

# Effect of Different Seeding Times and Seed Rates on the Growth Yield and Quality of Ricebean

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## ABSTRACT

The study was conducted to determine the effect of different seeding times and seed rates on the growth, yield and quality of ricebean (*Vigna umbellata*) during Kharif 1998. Treatments were three seeding times viz. 3, 10 and 17 August and three seed rates viz. 20, 25 and 30 kg ha<sup>-1</sup>. Results revealed that sowing on 3 August gave maximum seed yield at 1492 kg ha<sup>-1</sup> and gradually decreased with delay in sowing. Whereas seed rate of 25 kg ha<sup>-1</sup> gave maximum seed yield (1591 kg ha<sup>-1</sup>) which differed significantly from other rates of seeding.

**Key Words:** Ricebean; Seeding times; Seed rates; Yield components

## INTRODUCTION

Due to rapid population growth, it is, therefore, essential to explore the economic feasibility of less known pulse crops. Pulses are an excellent source of plant protein and good substitute of animal protein so known as "poor man's meat" in the developing world. Ricebean (*Vigna umbellata*), has been called an under utilized crop with a potential to become a major protein crop for the tropics and sub-tropics. The nutritive value of ricebean is exceptionally high. The protein contents of seeds vary from 14-24% and the amino acids, methionine and tryptophane are considerable high (Chandel *et al.*, 1978). Ricebean seeds also contain 5-7% crude fibre, 3-4% ash, 61-65% carbohydrates, 11-12% aspartic acids and 17-18% glutamic acid (Rodriguez & Mendoza, 1991). Being leguminous, it maintain soil fertility by fixing atmospheric nitrogen through symbiosis with rhizobial strains. Among different reasons of low production of pulses in Pakistan, plant population and seeding times are of prime importance. Ricebean under good management practices, can produce 3000 kg ha<sup>-1</sup> seeds and 3300-8200 kg ha<sup>-1</sup> dry herbage to meet scarcity of green forage during two lean periods, i.e. April-June and November-December (Mukherjee *et al.*, 1980). *Vigna umbellata* produces seed yields of 2.5-3.4 t ha<sup>-1</sup>, when sown in July-August and harvested late November (Chatterjee *et al.*, 1987). Ricebean when sown on July, August and September produced average seed yields of 3.09, 3.34 and 3.33 t ha<sup>-1</sup> respectively (Chatterjee *et al.*, 1987). 894 Kg ha<sup>-1</sup> grain yield of ricebean was obtained from seed rate of 25 kg ha<sup>-1</sup> (Tahir, 1998). Optimum sowing time and seed rate are key factors for determining the yield of ricebean.

This study was, therefore, initiated to determine the optimum seeding time and seed rate in order to maximize seed yield of ricebean.

## MATERIALS AND METHODS

The study was carried out at the Agronomic Research Area, University of Agriculture, Faisalabad during Kharif season 1998. The experiment was laid out using RCBD under split plot arrangement with three replications. The net plot size was 3 m x 5 m. Different seeding times were 3rd, 10th and 17th August and seed rates 20, 25 and 30 kg ha<sup>-1</sup> and were randomized in main and sub-plots, respectively. A basal dose of nitrogen and phosphorus i.e. 40-60 NP kg ha<sup>-1</sup> was applied at the time of sowing. Seeding was done with the help of single row hand drill keeping row to row distance of 60 cm. All other agronomic practices were kept normal and uniform for all the treatments. Observations recorded during the course of study using the standard procedures were number of plants m<sup>-2</sup>, Plant height, number of pods plant<sup>-1</sup>, 1000-seed weight, seed yield and seed protein contents (Jackson, 1962). The data Analyzed statistically and treatment means were compared by using Duncan's Multiple Range Test at 5% probability level (Steel & Torrie, 1984).

## RESULTS AND DISCUSSION

**Number of plants m<sup>-2</sup>.** Table I revealed that maximum number of plants (28.67 m<sup>-2</sup>) were obtained from seeding on 3rd August which were statistically *at par* with seeding on 10th August. The minimum number of plants (24.89 m<sup>-2</sup>) were noted in case of seeding on 17th

**Table I. Growth, Yield and Quality of ricebean as affected by different seeding times and seed rates**

Treatment	No. of plants (m <sup>-2</sup> )	Plant height (cm)	No. of pods plant <sup>-1</sup>	1000-seed weight (g)	Seed yield (kg ha <sup>-1</sup> )	Protein contents (%)
<b>1. Seeding times</b>						
3rd August	29 a	136.11 a	130.80 a	63.84 a	1492 a	18.32
10th August	28 a	135.02 a	128.00 a	61.86 ab	1369 a	18.21
17th August	25 b	126.10 b	113.00 b	56.95 b	1241 b	18.05
LSD <sub>(0.05)</sub>	2.0	1.46	6.32	5.26	125	N.S
<b>2. Seed rates (kg ha<sup>-1</sup>)</b>						
20	22 c	134.60 a	127.30 a	63.54 a	1069 c	18.97
25	27 b	133.72 a	124.40 ab	60.68 ab	1591 a	18.07
30	32 a	128.91 b	120.10 b	58.42 b	1456 b	17.59
LSD <sub>(0.05)</sub>	2.7	1.33	4.79	2.77	1.73	N.S

NS = Non-significant: Any two means not sharing a letter in common differ significantly according to DMRT at 5% probability level

August. Similar results were reported by Bhingarde and Dumbre (1996) who also noted that earlier sowing produced highest seedling germination percentage. Seed rate of 30 kg ha<sup>-1</sup> produced the maximum number of plants at 32.33 m<sup>-2</sup> whereas minimum number of plants at 22 m<sup>-2</sup> were recorded in seed rate of 20 kg ha<sup>-1</sup>. All the treatments differed significantly from one another. This variation of plant population can be attributed to using different seed rates. These results are in line with the observations of Piggot and Farrel (1982) who reported that plant population in each trial ranged from 5-110 plants m<sup>-2</sup> by changing seed rates.

