Chapter 5

6- Ground nut

Arachis hypogaea L.

Fabaceae

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Groundnut

- Groundnut seed contains 44-55% oil and 22-30% protein on a dry seed and is a rich source of mineral (phosphorus, calcium, magnesium and potassium) and vitamins E, K and B group.
- Groundnut oil also contains some palmitic acid, arachidonic acid, behenic acid, lignoic acid and other fatty acids.

BOTANICAL DESCRIPTION

Family :Leguminoceae/(Fabaceae)

Sub-family :Papilionoideae

Common Name: Groundnut

Scientific Name: *Arachis hypogaea L*

Origin: Northern Argentina and South Bolivia and Brazil in which majority of the species are found. Bolivia has the second largest number of species follow Paraguay, Argentina and Uruguay.

Cultivar choice and production potential

All cultivars can be grown under irrigation. Giza 5 cultivars matured after 120 days from sown. Giza 6 matured after 110 days from sown. Ismailia 1 and followed erects types. Giza 4 cultivar is half prostrate type.

The groundnut plant produces runners (horizontal stems) which in turn produce flowers at each node. These flowers self-pollinate and produce an anchor or peg which penetrates the ground. The groundnut pod is produced underground at the tip of the pegs.

Statistical of Production

- The world total planted area from Ground nut was 27.94 million hectares produced about 47.1 million tons with average of 1685 kg/ha.
- The highest harvested area from China cultivated 4.62 million hectare, and highest production also from China was 17.15 million tons. The highest productivity per unite area from China was 3705 kg/ha.
- In Egypt, the total cultivated area was 62000 hectares produced about 199000 tons with an average 3209 kg/ha. (FAO State, 2017)

