Yam (vegetable)

Yam is the common name for some plant species in the genus *Dioscorea* (family Dioscoreaceae) that form edible tubers (some other species in the genus being toxic).

Yams are perennial herbaceous vines native to Africa, Asia, and the Americas and cultivated for the consumption of their starchy tubers in many temperate and tropical regions. The tubers themselves, also called "yams", come in a variety of forms owing to numerous cultivars and related species.

Unknown yam variety, most likely of the *alata* species.

White yams at a retail market in Brixton, England, 2004

A yam

Description

A monocot related to lilies and grasses, yams are vigorous herbaceous, perennially growing vines from a tuber.[1] Some 870 species of yams are known,[1] a few of which are widely grown for their edible tuber but others of which are toxic (such as *D. communis*).

Yam plants can grow up to 15 metres (50 feet) in length and 7 to 15 centimetres (3 to 6 inches) high.[1] The tuber may grow into the soil up to 1.5 m (5 ft) deep.[1] The plant disperses by seed.[1]

The edible tuber has a rough skin that is difficult to peel but readily softened by cooking. The skins vary in color from dark brown to light pink. The majority, or meat, of the vegetable is composed of a much softer substance ranging in color from white or yellow to purple or pink in mature yams.

Etymology

The name "yam" appears to derive from Portuguese *inhame* or Canarian Spanish *ñame*, which derived from Fula, one of the West African languages during trade.[2] However, in Portuguese, this name commonly refers to the taro plant (*Colocasia esculenta*) from the genus *Colocasia*, as opposed to *Dioscorea*.[3][4]

The main derivations borrow from verbs meaning "to eat".[2] True yams have various common names across multiple world regions.[1]

In some places, other (unrelated) root vegetables are sometimes referred to as "yams", including:[1]

- In the United States, sweet potatoes (*Ipomoea batatas*), especially those with orange flesh, are often referred to as "yams"[5][6]
- In Australia, the tubers of the *Microseris walteri*, or yam daisy, were a staple food of Aboriginal Australians in some regions.[7]
- In New Zealand, oca (*Oxalis tuberosa*) is typically referred to as "yam".[8][9]
- In Malaysia and Singapore, taro (*Colocasia esculenta*) is referred to as "yam".[10]
- In Africa, South and Southeast Asia as well as the tropical Pacific islands *Amorphophallus paeoniifolius* is grown and known as "elephant foot yam".[11]

Distribution and habitat

Yams are native to Africa, Asia, and the Americas.[1] Three species were independently domesticated on those continents: *D. rotundata* (Africa), *D. alata* (Asia), and *D. trifida* (South America).[12]

Ecology

Some yams are invasive plants, often considered a noxious weed outside cultivated areas.[1]

Cultivation

Yams are cultivated for the consumption of their starchy tubers in many temperate and tropical regions, especially in West Africa, South America and the Caribbean, Asia, and Oceania.[1] About 95% of yam crops are grown in Africa.[13]

A yam crop begins when whole seed tubers or tuber portions are planted into mounds or ridges, at the beginning of the rainy season. The crop yield depends on how and where the sets are planted, sizes of mounds, interplant spacing, provision of stakes for the resultant plants, yam species, and tuber sizes desired at harvest. Small-scale farmers in West and Central Africa often intercrop yams with cereals and vegetables. The seed yams are perishable and bulky to transport. Farmers who do not buy new seed yams usually set aside up to 30% of their harvest for planting the next year. Yam crops face pressure from a range of insect pests and fungal and viral diseases, as well as nematodes. Their growth and dormant phases correspond respectively to the wet season and the dry season. For maximum yield, the yams require a humid tropical environment, with an annual rainfall over 1,500 millimetres (59 in) distributed uniformly throughout the growing season. White, yellow, and water yams typically produce a single large tuber per year, generally weighing 5 to 10 kilograms (11 to 22 pounds).[14]


