

Note on Root Development of Groundnut at Different Growth Stages Under Dry Farming Conditions

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In Gujarat State, groundnut (*Arachis hypogaea* L.) is grown on an area of nearly 1.8 million hectares out of the total cultivated area of 10.1 million hectares. It is predominantly a rainfed cash crop of Saurashtra region where its yield fluctuates heavily from year to year, depending on the availability of moisture in the soil profile. Plant roots absorb moisture from the soil and hence the depth of rooting as well as the growth of root system in a given volume of soil are important. Root studies assume greater importance in arid and semi-arid regions where moisture is almost always a limiting factor. Increasing the depth, ramification and growth rate of roots by breeding procedures and agronomic practices can result in higher yields and increased water use efficiency (Parmar and Patel, 1975). No field studies were, however, previously reported on the root development of groundnut at different growth stages under dry farming conditions in Saurashtra region. The present preliminary investigation was,

therefore, planned to study root growth habit of bunch type groundnut Junagadh-11 under field conditions at Dry Farming Research Station, Targhadia, during *kharif* season of 1977.

For conducting the study, groundnut was sown in plot No. 3^b3 of the farm on 28th June, 1977. The soil of the plot was medium black with pH of 7.8. Organic carbon content of the soil was 0.5 per cent and the available P_2O_5 and K_2O were 11 and 498 kg/ha, respectively. Prior to sowing, chemical fertilizers at the rate of 12.5 kg N and 25 kg P_2O_5 per hectare were drilled in the furrows. The growth of the crop was normal. The rainfall during the crop growth season amounted to 225, 406, 142, 67 and 0 mm during the months of June, July, August, September and October, respectively. The first observation on plant growth characters as reported in Table-1 was recorded when the crop was 30 days old and thereafter at about fifteen days' interval till maturity of the crop (112 days). For taking observations, five plants were selected at random from the plot at each time. The selected plants were taken out intact from the soil by digging out in such a way that the whole root mass alongwith the soil was removed. The roots were then sprayed with fine jet of water so that the root system was not broken. Observations were recorded on depth of root pene-

TABLE 1

Summarised data on root and shoot growth characteristics of groundnut (J-11) at different stages.

Date of observation and the corresponding crop stage	Tap root			Lateral roots		Wt. of root g		Wt. of shoot g		Shoot wt/root wt ratio	
	Length, Depth		Max.	No	Max.	Fresh	Air-dry	Fresh	Air-dry	Fresh	Air-dry
	cm	in	peri-		length						
	cm	mm	meter		cm						
28-7-77 Flowering	14.1	11.4	9.2	15.6	15.1	1.54	0.36	15.02	8.02	8.6	20.0
13-8-77 Pegging	17.1	13.0	9.5	20.0	17.7	1.61	0.42	16.61	11.33	10.4	27.2
28-8-77											
Pegging and pod development	19.4	14.3	13.6	27.0	19.1	2.35	1.19	30.74	24.90	13.1	21.1
12-9-77 Pod development	19.6	14.9	17.0	32.0	21.0	2.87	1.42	31.46	26.13	11.0	19.5
27-9-77 Pod development	22.7	16.8	17.8	33.0	25.5	2.89	1.13	31.55	26.39	10.9	26.4
17-10-77 Maturity	22.8	17.0	18.0	33.0	25.6	2.95	1.09	33.53	28.53	11.3	26.5

tration, length and maximum perimeter of the tap root, number and maximum length of lateral roots and fresh as well as air-dry weight of root and shoot.

Summarised data reported in Table 1 show that the maximum length of tap root was 22.8 cm and it reached upto a depth of 17 cm in the soil. During the initial period, the rate of tap root development was very rapid. About 63 per cent of the potential length of the tap root was found to grow in a period of only 30 days which was equivalent to about 27 per cent of the life period of the crop. Data on soil depth upto which the tap root reached as well as the fresh weight of root also showed similar trend of growth rate. In a growth period of first 30 days, the tap root reached upto a depth of 11.4 cm in the soil and then increased upto 17 cm at maturity. After the commencement of pod development stage, there was very little increase in the fresh weight of roots. Actually, decrease in the air dry weight of roots was noticed during the last 30 days of growth. In general, the length of

the longest lateral root was more than that of the tap root at all the corresponding crop growth stages. There was progressive increase in the fresh and air-dry weight of shoot till maturity. Growth rate of shoot was high during early pegging period. Ratio of both fresh and air-dry shoot weight to root weight did not show any definite trend. The ratio at maturity period was higher than that at 30 day-growth period. Rapid rate of shoot growth during the pegging period also resulted into the highest ratio of air-dry shoot weight to air-dry root weight (27.2) during pegging stage of the crop.

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REFERENCE

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