

## Effect of harvesting stages on seedling characters of groundnut (*Arachis hypogaea* L.)

■ ASHVINI PANDIT GAIKWAD\*

Department of Agricultural Botany, Disci. Seed Science and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri, AHMEDNAGAR (M.S.) INDIA

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\*Corresponding author:

### ABSTRACT

The studies revealed that in seedling characters of groundnut after each harvesting stage tested by carried out germination test in laboratory observed root length (cm), shoot length (cm), dry matter of seedlings (g) were increased after PM in all six varieties of groundnut.

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Groundnut (*Arachis hypogaea* L.) is an important oil seed, food and feed crop grown in an area of 6.45 million ha with total production of 6.57 million tones based on an average of the last five years FAO (2005). It is rich in oil (45–50%), which makes it more perishable and prone to rapid loss of both quality and viability in storage (Perez and Arguello, 1995). Hence, at harvest, it comprises seeds of varying maturity stages. Due to this, in some of the cultivars about 20–30 per cent seeds either do not germinate or fail to develop into healthy seedlings. This results in a patchy crop stand and consequent loss of yield (Nautiyal *et al.*, 2004). Under suboptimal conditions, poor seed quality not only reduces the final crop stand but also delays the onset of germination and adversely affects the seedling vigor. Reports on the effect of seed size on germination, field emergence, productivity and variations in crop stand in groundnut are available in the literature (Singh *et al.*, 1998 and Dayal *et al.*, 1999; Baki and Barker, 1973 and Isley, 1957). In groundnut crop for getting highest seed yields well developed pods are needed. Therefore, harvesting stages are essentials. Early harvested groundnut seeds are mostly immature and have highest

moisture content. In laboratory germination test shows root-shoot length increases after physiological maturity result in dry matter of seedling increases. In rainy season if matured pods remain in fields for longer period of time after physiological maturity result in sprouting of pods within field and reduce yield of pods. The objective of this study was to investigate the effect of harvesting stage on seedling characters of groundnut (*Arachis hypogaea* L.).

The present investigation entitled, “Effect of harvesting stages on seedling characters of Groundnut (*Arachis hypogaea* L.)” was conducted during *summer*, 2012 at All India Co-ordinated Research Project on *Summer* Groundnut, Mahatma Phule Krishi Vidyapeeth, Rahuri. The treatment 24 consisting of four harvesting stages, *viz.* (M<sub>1</sub>) Physiological maturity, (M<sub>2</sub>)10 DAPM, (M<sub>3</sub>)20 DAPM, (M<sub>4</sub>)30 DAPM and six varieties (V<sub>1</sub>)RHRG-6021, (V<sub>2</sub>)RHRG-6083, (V<sub>3</sub>)JL-501, (V<sub>4</sub>)TAG-24, (V<sub>5</sub>)SB-XI and (V<sub>6</sub>)TPG-41. The laboratory analysis carried out by using Factorial completely randomized design with three replications. The following laboratory observations were recorded seedling root length, shoot length and dry matter of seedling for each treatment and after every harvesting

stages. The data on laboratory observations were analysed as per method suggested by Snedecor and Cochran (1967).

The findings of the present study as well as relevant discussion have been presented under the following heads :

### Root length (cm)

#### Genotypes :

The genotype V<sub>3</sub> (JL-501) recorded highest root length (14.72 cm) followed by genotype V<sub>4</sub> (TAG-24) (14.30 cm). The genotype V<sub>6</sub> (TPG-41) recorded lowest root length (7.07

cm) (Huang and Ketring, 1987).

#### Harvesting stages :

The highest root length (16.38 cm) was recorded at M<sub>4</sub> (30 DAPM) followed by M<sub>3</sub> (20 DAPM) (12.94 cm). The lowest root length was observed at M<sub>1</sub> (PM) (3.92 cm).

#### Interaction effect on root length :

The highest root length was recorded in genotype V<sub>6</sub> (TPG-41) (18.27 cm) harvested at M<sub>4</sub> (30 DAPM) followed

Table 1 : Effect of genotypes and harvesting stages on root length (cm) of groundnut cultivars								
Sr. no.	Harvesting stages	Genotypes						Mean
		V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	
1.	M <sub>1</sub> (PM)	0.00	0.00	11.91	11.61	0.00	0.00	3.92
2.	M <sub>2</sub> (10 DAPM)	11.55	5.07	15.27	11.68	0.00	0.00	7.26
3.	M <sub>3</sub> (20 DAPM)	14.24	10.07	15.50	16.66	11.15	10.02	12.94
4.	M <sub>4</sub> (30 DAPM)	14.69	13.68	16.19	17.25	18.18	18.27	16.38
	Mean	10.12	7.21	14.72	14.30	7.33	7.07	10.12
			S.E. ±				CD (P = 0.05)	
	M		0.71				1.97	
	V		0.87				2.42	
	M × V		1.74				4.84	

