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Relation Between Dry Matter Production and Yield of Mungbean (*Vigna radiata* L.) Varieties Influenced by Planting Method and Sowing Time at Summer

M.S. Rahman, [1]M. Eunus, M. A. Mannan, M. R. Ali and M. M. Hoque
Regional Agricultural Research Station, Jamalpur-2000, Bangladesh
[1]Department of Agronomy, Bangladesh Agricultural University, Mymensingh, Bangladesh

Abstract: Two planting methods viz. line and broadcast, five varieties viz. Local, Barimung 2, Barimung 3, Binamung 2 and Binamung 5 and five sowing dates viz. February 5, February 20, March 5, March 20 and April 5 were tested to know the relation between dry matter production and yield of munbean. The highest seed yield (890 kg ha^{-1}) was obtained from Barimung 2 and significantly higher seed yield (870 kg ha^{-1}) was obtained from February 20 sowing, while March 20 sowing yielded the lowest (593 kg ha^{-1}). Barimung 2, Barimung 3 and Binamung 2 performed better in line sowing compared with broadcast method. Line sowing method was found good when the crop was sown on February 20. Binamung 5 gave the highest seed yield (1071 kg ha^{-1}) when sown on February 20. Binamung 2 gave the highest seed yield (1163 kg ha^{-1}) when sown on February 20 in line sowing method.

Key words: Mungbean, planting method, variety, sowing date, dry matter and seed yield

Introduction

Dry matter production at various growth stages is a pre-determinant factor to influence the yield and yield components of any crop. Environmental conditions influence the development of vegetative and reproductive phase and level of dry matter production especially in mungbean. Since sowing dates create variable environment for growing crops, these have certainly be found in mungbean to influence many parameters. Mungbean (*Vigna radiata* L.) is a short-duration grain legume, which suits most of the intensive cropping systems in tropical regions. It can be grown both in Rabi and Kharif growing season (BARI, 1998). The productivity of mungbean can be increased by selecting suitable varieties and by proper management (Reddy *et al.*, 1992). The varieties with higher dry matter production and its proper distribution results in higher productivity. Dry matter production can be increased by selecting varieties with higher photosynthetic rate. The delayed sowing of mungbean after March and early sowing before February both reduce yield and yield attributes (Chovatia *et al.*, 1993). Shani and Jaiswal (1991) and Dharmalingam and Basu (1993) are in agreement with the view that delayed sowing drastically reduces the seed yield. Temperature determines the plant growth, development and yield and it affects all plant processes either directly or indirectly (Baker *et al.*, 1989). Duke *et al.* (1979) reported that optimum temperature enhanced the plants capability to fix nitrogen and increase dry matter and grain yield. Planting method is an important factor to establish the optimum plant population in unit area. This study was, therefore, undertaken to find the relation between dry matter production and yield of five mungbean varieties sown at five different dates at summer under two planting methods.

Materials and Methods

The experiment was conducted at Regional Agricultural Research Station, Jamalpur during February-June, 1999. The soil of the experimental field was sandy loam having pH value 5.6. The land type was medium high of non-calcareous dark gray flood plain soil under Old Brahmaputra Flood Plain AEZ 9. Two planting methods viz. line and broadcast, five mungbean varieties viz. Local, Barimung 2, Barimung 3, Binamung 2 and Binamung 5 and 5 sowing dates viz. February 5, February 20, March 5, March 20 and April 5 were used. The experiment was laid out in split-split-plot design with three replications. The land was fertilized with 20-20-16 kg ha^{-1} NPK in the form of urea, triple super phosphate and muriate of potash at the time of final land preparation.

The crop was sown on as per treatment with spacing of 30 x 10 cm^2 in line sowing and 30 kg ha^{-1} seed was used in both line and broadcast method. The unit plot size was 12 m^2. Hand weeding was done twice at 20 and 35 days of each sowing. The crops were grown under rainfed conditions. " Elsan 50 EC" was sprayed at the time of pod formation stages in each sowing to control the pod borer and other insects.

At maturity, ten plants were selected randomly and collected from each unit plot to record data on dry matter production and yield contributing characters. Collected data were analyzed statistically and the means were adjusted by Duncan's Multiple Range Test using computer package program MSTAT-C.

