

Seed Production

Alugbati is highly selfed. Plants flower naturally during the short-day period. Seeds are ready to harvest when the fruits turn dark purple or dry altogether in the vine. Sun-dry to around 10% moisture content. To determine if the moisture content is acceptable, put some seeds inside a plastic bag and place under the sun. If condensation occurs after 20–30 minutes or more depending on how intense the heat of the sun is, continue sun-drying the seeds. Pack the dry seeds in moisture-proof containers and store in a cool, dry place. If properly stored, seeds can remain viable for about two years.

Cost and Return Analysis per Hectare

Items	Amount (P)
VARIABLE COSTS	
Labor (P220/man-day [MD])	
Clearing (20 MD)	4,400
Bed preparation (30-50 MD)	11,000
Manure application (10 MD)	2,200
Sowing (2 MD)	440
Transplanting (20 MD)	4,400
Topdressing (20 MD)	4,400
Spraying (20 MD)	4,400
Weeding (30 MD)	6,600
Irrigation (300 MD)	66,000
Harvesting/sorting (240 MD)	52,800
Miscellaneous (e.g., hauling, repairs, etc.) (10 MD)	2,200
Subtotal	158,840
Materials	
Seeds (3–5 kg)	1,000
Manure (40 sacks)	3,200
Fertilizer	
- 14-14-14 (6 bags)	4,938
- 46-0-0 (20 bags)	19,420
Fuel and oil	4,000
Packaging materials	3,000
Miscellaneous (e.g., pail, gloves, etc.)	2,000
Subtotal	37,558

Interest on Production Loans at 21% p.a.	10,500
Total (Variable Costs)	206,898
FIXED COSTS	
Land rental	20,000
Depreciation	
Sprinkler (5 pairs)	2,500
Scythe (5 pcs)	83
Hoe (5 pcs)	417
Shovel (3 pcs)	320
Plastic drum (2 pcs)	533
Total (Fixed Costs)	23,853
Total Costs	230,751
Gross Income	
Regular season (at P10/kg with 80 t/ha yield)	800,000
Offseason (at P20/kg with 40 t/ha yield)	800,000
Net Income	
Regular season	569,249
Offseason	569,249

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Alugbati Production Guide

Introduction

Alugbati (*Basella rubra* Linn., *B. alba* Linn.) also known as 'arogbati' (Bik.); 'dundula' (Sul.); 'grana' (Tag.); 'ilaibakir' (Ilk.); 'libato' (Tag.); Ceylon spinach, Malabar spinach, Indian spinach, Climbing spinach (Eng.); and 'Lo k'uei' or 'luo kui shu' (Chinese) is one of the most popular indigenous leafy vegetables in the Philippines. Originally from India, it is usually found in settled areas, in hedges, old cultivated areas, etc., throughout the Philippines. It is extensively grown in market gardens and home gardens and is being sold even in supermarkets in Visayas and Mindanao. It is also cultivated in tropical Asia, Africa, and Malaya.

Its leaves are somewhat fleshy, ovate, or heart-shaped. The fruit is fleshy and stalkless, which turns purple when mature. The young stems, shoots, and leaves are usually blanched. The edible species *Basella rubra* has red flowers and bright purple-red stems while *Basella alba*, which is more popular, has green leaves and stems. Alugbati production in 2006 was 32,303 tons (t) from 2,482 hectares (ha). It is grown almost anywhere, but major producers were Iloilo, Zamboanga del Norte, and Negros Oriental (Bureau of Agricultural Statistics [BAS], 2006).

Uses and Nutritional Value

Alugbati has a pleasant, mild spinach flavor that some may find earthy. It is slimy when overcooked, which makes it an excellent thickening agent in soups and stews. The purplish dye from the ripe fruit is used as food color and as rouge for the face. The cooked roots are used to treat diarrhea, while cooked leaves and stems are used as laxative. The flowers are used as antidote for poison. A paste of the root is used as a rubefacient or applied to swellings. A paste of the leaves is applied externally to treat boils.

Per 100 grams (g) edible portion, alugbati leaves contain:

Properties	Amount
Water (g)	92.5
Energy (kcal)	23.0
Protein (g)	2.0
Fat (g)	0.3

Carbohydrates (g)	3.0
Fiber (g)	0.9
Ash (g)	2.2
Calcium (mg)	128.0
Phosphorous (mg)	40.0
Iron (mg)	4.9
Vitamin A (µg)	456.0
Thiamine (mg)	0.04
Riboflavin (mg)	0.12
Niacin (mg)	0.5
Ascorbic acid (mg)	89.0

Source: The Philippine Food Composition Tables, 1997. Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST).

