



Canarium ovatum Engl.

Burseraceae

Marina Silalahi and Anisatu Z. Wakhidah

Synonyms

Canarium melioides Elmer; *Canarium pachyphyllum* G.Perkins (POWO 2020)

Local Names

Indonesia: kenari (general), pega burung (jambi); **Philippines:** pili, pilau (general), liputi (Tagalog); **English:** kernel, walnuts (Bone et al. 2013; PEC 2018; Ramona 2019)

Botany and Ecology

Description: This large tree reaches a height of about 35 m, and is a meter or more in diameter. The leaves are alternate, pinnate, and about 30 cm long with usually three pairs of opposite leaflets and a terminal leaflet. The leaflets are ovate-oblong, 12–20 cm long and 3–7 cm wide, smooth and shiny on both sides, pointed at the apex and rounded or obtusely pointed at the base. The flowers are clustered and are borne on large compound inflorescences. The fruit is ovoid, 4–5 cm long, 2–2.5 cm wide, entirely smooth, drupe-like. It consists of green or brown thin resinous pulp and contains thick shelled triangular seed (Lanting Jr and Palaypayon 2002).

Distribution and Habitat: This species is native to Philippines (POWO 2020). In the Philippines, it is common in primary forests at low and medium altitudes. It grows

M. Silalahi (✉)

Biology Education Department, Universitas Kristen Indonesia, West Jakarta, Indonesia

e-mail: marina.silalahi@uki.ac.id

A. Z. Wakhidah

Member of Indonesia Ethnobiology Society, Biology Research Center – LIPI, Bogor, Indonesia

Fig. 1 Living plants of *Canarium ovatum* (BURSERACEAE). (Alor, East Nusa Tenggara, Indonesia (© M. Silalahi))



particularly in Cagayan Province of northern Luzon; in the Bicol region including Masbate; and in some areas of eastern Visayas and southern Mindanao regions (Coronel 1994; Lanting Jr and Palaypayon 2002). The plant also occurs in Indonesia and grows well in Maluku and Southeast Sulawesi (Coronel 1996). It also has been introduced in other countries of New World area, notably in Hawaii (USA) and Brazil (Coronel 1994). The plant grows well on both light and heavy soils. It also thrives over a wide range of climatic conditions, growing successfully from sea level to an elevation of 400 m asl. It has also been reported to grow and fruit well in the highlands, although in Florida it did not tolerate cool periods and slight frost. Mature trees can resist strong winds. Trees are found mostly in the forest, in home gardens, and on the roadside (PEC 2018) (Figs. 1, 2, 3, and 4).

Local Medicinal Uses

Philippines: The “saheng” (oleoresin) is used as a stimulant; a rubefacient (an external skin application causing redness of the skin); and as an antirheumatic when applied externally. Poultices are used for swellings of the legs. Oleoresin, prepared in the form of ointment, is applied on indolent ulcers (Lanting Jr and Palaypayon 2002). The bark of *Canarium ovatum* is used by local community in Claver, Surigao Del Norte, to cure fever (Demetillo et al. 2019).

Fig. 2 Leaves of *Canarium ovatum* (BURSERACEAE). (Alor, East Nusa Tenggara, Indonesia (© M. Silalahi))



Phytochemistry

Chemical investigations of the dichloromethane extracts of the **leaves** of *Canarium ovatum* Engl. yielded β -amyrin (1a), α -amyrin (1b), epi- β -amyrin (2a), epi- α -amyrin (2b), epi-lupeol (2c), β -carotene (3), and lutein (4), while the **twigs** yielded 1a-1b. Dichloromethane extracts of **fruits** yielded triacylglycerols (5); the mesocarp also yielded 1a, 1b, 1,2-dioleoylglycerol (6), and monounsaturated and saturated fatty acids; the **nutshell** contains 6; and the **kernel** also yielded monounsaturated and saturated fatty acids (Ragasa et al. 2015). Ethanol extract of the pulp contains biologically active compounds such as sterols, triterpenes, flavonoids, alkaloids, saponins, glycosides, and tannins (Salvador-Membreve et al. 2018).

Bioactivities

In mice, ethanolic extract of fruit pulp shows **immunostimulatory** activity (Salvador-Membreve et al. 2018). Consumption of phenol-rich pomace drink may enhance plasma **antioxidant** and polyphenol status in humans (Arenas and Trinidad 2017). Leaf extract of *Canarium ovatum* has been used for the biosynthesis of silver

Fig. 3 Immature fruits of *Canarium ovatum* (BURSERACEAE). (Alor, East Nusa Tenggara, Indonesia (© M. Silalahi))



nanoparticles (CO-AgNPs) in an eco-friendly manner. CO-AgNPs inhibited the growth of the bacteria *Pseudomonas aeruginosa* (Arya et al. 2016). Antioxidant and **anticancer** activities of *Canarium ovatum* pulp have also been confirmed (Cajuday et al. 2017).

Local Food Uses

Philippines: Young shoots are edible and are usually used in cooking and in making green salads. The fruit kernel can be eaten raw, roasted, fried, or sugar-coated. The kernel is also used as an ingredient in cakes, puddings, and ice creams (Coronel 1996).