**Plant height.** It is evident from the data presented in Table I that different seeding times and seed rates had significant effect on plant height of ricebean. The results exhibited that seeding on 3rd August produced the tallest plants (136.11 cm), it however, did not differ statistically from 10th August treatment. The minimum plant height (126.1 cm) was observed seeding on 17th August. These results confirm the observations of Saharia (1981) who reported that plant height was generally reduced by delay in sowing in mungbean. Seed rate of 20 kg ha<sup>-1</sup> produced tallest plants (134.60 cm) which did not differ statistically from 25 kg seed ha<sup>-1</sup> treatment. The minimum plant height (128.91 cm) was observed where seed rate of 30 kg ha<sup>-1</sup> was used.

**Number of pods plant<sup>-1</sup>.** Plant growth behavior can be determined by number of pods per plant. The number of pods plant<sup>-1</sup> was significantly affected by different seeding times and seed rates. The results revealed that maximum number of pods (130.8) plant<sup>-1</sup> was obtained from seeding on 3rd August which was followed by relatively lower number of pods per plant from seeding on 10th August and these were statistically *at par* with each other (Table I). Whereas minimum number of pods (113) were obtained from seeding on 17th August. These results are similar to the findings of Phalwan and Hussain (1983) who reported that earliest sowing (15 April) gave the higher number of pods per plant.

Similarly, seed rate of 20 kg ha<sup>-1</sup> gave the maximum number of pods (127.3) per plant of ricebean which were statistically similar with seed rate of 25 kg ha<sup>-1</sup> where as seed rate of 30 kg ha<sup>-1</sup> gave the minimum number of pods (120.1) per plant. The decreasing trend of pods per plant with increasing seed rate is attributed to the competition existing between the populated crop due to the use of higher seed rate. These results are in line with the findings of Pookpokdil and Pataradil (1993) who also reported that decreasing number of pods plant<sup>-1</sup> with increasing plant density.

**1000-Seed weight.** Data indicated that maximum 1000-seed weight of 63.84 g was recorded in 3rd August sowing which was statistically *at par* with seeding on 10th August. Minimum 1000-seed weight (56.95 g) was noted in 17th August sowing which was also statistically similar with 10th August. These results confirm the findings of Sharma *et al.* (1989) who reported that delay in sowing decreased 1000-seed weight. Similarly, seed rate of 20 kg ha<sup>-1</sup> gave maximum 1000-seed weight (63.54 g) which was followed by 25 kg ha<sup>-1</sup>. Whereas seed rate of 30 kg ha<sup>-1</sup> gave minimum 1000-seed weight (58.42 g) which was similar with seed rate of 25 kg ha<sup>-1</sup>. These results are in conformity with the findings of Tahir (1998) who reported that different densities influenced significantly 1000-seed weight.

**Seed yield.** Data given in Table I indicates a significant effect of different seeding times and seed rates on the seed yield. Seeding on 3rd August produced maximum seed yield at 1492 kg ha<sup>-1</sup>, followed by seeding on 10th August but both treatments were statistically similar while the minimum seed yield of 1241 kg ha<sup>-1</sup> was produced from 17th August sowing. The higher seed yield from seeding on 3rd August could be because of relatively longer life span of crop compared with seeding on 17th August which remained in the field for relatively short duration. These results are in agreement with the findings of Bilal (1994) who reported that late sowing (13 April) decreased seed yield of mungbean. Seed rate

of 25 kg ha<sup>-1</sup> produced maximum seed yield at 1591 kg ha<sup>-1</sup> which was followed by 30 kg seed ha<sup>-1</sup> treatment. Where as seed rate of 20 kg ha<sup>-1</sup> produced minimum seed yield of 1069 kg ha<sup>-1</sup>. This was due to more plants per unit area in higher seeding rates reduced the number of pods plant<sup>-1</sup> and mean seed weight than low plant population (Table I). These results confirm the findings of Khan *et al.* (1988) who reported that moderate seed rate (17.5-25 kg ha<sup>-1</sup>) were better than low (10-15.5 kg ha<sup>-1</sup>) and higher (27.5-37.5 kg ha<sup>-1</sup>) seed rate.

**Protein Contents.** No significant effect of different seeding times and seed rates was found on protein contents and they varied about 18% among various treatments.

## CONCLUSIONS

The results indicated that ricebean may be planted during early August using 25 kg seed ha<sup>-1</sup> to get maximum seed yield ha<sup>-1</sup> under the climatic conditions of Faisalabad.

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