Freshly harvested purple yam (*D. alata*) sliced for cross-section

Yams suffer from relatively few pests and diseases.[15] There is an anthracnose caused by *Colletotrichum gloeosporioides* which is widely distributed around the world's growing regions.[15] Winch *et al.*, 1984 finds *C. gloeosporioides* afflicts a large number of *Dioscorea* spp.[15]

Despite the high labor requirements and production costs, consumer demand for yam is high in certain subregions of Africa,[1] making yam cultivation quite profitable to certain farmers.[16]

Major cultivated species

Many cultivated species of *Dioscorea* yams are found throughout the humid tropics.[1] The most economically important are discussed below.[14]

Non-*Dioscorea* tubers that were historically important in Africa include *Plectranthus rotundifolius* (the Hausa potato) and *P. esculentus* (the Livingstone potato); these two tuber crops have now been largely displaced by the introduction of cassava.[17]

D. rotundata and *D. cayennensis*

D. rotundata, the white yam, and *D. cayenensis*, the yellow yam, are native to Africa. They are the most important cultivated yams. In the past, they were considered as two separate species, but most taxonomists now regard them as the same species. Over 200 varieties between them are cultivated.[18]

White yam tuber is roughly cylindrical in shape, the skin is smooth and brown, and the flesh is usually white and firm. Yellow yam has yellow flesh, caused by the presence of carotenoids. It looks similar to the white yam in outer appearance; its tuber skin is usually a bit firmer and less extensively grooved. The yellow yam has a longer period of vegetation and a shorter dormancy than white yam.

The Kokoro variety is important in making dried yam chips.[19]

They are large plants; the vines can be as long as 10 to 12 m (33 to 39 ft). The tubers most often weigh about 2.5 to 5 kg (6 to 11 lb) each, but can weigh as much as 25 kg (55 lb). After 7 to 12 months' growth, the tubers are harvested. In Africa, most are pounded into a paste to make the traditional dish of "pounded yam", known as Iyan.[20]

D. alata

D. alata, called purple yam (not to be confused with the Okinawan purple "yam", which is a sweet potato), greater yam, winged yam, water yam, and (ambiguously) white yam,[21][1] was first cultivated in Southeast Asia.[1] Although not grown in the same quantities as the African yams, it has the largest distribution worldwide of any cultivated yam, being grown in Asia, the Pacific islands, Africa, and the West Indies.[1] Even in Africa, the popularity of water yam is second only to white yam. The tuber shape is generally cylindrical, but can vary. Tuber flesh is white and watery in texture.


Purple yam (*D. alata*)

D. alata and *D. esculenta* (lesser yam) were important staple crops to the seafaring Austronesian cultures. They were carried along with the Austronesian migrations as canoe plants, from Island Southeast Asia to as far as Madagascar and Polynesia.[22][23][24][25]

D. polystachya

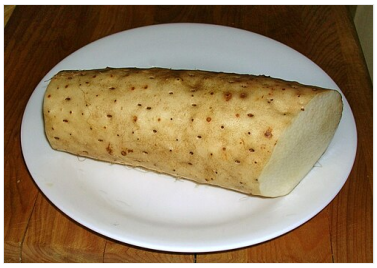
D. polystachya, Chinese yam, is native to China. The Chinese yam plant is somewhat smaller than the African, with the vines about 3 m (10 ft) long. It is tolerant to frost and can be grown in much cooler conditions than other yams. It is also grown in Korea and Japan.

It was introduced to Europe in the 19th century, when the potato crop there was falling victim to disease, and is still grown in France for the Asian food market.

The tubers are harvested after about 6 months of growth. Some are eaten right after harvesting and some are used as ingredients for other dishes, including noodles, and for traditional medicines.[20]

D. bulbifera

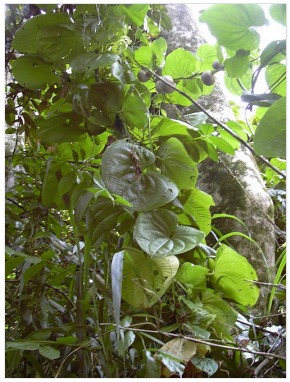
D. bulbifera, the air potato, is found in both Africa and Asia, with slight differences between those found in each place. It is a large vine, 6 m (20 ft) or more in length. It produces tubers, but the bulbils which grow at the base of its leaves are the more important food product. They are about the size of potatoes (hence the name "air potato"), weighing from 0.5 to 2.0 kg (1 lb 2 oz to 4 lb 7 oz).



