HORTICULTURE NOTE: NO. 4
YAMS

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SPECIES

There are two main species of yam grown in Papua New Guinea:

1. *Dioscorea alata* - the greater yam (Pidgin: yam tru; Motu: maho
2. *Dioscorea esculenta* - the lesser yam (Pidgin: mami; Motu: taitu)

Other yams grown for food in Papua New Guinea include *Dioscorea bulbifera, D. pentaphylla, D. nummularia* and *D. hispida.*

WHAT THE PLANT LOOKS LIKE

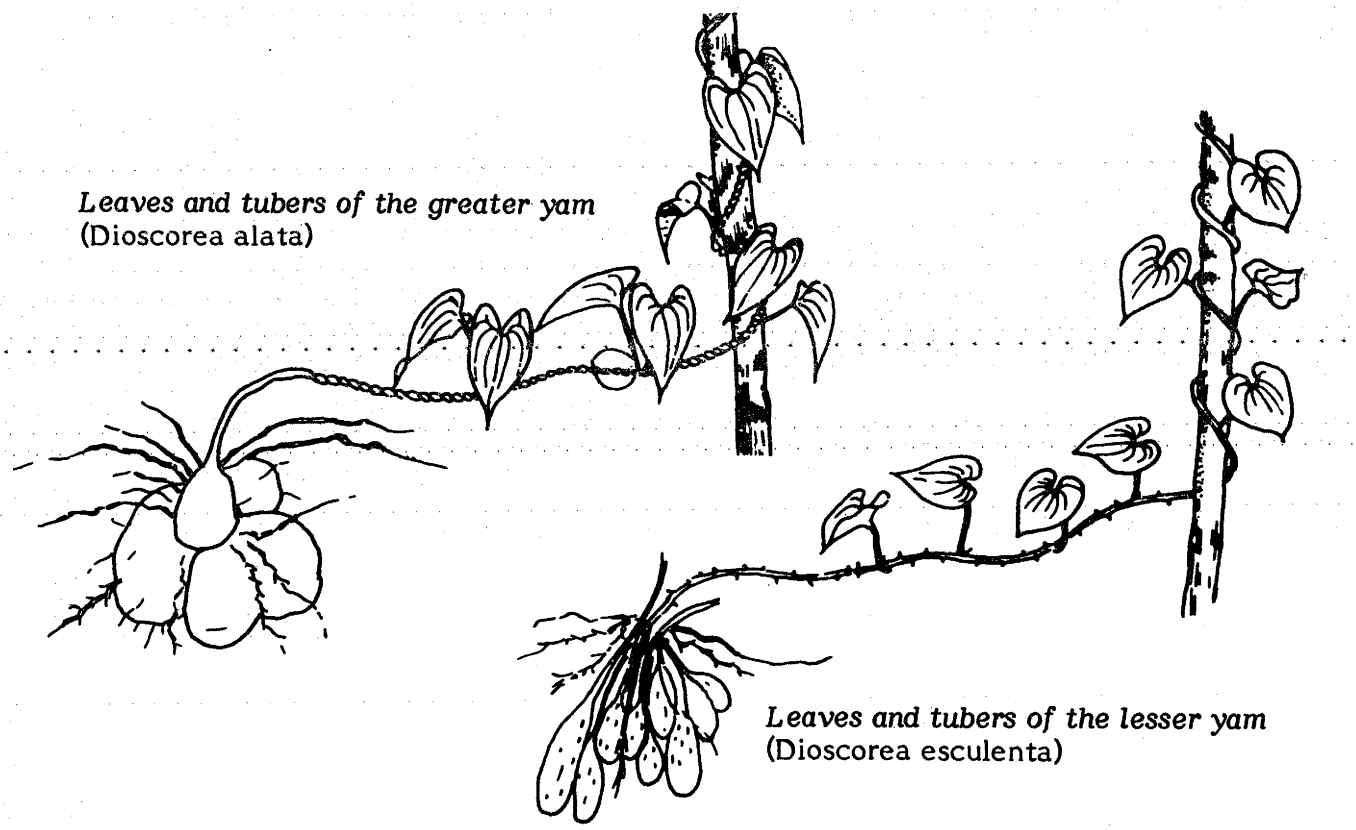
Yams have smooth or spiny climbing stems. They have either heart or finger shaped leaves.

The different shapes of leaves and tubers of various species are shown in the diagrams.

