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BAGO
***Gnetum gnemon* Linn.**

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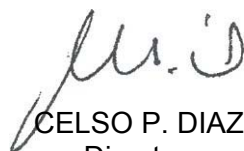
Foreword

In search of locally available natural resources that could be a productive source of livelihood for farmers, we came up with an alternative tree species called Bago (*Gnetum gnemon* L.).

Bago is a multi purpose tree species which is native to the Philippines. It can be a source of food, wood and fiber. Because of its edible young shoot, the species is more popularly known in some upland areas as a vegetable crop. Unknown to our local farmers, Bago trees can become a source of export products. Countries like Indonesia process the seeds and leaves of Bago and export them to Japan and some European countries.

Aside from its economic potential, bago can also help in rehabilitating our marginal lands. This species aids in soil improvement because of its beneficial association with some mychorrhizal fungi.

Both an economically and ecologically important tree species, Bago could provide great benefits to our rural communities. The information contained in this issue will serve as guide to our readers especially the upland farmers in considering bago for agroforestry, tree planting activities, or tree plantation development.



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Director

1. **Common name:** Bago
2. **Local names:** bago, magatungal (Lanao, Cotabato); bago or bagu (Bataan, Tayabas, Camarines); banago (Visaya, Bohol); kunan (Davao); nabo (Bicol)
3. **Internationally used common name:** Spanish koint fir (English)
Other common names: Melinjo, belinjo, bagoe - Indonesia
Maninjau - Malaysia
Voe, Khalet - Cambodia
Peedae, phak, miang
phak kaniang, liang - Thailand
Gam cay, bet - Vietnam
4. **Scientific name:** *Gnetum gnemon* Linn.
5. **Family:** Gnetaceae

6. Description

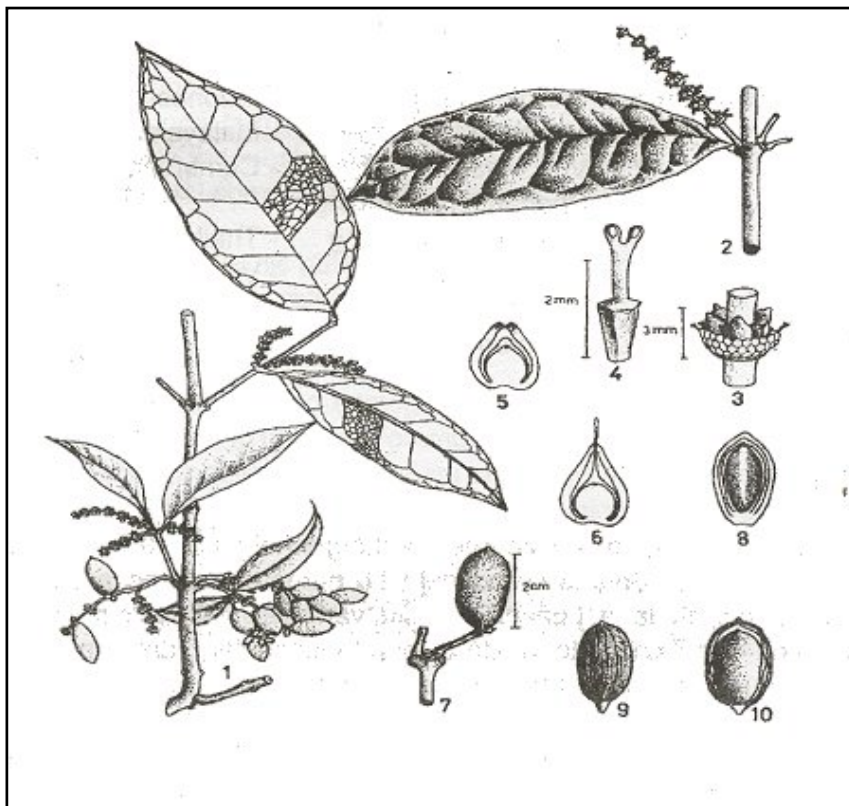
Bago is small to medium in size tree reaching a height of 10 to 15 m and a diameter up to 40 cm. Bole is cylindrical with numerous branches; crown is compact to conical in shape. Leaves opposite variable in size and shape, 10 to 20 cm long and 4 to 7 cm wide, ovate oblong to lanceolate, dark green, shiny smooth and usually pointed at both ends. Inflorescence are borne on young shoots and older branches. Fruits are produced in small clusters, 2.3 to 3.5 cm long, oblong with smooth red skin. Seed is enclosed in fleshy covering about one mm thick. Seedcoat is thin and brittle, and separates readily from the seeds.