Results and Discussion

Effect of planting method: Planting method had no significant influence on pods plant^{-1}, seeds pod^{-1}, 1000-seeds weight. Dry matter plant^{-1} were slightly higher in broadcast than line sowing and seed yield plant^{-1} showed the similar trait but numerically higher seed yield (730 kg ha^{-1}) was recorded in line sowing method might be due to better plant establishment per unit area (Table 1).

Effect of variety: Variety showed a significant demarcation along with pods plant^{-1}, seeds pod^{-1}, 1000-seed weight as well as seed yield (Table 1). Barimung 2 contributed the highest seed yield (890 Kg ha^{-1}) and it was statistically similar to those of other three modern varieties, while local variety produced the lowest seed yield (78 kg ha^{-1}). It is observed that mungbean "Kanti" produced the highest seed yield compared with other varieties. The present results are also in agreement with those of Thakuria and Shaharia (1990), who reported that the varieties of mungbean differed significantly for grains yield. Dry matter plant^{-1} was highest in Binamung 5 while seed yield plant^{-1} was recorded the highest in Binamung 2. In modern varieties, the reasons for obtaining higher seed yields are the higher number of pods plant^{-1}, seeds pod^{-1} and also 1000-seeds weight mainly in comparison with local variety.

Effect of sowing date: Sowing date also exhibited significant influence on seed yield and dry matter production of mungbean (Table 1). February 20 sowing gave the highest seed yield (870 kg ha^{-1}) attributed by the higher number of pods plant^{-1}, seeds pod^{-1} and moderate 1000-seeds weight. Chovatia *et al.* (1993) and Dharmalingam and Basu (1993) reported that delayed sowing reduced the yield of mungbean. While the highest dry matter and yield plant^{-1} were recorded from April 5 sowing and February 5 sowing dates. March 20 sowing gave the lowest seed yield (593 kg ha^{-1}). This might be due to the climatic conditions during the experimental period of time (Table 2).

Interaction effect of planting method and variety: Interaction effect of planting method and variety was found significant in terms of seed yield (Table 3). BARI (1982) reported the similar results. Barimung 2 produced the highest seed yield (941 kg ha^{-1}) in line sowing method due to the highest number of seeds pod^{-1} with optimum plant population. Barimung 2 and Binamung 2 produced the higher seed yield in both planting methods while Binamung 5 produced the higher dry matter in both sowing methods. Local variety produced the lowest seed yield plant^{-1} and

Table 1: Ability of dry matter production and yield of mungbean as influenced by planting method, variety and sowing date during summer, 1999

Treatments	Plant height (cm)	Plant stand m^{-2} (no.)	Pods $plant^{-1}$ (no.)	Seeds pod^{-1} (no.)	1000-seeds wt. (g)	Dry matter $plant^{-1}$	Seed yield $plant^{-1}$(g)	Seed yield (Kg ha^{-1})
Planting method								
1. Line sowing	38.40	36.70 a	8.00	7.71	23.13	7.27	1.58	730.00
2. Broadcast	40.40	28.00 b	7.80	7.64	23.00	7.35	1.70	671.00
CV (%)	8.91	3.30	5.38	7.49	7.28	5.10	12.50	17.11
Level of significance	NS	**	NS	NS	NS	NS	NS	NS
Variety								
1. Local	32.80 d	25.80 d	2.70 c	3.54 b	6.13 d	5.24 c	0.15 c	78.00 b
2. Barimung 2	44.00 a	35.00 ab	10.10 a	9.06 a	24.53 c	7.84 ab	2.06 a	890.00 a
3. Barimung 3	39.90 b	35.90 a	8.30 b	8.60 a	24.53 c	7.00 b	1.69 b	856.00 a
4. Binamung 2	43.20 a	33.20 bc	10.00 a	8.42 a	26.70 b	7.87 ab	2.26 a	846.00 a
5. Binamung 5	37.10 c	31.70 c	8.40 ab	8.74 a	33.42 a	8.60 a	2.04 ab	833.00 a
CV (%)	4.21	7.71	16.09	12.08	6.12	16.75	10.21	10.97
Level of significance	**	**	**	**	**	**	**	**
Sowing date								
1. February 5	22.30 e	31.40 c	8.20 ab	8.25 b	27.90 a	5.04 d	1.62 b	749.00 b
2. February 20	26.40 d	30.60 c	9.10 a	8.99 a	25.18 b	6.05 c	2.01 a	870.00 a
3. March 5	30.50 c	30.40 c	7.20 b	7.17 c	21.43 c	6.64 c	1.67 b	627.00 cd
4. March 20	53.20 b	32.80 b	7.50 b	6.93 c	20.37 d	8.35 b	1.37 b	593.00 d
5. April 5	64.60 a	36.30 a	7.50 b	7.01 c	20.43 d	10.46 a	1.55 b	664.00 c
CV (%)	5.97	5.28	14.80	11.37	5.02	12.73	14.53	8.28
Level of significance	**	**	**	**	**	**	*	**

