PLANT FACT SHEET

Dioscorea alata L.

GENUS *Dioscorea* **FAMILY** Dioscoreaceae

COMMON NAMES Greater yam

EDIBLE PARTS AND USES

Edible parts: Tubers, Root, Vegetable

The tubers are boiled, baked or mumued. They can be roasted, fried or mashed.
When they occur the aerial tubers of bulbils are also cooked and eaten.

DESCRIPTION

A yam with a long angular vine. It can climb 15 m high. The stems are square and twine to the right around support sticks. The stem does not have spines. It is often coloured green or purple. The leaves are heart shaped and borne in pairs along the vine. The leaves vary is shape, size and colour with different varieties. Leaves can be 10-30 cm long by 5-20 cm wide. The leaf stalk is 6-12 cm long. The flowers occur in the axils of the upper leaves. The male flowers are in small heads along branched stalks. These can be 25 cm long and green. The female flowers are in shorter spikes. Many cultivated varieties do not produce fertile seed. The fruit are 3-winged and 2.5 cm long by 3.5 cm wide. The seeds when they occur have wings right around them. One large but often irregular shaped tuber occurs under the ground. A very large number of different varieties occur. The tubers can vary in shape, size, colour, texture and other ways. Some varieties produce bulbils along the vine. Plants can vary in number of chromosomes.

HABITAT

A tropical plant. It grows from sea level up to about 1800 m in the tropics. Yams are most important in seasonally dry areas. They need a well drained soil and it has to have reasonable fertility. The temperature maximum is >30°C while the minimum is 20°C. The optimum temperature range is 25-30°C. Rainfall is often seasonal in yam areas and the maximum to be needs 14-20 weeks rain with an optimum of 1,150 mm during the growing season. Yams can tolerate drought but give maximum yields with high rainfall. The critical rain period is during the first 5 months. Light influences tuber growth. A continuous exposure of tubers to light significantly reduces tuber yields. Day length - Yams are influenced by photoperiod, or hours of sunlight. Short days (less than 10-11 hours of sunlight) favours tuber development. It does not suit atolls. It suits hardiness zones 10-12. In Yunnan.

PRODUCTION

Cultivation

Ceremonial yams have very specialised production techniques. For general food production, use top pieces of the tuber after they have sprouted, use a branched stick for support of the vine, space plants about 1 m apart and choose a smooth round cultivar. Given the large diversity of cultivars of greater yam, for efficient production

varieties need to be chosen which have regular rounded tuber shapes for easier harvesting and preparation; also selection needs to be made for varieties with less leaf spot and virus susceptibility and stable yield. Colour, cooking quality, storage ability, texture and other qualities need to be considered to suit the growers demands.

In most places the yam growth and maturation is integrated with seasonal rainfall patterns. They are mostly planted just before the first rains where a 8-10 month rainy season exists and give better yields in 6-8 month rainy season areas when planted 3 months before the rains. Earlier planting requires larger sett size to withstand desiccation.

Pre germination of tubers which are cut and stored in shady places gives improved yields over tubers left whole then cut into setts at planting. Because yam tubers have a period of dormancy, tubers do not normally commence re-growth for up to 5-6 months. This enhances their storability but delays out of season replanting. Dormancy can be broken using Calcium carbide treatment for 5 hours or by covering tubers with leaves of Croton aromaticus or Averrhoea bilimbi..

Yams are demanding in their nutrient requirements are are therefore often planted first in rotations. They need a fertile free draining soil. They cannot tolerate water logging.

It is normally grown from sections of the tubers especially top pieces. In some cultivars, it is also propagated by bulbils. Using staggered plantings of male and female plants and doing hand pollination it is possible to get viable seed set which can be used for establishing plants. It is common practice in many areas to plant the yam piece upside down. The probable reason for this is to give the shoot and roots time to develop and get established away from the sun and wind, so that the plant does not dry out. People in yam areas have their varieties classified as to whether they are planted at the top or the bottom of the hole, and whether the shoot is pointed up or downwards. This is a response to the diversity of tuber shapes and cultivars. A planting depth of 15 cm is optimum. Normally top pieces give higher yields than middle pieces of tubers and these are better than bottom pieces. Varietal differences in this occur. Top pieces give earlier and more reliable germination and mature earlier. They are also the less attractive part of the tuber for eating so are preferred for planting.

