

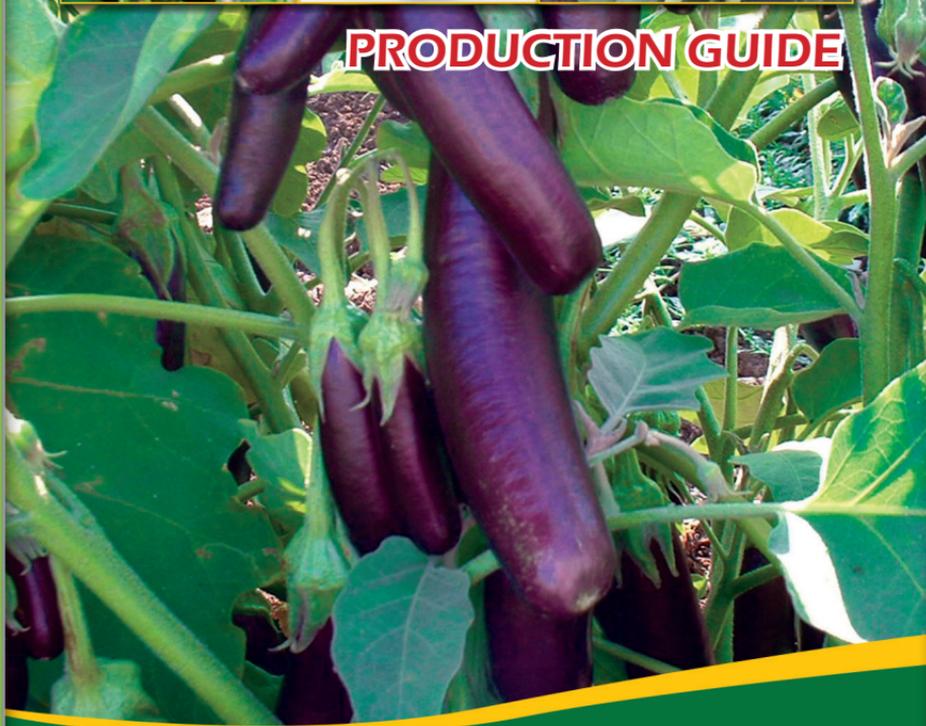


DEPARTMENT OF AGRICULTURE
Regional Field Office No. 02
Tuguegarao City, Cagayan

EGGPLANT



PRODUCTION GUIDE





Eggplant

Production Guide

This Publication is a project of the **Department of Agriculture, Regional Field Office No. 02, High Value Crops Development Program**. It contains the most recently available and locally adaptable technical information on **Eggplant Production** in Region 02.

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INTRODUCTION

Eggplant (*Solanum melongena*, L.) is a tender perennial plant of the Nightshade or *Solanaceae* family. It is extensively grown in the Philippines making it as one of the most important vegetables in the country. The young fruits may be roasted, fried, stuffed, cooked as curry, pickled or prepared with other vegetables as the popular Ilocano dishes, pinakbet and dinengdeng.

This vegetable is a good source of calcium, phosphorous, potassium, iron, protein, folic acid and vitamins A and B. It is high in fiber and low in fat, calories and sodium. Eggplant skin is called nasunin, a potent antioxidant and free radical scavenger that protects all membranes from damage.

Eggplant is also used in the preparation of traditional medicine. The ashes of the fruit are used as dry hot poultice for hemorrhoids and the rounded root is applied inside the nostrils against ulcerations. It is also used to cure diabetes, asthma, cholera, bronchitis and dysuria, a painful discharge of urine. The fresh or dried leaves and fruit can reduce blood cholesterol level. The juice from the roots is used to cure otitis and toothache.

Eggplant production accounts about 28 percent of the total volume of top vegetables grown in the country which attained the highest value among the leading vegetables. The area devoted to eggplant production is more than 1,875 hectares composed of farms ranging from 0.5 to 2.0 hectares with an average yield of 18.4 MT/ha which is about half of the average yield in Asia and the world (BAS, 2011).

ADAPTATION**Soil and Climatic Requirements**

Eggplant thrives best in sandy loam and clay loam soils with pH value ranging from 5.5 to 6.8. It can be planted throughout the year. The crop is moderately sensitive to flooding and moisture especially during flowering and fruit development. Eggplant requires 35-40 milliliter of water per week and a temperature of 20°C to 30°C during seed germination, 21°C to 30°C during its growth duration and 24°C to 32°C soil temperature.