In a column, the figure(s) having no letter(s) and same letter(s) do not differ significantly
NS- Not significant, *Significant at 5% level, **Significant at 1% level

Table 2: Fortnightly average rainfall, temperature and humidity per day during the experimental period at Regional Agricultural Research Station, Jamalpur

Period	Rainfall (mm)	Temperature (°C)	Humidity (%)
1 February-15 February	0.00	21.08	64
16 February- 28 February	0.00	23.56	54
1 March- 15 March	0.00	25.38	52
16 March- 31 March	0.04	26.39	48
1 April- 15 April	2.10	28.28	65
16 April- 30 April	0.35	31.00	67
1 May- 15 May	11.83	29.23	75
16 May- 31 May	3.01	30.06	72
1 June- 15 June	2.21	30.98	73
16 June-30 June	14.64	30.12	80

Source: Irrigation and water management division, RARS, Jamalpur, 1999

Table 3: Yield and yield contributing characters of mungbean as influenced by the interaction of planting method and variety during summer, 1999

Treatment	Plant height (cm)	Plant stand m^{-2} (No)	Pods $plant^{-1}$ (no.)	Seeds pod^{-1} (no)	1000-seed weight (g)	Dry matter $plant^{-1}$	Seed yield $plant^{-1}$	Seed yield (Kg ha^{-1})
Line sowing								
Local	33.80 e	31.94 cd	2.80	3.51	6.42	5.18	0.15	80.00 d
Barimung 2	42.30 b	37.40 b	9.91	9.37	24.80	8.20	2.06	941.00 a
Barimung 3	38.00 c	42.12 a	7.90	8.41	24.30	6.75	1.73	911.00 a
Binamung 2	41.68 b	37.60 b	10.12	8.61	26.72	7.57	2.05	886.00 ab
Binamung 5	36.20 d	34.51 c	9.00	8.61	33.41	8.64	1.93	833.00 bc
Broadcast								
Local	31.70 f	19.71 f	2.62	3.57	5.90	5.29	0.17	75.00 d
Barimung 2	45.70 a	32.63 c	10.11	8.74	24.32	7.47	2.07	839.00 bc
Barimung 3	41.80 b	29.70 de	8.60	8.78	24.71	7.24	1.67	800.00 c
Binamung 2	44.80 a	28.72 e	9.90	8.22	26.70	8.17	2.47	807.00 c
Binamung 5	38.12 c	29.00 e	7.93	8.86	33.42	8.57	2.15	833.00 bc
CV (%)	4.21	7.71	14.33	12.08	6.12	16.75	2.80	10.97
Level of significance	**	**	NS	NS	NS	NS	NS	*

In a column, the figure(s) having no letter(s) and same letter(s) do not differ significantly NS- Not significant,
* Significant at 5% level **Significant at 1% level

also dry matter in both planting methods.

Interaction effect of planting method and sowing date: Effect of planting method x sowing date on seed yield was found highly significant (Table 4). The highest seed yield (912 Kg ha^{-1}) was recorded from February 20 sowing in line sowing method while the lowest (585 Kg ha^{-1}) in March 20 sowing with broadcast method. February 20 sowing with line sowing method had an ability to produce maximum pods $plant^{-1}$ and seeds pod^{-1} that contributed a large for highest seed yield. March 20 sowing experienced a climatic hazard of excess rainfall during flowering and pod setting stages (Table 2), which resulted lower yield. Dry matter production was the highest in April 5 sowing while yield $plant^{-1}$ was the highest in February 20 sowing in both planting methods.