Chinese yam (*D. polystachya*)

Some varieties can be eaten raw, while some require soaking or boiling for detoxification before eating. It is not grown much commercially since the flavor of other yams is preferred by most people. However, it is popular in home vegetable gardens because it produces a crop after only four months of growth and continues producing for the life of the vine, as long as two years. Also, the bulbils are easy to harvest and cook.[20]

In 1905, the air potato was introduced to Florida and has since become an invasive species in much of the state. Its rapid growth crowds out native vegetation and it is very difficult to remove since it can grow back from the tubers, and new vines can grow from the bulbils even after being cut down or burned.[26]



Air potato (*D. bulbifera*)

D. esculenta

D. esculenta, the lesser yam, was one of the first yam species cultivated. It is native to Southeast Asia and is the third-most commonly cultivated species there, although it is cultivated very little in other parts of the world. Its vines seldom reach more than 3 m (10 ft) in length and the tubers are fairly small in most varieties.

The tubers are eaten baked, boiled, or fried much like potatoes. Because of the small size of the tubers, mechanical cultivation is possible, which along with its easy preparation and good flavor, could help the lesser yam to become more popular in the future.[20]

Wild yam (*D.* sp.)

D. dumetorum

D. dumetorum, the bitter yam, is popular as a vegetable in parts of West Africa, in part because their cultivation requires less labor than other yams. The wild forms are very toxic and are sometimes used to poison animals when mixed with bait. It is said that they have also been used for criminal purposes.[20]

D. trifida

D. trifida, the cush-cush yam, is native to the Guyana region of South America and is the most important cultivated New World yam. Since they originated in tropical rainforest conditions, their growth cycle is less related to seasonal changes than other yams. Because of their relative ease of cultivation and their good flavor, they are considered to have a great potential for increased production.[20]

Wild bitter vines (*D. dumetorum*)

Wild taxa

D. hirtiflora subsp. *pedicellata*

D. hirtiflora subsp. *pedicellata*, lusala, busala or lwidi, is native to Tropical Africa. It is widely harvested and eaten in Southern Zambia where it grows in open forest areas. In Southern Zambia, it is an important addition to the March–September diets of almost all, and income of over half of rural households.[27] Research on propagation of this subspecies to alleviate the threat from wild harvest has been successful.[28]

D. japonica

D. japonica – known as East Asian mountain yam, yamaimo, or Japanese mountain yam – is a type of yam (Dioscorea) native to Japan. Its other common names include cham ma, Chinese yam, dang ma, glutinous yam, jinenjo, pinyin, rìběn- shuˇyù, shan yao, Taiwanese yam, and wild yam. Varieties include *D. japonica* Thunb var. *pseudojaponica* Yamamoto, *D. japonica* Thunb. var. *pseudojaponica* (Hayata) Yamam, *D. japonica* var. *japonica*, *D. japonica* var. *oldhamii* and *D. japonica* var. *pilifera*. It is widely cultivated Japan, Korea, China, and neighbouring islands.[29]

It is widely cultivated as a food crop in Japan, Korea, China and neighbouring islands.[29] Jinenjo is a related variety of Japanese yam that is used as an ingredient in soba noodles.

Harvesting

Yams in West Africa are typically harvested by hand, using sticks, spades, or diggers.[30] Wood-based tools are preferred to metallic tools as they are less likely to damage the fragile tubers; however, wood tools need frequent replacement. Yam harvesting is labor-intensive and physically demanding. Tuber harvesting involves standing, bending, squatting, and sometimes sitting on the ground

depending on the size of mound, size of tuber, or depth of tuber penetration. Care must be taken to avoid damage to the tuber, because damaged tubers do not store well and spoil rapidly. Some farmers use staking and mixed cropping, a practice that complicates harvesting in some cases.