Production Management

Varieties

There are three common types of alugbati: *Basella alba* with green stem and oval to almost round leaves; *Basella rubra* with red stems and green, oval to round leaves; and a third type, which is a hybrid of the two. The Institute of Plant Breeding of the University of the Philippines Los Baños (IPB-UPLB) has released two stopgap varieties in 1981 through its Germplasm Registration and Release Office: the red-stemmed 'Pulahan' and the green-stemmed 'Luntian.'

Soil and Climate Requirements

Alugbati grows well under full sunlight in hot, humid climates and in areas lower than 500 m above sea level. Growth is slow in low temperatures resulting in low yields. Flowering is induced during the short-day months of November to February. Alugbati grows best in sandy loam soils rich in organic matter with pH ranging from 5.5 to 8.0.

Land Preparation

Alugbati is grown in beds similar to upland kangkong. Prepare raised beds or plots 0.75–1.0 m wide and 20–30 cm high at any convenient length. Make sure that a good drainage system is in place.

Planting

Alugbati is usually planted in home gardens using cuttings. Use mature stem cuttings 20–25 cm long with at least 3 internodes. Soak the cuttings in water overnight or store in a damp, shady area for 1–2 days. Plant 2–4 cuttings at 15–20 cm between hills and 20–30 cm between rows. Water before and after planting, if the soil is dry. Mulch with grass clippings or rice straw.

For market gardens, sow seeds in rows or broadcast on well-prepared seedbeds. Transplant seedlings at 20 cm x 20 cm distance between plants at 3 weeks after sowing. Water regularly to ensure high survival rate.

Fertilization

Alugbati can grow even under conditions of moderate soil fertility, but production is increased with the application of fertilizers, especially the organic types. A soil test is highly recommended to determine available N, P, and K. The fertilizer requirement is calculated based on the target yield. Apply compost or manure at 3–5 tons/ha during plot preparation and sidedress once a month with manure or compost at 20–30 bags/ha. Tea manure and fermented plant juice (FPJ) may also be used.

To prepare tea manure, soak $\frac{3}{4}$ sack of dried cow or horse manure in a $\frac{3}{4}$ plastic drum (200-L capacity) of water. Soak for 5–7 days with frequent stirring. To prepare FPJ, mix three parts chopped plant shoots or banana trunk with one part raw sugar or molasses. Ferment mixture for 5–7 days. Dilute 1 part tea manure or FPJ to 20–40 parts water and drench on the plots or use as foliar fertilizer. Top dressing with inorganic fertilizer such as urea at $\frac{1}{2}$ –1 bag/ha after each harvest may also be done.

Trellising

For commercial production, grow alugbati without trellis. In home gardens, provide V-shaped trellis, semi-vertical, or vertical trellis to maximize space.

Watering

Alugbati requires plenty of water for optimum growth. During the dry season, use either furrow irrigation at

5–7 days interval or sprinkler irrigation daily. Provide drainage canals during the rainy season. Apply mulch to conserve soil moisture during the dry season and protect the soil during the wet season.

Weeding

Early weed control is necessary to give alugbati a head start. Mulch with plastic or grasses/rice straw to suppress weed growth. With high density planting, spot weeding is already sufficient.

Pest and Disease Management

Alugbati is generally tolerant to pests and diseases, which makes it easy to grow organically. However, it serves as a host to a number of insect pests such as leafminers and cutworms, which can be managed by regular harvesting. Root-knot nematodes can be minimized by crop rotation with corn and planting of marigold. Alugbati is also tolerant to leaf spot caused by *Colletotrichum* spp.

Harvesting

Alugbati is ready for harvest at 30–45 days after transplanting. Plants may be harvested either once (once over) or repeatedly, by priming. In once-over harvest, cut the stems or shoots close to the ground, or uproot the entire plant (if grown from seeds), then wash and tie in bundles. With multiple harvests, pick the shoots at weekly intervals. Harvest late in the afternoon to reduce water loss and keep the produce in a cool, shaded place.

Postharvest Handling

Alugbati wilts easily. A common market practice is to sprinkle the bundles with water or to wrap them in banana leaves to retain freshness. If harvested with the roots intact, keep the bundles fresh for up to 7 days by letting them stand in a basin of water. For home consumption, pack alugbati in styrofoam boxes then store in the refrigerator to keep them fresh for up to 14 days.