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COMPARATIVE YIELD PERFORMANCE STUDY OF SOME MUSTARD MUTANTS AT RANGPUR REGION OF BANGLADESH

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ABSTRACT

The present research was conducted at the farmer's field of Rangpur during Rabi season 2018-19 to investigate the growth and yield performance of mustard mutants. The experiment was arranged in a randomized complete block design consisting of two mustard mutants (viz. MM-35, MM-36, MM-37 and BINA Sarisha-7) as treatment and replicated thrice. All the growth, yield attributes and yield were substantially influence among the mustard mutants except the phenological parameters. Results of the experiment showed that the highest plant height in BINA Sarisha-7 (142.87 cm) and MM-36 was found better in respect of maximum seed yield (1.75 ton/ ha), number of branches (3.87), 1000-seed weight (3.11 g). Besides this, MM-37 showed the maximum number of seeds siliqua-1. Therefore, findings of this study suggested that MM-36 would be suitable for better productivity and recommended for cultivation at Rangpur region in Bangladesh.

Key words: Yield, mustard, mutants.

Introduction

Mustard is one the most vital oil seed crop next to soybean throughout the world (FAO, 2014). Among the oil seed crops grown in Bangladesh, mustard is considered as the principal oil seed crop which belongs to the genus Brassica of the family Cruciferae. It is well adapted to all agro-climatic zones of the country and is grown in Rabi season (November-March). Mustard seeds have high energy content, having 28–32% oil with relatively high protein content (28–36%) by weight, although these values can vary slightly between varieties, growing regions and crop years. Actually mustard is covering above 69.94% of the oil cropped area and producing 38.80% of the total oil seed production in Bangladesh. Total area coverage and production of mustard in Bangladesh is 2,94,737 ha and 1,94,000 tons, respectively and rank first among the oil seed crops grown (BBS, 2013). The per capita consumption of edible oil in Bangladesh is 10-12g/day. The internal production of edible oil only meet less than one-third of the annual requirement (Mondal and Wahab, 2001). The major reasons for low yield of mustard in Bangladesh are lack of high yielding variety, appropriate population density and inadequate knowledge of sowing time, sowing methods and proper management practices (Mamun *et al*., 2014). There is a great scope of increasing yield of mustard by selecting appropriate high yielding varieties, soil topography, weather condition with improved management practices (Bhuiyan *et al*., 2011). The area under mustard cultivation is declining in Bangladesh due to late harvesting of high yielding T. aman rice and increased cultivation of boro rice losing an area of 104 thousand hectare with a production 68 thousand tons of mustard and rapeseed in last ten years (Anon., 2006). In Rangpur region T.aman-Fallow- Boro is major cropping pattern and after harvest of T. aman most of the land is remains fallow. Mustard is a short duration crop which can be introduced in the existing cropping pattern of this region to make a better use of the fallow land and increase the copping intensity. In Rangpur region only in few areas farmers usually cultivate mustard varieties which are mainly local and low yield potential. Besides local varieties Bangladesh Institute of Nuclear Agriculture (BINA) and Bangladesh Agriculture Research Institute (BARI) developed a number of short duration improved mustard varieties. After harvest of T. aman there is a scope to cultivate short duration high yield mustard varieties using residual soil moisture. Therefore, the present study was carried out to evaluate the growth and yield performance of mustard varieties and screen out the suitable variety for Rangpur region in Bangladesh.

Materials and Methods

The present research was conducted at the farmer's field of sadar, Rangpur during Rabi season 2018-19 to investigate the growth and yield performance of mustard mutants. The experiment was arranged in a randomized complete block design consisting of two mustard mutants (viz. MM-35, MM-36, MM-37 and BINA Sarisha-7) as treatment and replicated thrice. The land was prepared by ploughing and cross ploughing followed by laddering and fertilized uniformly with recommended fertilizer doses of Urea, TSP, MoP, Gypsum, Zinc Sulphate and Boric Acid at the rate of 200 kg, 150 kg, 100 kg, 150 kg, 5 kg and 10 kg ha-1, respectively. One-half of the urea and full doses of others fertilizer were applied during final land preparation and properly incorporated into the soil. The remaining urea was top dressed at 30 days after emergence (DAE). The experiment was laid out in a randomized complete block design with three replications. The size of unit plot was 4.0 m x 2.5 m. The distance between two rows were 30 cm and plant to plant 5 cm in line sowing method with intra plot spacing 0.50 m and intra block spacing of 1.0 m. Before sowing the seeds were treated with vitavax-200 @ 2.5 g/ kg seed. The seeds were placed continuously in the furrow at a depth of 3-4 cm from the soil surface after that covered the furrow and slightly pressed. Light irrigation was done immediately after sowing. Intercultural operations were taken as and when necessary. The collected data were compiled and statistically analyzed following analysis of variance (one-way ANOVA) using the MSTAT-C computer package program. Means were compared by using LSD at 5% level of probability (Gomez and Gomez, 1984).

Results and Discussion

First flowering and duration of flowering: On first flowering and duration of flowering there was no significant variation among the mutants. But numerically the earliest flowering (22 days) was found in RM-10 and (23 days) was found in RM-7 while the late flowering was observed (28.0 days) in RM-10 and (30 days) was found in RM-7. The duration of flowering was observed maximum (8 days) in BARI Sharisha-15 while minimum (6 days) was observed in RM-10.

Plant height: Plant height was not significantly influenced among the different mutants throughout the growing period (Table 1). Highest plant height was recorded from BINA sarisha-7 (142.87 cm) followed by MM-37 (138.30 cm), MM-36 (138.03 cm) and lowest plant height was recorded from MM-35 (134.40 cm) as shown in Table 1. Similar variation of plant height among rapeseed/mustard varieties was also reported by many scientists (Ahmed *et al*., 2017; Roy, 2007; Zakaria and Jahan, 1997; Hossain *et al*., 1996).