In forested areas, tubers grow in areas where other tree roots are present. Harvesting the tuber then involves the additional step of freeing them from other roots. This often causes tuber damage.

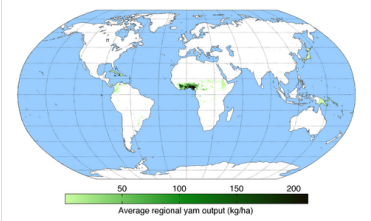
Aerial tubers or bulbils are harvested by manual plucking from the vine.

Tile on street depicting Aboriginal women gathering yams. Cooktown, Australia. 2005

Yields may improve and cost of yam production be lower if mechanization were to be developed and adopted. However, current crop production practices and species used pose considerable hurdles to successful mechanization of yam production, particularly for small-scale rural farmers. Extensive changes in traditional cultivation practices, such as mixed cropping, may be required. Modification of current tuber harvesting equipment is necessary given yam tuber architecture and its different physical properties.[30]

Production

In 2020, world production of yams was 75 million metric tons (74,000,000 long tons; 83,000,000 short tons), led by Nigeria with 67% of the total (table).



Map of worldwide yam production showing limited production range (Caribbean, West Africa, and Polynesia)

Yam production in 2020

Country	Production (millions of tonnes)
Nigeria	50.1
Ghana	8.5
Ivory Coast	7.7
Benin	3.2
Togo	0.9
Cameroon	0.7
World	**74.8**

Source:UN Food and Agriculture Organization[31]

Toxicity

Unlike cassava, most varieties of edible, mature, cultivated yam do not contain toxic compounds. However, there are exceptions. Bitter compounds tend to accumulate in immature tuber tissues of white and yellow yams.

Wild forms of bitter yams (*D. dumetorum*) do contain some toxins, such as dihydrodioscorine, that taste bitter, hence are referred to as bitter yam.[32] Bitter yams are not normally eaten except at times of desperation in poor countries and in times of local food scarcity. They are usually detoxified by soaking in a vessel of salt water, in cold or hot fresh water or in a stream. The bitter compounds in these yams are water-soluble alkaloids which, on ingestion, produce severe and distressing symptoms. Severe cases of alkaloid intoxication may prove fatal.

Aerial or potato yams (*D. bulbifera*) have antinutritional factors. In Asia, detoxification methods, involving water extraction, fermentation, and roasting of the grated tuber, are used for bitter cultivars of this yam. The bitter compounds in yams also known locally as air potato include diosbulbin and possibly saponins, such as diosgenin.[33] In Indonesia, an extract of air potato is used in the preparation of arrow poison.[34]

Uses

Nutrition

Raw yam has only moderate nutrient density, with *appreciable content* (10% or more of the Daily Value, DV) limited to potassium, vitamin B6, manganese, thiamin, dietary fiber, and vitamin C (table).[37] But raw yam has the highest potassium levels amongst the 10 major staple foods of the world (see nutritional chart). Yam supplies 494 kilojoules (118 kilocalories) of food energy per 100 grams. Yam generally has a lower glycemic index, about 54% of glucose per 150-gram serving, compared to potato products.[38]

Yam, raw

Nutritional value per 100 g (3.5 oz)	
Energy	494 kJ (118 kcal)
Carbohydrates	27.9 g
Sugars	0.5 g
Dietary fiber	4.1 g
Fat	0.17 g
Protein	1.5 g
Vitamins and minerals	

The protein content and quality of roots and tubers is lower than other food staples, with the content of yam and potato being around 2% on a fresh-weight basis. Yams, with cassava, provide a much greater proportion of the protein intake in Africa, ranging from 5.9% in East and South Africa to

about 15.9% in humid West Africa.[39]

As a relatively low-protein food, yam is not a good source of essential amino acids. Experts emphasize the need to supplement a yam-dominant diet with more protein-rich foods to support healthy growth in children.[40][41]

"Link to USDA Database entry" (https://fdc.nal.usda.gov/food-details/170071/nutrients). Archived (https://web.archive.org/web/20190403171801/https://fdc.nal.usda.gov/fdc-app.html#/food-details/170071/nutrients) from the original on 3 April 2019. Retrieved 19 October 2022.

