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Research Article

## EFFECT OF PLANTING DATES ON THE YIELD OF MUSTARD SEED

M.J. Alam<sup>1</sup>, K.S. Ahmed<sup>2</sup>, M.R.A. Mollah<sup>3</sup>, M.Z. Tareq<sup>4</sup> and J. Alam<sup>5</sup>

<sup>1</sup>Seed Science and Technology, Bangladesh Agricultural University, Mymensingh, Bangladesh.

<sup>2</sup>Department of Entomology, Bangladesh Agricultural University, Mymensingh, Bangladesh.

<sup>3</sup>On-Farm Research Division, Bangladesh Agricultural Research Institute, Bogra, Bangladesh.

<sup>4</sup>Bangladesh Jute Research Institute, Rangpur, Bangladesh.

<sup>5</sup>Supreme Seed Company Limited, Trishal, Mymensingh, Bangladesh.

Corresponding authors email: rmollah67@yahoo.com

### Abstract

The experiment was conducted at Shibganj upazila under Bogra district during October, 2014 to January, 2015 to observe the effect of planting dates on the yield of mustard seed. There were five planting dates viz. 25 October, 30 October, 05 November, 10 November and 15 November. Significant variations due to different planting dates were observed in plant height, number of leaves plant<sup>-1</sup>, number of siliqua plant<sup>-1</sup>, number of seed siliqua<sup>-1</sup>, 1000 weight plot<sup>-1</sup>, yield plot<sup>-1</sup> and yield ha<sup>-1</sup> of mustard. Results showed that the highest seed yield was 1.50 t ha<sup>-1</sup> obtained from 30 October. The lowest seed yield was 1.0 t ha<sup>-1</sup> from 15 November. From the results, the best planting date of mustard is on 30 October in the northern parts of Bangladesh.

**Keywords:** Planting date; yield; mustard seed

### Introduction

Mustard (*Brassica sp.*) is one of the most important oil crops of the world. Oil of plant origin constitute important component of human diet, ranking third after cereals & animal products and are nutritionally superior to animal oil (Singh, 2000). The genus *Brassica* belongs to the family *Brassicaceae* (formally *Cruciferae*). Rapeseed (*Brassica campestris* L.) commonly known as mustard in Bangladesh. It is a cool season crop. It is also a thermo sensitive as well as photosensitive crop (Ghosh and Chatterjee, 1988). Mustard is the major edible oilseed crop in Bangladesh. It is extensively grown traditionally as a pure crop as well as intercrop or mixed crop in marginal and sub-marginal soils in the eastern, northern and north western district of Bangladesh. The seed contains 40-45% oil and 20-25% protein. About 13.2% of the annual world edible oil supply comes from this crop (FAO, 2007). In Bangladesh, about ten oil seed crops are grown in the country. Among them, *Brassica* oil crop is the most important that supplies major edible oil in Bangladesh (BBS, 2009). It covers about 80% of the total oilseed acreage and about 71% of the total production (BBS, 2009). The seed yield of mustard in Bangladesh is about 760 kg ha<sup>-1</sup> which is very low in comparison to other developed countries (2400 kg ha<sup>-1</sup>) (FAO, 2007). The low yield is due to lack of high yielding varieties and improper agronomic practices. An

understanding of some morpho-physiological characters in mustard is necessary to make progress in genotypic improvement and for the management of the crop either to increase yield and quality or to reduce the cost of production (Mendham and Salisbury, 1985). Important physiological attributes such as plant height, number of leaves plant<sup>-1</sup>, number of siliqua plant<sup>-1</sup>, number of seed siliqua<sup>-1</sup>, 1000 weight plot<sup>-1</sup> and yield plot<sup>-1</sup>, leaf area index (LAI), crop growth rate (CGR), relative growth rate (RGR), net assimilation rate (NAR) and specific leaf weight (SLW) can address various constraints of a variety for increasing its productivity (Tandale and Ubale, 2007). There is a great scope of increasing yield of mustard by selecting high yielding varieties and improving management practices. Time of sowing is very important for mustard production (Rahman *et al.*, 1988, Mondal and Islam, 1993 and Mondalet *et al.*, 1999). Sowing at proper time allows sufficient growth and development of a crop to obtain a satisfactory yield. The seed yield and maturity of mustard plants are greatly influenced by environmental conditions regardless of proper sowing of times. Different sowing dates provide variable environmental conditions within the same location for growth & development of crop and yield stability (Pandey *et al.*, 1981). So, environmental factors greatly affect plant growth and yield. That is why, sowing date is an important determinant of crop yield. It depends on the onset of significant rainfall, temperature and

