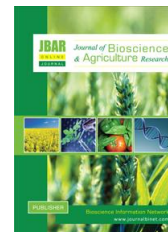


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Optimization of sowing time of BARI Sarisha 14 & BARI Sarisha 15 in Chittagong region

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ABSTRACT

The experiment was conducted in RARS, BARI Hathazari during Robi season in 2014-2015 and 2015-2016 to find out the best variety and best sowing time of mustard under the agro ecological condition of Chittagong region. There were two varieties viz. V_1 =BARI Sarisha 14 and V_2 =BARI Sarisha15 and six sowing date viz. S_1 =10 November, S_2 =20 November, S_3 = 30 November, S_4 =10 December, S_5 =20 December and S_6 =30 December. Significant variations due to different sowing time and varieties were observed in days to 50% flowering, days to maturity, plant height, branches plant⁻¹, siliqua plant⁻¹, length of siliqua, seeds siliqua⁻¹, 1000 seeds weight (g), yield plot⁻¹ and yield kg ha⁻¹. Result showed that highest yield was 2083 kg ha⁻¹ obtained from BARI Sarisha15 on 20 November (V_2S_2) followed by 1667 kg ha⁻¹ obtained from BARI Sarisha14 on 20 November (V_1S_2). From the result it can be concluded that best variety is BARI Sarisha15 and best sowing date is 20 November for Chittagong Region but both varieties can give satisfactory if they are sown from 10 November to 10 December.

Key Words: Mustard variety, Sowing time, Chittagong Region, Bari sarisha

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I. Introduction

Rapeseed is commonly known as mustard in Bangladesh. It is thermo sensitive as well as photosensitive cool season cop (Ghosh and Chatterjee, 1988). The seed contains 40-45% oil and 20-25% protein. Mustard supplied about 13.2 % of the annual world edible oil (FAO, 2007). Total

production of oilseed crop in Bangladesh is 847623 mt. while the production of mustard is 296402 mt. which is 34.97% of total oilseed crop of Bangladesh (BBS, 2014). 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 Mondal *et al.*, 1999). The seed yield and maturity of mustard plants are greatly influenced by environmental condition regardless of genotypes. Different sowing dates provide variable environmental conditions within the same location for not only growth and development but also yield stability (Pandey *et al.*, 1981). Decreasing crop yield in delayed sowing date has been reported by many researchers (Degenhardt and Kondra, 1981 and McDonald *et al.*, 1983). Late sowing of mustard decreased seed yield through synchronization of silique filling period with high temperature, the decrease in assimilates production, drought stress tolerance; shortened silique filling period and acceleration of plant maturity (Mendham *et al.*, 1995). That is why sowing date is an important determination for crop yield. In Chittagong region, people cannot prepare land for growing mustard within the BARI recommended date that is 5 November due to late monsoon. As a result farmers of Chittagong region grow mustard in different time ranging from 10 November to 10 December which effect the yield of mustard. Therefore, the experiment was undertaken to find out the best variety and optimize the best sowing time for mustard for Chittagong region.

II. Materials and Methods

The experiment was conducted at Regional Agricultural Research Station, Bangladesh Agriculture Research Institute, Hathazari during Rabi season in 2014-15 and 2015-16. Geographically the experimental field was located at 22°30'06.1" N latitude and 91°47'40.0" E longitude at an average elevation of 20 m above the of sea level. The experimental site belongs to Agro Ecological Zone (AEZ-29) known as the Northern and Eastern hills. The experimental treatments were two varieties and six sowing dates. The varieties were V_1 =BARI Sarisha 14 and V_2 =BARI Sarisha 15. The sowing dates were S_1 =10 November, S_2 =20 November, S_3 = 30 November, S_4 =10 December, S_5 =20 December and S_6 =30 December. Hence there were twelve treatments in the experiment viz. $T_1=V_1S_1$, $T_2=V_1S_2$, $T_3=V_1S_3$, $T_4=V_1S_4$, $T_5=V_1S_5$, $T_6=V_1S_6$, $T_7=V_2S_1$, $T_8=V_2S_2$, $T_9=V_2S_3$, $T_{10}=V_2S_4$, $T_{11}=V_2S_5$, $T_{12}=V_2S_6$. The experimental design was Randomized Complete Block Design (RCBD) with 3 replications having plot size of 3m X 2m. Seeds were sown in continuous and row was 30 cm apart from each. The seedlings were thinned after few days of germination maintaining 5 cm distance from each other. Fertilizer were applied @ 120:80:60:40:4 and 1 kg/ha of N: P₂O₅:K₂O: S: Zn and B respectively. Half of the urea and all other fertilizers were applied during final land preparation. The rest of the urea was applied at the initial stage of flowering. All intercultural operations were done timely to raise the crop uniformly. Data were recorded on days to 50% flowering, days to maturity, plant height, branches plant⁻¹, siliqua plant⁻¹, length of siliqua, seeds siliqua⁻¹, 1000 seeds weight, yield plot⁻¹ and yield kg ha⁻¹. The plot yield was converted into kg/hectare. The yield contributing characters were recorded from 5 randomly selected plants of each plot. The collected data were analyzed using computer package MSTAT-C and mean differences were adjudged by using Duncan's Multiple Range Test.

