

Groundnut - Recommended Cultural Practices

Introduction

Groundnut is grown either as a sole crop or intercropped with maize or sorghum. The cultivation of the crop started in irrigated agriculture, but later spread to the dry land cropping system. Soil conditions in dry land farming are considered more favorable for groundnut production. The seed contains 50 to 52% oil and 24 to 25% protein. Though the seed is generally roasted and eaten as a snack, there is great potential for oil extraction.

Land Preparation

Early and deep ploughing (20-30 cm) is important. Make a good firm seedbed with a moderately fine tilth. If groundnut is to be grown on ridges, the ridges should be made at or just before sowing, and should be flat-topped. If the soil is dry when the ridges are being made, a light rolling after ridging will help make the seedbed firm.

Crop Rotation

Groundnut fits into a wide range of farming systems. When grown as the sole crop, the crop is rotated with maize in irrigated farming and sorghum in rainfed farming. To reduce the incidence of pests and soil borne diseases, groundnut should not be monocropped. Groundnut does well on virgin land or following a well-fertilized crop such as maize. The soils in the Bay region are more suitable for groundnut production, but the high soil pH (8.0-8.3) in these soils could be a limiting factor for groundnut production.

Fertilizer Application

Groundnut will not grow well or fix nitrogen in acidic or infertile soils. The soil pH should be between 5.3 and 6.5; the crop should not be grown on soils of pH above 7.5.

Groundnut can benefit from residual fertility and in general, no additional fertilizer is needed if the crop is grown on well-managed land previously treated with a balanced fertilizer. Most soils in rainfed agriculture contain too little phosphorus, so in order to ensure good plant establishment, high yield, and good seed quality, apply single superphosphate before or at sowing. It will supply the crop with the phosphate, sulphate and calcium that are essential for crop growth and development. The fertilizer recommendation is more important for large-seeded virginia types than for the small-seeded Spanish types. The large-seeded types have thick shells and require more fertilizer input to facilitate normal seed development, while small-seeded types have thin shells and need less fertilizer application. In Somalia, most farmers grow Spanish type varieties.

Selection of varieties

Two new varieties of groundnuts were tested in the Lower and Middle Shebelle regions. The agronomic and yield performance of both varieties compared to the local in trials conducted in Afgoi, Jowhar and Jannale during the Gu of 2009 is in table 1.

Table 1: Yield and agronomic performance of two ICRISAT and one local variety of groundnut grown in Jowhar, Jannale and Afgoi during the Gu 2009 season.

Variety	Source	Days to 50% flowering	Plant Height (cm)	100 Seed Weight (gram)	Yield (kg/ha)
ICG12991	ICRISAT	33	33	35	1562
ICGV-SM 99568	ICRISAT	22	33	55	1506
Local	Local	25	40	36	2120

Good quality seed with a high germination percentage should be used. Groundnut pods intended for sowing should be hand-shelled 1-2 weeks before sowing. Select only fully matured nuts. Ensure that damaged seeds are removed before sowing. Also bear in mind that the germination rate declines when seed is kept for more than one month. However, loss of viability can be partly reduced by storing the seed in a cool dry place.

Seed Treatment

Before sowing it is recommended that groundnut seed be treated with a fungicide dust to control seedling blights caused by soil bacteria and fungi. Fungicides will reduce fungal disease and damping off, and thus increase both quantity and quality of the crop. Fungicidal dust, e.g., Thiram, has so far proved the best and gives adequate protection if coverage is good. The usual application rate is 120 g of Thiram per 100 kg of seed.

Sowing

In general, early sowing improves yields. Delays in sowing can reduce yields by up to 50% and adversely affect seed quality. Early-sown crops also takes advantage of early showers and suffer less risk of rosette and other diseases.

Plant Spacing and Seed Rate

Spacing will depend on the variety and moisture availability. If moisture is not a limiting factor, small-seeded Spanish types are spaced at 60 cm between rows and 10 cm between plants. This gives an optimum plant population of 167,000 per hectare. The large-seeded virginal types are spaced at 75 cm between rows and 15 cm between plants, giving an optimum plant population of 89,000 per hectare. These recommendations hold regardless whether it is sown on ridges or on the flat. In rainfed agriculture, spacing of 60 cm x 15cm is ideal.

Weed Control

Groundnut cannot compete effectively with weeds, particularly at the early stages of development (3-6 weeks after sowing). Early removal of weeds reduces this competition.

Crop rotation may reduce certain species of weeds. The crop should be thoroughly weeded within the first 45 days. Once flowering starts, weeds should be hand-pulled to prevent damage to developing pegs and pods.

Diseases

Groundnut is susceptible to a number of diseases such as early leaf spot, late leaf spot, rust, rosette, and aflatoxin.

Foliar Diseases

Early leaf spot (*Cercospora arachidicola*) is the most important groundnut foliar disease throughout Eastern Africa. It usually appears on 2-3 weeks old seedlings. Small chlorotic spots appear on leaflets about 10 days after infection. The spots develop into mature, sporulating, subcircular lesions.