WHERE YAMS GROW

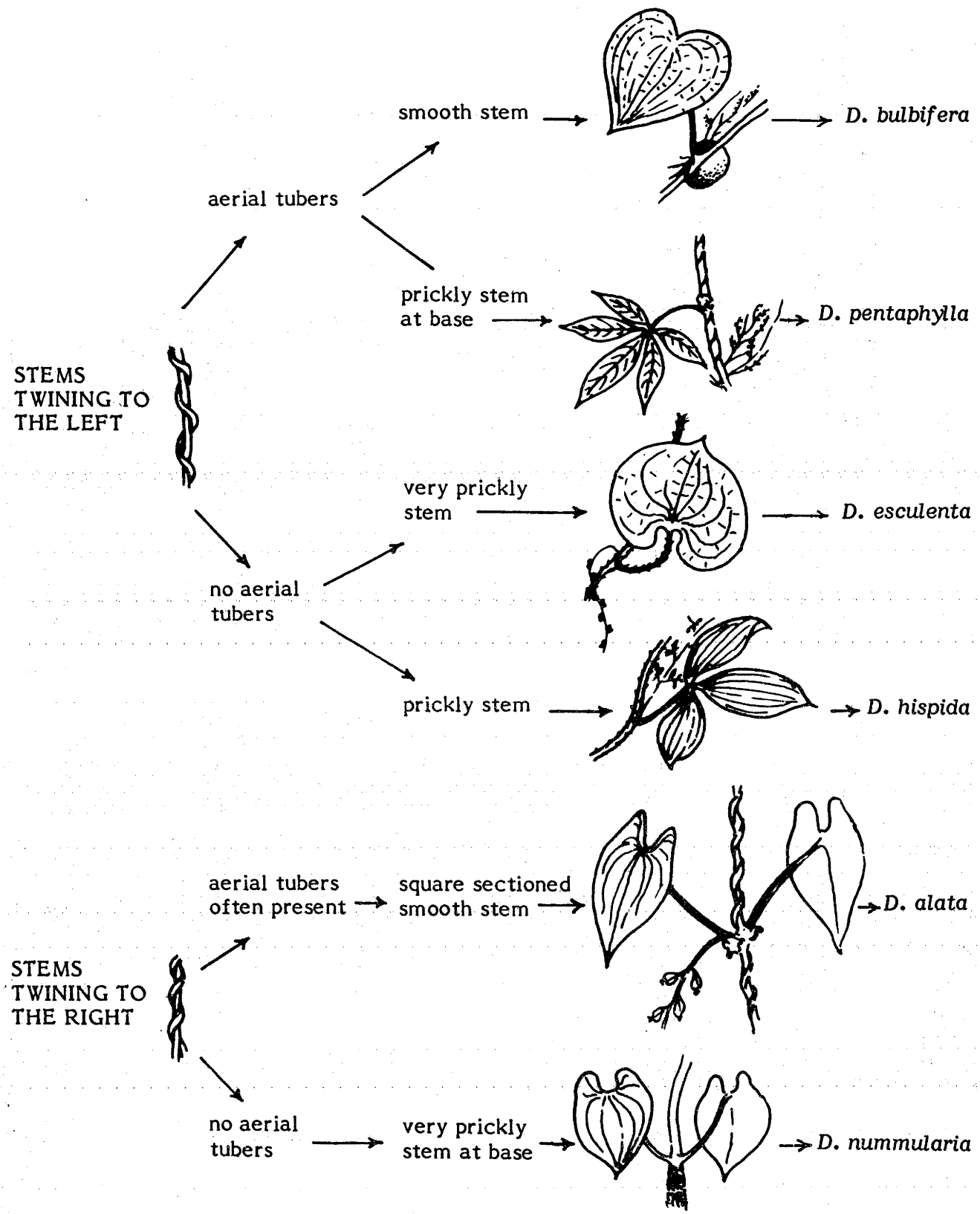
Yams have been cultivated for at least 2000 years in South East Asia, and for a long time in Papua New Guinea. It is thought that *D. alata* has been grown in this country for longer than *D. esculenta*, as *D. alata* is more widespread and has greater ceremonial importance.

