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International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Evaluation of Mustard Genotypes for Terai Regions of Nepal

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DOI: https://doi.org/10.55248/gengpi.2023.4101

ABSTRACT

Mustard is locally popular with the name of tora/rayo/raichi is getting priority among the farmers due to its dual advantage of leafy vegetables and oilseed. With the objective identification of the potential mustard genotypes from the available gene pools, a coordinated Varietal Trial (CVT) was conducted in Oilseed Research Program, Nawalpur. A total of 14 mustard genotypes were evaluated in a randomized complete block design (RCBD) with three replications. The plot size was 10 m^2 with five rows of 3-meter length maintaining inter-row of 40 cm and intra-row spacing of 15 cm. While depicting the yield, ICJ01-11 was considered the highest yielding genotype with the average yield of 521 kg/ha followed by ICJ9708 with the yield of 467 kg/ha and RH30 with the yield of 450 kg/ha. Due to the pivotal role of mustard as an oilseed production, it is indispensable to evaluate the available gene pool of local landrace, varieties and foreign genotypes of mustard to find out the highest yielding. So these promising genotypes can be used the in future to develop varieties of genotypes with high yield.

Keywords: Coordinated Varietal Trial, Mustard, Gene Pool, Rayo, Tori

1.Introduction

Mustard and rapeseed are considered as the third most edible oilseeds after soybean and palm oil. India is considered to be center of origin of mustard as it has been cultivated since 4000 BC. There are many advantages if mustard. It is grown for the edible oil, honey production and for the ornamental purpose. (Al-Shehbaz et al., 2006) and (Meyer et al., 2013). It is also as good feed for ruminants, poultry, fish and crustaceans. The rapeseed and mustard seed contain 40-45% oil, 24% protein. Rapeseed and mustard oil is nutritionally far superior to any other vegetable oils, because of sufficiently low level of saturated fatty acids (7%), moderate level of poly unsaturated fatty acids linoleic (omega-6) and linolenic (omega-3) which is highly balanced (12:10) and higher amount of monounsaturated fatty acids like oleic and erucic acid (70%).Rapeseed and mustard oil are safe for healthy people as well as for people with weak heart and those suffering from other chronic diseases.

In context to Nepal, regarding Rape seed and mustard, rape seed used to be popular for oil production whereas mustard for the green vegetable leaf. But now even mustard locally popular with the Tora/ Rayo/Raichi is playing pivotal role in the oil production. The area under Rapeseed and mustard cultivation in Nepal was 196121 ha, production 214, 055 mt and productivity 1.09 mt /ha (Moald, 2021) but substantial amount of acreage has been found under mixed cropping with wheat, lentil, chickpea and linseed (Ghimire et al.,2001). During FY 2019/20 area under mustard was 10076 ha with production 9454 mt and productivity 0.938 mt /ha (MoALD, 2021).

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2. Materials and Methods

With the objective identification of the potential mustard genotypes form the available foreign genotypes, Coordinated Varietal Trial (CVT) was conducted in Oilseed Research Program, Nawalpur, Narc. Coordinated varietal trial on mustard Under coordinated varietal trial, a total of 14 mustard genotypes were evaluated in randomized complete block design with three replications. The plot size was $10m^2$ with five rows of 3-meter length maintaining inter row spacing of 40cm and intra row spacing of 15 cm. The package of agronomic practice for mustard cultivation was followed as per the protocol developed by ORP, Nawalpur. The data regarding days to flowering, days to maturity, plant height, primary branch per plant, secondary branch per plant, siliqua per plant, seed per siliqua, and yield (kg/ha) were recorded and analyzed using statistical software Genstat discovery (ORP,2021).

