

Short Communication

Evaluation of Mustard Genotypes Under Late Sowing Condition in the Southern Region of Bangladesh

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Received 30 May 2009, accepted in final revised form 27 July 2009

Abstract

The experiment was conducted to find out suitable mustard genotypes under late sowing condition for the southern region of Bangladesh. Ten genotypes of Rai groups were sown at five different dates (December 01, December 08, December 15, December 22 and December 29). The highest yield was obtained from December 01 sowing whereas the lowest yield was recorded from December 29 sowing. Ishurdi local and Pucca Rai produced higher yield of 924 kg/ha and 812 kg/ha, respectively and these two genotypes could be sown late up to December 15 for obtaining profitable yield.

Keywords: Late sowing; Mustard genotypes; Sowing time; Screening.

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DOI: 10.3329/jsr.v1i3.2576

J. Sci. Res. 1 (3), 667-672 (2009)

1. Introduction

Oils and fat play important role in human nutrition. As a high energy component of food, edible oil is important for meeting the calorie requirement. This is also important for improving the taste of a number of food items. Fats and oils act as carrier for fat soluble vitamins (A, D, E and K) in the body and therefore, the presence of some fats/oils in the diet is essential for their absorption. In Bangladesh, there are more than ten different oil crops which produce fats and oils of variable quality and quantity. Among them, oleriferous Brassica is an important source of vegetable fats, mainly represented by rapes (*Brassica campestris* L. and *B. napaus* L.) and mustard (*B. juncea* L. Czern and Coss) known as mustard together. Mustard as the main oilseed crop in Bangladesh covers about 60% of the oilseed area and 61% of the total production [1].

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The southern region is characterized by tidal flooding, high rainfall in monsoon and short winter periods. T. aman is the main crop in the cropping pattern. During the rabi season, land remains fallow due to delay harvest of T. aman and excessive soil moisture. Land becomes free and soil comes to working condition at the end of November to first week of January, which is not optimum for sowing of many rabi crops.

Early planting of mustard reduces seed yield as because of excessive growth before flowering due to longer duration of vegetative phases. Plants produce more number of branches bearing excessive pods, resulting in both inter-and intra-pod and seed competition within plants and thus a high rate of seed abortion occurs. On the other hand, plants due to delayed sowing more rapidly fulfill the low temperature needs to initiate earlier inflorescence and flowering. That restricts leaf production ultimately and results in smaller plants and fewer pod bearing branches and finally low yield [2, 3]. Bangladesh Agricultural Research Institute (BARI) has developed high yield potential varieties of rapeseed and mustard for optimum sowing. Middle of October is the most suitable time for sowing of rapeseed and mustard in Bangladesh [4, 5]. *B. juncea* genotypes, also known as Rai group are usually late potential [6]. Razzaque *et al.* [7] obtained profitable yield of two varieties of Rai group up to 30 November. The present study deals screening of the genotypes of Rai group under late sowing condition in the southern region of Bangladesh.

2. Materials and Methods

The experiment was conducted at Regional Agricultural Research Station, Rahmatpur, Barisal during rabi 2002-03 and 2003-04. The experiment comprised five sowing dates *viz.* December 01, December 08, December 15, December 22 and December 29 of 2002 and 2003 and ten varieties/lines of Rai group *viz.*, BJ-08, BJ-17, BJ-49, J-535-2, Pucca Rai, Bolder, Jamalpur-1, Ishurdi local, BARI sorisha-9 and Daulat. The treatments were laid out in a split-plot design by assigning the sowing dates in main plots and varieties in sub-plots of 4×1.2m with three replications. Recommended doses of fertilizers were applied. Intercultural operations were done as and when necessary. Data on different yield and yield contributing characters were recorded and analyzed statistically.

3. Results and Discussion

Effect of sowing time

The highest yield (1469 kg/ha) was obtained from first sowing (December 01) (Table 1) followed by second sowing (1048 kg/ha), third sowing (607 kg/ha). The fourth and fifth sowing produced the lowest yield. The yield scored 14.5% coefficient of variation. This revealed there are scopes to screen variety/line for late sowing condition. First sowing produced the tallest plant (140 cm) and the highest number of siliqua plant (145.5). On the other hand fifth sowing had the shortest (82 cm) height and the lowest number of siliqua per plant (54).