humidity of a region. Decreasing crop yield in delayed sowing date has been reported by many workers (Kohn and Storrier, 1970, Doly and Marcellos, 1974, Degenhardt and Kondra, 1981, McDonald *et al.*, 1983). Determining suitable planting date plays an important role in conformation of plant growth stages with desirable environmental conditions which results in maximum yield. Planting date has a considerable effect on seed yield by influencing the yield components so that late planting decreases primary branches plant<sup>-1</sup> and silique plant<sup>-1</sup> and finally causes a remarkable reduction in seed yield (Thurling, 1974). The late sowing of mustard decreased seed yield through synchronization of silique filling period with high temperatures, the decrease in assimilates production, drought stress occurrence, shortened silique filling period and acceleration of plant maturity (Mendham *et al.*, 1981). A suitable planting date is one of them which is very important for good agronomic performance of mustard. Therefore, the present study was undertaken to find out the optimum planting date for mustard seed production in the northern part of Bangladesh.

## Materials and Methods

The experiment was conducted at Shibganjupazila under Bogra district during rabi season of October, 2014 to January, 2015. Geographically the experimental field was located at 24.6° N latitude and 89.3° E longitude at an average elevation of 20 m above the of sea level. The experimental site belongs to the Level Barind Tract Agro Ecological Zone (AEZ-25), which falls into puddled silt loam to silty clay loam in the top soils and porous silt with mottled plastic clay at varying depth. Deep grey terrace soils and grey valley soils are major components of the general soil types of the area. General fertility status is moderate, having low status of organic matter. The experimental field was also a piece of well drained high land with moderately even topography. The crop was planted in rows spaced 30 cm with 6 cm plant to plant distance. The variety of mustard was BARI Sarisha14. The experimental treatments were 5 sowing dates viz. T<sub>1</sub>=25<sup>th</sup> October, T<sub>2</sub>=30<sup>th</sup> October, T<sub>3</sub>= 5<sup>th</sup> November, T<sub>4</sub>=10<sup>th</sup> November and T<sub>5</sub>= 15<sup>th</sup> November. The experimental design was Randomized Complete Block Design (RCBD) with 4 replications having unit plot size 3.0 m × 1.0 m. Seed were sown in properly prepared land. Recommended fertilizers were used at the rate of 250, 180, 90 150 kg and 6 kg per hectare of Urea, TSP, MOP, gypsum and Zinc sulphate, respectively. Half of the urea and whole amount of all other fertilizers were applied at the time of final land preparation prior to sowing. The remaining half of the urea was applied as topdressing in 22 days after emergence of seedlings. Intercultural operations were done as and when necessary. The crop was harvested at proper maturity. Data were collected on plant height, number of leaves plant<sup>-1</sup>, number of silique plant<sup>-1</sup>, number of seed silique<sup>-1</sup>, 1000 seed weight, seed yield plot<sup>-1</sup> and seed yield

ha<sup>-1</sup>. The collected data were analyzed using computer package MSTAT and mean differences were adjudged by using Duncan's Multiple Range Test.

## Results and Discussion

The effect of different sowing dates significantly affected on plant height, number of leaves plant<sup>-1</sup>, number of silique plant<sup>-1</sup>, number of seed silique<sup>-1</sup>, 1000 weight plot<sup>-1</sup>, yield plot<sup>-1</sup> and seed yield ha<sup>-1</sup> are presented in Table 1. The highest plant height was 82.00 cm recorded from 30 October and it was significantly different from the all other treatments. Mondal and Islam (1993) supported the above result and showed that sowing in the last October gave the highest plant height than in first October and November. Shahidullah *et al.* (1997) also reported similar findings. These results are in agreement with the result of Rahman (2007) who stated that plant height differed significantly among the studied mustard.