Varietal Selection

Select varieties that are high yielding, resistant to insect pests and diseases, adapted to local conditions and acceptable to the consumers. Several improved varieties are listed in Table 1.

Table 1. Recommended Varieties of Eggplant Adapted in Region 02

Variety	Maturity (DAT)	Fruit Type		Features
		Color	Shape	
Dumaguete Long Purple OP	70-72	Purple	Cylindrical	High tolerance to bacterial wilt
Morena F1		Purple	Cylindrical	Excellent fruit quality, long shelf life and high yielding
Casino F1	50	Dark Glossy Purple	Straight and Cylindrical	Very prolific, gives high yield, suitable for all season
Gwapito F1	45-50	Purple Green	Round	Early maturing and high yielding
Sikat F1	45	Shiny Dark Purple	Cylindrical	Extra early maturing and high yielding

SEEDLING ESTABLISHMENT

There are two methods of raising seedlings: the seedbed method and the use of seedling trays or potlets.

Seedbed Method

Choose a level area fully exposed to sunlight, accessible to source of water, with good drainage and provided with windbreaks. Plow and harrow the field alternately until the soil attained fine tilt. Construct five (5) seedbeds measuring 1x10 m at 15 cm high.

Sterilize the seedbed to eliminate weed seeds and pathogens present in the soil. To sterilize, moisten the prepared seedbed for better heat penetration. Spread about 3 - 5 cm thick of either rice straw or rice hull on top of the seedbeds and burn slowly. Remove unburned materials and excess ash. To avoid toxic effects of the burned materials, do not sow seeds immediately after sterilization.

Seedling Tray/Potlets

Raising seedlings in tray or potlets requires less seeds, promotes uniform growth of seedlings, minimizes transplanting shock and lessens seedling mortality. It also saves labor for thinning, weeding, watering, and pest management.

Prepare soil mixture or media composed of one (1) part compost, one part carbonized rice hull (CRH), and one part garden soil. Sterilize the garden soil by roasting method. Mix the garden soil with the other media one (1) day after sterilization.

Fill the holes of the trays or potlets with the media. Use seedling trays with 100-104 holes. Commercial or ready mixed growing media are also available from agricultural dealers in the locality.

Sowing

A hectare of farm requires 100-200 g of eggplant seeds. One gram is approximately 250 seeds. To hasten germination, soak the required amount of seeds in clean water overnight. Air-dry the seeds before sowing.

Water the seedbeds before sowing. Prepare rows at a distance of 5 cm with the use of a stick. Drill the seeds evenly in the furrows and cover with fine soil.

When using seedling tray or potlets, sow one seed per hole or potlet at a depth of 1.0 cm and cover with fine soil. Sprinkle the trays/potlets with water after sowing.

Care of Seedlings

Water the seedlings regularly preferably in the morning just enough to keep the soil moist. Over-watering favors damping-off and production of weak seedlings.

Thin seedlings that are over-crowded 3-5 days after emergence (DAE) or when the seedlings have developed the first 2-3 true leaves. Prick the thinned seedlings in seedbeds, tray or potlets intended for this purpose. Water the pricked seedlings and place in a shaded area until these have recovered.

To produce healthy seedlings, apply starter solution of 2 tbsp ammonium phosphate (16-20-0) or complete fertilizer (14-14-14) dissolved in 4 liters of water at 10 DAE. Drench the solution evenly to the seedlings. Water the seedlings after applying the fertilizer solution to prevent leaf injury.

Protect the seedlings from excessive sunlight and rain. Construct a temporary shade using locally available materials such as cogon, talahib or coconut leaves and recycled plastic sack. Put posts of the shade about 120 cm high on the east side and about 60 cm high on the west side.

One week before transplanting, harden the seedlings to prepare them to direct field condition. Gradually expose the seedlings to direct sunlight. For the first day, expose the seedlings up to 10 o'clock in the morning and increase duration every day until the seedlings can withstand the heat of the sun the whole day. However, make sure that the seedlings do not wilt severely. Hardening could also be done by gradually reducing the amount of water and frequency of watering.

CULTURAL MANAGEMENT PRACTICES

Land Preparation

Prepare the field as early as possible to give enough time for the weeds and stubbles of previous crops to decompose. Plow the soil at a depth of 15-20 cm 2 to 3 times at one week interval. Harrow every after plowing to break the clods and level the field. A well-pulverized soil promotes good soil aeration and enhances root formation. Prepare furrows 50 cm apart

Fertilizer Application

The quantity and kind of fertilizer to apply depend on soil fertility based on the result of soil analysis. Submit soil samples for analysis at the Cagayan Valley Integrated Agricultural Laboratory (CVIAL), Department of Agriculture, RFO 02, Carig Sur, Tuguegarao City, Cagayan or at Ilagan City Soils Laboratory, Ilagan City, Isabela. However, in the absence of soil analysis, apply the recommended rates indicated in Table 2.

