

# A CROP PRODUCTION TECHNICAL GUIDE



## GINGER

*(Zingiber officiale Roscoe)*

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## **TECHNICAL GUIDE**

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## TABLE OF CONTENTS

Introduction.....	1
Uses.....	1
Climate and soil requirement.....	1
Recommended varieties.....	1
Site selection and land preparation.....	2
Water requirement.....	3
Planting.....	3
Plant nutrition.....	4
Pest and diseases.....	4
Fusarium rhizome rot.....	3
Control.....	4
Root knot nematodes.....	4
Yield and harvesting.....	5
Post harvest handling.....	6
Bibliography.....	7

## INTRODUCTION

Ginger (*Zingiber officiale* Roscoe) is a herbaceous perennial belonging to the family Zingerberaceae. It is believed to have originated in tropical Asia/India. Major world producers include India (largest producer), Nigeria, China, Sierra Leone, Australia and Jamaica. Ginger is produced in several Caribbean Islands and there is an important regional trade with Jamaica, Dominica and St Vincent and the Grenadines being exporters and Trinidad and Tobago and Barbados being importers.

## USES

Ginger is used as a culinary herb, condiment and is also renowned for its medicinal properties. The rhizomes produce the volatile oil, gingerol, which is used as could be seen in Table 1, approximately 81% of ginger is water.

**Table 1: Nutrient (%) composition of raw ginger**

<b>Water</b>	<b>Protein</b>	<b>Fat</b>	<b>Carbohydrates</b>	<b>Fiber</b>	<b>Ash</b>	<b>Volatile oil</b>
80.8	2.3	1.0	12.3	2.4	1.2	1.3

## CLIMATE AND SOIL REQUIREMENTS

Ginger is a root crop and requires well drained, friable, well prepared soil. Adequate quantities of organic matter (kg/ha) is recommended. Stiff clays and coarse sands (which compact after wetting) are not advisable, since malformed rhizomes could result. Adequate drainage is also required to avoid rotting of rhizome setts. The recommended soil pH is 5.0-6.0.

## RECOMMENDED VARIETIES

Different cultivars are grown commercially in the region In Trinidad and Tobago the small and pungent variety is called Wynad Manantody. This is an Indian variety widely grown in the state which produces the largest amount of ginger in India.

The other variety is large and mildly pungent. This is called white or yellow ginger.

In Jamaica two varieties are also grown and have been identified as blue or flint ginger and yellow or white ginger. As indicated, the rhizomes of the blue ginger exhibit a bluish tinge when cut, while the yellow ginger has a yellow flesh. The blue variety is reported to be harder, more fibrous and a poorer yielder, it also requires a longer time to dry when

compared to the yellow ginger. In St Vincent and the Grenadines the large fingered yellow ginger is more popularly grown.

### **SITE SELECTION AND LAND PREPARATION**

Ginger is considered an understorey plant. It is said to require about 40% normal lighting. Partial shade has been reported to promote plant efficiency and lead to increased yields. In the Caribbean, ginger is often intercropped under citrus and cocoa and planted in the alleys between bananas and plantains. It is now more popular to produce ginger as a crop in the production system as seen in figure 1 below.



**Figure 1: Pure stand ginger field**

**Figure 2: Attachment of rhizome to ginger stem**



## **WATER REQUIREMENT**

Although the plant needs water throughout the growth cycle the most critical period is the first 150 days after planting. Planting time usually falls in the dry season, so some form of irrigation may be necessary

## **PLANTING**

In the Caribbean, the crop is normally planted April to June for harvest in December to March. The rhizomes are used for planting. The mature rhizomes are cut into seed pieces or setts. Increased sett size results in plants with high vigor during growth and thicker rhizomes at harvest.

Setts of 3-5cm weighting between 40-60g with at least 2 viable buds are recommended as seen in figure 3 below. Setts can be pregerminated before planting using ethrel.



**Figure 3: Set pieces with visible buds attached**

Sett pieces can be dipped into 0.1% solution of ethephour for 4 minutes. After, the setts have been air dried they are then treated with a mixture of fungicide, nematicide and insecticide.

Setts are then placed in germination media (sawdust or promix) and kept damp. Buds should become swollen in 10-15 days. Plant before the new shoots begin to elongate.