The larger the sett the earlier the germination and the greater the yield. Increasing the seeding rate and plant density gives greater total yield but the extra planting material required means yield of food available is less. Normally on lighter soils closer spacing is used.

Compact soil or hard pans or stones result in tubers being exposed which decreases the yield and needs to be avoided This is related to light as well as physical constraints. Good drainage is essential. Yams must have a well drained soil with plenty of air in the soil. So yams will not normally grow on heavy clay soils or in areas with a lot of soil moisture. The soil can be improved for yam growing by putting leaves and other plant material in the planting hole, by making a mound above the hole, or by planting on a hillside. In some very loose sandy soils yams can just be planted in flat unmounded soils without digging a special yam hole but these situations are not common.

Yams should also have sticks to climb up. It is best to have a stick that is twisted or branched because the vine can slip down a very straight stick. Normally a stick 2 metres tall is sufficient. It needs to be a strong stick, firmly fixed in the ground. Yam varieties vary on the type of vine growth they have. This affects where the stick needs to be placed.

The fat irregular yams can have the sticks near the mound as a thick clump of vines and leaves soon develops. But if the stick is put beside the mound of one of the long ceremonial yams the vine will often reach the top of the stick before it has produced more than a couple of leaves, and will then fall back down to produce its leaves on the ground. The stick often needs to be put at some distance from the yam hole. The tip can be picked off the vine if branching is wanted earlier.

It may be that the long vine yams are more common in forest areas and the shorter branched vines in grassland areas.

In some areas yam vines are allowed to creep over the ground and do not have sticks to climb. This method only works satisfactorily in dry places because diseases of the leaves and vine can cause serious damage in wetter places. Where yams do not have sticks to climb plants need to be more widely spaced. Under most circumstances the amount of food produced can be doubled by allowing yam vines to climb up sticks.

In drier grassland areas mulching the mounds at planting has been found to improve establishment and yield.

Harvesting and Seed Production

The time to maturity ranges from 5 months on the coast to 9 or 10 months at higher altitudes. Yams will store well for over 6 months if given a dry, dark, well ventilated shed.
Disease - Anthracnose due to the fungus Glomerella cingulata causes early dying off of leaves in many areas and immature death in susceptible varieties under conditions favourable to disease. But anthracnose does not appear to stop yam production in any area. Climatic conditions favouring the disease are hot wet humid conditions and heavy rain. Earlier planting enables plants to be well established at the onset of rains which is the main infection time for the anthracnose fungus. Varieties resistant to anthracnose normally have thicker leaf leaf coatings or cuticles and shorter pores in the stomata or pores in the leaf. The resistant varieties also had higher levels of chemical phenols in the plant. Infected tubers are a main source of the fungus living and transferring between crops.

NOTES

There are about 650 species of Dioscorea. Demo

PICTURES



Credit: Food Plants International (Bruce French)



Credit: Food Plants International (Bruce French)



Credit: Food Plants International (Bruce French)



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REFERENCES

Abbiw, D.K., 1990, Useful Plants of Ghana. West African uses of wild and cultivated plants. Intermediate Technology Publications and the Royal Botanic Gardens, Kew. p 26

Ahirwar, R. K. & Shakya, V.S., 2015, An Ethnobotanical Survey of Some Wild Edible Plants of Bijuri Forest District Anuppur, Madhya Pradesh, Central India. International Journal of Science and Research (IJSR). 4(6) p 1642

Alegado, A. M. & De Guzman, R. B., 2014, Indigenous food crops of the Aetas tribe in the Philippines and their traditional methods of food preparation. in Promotion of Underutilized Indigenous Food Resources for Food Security and Nutrition in Asia and Pacific. FAO. Bangkok p 160

Ambasta, S.P. (Ed.), 2000, The Useful Plants of India. CSIR India. p 174

Anderson, E. F., 1993, Plants and people of the Golden Triangle. Dioscorides Press. p 209

Andrare, G. M. M., et al, 2023, Plantas Alimenticias Nao Convencionais (PANC) Nos Levantamentos Etnobotanicos do Brazil. Novos Cadernos NAEA v. 25 No. 2 p 208

Asprilla-Perea, J., & Diaz-Puente, J.M., 2018, Traditional use of wild edible food in rural territories within tropical forest zones: A case study from the northwestern Colombia. New Trends and Issues Proceedings on Humanities and Social Sciences [Online]. 5(1), 162–181.

