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GROWTH AND YIELD PERFORMANCE OF BARI MUNG-5 UNDER DIFFERENT TIME OF SOWING

NARGIS JAHAN AND A. M. M. GOLAM ADAM[1]

Plant Physiology Laboratory, Department of Botany, University of Dhaka, Dhaka-1000, Bangladesh

ABSTRACT

A field experiment was carried out at University of Dhaka from March to July, 2011 to study the effect of time of sowing on the growth and yield of BARI mung-5. The treatments consisted of three dates of sowing *viz*. March 15, April 15 and May 15. The crop responded significantly to sowing time and 15 April sowing seeds produced plants having maximum plant height (68.4 cm), leaves/plant (29.33), total dry matter/plant (17.99), branches/plant (8.17), pods/plant (11.33), pod length (8.78 cm), seeds/pod (11.17), 1000 seed weight (46.52 g), seed yield/plant (5.33 g), yield/ha (1.77 t) and harvest index (29.58 %) at harvest. The seed yield decreased by 36.8 and 49.9% when seed sown early (15 March) or late (15 May) due to production of lower yield components.

Key words: BARI mung-5, Sowing time, Growth, Yield

INTRODUCTION

Mungbean (*Vigna radiata* L. Wilczek) is one of the major pulse crops supplementing protein in cereal-based diet of the poor people in Bangladesh. Seed contains carbohydrate (51%), protein (26%), minerals (4%), and vitamins (3%). It is potentially useful in the predominent rice-based farming system because of its short duration (Ahmed *et al.* 1978). Yield potential of mungbean is generally low. Various factors responsible for low yield of mungbean at the farmer's field are: lack of awareness of farmers about optimum time of sowing, using high yielding variety, improper planting patterns, insufficient plant protection measures and imbalanced use of fertilizers. Sowing time, a non-monetary input is the single most important factor to obtain maximum yield from mungbean (Samanta *et al.* 1999). Early or late sown crop may not germinate properly followed by lower growth and development producing lower yield (Hussain *et al*. 2004, Islam 1983).

In Bangladesh research has been done on growth, yield attributes and yield of different varieties of mungbean in relation to variation of sowing time (Ahmed *et al.* 1978, Miah *et al.* 2009, Nag *et al.* 2000). However, optimum time of sowing of

[1] Corresponding author: Department of Botany, Jagannath University, Dhaka, <adam_du04@yahoo.com>

mungbean may vary from variety to variety and season to season under different agroecological conditions. Therefore, the present investigation was undertaken to study the growth and yield variations in mungbean with a view to identifying the optimum sowing time of BARI mung-5 in Kharif-I season.

MATERIALS AND METHODS

The experiment was carried out in the research field of the Department of Botany, University of Dhaka during March to July, 2011. The treatment comprised of three dates of sowing: 15 March (S_1), 15 April (S_2), and 15 May (S_3). The experiment was laid out in RCBD with six replications. Fertilizers at the rate of 45, 100 and 60 kg/ha of N, P_20_5 and K_20 were applied at the time of final land preparation of each sowing. Seeds of BARI mung-5 were collected from BARI, Joydebpur, Gazipur. Seeds were sterilized with 0.5% calcium hypochlorite before sowing. The seeds were sown in rows 30 cm apart. Weeding was done at 15 days after sowing followed by thinning to keep plant to plant distance of 10 cm.

Data on plant height, branches/plant, leaves/plant and total dry matter (TDM)/plant were recorded from the age of 30 days after sowing at an interval of 7 days. Pods/plant, length of pod, dry weight of pods/plant, seeds/pod, seeds/plant, 1000-seed weight, yield/plant and yield were recorded at harvest. Data were analyzed statistically to determine the significance of the characters studied. LSD test was applied for the comparison of means (Steel and Torrie 1960) at the 5% level of significance.

RESULTS AND DISCUSSION

The early growth and development (plant height, branches/plant and leaves/plant) was very slow at 30 DAS, then it started rapidly from 44 DAS and highest at harvest. The 15 April sown crop always showed maximum growth of these parameters and was significantly comparable to the other treatments (15 March and 15 May) at all growth stages (30 DAS to first harvest) (Figs 1 and 2). Different scientists reported that majority of crops can utilize the factors of favourable environment which ultimately influences plant to have more growth and development in mungbean plants (Miah *et al.* 2009, Soomro 2003, Sarker *et al.* 2004, Quresh and Rahim 1987).

Total dry matter (TDM) of a plant is an important parameter which influences the production of yield attributes and yield of plant. In this experiment, the early growth of TDM was very slow (30 - 44 DAS), then increased rapidly and picked at harvest. Crop sown on April 15 showed significantly greater TDM than other sown crop at all growth stages (Fig. 2) (Sarker *et al.* 2004). The late sown crop (15 May) showed significantly lower plant height, branches/plant, leaves/plant and TDM/plant at all growth stages.

