



DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY

AMPALAYA

PRODUCTION GUIDE



Ampalaya
Momordica charantia



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The AMPALAYA Plant

Bittergourd or ampalaya (*Momordica charantia* L.) belongs to the family *Cucurbitaceae* along with cucumber, squash, watermelon and muskmelon. Native to China and India, the fast-growing vine is grown throughout Asia. Ampalaya is a climbing vine that can grow as long as 5 m. It has tendrils, palmately veined leaves and cut nearly to the base into five or seven oblong-ovate, variously toothed lobes that form a heart-shaped base. It also has separate male and female flowers. The male flower has peduncle or stalk about 2-3 cm while the female flower has 3.5 cm long peduncle with small fruit. Flowering starts 45-55 days from sowing and lasts up to 6 months.

It is also known as *paria* (Ilokano), *palia* (Bisaya) and Balsan pear (English). It is high in vitamins and an excellent source of iron and calcium. The fruit, young shoots and flowers are used as vegetable. It comes in different shapes and sizes and has a warty skin and very bitter taste.

Nutritional Value

The fruits and shoots are soaked in salt water to remove some of their bitterness and then steamed, fried or pickled. Bittergourd is similar in nutritional value to other cucurbits except it is higher in foliate and vitamin C. The vine tips are an excellent source of Vitamin A. It is popularly known to cure infectious diseases and diabetes. The fruit contains the hypo-glycemic principle charantin, which is used to treat diabetes. The young leaves and shoots of Makiling variety were reported to have lowered the blood sugar level of people with type 2 diabetes mellitus (DOST-PCAARRD). Presently, ampalaya tablets and tea are marketed as food supplements. Table 1 presents the nutrients that can be found in 100 grams of bittergourd.

Bittergourd has been found to have great medicinal value. It is a very good blood purifier. It helps to treat blood disorders such as blood boils and itching due to toxemia. It is also good in the treatment of malaria. The juice has a good effect on cholera patients and helps to treat the disease. It is said to have antidote, antipyretic tonic, appetizing, anti-bilious and laxative properties (March 2, 2009. Food Quad Health and Lifestyle by Ayushueveda).

Table 1. 100 grams of bittergourd comprises the following nutrients

Properties	Amount	Properties	Amount
Calcium	19 mg	Sodium	5 mg
Selenium	0.2 mcg	Iron	0.43 mg
Magnesium	17 mg	Copper	0.34 mg
Manganese	0.059 mg	dietary fiber	39
Zinc	0.8 mg	Folate	72 mcg
Panthothenic Acid	0.212 mcg	Protein	1 g
Total Carbohydrates	4 g		

CULTIVATION

In the Philippines, ampalaya is cultivated in 10,877.10 hectares in 2011 (<http://countrystat.bas.gov.ph/?cont=10&pageid=1&ma=P00LUAHO>). Southern and Central Luzon were the top regional producers of ampalaya fruits followed by the Ilocos and Cagayan Valley regions (Table 2). The national yield production was reported at 86,599.32 metric tons with the highest production in Central Luzon at 25,034.12 metric tons followed by CALABARZON with 24,029.83 metric tons (Table 3) (<http://countrystat.bas.gov.ph/?cont=10&pageid=1&ma=P00LUAHO>). It grows best in low elevation and in full sunlight and

can be planted anytime of the year. It thrives in a wide range of soils but grows best in well-drained, sandy loam soil with pH of 5.5-6.5.

Table 2. Area Planted/Harvested of Ampalaya, Philippines, 2011*

PHILIPPINES	10,877.10
CAR	103.5
Ilocos Region	1,235.21
Cagayan Valley	1,148.00
Central Luzon	1,947.60
CALABARZON	2,369.00
MIMAROPA	248.41
Bicol Region	417
Western Visayas	380.64
Central Visayas	701.04
Eastern Visayas	284.15
Zamboanga Peninsula	695
Northern Mindanao	505.85
Davao Region	391
SOCCSKSARGEN	242.2
CARAGA	133
ARMM	75.5

* <http://countrystat.bas.gov.ph/?cont=10&pageid=1&ma=P00LUAH0>

Table 3. Volume of Production (mt) of Ampalaya, Philippines, 2011

PHILIPPINES	86,599.32
CAR	455.05
Ilocos Region	9,628.74
Cagayan Valley	6,610.13
Central Luzon	25,034.12
CALABARZON	24,029.83
MIMAROPA	562.29
BICOL REGION	2,816.35
Western Visayas	2,720.29
Central Visayas	3,226.66
Eastern Visayas	1,180.36
Zamboanga Peninsula	2,678.54
Northern Mindanao	2,650.66
Davao Region	2,530.06
SOCCSKSARGEN	1,532.60
CARAGA	656.08
ARMM	287.56

* <http://countrystat.bas.gov.ph/?cont=10&pageid=1&ma=P00LUAH0>

VARIETIES

Table 4. Ampalaya varieties presented in the Philippine Seed Industry Association Seed Catalogue.

