



DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY

KATURAY

PRODUCTION GUIDE



Katuray
Sesbania grandiflora (L.) Poir



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The KATURAY Plant

Katuray, (*Sesbania grandiflora* (L.) Poir) is a small soft wooded perennial tree (genus *Sesbania* of the Family: Fabaceae) growing to 12 m with a cylindrical trunk diameter of about 30 cms. It is commonly called sesbania, agatisesbania, West Indian pea and Vegetable hummingbird in English. In the Philippines it is locally known as *Katuray* (Tagalog, Ibanag, Pangasinan-se), *Diana* (Bisaya), *Katuday* (Ilocano, Ibanag), *Gauai-gauai* (Camarines, Capiz, Negros), *Kature* (Pampango) and *Kambangturi* (Sulu).

The bark of this species is light gray, corky and deeply furrowed and the trunk is soft and white. The ovate leaves are alternate, evenly pinnate, and 20-30 cm long. Leaflets are in 20-40 pairs, oblong, pale green 2.5-3.5 cm long. The inflorescence is short and the flowers are purple, cream or white. The pods swing freely, are slightly curved, and contain 10-25 seeds. The seeds are bean-shaped and about 2 mm x 3mm. The fruits look like flat, long and thin green beans. The tree thrives under full exposure to sunshine and is extremely frost sensitive.



Origin and Major Types

Katuray is believed to have originated either in India or Southeast Asia and grows primarily in hot and humid tropical areas of the world. The tree is indigenous from Malaysia to North Australia and cultivated in many parts of India.

Two varieties of *Sesbania grandiflora* are recognized including variety *grandiflora* which has white flowers and variety *coccinea* which has rose pink or red flowers.

Production trends

Sesbania grandiflora or Katuray is a native to Asian countries such as India, Malaysia, Indonesia and the Philippines. The tree is commonly seen growing on the dikes between rice paddies, along roadsides and in backyard vegetable gardens. It has been introduced and has become established in cultivation in Southern Florida, Hawaii, Jamaica, Mauritius, Central America, and South America.

As per record of Bureau of Agricultural Statistics (BAS), Katuray thrives in the Cordillera Autonomous Region (CAR) and Iloilo in the Philippines. However, there is no any data recorded in their data base in terms of production area and volume of production of katuray.

Uses/Importance

Culinary



The green pods are eaten by humans and livestock. The young leaves which contain 36% crude protein are also eaten by man and livestock, and reportedly increase the milk production of cattle. The leaves are made into leaf meal for feeds.

The fresh flowers of Katuray are eaten as vegetable in stews and salads in Southeast Asia, like Laos; Thailand; Java in Indonesia; Vietnam; and the Ilocos Region in the Philippines.

In the Thai language the flowers are called *dokkhae* and are used in the *Thai cuisine* both cooked in curries, such as *kaengsom* and *kaengkhae* as well as raw with *namphrik*.

The young pods are also eaten, along with the leaves. In Sri Lanka, agatileaves, known as *Katuramurunga* in Sinhala language, are sometimes added to *sudhuhodhi* or white curry, (a widely-

eaten, thin coconut gravy) believed locally to be a cure for canker sores. In India this plant is known as *agati* (Hindi), *agastya* (Kannada), *agise* (Telugu), and both the leaves and the flowers have culinary uses.

Medicine

All parts of Katuray are utilized for medicine in Southeastern Asia and India including preparations derived from the roots, bark, gum, leaves, flowers, and fruit.

In a number of cultures, the root is applied as a poultice for application to inflammation and fever. Powdered roots of *Sesbania grandiflora* var. *coccinea* are mixed in water and applied externally as a poultice or rub to rheumatic swellings.

The bark contains a tanning agent, fiber and an extract used medicinally for headache, diarrhea, anemia, cough and hypertension. Gum from the bark has water-proofing capabilities and can prolong the life of fishing tackle. Fishinglines are usually rubbed with the bark. It is considered as an astringent and is utilized for the treatment of smallpox, in the Philippines for the treatment of ulcers in the mouth and alimentary canal, in Java, for the treatment of thrush and infantile disorders of the stomach, and in Cambodia the pounded bark is applied to scabies.

