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Research Article

Evaluation of Rapeseed Genotypes in Various Locations to Find High Yielding and Suitable Genotypes in Wide Range of Nepal

Bisheswar Prasad Yadav[1], Santosh Rasaily[1], Pramod Wagle[1], Razan Malla[1], Nabina B.K [2], Sheetal Aryal [3]

[1]Nepal Agricultural Research Council, Nepal
[2]Mahadev Janata Higher Secondary School, Nepal
[3]CIMMYT International, Nepal.

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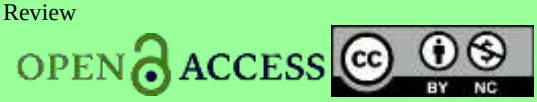
***Corresponding author**
Bisheswar Prasad Yadav,
Nepal Agricultural Research Council, Nepal
Email: masteryadavbp2001@gmail.com



Abstract

Experimental trials were conducted in Various NARC Station of Nepal. 2 years Coordinated Varietal Trial (CVT) was conducted in allocated location in RCBD design with 14 exotic genotypes including local check. Best 4 elite genotypes were selected for the Coordinated Farmers Field Trial (CFFT). Through the analysis from CVT and CFFT trial, ICT 2001-35 was found to be high yielding, more stable and suitable in wider range was release as Nawalpur Tori 4 in 2019. This Variety is new hope for the farmer and may play pivotal role to meet the national demand of the country.

Keywords: rapeseed; oilseed crops; genotypes

Introduction

Among the oilseed crops, rapeseed (*Brassica campestris* var *toria*) is dominant crops of Nepal. Its cultivation has occupied about 85 % of the total oilseed area in the country. It is mostly grown after monsoon maize in upland condition and after early rice in lowland of terai, inner terai and mid-hills (Ghimire *et al*., 2000). In context to World scenario, Rapeseed accounts for third most important edible oilseeds after soybean and palm oil. Rapeseed oil is considering to be nutritious and has many health benefits. Oil of plant origin constitute important component of human diet, ranking third after cereals & animal products and are nutritionally superior to animal oil (Singh *et al*., 2000).

The rapeseed contains 40-45% oil and 20-25% protein (Hasanuzzaman *et al*., 2008). Rapeseed/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 is safe for healthy people as well as for people

with weak heart and those suffering from other chronic diseases. his crop is important from income generation point of view and is prominent sources of fats, protein and vitamins as compared to cereals and legumes in Nepalese diet (Chaudhary, 2001). Similarly, 4.8% nitrogen, 2% phosphorus and 1.3% potash can be obtained from mustard oil cake (Prasai & Yadhav, 1999) which is used in many animal and poultry feed.

In Nepal, Rapeseed is considered as cash crop and the Nepalese farmer economy directly depends upon the yield of the rapeseed. During 2016/17, area of rapeseed was 160405 ha, production 159710 mt and productivity 0.996 mt/ha and area of mustard was 5692 ha, production 6792 mt and productivity 1.193 mt /ha (MOALD, 2018). The production of rapeseed has been declining for last some few years in the country. Till the date Nepal has few improved Variety which has average yield of 0.99 kh/ha, which indicate that there is lack of high yielding variety. In order to evaluate the high yielding variety, Nepal had brought different exotic lines through the NARC system and conducted multiple evaluation trails to find out high yielding, well adaptable and stable variety. The success of crop improvement programme depends upon the magnitude of variability available in the genetic resources of that crop. No single country for that matter even region can be self-sufficient in its needs for plant genetic resources (Arora *et al*., 1991).

Materials and Methods

Local and Exotic germplasm were evaluated under different environment condition of Nepal (Oil Seed Research Program, Sarlahi, Regional agriculture Research Station, Parwanipur, Regional Agricultural Research Station, Khajura, Agricultural Research Station, Surkhet and Belachapi, Ginger Research Program, salyan, Agri Botany Division, Khumaltar) in two different on succeeding year, 2013 and 2014. Coordinated Varietal Trial was conducted in Random Complete Block Design (RCBD) with 14 Genotypes including local genotypes in 3 replications with the plot size of 5x2.1 m^2. Among the 14 genotypes, 4 genotypes were selected for Coordinated Farmer field Trials in the same location in 2013, 2014 and 2016 A.D. with plot size of 50 m^2. Chemical fertilizers were applied @ 60:40:20 kg/ha. Weeding was conducted in 15 days and 35 days after seeding. To manage sawfly dusting of Malathion is recommended and to manage Aphid, Imidacloropid (0.5 ml/liter of water) is recommended. Alternaria Blight can be Controlled by spraying Dithane M 45 @ of 3gm/lt of water. Computer based statically software like Crop stat and R-studio was used to analyse the data.