Environments Requirement

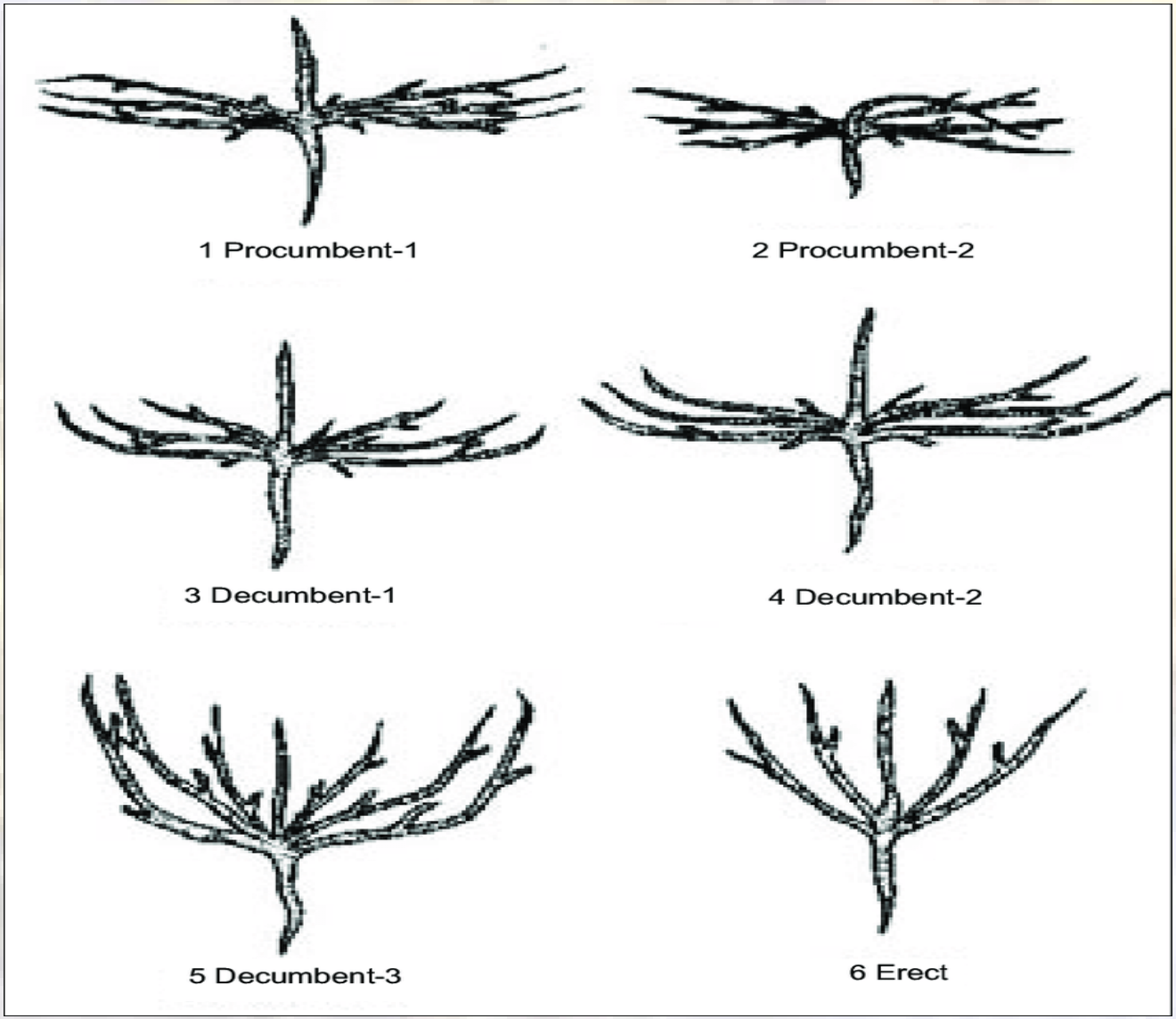
- Warm and moist conditions are highly congenial for groundnut cultivation.
- Temperature, light intensity and humidity significantly influence the productivity of groundnut.
- Optimum temperature of 25-35 °C is required for good germination, flowering and pod formation.
- Sandy-loam soils rich in organic matter is considered best for the crop.
- Sowing time of *summer* groundnut is March to June.
- The lower limit for germination of groundnuts is around 18°C. Temperatures between 20-30°C result in 95% germination. However at 33°C this declines to 84%. Optimum germination temperatures are thus between 20-30°C with a minimum of 18°C.