Table 2. Kind and amount of fertilizer and time of application for eggplant.

Method of Application	Kind of Fertilizer	Time of application
Basal	Apply the fertilizers on both sides of the bed for every 10 linear meters of the planting rows or ridges	
With plastic mulch	0.5 kg fully decomposed chicken dung or any commercial organic fertilizer 0.4 kg ammonium phosphate (16-20-0) 0.4 kg ammonium sulfate (21-0-0) 0.1 kg muriate of potash (0-0-60)	

Eggplant Production Guide

Conventional (without mulch)	0.5 kg fully decomposed chicken manure or any commercial organic fertilizer 0.4 kg ammonium phosphate (16-20-0)	
Side-dress	Apply fertilizer solution at the rate of 170 ml or one small sardine can per hill	
With plastic mulch	3 tbsp urea per 15L water	3, 5, 9, 13 and 17 weeks after transplanting (WAT)
	3 tbsp muriate of potash per 15 L water	7, 11, 15 and 19 WAT (fruiting stage)
Conventional (without mulch)	6 g (0.4 tbsp) Urea/hill; or 120 g (8 tbsp) Urea/10 linear meters	3 and 9 WAT
	3 g muriate of potash/hill; or 60 g (5.2 tbsp) muriate of potash/10 linear meters	6 and 12 WAT
Complete fertilizer (14-14-14) per hill or 160 g complete fertilizer/10 linear meters	8g complete fertilizer (14-14-14) per hill; or 160 g complete fertilizer/10 linear meters	15 WAT

When side dressing, drill the fertilizers evenly within a shallow furrow about 20 cm away from the base of the plant. Fertilizer can also be applied by dibbing at the midpoint about 25 cm between plants along the rows.

Mulching

Mulching is usually applied to control weeds, conserve soil moisture, and prevent soil erosion and leaching of fertilizers. The mulch also reflects sunlight to repel insect pests hiding under the leaves. The most common mulching materials include coconut choir dust, rice straw, rice hull, and plastic.

Apply the coconut choir dust, rice straw or rice hull mulches after hilling up at 3 to 5 cm thick. If planted in plots, apply mulch after transplanting. When using plastic mulch, put this before transplanting as follows:

- Stretch the plastic mulch over the planting bed, with the silver color on top.
- Fasten the edges of the plastic mulch to the soil with bamboo slats (6 to 8 cm long) spaced at 30 cm apart.
- If bamboo slats are not available, cover its edges with soil using a shovel or rake or by passing a moldboard plow near the edges.
- Make holes at a distance of 50 cm about 10 cm from the edge on both sides of the plastic mulch.
- Punch holes using any of the following ways:
 1. Using a serrated-lipped tin can. Cut the lip of a 7 to 10 cm diameter tin can with metal scissor to form 1-cm long saw-like edges. Push and twist with the serrated side down the can on the marked planting spots of the plastic sheet.
 2. Using of hot tin can. Punch small holes using a nail at the sides and bottom of a 7-10 cm diameter tin can. Attach a wooden or bamboo handle. Fill the can with burning charcoal. The holes ventilate the charcoal to keep it burning. Push the tin can with the heated bottom on the marked planting spots of the plastic sheets.
 3. Using a cutter. Cut intersecting lines at 7-10 cm long to form “+” or “X” at the marked planting spots. During transplanting, fold up the 4 flaps to form square planting holes.

Transplanting

Eggplant seedlings are ready for transplanting 30-35 days after sowing (DAS) or when the seedlings have developed 3 - 4 true leaves. Pull seedlings carefully. Do not remove the soil adhering to the roots to minimize root injury and promote faster recovery.

When using plastic mulch, transplant seedlings directly into the prepared holes in the plastic sheets.

For conventional method or without the use of plastic mulch, transplant the seedlings within the furrows at a distance of 50 cm between hills. Most farmers plant eggplant in double row method

because it provides developing fruits adequate protection against sun scalding. It also facilitates farm operations. Transplant only one seedling per hill. Preferably, transplant during cloudy days or late in the afternoon to avoid transplanting shock. Replant missing hills or wilted plants within 3 - 5 days after transplanting (DAT). Water the newly transplanted seedlings immediately.