†Percentages estimated using US recommendations for adults,[35] except for potassium, which is estimated based on expert recommendation from the National Academies.[36]

Yam is an important dietary element for Nigerian and West African people. It contributes more than 200 calories per person per day for more than 150 million people in West Africa, and is an important source of income. Yam is an attractive crop in poor farms with limited resources. It is rich in starch, and can be prepared in many ways. It is available all year round, unlike other, unreliable, seasonal crops. These characteristics make yam a preferred food and a culturally important food security crop in some sub-Saharan African countries.[42]

Comparison to other staple foods

The following table shows the nutrient content of yam and major staple foods in a raw harvested form on a dry weight basis to account for their different water contents. Raw forms, however, are not edible and cannot be digested. These must be sprouted, or prepared and cooked for human consumption. In sprouted or cooked form, the relative nutritional and antinutritional contents of each of these staples is remarkably different from that of raw form of these staples.[43]

Nutrient content of 10 major staple foods per 100 g dry weight[44]

Staple	Maize (corn) [A]	Rice, white[B]	Wheat[C]	Potatoes[D]	Cassava[E]	Soybeans, green[F]	Sweet potatoes[G]	Yams[Y]	Sorghum[H]	Plantain[Z]	RDA
Water content (%)	10	12	13	**79**	60	68	77	70	9	65	
Raw grams per 100 g dry weight	111	114	115	**476**	250	313	435	333	110	286	
Nutrient											
Energy (kJ)	1698	1736	1574	1533	1675	**1922**	1565	1647	1559	1460	8,368–10,460
Protein (g)	10.4	8.1	14.5	9.5	3.5	**40.6**	7.0	5.0	12.4	3.7	50
Fat (g)	5.3	0.8	1.8	0.4	0.7	**21.6**	0.2	0.6	3.6	1.1	44–77
Carbohydrates (g)	82	91	82	81	**95**	34	87	93	82	91	130
Fiber (g)	8.1	1.5	**14.0**	10.5	4.5	13.1	13.0	13.7	6.9	6.6	30
Sugar (g)	0.7	0.1	0.5	3.7	4.3	0.0	18.2	1.7	0.0	**42.9**	minimal
Minerals	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[Y]	[H]	[Z]	RDA
Calcium (mg)	8	32	33	57	40	**616**	130	57	31	9	1,000
Iron (mg)	3.01	0.91	3.67	3.71	0.68	**11.09**	2.65	1.80	4.84	1.71	8
Magnesium (mg)	141	28	145	110	53	**203**	109	70	0	106	400
Phosphorus (mg)	233	131	331	271	68	**606**	204	183	315	97	700
Potassium (mg)	319	131	417	2005	678	1938	1465	**2720**	385	1426	4700
Sodium (mg)	39	6	2	29	35	47	**239**	30	7	11	1,500
Zinc (mg)	2.46	1.24	3.05	1.38	0.85	**3.09**	1.30	0.80	0.00	0.40	11
Copper (mg)	0.34	0.25	0.49	0.52	0.25	0.41	**0.65**	0.60	-	0.23	0.9
Manganese (mg)	0.54	1.24	**4.59**	0.71	0.95	1.72	1.13	1.33	-	-	2.3
Selenium (µg)	17.2	17.2	**81.3**	1.4	1.8	4.7	2.6	2.3	0.0	4.3	55
Vitamins	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[Y]	[H]	[Z]	RDA
Vitamin C (mg)	0.0	0.0	0.0	**93.8**	51.5	90.6	10.4	57.0	0.0	52.6	90
Thiamin (B1) (mg)	0.43	0.08	0.34	0.38	0.23	**1.38**	0.35	0.37	0.26	0.14	1.2
Riboflavin (B2) (mg)	0.22	0.06	0.14	0.14	0.13	**0.56**	0.26	0.10	0.15	0.14	1.3
Niacin (B3) (mg)	4.03	1.82	**6.28**	5.00	2.13	5.16	2.43	1.83	3.22	1.97	16
Pantothenic acid (B5) (mg)	0.47	1.15	1.09	1.43	0.28	0.47	**3.48**	1.03	-	0.74	5
Vitamin B6 (mg)	0.69	0.18	0.34	**1.43**	0.23	0.22	0.91	0.97	-	0.86	1.3
Folate Total (B9) (µg)	21	9	44	76	68	**516**	48	77	0	63	400
Vitamin A (IU)	238	0	10	10	33	563	**4178**	460	0	3220	5000
Vitamin E, alpha-tocopherol (mg)	0.54	0.13	1.16	0.05	0.48	0.00	1.13	**1.30**	0.00	0.40	15
Vitamin K1 (µg)	0.3	0.1	2.2	**9.0**	4.8	0.0	7.8	8.7	0.0	2.0	120
Beta-carotene (µg)	108	0	6	5	20	0	**36996**	277	0	1306	10500
Lutein+zeaxanthin (µg)	**1506**	0	253	38	0	0	0	0	0	86	6000
Fats	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[Y]	[H]	[Z]	RDA
Saturated fatty acids (g)	0.74	0.20	0.30	0.14	0.18	**2.47**	0.09	0.13	0.51	0.40	minimal
Monounsaturated fatty acids (g)	1.39	0.24	0.23	0.00	0.20	**4.00**	0.00	0.03	1.09	0.09	22–55
Polyunsaturated fatty acids (g)	2.40	0.20	0.72	0.19	0.13	**10.00**	0.04	0.27	1.51	0.20	13–19
	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[Y]	[H]	[Z]	RDA