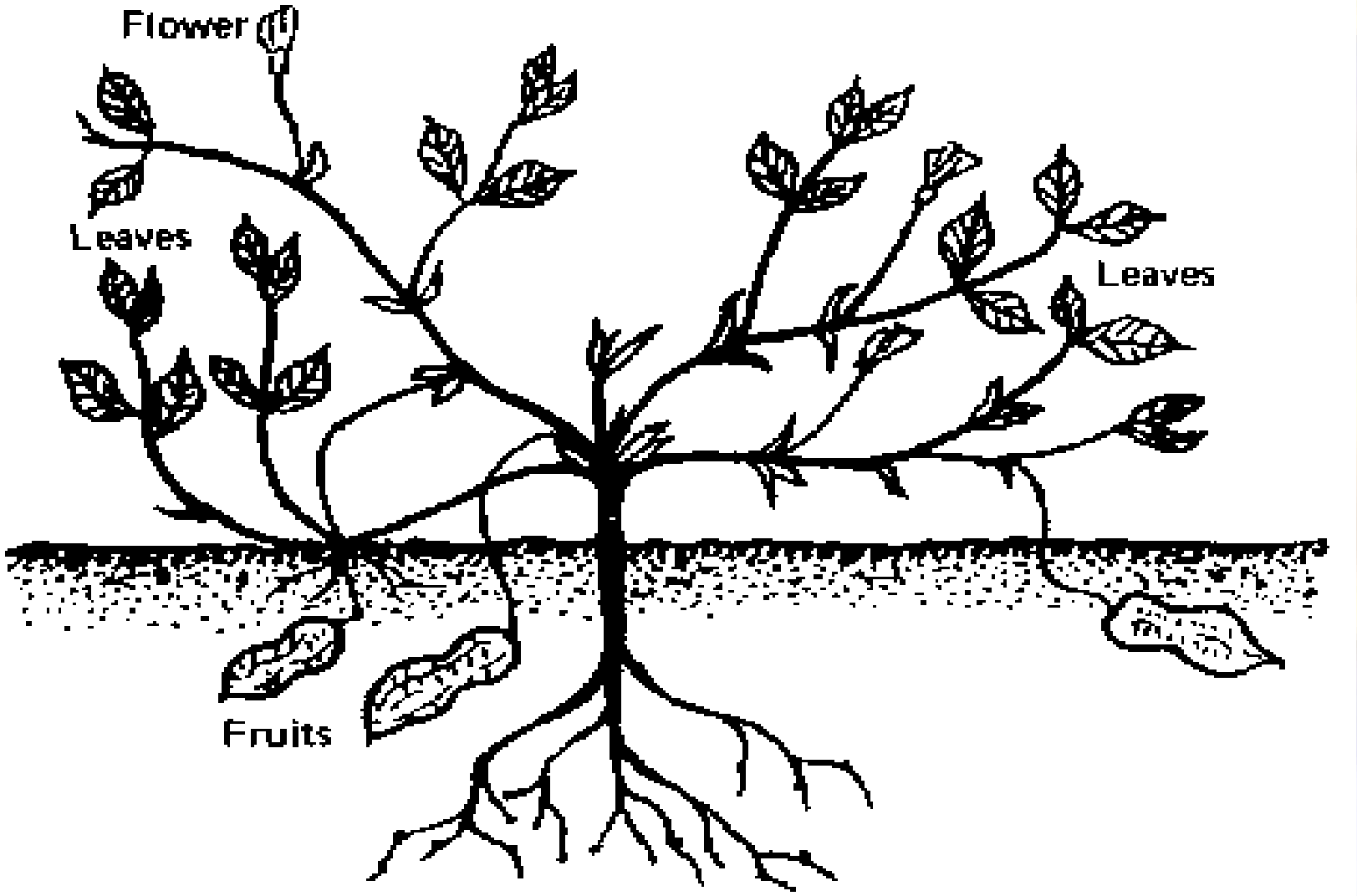
Types

The species *A. hypogaea* consists of two subspecies, ssp hypogaea and ssp fastigiata. Each subspecies has two botanical varieties

