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A STUDY ON GROWING PERIODS IN MASH (*Phaseolus mungo* L.)

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The effect of different growing periods on the growth and yield of Mash 80, was studied at Lyallpur. For this purpose, growing period commencing from middle of March to middle of July was selected) Mid July sowing increased the germination percentage, seedling density, number of pods per plant and 1000-grain weight. The highest yield of 6.15 maunds per acre was obtained from Mid-July sowing.

INTRODUCTION

Mash (*Phaseolus mungo* L.) being rich in protein (24%) is a very valuable crop especially when used with other starchy foods. It covers an area of 250* thousand acres with a total production of 65 thousand tons of grains annually. Out of the total area under mash, nearly 33 per cent is irrigated and the rest is sown under barani conditions. Unfortunately mash yield is low, particularly in the irrigated areas where it is almost a failure. Time of sowing is believed to be the most important agronomic factor responsible for the growth and subsequent performance of this crop. Sharma (1969) observed that mung bean and black gram (mash) when sown early gave higher yield. However, the late sown crop gave more yield when sown in lines 30 cm. apart. Aziz (1960) found that Mash and mung crop when sown during the first fortnight of July gave better yield than both the early and late sowing. Khan (1970) found that mung bean when planted from early March to middle of April gave higher yield under irrigated conditions at Lyallpur. He further concluded that a second crop may be raised from the same field after harvesting the March sown crop in July. Belic (1966) concluded that delay in sowing shortened the interval between emergence and maturity in soybean. However, Fuciman (1967) found that horse-bean gave the highest yield of 52 68 h.kg. grain per hectare when sown as early as possible in spring. Keeping these contradictory observations in view the present study was therefore designed to reach a more definite conclusion regarding the growing period of Mash commensurate with high yield under Lyallpur conditions.

MATERIALS AND METHODS

The investigations, to ascertain the effect of planting dates on the growth and yield of Mash was studied at the Agronomy Research Farm, University

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of Agriculture, Lyallpur. Randomized complete block design with four replications was used. The net plot size was kept 1/80 acre. Fifty pounds of P2O5 was used as a basal dose in each treatment. The crop was sown from the middle of March to the middle of July at one month interval. After harvesting March, April and May sown crops, the same plots were replanted as before to study the feasibility of taking two crops in one growing season. Mash variety 80, was sown in lines 1 feet apart with single row hand-drill using a seed rate of 6 seers per acre. All other cultural operations were normal and uniform for all the treatments. Germination percentage was recorded from a unit area of 2' 2' selected at random from three different places in each plot. For recording detailed observations on growth rate, number of pods per plant and number of grains per pod ten plants were selected at random, properly labelled and kept under observation till harvest. The data were analysed by analysis of variance method and Duncan's Multiple Range test was employed to compare the treatment means.

RESULTS AND DISCUSSION

Germination and plant growth are governed by environmental variations such as temperature, air and moisture (Delorite and Ahlgren, 1957). The different sowing dates showed significant effect on the germination counts per unit area and was observed to be significantly lower in early and late sowing. The temperature variations in early and late sowings probably adversely affected the seedling emergence and their subsequent development (Table 1). In case of second crop seedling emergence was significantly higher in Mid-July sowing as compared to mid-August sown crop. Duration of germination was significantly affected by the growing periods. Mid-July sown crop germinated in the shortest time i.e. within 6.9 days. Earlier or later the sowings, longer was the duration of germination and poorer was the seedling establishment. Similar observations were made by Belic (1966) on soybeans. Plant height and number of leaves per plant were significantly higher in sowings from the middle of April to middle of June (Table 2). Excessive vegetative plant growth probably led to poor fruiting and ultimately to lesser yield per acre. The results are in accordance with those of Gross (1964). Number of pods per plant were significantly higher in mid-July sown crop than early and late sowings. Similar observations were made by Reipma (1958). Plant density was the highest in case of mid-July sown crop and the minimum in mid-March and mid-August sown crops (Table I) Lower plant density was due to seasonal variations and high plant mortality in early and late sowings. Similar observations were recorded by Nelson and Roberts (1962). Planting dates did not show significant effect on the number

TABLE 1. *Effect of sowing dates on seedling emergence, number of days taken to complete germination and number of leaves per plant at harvest*

Planting dates	Av. %age germination	Av. No. of days taken to complete germination	Av. plant density per acre at maturity
First crop			
Mid March	27.6 c*	9.9 a*	23.9 bc*
Mid April	38.1 b	9.1 b	39.9 a
Mid May	21.5 cd	8.2 d	33.4 b
Mid June	16.9 d	7.8 e	34.5 d
Mid July	46.5 d	6.9 f	17.3 c
Second crop			
Mid July	44.8 ab	6.9 f	16.1 c
Mid August	23.3 cd	8.8 bc	18.6 c
Mid August	23.3 c	8.7 bc	16.1 c

*Duncan's Multiple Range Test at 5 per cent probability. Any two means in each column not sharing a letter differ significantly.

TABLE 2. *Effect of sowing dates on height per plant, plant density at maturity and 1000-grain weight*

Planting dates	Plant height (inches)	Av. plant density per acre	Av. 1000-grain weight (gms.)
First crop			
Mid March	12.9 de*	13915	36.6 c*
Mid April	27.0 a	40777	36.1 d
Mid May	23.8 ab	4235	35.9 d
Mid June	23.8 ab	5929	36.2 cd
Mid July	14.4 cd	62641	37.7 a
Second crop			
Mid July	17.4 cd	41987	37.1 b
Mid August	10.8 de	19239	36.1 d
Mid August	9.6 e	17424	35.8 d
		N.S.	

*Duncan's Multiple Range Test at 5 per cent probability. Any two means in each colum not sharing a letter differ significantly.

N.S. = Nonsignificant.

TABLE 3. *Effect of sowing date on number of pods per plant, number of grains per pod and grain yield per acre*

Planting dates	Av. No. of pods per plant	Av. No. of grains per pod	Av. grain yield per acre (maunds)
First crop			
Mid March	5.1 c*	5.2 a*	0.20 d*
Mid April	3.1 c	5.5 a	0.10 d
Mid May	3.3 c	4.8 a	0.92 c
Mid June	11.0 c	5.1 a	0.84 c
Mid July	125.2 a	6.6 a	6.15 a
Second crop			
Mid July	100.4 b	6.5 a	4.99 b
Mid August	5.4 c	5.4 a	0.16 d
Mid August	6.1 c	5.2 a	0.14 d

*Duncan's Multiple Range test at 5 per cent probability. Any two means in each column not sharing a letter differ significantly.

of grains per pod. However, the grain weight was influenced significantly (Table 1). Number of grains per pod seems to be genetically stable character and hence was least affected by the cultural operations. The highest mean yield per acre was obtained from mid-July sowing. In rest of the treatments, the level of yield was very low (Table 2). The higher yield in case of mid-July sown crop may be attributed to high fruting, low plant mortality and favourable seasonal conditions as compared to other sowing dates. These findings are in agreement with those of Kale (1936) and Earl (1969), Robert and Singh (1951), Leonard (1969), Aziz (1960), Fuciman (1967), Mulalic (1969) and Sharma (1969).

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