PRODUCTION GUIDE ON GINGER

Introduction

Ginger is one of the earliest important species grown in the Western hemisphere reported to be a native of Southeast Asia.

Ginger (Zingiber officinale Rosc.) which is popularly known as luya, luy-a, and kabasi in the Philippines is grown as an important spice crop. It is used as a raw material in the production beverages, perfumes and medicines. Due to its penetrating flavor, it is largely used for cooking and the preparation of preserves, candy, and pickles.

Dry ginger contains 1to 3 percent volatile oil and 50 percent starch; its other constituents are fiber, protein, resin, fixed oils, etc.

Two well-known by-products are ginger essence and oil.

SOIL AND CLIMATE REQUIREMENTS

Ginger requires a warm temperature (29-35 degree Celsius) and a humid climate for growth. It also requires a distinctive pattern of rainfall of at least 150 to 200 cm during the growing period and no rainfall a month prior to harvest. In the absence of rain, however, adequate irrigation is essential.

Ginger also thrives on fairly high rainfall- about 3,000 mm on the average. Although able to grow at sea level or up to 1,500 meters above it, ginger thrives at an optimum elevation of 300-900 meters.

Being a shade tolerant crop, ginger can be grown with tall crops and crops that grow on poles. An experiment shading using wooden slots showed that 25 to 50 percent shading resulted in optimum yield.

Ginger grows best on sandy loam, clay loam and porous deep soils. Soil must be well-drained, friable and rich in organic matter.

Depending on the climate, plant ginger the following months:

Types of Climate:

I	II	III	IV
May-June	Year Round	May-June Nov. - Dec.	May-June

PLANTING MATERIALS

A. Varieties	Characteristics
1. A) Native B) Red Native Variety	Small, fibrous pungent rhizome Improved native strain Similar to native variety except that its rhizomes are red while parts growing above the ground are darker green
2. Imugan	Medium-sized rhizomes with prominent leaf scars Resistant to soil-borne diseases Yields 30-70% more than the native stain
3. Jamaica “Oya”	Pleasant aroma Pale Medium-sized rhizomes which turn brownish-yellow when dried. Used for manufacture of soft drinks.
4. Hawaiian	Extra large Yellowish brown with pinkish traces. Less pungent when fresh Yields 20-30 tons/ha. Best for making brine, dried pickles and ground ginger.

B. **Preparation**

1. Produce only fresh and quality rhizomes from reliable sources. A hectare requires about 58,000 rhizomes. (1,160 kgs.)
2. Cut the rhizomes into seed-pieces of about 20 grams each containing 2-3 bud-eyes. Wash theses seed places in tap water.
3. Soak in solution containing 45 grams of Captan per 20 liter of water for 10-15 minutes. Dry the seed places for one to three days before pre-germination.
4. Pre-germinate the seedpieces in raised beds. Plant the seedpieces about 2.5 cm apart and moisten regularly.

   Plant seed pieces five cm. deep at the ridges of the furrows, 30 cm between hills in square or triangular method.

   Planting Season:

   Misamis Occidental – May-June

MAINTENANCE AND FERTILIZATION

1. Side dress with one (1) tablespoonful of complete fertilizer (14-14-14) 8 cm. away from the hills.
2. Gather either coconut leaves, rice straws, dried banana leaves or cogon straws and mulch the planted area.
3. Apply 400 kgs. Of complete fertilizer per hectare on the 2^{nd} and 4^{th} months.
4. Remove weeds emerging from the mulch.

Pest and Disease Control

Pests	Control
1. Pineapple Mealy Bug	Practice crop rotation. Control ants by spraying malathion 57EC at 2-3 tbsp. per gallons of water. Collect and crush eggs and caterpillars.
2. Black army-worm	Collect and crush caterpillars to help reduce further damage to the plants. Spray Malathion 3-5 tbsp. per 5 gallons of water at 7-14 days interval until controlled. Eggs masses should be collected and crushed.
3. Aphids	Encourage growth of natural enemies. Spray Malathion 3-4 tbsp. per 5 gallons of water at 7-14 days interval until controlled.
4. Shoot Borer	Spray Parathion at recommended rate.

Diseases	Symptoms	Control
1. Leaf Spot and Soft Rot	Presence of very small circular or irregular water-soaked spots on the leaves. Small spots enlarge, and become yellowish and later turn brown; the center of the spot become white.	Practice clean culture. Spray Maneb 50 at 14 days interval until controlled. Plant disease-free seed pieces and provide good drainage. Control insects that wound the rhizomes. Use only healthy rhizomes for planting. To prevent spread of the fungus avoid going the fields especially when ginger leaves are wet.
2. Bacterial wilt	Slight yellowing and wilting of the lower leaves. The wilt progresses upward, affecting the lower leaves and	Plant healthy rhizomes. Practice clean culture. Avoid intercropping or crop rotating of solanaceous plant.

