



DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY

TALINUM

PRODUCTION GUIDE



Talinum
Talinum fruticosum



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https://www.google.com.ph/search?q=Meloidogyne+spp&client=firefox-a&hs=MjW&rls=org.mozilla:en-US:official&source=lnms&tbm=isch&sa=X&ei=DD6xUqvEFISgigfe44GIDw&ved=0CAkQ_AUoAQ&biw=1600&bih=797

https://www.google.com.ph/search?q=white+leaf+spot&client=firefox-a&hs=rrp&rls=org.mozilla:en-US:official&source=lnms&tbm=isch&sa=X&ei=FiexUpPPHYquiAfA7YCgDg&ved=0CAkQ_AUoAQ&biw=1600&bih=797#facrc=_&imgdii=_&imgsrc=eZJWoKzuEVORLM%3A%3BaW92iZRC32ZVwM%3Bhttp%253A%252F%252Fwww.clemson.edu%252Fextension%252Fhgic%252Ftyk%252F2010%252Fimages%252Ftyk12_lichenized.jpg%3Bhttp%253A%252F%252Fwww.clemson.edu%252Fextension%252Fhgic%252Ftyk%252F2010%252Ftyk12.html%3B300%3B304

<http://www.ijppsjournal.com/Vol5Suppl2/6735.pdf>

http://www.underutilized-species.org/species/species_details.asp?id=555

<http://www.yummy.ph/recipe/stir-fried-talinum-tops-with-oyster-sauce>

Reitsma, J. ; Sloof, W. C. *Chronica naturae* 1947 Vol. 103 No. 6 pp. 92-94 pp. Brachysporiosis of *Talinum triangulare* (Jacq.) Willd. <http://cabdirect.org/abstracts/19471101182.html;jsessionid=1AF823BB55A6147E3FFE15240343658E>

Oluwalana, Isaac Babatunde; Jerome Ayokunle Ayo; Micheal Ayodele Idowu; and Sunday Abiodun Malomo. 2011. Effect of drying methods on the physicochemical properties of waterleaf (*Talinum triangulare*). *Int. J. Biol. Chem. Sci.* 5(3): 880-889, June. http://www.google.com.ph/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0CEcQFjAD&url=http%3A%2F%2Fwww.ajol.info%2Findex.php%2Fijbcs%2Farticle%2Fdownload%2F72167%2F61104&ei=fbYWU5HIKlaYiAeq74HICw&usg=AFQjCNH5VbNApKWIB6RDEXdMUBtwxCY8Sw&sig2=6s_2PZbH9VnWH4EDLgiCCw&bvm=bv.62286460,d.aGc

Talinum Dip



Method of Preparation:

Blend together 2 cups yogurt (I used my home-made low-fat yogurt), 1 packet of soup mix (your choice of flavor; you can also use "ginisa" mix), ½ cup chopped spring onions, a few cloves of garlic and about 1 ½ - 2 cups of chopped talinum leaves (previously blanched, and thoroughly drained). Season

with salt and pepper to taste. You may add grated cheese for added flavor. Refrigerate for a while to allow the flavors to come together.

The dip goes well with corn chips, slightly toasted tortillas or pita bread, or vegetable sticks.

References

Backyard Gardening Technoguide.Philippine Council for Agriculture, Forestry and Natural Resources Research and development Center (PCARRD) pp 18-19.

DA-NAFC Sub-Committee on Fruits and Vegetables.Booklet on Indigenous Vegetables. 52p

http://database.prota.org/PROTAhtml/Talinum%20triangulare_En.htm

<http://kelakitchen.wordpress.com/2010/04/23/vegging-in-baguio-city/>

<http://lessmeatdiet.blogspot.com/2011/04/talinum-dip.html>

<http://plants.usda.gov/core/profile?symbol=TATR2>

<http://simplengvegetarian.blogspot.com/2011/06/philippine-spinach-talinum-fruticosum.html>

<http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?36216>

https://www.google.com.ph/search?q=leaf+mosaic&client=firefox-a&hs=o5q&rls=org.mozilla:en-US:official&source=lnms&tbn=isch&sa=X&ei=eZmxUpTFE6ijigfn-ICQDw&ved=0CAkQ_&biw=1600&bih=797#facrc=_&imgdii=_&imgsrc=OkfMjTkNOMrOrM%3A%3BF45WrIA4IUUVXM%3Bhttp%253A%252F%252Ffold.padil.gov.au%252Fpbt%252Ffiles%252Fuall%252Fpbt30-symptom-02.jpg%3Bhttp%253A%252F%252Ffold.padil.gov.au%252Fpbt%252Findex.php%253Fq%253Dnode%252F20%2526pbtID%253D152%3B419%3B452

