

# Peanut: A Soil Conserving Leguminous Oil Crop



**Rani G. Kumar, Girish K. Panicker\* and Franklin O. Chukwuma**

**Definition:** A native of South America, Peanut or groundnut (*Arachis hypogea* L.) is a member of the pea family. A perennial herbaceous legume, peanut is self-pollinating and commonly cultivated as an annual. This universal crop, grown in warm regions is considered the fifth important oilseed, globally. Peanut came to the United States along with the African trading ships, during the colonial period.

## **Purposes:**

- To conserve soil and water through the use of vegetation
- To maintain and /or improve soil availability, quality, and soil nutrients
- To suppress weeds, reduce insect pests and diseases, and increase crop yield
- To improve soil tilth, soil organic matter, and soil structure

## **General Criteria Applicable to all Purposes**

**Planting:** The best time for planting peanut is the first week of May. The four main varieties produced around the world include Virginia, Runner, Spanish and Valencia. Cultivar selection has to be done on the basis of tests, quality, higher yield, pest resistance and maturity. Pest management, seedbed preparation, fertilization and moderate irrigation, performed prior to the planting will ensure a bumper harvest. Minimum 50 degree F is necessary for full growth. In order to reach maximum canopy cover, the crop needs 60 to 70 days and full sunlight. Peanuts require a growing cycle of four to five months (110 to 160 days). Twin row planting offers higher yields and larger seeds. Peanuts add extra weight immediately before harvest.

**Soil and Spacing:** Well-drained, loose, light colored, sandy loams with a pH of 5.5-7.0, slight acidity, moderate amounts of organic matter, and good drainage are ideal for peanut production. This “soil cleaner” crop use residual nutrients from previous crops or cover crops and fix nitrogen within its root modules. Space rows 24 to 36 inches apart and seeds 4 to 6 inches apart, at a depth of 2 to 4 inches. For the formation of peanut kernels, applying Gypsum [calcium (CaSO<sub>4</sub>) sulphate] is recommended.

**Crop Rotation** is a practical method by which plant pathogens creating negative biological, chemical and physical changes in the land as well as pests can be controlled. Rotating crops build healthy soil and increase profitable yields. Through a cropping sequence, the farmer is able to maintain the biodiversity, nutrient recycling and utilization of the farm. Corn, perennial grass sods, millets, grain sorghum and small grains are suitable preceding crops for peanuts. Cereal cover crops and cotton are accepted succeeding crops for peanut because of the latter’s capability to lower N requirements and production costs. Peanut should be avoided in the same fields for successive years. Generally, in peanut farming systems, rotation is done with small grains, potatoes and corn. For eliminating plant-parasitic nematodes, rotation is a good remedy. Cotton is suitable to rotate with peanut because both withstand root-knot nematode species.

**Mulching** is an adaptable and beneficial practice of covering the soil around the plants with a protective material. Mulches control soil temperature fluctuations, weed growth, moisture loss, fertilizer leaching and also act as conservation agents. Applying mulch after a heavy rainfall will offer striking effect. Organic mulches enrich the soil as they decay, supply humus and nutrients for healthy plant growth and improve soil tilth and water penetration. Mulch applications can significantly increase the yield of peanut production by reducing soil erosion and soil-borne diseases. Mulching should be done around established plants after spring so that the soil is warm enough for steady root growth.

**Disking** is a useful method connected with farming practices. Disking breaks up large clods of heavier soils, levels and smoothen the field and seed beds, allows uniform mixing, initiates the decay of residues, control weeds and leads the way for successful planting and harvesting. Disadvantages of disking include high cost of labor, dust, soil compaction and erosion, and decrease in productivity.

**Weed and Pest Management** has to be conducted through a combination of cultural, biological and chemical practices. Usually, the last part of the growing season is dangerous. Weeds can be skillfully diminished with herbicides. Weekly monitoring and insecticide usage can eliminate insect pests while fungicide application (when needed) will promise quality peanuts. For optimum production, usage of resistant seeds, prompt disease detection, and suitable pesticide application are necessary. Previous crop roots destruction, fallowing, crop rotation, scouting, field mapping and tillage are additional non-chemical management methods.

**Residue Management** is a valuable technology for reducing erosion. Peanut residue incorporated into the soil decomposes faster than the residue left on soil surface. Crop residue, if retained on the soil surface, can dramatically reduce soil erosion. Legumes have been long known to benefit succeeding crops. They replenish the soil with crop nutrients. The rate of crop residue decomposition is important from both agriculture and environmental standpoints. The slow release of nitrogen from decomposing residues may be better for plant uptake than source of inorganic nitrogen. This will increase nitrogen uptake efficiency and yield while reducing nitrogen leaching into groundwater.

The total fresh residue mass of peanut, including shoot and root, ranges from 17,000 lbs to 20,000 lbs/acre (4,600 to 5,250 lbs/acre dry residue). The residue of this leguminous crop contains 41.84% carbon and 3.16% nitrogen. At this rate, this oil crop returns 1,900 to 2,200 lbs of carbon and 150 to 170 lbs of nitrogen per acre. The maximum canopy height and root depth recorded in a heavy soil are 19 and 12.5 inches, respectively. This crop attains a maximum canopy cover after 80 days of planting, which ranges from 80 to 90%. After 50 days of planting, it attains 50% of canopy cover. Leaf area index (LAI) is the unit area of leaves per unit area of soil surface. The LAI recorded goes up to a maximum of 2 after 70 days of planting. Peanut is a soil conserving and nutrient replenishing oil crop. The maximum residue cover recorded after disking is 43%.