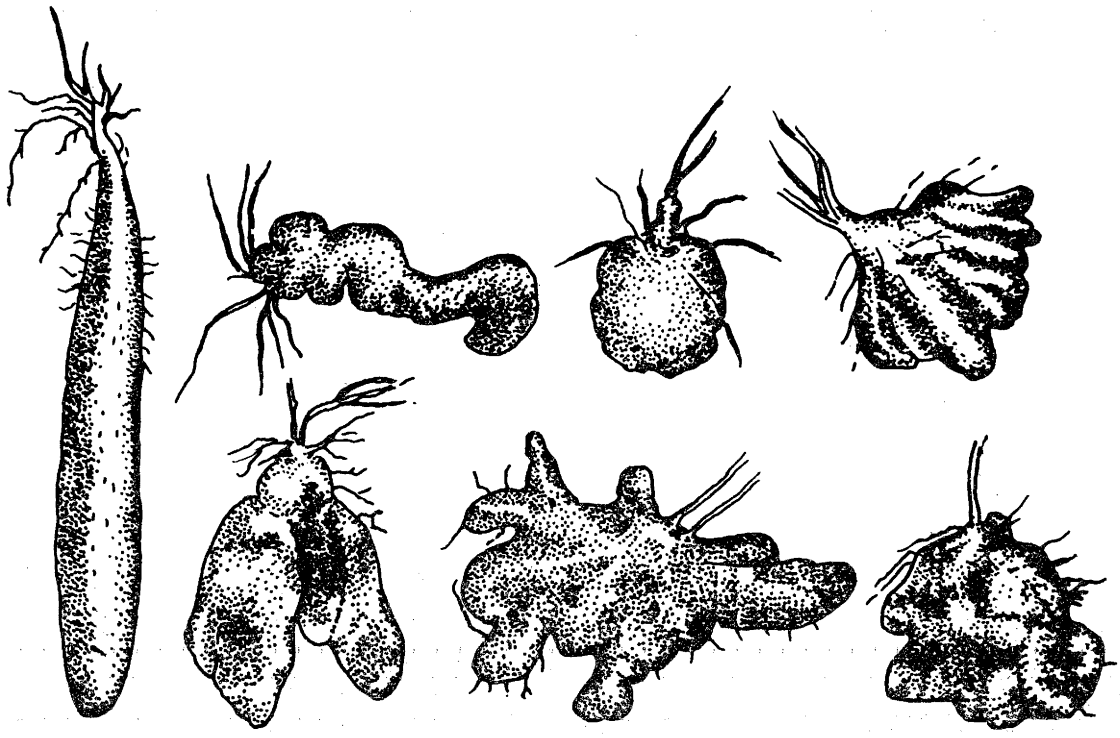
Yams are important crops in lowland areas which have marked wet and dry seasons, e.g. parts of the East and West Sepik, Milne Bay, Central and Western Provinces. *D. alata* can grow up to 2100 m but is only important below 1900 m. *D. esculenta* is occasionally grown in the highlands but is rarely seen above 900 m.



Leaves and tubers of the greater yam
(Dioscorea alata)

Leaves and tubers of the lesser yam
(Dioscorea esculenta)


STEMS TWINING TO THE LEFT
aerial tubers
smooth stem
D. bulbifera
prickly stem at base
D. pentaphylla
no aerial tubers
very prickly stem
D. esculenta
prickly stem
D. hispida
STEMS TWINING TO THE RIGHT
aerial tubers often present
square sectioned smooth stem
D. alata
no aerial tubers
very prickly stem at base
D. nummularia



Tubers of the greater yam (Dioscorea alata) grow in many different shapes and sizes. Some are shown here.

Long rainy seasons are needed for best growth. However too much rainfall can help to spread leaf diseases. Yields are reduced by drought.

SOILS AND FERTILIZERS

Yams must be grown in soils with good drainage. Deep, loose, well-drained clay loam soils are best. Sandy soils often do not hold enough water.

Yams are usually planted in mounds or ridges. During the first six weeks of growth, yams use up the food stored in the sett (the tuber from which the new plant grows). For the first half of the growth period, yams need plenty of nitrogen for the growth of leaves and stems. When the tubers start to develop, potassium is required.

Yams are usually the first crop planted on newly cultivated ground and inorganic fertilizers are not usually necessary for good growth. Partially rotted organic material is useful, and should be dug into the soil before planting.

VARIETIES

There are many varieties of *D. alata* and *D. esculenta*. Varieties which give high yields of good tubers under local conditions should be used.

HOW YAMS ARE GROWN

Yams are always planted from whole tubers, tuber pieces or aerial (above ground) tubers. The largest and healthiest tubers should be selected for planting. Only tubers of *D. alata* can be cut for setts. Setts cut from tubers should weigh 100-500 g. When the tubers are cut for setts, throw away any rotten parts. The cut surfaces should be dusted with wood ashes and allowed to dry a little before planting. Always handle setts very carefully.