The TALINUM Plant

Description /origin/types



Talinum, *Talinum triangulare* (Jacq.) Willd (synonym of *Talinum fruticosum* (L.) Juss.) otherwise known as waterleaf, cariru, Surinam purslane, Philippine spinach, Ceylon spinach, Florida spinach and potherb fame flower is an erect perennial herb herbaceous perennial herb belonging to the family *Portulacaceae* with swollen

roots and obtuse-angular to terete (cylindrical but usually slightly tapering at both ends, circular in cross section, and smooth-surfaced), glabrous, succulent stems. It is popularly known as Waterleaf because of its high content of almost 90.8% per 100 gm of edible leaf. It is locally known as Galaghati (Subanon), Biala (Marinduque), and Talinum (Tagalog, Ilokano).

The plant can stand 30-100 cm tall, branches with 2 lateral, basal buds. Leaves are spirally arranged to nearly opposite, often crowded at the top of the branches, indistinctly or shortly petioled; leaf-blades usually spatulate, 3-15 cm by 1-6 cm, entire and succulent, obtuse to rounded and occasionally notched at the apex. Inflorescence are terminal, corymboidthyse, 5-30 cm long, with 2-5 erect, sharply triangular axes, each 6-25-flowered; long peduncled. Flowers are bisexual, 0.5-2.5 cm in diameter, pedicels elongate after anthesis. Sepals 2, free, green, persistent. It has 5 petals which are obovate, up to 10 mm by 4 mm, and pink in color. The stamens amount to 20-40. The ovary is superior, style 2-3-fid. Its fruit is a dehiscent capsule, ellipsoid to globular, 4-7 mm long, 2-3-valved and elastically dehiscent, yellow. Seeds are numerous, compressed globose-reniform, 0.8-1.2 mm long, granulate, glabrous and shining black.

T. triangulare is fast-growing, and once established it easily reseeds itself. It flowers early and year round, and is mainly self-pollinating. Flowers are open in the morning. It could be most easily distinguished from *T. paniculatum* (Jacq.) Gaertner (a pantropical weed, primarily used as vegetable in South-East Asia) by its sharply triangular flowering axes (terete in *T. paniculatum*).

Origin

Waterleaf is a cosmopolitan weed common throughout the humid tropics. It has been recorded for several countries in West

and Central Africa. It is claimed to have a South American origin, but an African origin may also be possible, as several *Talinum* species including the closely related *Talinum portulacifolium* (Forssk.) Schweinf occur in Africa.

Aside from the Philippines, it is also found in other countries like Malaysia, Thailand, Taiwan and Indonesia.

Production trends

The crop which is grown in West Africa, South Asia, Southeast Asia, and warmer parts of North America and South America, originated from tropical Africa. It is an all-season vegetable which was long considered a vegetable for the poor and was thus not highly valued. Since the increased popularity of eru (*Gnetum* leaves) in Cameroon and eastern Nigeria from around 1990 onwards, the demand for waterleaf has steadily risen and is now extensively grown in many countries in Asia, South America and West Africa. In Nigeria, it is widely cultivated and consumed in the southern part, particularly in Cross River and Akwalbom States. The demand for waterleaf is high in these states, and it is therefore a major source of income for farmers. Its high demand is attributed to its nutritional value and importance as a “softener” when cooking the common fibrous leafy vegetables. Waterleaf is now a common product on local markets of Nigeria, but no data on production and trade are available. The increasing demand for waterleaf due to urbanization has therefore pushed farmers into small and medium scale production of waterleaf in Akwalbom State.

Throughout the Philippines, *talinum* is adaptable. It is best suited in a wet tropical environment with partial shade. However, as per record of Bureau of Agricultural Statistics (BAS) there is no any data recorded in their data base in terms of production area and volume of production of *talinum*.

Uses/Importance

Waterleaf is eaten as a vegetable throughout the tropics including many countries in West and Central Africa; it is cultivated in Nigeria and Cameroon. The leaves and shoots are usually consumed as cooked (boiled or steamed) vegetable. They are rather soft and watery and should not be cooked for long time. *Talinum* is also added raw to salads in the Sudanese cuisine in West Java.