Effect of genotypes

Pucca Rai and Ishurdi local produced the highest yield (Table 2). Bolder, Daulat and J-535-2 ranked the second position regarding yield. The lowest yield was recorded from BJ-17 and BJ-49. Ishurdi local, Jamalpur-1 and Bolder were late in maturity and required 93-94 days. BARI sorisha-10 and Daulat were the earliest in maturity. Pucca Rai and Bolder produced the tallest plant whereas BARI sorisha-10 produced the shortest (98 cm). The highest number of siliqua per plant was obtained from Pucca Rai and Ishurdi local. BJ-49 produced the lowest number of siliqua (69.2) per plant.

Table1. Yield and yield components of mustard as affected by sowing dates (pooled average of 2002-03 and 2003-04).

Sowing time	Yield (kg/ha)	Days to maturity	Plant height (cm)	No.of siliqua/plant
1 st sowing (Dec.01)	1469 a	94	140a	145.5a
2 nd sowing (Dec.08)	1048 b	94	135ab	131.6b
3 rd sowing (Dec.15)	607 c	92	130b	126.2b
4 th sowing (Dec.22)	193 d	90	95c	75.3c
5 th sowing (Dec.29)	183 d	86	82d	54.0d
F-test	**	ns	**	**
CV (%)	14.5	2.3	6.5	11.2

Table 2. Yield and yield components of mustard as affected by genotypes (pooled average of 2002-03 and 2003-04).

Genotypes	Yield (kg/ha)	Days to maturity	Plant height	No.of siliqua/plant
BJ-08	529cd	91b	124b	80.7b
BJ-17	486d	91 b	116c	93.8c
BJ-49	502d	90 b	180b	69.2d
J-535-2	754b	91b	115c	85.3b
Pucca Rai	895a	95 a	138a	92.5a
Bolder	778b	93 a	135a	82.2b
Jamalpur-1	795b	93 a	100d	88.5ab
Ishurdi local	897a	94 a	120b	90.8a
BARI sorisha-10	621c	88c	98d	78.5c
Daulat	745b	89c	125b	83.3b
F-test	**	**	**	**

Interaction between sowing dates and genotypes

In first sowing Pucca Rai produced the highest yield (1945 kg/ha) and that was identical with that of Ishurdi local (1736 kg/ha) (Table 3). The lowest yield was recorded from BJ-

17 (1043 kg/ha). Pucca Rai, Jamalpur-1, Bolder and Ishurdi local were late in maturity (98 days). BJ-08, BJ-17, Bari sorisha-10 and Daulat were the earliest genotypes and required 90 days to maturity. In second sowing (8 December), Ishurdi local gave the highest yield (1529 kg/ha). Jamalpur-1 produced the second highest yield (1388 kg/ha). Days to maturity in second sowing were same with first sowing. In third sowing, Ishurdi local produced the highest yield (924 kg/ha). Pucca Rai was the second highest yielding genotype (812 kg/ha) followed by Jamalpur-1 (742 kg/ha). These genotypes were late in maturity (94 days). In fourth (22 December) and fifth (29 December) sowing, the performances of the genotypes were not satisfactory.

Table 3. Interaction effect of sowing time and genotypes on yield and maturity time of mustard (pooled average of 2002-03 and 2003-04).

Genotypes	First sowing (1 st Dec.)		2 nd sowing (8 th Dec.)		3 rd sowing (15 th Dec.)		4 th sowing (22 nd Dec.)		5 th sowing (29 th Dec.)	
	Yield (kg/ha)	DM	Yield (kg/ha)	DM	Yield (kg/ha)	DM	Yield (kg/ha)	DM	Yield (kg/ha)	DM
BJ-08	1251 d	90c	650gh	90c	374e	90b	142	87b	241	89b
BJ-17	1043 f	91c	663gh	90c	371e	90b	179	87b	173	88 ab
BJ-49	1181de	94ab	542i	94ab	320e	90b	204	86c	264	88 ab
J-535-2	1598bc	95ab	1254cd	94ab	634c	94a	165	88b	117	87 a
Pucca Rai	1944a	98a	1298c	97a	812b	94a	209	94a	211	88 ab
Bolder	1702b	97a	1108d	97a	669c	93a	265	94a	145	87 a
Jamalpur-1	1529 bc	98a	1388b	97a	742bc	94a	207	94a	108	87 a
Ishurdi local	1736ab	98a	1529a	97a	924 a	94a	177	95a	117	87 a
Barisorisha-10	1388c	90c	956d-g	90c	539cd	90b	136	86bc	135	88 ab
Daulat	1316c	90c	1097d-g	90c	621 cd	90b	249	89b	271	88 ab
F-test	**	*	**	*	**	*	ns	*	ns	*

DM= Days to maturity.