The juice of the leaves is considered anthelmintic (expel parasitic worms (helminths) from the body, by either stunning or killing them)and tonic and is used to treat worms, biliousness, fever, gout, and itchiness, and leprosy. Malaysians apply crushed leaves to sprains and bruises. In Ayurvedic medicine (a system of traditional medicine native to the Indian subcontinent and a form of alternative medicine) the leaves are utilized for the treatment of epileptic fits and clinical research supports the anticonvulsive activity of Katuray leaves.

Reforestation and Cover Crop

Katuray has been used very effectively in Taiwan and Indonesia for reforestation of eroded slopes and rehabilitation of depleted agricultural lands. It is used as support for pepper vines and betel as windbreaks, light shade and live fencing; and for beautification.

It is grown as a cover crop or green manure during the summer months in Yuma. In the process of growing cover crops *Sesbania* while green or soon after flowering is incorporated in the soil for the purpose of soil improvement.

Nutritional Properties

Katuray contains arginine, cysteine, histidine, isoleucine, phenylalanine, tryptophan, valine, threonine, alanine, asparagine, aspartic acid, oleanolic acid, galactose, Rhamnose and glucuronic acid. The flowers are rich in nutrition as listed below:

Table 1. Nutritional values of *katuray*flowers
per 100 grams edible portion

Nutrients	Boiled
Water (g)	91.02-94.49
Protein (g)	0.008
Fat (g)	1.22
Total Carbohydrates	0.36
Fiber (g)	6.87
Ash (g)	0.29-0.53
Calcium (mg)	0.05
Phosphorous (mg)	0.29-0.53
Iron (mg)	0.18

Crop varieties



The traditional or locally known varieties of katuray tree identified in the Philippines were those of the white (*grandiflora*) and rose pink or red (*coccinea*) flowers. The flowers are similar in shape and arrangement to Pea flowers with five petals that are differentiated into a standard, wing, and keel petals. The standard petal is usually upright, the wing petals spread out on either side of the flower, and the keel is boat-shaped and in this species is curved down and away from the flower.

Cultivation

Katuray is native to tropical Asia and is widespread in India, Malaysia, Indonesia, and the Philippines where it is found in tropical dry and moist forest from sea level to 800 m.

It is commonly found in disturbed and agricultural environments including along roadsides, on dikes between rice paddies, and in backyard vegetable gardens. It has been introduced and has become established in cultivation in Southern Florida, Hawaii, Jamaica, Mauritius, Central America, and South America. Agati is frost-sensitive and requires annual precipitation between 4.8-22.5 dm and annual temperatures of 24.3-26.7°C.

Katuray bears flowers during its second year of growth. It may be pollinated by birds. Following pollination seed development generally takes 40 days.



Propagation

It can be propagated by cuttings, seedlings, direct seeding, and aerial sowing.

Climate and soil requirements

The tree grows where there is good soil and hot humid temperature. It's a tropical plant and dies in snow and cold weather. It is commonly grown throughout the lower elevation of the Philippines.

Land preparation and planting

The land has to be cultivated before planting. Holes are dug at 5m x 5 m distance. For seedlings, the holes must be at least 45 cm deep and 30 cm in diameter. For cuttings, the poles are deeper. Irrigation water is necessary for newly planted seedlings, not for established trees. Mulching can serve as compost and reduce water loss.

Fertilization

Organic fertilizer (Compost) and complete fertilizer (14-14-14) are applied during planting as basal. Use complete fertilizer for continued growth and higher percentage of survival. Succeeding fertilization should be done on the onset of the rainy season and during September and October or before the end of the rainy season.

Irrigation

Water the trees frequently especially during the first planting season to help develop the root system. For mature trees, water frequently especially when flowering. Irrigation can be complemented with mulching, good vegetation, or by shallow cultivation.

Weed Management

Make a periodic weeding (ring weeding) around the plant to free from vegetation during its first growing months and will last after 1 year. Weeding should be done during wet season and not during dry spell as it resulted to rapid evaporation of soil moisture.

Crop Protection

Katuray is susceptible to severe pest attacks from leaf webbers, leaf feeders and stem borers.