Plant yams at the beginning of the wet season. Dig a hole in the soil and place the sett in it. Cover the sett with about 10 cm of soil. Sometimes a mulch of dried grass is placed over the planting site, though many different practices are used throughout Papua New Guinea.

Yams which are staked normally give higher yields than those grown on the ground. However the gain in yield must be balanced against the cost of the stakes and the extra labour involved. The stakes should be about 2 m long. One stake is needed for each plant. Trees left during land preparation may be used.

To ensure high yields, keep your gardens free of weeds.

HARVESTING, STORAGE AND YIELDS

D. alata requires 7 months from planting to harvest whilst *D. esculenta* requires 8 to 10 months. Yams should not be harvested until the vine has completely died. Most varieties of *D. alata* produce large tubers, deep in the ground. They must be dug with care.

The tubers of *D. esculenta* vary greatly. Some varieties have tubers which look like sweet potatoes while others have larger tubers, up to 3 kg in weight. Each plant produces 4 or more tubers, so the total yield is often high. *D. esculenta* is suitable for mechanical harvesting.

Individual tubers of *D. alata* can weigh up to 80 kg. The highest yield recorded in a village garden during a survey in Central Province in 1983, was 20 t/ha.

D. esculenta has a thin skin and is easily damaged at harvest. However, if dug carefully the tubers will store for several months.

D. alata has a thick skin and long dormancy period, and can be stored for many months. Insects and diseases can shorten the storage life.

Storage practices vary. Yams can be left in the ground but there is greater risk of loss from rats and pigs. Yams may be stored by placing them on shelves in specially made houses, or in a room of the farmer's house. Free circulation of air around the tubers helps to prevent rotting. Storing yams in piles is common but it should be discouraged as rots can spread rapidly through the pile.

HOW YAMS ARE USED

Yams are usually peeled, then boiled in water until soft. They can also be cooked in a mumu or baked in a fire. Some varieties of *D. alata* can be used to make crisps, similar in taste and texture to potato crisps. They are made by frying thin slices of yam quickly in hot fat or cooking oil.

PESTS AND DISEASES

D. esculenta is relatively free of pests and diseases. A leaf spot caused by *Cercospora* sp. occurs, but damage is usually not serious.

Anthracnose, caused by the fungus *Colletotrichum gloeosporoides* (*Glomerella singulata*) can be a very serious disease of yam in Papua New Guinea. *D. alata* is much more likely to be attacked by this disease than *D. esculenta*. Anthracnose is more serious in the wetter areas of the country.

The first signs of anthracnose are generally small brown spots, less than 5 mm across, on the lower stems and leaves. These grow larger and become black, and the leaves may curl up. A special characteristic of the disease is that the fungus grows within the spots, in concentric circles (rings of different sizes one inside the other). The plant may become infected by other diseases, especially in wet weather and this can lead to the death of the plant.

Anthracnose spores live on crop waste. This is an important source of infection in newly planted crops. Therefore, one way to reduce the level of the disease is to remove and burn all crop waste after harvest. Also, plant yam species which are least affected by the disease - especially in wetter areas.

Nematodes are pest of yams, especially *D. alata* in Papua New Guinea. Only clean sound planting material should be used. Do not use tubers which are rotting or showing dark brown lesions (cracks) on the cut surface. (See Plant Pathology Note No. 5.)

A number of insects feed on the leaves of yams however control is not usually necessary. A mealy bug (*Planococcus dioscorea*) feeds on the roots and tubers of yams. In storage they multiply and cause shrivelling of the yams. Only clean healthy tubers should be used as planting material.

FURTHER READING

Massal, E. and Barrau, J. (1956). *Food Plants of the South Sea Islands.* South Pacific Commission Technical Paper No. 94. Noumea. (Reprinted 1980.)

Plant Pathology Note No. 5. Root Knot Nematode. *Harvest* 6 (3): 154-156.

Purseglove, J.W. (1972). *Tropical Crops - Monocotyledons.* Longmans, London. pp. 79-117.

Wilson, J. (no date). *Careful Storage of Yams.* Commonwealth Secretariat, London. (Available from Publications Section, D.P.I., Konedobu).

FURTHER INFORMATION

For further information and advice on vegetable growing contact the Area Horticulturist in your region. The addresses for the Area Horticulturists are as follows:

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