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FLUSHING BEHAVIOUR AND PEST INCIDENCE IN INDETERMINATE AND DETERMINATE PIGEONPEAS

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The indeterminates showed lower flusing frequency than the determinates with the first flush being major one while higher yield on succeeding flushes were observed in the latter. Recurrent flushing in the determinates may, thus, snbstitute planting of the parent line on different dates in a crossing programme. A ratoon crop beyond first flush in early (T-21) and medium (K-11) duration indeterminates is possible. Delayed harvesting including both the overlapping frushes in the late indeterminates increased the total yield. Podfly was the major pest affecting more the late cultivar and latter flushes in both the types of pigeonpea. Higher pod and seed damages due to pod bug, Lepidopteran borer complex (LBC) were observed in the determinates while the pod fly damage was similar for both. Accordingly, higher yield losses were seen in determinates.

Very few instances of studies on studies on recurrent growth habit of pigeonpeas are seen as that of using pigeonpea as forage (Akinola *et al.*, 1975) and taking forage and grain successfully from the single crop (Killinger, 1968; and Akinola and Witeman, 1975). In India for tne first time, Sharma *et al.* (1978) observed the ratoonability and grain yield potential of pigeonpea cultivars in three varietal tests covering the three maturity groups separately. Later, Reddy et al. (1980) showed the pattern of podfly and pod borer damages over the two overlapping flushes of late pigeonpeas.

Flushing chythum and ratoonability thus, may vary according to growth habit of the crop (determinate and indeterminate) and the maturity groups, Obviously, the attributes like the pattern of insect damage and the productivity *per se* would vary. Since no such data are available, an experiment covering both the determinate and indeterminate pigeonpeas of different maturity groups, was conducted with the following objectives: (a) To identify the flushing habit of determinate and indeterminate cultivars. (b) To record the pattern of insect damage and effect on yield and yield attributes; and (c) To suggest some possibilities of utilizing the flushing habit in breeding programmes.

MATERIAL AND METHODS

Two separate field experiments, the first with the determinate and the second with the indeterminate type of pigeonpea involving a genotype x combination of treatments, were conducted in a factorial randomized block design with 3 replications in 1981 rainy season at Banaras Hindu Uni-

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versity, Varanasi. The determinate type involved the early, medium and late duration cultivars as Pusa ageti, ICP 7050 and ICP 6915, respectively, while the indeterminate counterpart comprised of T - 21, C - 11 and G - 3 cultivars. Each plot comprised of 20 rows, each 10 metre long, spaced at 70x30 cm. From each plot, 10 plants were randomly selected for recording the observations Each flush was harvested separately by picking the pods from the 10 labelled plants of each cultivar.

RESULTS AND DISCUSSION

Among the determinate types, the late cultivar ICP-6915 gave maximum yield (18.41 g/plant) due to highest number of seeds per pod and the seed index (Table 1). As third flush was most promising, maximum yield of 26·94 g/plant was recorded by ICP-6915 at this flush.

The per cent pod and seed damages by pod fly (Table 2) were maximum in ICP-6915 (54 58 and 27.27, respectively). Thus, yield and pod fly damage increased with the duration of cultivar and flushing order giving maximum yield at third flush. The fourth flush recorded maximum pod fly damage showing lower yield than the third flush. Reasonably good yield in the succeeding flushes upto the last flush indicate feasibility of substituting planting on different dates by flushes when the same determinate genotype is needed in the crossing programme.

Contrary to determinates, the indeterminates showed only two flush has with the first flush being major one (Table 3). More yield from lesser number of flushes shows better yielding ability in the indeterminates. Higher seed index and lower pod and seed damages by pod bug and Lepidopteran borer complex (Table 3, 4) also resulted in higher yield in the indeterminates (25.96 g/plant) than those of determinates (15.69 g/plant).

Similar to determinates, the pod fly damage was more in late cultivar and latter flush. The difference in yield between the flushes narrowed with the increase in duration. Characteristically, the early and medium duration indeterminates showed adequate time lag between the flushes which can be utilised by ratooning after first flush harvest to obtain a ratoon crop in the shape of second flush.