Interaction effect of variety and sowing date: Significant variation was also observed for seed yield due to the interaction effect of variety and sowing date (Table 5). Masood and Meena (1986) and Thakure and Khaire (1989) observed similar findings. Binamung 5 sown on February 20 gave the highest seed yield (1071 Kg ha^{-1}) because of its higher pods $plant^{-1}$, seeds pod^{-1} and 1000-seeds

Table 4: Yield and yield contributing characters of mungbean as influenced by the interaction of planting method and sowing date during summer, 1999

Treatment	Plant ht. (cm)	Plant stand m^{-2} (No.)	Pods $plant^{-1}$ (No.)	Seeds pod^{-1} (No.)	1000-seed wt. (g)	Dry matter $plant^{-1}$(g)	Seed yield $plant^{-1}$(g)	Seed yield (Kg ha^{-1})
Line sowing								
Feb. 5	21.70 g	35.50 c	8.10	8.42	27.90	4.94	1.55	820.00 b
Feb. 20	26.01 f	33.52 d	9.31	9.04	25.22	6.15	1.82	912.00 a
March 5	30.61 e	35.80 c	6.90	7.03	21.51	6.29	1.62	637.00 cd
March 20	50.62 d	37.71 b	7.61	6.90	20.20	8.36	1.36	600.00 d
April 5	63.10 b	40.90 a	7.92	7.13	20.82	10.61	1.57	682.00 c
Broadcast								
Feb. 5	23.00 g	27.43 f	8.40	8.09	27.90	5.15	1.68	678.00 c
Feb. 20	26.71 f	27.73 f	8.92	8.93	25.12	5.96	2.20	828.00 b
March 5	30.41 e	25.05 g	7.51	7.30	21.40	6.99	1.72	617.00 d
March 20	55.80 c	27.92 f	7.42	6.97	20.52	8.34	1.38	585.00 d
April 5	66.13 a	31.85 e	7.00	6.89	20.10	10.31	1.54	646.00 cd
CV (%)	5.97	5.28	14.80	11.37	5.02	12.73	16.21	8.29
Level of significance	**	**	NS	NS	NS	NS	NS	**

In a column, the figure(s) having no letter(s) and same letter(s) do not differ significantly
NS-Not significant, *Significant at 5% level, **Significant at 1% level

Table 5: Yield and yield contributing characters of mungbean as influenced by the interaction of variety and sowing date during summer, 1999