Table 2 : Effect of genotypes and harvesting stages on shoot length (cm) of groundnut cultivars								
Sr. no.	Harvesting stages	Genotypes						Mean
		V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	
1.	M <sub>1</sub> (PM)	0.00	0.00	3.22	2.85	0.00	0.00	1.01
2.	M <sub>2</sub> (10 DAPM)	2.84	1.18	3.25	2.87	0.00	0.00	1.69
3.	M <sub>3</sub> (20 DAPM)	3.48	3.15	3.30	2.98	3.60	2.39	3.15
4.	M <sub>4</sub> (30 DAPM)	3.83	3.85	7.38	6.27	4.15	4.08	4.93
	Mean	2.54	2.05	4.29	3.74	1.94	1.62	2.69
			S.E. ±				C.D. (P = 0.05)	
	M		0.29				0.80	
	V		0.35				0.99	
	M × V		0.71				N.S.	

N.S. = Non-significant

Table 3 : Effect of genotypes and harvesting stages on dry matter of seedling of groundnut cultivars								
Sr. no.	Harvesting stages	Genotypes						Mean
		V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	
1.	M <sub>1</sub> (PM)	0.00	0.00	3.71	3.66	0.00	0.00	1.23
2.	M <sub>2</sub> (10 DAPM)	3.65	1.41	3.93	3.88	0.00	0.00	2.14
3.	M <sub>3</sub> (20 DAPM)	3.70	3.40	4.10	4.53	3.50	2.71	3.66
4.	M <sub>4</sub> (30 DAPM)	3.92	3.61	4.39	4.56	4.79	4.88	4.36
	Mean	2.82	2.11	4.03	4.16	2.07	1.90	2.85
			S.E. ±				C.D. (P=0.05)	
	M		0.18				0.50	
	V		0.22				0.61	
	M × V		0.44				1.23	

M- Harvesting days, V- Variety, PM- Physiological maturity, DAPM- Days after physiological maturity

by genotype  $V_5M_4$  (18.18 cm). The lowest root length was observed in combinations  $V_1M_1$ ,  $V_2M_1$ ,  $V_5M_1$ ,  $V_6M_1$ ,  $V_5M_2$  and  $V_6M_2$  (0.00 cm).

#### Shoot length (cm) :

##### Genotypes :

The genotype  $V_3$  (JL-501) (4.29 cm) recorded highest shoot length followed by genotype  $V_4$  (TAG-24) (3.74 cm). The genotype  $V_6$  (TPG-41) recorded lowest shoot length (1.62 cm).

##### Harvesting stages :

The highest shoot length (4.93 cm) was recorded at  $M_4$  (30 DAPM) followed by  $M_3$  (20 DAPM) (3.15 cm). The lowest shoot length (1.01 cm) was observed at  $M_1$  (PM).

##### Interaction effect on shoot length :

The interaction effect due to genotypes and harvesting stages were statistically non-significant in respect of shoot length.

#### Dry matter of seedlings (g) :

##### Genotypes :

The genotype  $V_4$  (TAG-24) recorded highest dry matter (4.16 g) of seedlings followed by genotype  $V_3$  (JL-501) (4.03 g). The genotype  $V_6$  (TPG-41) recorded lowest dry matter of seedlings (1.90 g) (Venu *et al.*, 1995).

##### Harvesting stages :

The highest dry matter of seedling (4.36 g) was recorded at  $M_4$  (30 DAPM) followed by  $M_3$  (20 DAPM) (3.66 g). The lowest dry matter of seedling was observed at  $M_1$  (PM) (1.23 g) (Nautiyal and Zala, 2004; Saha and Dwivedi, 1981).

##### Interaction effect on dry matter of seedling :

The highest dry matter of seedling (4.88 g) was recorded in genotype  $V_6$  (TPG-41) harvested at  $M_4$  (30 DAPM) followed by genotype  $V_5M_4$  (4.79 g). The lowest dry matter of seedling (0.00 g) was observed in treatment combinations *viz.*,  $V_1M_1$ ,  $V_2M_1$ ,  $V_5M_1$ ,  $V_6M_1$ ,  $V_5M_2$  and  $V_6M_2$ . This might be due to germination and root, shoot length increases after PM in laboratory test (Nautiyal and Ravindra, 1996).

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