# *Antidesma bunius*

## Scientific Name

***Antidesma bunius* (L) Sprengel.**

## Synonyms

*Antidesma andamanicum Hook.f., Antidesma bunius* Spreng. var. *cordifolium* (C. Presl) Müll. Arg., *Antidesma bunius* var. *floribundum* (Tul.) Müll.Arg. *Antidesma bunius* (L.) Spreng. var. *genuinum* Müll.Arg., *Antidesma bunius* var. *pubescens* Petra Hoffm., *Antidesma bunius* var. *sylvestre* (Lam.) Müll.Arg., *Antidesma bunius* var. *wallichii* Müll.Arg., *Antidesma ciliatum* Presl, *Antidesma colletii* Craib, *Antidesma cordifolium* Presl, *Antidesma crassifolium* (Elmer) Merr., *Antidesma floribundum* Tul., *Antidesma glabellum* K.D.Koenig ex Benn., *Antidesma glabrum* Tul., *Antidesma retusum* Zipp. ex Span., *Antidesma rumphii* Tul., *Antidesma stilago* Poir. nom. illeg., *Antidesma sylvstre* Lam., *Antidesma thorelianum* Gagnep., *Bunius sativus* Rumph., *Sapium crassifolium* Elmer, *Stilago bunius* L.

## Family

Phyllanthaceae also placed in Euphorbiaceae.

## Common/English Names

Bignay, Black Currant Tree, Chinese Laurel, Currant Tree, Currentwood, Nigger's Cord, Salamander Tree, Wild Cherry.

## Vernacular Names

***Australia***: Moi-Kin, Chunka (Queensland Aboriginal);
***Chinese***: Wu Jue Cha, Wu-Yuer-Cha, Wu-Jueh-Ch'a;
***Dutch***: Salamanderboom, Woeni;
***French***: Antidesme;
***German***: Lorbeerblättriger Flachsbaum, Salamanderbaum;
***India***: Bor-Heloch, Bor Heloch (Assamese), Bol-Aborak, Bol Aborak (Garo), Himalcheri (Hindu), Kareekomme, Naayikomme, Naayikoote, Nayikute, Kari Komme, Naikuti, Naayi Kote (Kannada), Dieng Soh Silli (Khasi), Mail-Kombi, Karivetti, Cerutali, Cherutali, Cheruthali, Noelitali, Nulitali, Nulittali (Malayalam), Amati, Aamatee, Bhumy-Sadpay (Marathi), Nolaiali, Nolaidali, Nolaitali, Nolaittali, Noyilatali, Neralaitali (Tamil), Janupullari, Janu Polari, Anepu, Aanepoo, Jaanupolaari (Telugu);
***Indonesia***: Buah Monton (Batak, Sumatra), Bune (Bima, Timor), Bunih (Buginese, Sulawesi),

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Attor (Flores), Takuti (Gorontalo, Sulawesi), Buneh, Boeni, Wuni, Buni (Java), Bernai, Bonia, Menerk, Njam (Lampung, Sumatra), Burneh (Madurese), Bune Tedong (Makassar, Sulawesi), Buni (Malay), Katakuti, Kutikata (Malay, Maluka), Kiti-Kata (Malay, Timor), Rambai Tiris (Singkep), Barune, Huni, Huni Gede, Huni Wera, Wuni (Sundanese), Kiti-Kata (Timor), Barune (Sumbawanese), Guna, Haju Wune, Wuler (Lesser Sunda Islands);
***Japanese***: Buni NoKi, Nanyou Gomishi, Saramando No Ki;
***Laotian***: Kho Lien Tu;
***Malaysia***: Buni, Berunai, Bras-Bras Hitam;
***Nepal***: Himalcheri;
***Philippines***: Dokodoko, Mutagtamanuk (Bagobo), Bignay, Bignai (Bikol), Bugney, Bugnay, Bugnei, Bungai (Bontok), Bignai, Bignay, Bugnay, Bungai (Cebu Bisaya), Vunnay, Bugnay, Bundei, Vunnai, Bungai, Paginga (Ibanag), Bugney, Bugnei (Ifugao), Bugnay, Bungai (Iloko), Bignay, Bignai, (Mangyan), Isip (Pampangan), Bungai, Bugnay (Panay Bisaya), Oyhip, Bignai, Bignay, (Sambali), Bignay, Bignai, Bignay-Kalabaw (Tagalog);
***Portuguese***: Candoeira;
***Spanish***: Bignai;
***Thai***: Ba Mao Ruesi, Maeng Mao Khwai, Mao Chang, Mao Luang, Ma Mao Dong, Ma Mao Luang;
***Vietnamese***: Choi Moi, Liên Tu.