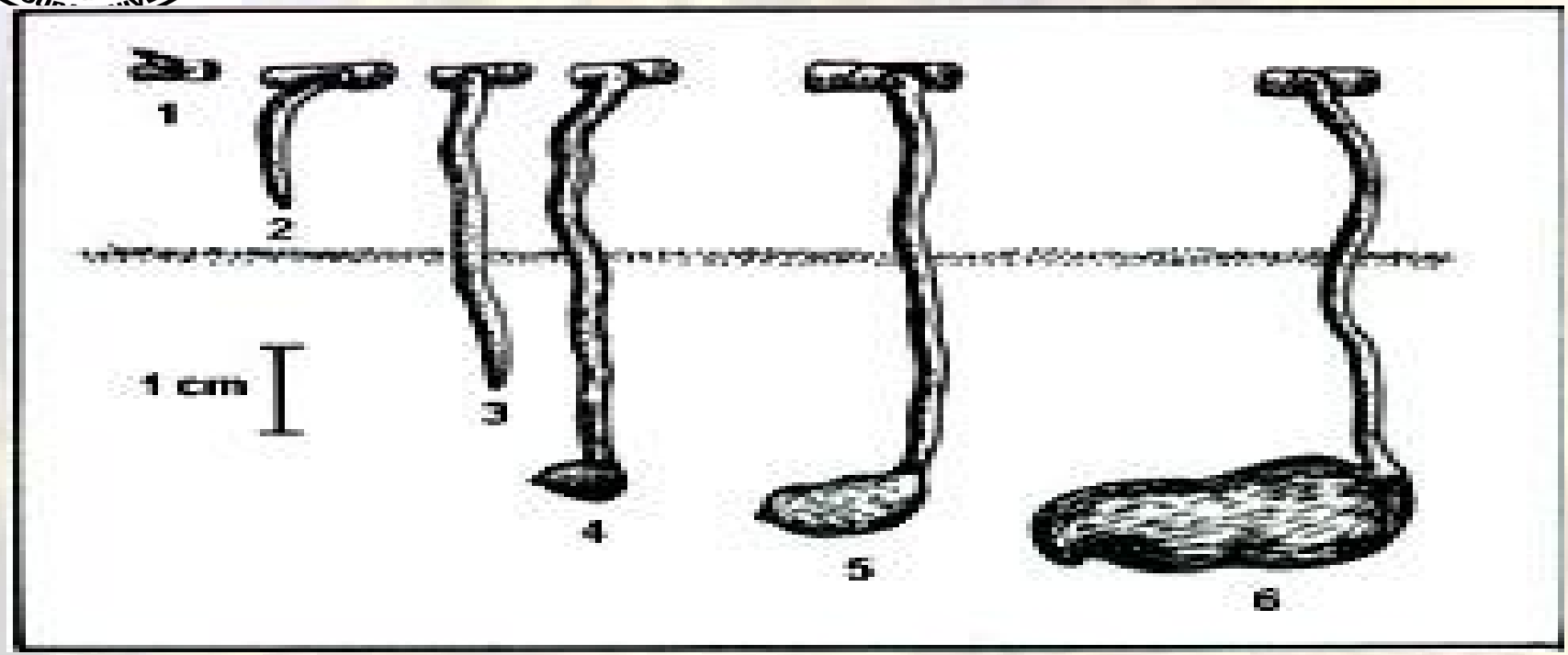
1. Arachis hypogaea hypogaea hypogaea Linn.
2. Arachis hypogaea hypogaea hirsuta Kohler.
3. Arachis hypogaea fastigiata fastigiata Waldron.
4. Arachis hypogaea fastigiata vulgaris Harz.

Growth habit





A groundnut plant



Normally 60-80 days are required for pod development from flowering to maturation in spreading types and slightly less than that (50-60 days) in bunch types. Vegetative development declines during pod filling.

Soil

Groundnut is grown in a well-drained sandy loam, or sandy clay loam soil. Deep well-drained soils with a pH of 6.5-7.0 and high fertility, are ideal for groundnut.

Runner and Spanish types are better suited to heavy textured soils than the Virginia types. The loss of pods is usually high in heavier soils.

An optimum soil temperature for good germination of groundnut is 30°C. Low temperature at sowing delays germination and increases seed and seedling diseases.

Crop rotation

A well planned, crop rotation system can ensure good yields of high quality. In order to reduce risk in the farming system, groundnuts should be grown in rotation with other crops, especially grass type crops. Groundnuts have been shown to improve the yield of subsequent maize and other grain crops up to 20%. Ground nut sown after winter crops like wheat, flax and hordium.

A crop rotation of groundnut-cereal-cereal helps in efficient nutrient utilization and reduces soilborne diseases and nematodes. It also helps to reduce the incidence of weeds.

Planting date and Depth

The normal planting time for groundnuts in Egypt is April-June.

The correct planting depth of 50-75 mm ensures that the plant develops and produces optimally. Seed which germinates slowly as a result of deep planting, takes longer to emerge and a substandard plant will be produced. We should cultivated peanut SSat suitable date due to *increases in the period of vegetative growth consequently increase the period of photosynthesis and reduced competition between peanut plants then increase seed yield*. Sown at optimum planting date increase number of plants per unit area reflected *peanut* plants will be more approached to uniformity which helps sun radiation penetration within plants then increase net photosynthesis, consequently increase seed number and size then increased seed yield.