	followed by a complete yellowing and browning of the entire shoot. Extensive bacterial ooze of a slimy, creamy exudates on the surface of a cut made in the rhizome or on the above-ground stem of an infected plant.	And other plants attacked by Pseudomonas solanacerum. Plow the filed early to let dry for three months. Crop rotate with rice or corn. Control weeds, especially the common purslane. Use healthy or disease-free seed pieces.
3. Fusarium yellow and Rhizome rot	Plants become yellow and exhibit stunted growth. The lower leaves dry out over an extended period of time. The disease start in the seed piece originally planted.	Plant healthy rhizomes. Practice clean culture. Dip in Captan 50 at the recommended rate of 10% solution.
4. Root knot nematode	The cortex of the rhizome appears lumpy and cracked.	Treat soil with nematicides at 14 days before planting. Plow field early to let dry. Biologically control by green manuring. Fertilize ginger with organic fertilizer.
5. Bacterial soft rot	Softening of the tissue is accompanied by the production of strong odor. The disease is more prevalent in rhizome that have grown deep in the ground.	Plant disease-free seed pieces. Avoid injuries in the process of weeding and other filed operation. Provide good drainage in the field. Control insects and other animals that produce wounds in the rhizomes. Avoid very close planting. Provide very good drainage.

HARVESTING

1. Harvest ginger when stalks exhibit yellowing and withering, about nine (9) months after planting.
2. Harvesting methods vary with the size of the farms.
   2.1 For small farms, three (3) laborers may harvest the crop. One digs the hills with a spading fork; the second pulls out the plants, shakes off the soil and lays them on the ground; and the third trims off the stems (taking care that the rhizomes do not break) and spreads the rhizome dry.
   2.2 For large scale plantation, plow the ground to loosen the soil and expose the rhizome.

POST HARVEST HANDLING

A. Curing – before storing, ginger is cured under an open shed. Ginger may be cured by forcing warm air through the crates. To do this, arrange the crates in such a manner that warm air is forced through them by an ordinary electric fan.
The crop is cured for about two days. The fan is continuously used for about 12 hours on a dry day. For curing large quantities of harvest, several fans are used. The dried crop is left to cure for five to ten days before storage.

B. Storing – fresh ginger is highly perishable. After harvesting, the seed has to be stored till the next planting.
Storing ginger in pits is the best way to get healthy and plump seeds as well as higher yields. Smoking the seeds is also beneficial for higher germination although the seeds do not remain as plump as those in pits. Cured ginger stored at 15.5 degree Celsius and a relative humidity of 80 percent keeps for a year.

C. Grading – ginger is graded in the field; is based on the soundness and the size of the rhizomes.

D. Processing – handling ginger for the commercial processing generally revolves a higher level of separation and equipment management. In the production of salted ginger, for instance, the volume of ginger bought from various farmers is thoroughly cleaned in a washing machine before processing. Clean and dry rhizomes are classified according to the specifications of prospective buyers. The rhizomes are then processed in a tank with brine solution. For safe transport, containers should be supported with wooden pallets. These containers are then piled in the storage room before they are transported to the prospective buyer.

MARKETING

Ginger rhizomes are bought from farmers by various agents such as contract buyers, agent buyers, assembler-wholesalers, wholesaler-retailers and exporters. Contract buyers sell ginger to exporters. The usual transformation facilities are sleds, carts, horses carrying baskets, or jeeps.

While waiting for the next planting season or the best time to sell their produce, farmers store ginger in various ways. They pile them in a part of the house with cement flooring or in a shaded cool place. They may also store ginger in pits or protect them with coconut leaves from direct exposure to the sun.

Ginger is generally sold by kaing, can, sack, kilo, pile or tumpok and by piece.

NUTRITIVE VALUE

The characteristic aroma of ginger is due to the volatile oil content of about 3 percent. Its probable chief components are the sesquieterpene zingiberence, the terpenes of d-camphene and phellandrene, and the alcoholic zingiberol, although several other components have been reported present in small amounts.

The pungency of ginger is due to an ether soluble non-volatile substance known as gingerol, a mixture of phenolic compounds containing the ketone zingerone.

The ginger rhizome is found low in amino acid but rich in potassium. It is widely used as essential flavoring in the preparation of European and Japanese dishes.

UTILIZATION

Ginger is used in the manufacturer if ginger oil, ginger oleoresin or gingerin, starch from spent ginger, ginger powder used in soft drinks, alcoholic beverages, ginger preserves, ginger candy, and ginger pickles.

Estimated Production Cost of Fresh Ginger per Hectare

Operation & expenses	Man-day (no.)	Animal-day (no.)	Total cost (p)
Land Preparation			
Plowing			
1st	8	8	2, 400.00
2nd	7	7	2, 100.00
Harrowing			
1st	3	3	900.00
2nd	3	3	900.00
Other Labor Cost:			
Furrowing	3	3	900.00
Seed treatment	1	-	100.00
Hauling & planting	25	-	2, 500.00
Mulching	20	-	2, 000.00
Fertilization	6	-	600.00
Harvesting	32	-	3, 200.00
Cleaning	8	-	800.00
Hauling	3	3	900.00

Inputs

Rhizome seed: 1,160 @ Php 18.00	20, 880.00
Fertilizer: 7 bags @ 710.00	4, 970.00
Mulching materials: 10, 000 coconut fronds @ Php 0.50 each	5,000.00
Chemicals for seed treatment	1, 000.00
Total: Php **49, 150.00**	
Yield per ha (10 tons) @ Php 20.00/ kilo	200, 000.00
Net Return	150, 850.00
ROI	307%