OWNER	VARIETY	MATU- RITY (DAS)	FRUIT TYPE					SEASON	FEATURES
			Color	Blossom End	Length (Cm)	Dia- meter (Cm)	Weight (g)		
Pine Valley Corporation	Hybrid Socorro	55-60	green	tapering	30	4-5	270	Year round	Uniform, firm and glossy fruits. Good tolerance to diseases
Pine Valley Corporation	La Trinidad	50	Deep green	Tapering	30-34	5	270	Year round	High tolerance to virus such as powdery mildew and the like
Allied Botanical	Sta. Lucia	58	Bright shiny green	Long and tapering with a distinct blunt end	32	5	272	Year round	A very prolific and uniform selection with thick flesh. Well adapted and vigorous. Good for year round production
Allied Botanical	Trident 357	50-55	Dark green	Long and tapering	35	4.5	270	Year round	Very vigorous, large and uniform in size
Bioseed	Bio choo Choo	55-60	Dark green		20-22		75-80	Year round	Plant is vigorous with strong vines early maturing hybrid

CULTURE AND MANAGEMENT

- A. **Planting guide.** Prepare the soil thoroughly by plowing (Figure 1) and harrowing for two to three times until soil is already loose. Make planting beds of about 1m to 1.5m. To manage weed growth problems, plastic mulch may be placed on planting beds. Seeds are used as planting material. Bittergourd can be direct seeded or transplanted and needs 2 to 3 kgs of seeds to plant one hectare of land. The seeds can be soaked in water overnight or the seed coat can be carefully cracked to facilitate water absorption. Sow the seeds the next day in seedbeds or plug trays. Transplant the seedlings 7-10 days from germination. Spacing is 2-3 meters between rows and 30



Figure 1. Plowing

cm between hills. For leaf production, the spacing is 1 meter between rows and 0.5 meters between plants in a row.

- B. **Fertilization.** Apply 4 bags Dolomite after first plowing or 2 weeks before planting. Apply 2 tons of processed chicken manure or vermicompost in 1 hectare land 2 weeks before planting. Basal application of complete fertilizer (14-14-14) at the rate of 10-15 gm/hill is necessary. It is recommended to sidedress with 10-15 gm/hill of urea (46-0-0) and muriate of potash (0-0-60) once a month (dry season) and sidedress with urea and muriate of potash every two weeks. Spraying of Fermented plant juice (FPJ) can be done once a week from planting to fruiting stage.
- C. **Trellising, vine trimming and pruning.** Bittergourd grows best with A-type trellis (Figure 2) and table type (Figure 3) with vertical trellis. Bamboo poles with 3m x 3m spacing are usually done. Spacing of 1.5 m between rows and 0.75 cm between hills is employed. Prune the shoots below the 2 m mark from the base of the main stem. Removal of some lateral shoots at the upper part and lower shoots (Figure 4) can also be done to maintain bigger fruits.

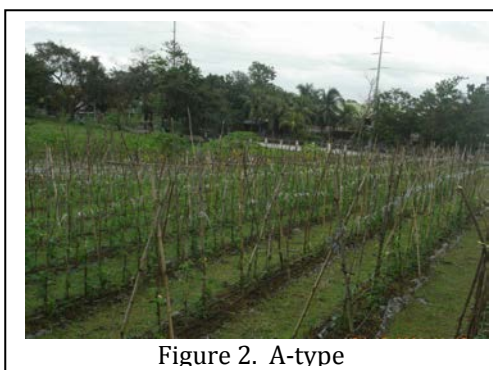


Figure 2. A-type

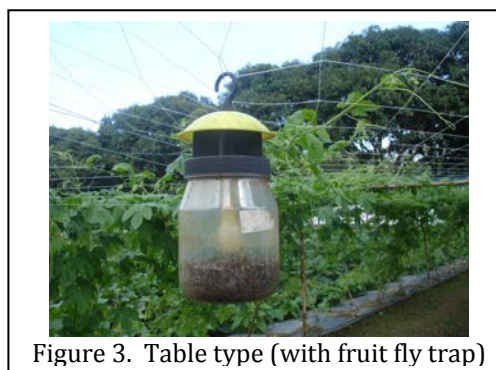


Figure 3. Table type (with fruit fly trap)



Figure 4. Ampalaya plants with lower shoots removed

- D. **Harvesting** (Figure 5). Harvest the fruits when the fruits are still green, shiny and have attained the full size. This is about 15-20 days from pollination or 45 -75 days from planting depending on the variety. There are early and late maturing type. Harvesting can be done 2 to 3 times a week and done continuously for 2 to 3 months. *Source:google.com (bicol.da.gov.ph)BPI-lbncrdc*