Treatment		Plant ht. (cm)	Plant stands m^{-2}	Pods $plant^{-1}$	Seeds pod^{-1}	1000-seed wt. (g)	DM $plant^{-1}$ (g)	Seed yield $plant^{-1}$(g)	Seed yield (Kg ha^{-1})
	D_1	18.20 o	22.70 l	6.90 c	9.00 a-c	15.70 k	4.63 kl	0.47 g	175.00
	D_2	21.30 m-o	23.21 kl	6.71 c	8.70 a-c	15.00 k	4.12 l	0.30 g	216.00
V_1	D_3	28.40 ij	25.70 jk	0.00 d	0.00 d	0.001	4.03 l	0.00 g	00.00
	D_4	42.20 f	28.20 ij	0.00 d	0.00 d	0.001	6.40 h-j	0.00 g	00.00
	D_5	53.91 de	29.31 l	0.00 d	0.00 d	0.001	7.01 f-l	0.00 g	00.00
	D_1	27.51 l-k	32.80 e-h	10.90 ab	8.22 bc	28.30 de	6.77 g-l	2.38 a-e	946.00 b-d
	D_2	30.80 hi	33.50 d-g	12.30 a	9.30 a-c	25.70 fg	7.73 d-h	2.74 ab	1026.00 a-c
V_2	D_3	34.40 gh	32.51 e-h	10.10 a-c	9.70 ab	23.70 h-j	7.87 d-h	2.13 b-f	935.00 c-e
	D_4	58.13 c	36.30 b-d	9.22 a-c	9.10 a-c	22.21 j	8.57 d-f	1.55 f	730.00 l-k
	D_5	69.21 a	39.83 a	7.90 bc	9.10 a-c	22.82 ij	8.24 d-g	1.53 f	813.00 f-l
	D_1	21.30 m-o	33.71 c-f	7.91 bc	8.50 a-c	26.31 fg	4.32 l	1.57 f	900.00 d-f
	D_2	23.20 l-n	33.30 e-g	7.30 bc	9.02 a-c	24.53 g-l	4.58 kl	1.63 ef	1006.00 a-c
V_3	D_3	28.42 ij	35.21 b-e	7.80 a-c	9.21 a-c	25.30 f-h	6.10 l-k	1.75 d-f	733.00 l-k
	D_4	57.06 cd	36.50 bc	8.80 a-c	8.50 a-c	23.00 ij	8.82 c-e	1.52 f	788.00 g-k
	D_5	69.60 a	40.80 a	9.62 a-c	7.80 c	23.54 h-j	11.15 b	2.04 b-f	851.00 d-h
	D_1	24.84 j-m	37.00 b	8.81 a-c	7.71 c	29.00 cd	4.401 l	1.69 d-f	841.00 e-h
	D_2	32.60 gh	30.02 hi	10.22 a-c	9.20 a-c	26.54 cf	7.43 e-l	2.94 a	1032.00 ab
V_4	D_3	35.95 g	30.02 hi	10.30 a-c	8.71 a-c	25.36 f-h	8.33 d-g	2.57 a-c	768.00 h-k
	D_4	56.72 cd	32.51 e-h	9.91 a-c	8.40 bc	25.80 fg	8.89 c-e	1.93 c-f	738.00 l-k
	D_5	66.10 ab	36.30 b-d	10.90 ab	8.21 bc	26.84 ef	10.29 bc	2.19 b-f	852.00 d-h
	D_1	19.85 no	31.00 f-l	6.80 c	7.80 c	40.20 a	5.10 j-l	1.97 c-f	884.00 d-g
	D_2	24.00 k-m	33.01 e-g	9.11 a-c	8.80 a-c	34.34 b	6.40 h-j	2.43 a-d	1071.00 a
V_5	D_3	25.50 j-l	28.71 l	7.73 bc	8.30 bc	32.81 b	6.85 g-l	1.93 c-f	699.00 k
	D_4	52.15 e	30.70 g-l	9.50 a-c	8.81 a-c	30.84 c	9.06 cd	1.85 c-f	708.00 jk
	D_5	64.32 b	35.31 b-e	9.11a-c	10.00 a	29.00 d	15.60 a	1.99 b-f	803.00 f-j
CV %		5.97	5.28	14.80	11.37	5.02	12.73	10.47	8.29
Level of significant		**	**	**	**	**	**	**	**

In a column, the figure(s) having no letter(s) and same letter(s) do not differ significantly **Significant at 1% level
V_1- Sonamoog (local variety) V_2- Barimung 2 V_3- Barimung 3 V_4- Binamung 2 V_5- Binamung 5
D_1- February 5 D_2- February 20 D_3- March 5 D_4- March 20 D_5- April 5

Table 6: Yield and yield contributing characters of mungbean as influenced by the interaction of planting method, variety and sowing date during summer, 1999