## Origin/Distribution

It is difficult to establish the natural geographic distribution of the species as it is impossible to distinguish truly wild occurrences. It seems to be absent in Peninsular Malaysia (except Singapore) and nearly absent in Borneo. It is common in the wild from the lower Himalayas in India, Sri Lanka, and southeast Asia (but not Malaya) to the Philippines, PNG, Solomon Islands and northern Australia. It is cultivated in India (incl. Andaman and Nicobar Islands), Sri Lanka, southern China (Hong Kong, Hainan and Guangdong province), Myanmar, Laos, Vietnam, Thailand, Sumatra, Singapore, Borneo, Java, Philippines, Sulawesi, Lesser Sunda Islands, Moluccas, New Guinea, Christmas Islands (Indian Ocean, Australia), Tahiti, Hawaiian Islands, Cuba, Honduras and Florida. It is an abundant and invasive species in the Philippines; rarely cultivated in Malaysia, and grown in every village in Indonesia where the fruits are marketed in bunches.

## Agroecology

The tree is not strictly tropical for it has proved to be hardy up to central Florida. It thrives from sea-level up to 2,100 m altitude. In its natural area, it occurs in a wide range of habitats that include: wet evergreen forest, dipterocarp forest, teak forest, on river banks, at forest edges, along roadsides, in bamboo thickets, in semi-cultivated and cultivated areas, in shady or open habitats usually in secondary but also in primary vegetation. It thrives best in full sun and on a wide range of soils from sand, loam or clay and on (coral) limestone or granite bedrock. It is tolerant of infertile soil and occasional waterlogging.

## Edible Plant Parts and Uses

Ripe fruits are eaten fresh or cooked. Acid green fruits are used as flavoring in fish soup dishes. The fruits are also made into jam, preserves or are used in combination with other fruits, because of their high pectin content to make jelly. The fruits are also utilised in the production of syrup, soft drinks, wine, liqueur and brandy or are used in sauces for fish dishes. The pulp can be used for desserts like cakes, bavarois or ice cream. The young, tender leaves are eaten with rice in Indonesia and the Philippines. The leaves are often combined with other vegetables as flavouring. The leafy shoots are used for tea in China.

## Botany

An evergreen, dioecious, perennial tree, 15–30 m high with a straight trunk, bole diameter of 20–85 cm, yellow brown bark, terete branchlets

glabrous to densely ferrugineous-pubescent, usually branching near the base with a dense and irregular crown (Plates 1 and 2). Leaves are distichous with petiole furrowed and short, glabrous to ferrugineous-pubescent. Stipules are linear-lanceolate, pubescent and caduceus. The leaf lamina is oblong to elliptic, more rarely obovate, base obtuse or rounded to shallowly cordate, apex acuminate, obtuse or acute, entire, coriaceous, glabrous, glossy green above, yellowish green adaxially with 5–10 pairs lateral veins. Staminate inflorescences are 6–15 cm long, axillary, consisting of 3–8(–14) branches with deltoid to elliptic, pubescent bracts. Staminate flowers measure 3–4 by 3 mm, sessile; calyx, cupular, sepals 3 or 4, green, glabrous to ferrugineous-pubescent on both sides with fimbriate margin; disc variable, stamens 3 or 4, 2–3 mm long, exserted; pistillode clavate to cylindrical and short. Pistillate inflorescences are 4–17 cm long, axillary, simple or 4-branched, axes glabrous to pubescent with deltoid, short, pubescent to pilose bracts. Pistillate flowers are 2.5–3 by 1.5 mm; pedicels 0.5–2 mm long, pubescent to glabrous; calyx 1–1.5 by 1.5 mm, cupular, sepals 3, green, glabrous to pilose on both sides, ovary ellipsoid, glabrous to very sparsely pilose, style terminal to subterminal with 3–6 stigmas. Infructescences are 10–17 cm long, robust and fruiting pedicels 2–9 mm long, pubescent to glabrous. Fruits are globose or ovoid, glabrous, 5–11 mm by 4–7 mm, green turning yellow to pink to red and bluish-violet when ripe (Plates 1, 2 and 3), juicy with a single, straw-coloured, compressed, oval, 6–8 mm by 4.5–5.5 mm, ridged or fluted, very hard kernel.

**Plate 1** Bignay foliage and fruit at various stages of development

**Plate 2** Clusters of immature bignay fruit near top of irregular canopy

**Plate 3** Close-up of developing bignay fruit cluster

## Nutritive/Medicinal Properties

Nutrient composition of bignay fruit per 100 g of edible portion based on analyses made in Florida and the Philippines (Morton 1987) was reported as – moisture 91.11–94.80 g, protein 0.75 g, ash 0.57–0.78 g, calcium 0.12 mg, phosphorus 0.04 mg, iron 0.001 mg, thiamine 0.031 mg, riboflavin 0.072 mg, niacin 0.53 mg. Another analysis made in Australia (Brand Miller et al. 1993) reported the following: energy 12 kJ, moisture 81.7 g, nitrogen 0.11 g, protein 0.7 g, fat 0 g, ash 0.5 g, available carbohydrate 0 g, calcium 29 g, potassium 137 g, sodium 29 g, niacin equivalent 0.1 mg and vitamin C 69 mg.

