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Effect of Seed Rates on Mungbean Varieties Under Dryland Conditions

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ABSTRACT

The effect of seed rates on mungbean varieties under dry land conditions was studied at Ahmad Wala Research Station Karak (NWFP) during summer 1998. The experiment was laid out in randomized complete block design with spilt plot arrangement. Varieties were allotted to the main plot while seed rates to the subplots. Five mungbean varieties, NM-92, NM-19-19, NM-121-25, N/41 and local, and four seed rates 10, 20, 30, 40 kg ha^{-1} were evaluated. The experimental results exhibited that maximum pods per plant (18.18), highest number of grains per pod (9.79), maximum thousand grain weight (28.09 g) and highest grain yield (446.07 kg ha^{-1}) were recorded in mungbean variety NM 121-25. Similarly, seed rate of 10 kg ha^{-1} gave significantly maximum number of pods per plant (19.70), maximum number of grains per pod (10.14) and maximum thousand grain weight (30.01 g). Highest and significant grain yield (485.80 kg ha^{-1}) was recorded in 20 kg ha^{-1} seed rate.

Key Words: Mungbean; Seed rates; Varieties

INTRODUCTION

The yield and quality of mungbean can be improved by applying best agronomic practices such as optimum seed rate and use of high yielding varieties. Optimum seed rate plays an important role in contributing to the high yield because in case of thick plant population, most plants remain sterile, easily attacked by diseases as compared to normal population. Robert and Singh (1981) reported that pods per plant and percent seed set decreased at seed rate of 6 kg ha^{-1}. Mackenzie and Lious (1985) studied the performance of mungbean over a range of 12 plant densities from 10,000 to 60,000 plants per hectare. Increasing the plant density was positively correlated to yield and plant height and negatively related with flowering as significant reduction was noticed in flowering. Increasing the number of plants per m^2 increased plant height and decreased number of primary branches per plant and thousand-grain weight (Newsletter, 1981). Variety is another important factor contributing to yield. For every climate, there are varieties of different crops. Francisco and Maeda (1989), Jain *et al.* (1988), Yaday and Warsi (1988) found significant differences in yields and yield components of different mungbean varieties. In view of the above facts, the present study was initiated to investigate the effects of different seed rates on the varietal evaluation of mungbean under dryland conditions.

METERIALS AND METHODS

Effect of seed rates on mungbean varieties under dryland conditions was studied at Ahmadwala Research Station Karak (NWFP) during summer, 1988. The experiment was laid out in randomized complete block design with split plot arrangement replicated four times. Varieties were allotted to main plots while seed rates were kept in subplots. The subplot size was 4m x 1.8m having six rows with row-to-row distance of 30 cm. Urea and Diammonium phosphate was applied before sowing to meet the requirement of a basal NP 15:60 dose of nitrogen and phosphorus. Sowing was done on 17th July 1998. Five varieties, NM-92, NM- 19-19, NM-121-25, N/41 and Local and four seed rates, 10, 20, 30 and 40 kg ha^{-1} were included in the experiment. Data were recorded on pods per plant, grains per pod, thousand grain weight and grain yield. The data was statistically analyzed and means were compared using LSD test.

RESULTS AND DISCUSSION

Pods per plant. Both varieties and seed rates had significant effect on number of pods per plant (Table I) while the interaction effect was not significant.

Table I. Pods per plant as affected by different varieties and seed rates of mungbean under dry land conditions

Mungbean Varieties	Seed rates (kg ha-1)				
	10	**20**	**30**	**40**	**Mean**
NM-92	17.25	16.75	14.00	11.00	14.75 bc
NM 19-19	20.25	17.75	14.75	11.25	16.00 b
NM 121-125	23.00	19.25	17.00	13.50	18.18 a
N/41	17.50	14.75	12.50	10.00	13.68 c
LOCAL	20.25	17.00	14.50	11.25	15.81 b
MEAN	19.70 a	17.10 b	14.55 c	11.40 d	

LSD Value for seed rates = 1.487; LSD Value for varieties; = 1.017; Means followed by different letters are significantly different at 5% level of probability using LSD test

Maximum number of pods per plant (18.18) was produced by NM 121-25, while minimum (13.68) pods

per plant were recorded in variety N/41. Maximum pods per plant (19.70) were recorded at seed rate of 10 kg ha^{-1} while minimum pods per plant (11.40) were recorded in plots seeded at the rate of 40 kg ha^{-1}. Increasing the seed rate gradually reduced number of plants per plant. Mackenzie (1985) also reported decrease in number of pods per plant in mungbean with increase in plant density. Panwar and Sirobi (1987 also reported that by increasing plant density in mungbean cultivars, yield per plant and pods per plant decreased.