It is a mucilaginous vegetable with high oxalate content and is rich in saponins. Cooking or blanching removes nearly most of the soluble oxalate. Furthermore, the leaves serve as sauce, condiment, spice, softening of soups and for flavouring in foods.

7. Mix the blanched talinum, tomatoes, and shallots in a bowl. Season with salt.

Stir-fried Talinum Tops with Oyster Sauce

Prep Time 10 mins **Cooking Time** 8 mins

Ingredients:

- 45 grams (or 3 tablespoons) oyster sauce
- 1/4 cup water
- 1 teaspoon sugar
- 1/2 tablespoon cornstarch or cassava starch
- 1 head garlic, chopped
- 1/4 kilo talinum tops
- 1 small carrot, julienned
- 3 tablespoon peanut oil (if not available, use vegetable oil)

Method of Preparation:

1. In a small bowl, combine the oyster sauce, water, sugar, and cornstarch; mix well and set aside.
2. Heat oil in wok. Sauté garlic until golden brown. Add in talinum tops and carrots.
3. When the leaves start to wilt, add in the oyster sauce. Stir-fry talinum tops for 1 minute; mix well. Serve immediately.



Talinum and Mango Salad in Sweet Sugar Cane Vinaigrette Dressing



Method of Preparation:

Just mix the talinum leaves, cherry tomatoes, cucumber, mango slices together and sprinkle some lemon juice on top. Then just add the vinaigrette dressing (Del Monte sugar cane vinegar, pepper and some brown sugar)

Spinach with Shrimp

Method of Preparation:

Saute minced garlic, sliced onions and ginger in olive oil and then add the shrimps. Once the shrimps turn a bit pink, add the spinach leaves and cook it for another 2 minutes.



Fuel and oil	6,000
Packaging Materials	4,000
Miscellaneous (e.g. pail, gloves, etc.)	4,000
Subtotal	42,000
Interest on Production Loan at 21% per annum	51,368.10
Total (Variable Costs)	266,368.10
FIXED COSTS	
Land rental	25,000
Depreciation	
Sprinklers (5 pairs)	2,500
Knapsack sprayer (1 unit)	500
Scythe (5 pieces)	100
Hoe (5 pieces)	500
Shovel (3 pieces)	360
Plastic drum (2 pieces)	650
Total (Fixed Costs)	29,610
TOTAL COSTS	295,978.10
GROSS INCOME	
Regular season (80,000 bundles/ha at P10/bundle)	800,000
Offseason (40,000 bundles/ha at P15/bundle)	600,000
NET INCOME	
Regular season	504,021.90
Offseason (40,000 bundles/ha at P12/bundle)	304,021.90

Talinum Recipes

Talinum Salad

Ingredients:

3 cups raw talinum	2 to 3 ripe tomatoes
2 shallots	water for blanching
salt to taste	

Method of Preparation:

1. Pick young talinum shoots from your garden. The stalk should be easy to pinch off. If there's some resistance, it may already be too old. So move up the stalk until it breaks off easily.
2. Wash the talinum thoroughly and remove any flowers and seeds. If some of the stalks are too hard, remove the hard portions. Detach the leaves from these hard portions. You can still use the leaves for this recipe.
3. Boil enough water in a pot to blanch the talinum. You have to be ready with tongs or a slotted spoon to fish out the talinum as soon as they wilt.
4. Remove the talinum from the water and dump them in a bowl of cool water to stop the cooking process. Set aside.
5. Cube the ripe tomatoes. Set aside.
6. Peel the shallots and slice thinly. Set aside.

Talinum, with its slimy texture, is a popular vegetable in many African countries. It spreads easily and is becoming an agricultural weed. Agronomic research and breeding work should be done on this vegetable.

The leaves of this plant have been implicated medically in the management of cardiovascular diseases like stroke and obesity. According to traditional medicine the leaves of waterleaf are used to treat polyuria, internal heat, measles, gastrointestinal disorders, hepatic ailments and cancer. In India, diabetics and invalids use the leaves of *T. triangulare* as a substitute for *Amaranthus gangeticus*.

In Southeast Asia, waterleaf is sometimes planted as an ornamental pot plant or an edging plant in gardens. In South America, decoctions are used for painful eyes and to aid recovery from blows and falls.