Treatment		Plant ht. (cm)	Plant stand m^{-2}	Pods $plant^{-1}$	Seeds pod^{-1}	1000-seed weight (g)	DM $plant^{-1}$(g)	Yield $plant^{-1}$(g)	Seed yield (Kg ha^{-1})
Line sowing									
V_1	D_1	19.20 wx*	27.70 s-v	7.20	9.10	16.30 n	4.73 n-p	0.44 h	173.00 m
	D_2	20.30 u-x	27.30 s-v	6.91	8.50	15.70 n	4.10 p	0.28 h	230.00 m
	D_3	30.30 o-s	31.31 m-s	0.00	0.00	0.00 o	4.10 p	0.00 h	00.00 n
	D_4	41.70 m	35.70 f-l	0.00	0.00	0.00 o	6.18 j-p	0.00 h	00.00 n
	D_5	57.60 g-j	37.31 d-l	0.00	0.00	0.00 o	6.80 l-m	0.00 h	00.00 n
V_2	D_1	25.70 r-u	36.70 e-j	9.81	8.50	29.71 c-f	6.13 j-p	2.13 b-f	964.00 cd
	D_2	31.50 n-r	35.01 g-m	12.41	9.20	25.32 h-l	7.67 f-k	2.40 a-f	1115.00 ab
	D_3	33.50 n-q	38.00 c-g	10.32	9.70	24.70 l-l	8.30 e-k	2.55 a-f	975.00cd
	D_4	54.91 l-k	37.70 d-h	9.14	9.50	21.71 m	8.68 c-l	1.66 d-f	776.00 h-k
	D_5	66.02 c-e	39.70 c-f	8.40	9.90	22.73 lm	10.22 b-e	1.57 d-g	874.00 d-g
V_3	D_1	19.90 u-x	38.70 c-g	7.61	8.50	26.00 g-j	4.23 p	1.48 d-g	1112.00 ab
	D_2	23.20 t-w	36.03 e-k	7.10	9.20	24.32 j-m	4.80 m-p	1.52 d-g	1053.00 a-c
	D_3	27.30 r-t	42.01 bc	6.61	8.50	25.70 g-k	5.07 l-p	1.53 d-g	760.00 h-k
	D_4	53.80 j-l	45.30 ab	9.30	8.20	23.04 k-m	8.76 c-l	1.50 d-g	694.00 j-l
	D_5	65.90 c-e	48.31 a	9.11	7.70	22.70 lm	10.90 bc	2.60 a-d	938.00 c-f
V_4	D_1	24.34 s-w	42.00 bc	9.20	7.90	27.31 f-l	4.50 n-p	1.97 c-f	786.00 g-k
	D_2	29.7 o-s	33.31 l-n	10.21	9.20	26.70 g-j	7.30 g-l	2.53 a-f	1163.00 a
	D_3	35.2 n-p	35.02 g-m	10.10	8.90	25.31 h-l	7.13 g-m	2.17 b-f	864.00 d-g
	D_4	53.5 j-l	36.33 e-k	9.71	8.70	25.73 g-k	9.05 c-l	1.80 d-f	816.00 e-h
	D_5	65.5 c-f	41.31 cd	11.10	8.40	28.31 d-g	9.88 b-f	1.79 d-f	801.00 f-l