Result and Discussions

Different analysis like ANOVA of CVT and CFFT, Stability Analysis and GGE Biplot were done to find the best Rapeseed variety for the wider range of Nepal. In ANOVA Of CVT -2013, there was significant difference in the yield of rapeseed in only two location (RARS, Parwanipur and ABD, Khumaltar) whereas the yield was not significant in other location. While analyzing the average mean yield data (Table 1) over different location of different genotype, the highest yield was observed in ICT 2001-35 (989 kg/ha) followed by Morang 2 (957 kg/ha). Similarly, in CVT of 2014, there was significant difference in yield of rapeseed in three location (RARS, Khajura, ARS Surkhet and ABD, Khumaltar) whereas the yield was not significant in other location. While analyzing the mean yield data (Table 2) over the location, highest yield was observed in ICT2001-35 (784 kg/ha) followed by ICT2001-34 (742 kg/ha). In CFFT of 2013 (Table 3), ICT 2001-35 showed highest yield in Bara 1360 kg/ha), Rautaht (1508 kg/ha), Sarlahi (1600 kg/ha) and Kavre (953 kg/ha) where as in Chitwan, Morang-2 showed highest yield (1635 kg/ha) as compared to ICT 2001-35 (1425kg/ha). However mean yield was highest in ICT 2001-35 (1288 kg/ha) among the locations. In CFFT of 2014 (Table 4), ICT 2001-35 showed highest yield in Rautaht (1160 kg/ha) and Chitwan (1129 kg/ha). In Sarlahi, ACC#9109 (1000 g/ha) showed highest yield as compared to ICT 2001-35 (900 kg/ha) and similarly in Bara, ACC#9118 (1100 kg/ha) showed highest yield than ICT 2001-35 (950 kg/ha). However, ICT 2001-35 show highest mean yield (1017 kg/ha) over location.

In CFFT of 2016 (Table 5), ICT 2001-35 showed highest yield in Sarlahi (1360 kg/ha), Rautaht (1508 kg/ha), Sarlahi (1600 kg/ha) and Kavre (953 kg/ha) where as in Chitwan, Morang-2 showed highest yield (1635 kg/ha) as compared to ICT 2001-35 (1425kg/ha). However mean yield was highest in ICT 2001-35 (1288 kg/ha) overall location.

In GGE Biplot analysis (Fig 1), ICT 2001-35 prove to be best and had wide range of performing high yield. Similarly, in stability analysis also (Fig 2), ICT-2001-35 was considered to be more stable in 2 different year.

Table 1: Performance of rapeseed genotypes tested in CVT at different locations, 2013.

EN	Varieties	Seed yield kg/ha					Mean
		NORP	Parwn.	Surkhet	Khajura	ABD	
1	ICT 2001-2	1260	1058	1345	1094	673	952
2	ICT 2001-13	1372	996	1400	687	600	890
3	ICT 2002-9	1378	1003	1450	750	780	953
4	ICT 2002-11	1337	959	1586	707	724	944

Table 1: Performance of rapeseed genotypes tested in CVT at different locations, 2013. (Contd.)

EN	Varieties	Seed yield kg/ha					Mean
		NORP	Parwn.	Surkhet	Khajura	ABD	
5	ICT 2002-16	1095	892	1234	750	753	872
6	Uttara	1063	1078	1224	833	615	888
7	ICT 2002-24	1224	843	1046	833	925	880
8	ACC# 5738	1171	875	1323	1013	879	926
9	ICT 2001-35	1215	1030	1405	877	781	989
10	ICT 2001-34	1246	932	1199	780	676	860
11	ICT 2001-41	1198	1128	1409	963	526	905
12	Preeti	1197	1064	1358	837	554	869
13	Morang 2	1137	861	1554	833	961	957
14	Local ch	1091	-	1253	803	783	933
	F test	NS	*	Ns	Ns	*	
	CV %	10.3	11.3	13.8	25.8	20.3	
	GM	1213	978	1342	640	730	
	Lsd 0.05	-	90			116	

Table 2: Performance of rapeseed genotypes tested in CVT at different locations, 2014.

EN	Varieties	NORP	Parw.	ABD	Nepalg.	Surkhet	Mean
1	ICT 2001-2	940	778	548	897	994	721
2	ICT 2001-13	964	804	325	823	819	688
3	ICT 2002-9	1018	846	303	888	774	673
4	ICT 2002-11	890	887	373	942	912	764
5	ICT 2002-16	836	802	287	805	680	625
6	Uttara	720	723	597	651	829	641
7	ICT 2002-24	848	844	430	774	717	697
8	ACC# 5738	952	818	709	811	874	721
9	ICT 2001-35	888	965	697	857	935	784
10	ICT 2001-34	1096	925	808	780	629	742
11	ICT 2001-41	872	831	694	801	1019	791
12	Preeti	990	787	752	828	873	781
13	Morang 2	968	798	710	799	814	689
14	Loc Check	636	-	682	533	545	499
	F test	Ns	Ns	**	*	*	
	CV%	17.2	13.7	27.9	19.4	19	
	GM	904	831	565	593	815	
	Lsd 0.05	-	-	123	89	120	

Table 3: Mean Yield (kg/ha) of CFFT rapeseed at different locations, 2013.