Contray to early and medium ones, the late cultivar showed an averlapping of the two flushes and thus the first flush can safely be harvested alongwith the second flush giving, thereby, at least 50% in excess of first flush yield.

REFERENCES

AKINOLA, J. O. and P. C. WHITEMAN, 1975. Agronomic studies on bigeonpea (*Cajanus cajan* (L) Millsp.). III Response to defoliation, *Aust. J. Agric. Res*, 26 : 67-79.

AKINOLA, J O P. C. WHITEMAN, and E. S. WALLIS, 1975 The agronomy of pigeonpea (*Cajanus cajan*). Review series No. 1/1975. Common W. Bur. Pastures Field Crops, (GB) *Rev. Ser*, No. 1/1975, pp 1-57.

KILLINGER, G. B. 1968. Pigeonpea (*Cajanus cajan*) (L.) Druce) A useful crop for Florida. *Proc. Soil, Crop Sci.* Sco. Fla. 28: 162-97

REDDY, A R S VENKATESWARLU, and O. N. SINGH. 1980. Pattern of podfly and pod borer damage in late pigeonpeas. *International Workshop on Pigeonpeas*, 2 : 323-27

SHARMA, D. K. B SAXENA, and J. M. GREEN 1978. Potential of ratooning in pigeonpea *Field Crops Res.*, 1 : 165-72.

Table 1 Flush-wise yield and yield attributes in determinate pigeonpeas

Treatment	Pods/plant	Pod length (cm)	Seeds/pod	Seed index(100 seed weight in g)	Grain yield plant (g)
Pusa ageti (Early)					
Flush 1	32ab	4.5c	2 8a	12 67c	3.02a
Flush 2	98d	4 7d	2 8a	12 10bc	15.66bcd
Flush 3	126ef	4.3c	3.0ab	11 30b	26,75fg
Flush 4	114de	4.2c	2,9a	11,27b	15.53bcd
CP—7050 (Medium)					
Flush 1	—	—	—	—	—
Flush 2	98d	3.7b	3,5c	7 63a	18.97de
Flush 3	140f	3.5ab	3 2b	7.40a	17 22cde
Frush 4	184g	3.3a	3.3b	6.90a	17.5dcde
ICP—6916 (Late)					
Flush 1	34ab	6.3g	4.1d	20.00d	11 85d
Flush 2	20a	6.2g	4 2de	19.80d	12.95bc
Flush 3	51bc	5.7f	4 1de	21.20e	26.94g
Flush 4	63c	5.4e	4.3e	19 30d	21 90ef
Mean					
Pusa ageti	92b	4 5b	2 9b	11 83b	15 24a
ICP—7050	106c	2.6a	2 5a	5.48a	13 43a
ICP 6915	42a	5 9c	4 2c	20.08c	18 41a
Flush 1	22a	3,6a	2 3a	10 89a	4.95a
Flush 2	72b	4 9d	3 5b	13.18c	15 86b
Flush 3	106c	4,5c	3.5b	13.30c	23.64c
Flush 4	121c	4.3b	3.5b	12,49b	18.32b
G. M.	80.59	4,3	3,2	12.46	15.69

*Different letters in the superscript denote significant differences at 5% level of significance.