3. Result and Discussion

All the genotypes were found to Non-significant for the parameters except primary branch per plant. However, ICJ9708 was considered to be early flowering with 62 days whereas RH30 and ICJ01-11was considered to be early maturity of 113 days. These genotypes can be considered in the future breeding programs for developing early varieties. In addition to the result, Pusa Agrani was considered to be short height genotypes with the average length of 107 cm and followed by RH30 with the height of 111 cm. These genotypes can be used for the development of dwarf varieties in future breeding program. Highest average number of primary branches was observed in ICJO1-62 and Pusa jagarnath having 2 number of primary branches per plant where as Pusa Agrani was considered to have highest number of secondary branches with the average number 7.33. highest number of siliqua per plant was observed in ICJ01-56 with 120.3 number of siliqua per plant followed by ICJ01-69 with 111.3 number of siliqua per plant. Similarly, ICJ01-11 was considered to have high seed per siliqua with 13.67 average number of seed per siliqua followed by Rohini with 12.67 average number of siliqua per plant. While depicting the yield, ICJ01-11 was considered highest yielding genotype with the average yiled of 521 kg/ha followed by ICJ9708 with the yield of 467 kg/ha followed by RH30 with the yiled of 450 kg/ha. In case of thousand seed weight RH 30 was found the highest thousand seed weight with the weight of 5.6 gram followed by ICJ9708 and ICJ9701 with the weight of 5.4 gram. The overall performance of elite mustard genotypes under ORP, Sarlahi condition during FY 2077/78 is presented below in table 1. From the result, ICJ01-11, RH 30, ICJ9708 and ICJ9701 can be considered in future program for the developing highest yielding varieties.

1. Table. Yield and ancillary characters in CVT mustard at ORP Nawalpur, 2077/78

E.N	Genotypes	DF	DM	Pht (cm)	PB/PL	SB/Pl	Sil/pla	Seed/sil	Yield (kg/ha)	TSwt
1	ICJ9708	62	115	124.3	1.33	5.33	98	11.33	467	5.4
2	T-59	65	114	120.3	1.67	5.67	106	11.33	383	5.3
3	RH30	63	113	111.7	1.33	6	89.3	11.33	450	5.6
4	ICJ01-11	65	113	117.7	1	6.33	106.7	13.67	521	5.3
5	Rohini	66	114	126.3	1.67	5.67	95.7	12.67	416	4.9
6	ICJO1-62	65	116	124.3	2	7	110.3	12.33	392	5
7	RH8113	65	116	125.7	1	5.33	103.7	11.33	433	4.9
8	ICJ9701	66	115	118.7	1	5	110	13	392	5.4
9	ICJ01-40	64	114	115.3	2	5.33	110	10.67	367	5
10	ICJ01-56	66	115	111.3	1.67	5	120.3	10.33	317	5.3
11	Pusa Agrani	64	114	107	1.67	7.33	116	12.33	388	5.3
12	Pusa Jagarnath	64	113	115	2	6.33	112	12.33	437	4.9
13	ICJ01-69	66	117	116.7	1.33	5.67	111.3	11.33	379	5.2
14	Krishna	63	114	119.7	1.33	5.33	89.3	12.33	417	5.1
	Gm	65	114	118.1	1.5	5.81	105.6	11.88	411	5.2
	F-test	NS	NS	NS	*	NS	NS	NS	NS	NS
	Lsd	3.09	3.79	22.7	0.69	1.58	34.68	2.29	103.49	0.79
	CV	2.9	2	11.5	27.3	16.2	19.6	11.5	15	9.1

4. Conclusion

Mustard which was considered previously as a leafy vegetable now is growing popularity for the oilseed production as well. Due to the pivotal role of mustard as a oilseed production, it is indispensable to evaluate the available gene pool (local landrace, varieties and foreign genotypes) of mustard to find out the highest yield. ICJ01-11, RH 30, ICJ9708 and ICJ9701 were found to have highest yield with good thousand seed weight and number of seed per siliqua. So these genotypes can be used in future to develop varieties of genotypes with high yield. Hope in future as rapeseed, mustard will be popular for the dual purpose of leaf vegetable and oilseed purpose.

Acknowledgement

Authors acknowledge Nepal Agricultural Research Council, Singha Durbar Plaza, Bagmati Province, Nepal; Oil Seed Research Program, Nawalpur, Sarlahi, Province no 2, NARC, Nepal.

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