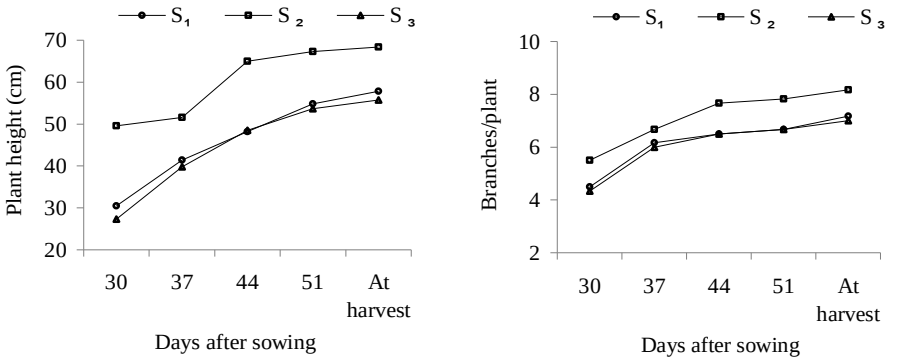

Fig. 1. Effect of different sowing time on plant height and branches/plant of BARI mung-5 at different days ($LSD_{0.05}$ for plant height are 3.48, 3.68, 6.68, 1.89 and 6.77 at 30, 37, 44, 51 and at harvest respectively and for branches/plant is 0.10 at 30 days after sowing).

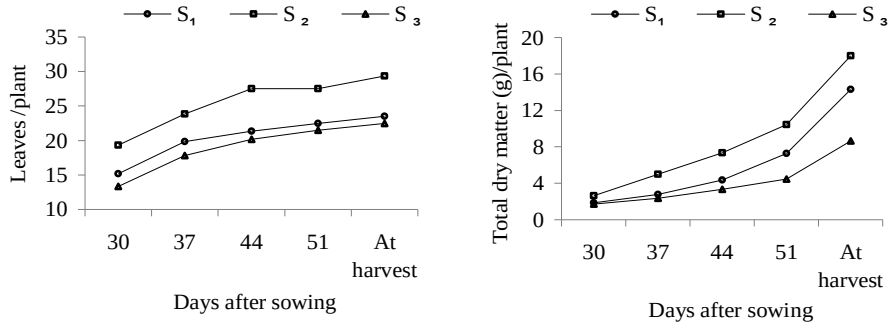

Fig. 2. Effect of different sowing time on leaves and total dry matter/plant of BARI mung-5 at different days ($LSD_{0.05}$ for leaves/plant are 4.52, 3.97, 3.59 and 3.77 at 30, 37, 44 and 51days after sowing respectively, whereas for TDM 0.39, 0.99, 1.84, 1.87 and 2.35 at 30, 37, 44, 51 and at harvest respectively).

Yield contributing characters *viz.* pods/plant, length of pod, dry weight of pods/plant, seeds/pod, seeds/plant, 1000-seed weight yield/plant and yield/ha were significantly affected by sowing time (Table 1).

Treatment S_2 (15 April) showed significantly maximum pods/plant (11.33), length of pod (8.78 cm), dry weight of pods/plant (6.25 g), seeds/pod (11.17) and seeds/plant (122.50) than the other days of sowing. The 15 May sowing treatment gave significantly lower yield-contributing characters, while 15 March sown crop gave significantly highest 1000 seed weight which was similar to S_2. Miah *et al.* (2009) and Rehman *et al.* (2009) reported higher number of pods in mungbean plant sown in March and April. Sarker *et al.* (2004) showed that pod length of mungbean was significantly influenced by planting time. Rehman *et al.* (2009) reported higher number of seeds/pod in mungbean plant sown in April. However, the results is contradictory to the findings of Miah *et al.* (2009) who

reported lower number of seeds/pod and lower number of seeds/plant when mungbean sown on April. They agreed that time of sowing had greater influence on plant to grow well coupled with favourable environment condition producing maximum yield contributing characters in mungbean plants.

Seed yield/plant was noticed significantly higher with S_2 (15 April) (5.33 g) than other treatments (S_1 = 3.37 g and S_3 = 2.67 g) and it was 58.16 and 99.62 % higher than treatment S_1 and S_3, respectively. Similar trends were recorded from yield/ha. This result affected increased yield contributing characters (Sarker *et al*. 2004, Miah *et al*. 2009 and Rehman *et al*. 2009).

Table 1. Effect of different sowing time on yield attributes and yield of BARI mung-5.

Treatments	Pods/ plant (no.)	Length of pod (cm)	Dry weight of pods/plant (g)	Seeds/ pod (no.)	Seeds/ plant (no.)	1000-seed weight (g)	Yield/ plant (g)	Yield/ ha (t)	Harvest index (%)
S_1	9.17 ab	7.43 b	4.87 b	8.87 b	80.01 b	46.78 a	3.37 b	1.10 b	23.78 b
S_2	11.33 a	8.78 a	6.25 a	11.17 a	122.50 a	46.52 a	5.33 a	1.77 a	29.58 a
S_3	7.17 b	7.33 b	3.82 c	8.09 b	58.15 c	44.67 b	2.67 c	0.89 c	30.92 a
CV (%)	27.22	13.24	26.15	18.64	33.52	3.47	31.94	32.12	14.28
LSD (0.05)	2.68	1.02	0.97	1.68	14.78	1.28	0.50	0.18	2.28

Harvest index was affected significantly due to different sowing time. Treatment S_3 and S_2 produced similar value of harvest index (30.92 and 29.58, respectively). This result agrees with the findings of Fraz *et al.* (2006) on mungbean. In soybean, Seijoon *et al.* (2000) also found similar results and suggested that the increased harvest index with late sowing could be related to high assimilate use efficiency due to increased sink capacity.

It can be concluded that mungbean seed is to be sown on 15 April to achieve maximum seed yield. Crop sown beyond this date fails to produce remarkable yield attributes and seed yield of mungbean.

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