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FLOWERING PATTERN AND POD PRODUCTION IN BUNCH GROUNDNUT AS INFLUENCED BY SEASON

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Flowering pattern and Potentiality to convert flowers into pegs and pods was studied in ten bunch cultivars of groundnut (*Arachis hypogaea L.*). In all the cultivars, except one, there was unimodal pattern of flowering in all types, except one, maximum flowering was in second week, since start of flowering. In case of JL-10, there was a slight bimodal pattern of flowering, the peaks being in second and fourth week, the maximum flowering being in 4th week. In JL-24 flowering span was of 5 weeks (very short) while in other nine cultivars it was 8 week to 9 weeks. On an average, 80 to 85 percent flowers were observed in the first five weeks, percentage of fully developed pods ranged from 8.3 to 15.6. The highest conversion capacity was in JL-24.

Groundnut (*Arachis hypogaea L*) which is mainly a rainfed crop in the Maharashtra State, varies in its yield per hectare from district to district and rom season to season in the same district depending upon the rainfall distribution. In Khandesh tract of the State, groundnut crop is usually sown in the first week of July. The flowering commences after 3 weeks of sowing. The flowering period continues for a period of 6 to 9 weeks. The continuous optimum rainfall and humidity have favourable effects on flowering and the development of gynophores and pods. While launching an exhaustive programme of breeding groundnut, it was felt necessary to know the percentage of fully developed pods to the total number of flowers produced The study of flowering pattern and pod production in ten selected cultivars was therefore, under taken.

MATERIAL AND METHODS

Eight varieties viz. FSB-7-2, JL-5, JL-7, JL-10, JL-14, JL-19 and JL-23 developed by hybridization at Jalgaon and the one, JL-24 a selection from the material introduced from Taiwan were tried along with SB 11 as chec during 1976 and 1977 kharif season in a randomized block design, replicated four times with a net plot size of 10.0X 3.0 m. m. The sowing was done on 6th July and 3rd July during 1976 and 1977 respectivelly. Five plants in each variety were selected at random

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in each of the replications. The flowers produced on the selected plants were recorded daily between 8.0 to 9.0 A. M. for a period of 8 to 9 weeks.

In the first year, flowering commenced on 1 st August i. e. 26 days after sowing and continued for 8 weeks. The total rainfall during that season was 195 mm and rainy days were 34. During the second year, flowering commenced on 26 th July i e. 24 days after sowing and continued for 9 weeks. The total rainfall during the season was 312.2 mm and the rainy days were 35.

RESULTS AND DISCUSSION

Date of flowers produced per plant total number of pegs, number of fully developed pods, the percentage of flowers to pegs, flowers to pods and pegs to pods in each variety and weekly rainfall for the two seasons are given in table 1.

In the year 1976, the total number of flowers produced by the different varieties ranged from 47.8 to 87.5 while in 1977 the reange was from 61. 7 to 128. The differences between flower production by the varieties during these two year appears to be due to total rains received during the years. Seshadri (1962) stated that flower production in groundnut, though it is a varietal character is largely influenced by rainfall. A well distributed rainfall is more beneficial than heavy rains at irregular intervals. Sindagi (1958) reported average number of flowers from 59 to 71 while Utkuday *et al* (1961) observed on an average 63 to 65 flowers/plant. The results presented in this paper were inconfirmity with those of Sindagi (1958) & Urkuday *et al* (1961). Seshadri (1962) reported that normally the period of flowering last for 3 to 6 weeks in case of bunch. This will very largely by the rainfall distribution during crop growth peried. There was unimodal pattern of flowering in all varieties except one (JL-10),

In all types except one (JL-10), the maximum flowering was in second week since starting of flowering. In the case of JL-10, there was a slight bimodal pattern of flowering, the peaks being in second and forth week. The maximum flowering being in 4 th week In JL-24, flowering span was 5 weeks (very short) while in other nine cultivars it was 8 to 9 weeks during 1976 & 1977 . During both the years, on an average, 80-85 percent flowers produced in the first five weeks and very less. were produced in 6 to 8 weeks (Table-1). Ali Mahmmed *et al.* (1932) shown that flowering is rapid, the maximum flowering takes place earlier (54-97-days) in bunch. Shibuys (1935) found the flowering period to very from 69 to 73 days (9 to 10 weeks). Bouffil (1947) reported the flowering period from 51 to 58 days (7 to 8 weeks). Smith (1950) found that in bunch 2/3 of the flowers were produced during one month period beginning with six weeks after planting. Sindagi (1958) reported that maximum number of flowers were produced during first two weeks after commencement of flowering. Similarly Urkuday (1961) observed that 85-90 percent flowers in bunch were