III. Results and Discussion

Effect of variety

Significant variations due to different varieties were observed in days to maturity, plant height, branches plant⁻¹, siliqua plant⁻¹, length of siliqua, seeds siliqua⁻¹, 1000 seeds weight (g), yield plot⁻¹ and yield kg ha⁻¹ (Table 01). BARI Sarisha 14 and BARI Sarisha 15 gave 1567 kg/ ha and 1706 kg/ha yield respectively (Sultana *et al.*, 2014). BARI sarisha 15 shows superiority over BARI sarisha 14 in case of most parameters except seeds siliqua⁻¹ and 1000 seeds weight. BARI sarisha-15 produced 1240.7 kg/ ha while BARI sarisha 14 produced 1071.2 kg/ ha during different sowing time.

Table 01. Effect of varieties at RARS, Hathazari during Rabi season in 2014-2015 and 2015-2016

Entries	Days to 50% flowering	Days to Maturity	Plant Height	No. branch/plant	No of siliqua/ plant	length of siliqua	no of seeds/ siliqua	1000 seed weight(g)	seed yield/plot (Kg)	yield (kg/ha)
BARI sarisha 14	36.83 b	74.22 b	84.78 b	6.03 b	90.85 b	4.64 b	33.84 a	2.55 a	0.64 b	1071.2 b
BARI sarisha 15	42.33 a	81.50 a	104.87 a	7.46 a	125.06 a	4.92 a	25.73 b	2.36 b	0.74 a	1240.7 a
CV (%)	0.0	8.56	6.06	11.04	20.52	5.20	9.56	5.38	11.19	11.51

Effect of sowing date

Significant variations due to different sowing dates were observed in days to maturity, plant height, branches plant⁻¹, siliqua plant⁻¹, length of siliqua, seeds siliqua⁻¹, 1000 seeds weight (g), yield plot⁻¹(kg) and yield kg ha⁻¹ (Table 02). Twenty (20) November produced highest no. of siliqua plant⁻¹. Same treatment shows superiority in case of plant height (86.5 cm), seeds siliqua⁻¹ (32.10), 1000 seeds weight (3.09 g), yield plot⁻¹(1.13 kg) and yield kg ha⁻¹ (1875) over other sowing dates. 1000 seed weight showed gradual reduction with the delayed planting time (Mondal *et al.*, 1999) and also reduced the seed yield plot⁻¹ which was also found by other researchers (Bukhtiar *et al.*, 1992 and Kalra *et al.*, 1985).

Table 02. Effect of sowing dates at RARS, Hathazari during Rabi season in 2014-2015 and 2015-2016

Entries	Days to 50% flowering	Days to Maturity	Plant Height	No. branch/plant	No of siliqua/ plant	length of siliqua	no of seeds/ siliqua	1000 seed weight(g)	seed yield/plot (Kg)	yield (kg/ha)
10 November	35.50	83.5 ab	94.93b	6.367 cd	129.5 a	4.83 b	26.10 b	2.883 b	0.83 b	1389 b
20 November	39.00	86.5 a	96.78b	7.400ab	122.9 a	4.90 b	32.10 a	3.092 a	1.12 a	1875 a
30 November	39.50	82.5 ab	108.0 a	5.800 d	109.1ab	5.35 a	29.13 ab	2.717 c	0.87 b	1458 b
10 December	42.00	68.1 d	103.6 a	7.842 a	125.7 a	5.20 a	31.87 a	2.292 d	0.79 b	1311 b
20 December	41.50	77 bc	84.17 c	6.867 bc	89.95 bc	4.06 a	30.13 a	1.983 e	0.39 c	652.8 c
30 December	40.00	69.5 cd	81.57 c	6.233 cd	70.63 c	4.36 c	29.40 ab	1.800 f	0.15 d	250.0 d
CV (%)	0.0	8.56	6.06	11.04	20.52	5.20	9.56	5.38	11.19	11.51