The results of present study were also supported by the results of Khaton (2004) in mustard. Among the five planting dates the highest number of leaves plant<sup>-1</sup> (27.08) was obtained from the planting date 30 October. It was significantly different from the all other planting dates. The lowest number of leaves plant<sup>-1</sup> (16.70) was recorded from 15<sup>th</sup> November. Angrej *et al.* (2002) reported that the highest number of leaves plant<sup>-1</sup> was obtained 30 October. The highest number of silique plant<sup>-1</sup> (85) was also obtained from 30 October which was statistically similar to the first, third and fourth planting date but dissimilar to 5<sup>th</sup> planting date. This finding was in conformity with the findings of Mondal *et al.* (1999) who stated that the 30 October planting produced the highest number of silique plant<sup>-1</sup> and reduced in the late sowings. The highest number of seeds silique<sup>-1</sup> was produced in 30 October and it was statistically similar with those of 25 October, 05 November and 10 November. The lowest number of seeds silique<sup>-1</sup> was found in the plants of 15 November which was significantly different from all other treatments. These results are in agreement with the results of Mondal *et al.* (1999) and Shahidullah *et al.* (1997). The highest 1000-seed weight was recorded in 30 October which was statistically similar to those of 25 October, 05 November and 10 November. The 15 November sowing was recorded the lowest weight of 1000-seed indicating reduced test weight with each successive delay in sowing after 30 October. Mondal *et al.* (1999) stated that 1000-seed weight reduced with the delayed planting time. The highest seed yield plot<sup>-1</sup> was obtained from 30 October which was 450 g plot<sup>-1</sup>. It was statistically similar to those of 25 October and 05 November. But, dissimilar to those of 10 November and 15 November. The lowest seed yield plot<sup>-1</sup> (300 g) was produced from the 15 November. Kalra *et al.* (1985) and Bukhtiar *et al.* (1992) stated that delaying in planting dates reduced the seed yield plot<sup>-1</sup>.

**Table 1:** Effect of planting dates on the yield and yield attributes of mustard (BARI Sarisha 14) as influenced by different dates of planting during rabi 2014-15.

Treatment	PH(cm)	No. of leaves/plant	No. of siliqua/plant	No. of seed/siliqua	1000 seed wt (g)	Yield/plot (g)	Yield (t/ha)
T <sub>1</sub> (25 Oct.,14)	74.70b	24.18b	75.80b	24.9b	3.40b	410.0b	1.3b
T <sub>2</sub> (30 Oct.,14)	82.00a	27.08a	85.00a	29.00a	4.00a	450.0a	1.5a
T <sub>3</sub> (5 Nov.,14)	74.75b	24.23b	76.00b	25.00b	3.50b	420.0b	1.35b
T <sub>4</sub> (10Nov,14)	70.60c	19.52c	71.18c	23.00c	3.30b	360.0c	1.2c
T <sub>5</sub> (15Nov,14)	66.13d	16.70d	68.50d	20.10d	3.10b	300.0d	1.0d
CV%	6.11	7.42	5.47	7.67	7.08	7.22	7.09
Level of significant	*	*	*	*	*	*	*

\*= Significant at 5% level of probability

The higher seed yield ha<sup>-1</sup> (1.5 t ha<sup>-1</sup>) produced by 30 Octobersowing might be attributed to higher number of plant height, number of leaves plant<sup>-1</sup>, number of siliqua plant<sup>-1</sup>, number of seed siliqua<sup>-1</sup> in individual plants, 1000-seed weight plot<sup>-1</sup>, yield plot<sup>-1</sup> and yieldt ha<sup>-1</sup>. Sowing on 5 Novemberyielded the second highest yield (1.35 t ha<sup>-1</sup>). The lowest seed yield (1.00 t ha<sup>-1</sup>) was obtained from 15 November. The findings in the present study about seed yield tha<sup>-1</sup> were fully supported by Brar et al. (1998), Buttar and Aulakh (1999), Mondalet al. (1999) and Degenhardt and Kondra (1981).