produced in first 6 weeks after commencement of flowering. Sarma and Vijaykumar (1971) also reported that maximum number of flowers were produced in the first five weeks, subsequent to which there was a gradual reduction. The results presented in this paper were in confirmity to those of Ali Mahammed *et al.* (1932), Shibuya (1935), Bouffil (1947), Smith (1950), Sindagi (1958) Urkuday *et al.* (1961) and Sarma & Vijaykumar (1971). Bouffil (1947) also described four stages of peak and deeling of flowering in spreading groundnut. similarly Smith (1950) reported that the period of flowering was 70-75 days (10-11 weeks) in runner type. The results presented in this paper are pretaning to bunch type only. In the present study, the maximum number of flowers were produced by the variety JL-10 during both the years while less were produced by JL 24 in both the years which however produced over 90 percent flowers with in first 3 weeks. It was the shortest flowering span. The variety JL-24 produced lowest number of pegs and JL-23 produced highest number of pegs during 1976 while in 1977 the variety JL-24 produced lowest pegs and the variety JL-10 recorded the highest peg number. The percentage of flowers to pegs ranged from47.20 to 64.10 and 18.18 to 31.73 during 1976 and 1977 respectively. No authors mentioned earlier have reported average number of pegs produced per plant and the percentage of flower to pegs.

In groundnut, all the flower produced do not get fertilized. This character is also influenced by climatic factors such as rainfall, temperature etc, The percentage of fertilization varies from 4.9 to 67.5 (Seshaderi 1962). In the present study, fully developed pods ranged from 3.1 to 11.5 in kharif 1976 while in 1977, it ranged from 13 6 to 17 9. During both the years, the variety SB-XI has produced the lowest number of fully developed pods while JL-24 has produced the highest number of pods. The percentage of flowers to fully developed pods ranged from 4.98 to 24 05 during 1976 while in 1977, it ranged from 11.63 to 31.60. The variety JL 24 showed high percentage of flower to fully developed pods during both the years under study Sindagi (1958) and Urkuday *et al.* (1961) reported percentage of fully developed pods to flower ranging from 22 to 23 and 22.9 to 26 16 respectively under rainfed kharif season. The results reported in this paper were in confirmity with those reported by the above authors. The variety SB XI and JL-8 had the lowest percentage of conversion of flowers to pods during 1976 and 1977 respectively while JL-24 had highest percentage of conversion of flowers to pods during both the years. The percentage of pods formation was higher due to sufficient rains during flowering, pegging and pod development period. In both the years JL-24 produced more or less same percentage of fully developed pods indicating that though the rainfall in 1976 was slightly less than in 1977, the potential of conversion of flowers to pods remain uncharged. In JL-24 variety there is basal flowering and that to in custer and because of this nature the conversion of flowers to pegs and pegs to pods is more as compared to other varieties,

It showed its earliness in maturity in 87 days as against 105-110 days of SB XI.

The entry of pegs into the soil depends on several factors such as season, cultural operation, etc. If there is sever drought, the pods stuggle hard to penetrate into the soil. If there is enough moisture in the soil at the time of entry of pegs or if the soil is frequently inter cultivated the pegs penetrate more easily into the soil. The development of pod is controlled by outer and inner conditions affecting the gynophore (Seshadri 1962). The conversion of pegs to pods ranged from 9.62 to 46.18 in 1976 while in 1977, it ranged from 44.73 to 95.33. During both the years, the variety SB XI had the lowest and JL-24 had the highest conversion percentege of pegs of pods. The variety JL-24 had the highest conversion of percentage of pegs to fully developed pegs is being reported for the first time.

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Table 1 : Weekly per plant Flower Production in groundnut varieties (Average of 20 plants) during 1976 and 1977