Nutritional/Medicinal Properties

The plant has a rich content of crude protein, total lipids, essential oils, cardiacycosides, flavonoids and polyphenols. Preliminary phyto-chemical studies on *T. triangulare* revealed the presence of omega-3-fatty acids and high levels of essential nutrients like minerals (such as calcium, potassium and magnesium), soluble fibres (such as pectin) and vitamins (such as C, α and β tocopherols and β-carotene) which are required for growth and development. The leaf extracts of waterleaf have been proved to possess remarkable antioxidant activity and high kaempferol content.

Nutritional values per 100 grams edible portion of talinum.

Nutrients	Boiled
Water (g)	90-92
Protein (g)	1.9-2.4
Fat (g)	0.4-0.5
Total Carbohydrates	3.7-4.0
Fiber (g)	0.6-1.1
Ash (g)	2.4
Food energy (cal)	52
VitB1 (I.U.)	0.08
VitB2 (I.U.)	0.18
Vit C (mg)	31
Niacin (mg)	0.30
Calcium (mg)	90-135
Iron (mg)	4.8-5.0
Carotene (I.U.)	3
Energy value (kJ)	105

Crop varieties

Talinum is comprised of about 40 species, most of them found in Mexico and southern United States, and 7 species in tropical Africa. *Talinum triangulare* is one of them and is sometimes confused with *Talinum portulacifolium*, but the latter differs by its paniculate inflorescence with terete axis, sepals not prominently veined and smooth seeds.

There is no known local variety of talinum identified in the Philippines.

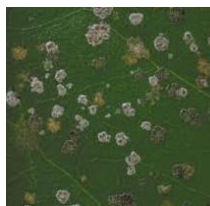
Cultivation

Propagation

Talinum or waterleaf is usually propagated by seed. However, small seeds are difficult to collect because fruits readily or easily shatter. It can also be propagated using cuttings of 15-20 cm long which are taken from mature stems.

Planting

Seeds are planted by broadcasting, direct seeding or sowing in a seedbox and then, transplanting. The delicate seedlings must be shaded and mulched. Plant densities vary at 10-25 plants/m² depending on the harvesting method and crop duration.



White Leaf Spot

Pest and Disease Management

Waterleaf is one of the few vegetables that are hardly affected by pests or diseases. The most common diseases are **white leaf spot** (*Pleospora* spp.) and **leaf mosaic** caused by an unknown virus.

A so-far unidentified blight causes dark-green spots on the underside of the leaves. The spots later turn brown or reddish on the upper side of the leaves and eventually become black, rendering the shoots unsaleable. There is no known treatment other than eliminating affected plants at an early stage.



Leaf Mosaic

Brachysporiosis disease of *Talinum* leaves [used for spinach and salads] caused by *Brachysporium robustum* n.sp. was first observed in the experimental vegetable garden at Moeara near Buitenzorg (Bogor) in Indonesia. The first symptoms are diminutive, slightly raised, red-brown spots scattered over the mature leaves, and usually first visible on the lower surfaces of the leaf. The spots

may enlarge to circular patches about 5 mm. in diameter, the centre becoming translucent, parchment-like and brittle, often making holes. When stalks and petioles are attacked they show elongated lesions. Sporulation occurred only in a moist chamber.

Waterleaf is a host of root-knot nematodes (*Meloidogyne* spp.).



Root knot

Harvesting

Harvesting starts about 6-8 weeks after sowing, either by uprooting or by cutting the young tops. This may be done 15-20 times a year at two-week intervals. However, it is usually advisable to renew the planting after about six months. Yields have been estimated at 10 kg/m² per year. Seed yields are low and amount to 100-300 kg/ha. Seed production in untopped plants reaches a peak about 10 weeks after sowing.

Postharvest

Waterleaf could be best dried using oven drying method at 60 °C, in order to retain much of the nutritional and sensory properties.

Cost of Production and ROI per hectare

Items	Amount (P)
VARIABLE COSTS	
Labor (P250/man-day (MD))	
Clearing (20 MD)	5,000
Bed preparation (20 MD)	5,000
Manure application (10 MD)	2,500
Sowing (2 MD)	500
Transplanting (20 MD)	5,000
Topdressing (20 MD)	5,000
Spraying (20 MD)	5,000
Weeding (30 MD)	7,500
Irrigation (300 MD)	75,000
Harvesting/sorting (240 MD)	60,000
Miscellaneous (e.g. hauling, repairs, etc.) (10 MD)	2,500
Subtotal	173,000
Materials	
Seeds (3 kg)	1,500
Manure (40 sacks)	10,000
Fertilizer	
14 - 14 - 14 (6 bags)	7,500
46 - 0 - 0 (20 bags)	3,000
Pesticides	6,000