A raw yellow dent corn
B raw unenriched long-grain white rice
C raw hard red winter wheat
D raw potato with flesh and skin
E raw cassava
F raw green soybeans
G raw sweet potato
H raw sorghum
Y raw yam
Z raw plantains
*/** unofficial

Storage

Roots and tubers such as yam are living organisms. When stored, they continue to respire, which results in the oxidation of the starch (a polymer of glucose) contained in the cells of the tuber, which converts it into water, carbon dioxide, and heat energy. During this transformation of the starch, the dry matter of the tuber is reduced.

Amongst the major roots and tubers, properly stored yam is considered to be the least perishable. Successful storage of yams requires:[34][45]

- initial selection of sound and healthy yams
- proper curing, if possible combined with fungicide treatment
- adequate ventilation to remove the heat generated by respiration of the tubers
- regular inspection during storage and removal of rotting tubers and any sprouts that develop
- protection from direct sunlight and rain

Storing yam at low temperature reduces the respiration rates. However, temperatures below 12 °C (54 °F) cause damage through chilling, causing a breakdown of internal tissues, increasing water loss and yam's susceptibility to decay. The symptoms of chilling injury are not always obvious when the tubers are still in cold storage. The injury becomes noticeable as soon as the tubers are restored to ambient temperatures.

The best temperature to store yams is between 14 and 16 °C (57 and 61 °F), with high-technology-controlled humidity and climatic conditions, after a process of curing. Most countries that grow yams as a staple food are too poor to afford high-technology storage systems.

Sprouting rapidly increases a tuber's respiration rates, and accelerates the rate at which its food value decreases.[34]

Certain cultivars of yams store better than others. The easier to store yams are those adapted to arid climate, where they tend to stay in a dormant low-respiration stage much longer than yam breeds adapted to humid tropical lands, where they do not need dormancy. Yellow yam and cush-cush yam, by nature, have much shorter dormancy periods than water yam, white yam, or lesser yam.