7. Distribution

Found in India, Fiji, Solomon Islands, Malaysia, Sumba, Sulawesi, New Guinea and Malay Peninsula, Philippines (Ilocos Norte, Bataan, Quezon, Laguna, Batangas, Mindoro, Palawan, Sibuyan, Camarines Provinces, Panay, Samar, Leyte, Mindanao, Bukas Grande Siargao).

8. Site requirements

Climate - *Gnetum gnemon* thrives in dry and humid areas on secondary and primary forests at low and medium altitude (0 to 1,200 m asl). It grows best in areas with annual precipitation of 3,000 to 5,000 mm although it can also survive annual rainfall of only 750 to 1,000 mm.



Source: Pancho, J. 1983. Kalikasan: The Philippine Journal of Biology Supplement No. 1, New Mercury Printing Press. Pp. 51-53.

Gnetum gnemon Linn.: 1. flowering twig; 2. twig with staminate inflorescences; 3. portion of staminate inflorescence, enlarge; 4. staminate flower; 5. vertical section of sterile, pistillate flower; 6. section of flower; 7. infrutescence; 8. vertical section of fruit; 9. fruit without layer; 10. same, layer removed to expose seed.

Soil - *Gnetum gnemon* can grow in diverse soil types from sandy, clay to clay loam to calcareous soils but prefers relatively neutral soil with good drainage.

9. Uses

Agroforestry - In Indonesia, *G. gnemon* is widely planted as a home garden tree or for field borders, agroforestry and soil improvement purposes.

Food - the young leaves and tender tips of *G. gnemon* are edible and used as a vegetable. The nut is eaten either boiled, fried or roasted. In Indonesia, nuts are exported. In Java, it is an important home industry where the seed is heated, the husk is broken and the hot kernel is pounded into a flat cake. The cakes are sun-dried, graded and packed for sale. A crisp snack (emping) is prepared by soaking up the cakes in boiling water.

Wood - boxes, tool handles

Bark - the bark fibers are processed into rope making, fishing net and high grade paper products. The inner bark is used for the famous Sumba bow string.

Others - it has a beneficial association with mycorrhizae (*Scleroderma sinnamariense*) which makes phosphorous and some micro-element from soil readily available to plant growth and development.

10. Propagation

The species could either be propagated by seed or by asexual means such as air layering, grafting, cutting or budding.

In budding and grafting, mature, non-petioled bud woods are used. The buds are cut 3.5 to 4 cm long for budding.

11. Seed technology

Phenology

In Indonesia, the species bears fruits three times a year from March to April, June to July and September to October. In the Philippines, the fruits mature early in the rainy season (June to July).

Seed collection

G. gnemon seed is collected from mature reddish color fruit. It is classified as an orthodox seeds as it could prolong seed viability for quite sometime.

Germination

Seeds will take about 45 to 360 days to germinate. The seed is pre-germinated in a box filled with alternating layers of seed and sand, watered daily and raised under shade. Seedling of the species could be raised in a shaded nursery about 6 months prior to field planting. Greater seedling vigor is observed when applied with 20 to 40 gms of phosphorous. Likewise, the inoculation of mycorrhizae fungi (*Scleroderma sinnamariense*) gave a better seedling growth.

12. Plantation establishment

Prepare planting site by removing the weeds/shrubs. The plants are set 10 to 12 m apart in the field, where they bear the first fruit six to seven years after planting.

Both the mature and young stands can adopt in partially shaded and relatively open areas. When fully established, it could withstand long dry spell. With its inherent beneficial association with mycorrhizae, it will make phosphorous and some micro-element from soil readily available to plant growth and development.

13. Management

In Indonesia, where seeds of *G. gnemon* is an important export commodity, the species if grown from seeds will bear fruit six to seven years after planting. In West Sumatra, large trees are reported to yield 20,000 to 25,000 fruits per year. The maximum production of seeds could reach up to 80 to 100 kg/tree/year. The tree produces seeds three times a year. Using air layers, the young plants come into bearing within two to three years after planting and that only female (seed producing) trees are obtained.

14. Pest and diseases

No recorded pest and diseases so far have been observed to the species. The trees have to be guarded against rats and squirrels.

15. References

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