Pak J Sci Ind Res 1999 **42** *(5) 257-259*

Effect of Sowing Date on the Yield and Yield Components of Short Duration Pigeonpea

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(Received 3 November 1996; accepted 22 June 1999)

In a 2-year field trial conducted at Ishurdi, short duration pigeonpea (*Cajanus cajan* L. Milisp.) responded to the sowing date (15 March, 15 April, 15 May, 15 June, 15 July, 15 August, 15 September, 15 October, 15 November and 15 December). The highest yield was obtained from 15 September sowing, which also produced the highest number of pods per plant and 1000 seed weight. Conpared with the sowing date of 15 September, other dates reduced the yield by 22.8 to 207.3%. Days to flowering, days to maturity and plant height declined almost linearly with the progress of sowing dates. September was the optimum time of sowing.

Key words : Sowing date, Yield components, Pigeonpea, *Cajanus cajan.*

Introduction

Pigeonpea (*Cajanus cajan* L.) is a minor pulse crop of Bangladesh. It is grown on about 5.564 ha, producting 3.857 tons of grain (BBS 1994) with average yield of 1.44 t ha^{-1} and contributes less than 1% of the total pulses produced in the country. It is mainly grown in the northern districts viz. Jessore, Kustia, Meherpur, Pabna, Rajshahi, Nilphamari, Kurigram etc. Bangladesh, as sole or mixed crop as well as along the road sides and hilly areas of the country. The local cultivars are of long duration type and take about 300 days to mature. Therefore, its area is gradually declining due to competition with other more profitable winter crops. Alternatively a wide range of variations among pigeonpea cultivars is available around the world. These are classified on the basis of maturity group as along duration (<180 days), medium duration (150-180 days), short duration (<150 days) and extra early i.e 110-130days (Kaul *et al* 1990).

To hold the pigeonpea area and also to fit this crop into the intensive cropping system, a few short duration lines have been introduced from ICRISAT, India. Since these lines are completely new to the Bangladesh environment, it is necessary to develop suitable cultural techniques for obtaining maximum grain yield. Date of sowing is the most important factor to be considered, which will not only determine the crop duration but also determine the feasibility of the crop to fit into the existing cropping system. Date of sowing has a profound effect on the crop duration and phenology of pig eonpea (Singh *et al* 1984; Malik *et al* 1986; Hammerton 1986; Kannaiyan *et al* 1988).

The present study was therefore, planned with a short duration photoinsensitive pigeonpea line 76012, to study the effect of different sowing dates on the yield and yield components and also to determine the exact date of sowing of the crop under Bangladesh conditions.

Materials and Methods

The experiment was conducted in the Gangetic calcareous grey floodplain soils of the Regional Agricultural Research Station, Ishurdi during the period from March to December 1991 and 1992 respectively. The soil of the experimental plot was silty loam with pH 7.5. A promising short duration photoinsensitive pigeonpea line was sown under rainfed condition on ten different dates viz. 15 March, 15 April, 15 May, 15 June, 15 July, 15 August, 15 September, 15 October, 15 November and 15 December. The trial was laidout in a randomized complete block design with three replications. The plot size was 25 m^2. The land was fertilized with N 20 kg, P_2O_5 40 kg and K 20 kg per hectare during final land preparation of each sowing. Seeds were sown in line with a spacing of 30 X 10 cm. Two weedings one at 15-20 and another at 35-40 days after sowing were done to keep the crop weed free. Sumithion was sprayed twice during flowering and pod setting stage of the crop to protect it from insect pests.

Data on plant height and number of pods per plant were recorded from ten randomly selected plants from each plot.

