



## Research Article

### SEASONAL VARIANCE ON GROUNDNUT SEED PRODUCTION: ROUND THE YEAR EXPERIENCES

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#### ABSTRACT

The peanut, or groundnut (*Arachis hypogaea*), is a species in the legume or "bean" family (Fabaceae). The peanut was probably first domesticated and cultivated in the valleys of Paraguay. The specific name, *hypogaea* means "under the earth"; after pollination, the flower stalk elongates, causing it to bend until the ovary touches the ground. Continued stalk growth then pushes the ovary underground where the mature fruit develops into a legume pod, the peanut – a classical example of geocarpy. India and China are the world's largest producers of peanuts, they account for a small part of international trade because most of their production is consumed domestically as peanut oil. Exports of peanuts from India and China are equivalent to less than 4 % of world trade. The major producers of peanuts are the United States, Argentina, Sudan, Senegal, and Brazil. The Present study on seed yield and seed quality parameters strongly suggested that groundnut seeds should be produced in summer and rainy (Kharif) seasons. Winter season should not be considered for seed production in groundnut.

**Keywords:** *Arachis hypogaea*, Fertile land, Cultivation, Rogueing, Harvesting, Indexing.

#### INTRODUCTION

The peanut, or groundnut (*Arachis hypogaea*), is a species in the legume or "bean" family (Fabaceae). The peanut was probably first domesticated and cultivated in the valleys of Paraguay.<sup>1</sup> It is an annual herbaceous plant growing 30 to 50 cm (1.0 to 1.6 ft) tall. The leaves are opposite, pinnate with four leaflets (two opposite pairs; no terminal leaflet); each leaflet is 1 to 7 cm ( $\frac{3}{8}$  to  $2\frac{3}{4}$  in) long and 1 to 3 cm ( $\frac{3}{8}$  to 1 inch) across. The flowers are a typical pea flower in shape, 2 to 4 cm (0.8 to 1.6 in) ( $\frac{3}{4}$  to  $1\frac{1}{2}$  in) across, yellow with reddish veining (Figure 1). The specific name, *hypogaea* means "under the earth"; after pollination, the flower stalk elongates, causing it to bend until the ovary touches the ground. Continued stalk growth then pushes the ovary underground where the mature fruit develops into a legume pod, the peanut – a classical example of geocarpy. Pods are 3 to 7 cm (1.2 to 2.8 in) long, containing 1 to 4 seeds.<sup>2</sup> (Figure 2)

#### Taxonomic status

Kingdom: Plant

Division: Spermatophyte

Subdivision: Angiosperm

Class: Dicotyledonous

Family: Leguminosae

Sub-family: Papilionaceae

Genus: *Arachis*

Species: *hypogaea*

Common Name: Ground Nut

Scientific Name: *Arachis hypogaea*

Peanuts are known by many other local names such as earthnuts, ground nuts, goober peas, monkey nuts, pygmy nuts and pig nuts<sup>3,4</sup> despite its name and appearance, the peanut is not a nut, but rather a legume. The orange-veined, yellow-petaled, pea-like flower of the *Arachis hypogaea* is borne in axillary clusters above ground. Following self-pollination, the flowers fade and wither. The stalk at the base

of the ovary, called the pedicel, elongates rapidly, and turns downward to bury the fruits several inches in the ground, where they complete their development. The entire plant, including most of the roots, is removed from the soil during harvesting.<sup>5-7</sup> The fruits have wrinkled shells that are constricted between pairs of the one to four (usually two) seeds per pod. Peanuts grow best in light, sandy loam soil. They require five months of warm weather, and an annual rainfall of 500 to 1,000 mm (20 to 39 inch) or the equivalent in irrigation water.<sup>6-8</sup> The pods ripen 120 to 150 days after the seeds are planted. If the crop is harvested too early, the pods will be unripe. If they are harvested late, the pods will snap off at the stalk, and will remain in the soil.<sup>8</sup> They need an acidic soil to grow preferably with 5.9 -7 pH. Peanuts are particularly susceptible to contamination during growth and storage. Poor storage of peanuts can lead to an infection by the mold fungus *Aspergillus flavus*, releasing the toxic and highly carcinogenic substance aflatoxin. The aflatoxin-producing molds exist throughout the peanut growing areas and may produce aflatoxin in peanuts when conditions are favourable to fungal growth.<sup>7</sup> Harvesting occurs in two stages: In mechanized systems, a machine is used to cut off the main root of the peanut plant by cutting through the soil just below the level of the peanut pods. The machine lifts the "bush" from the ground and shakes it, then inverts the bush, leaving the plant upside down on the ground to keep the peanuts out of the soil. This allows the peanuts to dry slowly to a bit less than a third of their original moisture level over a period of three to four days. Traditionally, peanuts were pulled and inverted by hand. After the peanuts have dried sufficiently, they are threshed, removing the peanut pods from the rest of the bush.<sup>8</sup>

#### Choice of location

The seed production plot was located at Pallishree Research Farm, Arambagh. Daily mean temperature range of that place was 20°C and 32°C, relative humidity was between 70 -80 %. The production plot was sufficient solar radiation with

optimum wind velocity. The annual precipitation was 3.95 cm. selected fields on which ground nut was not raised in the previous two seasons. Filed showed good fertility and the soil was preferably loam, rich in humus content with well drained facility.

**Isolation requirement**

Ground nut is a completely self-fertilized crop. The percentage of natural crossing is practically negligible. Cross pollination does not take place because the stigma remains enclosed in the keel even in fully opened flowers. An isolation of three metres from other fields of groundnut was considered for pure seed production.