Irrigation

If plastic mulch is used, water the beds 2 days before transplanting to cool down the soil under the mulch and allow the fertilizers applied to dissolve. For conventional method or without the use of mulch, irrigate the furrows to dissolve the fertilizers applied and minimize direct contact of the seedling roots with the fertilizers.

During the dry season, irrigate at 7, 21 and 30 DAT. Irrigate every 10 days thereafter. The mulched eggplant requires lesser frequency of irrigation water. During the wet season, irrigate as the need arises.

Pruning

Pruning is necessary for plant growth and fruit development. Remove the lateral branches below the split, except the branch nearest to the split (Y branch) to allow the air to move freely on the base of the plants and to minimize occurrence of fungal and bacterial diseases. Prune unnecessary leaves to reduce competition in nutrient absorption.

Weeding and Cultivation

Practice regular hand weeding to minimize the growth of weeds. Off-bar at 14 DAT and hill-up at 21 DAT. Pull the remaining weeds in between plants after cultivation.

Pests Management

Various pests affect solanaceous vegetable during its growing period. Insect pests and diseases reduce yield, lower the quality of produce and increase cost of production.

The common insect pests of eggplant are fruit and shoot borer. The most destructive diseases are bacterial and fusarium wilt. Prevent the occurrence of pests by practicing field sanitation, plant resistant varieties, crop rotation and as last recourse, spray insecticide following the manufacturers' recommended dosage.

In case of disease infection, pull and burn infected plants.

Harvesting and Postharvest Operations

Harvesting starts 46 to 50 DAT, depending on the variety and the intended use of the fruits. Harvest fruits that are still tender and young. Harvest early in the morning and protect the fruits from the sun, rain, and mechanical damage. Harvest all fruits from the plants to prolong the fruiting period of the crop. Harvesting is usually done two times a week. Use pruning shear in harvesting to avoid damaging the plants. Remove damaged fruits and sort according to market standards. Prick the bags with a pin for ventilation. Provide two pricks per kilogram of packed fruits. For some varieties, the fruits can be stored up to five days under this condition.

COST AND RETURN ANALYSIS FOR ONE HECTARE EGGPLANT PRODUCTION

A. Labor Inputs

PARTICULARS A. Labor Cost	1/ NUMBER		VALUE IN PESO (P)
	Man-days	Man-Animal-days	
1. Seedbed Preparation			
a. Digging and pulverizing	4		1,000.00
b. Levelling	2		300.00
c. Sowing, watering & spraying	7		1,050.00
2. Land Preparation			
a. 1st Plowing		8	2,400.00
b. 1st Harrowing		4	1,200.00
c. 2nd Plowing		5	1,500.00
d. 2nd Harrowing		3	900.00
e. Furrowing		2	600.00
3. Transplanting	15		2,250.00
4. Basal Fertilization	4		600.00
5. Care of the Plants			
a. Watering (2x a week up to flowering period or 8 weeks)	16		2,400.00
b. Weeding and cultivation (4x)	20		3,000.00
c. Side dressing of fertilizer	5		750.00
d. Hilling-up	4	5	1,500.00
e. Control of pests and diseases	16		1,800.00
6. Harvesting, sorting and packing	50		7,500.00
7. Hauling	4		600.00
Sub-Total			29,350.00

B. Inputs	Quantity	2/ Unit Cost (P)	Amount (P)
1. Seeds (OPV)	200 grams	7,000.00	14,000.00
2. Fertilizer			
- Complete (14-14-14)	3 bags	1,100.00	5,400.00
- Urea	2 bags	1,400.00	3,600.00
- Organic fertilizer	20 bags	300.00	4,000.00
3. Insecticides	5 liters	850.00	4,250.00
4. Fungicides	2 kg	780.00	1,560.00
5. Polyethylene	1250 pieces	5.00	6,250.00
6. Miscellaneous			1,500.00
Sub-Total		27,160.00	27,160.00
Sub-Total (A&B)		56,110.00	56,260.00

C. Contingency (15% of A & B)

Materials	Quantity	3/ Unit Cost (P)	Amount (P)
C. Contingency (15% of A & B)			8,439.00
GRAND TOTAL			64,699.00
Yield /ha (kg)	18,400		
Gross Income		3/10.00/kg	184,000.00
Net Income			119,301.00
Return on Investment (ROI)			184.39

1/ Man-days = P250

MAD = P400

2/ Cost of items as of December 2015

3/ Farm gate Price

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