Balkrishna, A., et al, 2022, Indigenous Uses of Plants among Forest-dependent Communities of Seijosa, Arunachal Pradesh. International Journal of Economic Plants 2022, 9(1):064-080

Bandyopadhyay, S. et al, 2009, Wild edible plants of Koch Bihar district, West Bengal. Natural Products Radiance 8(1) 64-72

Banerjee, A., et al, 2013, Ethnobotanical Documentation of Some Wild Edible Plants in Bankura District, West Bengal, India. The Journal of Ethnobiology and Traditional Medicine. Photon 120 (2013) 585-590

Baro, D., Baruah, S. and Borthukar, S. K. 2015, Documentation on wild vegetables of Baksa district, BTAD (Assam). Scholars Research Library. Archives of Applied Science Research, 2015, 7 (9):19-27

Barrau, J., 1976, Subsistence Agriculture in Polynesia and Micronesia. Bernice P. Bishop Museu, Bulletin 223 Honolulu Hawaii. Kraus reprint. p 45

Bodner, C. C. and Gereau, R. E., 1988, A Contribution to Bontoc Ethnobotany. Economic Botany, 43(2): 307-369

Borrell, O.W., 1989, An Annotated Checklist of the Flora of Kairiru Island, New Guinea. Marcellin College, Victoria Australia. p 20

Bouri, T. & Ganguly, S., 2016, Documentation of traditional knowledge on edible wild plants of forests in Burdwan district, West Bengal (India). Journal of Medicinal Plants Studies 2016; 4(5): 35-38

Bourret, D., 1981, Bonnes-Plantes de Nouvelle-Caledonie et des Loyaute. ORSTOM. p 47

Brouk, B., 1975, Plants Consumed by Man. Academic Press, London. p 143

Burkill, H. M., 1985, The useful plants of west tropical Africa, Vol. 1. Kew.

Burkill, I.H., 1966, A Dictionary of the Economic Products of the Malay Peninsula. Ministry of Agriculture and Cooperatives, Kuala Lumpur, Malaysia. Vol 1 (A-H) p 826

Call, C. A., et al, 2004, Participatory Rural Appraisal in the Upland Ecosystem of Mt Malindang, Misamis Occidental, Philippines. Biodiversity Research Programme for Development in Mindanao. p 53

Campbell, D. et al, 2021, Wild Food Harvest in Jamaica. Frontiers in Sustainable Food Systems. Vol. 5 Article 663863

Cao, Y., et al, 2020, Ethnobotanical study on wild edible plants used by three trans-boundary ethnic groups in Jiangcheng County, Pu'er, Southwest China. Journal of Ethnobiology and Ethnomedicine (2020) 16:66

Castaneda, H., & Stepp, J. R., 2007, Ecosystems as Sources of Useful Plants for the Guaymi People of Costa Rica. Ethnobotany Journal. 5:249-257

Castillo, C., 2013, The Archaeobotany of Khao Sam Kaeo and Phu Khao Thong: The Agriculture of Late Prehistoric Southern Thailand. Ph. D. thesis University College, London p 380

Chai, P. P. K. (Ed), et al, 2000, A checklist of Flora, Fauna, Food and Medicinal Plants. Lanjak Entimau Wildlife Sanctuary, Sarawak. Forestry Malaysia & ITTO. p 159

Chaiyong, S., et al, 2023, Uncovering the ethnobotanical importance of community forests in Chai Nat Province, Central Thailand. BIODIVERSITAS 24 (4): 2052-2063

Chanda, M., et al, 2018, Assessment of Traditionally Used Wild Edible Plants and Its Impact on Health and Livelihood among the Ethnic Communities of Tripura. Asian Journal of Agricultural and Horticultural Research. 2(3): 1-13

Chaudhary, R.P. (Ed.), et al, 2021, Flora of Jailash Sacred Landscape Nepal. An Annonated Checklist - Volume 1 Research Centre for Applied Science and Technology (RECAST), Tribhuvan University, Kirtipur, Kathmandu, Nepal. p 31

Cheifetz, A., (ed), 1999, 500 popular vegetables, herbs, fruits and nuts for Australian Gardeners. Random House p 66

Cheng, Z., et al, 2022, Ethnobotanical study on wild edible plants used by Dulong people in northwestern Yunnan, China. Journal of Ethnobiology and Ethnomedicine (2022) 18:3

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