**MATERIALS AND METHODS**

**Cultural practices**

One ploughing and three to four harrowing was done and then land was levelled thoroughly. At the time of last harrowing basal doses of fertilizers were applied. Groundnut was cultivated thrice i.e., in rainy, winter and summer seasons to see the best result which was my main objectives

to carry on this work. Two types of treated seed (AK 12-24, TAG-24) were collected from the same research farm and the sowing was done in lines. The depth of seeding was 5cm and the seed rate was 90 Kg/Ha. N: P: K ratio of 20:50:30 Kg/Ha were applied in two split doses at the time of earthing. For best result we also applied farm yard manure and compost @2.5t/Ha. Irrigation and inter culture were done at regular interval followed by rouging, application of control measures.

**Harvesting**

When the leaves started yellowing and began falling down, the crop was ready to harvest. At that stage the pods became reticulated and brittle within them the seeds were coloured and easily separated from the shell of the pod (Figure 3). The uprooted plants with pods were left in the field for three days for sun drying (Figure 4). Threshing was done by hand picking. Seed moisture content at the time of harvesting was maintained at 14-20 %. Post harvest preservation of groundnut is considered an important aspect of efficient cultivation practices, because improper preservation can cause severe economic loses (Figure 5).

Table 1: Shows the seasonal as well as genotypic effect on seed production of groundnut

Season of Seed Production	Variety	Plant Height (cm)	Ineffective Pegs/Plant (No)	Pod Bearing Peg/Plant (No)	Pod Length (cm)	Pod Wt (100/g)	Seed Wt (100/g)	Pod Yield (Kg/Ha)
Rainy	AK 12-24	58.2	20.2	39.2	2	90	37	1250
	TAG 25	51.2	19.2	61	2.8	110	43	1750
Winter	AK 12-24	25.05	20	34.5	2.2	65	27.3	723
	TAG 24	21.8	19.2	22.6	2.2	74	34.1	556
Summer	AK 12-24	98.2	21.8	22.2	1.88	92	39.5	1550
	TAG 24	62.5	24.6	24.6	2.64	122	44.5	2200

Table 2: Shows the seasonal as well as genotypic effect on seed characteristics of groundnut

Season of Seed Production	Variety	Laboratory Testing of Seed					Field Testing of Seed	
		Germination (%)	Speed of Germination	Root Length (cm)	Shoot Length (Cm)	Vigour Index	Field Emergence (%)	Seedling Dry Wt (Mg)
Rainy	AK 12-24	98	48	4.3	3.6	7742	84	285
	TAG 25	98	49	3.7	4.1	7644	92	450
Winter	AK 12-24	86	34	3.6	3.4	6020	77	272
	TAG 24	96	47	4.3	3.5	7488	88	315
Summer	AK 12-24	93	42	5.5	4.9	9672	76	358
	TAG 24	97	48	5.7	4.8	10185	90	386



Figure 1: Flowers of *Arachis hypogea*



Figure 2: Mature pods of *A. hypogea*



Figure 3: Reticulated seeds of *A. hypogea*



Figure 4: Seeds of *A. Hypogea* after 3 days of sundrying



Figure 5: Mature seeds of *A. hypogea*

## RESULTS

After round the year cultivation, we observed that both AK 12-24 and TAG- 24 varieties required maximum days of maturity in winter season while minimum days were required in summer followed by rainy season. AK 12-24 recorded higher plant height in each season as compared to TAG- 24. Maximum plant height was recorded in summer season (98.2 cm and 62.5 cm). Both the varieties showed similar trend of 100 Pod weight i.e., maximum in summer (92 g and 122 g) and minimum in winter (65 g and 74 g). Similarly two varieties recorded greater 100 Seed weight in summer season (70 g and 89 g) in comparison with winter season (27.3 g and 34.1 g). TAG- 24 recorded the highest pod yield per hectare in summer season followed by rainy season. AK 12-24 also showed similar trend. Both two varieties registered very poor yield in winter season along with higher crop duration time as shown in the Table 1. These clearly indicate the disadvantages of their seed production programme in this season. On the other aspect, genotypic effect on seed characteristic, TAG- 24 recorded higher germination percentage in every season while AK 12-24 showed highest germination percentage in rainy season only. Both two varieties were recorded acceptable levels of speed of germination in every season. The maximum root and shoot length of both the varieties were recorded in summer season. After thoroughly assessment, Greater vigour index and the percentage of field emergence showed acceptable level in summer season with comparison to other season as shown in Table 2.

## DISCUSSION

Maximum seedling dry weight of both the varieties was recorded in rainy season but minimum seedling dry weight of both varieties was recorded in winter season. This type of variations may be occurs due to the climatic conditions or weather of that places. Both two tables clearly indicate the maximum and better production as well as result observed in summer season in comparison with other two seasons (winter and Rainy). Although India and China are the world's largest producers of peanuts, they account for a small part of international trade because most of their production is consumed domestically as peanut oil. Exports of peanuts from India and China are equivalent to less than 4 % of world trade. The major producers/exporters of peanuts are the United States, Argentina, Sudan, Senegal, and Brazil. These five countries account for 71 % of total world exports. As we

had familiar from different reviews that peanuts grows best in light, sandy loam soil and they require five months of warm weather, and an annual rainfall of 500 to 1,000 mm (20 to 39 in) or the equivalent in irrigation water. Our present study on seed yield and seed quality parameters strongly suggested that groundnut seeds should be produced in summer and rainy (Kharif) seasons. Winter season should not be considered for seed production in groundnut.

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