## Conclusion

From the above study, it may be concluded that the best sowing time of mustard (BARI Sarisha 14) is on 30 October in the northern parts of Bangladesh.

## References

- Angrej S, Dhingra KK, Jagroop S, Singh MP, Singh J and Singh A (2002) Effect of sowing time and plant density on growth, yield and quality of Ethiopian mustard (*Brassica carinata*A.Br.). *J. Res. Punjab Agric. Uni.* **39**(4): 471-475.
- BBS (Bangladesh Bureau of Statistics) (2009) Monthly Statistical Book of Bangladesh, October 2009. Ministry of planning, Govt, Peoples Rep. Bangladesh. p.14.
- Brar ZS, Bal DS and John AS (1998) Influence of sowing dates, nitrogen and planting geometry on the performance of Gobhi Sarson (*Brassica napus* spp. *olefera* var. *annua*). *Indian J. Agron.* **43**(1): 133-137.
- Bukhtiar BA, Atta M and Habib G (1992) Effect of sowing dates on seed yield of rapeseed and mustard under rainfed conditions. *J. Agric. Res.* **3**(4): 463-469.
- Buttar GS and Aulakh CS (1999) Effect of sowing date, nitrogen and row spacing on growth, yield attributes and yield of Indian mustard (*Brassica juncea*). *Indian J. Agron.* **44**(4): 813-815.
- Degenhardt DF and Kondra ZP (1981) The influence of seeding date and seeding rate on seed yield and growth characters of five genotypes of *Brassica napus*. *Can. J. Plant Sci.* **61**:185-190.
- FAO (Food and agricultural Organization) (2007) FAO Production year Book. Rome, Italy, Vol. 61. p.64.
- Ghosh RK and Chatterjee BN (1988) Effect of dates of sowing on oil content and fatty acid profiles of Indian mustard. *Indian J. Oilseed Res.* **5**(2):144-149.
- Kalra UK, Yadava TP and Bhola AL (1985) Effect of sowing date, nitrogen and row spacing on growth, yield attributes and yield of Indian mustard. *Agricultural Science Digest* **3-4**: 177-178.
- McDonald GK, Sutton BG and Ellison FW (1983) The effect of time of sowing on the grain yield of irrigated wheat in the Namoi Valley, New South Wales. *Aust. J. Exp. Agric. Anim. Husb.* **34**: 229-240. DOI: 10.1071/ar9830229
- Mendham NJ and Salisbury PA (1995) Physiology: Crop development, growth and yield. In: Kimber D and McGregor dI (Eds) *Brassica Oilseeds. Production and Utilization*. CAB International. P.11-64.
- Mondal MRI and Islam MA (1993) Effect of seed rate and date on yield and yield components of rapeseed. *Bangladesh J. Agril. Sci.* **20**(1): 29-33.
- Mondal RI, Biswas M, Hydar-Ali MK and Akbar MA (1999) Response of rapeseed genotype Dhali to seed rate and seeding date. *Bangladesh J. Agril. Res.* **24**(1): 83-90.
- Pandey BP, Srivastava SK and Lal RS (1981) Genotype x environment interaction in lentil. *LENS* **8**: 14-17.

Rahman MM, Salam MU, Miah MG and Islam MS (1988) Effect of sowing time on the performance of mustard (SS-75). *Bangladesh J. Agric. Res.* **13**(1): 47-55.

Shahidullah M, Islam U, Karim MA and Hussain M (1997) Effect of sowing dates and varieties on yield and yield attributes of mustard. *Bangladesh J. Sci. Ind. Res.* **32**(4): 515-516.

Tandale MD and Ubale SS (2007) Evaluation of effect of growth parameters, leaf area index, leaf area duration, crop growth rate on seed yield of soybean during Kharif season. *Int. J. Agric. Sci.* **3**(1): 119-123.

Thurling N (1974) Morph physiological determinants of yield in rapeseed. *Aust. J. Agric. Res.* **25**: 711-721. DOI: 10.1071/AR9740711