Table 2 Flush-wise insect damage in determinate pigeonpeas

Treatment	Per cent pod damage			Per cent seed damage		
	Pod fly	pod bug	LBC	Pod fly	Pod bug	LBC
Pusa ageti (Early)						
Flush 1	10 0a*	78.0f	18.0fg	4.0ab	62.5f	8.3e
Flush 2	30.3ab	40 7e	6.7bcde	15.5c	26.1e	3.4bcd
Flush 3	13.0a	10,7abc	0.7a	5 7b	4.7a	0 2a
Flush 4	43.0cd	12.7bc	13 3efg	24.3d	6.3bc	9.5e
ICP—7050 (Medium)						
Flush 1	—	—	—	—	—	—
Flush 2	7.0a	7.0a	4.0ab	2 1a	2.7a	1.9ab
Flush 3	27.3b	10.0ab	5 3bcd	11.4c	3.5a	2.4bc
Flush 4	45.3de	25.7d	12 7efg	21.6d	11.4d	5.8de
ICP—6915 (Late)						
Flush 1	58.7e	29.7d	10 7def	29 2c	10.1cd	3.7bcd
Flush 2	29.3bc	27 0d	4.3bc	10.8c	8.7bcd	1.5bc
Flush 3	54.3de	17.7c	8.3cde	27.3d	5.4ab	4.2cd
Flush 4	76.0f	13 7bc	19.7g	41.7e	3.9a	8.3e
Mean						
Pusa ageti	24.1a	35 5c	9.7b	12.3b	24 9c	5.4b
ICP—7050	19 9a	10.7a	5.5a	8 8a	4.4a	2.5a
ICP—6915	54 6b	22.0b	10.8b	27.3c	7.0b	4.4b
Flush 1	22.9a	35 9d	9 6a	11.1a	24.2d	4.0a
Flush 2	22.2a	24 9c	5 0a	9 5a	12.5c	2.3a
Flush 3	31.6b	12.8a	4.8a	14.8b	4.6a	2.3a
Flush 4	54.8c	17.3b	15.2b	29.2c	7.2b	7.8b
G. M.	32.9	22 7	8.6	16.1	12.1	4.1

* Different letters in the superscript denote significant differences at 5% level of significance.

Table 3 Flush-wise Yield attributes in indeterminate Pigeonpeas.

Treatment	Pods/plant	Pod length (cm)	Seeds/pod	Seed inde x (100 seed weight in g)	Grain yield/ plant (g)
T—20 (Early)					
Flush 1	344d*	4.7c	3.9a	7.40a	57.05d
Flnsh 2	67a	4.7c	3.9a	7.17a	9.46a
C—11 (Medium)					
Flush 1	122bc	4.4b	3.4a	10 40a	26.31b
Flush 2	80ab	3.9a	3.2a	9.50a	16 92ab
G—3 (Late)					
Flush 1	139c	4.4b	3.3a	9.77a	29.43c
Flush 2	137c	4.0a	3.2a	9 70a	16.60ab
Mean					
T—21	206c	4.7b	3.9b	7.28a	33.26b
C—11	101a	4.1a	3.3a	9.95b	21.61a
G—3	138b	4.2a	3 3a	9.73b	23.02a
Elush 1	202b	4.5b	3.5a	9.19b	87.60b
Flush 2	95a	4 2a	3.4a	8.79s	14.33a
G. M.	148	4.4	3 5	8 99	25.96

* Different letters in the superscript denote significant differences at 5% level of significances.

Table 4 Flush-wise insect pest demage in indeterminate pigeonpeas

Treatment	Per cent pod damage			Per cent seed damage		
	Pod fly	Pod bug	LBC	Pod fly	Pod bug	LBC
T—21 (Early)						
Flush 1	12.9a*	24.0b	1.6a	4 1a	10 2b	0.5a
Flush 2	5 .0c	8.0a	18.3c	22 4a	2.6a	9 0c
C—11 (Medium)						
Flush 1	32.0b	7.3a	3.3ab	12.2a	2.4a	1.4ab
Flush 2	37.0bc	8 3a	2.6ab	19.4a	3.4a	1.4ab
G—3 (Late)						
Flush 1	36.0bc	6.7a	5.0b	15.0a	2.2a	1.9b
Flush 2	48.7c	6.7a	6.0a	27.5a	3.1a	2.6b
Mean						
T-21	31.5a	16.0b	10 0b	13 3a	6 5b	4.8b
C . 11	34.5a	7.3a	3.0a	15.9ab	2.9a	1.5a
G—3	42.3a	6.7a	5.5b	21.3b	2.7a	2.3ab
Flush 1	26.7a	12.7b	3.3a	10.5a	5 0a	1.3a
Flush 2	45.6b	7.7a	9.0b	23.2b	3.1a	4 4b
G M.	36.1	10.2	6.2	16.8	4.0	2.8

* Different letters in the superscript denote significant differences at 5% level of significence.