Application of ethrel to pregerminate ginger setts can lead to out of season production.

Planting is done in prepared fields either in beds, ridges, furrows or flat.

Furrow cultivation:

Advantages

- Higher moisture levels in furrow
- Excavated soil available for moulding
- Assists in soil, water and nutrient conservation
- Longer rhizomes

Furrow should be 30-45 cm deep. Till base of furrow and incorporate organic manure.

Recommended spacing 30 x 15 cm, 20 x 20 cm and 25 x 25 cm. It has however been noted that the closer spacing gives higher yields.

Sett pieces placed in the soil should be covered to a depth of no more than 5 cm.

## **PLANT NUTRITION**

It is recommended to incorporate organic farmyard manures before planting at a rate of 50 kg/ha. The crop generally requires 100 kg/ha nitrogen. This should be achieved with split applications at 1 month after planting and again at 60, 90 and 120 days after planting.

Phosphorous is not required as a side dressing. Ginger is very susceptible to potassium deficiency.

## **PESTS AND DISEASES**

Rhizomes are affected by the fungi—*Fusarium spp*, *Pythium spp* - soft rot and *Rhizoctonia solani*

Bacteria—*Pseudomonas spp* have also been associated with ginger.

Root knot nematode—*Meloidogyne spp*

### **Fusarium rhizome rot**

This is specific to ginger. Infected plants are stunted and yellow, lower leaves dry out and turn brown. All above ground shoots eventually dry out completely. Plant collapse is very slow, up to several weeks.

Diseased rhizomes have a brown interveinal discoloration and are usually shrivelled in appearance. There is usually increased nematode infestation when fusarium rhizome rot is present. This leads to increased yield losses. This disease was responsible for the severe decline in ginger production in the late 1990's in Jamaica

### **Control**

Do not use planting material from infected rhizomes. All shrivelled pieces or those showing brown discoloration should be discarded.

Seed or sett pieces should be dipped in hot water at 50<sup>0</sup> C for 10 minutes if incidence of root rot was high in the previous crop.

After preparation, the sett pieces should also be dipped in (0.2%) Ridomyl or benomyl solution for 20 minutes and air dried for 1 minute before planting.

Areas with nematode infestation should be avoided. Practice crop rotation. Do not plant ginger in the same area each year.

Pythium is normally a storage rot. There is a white fluffy growth on the broken rhizome surface, with a light brown discoloration internally.

High soil moisture content is known to lead to increased incidence of the disease. The importance of well drained soil cannot be over emphasised.

### **Root knot nematodes**

Plants that are heavily infested are stunted with chlorotic leaves whose margins are necrotic. Roots are swollen and distorted with wart like growths on the surface of the rhizomes. Heavy infestations can greatly reduce marketable yields.

Material selected for planting should be as free from nematodes as possible. The soil should be examined for nematode infestation prior to planting.

### **YIELD AND HARVESTING**

Yield depends on variety, soil type and irrigation regime. In the Caribbean improved production practices have resulted in yields of up to 38,000 kg/ha. The normal farmer yield is approximately 12,000 kg/ha for small varieties to 22,000 kg/ha for larger varieties.

The crop takes 8-9 months to mature. At maturity the foliage turns yellow and the plants lodge. Delayed harvesting can lead to a reduction in rhizome quality. Carefully lift the rhizomes from the soil with selective harvesting instrument. The rhizomes are then thoroughly washed to remove soil then air dried before marketing. Direct sunlight would increase water loss and cause shriveling.

Rhizomes are usually harvested by hand using a fork or cutlass. It is advisable not to harvest under extremely wet or extremely dry conditions to minimize rhizome damage.

Field crates are recommended for transporting ginger from the field to the pack house. Sacks or bags are unsuitable since they can lead to substantial breakage of rhizomes.

## **POST HARVEST HANDLING**

Ginger can be stored for up to two months under the right conditions. A storage temperature of 12°C and 65-75% relative humidity is recommended. Below 12°C ginger is susceptible to chilling injury.

Storage at ambient temperature for a prolonged period would result in moisture loss, shriveling, discoloration and sprouting of the rhizome.

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1991-1994