Figure 1: Early leaf spot - *Cercospora arachidicola*



Figure 2: Late leaf spot - *Phaeoisariopsis personata*

Late leaf spot (*Phaeoisariopsis personata*) usually occurs on 3-month old crops and severity is generally low to moderate. Lesions caused by late leaf spot are usually smaller, more nearly circular, and darker in colour than those of early leaf spot.

Since the leaf spot pathogens survive mainly on infested crop debris in the soil, cultural practices such as crop rotation and burying of the crop debris can significantly reduce disease severity. Timely land preparation, in which buries infested crop debris under the soil, also helps reduce disease severity.

Rust (*Puccinia arachidis*)

Generally occurs sporadically and at low severity, but can sometimes cause significant yield losses. The pathogen can survive on volunteer groundnut plants. Long-distance spreading of the disease can occur through airborne spores, spores contaminating the surfaces of pods/seeds, or infected crop debris.



Figure 1: Rust - *Puccinia arachidis*

Rosette

Groundnut rosette, a virus disease transmitted by the aphid (*Aphis craccivora*), is widely prevalent in east Africa. Rosette may not occur at serious levels every year, but yield losses can reach 100% during disease epidemics. Late-sown crops, especially where plant stands are poor, are at greatest risk.



Figure 4: Rosette

Early sowing at optimum plant population will give complete soil cover as quickly as possible. This will restrict the movement of aphids, thereby controlling the spread of rosette disease. The use of rosette-resistant cultivars will also prevent crop losses.

Aflatoxin

Aflatoxin (*Aspergillus flavus*), a fungi of the aspergillus group, can invade groundnut tissues, producing toxic compounds known as aflatoxins. Contaminated produce can be poisonous to people and livestock, and cannot be exported. Aflatoxin contamination and the related root disease also affect groundnut seed, leading to low germination percentage and poor seedling establishment. Aflatoxin contamination can occur before harvest,



Figure 5: Groundnuts affected by Aflatoxin

during field drying and in storage.

Pre-harvest contamination is influenced by soil moisture and temperature, and is likely to be most serious under drought conditions. Postharvest aflatoxin contamination occurs if the groundnuts becomes moist and / or damaged, and can occur at harvest or later.

Methods to control aflatoxin include:

- 1) Avoiding mechanical damage to pods or kernels during weeding, harvesting and storage.
- 2) Harvesting groundnuts as soon as they are mature
- 3) Proper drying (until moisture content is reduced to 6-8%). This will help avoid aspergillus infection and consequent aflaricin contamination. Normally this can be achieved by drying pods in the sun for 6-7 days, taking care to cover them if it rains.
- 4) Storing groundnuts in the shell, at low temperatures and under moisture-free conditions.

Insect Pests

Groundnut is generally free from serious insect pests, but some insects can cause economic damages. The economically important pests are aphids, thrips (*frankliniella schultzi*), jassids (*Empoasca dolichi*), white grubs, termites (mainly *Microtermes* sp), and *Hilda patruelis*. False wireworms and millipedes seem to occur less frequently. In general soil insects appear to cause more damage than foliage feeders or sucking pests. However, aphids are particularly harmful because they transmit groundnut rosette disease.



Figure 2: Picture of adult thrip - *frankliniella schultzi* and its effects on the groundnut plant

Control of insect pests

No control measure has proved effective against termites and *Hilda partuelis*. It is therefore important to avoid growing groundnut in fields with a history of termites or in fields with termite mounds. *Hilda* is commonly found at the edge of the field, so its incidence can be reduced by clearing grass at the edges of the field. Aphids can be controlled with insecticide sprays but these are expensive, and therefore the use of rosette-resistant varieties is recommended. Sowing at optimum plant population will restrict aphid movement, thus reducing the spread of rosette.

Harvesting and Postharvest Handling

It is important to harvest groundnut at the right time, i.e., when the crop is mature. Groundnut is mature when 70% of the inside of the shells have dark markings and the kernels are plump with the colour characteristic of the variety. If harvested prematurely, the kernel will shrink upon drying, resulting in decreased shelling percentage, poor seed quality, and lower oil content.

Drying

The primary objective of drying is to achieve rapid but steady drying of the pods, in order to avoid aflatoxin contamination. Harvested plants should be staked in the field for a few days to allow them to dry in the sun and air, before stripping the pods. Then drying should continue until the moisture content is reduced to 6-8%. Normally this can be achieved by drying the pods in the sun for 6-7 days, taking care to cover them if it rains. But remember that if pods are exposed to the sun for too long, both, kernel quality and seed germination will be affected.

Storage

Groundnut is best stored unshelled, in cool, dry conditions, protected from rain and vermin (particularly rats and mice). Bagged groundnuts - whether shelled or unshelled - should not be placed directly on a concrete floor due to the risk of dampness that may cause mould to develop. Before bagging, dust the pods with Actellic Super to protect them from storage pests.