Table 6: Continued

Treatment		Plant ht. (cm)	Plant stand m^{-2}	Pods $plant^{-1}$	Seeds pod^{-1}	1000-seed weight (g)	DM $plant^{-1}$(g)	Yield $plant^{-1}$ (g)	Seed yield (Kg ha^{-1})
V_5	D_1	19.4 v-x	32.30 j-p	6.61	8.10	40.40 a	5.10 l-p	1.74 d-f	1067.00a-c
	D_2	25.4 s-u	36.00 e-k	10.00	9.10	34.21 b	6.87 h-n	2.38 a-f	997.00 b-d
	D_3	26.5 r-t	32.71 j-p	7.30	8.10	31.70 bc	6.83 h-n	1.83 d-f	586.00 l
	D_4	49.1 l	33.73 h-n	10.10	8.10	30.72 cd	9.14 c-h	1.82 d-f	717.00 j-l
	D_5	60.6 e-h	37.73 d-h	10.91	9.70	30.30 c-e	15.24 a	1.88 c-f	797.00 f-l
Broadcast									
V_1	D_1	17.30 x	17.74 x	6.50	9.00	15.00 n	0.00 o	7.21 g-l	0.00 h
	D_2	22.30 t-x	19.01 x	6.40	8.90	14.30 n	4.53 n-p	0.50 gh	177.00 m
	D_3	26.41 r-t	20.00 x	0.00	0.00	0.00 o	4.13 p	0.32 h	201.00 m
	D_4	42.60 m	20.71 x	0.00	0.00	0.00 o	3.97 p	0.00 h	00.00 n
	D_5	50.11 kl	21.33 wx	0.00	0.00	0.00 o	6.62 l-o	0.00 h	00.00 n
V_2	D_1	29.33 q-s	29.00 o-t	12.00	7.91	27.00 f-j	7.40 g-l	2.62 a-d	927.00 c-f
	D_2	30.25 o-s	32.07 k-q	12.20	9.40	26.00 g-j	7.80 f-k	3.08 ab	937.00 c-f
	D_3	35.20 n-p	27.01 s-v	9.90	9.60	22.70 lm	7.43 g-l	1.70 d-f	896.00 d-g
	D_4	61.44 d-g	35.00 g-m	9.40	8.62	22.70 lm	8.46 d-j	1.43 e-g	685.00 j-l
	D_5	72.54 ab	40.02 c-e	7.30	8.20	23.00 k-m	6.27 j-p	1.50 d-g	752.00 l-k
V_3	D_1	22.80 t-x	28.70 p-v	8.10	8.54	26.73 g-j	4.40 op	1.67 d-f	689.00 j-l
	D_2	23.35 t-w	30.75 m-s	7.50	8.80	24.72 l-l	4.37 op	1.75 d-f	958.00 c-e
	D_3	29.57 p-s	28.31 q-v	8.92	10.02	25.00 h-l	7.13 g-m	1.92 c-f	706.00 j-l
	D_4	60.11 f-l	27.74 s-v	8.43	8.70	23.00 k-m	8.88 c-l	1.53 d-g	883.00 d-g
	D_5	73.31 a	33.32 h-n	10.11	7.90	24.30 j-m	11.40 b	1.48 d-g	764.00 h-k
V_4	D_1	25.20 s-v	32.00 k-q	8.30	7.54	30.70 cd	4.30 op	1.42 fg	896.00 d-g
	D_2	35.44 no	26.74 t-v	10.22	9.20	26.32 g-j	7.57 f-k	3.35 a	902.00 d-g
	D_3	36.50 n	25.01 u-w	10.50	8.42	25.33 h-l	9.53 b-g	2.97 a-c	673.00 j-l
	D_4	60.00 f-l	28.74 p-v	10.00	8.03	26.00 g-j	8.74 c-l	2.05 b-f	660.00 kl
	D_5	66.84 cd	31.31 l-r	10.60	7.94	25.32 h-l	10.72 b-d	2.58 a-e	930.00 d-g
V_5	D_1	20.34 u-x	29.74 n-t	7.00	7.50	40.00 a	5.10 l-p	2.20 b-f	702.00 j-l
	D_2	22.55 t-x	30.01 n-t	8.10	8.52	34.30 b	5.93 k-p	2.50 a-f	1144.00 a
	D_3	24.50 s-w	24.70 vw	8.00	8.54	34.01 b	6.87 h-n	2.03 b-f	812.00 e-h
	D_4	55.11 h-k	27.71 r-v	9.00	9.50	31.00 cd	8.98 c-l	1.88 c-f	699.00 j-l
	D_5	67.90 bc	33.00 j-o	7.10	10.32	27.70 e-h	15.97 a	2.12 b-f	810.00 f-l
CV (%)		5.97	5.28	14.80	11.37	5.02	12.73	16.23	8.28
Level of significant		**	**	NS	NS	**	**	*	**

In a column, the figure having no letter(s) and same letter(s) do not differ significantly, Not significant, **Significant at 1% level

V_1- Sonamoog (local variety) V_2- Barimung 2 V_3- Barimung 3 V_4- Binamung 2 V_5- Binamung 5

D_1- February 5 D_2- February 20 D_3- March 5 D_4- March 20 D_5- April 5

weight. Local variety failed to produce any pod at later three sowings. At later three sowings, local variety had a profound vegetative growth but flowering was absent. In case of dry matter production, dry matter $plant^{-1}$ increased gradually due to delayed sowing while seed yield $plant^{-1}$ decreased after February 20 sowing in most cases. April 5 sowing date produced slightly higher seed yield than March sowing. This might be due to temperature and climatic conditions during the experimental period of time (Table 2).

Interaction effect of planting method, variety and sowing date: The interaction effect of planting method, variety and sowing date produced significant influence on seed yield (Table 6). The highest seed yield (1163 kg ha^{-1}) was recorded from Binamung 2 at February 20 sowing in line sowing method. It might be due to higher number of pods $plant^{-1}$, seeds pod^{-1} and 1000-seeds weight. Local variety failed to produce any seed at March 5, March 20 and April 5 sowing in both planting methods. In case of dry matter production, a general increasing trait was observed while the seed yield $plant^{-1}$ decreased at later sowings.

It is revealed from the above discussion that the relation between dry matter production and yield of mungbean differed due to different situations. Variety has no clear-cut relation between dry matter production and yield. Sowing date has a negative relation between dry matter productions and yield. From the study it may be concluded that higher dry matter production not always indicate higher yield of mungbean; there may be some condition such as sowing time.

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