

Scale Insect - They infest the young shoots, stems and mostly the leaves. Scale insects produce saccharine deposits on the leaves of coffee trees which attract ants that feed on the honey dew which increases the growth of sooty mold.



Management practices:

Spray mineral oil at the rate of 80 ml per 16 li of water at 7 days interval. Spray soap solution (Perla at 25 g per 16 li of water) at 7 days interval to check the spread of the insect. Spray botanical pesticides like hot pepper.

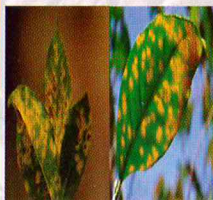
Stem or twig borer - The adult carpenter moth is pale gray with numerous black spot on the wings. The larvae bores the twigs and stems and feed on the soft tissues of the trees eventually the tree dies.



Management practices:

Collect and burn all infested branches. Weeding to remove alternate host plants. Proper pruning is necessary to avoid heavy shading. Proper application of organic fertilizer to induce healthy growth of shoots.

Common Coffee Diseases



Coffee Leaf Rust - One of the most destructive foliar diseases of coffee. This usually occurs during warm moist weather condition. The affected leaves may fall off which cause die back and weakening of the whole plant resulting to reduced yield.

Management practices:

Use of resistant varieties. Weeding to remove alternate host plants. Rejuvenation of infected coffee trees.



Anthracnose or Brown Blight- It attacks all stages of the crop from flower including unopened inflorescence to the ripe berries. The pulp tends to stick to parchment and beans become dark brown, brittle and dry up.

Management practices:

Provide proper fertilization is necessary to correct nutrient deficiency which could increase tolerance of the crop to disease damage. Prune to allow penetration of sunlight and proper aeration. Avoid excessive shade. Immediate pruning after harvest is recommended for good spray coverage.

Harvesting -The coffee berries are harvested manually through selective picking of ripe berries. Harvest berries that are shiny, red and firm. The maturity of coffee berries from flowering to harvesting depends upon the varieties. Arabica variety matures from 8-9 months.



ITEMS	UNIT	QTY	UNIT COST PhP	COST PER HA PhP
A. Supplies/Materials				
Seeds	kg	1.5	350	525.00
Commercial organic fertilizer	bags	250	400	100,000.00
Fermented products	li	10	300	3,000.00
Perla soap	bar	40	35	1,400.00
Bio-fungicides	li	15	480	7,200.00
Botanicals	li	10	200	2,000.00
Power sprayer	pcs	1	15,000	15,000.00
Pruning share	pcs	10	300	3,000.00
Pruning saw	pcs	5	600	3,000.00
Plastic drum	pcs	5	1,000	5,000.00
Jute sacks	pcs	100	15	1,500.00
B. Labor				
	Man-days			
1. Nursery Management				
1.1. Bed preparation, sowing and mulching.	"	2	350	700.00
1.2. Maintenance of seedlings.	"	4	350	1,400.00
1.3.Preparation of soil media, potting and pricking of seedlings.	"	5	350	1,750.00
1.4. Maintenance in the nursery.	"	22	350	7,700.00
2. Plantation Establishment.				
2.1. Land preparation and planting).	"	60	350	21,000.00
2.2. Maintenance of coffee trees.	"	260	350	91,000.00
3. Harvesting and Hauling	"	50	350	17,500.00
4. Postharvest activities (pulping, and drying)	"	20	350	7,000.00
C. Equipment				
Pulper machine	pcs	1	50,000	50,000.00
Grand total				353,175.00
Contingencies				35,317.50
Total Production Cost				388,492.50
Gross income (3 yr average yield = 1,692 kg @350/kg)				592,200.00
Net Income				203,707.50
ROI (%)				52.44%

Credits:

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Department of Agriculture



BUREAU OF PLANT INDUSTRY

Baguio National Crop Research Development
and Production Support Center
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ORGANIC PLANT MATERIAL PRODUCTION ARABICA COFFEE (Coffea arabica L.)



Introduction

Coffee (*Coffea Arabica*) is a promising economic crop for some areas of the Philippines and higher value coffee grown in cooler, elevated areas at 1,000 m to 1,800 m above sea level. It is also a very good planting material for reforestation and agro-forestation in denuded areas and barren hills.

Arabica coffee production is a potential income earner to those coffee growers in the Cordillera Region. Due to each importance, coffee growing is being encouraged among farmers to consider coffee production as an economic activity to increase their areas of production as a major livelihood and income earner.

Soil and Agro-climatic Requirements

Arabica coffee grows best at altitudes of 1,000 - 1,800 meters above sea level. Temperature requirement range from 15-26°C and the ideal amount of rainfall range from 1500-2000mm per year. The optimum pH value of the soil lies between 5-6. Soil should be fertile depth about 1.5 m surface, friable, loamy, well-drained soil with a good water holding capacity and aeration.