Seeding rate and plant density

- **Seeding rate was 40-45 kg/fed from seed or 75 kg from pods. Generally 35 000 plants/fed are recommended for dryland production, while 70 000 plants/fed are ideal for irrigation. Various plant patterns can be followed, namely single row, double row, tram lines, etc. Row width 50-60 cm apart. Groundnuts should not be planted closer than 50 cm in the row. Hills was cultivated at 5-10 cm between.**

Planting peanut with optimum plant population density reduced competition between plants then increase photosynthesis rate which consequently increase seed yield. **Sowing *peanut* at optimum stand increase number of plant per unit area reflected plants will be more approached to uniformity which helps sun radiation penetration within plants then increase net photosynthesis, consequently increase seed number and size then increased seed yield.**

Seed treatments

- Groundnut seed is susceptible to fungal rot in the soil. A fungicidal seed treatment will limit this decay and increase the stand in the field. It is therefore recommended that all seed be treated before planting. Two seed coating agents are currently registered for use on groundnuts, namely Mancozeb and Thiram. Comprehensive directions for the use of these agents are indicated on the label.

Fertilization requirments

1- Application of 10 m3/fed of chicken manure or 20 m3/fed of well decomposed farm yardmanure should be completed at least 1 month before sowing. Gypsum is a cheap source of calcium (19-24%) and sulphur (15-18%).

2-Application of 200 kg/fed calcium super phosphate (15.5 P2O5) during seed bed preparation.

3- 2-Application of 50 kg potassium sulphate (48% K2O) before the second irrigation.

4- Groundnut fixes atmospheric nitrogen with the help of Rhizobium in the root nodules. So, An application of 10 kg N/fed as ammonium sulphate at the time of sowing is recommended for soils with moderate to low nitrogen content. If no rhizobium inculpation N fertilizer will be added at rate of 30 kg N/fed as calsium nitrate

Micronutrient fertilization

- 1- In soils where available sulphur is less than 10 ppm, sulp However, additional sulphur is not required when gypsum is applied because it also contains 15-18% sulphur hur application is necessary.
- 2- Groundnut grown in soils with a high pH often show iron chlorosis.
- 3- Zinc increases the chlorophyll content in the leaves, the number of nodules, and pod yield. Zinc deficiency occurs when the soil is alkaline or low in organic matter.
- 4- Molybdenum deficiency decreases vegetative growth, effective nodulation, and nitrogen content of foliage. Molybdenum availability increases under alkaline conditions.
- 5- Severe boron deficiency causes leaves to turn deep green. Plant growth is reduced. Terminal leaves are small and deformed. Internodes length is reduced, due to secondary branching.
- So, 0.5 g/L from Zn + Mn + Fe and spray twice, the first after 45

Irrigation

- In Egypt, groundnut Irrigated with sprinkler or dripped irrigation in sandy soils every 4-6 days. In case of floating irrigation was irrigated every 15 days in yellow clay soil.
- Water deficit during the flowering and pegging stages results in higher yield losses than stress at any other growth stage; This deficit reduces the number of flowers plant-1.
- Water deficit in the soil surface during peg formation and pod development reduces pod number and pod yield.

Harvesting

- After 120 days from sown,Yellowing of foliage, and dropping of older leaves. The groundnuts should be harvested when approximately 75% of the pods have reached maturity. The mature pods become hard and tough. The inside shell surface becomes rough with visible net venation with a dark brown color. When 75% of the pods of a selected number of plants already show the dark discolouration (indicating maturity), the harvest process can start. Groundnuts can be harvested either by means of the stacking method or mechanically. In the mechanical harvesting method, groundnuts are placed in wind rows after being lifted, harvested with a combine and conditioned in a drying unit.

Seed Yield

- Productivity was about 20-25 ardab/fed seed (one ardab = 75 kg) differed according to cultivar and sown dates

thank you