Grains per pod. Grains per pod were significantly affected by varieties and seed rates (Table II). The interaction of seed rates and varieties had no significant effects. Maximum grains per pod (9.79) were recorded in variety NM 121-125 followed by NM 19-19 (8.40). Minimum grains per pod (8.01) were recorded in variety N/41. Maximum grains per pod (10.14) were recorded in the plots seeded at the rate of 10 kg ha^{-1} while minimum grains per pod (6.63) was observed at seed rate of 40 kg ha^{-1}. The results are confirmed by Bonari and Macchia (1975) who reported that percent seed set decreased with increasing planting density.

Table II. Grains per pod as affected by different varieties and seed rates of mungbean

Mungbean Varieties	Seed rates (kg ha^{-1})				
	10	**20**	**30**	**40**	**Mean**
NM-92	9.41	8.91	7.49	6.33	8.04 bc
NM 19-19	10.16	9.24	7.24	6.91	8.40 b
NM 121-125	11.16	10.83	8.91	8.42	9.79 a
N/41	9.74	9.16	7.16	5.99	8.01 c
LOCAL	10.24	9.58	7.66	5.66	8.28 b
MEAN	10.14 a	9.55 b	7.69 c	6.63 d	

LSD Value for seed rates = 0.5071; LSD Value for varieties = 0.6716; Means followed by different letters are significantly different at 5% level of probability using LSD test

Thousand grain weight (g). Varieties and seed rates had a significant effect on thousand-grain weight of mungbean (Table III). Maximum thousand grain weight (28.09 g) was recorded in variety NM 121-25 while minimum thousand grain weight (26.42 g) was observed in variety N/41. In seed rates, maximum thousand-grain weight (30.01g) was observed in plots at the rate of 10 kg ha^{-1} while minimum thousand grain weight (24.43 g) was recorded at seed rate of 40 kg ha^{-1}. The results are endorsed by Newsletter (1981), which reported that thousand grain weight decreased when seed rate increased.

Grain yield. Grain yield was significantly affected by seed rates and varieties (Table IV). Maximum grain yield of 466.07 kg ha^{-1} was recorded in NM-121-52 while minimum grain yield (409.6 kg ha^{-1}) was recorded in variety N/41. Similarly, maximum grain yield of 485.80 kg ha^{-1} was achieved by the plots seeded at the rate of 20 kg ha^{-1} while minimum grain yield (383.95 kg ha^{-1}) was recorded in the plots where 40 kg ha^{-1} seed rate was used. The results are in agreement with Bonari and Macchia (1975) who reported that seed yield decreased with increasing plant density. Similar results were also recorded by Panwar and Sirobi (1987) who found that by increasing plant density, yield per plant and pods per plant decreased.

Table III. Thousand grain weight (g) affected by different varieties and seed rates of mungbean

Mungbean Varieties	Seed rates (kg ha^{-1})				
	10	**20**	**30**	**40**	**Mean**
NM-92	30.23	26.67	26.62	26.91	27.05 b
NM 19-19	29.91	27.02	25.23	24.86	26.75 b
NM 121-125	30.72	29.63	26.00	26.02	28.09 a
N/41	28.20	27.48	26.99	24.01	26.42 b
LOCAL	30.01	27.23	25.10	24.07	26.60 b
MEAN	30.01 a	27.60 b	25.98 c	25.17 d	

LSD Value for seed rates = 0.7541; LSD Value for varieties = 0.9999; Means followed by different letters are significantly different at 5% level of probability using LSD test

Table IV. Grain yield (kg ha^{-1}) as affected varieties and seed rates of mungbean

Mungbean Varieties	Seed rates (kg ha-1)				
	10	**20**	**30**	**40**	**Mean**
NM-92	412.50	485.50	444.75	387.25	432.50 b
NM 19-19	413.75	488.75	429.25	380.75	428.13 b
NM 121-125	430.25	503.50	452.00	398.50	446.07 a
N/41	393.00	461.25	418.00	366.25	409.63 c
LOCAL	415.50	490.00	434.75	387.00	431.81 b
MEAN	413.00 c	485.80 a	435.75 b	383.95 d	

LSD Value for seed rates = 5.248; LSD Value for varieties = 7.613; Means followed by different letters are significantly different at 5% level of probability using LSD test

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