Figure 5. Harvesting

PESTS AND DISEASE MANAGEMENT

Table 5. Common pests and diseases and their control

Pests	Scientific Name/Causal Organism	Recommended control
Yellow beetle		Dust with wood ash , or carbaryl with ash
Cutworm	(<i>Agrotis</i> , <i>Amathes</i> , <i>Peridroma</i> , <i>Prodenia</i> spp.)	Spray with Citronella, hot pepper extracts or <i>Bacillus thuringensis</i> . Trichocards from RCPC or NCPC be applied at young stage.
Aphids	<i>Acyrtosiphon pisum</i>	Spray with dishwashing liquid detergent, use of beneficial insects like parasitic wasps and lady beetles which prey on aphids.
Leaf folder	<i>Cnaphalocrocis medinalis</i>	Collect folded leaves, introduce beneficial insects such as earwigs (Order Dermaptera) and ichneumonid parasite, <i>Macrocentrus</i> sp.(for black leaffolder), hymenopterous parasite, <i>Brachymeria</i> sp. (for brown leaffolder), chalcid wasp (for green leaffolder), plant insect repellent crops (marigold,citronella,celosia and others) around planting area.
Fruit fly	<i>Bactrorera dorsalis</i> Hendel	Clear plastic bagging, fruit fly attractant
Downy Mildew	Causal Organism: <i>Peronospora sparsa</i>	Remove infected leaves, spray with Noxdox, mancozeb and copper oxide
Bacterial wilt	<i>Ralstonia (Pseudomonas) solanacearum</i>	crop rotation, sanitation and heal the soil



Figure 6. Fruitfly attractant



Figure 7. Wrapping fruits with paper to get rid of fruitfly

Table 6. Cost and Return Analysis Per Hectare of Ampalaya Production

Items	Total Cost (Php)/ha
Labor Cost (P 250/day, P 500/MAD)	
Land Preparation (plowing and harrowing)	5,000.00
Furrowing and Bedding (1MAD and 6 MD)	3,500.00
Placing plastic mulch (4MAD X 2)	2,000.00
Compost and basal Fertilization (6 MD)	1,500.00
Side-dress fertilization (2 MD)	500.00
Planting (6 MD)	1,500.00
Trellising (15 MD)	3,750.00
Irrigation and foliar application (*FPJ) (20 MD)	5,000.00
Spraying (8 MD)	2,000.00
Weeding	3,500.00
Vine training (5 MD)	1,250.00
Harvesting (20 MD)	5,000.00
Sub-total	34,500.00
Materials	
Seeds, 3kgs	10,000.00
Trellis	30,000.00
Plastic mulch - 8 rolls (1600/roll)	12,800.00
Manure (vermicompost/processed chicken manure) 40 bags /ha (P250 per bg)	10,000.00
Fertilizer	
2 bags of 14-14-14	4,400.00
2 bags of Urea,	4,400.00
1 bag of 0-0-60	2,200.00
2 liters of FPJ	100.00
4 bags of Dolomite	1,800.00
Pesticides	5,000.00
Sub-total	80,700.00
Total Variable Cost	115,200.00
Miscellaneous (15% of Total variable cost)	17,280.00
TOTAL COST	132,480.00
Gross Income	
20 tons@ 20.00/kilo	400,000.00
30 tons @ 20.00	600,000.00
Net Income	
20 tons	267,520.00
30 tons	467,520.00
Average Net income for 20-30 tons/ha @ 20.00/kilo	367,520.00
ROI%	277.42%%

*Fermented Plant Juice

REFERENCES

- Ayushueveda, Food Quad Health and Lifestyle, March 2009.
- Bautista, O.K. And Mabesa, 1977. Vegetable Production. UPLB College Los Baños Laguna.
- Gilkeson, Linda and Miriam Klein. Ecological Agriculture Projects. A Guide to the Biological Control of Greenhouse Aphids. Date retrieved, September 19, 2012. <http://eap.mcgill.ca/publications/EAP53.htm#Aphids>
- HVCC-BPI-LBNCRDC Techno-Demo Los Baños, 2009. Siemonsma, J.S., Piluek, K., PROSEA 8: Vegetables. Wageningen, the Netherlands: Pudoc, 1993
- Jason Morrison 2006, [USDA National Nutrient Database for Standard Reference \(SR\), Release 18. Food Labeling Guide: Reference Values for Nutrition Labeling](#) by the U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition. Percentages shown are Based on a 2000 Calorie intake, for children and adults above the age of 4.
- Leaffolders. Date retrieved, September 19, 2012 <http://keys.lucidcentral.org/keys/sweetpotato/key/Sweetpotato%20Diagnoses/Media/Html/TheProblems/Pest-LeafChewingInsects/LeafFolders/Leaffolders.htm>
- Lucena B. Gajete and Charlito R. Juico, 2008. "Bittergourd Production", EntrePinoy Business Opportunities, Investments and Livelihood Resources
- PCARRD -DOST, Information Bulletin No. 152-A/2009

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