Weeks	SB-X1	F SB	JL-5	JL-7	JL-10	JL-12	JL-14	JL-19	JL-23	JL-24	Rain fall in mm	Rainy days
1	2	3	4	5	6	7	8	9	10	11	12	13
1-8-76 to 7-8-76	9.8	16.6	12.5	3.8	7.0	3.1	7.8	6.8	8.8	19 0	52.4	6
26-7-77 to 1-8-77	13.0	13.2	12.3	8.0	11.7	14.1	16.9	13.7	14 6	18.6	76 0	6
Average	11.4	14.2	12.4	5.9	9 3	8.6	12.3	10.2	11.7	18.8		
8-8-76 to 14-8-76	15.1	18.1	14·0	15 4	17.1	10.9	17.9	16.6	16.9	20.4	17 8	5
2-8-77 to 8-8-77	24.3	21.9	26.3	19.7	23.7	24.0	22.8	23 2	25.2	23.5	14.4	5
Average	19.7	20.0	20.1	17.5	20.4	17.4	20.3	19.9	21 0	21.9		
15-8-76 to 21-8-76	11.5	10.3	9.2	11.9	13.1	6.9	9.2	11.6	11 6	4.9	19.0	4
9-8-77 to 15-8-77	20.5	16.7	17.9	21.7	22.0	25.3	23.0	19 2	25.2	15.0	14.0	2
Average	16.0	13.5	13 5	16.8	17 5	16 1	16 1	15.4	18 9	9 9		
22-8-76 to 28-8-76	9 3	9.3	6.6	10.4	16 3	10.1	12.1	10 0	13.4	3 5	21 2	3
16-8-77 to 22-8-77	13.5	14.7	10.5	17.6	26.2	19.3	14.2	13.9	19.2	2.6	1.8	2
Average	11 4	12.0	8 5	14.0	21.2	14.7	13.1	11.9	16 3	3.0		
29-8-76 to 4-9-76	8.5	7.0	7.9	9.1	15 9	10.3	9.0	7.6	12.7	—	55.2	6
23-8-77 to 29-8-77	9.2	11.1	10 8	11.7	19.0	13.1	9 6	11.6	11.5	2.0	107.0	7
Average	8.6	9 0	9.3	10.4	17.4	11.7	9.3	9.6	12.1	1.0		
5-9-76 to 11-9-76	3.0	4.0	7.6	6 8	14.1	7.9	7.0	6.7	9 3	—	22.2	6
30-8-77 to 5-9-77	9.1	10.1	8 3	11.5	10.7	11.9	10 4	11.8	11.3	—	54.6	7
Average	6.0	7.4	7.9	9.1	12.4	9 9	8.7	9.2	10.3	—		
12-9-76 to 18-9-76	1.0	1.2	1.8	1.6	2.5	2.5	2.0	1.9	2.9	—	7.3	3
6-9-77 to 12-9-77	1.6	6.8	6.6	5.0	7.3	7.3	6.8	6.9	6.4	—	23.4	3
Average	1.3	4.0	4.2	3.3	4 9	4 9	4.4	4.4	4.6	—		
19-9-76 to 25-9-76	1.1	0.0	1.0	1.0	1.5	1.0	1.1	1.2	1.3	—	0.2	1
13-9-77 to 19-9-77	1.8	5.0	5.3	6.3	6 2	5.6	7.0	5 2	6.0	—	22.0	3
Average	1.4	2.5	3.1	3.6	3.8	3 3	4.0	3.2	3.6	—		
20-9-77 to 26-9-77	—	2.5	3.0	1 5	1.2	1.4	2.0	1.5	1.6	—		

TABLE 1 (Contd)

1	2	3	4	5	6	7	8	9	10	11	12	13
Av. No. of flowers produced/plant												
1976	63.3	67.4	60.0	69.0	87 5	52.7	66.1	62.4	76.9	47.8	195.0	34
1977	93.0	102.0	101.0	103.0	128.0	122.0	112.7	107.0	122.0	61.7	311.2	35
Average	78.0	84.5	80.9	81 5	107.7	87.3	89.4	64.7	99.4	54.7		
Av. No. pods produced/plant												
1976	32.1	35.6	30 5	38.1	42.5	32.4	31.2	35.8	49.3	24.9	—	—
1977	30.4	26.1	28.6	21.8	38.1	24.1	17.5	27.8	35.2	20.2		
Average	31.3	30.8	29.5	29.9	40.3	28.2	24.3	31.9	24.2	22.5		
Av. No. of pods produced/plant												
1976	3.1	3.7	7.2	10.3	13.7	9.4	9.6	6.5	11 5	11.5		
1977	13.6	13.9	14.4	17.5	17.6	14.2	14.1	14.1	17.9	19.5		
Average	8 3	8 8	10 8	13.9	15.6	11.9	11.8	10.8	14 7	14.5		
Percentage-flowers to pegs	40.1	36.5	36.5	36.7	37.4	32.3	27.2	37.5	42.4	41.1		
Percentage-flowers to pods	10.7	10.4	13.3	17.0	14.5	13.6	13.2	12.1	14.7	26.4		
Percentage-pegs to pods	26.6	26.5	36.5	46.4	38.9	41.7	48.8	32.3	34.7	64.3		