Interaction effect (Varieties X sowing dates)

Significant variations due to different sowing time and varieties were observed in days to maturity, plant height, branches plant⁻¹, siliqua plant⁻¹, length of siliqua, seeds siliqua⁻¹, 1000 seeds weight (g), yield plot⁻¹ and yield kg ha⁻¹ (Table 03). The highest plant height was recorded 119.9 cm from T₉=V₂S₃ which is significantly differs from other. These results are in the agreement with the result of Rahman *et al.* (2007) who stated that plant height differed significantly among the studied mustard. Highest and lowest no. of siliqua plant⁻¹ were recorded 151.7 and 62.53 from T₇=V₂S₁ and T₆=V₁S₆ respectively. T₉=V₂S₃ produced highest length of siliqua (5.39) while T₅=V₁S₅ produced lowest length of siliqua (3.75). Highest no. of seeds siliqua⁻¹ was 38.93 obtained from T₂=V₁S₂ and same treatment provided highest 1000 seed weight (3.18 g). Lowest no. of seeds siliqua⁻¹ was obtained 23.53 from T₇=V₂S₁. Highest yield 2083 kg/ha and lowest yield 277 kg/ha were counted from T₈=V₂S₂ and T₁₂=V₂S₆ respectively.

Table 03. Effect of Interaction effect (Varieties X sowing dates) at RARS, Hathazari during Rabi season in 2014-2015 and 2015-2016

Entries	Days to 50% flowering	Days to Maturity	Plant Height	No. branch/plant	No of siliqua/plant	length of siliqua	No of seeds/siliqua	1000 seed weight(g)	seed yield/plot (Kg)	yield (kg/ha)
T ₁ =V ₁ S ₁	32	81 ab	80.47 de	6 de	107.3 bcd	4.7 cde	28.67 cde	2.9 bc	0.70 e	1167 e
T ₂ =V ₁ S ₂	35	85 a	86.60 cd	6.93 bcd	117.1 abc	4.72 bcde	38.93 a	3.18 a	1 b	1667 b
T ₃ =V ₁ S ₃	37	81 ab	96.00 c	4.86 e	82.13 cde	5.3 a	33 bc	2.76 bc	0.83 cde	1389 cde
T ₄ =V ₁ S ₄	39	54.3 d	93.60 c	6.75 bcd	108.5 bc	5.23 a	37.53 ab	2.46 d	0.81 de	1344 de
T ₅ =V ₁ S ₅	40	76 bc	76.47 e	5.73 de	67.50 de	3.75 g	32.53 cd	2.13 e	0.38 f	638 f
T ₆ =V ₁ S ₆	38	68 c	75.60 e	5.93 de	62.53 e	4.14 fg	32.40 cd	1.88 f	0.13 g	222 g
T ₇ =V ₂ S ₁	39	86 a	109.4 b	6.73 bcd	151.7 a	4.97 abcd	23.53 e	2.86 bc	0.96 bc	1611 bc
T ₈ =V ₂ S ₂	43	88 a	106.9 b	7.86 abc	128.7 ab	5.08 abc	25.27 e	3 ab	1.25 a	2083 a
T ₉ =V ₂ S ₃	42	84 a	119.9 a	6.73 bcd	136.0 ab	5.39 a	25.27 e	2.66 cd	0.91 bcd	1528 bcd
T ₁₀ =V ₂ S ₄	45	82 ab	113.6 ab	8.93 a	142.9 ab	5.16 ab	26.20 e	2.11 e	0.76 e	1278 e
T ₁₁ =V ₂ S ₅	43	78 abc	91.87 c	8 ab	112.4 abc	4.36 ef	27.73 de	1.83 f	0.40 f	666 f
T ₁₂ =V ₂ S ₆	42	71 bc	87.53 cd	6.53 cd	78.73 cde	4.58 de	26.40 e	1.71 f	0.16 g	277 g
CV (%)	NS	8.56	6.06	11.04	20.52	5.20	9.56	5.38	11.19	11.51

IV. Conclusion

Result revealed that best sowing time is 20 November and best variety is BARI Sarisha 15. But farmer can get satisfactory yield from both of the varieties if they sow mustard from 10 November -10 December in Chittagong region.

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