Seed selection

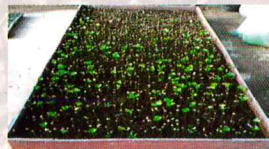
Three NSIC Registered Varieties

Red Bourbon Yellow Bourbon Catuira

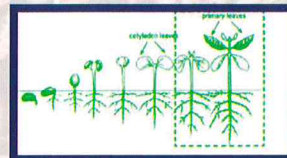


1. Seed germination. The seedbeds are dug and pulverized. A plot measuring 1 m x 20 m can accommodate 2.25 kg of seeds. Fine river sand, or composted rice hull is mixed on the prepared bed to improve aeration. Furrows are prepared at a depth of 1.5 cm distanced at 2.5 - 3.0 cm apart. The seeds are sown with the flat surface downward at 2.5 x 2.5 cm distance then the seedbeds are provided with mulch (any available material) to prevent seeds from strong rains and weed growth and to hasten germination. Regular watering of the seeds is necessary until the seeds have germinated.

2. Pricking and potting - The seedlings are ready for pricking when rounded leaves or coleoptile have fully developed (butterfly stage). The polyethylene bags contain media consisting of soil + fine river sand or composted rice hull + vermicompost (2:1:1 ratio). Prick the seedlings into individual polyethylene bags 6" x 8" x .002.



Germination Pan



Germination Process

B. Propagation by stem cutting or clonal propagation

To ensure quality planting materials a mother clonal garden should be established first to serve as source of cuttings. Cuttings are taken from the green portion or semi-hard wood of the selected vertical stem. Then further cut into single nodes measuring 6 cm long excluding the young shoots.

Cuttings are dipped in pure honey and then stick in coir dust as rooting medium. Water the stem cuttings immediately by mist application. Cover the rooting chamber with plastic sheet to increase heat inside the rooting chamber and to enhance development of roots. Misting is done every morning and late in the afternoon up to the 15th day from sticking. Watering with the use of fine sprinkler is applied on the 16th day up to the stem cuttings are ready for pricking in polyethylene bags with 2:1:1 ratio of garden soil, composted rice hull and vermicompost.

Shading - Shade is constructed above potted seedlings to provide 50% shading for good growth of the coffee seedlings.

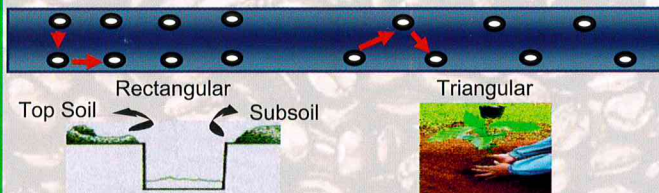
3. Fertilizer application- Two months after potting spray seedlings with fermented plant juice (FPJ) at the rate of 32 tbsp/16 liters of water at 7 days interval until the seedlings are ready for transplanting in the field. For additional nutrient of the crop, any certified commercial organic foliar fertilizers are applied.

Establishment and Management of the Plantation

1. Land preparation- The area to be planted should be cleared of all rubbish. The area is usually prepared during the dry months. Marginal lands in sloppy or mountain sides should be cleared to remove the weeds then stake. In staking, distance should be measured horizontally along the contour (slope area).

2. Preparation of planting holes - Size of hole is 50 x 50 x 50 cm or 40 x 40 x 40 cm. Distance of planting- 2 m x 2 m (2,500 pcs per ha). The holes are set at a square or rectangular pattern (applied on plains or flat areas). Triangular pattern is normally used in sloping areas.

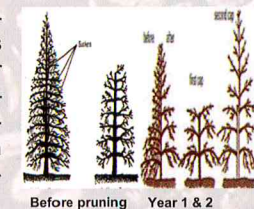
3. Transplanting - Soil analysis of the plantation site is required to determine the appropriate fertilizer requirement. In the absence of soil analysis, a general recommendation is to fill the hole with 1- 2 kg fully decomposed animal manure or vermicompost as basal application.



4. Fertilizer application—For non-bearing trees, 1- 2 kg/ tree of fully decomposed animal manure or vermicompost is applied. The same rate is applied for every 6 months thereafter. Spray fermented plant juice (FPJ) at the rate of 32 tbsp /16 liters at vegetative stage. For bearing trees, split application of 6 - 8 kg vermicompost is recommended. First application is at the onset of rainy season, second is during the middle of rainy season and third is towards the end of the rainy season. Spray coffee trees with fermented fruit juice (FFJ) at the rate of 32 tbsp /16 liters of water during flowering or fruiting stage at 7 days interval.



Pruning - This is done to remove unnecessary and unproductive branches including undesirable sprouts in order to: Regulate plant height, easily facilitate harvesting and other field operations, and to promote better aeration and light penetration. This is done before flowering or after harvest.



Rejuvenation - Generally defined as the cutting of vertical stems of old coffee trees to induce growth of new sprouts. The trees are cut back at knee high and two or three vigorous shoots are allowed to grow from the stem. It is advantageous than replanting of new seedlings.



When to rejuvenate. Rejuvenation should be done at the start of rainy season. Rejuvenate the trees when: yield has declined; coffee tree has grown so tall and unproductive; few lateral branches located at the top of the tree. When trees are damaged by typhoons or natural calamities; when branches break at harvest time and are damaged caused by insect pest and diseases.

Common Insect Pests

Coffee berry borer - the most destructive and hardest to control. The female beetle make it entrance to the coffee bean by boring a hole at its tip and tunnel within the bean to lay eggs. The hatched larvae feed on the endosperm tissue of the beans.



Management practices:

Collect and burn all infested berries before and after harvest. Keep plantation free from over-ripe berries to reduce insect population. Proper pruning is necessary to avoid heavy shading. Botanical spray using neem seeds (500 neem seeds/gal of water). Use sticky traps to attract adults.