A. Insect Pests

1. **Sesbania stem borer** (*Azygophleps scalaris*) has caused occasional damage in India. It is a moth in the Cossidae family found in Pakistan, India, China, Sri Lanka, Myanmar, Thailand, Cambodia, Bangladesh, Mauritania, Somalia, Senegal, Côte d'Ivoire, Ghana, Nigeria, the Democratic Republic of the Congo, Kenya, Angola, Namibia, Tanzania, and Sudan.



The larvae tunnel through the main stem of the host plant and also feed on the roots and eat the pith region without damaging the epidermis.

2. Larvae of the **seed chalcid** *Bruchophagus mellipes* infests and damages seed.

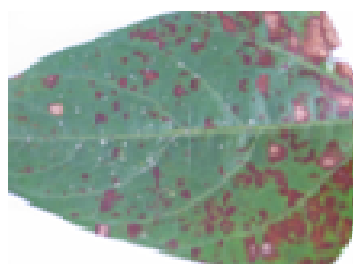


B. Diseases

1. *Katuray* is highly susceptible to the **root-knot nematode** *Meloidogyne incognita* a type of roundworm, in the family Heteroderidae. It is an important plant parasite as it prefers to attack the root of its host plant once inside, the larva establishes a feeding site, which causes a nutrient-robbing gall. If root-knot nematodes become established in deep-rooted, perennial crops, control is difficult and options are limited. Root-knot nematode damage results in poor growth, a decline in quality and yield of the crop and reduced resistance to other stresses (e.g. drought, other diseases). A high level of damage can lead to total crop loss. Nematode-damaged roots do not use water and fertilizers as effectively, leading to additional losses for the grower.



Root-knot nematodes (*Meloidogyne* spp.) can be controlled with a biocontrol agent *Paecilomyces lilacinus*, *Pasteuria pentrans*.



2. It is also susceptible to **grey leaf spot** caused by *Pseudocercospora sesbaniae*. It attacks the leaves; the first symptoms are yellow spots on the upper surface. The under surfaces have a whitish bloom, which becomes grey and finally black as the leaves mature.
3. **Sesbania mosaic virus** is reported in India and is spread from infected growing trees.

Young plants are very susceptible to nematodes, the plants tend to wilt. Seeds (on the trees or in storage) are readily infested by weevils through feeding in the seeds.

For the control use selective insecticides with proper dosage and recommendation as well as good sanitation of the area.

Harvesting

Harvesting is usually done manually or with the use of special pole to hook the flowers when trees are tall. Individual flowers, flower buds and young pods, or the whole bunch of inflorescencemay be picked at one time. Pods should be harvested immediately when mature.

Establishment of a One-hectare Katuray Production

1. Equipment and Tools

Quantity	Item	Unit price/(P)	Cost
2 unit	Knapsack sprayer	2,500.00	5,000.00
3 units	Hoe	300.00	900.00
2 unit	Grass cutter	15,000.00	30,000.00
6 units	Bolo	200.00	1,200.00
4units	Spade	500.00	2000.00
1 unit	Weighing scale	1,200.00	1,200.00
Sub-total			40,300.00

2. Supplies and Materials

Quantity	Item	Unit price/(P)	Cost
3500 pcs	katuray cuttings	10.00	35,000.00
1 roll	Plastic twine	120.00	120.00
2pcs	Meter stick	50.00	100.00
5 tons	Organic fertilizer	1,200.00	1,200.00
5 bags	14-14-14 (complete fertilizer)	1000.00	5000.00
5 bags	46-0-0 (Urea)	1000.00	5000.00
1 liter	Insecticide	1,200.00	1,200.00
1 kg	Fungicide	1,500.00	1,500.00
100 liters	Fuel	50.00	5,000.00
Sub-total			54,120.00

3. Labor

Activity	Man-Day (MD)	Unit ost/(P)	Cost(P)
Plowing	8 MMD	500.00	4,000.00
Harrowing 2x	8MMD	500.00	4,000.00
Manure Application	2MD	250.00	500.00
Planting	5MD	250.00	1,250.00
<i>Pesticide and Fertilizer application</i>			
Basal	2MD	250.00	500.00
Side-Dress	5MD	250.00	1,250.00
Spraying	10MD	250.00	2,500.00
Weeding	10MD	250.00	2,500.00
Irrigation/Watering	20MD	250.00	5,000.00
Harvesting	50MD	250.00	12,000.00
Miscellaneous	40MD	250.00	10,000.00
Sub-total			43,500.00