Studies reported three different kinds of flavonoids in bignay fruit i.e., catechin, procyanidin B1 and procyanidin B2 which occurred in varying levels in different cultivars (Butkup and Samappito 2008). These three chemical compounds were the major flavonoids in bignay fruit. The highest amount of procyanidin B1 was found with Lompat followed by Maeloogdog with values of 4,122.75 and 3,993.88 mg/100 g of fresh weight (FW), respectively and the highest amount of procyanidin B2 was found with Sangkrow 2 followed by Fapratan with values of 5,006.39 and 3,689.42 mg/100 g FW, respectively Catechin contents in fruits of the 15 cultivars varied from 73.39 to 316.22 mg/100 g of fresh weight. The major group of organic acids in Mao Luang berries were: tartaric acid (7.97–12.16 mg/g FW), ascorbic acid (10.01–16.55 mg/g FW), citric acid (4.44–11.73 mg/g FW) and benzoic acid (8.13–17.43 mg/g FW) and the minor group included malic acid (3.05–4.52 mg/g FW), lactic acid (1.12–4.09 mg/g FW), oxalic acid (1.00–1.45 mg/g FW) and acetic acid (0.19–0.69 mg/g FW) (Samappito and Butkhup 2008b).

Thai scientist also reported on the chemical contents of fresh ripe fruit and brewed red wines of both non-skin contact and skin contact fermentation techniques of Mao Luang ripe fruits (Samappito and Butkhup 2008a). Ripe Mao Luang fruits on fresh weight of 100 g berries had the following mean values: fresh weight 65.62 g, juice:solids 3.28, pH3.51, total soluble solid (TSS), 16.50$^0$ brix, total organic acids (TOA), 49.36 mg/L, TSS: TOA 28. 10%, total flavonoids contents (TFC) 397.90 mg/L, total phenolic acids viz. gallic, caffeic, vanillic, ellagic and ferulic acid (TPA) 76.04 mg/L, total procyanidin B1 and B2 contents (TPC) 156.21 mg/L, and reducing sugars (184.32 g/L). Skin contact Mao Luang red wine gave higher amounts of flavonoids, phenolic acids, anthocyanins of procyanidin B1 and procyanidin B2, organic acids than non-skin contact red wine. The differences were highly significant. Additionally, ethanol (%) and total acidity (g/L citric acid) were much higher for skin contact wine than non-skin contact wine but a reverse was found with total soluble solids ($^0$brix) and pH where non-skin contact wine gave higher mean values than skin contact wine. In a recent study, they found that total phenolic content (TP) of *A. bunius* fruit accounted for 19.60–8.66 mg GAE/g FW as assayed by the Folin-Ciocalteu method (Butkhup and Samappito 2011). TP gradually decreased from the immature to ripe fruit stages. Total anthocyanin, however, was highest at the over-ripe stage with mean value of 141.9 mg/100 g FW. Highest antioxidant activity (DPPH) was found at the immature stage accompanied by the highest content of gallic acid and TP. The main polyphenol compounds namely procyanidin B2, procyanidin B1, (+) – catechin, (-)-catechin, rutin and *trans*-resveratrol increased during fruit development and ripening. Other phenolics like gallic, caffeic and ellagic acids significantly decreased during fruit development and ripening. At the overripe stage the fruit possessed the highest antioxidants and would be the best time to harvest.

Scientists in the Philippine reported that methanolic crude extracts of the leaves and fruits of bignay contains unidentified compounds with potential cytotoxic activity using the *Artemia salina* assay (Micor et al. 2005).

In folkloric medicine, bignay leaves are regarded as sudorific and employed in treating snakebite in Asia. The leaves are acid and diaphoretic, and are boiled with pot-herbs, and employed by the natives in syphilitic affections. The ripe fruit is subacid, and is esteemed for its cooling qualities. Filipinos believe the fruit can cure various ailments from parched tongue, lack of appetite, indigestion, high blood pressure to diabetes.

## Other Uses

The bark yields a strong fibre for rope and cordage. The timber is reddish and hard and is utilized for the production of beams, tresses, rafters, light constructions, firewood and charcoal. The wood has been experimentally pulped for making cardboard. It is also planted as an ornamental, windbreak, hedge, living fence, in agroforestry, in home gardens and roadside tree

## Comments

Bignay is easily established from stem cuttings as seeds may not be viable due to inadequate pollination.

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