Table 1. Yield attributing performances of mustard mutants grown in Rangpur region of Bangladesh

Treatments	Days to maturity	Plant height (cm)	No. of branch plant^{-1}	No. of siliqua plant^{-1}	Siliqua length (cm)	No. of seed siliqua^{-1}	Thousand seed wt. (g)
MM-35	97.33	134.40	3.03c	94.33d	4.55	12.30a	2.9b
MM-36	97.67	138.03	3.87a	105.83b	4.82	11.97b	3.11a
MM-37	94.00	138.30	3.30b	112.97a	4.45	12.40a	3.02b
BINA Sarisa 7	98.67	142.87	3.20b	98.97c	4.57	12.43a	3.1a
CV (%)	1.93	5.51	22.26	15.08	10.47	6.38	2.76
LSD (0.05)	NS	NS	0.12	4.03	NS	1.21	0.13

Number of branches plant-1: Number of branches was significantly influenced among the different mutants throughout the growing period (Table 1). Highest number of branches was recorded from MM-36 (3.87) followed by MM-37 (3.30), BINA sarisha-7 (3.20) and lowest number of branches was recorded from MM-35 (3.03).

Number of siliqua plant^{-1}: Number of siliqua was significantly influenced among the different mutants throughout the growing period (Table 1). Highest number of siliqua was recorded from MM-37 (112.97) followed by MM-36 (105.83) and lowest number of siliqua was recorded from MM-35 (94.33) followed by BINA sarisha-7 (98.97). The findings of Akhter (2005), Roy (2007) and Mamun *et al*. (2014) are in conformity with the results of this finding that the number of siliquaplant^{-1}of mustard was significantly affected by the varieties.

Siliqua length: Siliqua length was not significantly influenced among the different mutants throughout the growing period. Siliqua length height was recorded from MM-36 (4.82 cm) followed by BINA sarisha-7 (4.57 cm) and lowest siliqua length was recorded from MM-37 (4.45 cm) followed by MM-35 (4.55 cm.)

Number of seeds siliqua^{-1}: Number of seeds siliqua^{-1}was significantly influenced among the different mutants throughout the growing period (Table 1). Number of seeds siliqua^{-1}height was recorded from BINA sarisha-7 (12.43) followed by MM-37 (12.40), MM-35 (12.30) and lowest number of seeds siliqua^{-1} was recorded from

Weight of 1000 seeds: There was a significant variation among the mutants on weight of 1000 seeds. Weight of 1000 seeds was higher (3.11 g) in MM-36 which was statistically similar to BINA sarisha-7 (3.10 g) and MM-35 produced the lowest 1000 seed weight (2.9 g) followed by MM-37 which was statistically similar to MM-35. The result is in conformity with that of Mamun *et al*. (2014).

Seed yield: MM-36 resulted the higher seed yield (1.75 tha^{-1}) followed by BINA sarisha-7 (1.71 tha^{-1}) which was not statistically similar with other mutants while the lower (1.62 ton/ha) was obtained from MM-37 followed by MM-35 (1.65 tha^{-1}) which was statistically similar to MM-37 (Fig. 1). Higher seed yield was attributed by the yield components. The results agreed with Rahman (2002), Mondal *et al*. (1995), Zaman *et al*. (1991) and Mendham *et al*. (1981) who reported that seed yield of rape and mustard varied with different varieties. Yeasmin (2013) also found significant varietal effect on seed yield.

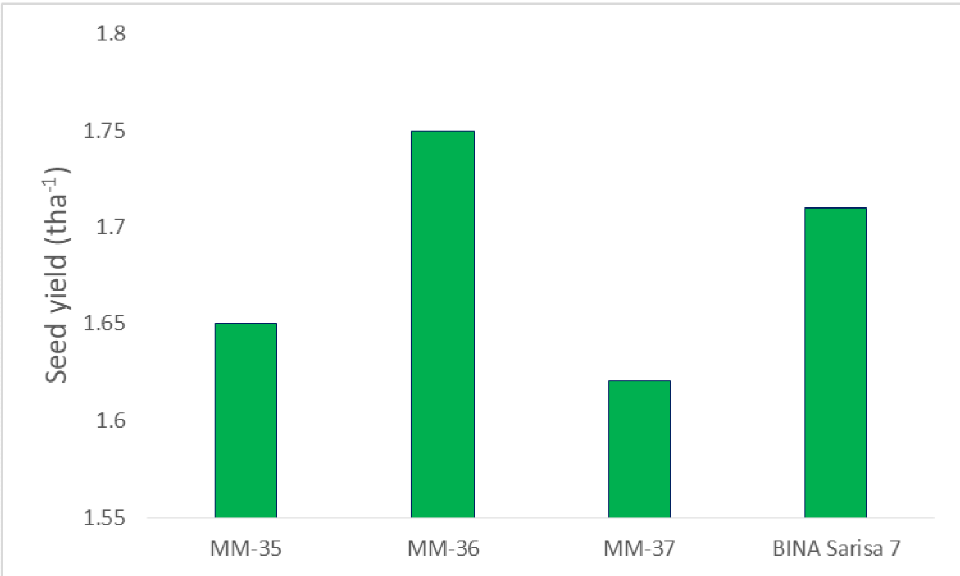

Fig 1. Comparison of seed yield of the treatments

Conclusion

The result revealed that the growth, yield and yield attributes of mustard varied substantially among the tested mutants used in this experiment yet no significant variation in phenological parameters. Considering the productivity, MM-36 can be recommended for cultivation at Rangpur region in Bangladesh.

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