Labor cost at Php 250.00/MD and 500 man machine per day

Summary of Cost of Establishment for a hectare of Katuray

Particulars	Amount
Equipment and Tools	40,300.00
Supplies and materials	54,120.00
Labor	43,500.00
Total	139,920.00

Estimated Yield for a hectare of Katuray

Harvest	Harvestable flowers (kg)	Gross Income	Production cost (PhP)	Net income	ROI
1 st harvest	833.5	12,502.5	?	?	?
2 nd harvest	1,667	25,005.0	?	?	?
3 rd harvest	3,334	50,010.0	?	?	?
4 th harvest	5,001	75,015.0	?	?	?
5 th harvest	7,501.5	112,522.5	?	?	?
Total	18,337.00	275,055.0	139,920	135,135	96.5 %

Harvest	Average harvestable flowers/tree (kg)	No. of trees/hectare	Production of marketable flower/hectare (kgs)	Gross income (P)
1 st harvest	0.25	3,334	833.5	12,502.5
2 nd harvest	0.5	3,334	1,667	25,005.0
3 rd harvest	1.0	3,334	3,334	50,010.0
4 th harvest	1.5	3,334	5,001	75,015.0
5 th harvest	2.25	3,334	7,501.5	112,522.5
Total			18,337.00	275,055.0

Marketable flower at 15 peso/kilo; Planting distance = 1.5mX2.0m; Number of plant /hectare = 3,334

Famous Filipino Recipes Using Katuray:



Katuray Flower Salad (Salade Fleur Katuray)

Assemble these supplies:

- 3 cups blanched katuray flowers
- 1 onion Salt to taste
- 3 tablespoons gluten, fried
- 3 tablespoons French dressing

Steps in preparation:

1. Remove the unnecessary parts of the katuray flower.
 2. Pour hot water and press to remove the water.
 3. Arrange on a salad plate and pour French dressing.
- Garnish with onion and fried gluten strips.

Bulanglang

- 3 cups rice washing (water used for rinsing rice)
- 2 tablespoons bagoongnaisda

- 3 medium tomatoes, chopped
- ½ medium kalabasa (squash), peeled and cut into chunks
- 1 cup sitaw (string beans)
- 1 cup sigarilyas (winged beans)
- 6 pieces bonito ampalaya (small bitter gourd)
- 12 to 15 pieces bataw (hyacinth bean)
- 6 round eggplants
- 6 pieces okra
- 1 cup himbabao
- 1 cup bunga ng malunggay, peeled and cut to 1-inch lengths
- 10 to 12 pieces bulaklak ng katuray, pistil removed
- 3 to 4 pieces fried bangus (milkfish) steaks

Procedure:

1. Place the rice washing in a large pot. Add bagoongnaista and tomatoes; bring to a boil.
2. Put in the rest of the vegetables in the following sequence: Add kalabasa and cook for about 5 minutes. With about 2 to 3 minute intervals and stirring in between, add sitaw, sigarilyas, ampalaya, bataw, eggplants, okra, himbabao, bunga ng malunggay, and bulaklak ng katuray.
3. Add fried bangus on top of the vegetables. Cover and simmer for 2 minutes.



Serves 4 to 5

Prep Time 15 minutes

Cooking Time 18 to 20 minutes

ADOBONG KATUDAY/KATURAY

Ingredients:

- 1/4 kg. katuday (boiled for 1-2 minutes)
- 3-4 tbsp. soy sauce
- 2 tbsp. vinegar/sukangiloko
- 1/2 tsp. crushed black pepper
- 1 medium sized onion – sliced finely
- 3 cloves garlic – crushed and minced
- 2 tbsp. canola/vegetable oil for sauteing
- pinch of magic sarap

Procedure:

- 1) Saute garlic until golden brown, followed by the onion.
- 2) Add the boiled katuday and saute for about 30 seconds.
- 3) Add the soy sauce, vinegar, pepper and a pinch of magic sarap and mix until thoroughly blended.
- 4) Simmer for 2 minutes and ready to serve.

References

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