Storage losses for yams are very high in Africa, with bacteria, insects, nematodes, and mammals being the most common storage pests.[46]:1,7

Consumption

Yams are consumed in a variety of preparations, such as flour or whole vegetable pieces across their range of distribution in Asia, Africa, North America, Central America, the Caribbean, South America, and Oceania.[1]

Yams being fried in Ivory Coast

Africa

Yams of African species must be cooked to be safely eaten, because various natural substances in yams can cause illness if consumed raw. The most common cooking methods in Western and Central Africa are by boiling, frying or roasting.[47]

Among the Akan of Ghana, boiled yam can be mashed with palm oil into *eto* in a similar manner to the plantain dish *matoke*, and is served with eggs. The boiled yam can also be pounded with a traditional mortar and pestle to create a thick, starchy paste known as *iyan* (pounded yam) which is eaten with traditional sauces such as *egusi* and palm nut soup.[48][49]

Tonga

Pounding yam, DR Congo

Another method of consumption is to leave the raw yam pieces to dry in the sun. When dry, the pieces turn a dark brown color. These are then milled to create a brown powder known in Nigeria as *elubo*. The powder can be mixed with boiling water to create a thick starchy paste, a kind of pudding known as *amala*, which is then eaten with local soups and sauces.[50]

Yams are a staple agricultural commodity in West Africa with cultural significance,[47] where over 95% of the world's yam crop is harvested. Yams are still important for survival in these regions. Some varieties of these tubers can be stored up to six months without refrigeration, which makes them a valuable resource for the yearly period of food scarcity at the beginning of the wet season. Yam cultivars are also cultivated in other humid tropical countries.[1]

Yam is the main staple crop of the Igbos in south eastern Nigeria where for centuries it played a dominant role in both their agricultural and cultural life. It is celebrated with annual yam festivals.[51]

Brazil

Yams are particularly consumed in the coastal area of the Northeast region, although they can be found in other parts of the country. In Pernambuco state, it is usually boiled and served cut in slices at breakfast, along with cheese spread or molasses.

Colombia

In Colombia yam production has been specifically located in the Caribbean region, where it has become a key product in the diet of the population of this area. In 2010, Colombia was among the 12 countries with the highest yam production worldwide, and ranked first in yield of tons per hectare planted. Although its main use is for food, several studies have shown its usefulness in the pharmaceutical industry and the manufacture of bioplastics. However, in Colombia, there is no evidence of the use of this product, other than food.[52]

Philippines

In the Philippines, the purple *ube* species of yam (*D. alata*), is eaten as a sweetened dessert called *ube halaya*, and is also used as an ingredient in another Filipino dessert, *halo-halo*. It is also used as a popular ingredient for ice cream.[53]

Yams at Port-Vila market (Vanuatu)

Vietnam

In Vietnam, yams are used to prepare dishes such as *canh khoai mỡ* or *canh khoai từ*. This involves mashing the yam and cooking it until very well done. The yam root was traditionally used by peasants in Vietnam to dye cotton clothes throughout the Red River and Mekong delta regions as late as the mid-20th century, and is still used by others in the Sapa region of northern Vietnam.[54]

A piece of cake made with ube (purple yam; Philippines)

Indonesia

In Indonesia, the same purple yam is used for preparing desserts. This involves mashing the yam and mixing it with coconut milk and sugar. White- and off-white-fleshed yams are cut in cubes, cooked, lightly fermented, and eaten as afternoon snacks.

Japan

An exception to the cooking rule is the mountain yam (*Dioscorea polystachya*), known as *nagaimo* and can be further classified into *ichōimo* (lit. 'ginkgo-leaf yam'; kanji: 銀杏芋), or *yamatoimo* (lit. Yamato yam; kanji: 大和芋), depending on the root shape.

Yamakake, Japanese dish prepared from *tororo* (*D. polystachya*) and *maguro* (tuna)

Mountain yam is eaten raw and grated, after only a relatively minimal preparation: the whole tubers are briefly soaked in a vinegar-water solution to neutralize irritant oxalate crystals found in their skin.

Another variety of yam, *jinenjo*, is used in Japan as an ingredient in soba noodles. In Okinawa, purple yams (*Dioscorea alata*) are grown. This purple yam is popular as lightly deep-fried tempura, as well as being grilled or boiled. Additionally, the purple yam is a common ingredient of yam ice cream and cake with the signature purple color.