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Table 1

Yield and yield components of short duration pigeonpea (76012) versus dates of sowing (Pooled average of 1992 and 1993)

Date of sowing	Days to flowering	Days to maturity	Grain growth duration (days)	Plant height (cm)	No. of pods/plant	1000 seed weight(g)	Yield (Kg/ha)	%Yield reduction *
15 March	92b	168c	76b	165.0b	13.6ghi	60.1g	455f	207.3
15 April	100a	180a	80a	175.3a	14.2gh	60.3g	465f	200.6
15 May	94b	170b	76c	167.7b	15.8g	61.5g	478f	192.5
15 June	84c	152d	68f	92.7c	27.5f	69.4de	620c	125.5
15 July	77d	140e	63h	76.3d	29.4d	70.6d	677d	106.5
15 Aug	64e	133f	69ef	67.0e	34.5c	72.4c	998c	40.1
15 Sept	56f	127g	71d	60.7ef	39.8a	78.6a	1398a	--
15 Oct	54f	123h	69ef	55.0f	36.5b	76.2b	1138b	22.8
15 Nov	50g	117i	67f	47.0g	28.4e	68.4ef	643e	117.4
15 Dec	48g	114ij	66fgh	45.3gh	27.4f	67.7f	621e	125.1
CV(%)	4.8	4.3	3.6	15.2	10.6	5.2	13.4	

*% Yield reduction over 15 September sowing.

The 1000-seed weight was recorded from the sample drawn from the grain yield obtained from each plot. The data were analyzed by DMRT following Steel and Torrie (1980).

Results and Discussion

The yield and yield components of pigeonpea as affected by different dates of sowing are presented in Table 1. The data of sowing exerted a significant influence on the yield parameters. The crop duration, vis-a-vis vegetative as well as reproductive phases were affected significantly as the sowing dates delayed. The crop sown on 15 March started flowering at 92 days and that of 15 December sowing at 48 days. Similarly the total crop duration for these dates were 168 days and 114 days, respectively. The crop maturity of 15 March sowing occurred around 25 August and the same for the rest of the sowing (upto 15 October) were completed before 18 February. The crop sown on 15 November and 15 December matured around 12 March and 9 April respectively. The variation of maturity period have narrowed down compared to the sowing dates which did not commensurate with the variation of the latter.

The date of sowing had a profound effect on vegetative growth i.e. plant height. The plants of the 15 April sowing were significantly tallest and those of 15 December were shortest. The plants of the 15 March sowing were identical with that of 15 May sowing. The plant height after 15 May sowing (i.e. from 15 June onwards) abruptly reduced compared to the former ones. The number of pods per plant was significantly influenced by the date of sowing but this influence was rather inconsistent. Significantly the highest number of pods per plant was obtained from 15 September sowing. The crop sown on 15 March produced the lowest number of pods per plant which was statistically similar to those of 15 April and 15 May sowing, respectively. The pods per plant up to 15 May sowing were lowest due to the fact that the crops flowered in the month of June, July and August when cloudy weather and rains affected pod setting. Yadev *et al* (1984) also reported that cloudy weather and rain during flowering appear to reduce the percent pod set. The seed size was significantly influenced by the data of sowing in a similar trend to that of number of pods per plant.

Finally the contribution of all these characters has been reflected in the final yield. Significantly the highest yield of 1398 kg ha^{-1} was produced by 15 September sowing followed by 15 October sowing (1138 kg ha^{-1}). Similar results were also reported by Shankaral and Hegde (1989), Singh and Saxena (1991), Choudhary and Bhargave (1986) and Sadaphal (1988) who concluded that September is the ideal period for short duration pigeonpea sowing and any deviation from this causes yield reduction. The lowest yield was obtained from 15 March sowing. Yield of the crop gradually increased upto 15 September sowing after which it declined. The yield reduction occurred over the range of 22.8 to 207.3% compared to 15 September sowing. The reasons for this yield variation was that an increase in temperature during pod filling curtailed the growth period of the crop and turned the crop into maturity. Summerfield *et al* (1984) reported a similar result and concluded that heat stress during reproductive period curtailed growth and reduced yield significantly.

Therefore, it may be inferred from this study that September may be considered as the optimum time for sowing of short duration pigeonpea for better yield under rainfed conditions in Bangladesh.

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