clean them. After cleaning, rhizomes are removed from the water and the outer skin is removed with a bamboo splinter or wooden knife having pointed ends. Iron knife is not recommended, as colour will be faded. In order to get rid of the last bit of the skin or dirt, the dry rhizomes are rubbed together. The peeled rhizomes are washed and dried in the sun uniformly for one week. Rhizomes are to be dried to a moisture level of 11% and they are stored properly to avoid infestation by storage pests. The yield of dry ginger is 16-25 percent of the fresh ginger depending upon the variety and location where the crop is grown.

## Dos

- Ensure good drainage in the field.
- Adopt Micro jet or Minisprinkler or drip irrigation.
- Compulsorily apply organic manure as per recommendation.
- Select high yielding, disease and pest tolerant variety suitable for each location.
- Strictly follow the irrigation schedule given by the engineer.
- Follow the irrigation system maintenance schedule given by the engineer.
- Compulsorily weed/ inter-cultivate, timely operation helps in crop growth.
- Follow fertigation schedule as given by the engineer.
- Follow disease and pest control measures timely and effectively.
- Apply sprays in the evening or early morning only.

## Don'ts

- Don't over irrigate the crop at anytime.
- For fertigation don't mix solid fertilizers and dissolve them together. Prepare individual solutions and mix them for application.
- Don't use the fertigation unit for bulky organic manure and fertilizers that are not soluble in water.
- Don't add solid fertilizer from the bag directly to the fertilizer tank. Prepare solution separately and pour the solution to the fertilizer tank. Prepare solution only in plastic buckets. Don't use metal container.
- Don't stir the solution with naked unprotected hand. Use wooden spoon or stick.
- Don't heat the fertilizer solution to increase solubility.
- Do not spray the crop during hot sunny times.

## Frequently asked questions (FAQ's)

1. Whether the meagre quantity of water supplied through micro irrigation is enough?

- Irrigation rate is estimated based on the Evapotranspiration of the location and therefore it is enough. With conventional flood / channel irrigation water completely replaces the air in root zone thereby suffocating the plant. The last few days of the irrigation cycle the crop also suffers from water stress. The periodical water logging and stress affects growth and production of ginger.

2. Can I prefer Sprinkler method of irrigation for Ginger ?

- It is also suitable and relatively less costly compared to

*Crop yields depend on climate, soil and management and therefore can't be guaranteed by the company.*

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