India

In central parts of India, the yam is prepared by being finely sliced, seasoned with spices, and deep fried. In Southern India, the vegetable is a popular accompaniment to rice dishes and curry. The purple yam, *D. alata*, is also eaten in India, where it is also called the violet yam. Species may be called by the regional name "taradi", which can refer to *D. belophylla*,[55] *Dioscorea deltoidea*,[56] and *D. bulbifera*.[57] Digging and selling taradi is a major source of income in the region of Palampur.[58]

Nepal

Dioscorea root is traditionally eaten on *Māgh Sankrānti* (a midwinter festival) in Nepal.

Fiji Islands

Yam is, along with cassava and taro, a staple food, and is consumed boiled, roasted in a lovo, or steamed with fish or meat in curry sauce or coconut milk and served with rice. The cost of yam is higher due to the difficulty in farming and relatively low volume of production.[59]

Jamaica

Because of their abundance and importance to survival, yams were highly regarded in Jamaican ceremonies and constitute part of many traditional West African ceremonies.[60]

The West

Yam powder is available in the West from grocers specializing in African products, and may be used in a similar manner to instant mashed potato powder, although preparation is a little more difficult because of the tendency of the yam powder to form lumps. The powder is sprinkled onto a pan containing a small amount of boiling water and stirred vigorously. The resulting mixture is served with a heated sauce, such as tomato and chili, poured onto it.

Skinned and cut frozen yams may also be available from specialty grocers.

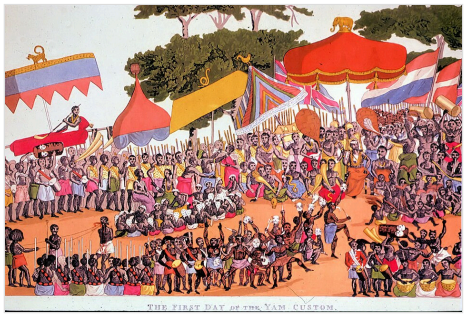
Phytochemicals and use in medicine

The tubers of certain wild yams, including a variant of 'Kokoro' yam and other species of *Dioscorea*, such as *Dioscorea nipponica*, are a source for the extraction of diosgenin, a sapogenin steroid.[33] The extracted diosgenin is used for the commercial synthesis of cortisone, pregnenolone, progesterone, and other steroid products.[61] Such preparations were used in early combined oral contraceptive pills.[62] The unmodified steroid has estrogenic activity.[63]

In culture

Historical records in West Africa and of African yams in Europe date back to the 16th century. Yams were taken to the Americas through precolonial Portuguese and Spanish on the borders of Brazil and Guyana, followed by a dispersion through the Caribbean.[64]

Yams are used in Papua New Guinea, where they are called *kaukau*. Their cultivation and harvesting is accompanied by complex rituals and taboos. The coming of the yams (one of the numerous versions from Maré) is described in Pene Nengone (Loyalty Islands of New Caledonia).



1817 painting of Ashanti yam ceremony, Ghana

Nigeria and Ghana

A yam festival is usually held in the beginning of August at the end of the rainy season. People offer yams to gods and ancestors first, before distributing them to the villagers.

The New Yam Festival celebrates the main agricultural crop of the Igbos, Idomas, and Tivs. The New Yam Festival, known as *Orureshi* in Owukpa in Idoma west and *Ima-Ji*, *Iri-Ji* or *Iwa Ji* in Igbo land, is a celebration depicting the prominence of yam in social and cultural life.

The Igbo people accord special respect to yam to the extent that no one eats the newly harvested yam until the New Yam celebrations or feast is marked. It is called Iri ji ọhụrụ.

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External links

- Yam at the Wikibooks Cookbook subproject
- "Yam crop improvement" (https://www.iita.org/research/our-research-themes/improving-crops/yam-crop-improvement/). *International Institute for Tropical Agriculture*.