Biocultural Importance

In Philippines, the sprout is boiled with iron sulfate (“vitriol”) to blacken teeth by the Ibanag people who live along the banks of the lower Cagayan River below Gattaran (Zumbroich and Salvador-Amores 2009).

Fig. 4 Mature fruits of *Canarium ovatum* (BURSERACEAE). (Alor, East Nusa Tenggara, Indonesia (© M. Silalahi))



Economic Importance

Indonesia: *Canarium ovatum* produces copious fruits. Its leaves are easy to decompose and enrich the soil. The trees grow big and tall with wide canopy. These traits led to the selection of the tree by farmers of Hutumury Village in Ambon City as shelter trees for nutmeg plant (*Myristica fragrans*) (Bone et al. 2013; Salampessy et al. 2017). The wood is used to make popular key holders (Gonzalez and Bunoan 1947). **Philippines:** The tree is an important nut-producing species. The fruit pulp yields an oil that can be used in the manufacture of soap and other products (Coronel 1996). The plant seed has a hard and stony shell that makes it an excellent fuel for cooking (Gonzalez and Bunoan 1947). The plant is used as fence tree and a verdant shade tree for lawns. It is a good living wind break for other crops such as bananas and papayas. Its resin-rich wood is an excellent firewood (Coronel 1996).

References

Arenas E, Trinidad T. Acute effects of thermally processed pili (*Canarium ovatum*, Engl.) pomace drink on plasma antioxidant and polyphenol status in humans. *Avicenna J Phytomed.* 2017;7(5):467–76.

- Arya G, Kumar N, Gupta N, Kumar A, Nimesh S. Antibacterial potential of silver nanoparticles biosynthesised using *Canarium ovatum* leaves extract. IET Nanobiotech. 2016;11(5):506–11.
- Bone I, Salampey ML, Febryano IG, Siahaya ME. Local knowledge community in the selection of shelter trees in dusung nutmeg: case study on Hutumury Village in Ambon City. Int Spices Conf. 2013:178–84.
- Cajuday LA, Membreve DMS, Serrano JE. Evaluation of the antioxidant and anticancer activities of *Canarium ovatum* (Burseraceae) pulp extracts. Int J Biosci. 2017;11(3):247–56.
- Coronel RE. History and current status of pili nut (*Canarium ovatum*) production in the Philippines. In Stevens ML, Bourke RM, Evans BR, editors. South Pacific indigenous nuts-proceedings of a workshop 31 October – 4 November 1994 Le Lagon Resort, Port Vila, Vanuatu. 1994, p. 134–39.
- Coronel RE. Pili nut *Canarium ovatum* Engl. Rome: International Plant Genetic Resources Institute; 1996.
- Demetillo MT, Betco GL, Goloran AB. Assessment of native medicinal plants in selected mining area of claver Surigao Del Norte, Philippines. J Med Plant Res. 2019;7(2):171–4.
- Gonzalez LG, Bunoan JC Jr. Variability of pili trees grown in the College of Agriculture. Philipp Agric. 1947;31:60–5.
- Lanting Jr MV, Palaypayon MV. Forest tree species with medicinal uses. College: Ecosystems Research and Development Bureau Department of Environment and Natural Resources; 2002;4031(11):18.
- PEC. Plant use English contributors. *Canarium ovatum* (PROSEA). PlantUse English 2018. Published on the Internet. [https://uses.plantnet-project.org/e/index.php?title=Canarium_ovatum_\(PROSEA\)&oldid=328513](https://uses.plantnet-project.org/e/index.php?title=Canarium_ovatum_(PROSEA)&oldid=328513). Retrieved 19 Sept 2020.
- POWO. Plants of the world online. Kew: facilitated by the Royal Botanic Gardens; 2020 Published on the Internet. <http://www.plantsoftheworldonline.org/>. Retrieved 19 Aug 2020.
- Ragasa CY, Torres OB, Gutierrez JMP, Kristiansen HPBC, Triterpenes SCC. Acylglycerols from *Canarium ovatum*. J Appl Pharm Sci. 2015;5(4):94–100.
- Ramona F. Diversitas dan Potensi Kelelawar Megachiroptera sebagai disperser dan polinator di Hutan Harapan. Jam J Bio Site. 2019;4(1):1–11. (In Bahasa).
- Salampey ML, Febryano IG, Bone I. Pengetahuan ekologi masyarakat lokal dalam pemilihan pohon pelindung pada sistem agroforestri tradisional “Dusung” Pala di Ambon. J Pen Sos Ekon Hut. 2017;14(2):135–42.
- Salvador-Membreve DM, Cajuday LA, Serrano JE, Baldo DEB. Immunomodulatory properties of ethanol extract of *Canarium ovatum* (Burseraceae) pulp. Trop J Pharm Res. 2018;17(8):1565–9.
- Zumbroich TJ, Salvador-Amores A. When black teeth were beautiful-the history and ethnography of dental modifications in Luzon, Phillipines. Int J Asian Stud. 2009;10(1):125–69.