The present findings may be compared with the findings of several workers [4, 5, 7-9]. They reported October to November as the best sowing time of mustard and rapeseeds. Razzaque *et al.* [10] found two genotypes of Rai group, Daulat and Ishurdi local could be late potential and stated that they could be sown up to 30 November for obtaining a profitable yield.

Economics

The highest value for BCR of Pucca Rai in December 01 sowing was obtained 3.11 followed by that of Ishurdi local of the same sowing date (Table 4). Considering the benefit cost ratio, it was observed that most of the genotypes produced economically viable yield up to 08 December sowing. Sowing up to 15 December only Pucca rai and Ishurdi local were able to produce profitable yield with BCR 1.48 and 1.30, respectively. All the genotypes failed to produce viable yield after 15 December sowing.

Table 4. Economic performance of different mustard genotypes during the rabi seasons of 2002-03 and 2003-04.

Sl.	Genotypes	First sowing (1 st Dec.)				2 nd sowing (8 th Dec.)			
		Yield (kg/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	BCR	Yield (kg/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	BCR
1.	BJ-08	1251	31275	15629	2.00	650	16250	15629	1.04
2.	BJ-17	1043	26075	15629	1.67	663	16575	15629	1.06
3.	BJ-49	1181	29525	15629	1.89	542	13550	15629	0.87
4.	J-535-2	1598	39950	15629	2.56	1254	31250	15629	2.00
5.	Pucca Rai	1944	48600	15629	3.11	1298	32450	15629	2.08
6.	Bolder	1702	42550	15629	2.72	1108	27700	15629	1.77
7.	Jamalpur-1	1529	38225	15629	2.45	1388	34700	15629	2.22
8.	Ishurdi local	1736	43400	15629	2.79	1529	38225	15629	2.45
9.	Barisorisha-9	1388	34700	15629	2.22	956	23900	15629	1.53
10.	Daulat	1316	32900	15629	2.11	1097	27425	15629	1.75

Table 4. (Contd.)

Sl.	3 rd sowing (15 th Dec.)				4 th sowing (22 nd Dec.)				5 th sowing (29 th Dec.)			
	Yield kg/ha	GS Tk/ha	TVC Tk/ha	BCR	Yield kg/ha	GS Tk/ha	TVC Tk/ha	BCR	Yield kg/ha	GS Tk/ha	TVC Tk/ha	BCR
1.	374	9350	15629	0.60	142	3550	15629	0.23	241	6025	15629	0.39
2.	371	9275	15629	0.59	179	4475	15629	0.29	173	4325	15629	0.28
3.	320	8000	15629	0.51	204	5100	15629	0.33	264	6600	15629	0.04
4.	634	15850	15629	1.01	165	4125	15629	0.26	117	2925	15629	0.19
5.	812	20300	15629	1.30	209	5225	15629	0.33	211	5275	15629	0.34
6.	669	16775	15629	1.02	265	6625	15629	0.42	145	3625	15629	0.23
7.	742	18550	15629	1.17	207	5175	15629	0.33	108	2700	15629	0.17
8.	924	23100	15629	1.48	177	4425	15629	0.28	117	2925	15629	0.19
9.	539	13475	15629	0.86	136	3400	15629	0.22	135	3375	15629	0.22
10.	621	15525	15629	0.99	249	6225	15629	0.40	271	6775	15629	0.43

TVC= Total variable cost; BCR= Benefit cost ratio; GS= Gross return.

Seed rate = 8kg/ha

Input	:	Tk/kg	Out put	:	Tk/kg
Seed	:	50.00	Mustard	:	30.00
Urea	:	7.00			
TSP	:	15.00			
MP	:	10.00			
Gypsum	:	8.00			

4. Conclusion

From the present findings it may be said that Ishurdi local and Pucca Rai of Rai group mustard is suitable for sowing up to 15 December profitably, particularly in the Southern region of Bangladesh.

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