Locations	ACC#9118	ACC#9109	ICT 2001-35	Morang-2
Karaiya, Chitwan	1350	1350	1425	1635
Nijgadh, Bara	1080	1160	1480	1360
Santpur, Rautahat	1406	1466	1508	1153
Haripur, Sarlahi	1000	1333	1600	1333
Parwanipur, Bara	843	797	763	663
Kavre, Kavreplanchok	820	1000	953	640
Mean	1083	1184	1288	1130

Table 4: Mean Yield (kg/ha) of CFFT rapeseed at different locations, 2014**.**

EN	Varieties	Chitwan	Sarlahi	Bara	Rauthat	Nijgadh	Mean
1	ACC#9118	825	900	1100	1090	983	980
2	ACC# 9109	923	1000	1000	1030	944	979
3	ICT 2001-35	1129	900	950	1160	950	1017
4	Unnati	1121	850	800	990	850	926
5	Loc check	821	700	700	730	700	730

Table 5 : Mean Yield (kg/ha) of CFFT rapeseed at different locations, 2016.

EN	Varieties	sarlahi	Chitwan	Surkhet	ABD	Salyan	Bara	Mean
1	ACC#9118	763	500	1875	782	1400	1150	1041
2	ACC#9109	875	652	1915	708	1200	1050	1007
3	ICT2001-35	975	703	2085	793	1250	1162	1090
4	Morang2	812	693	2305	696	450	975	986

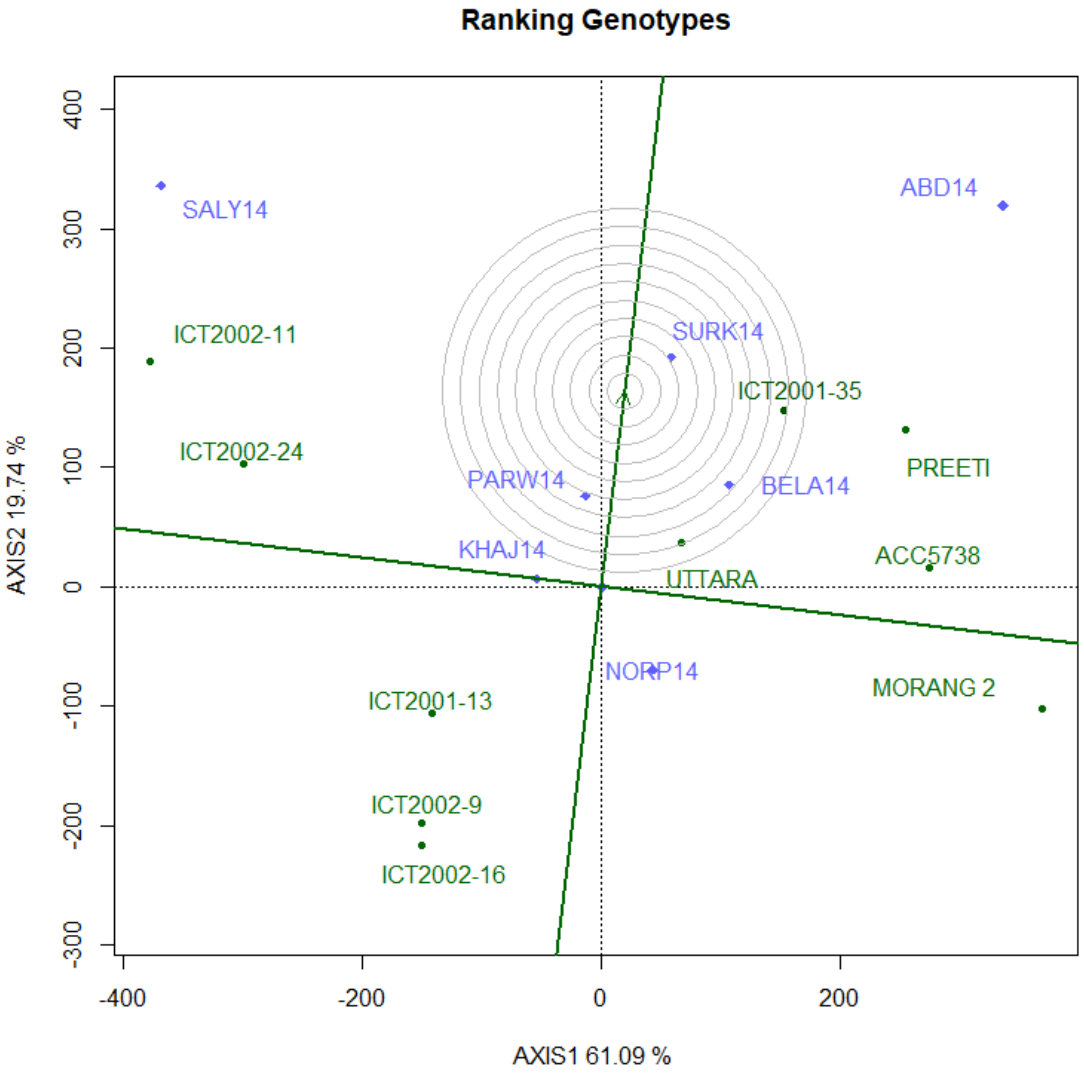


Fig. 1: GGE Biplot for Rapeseed

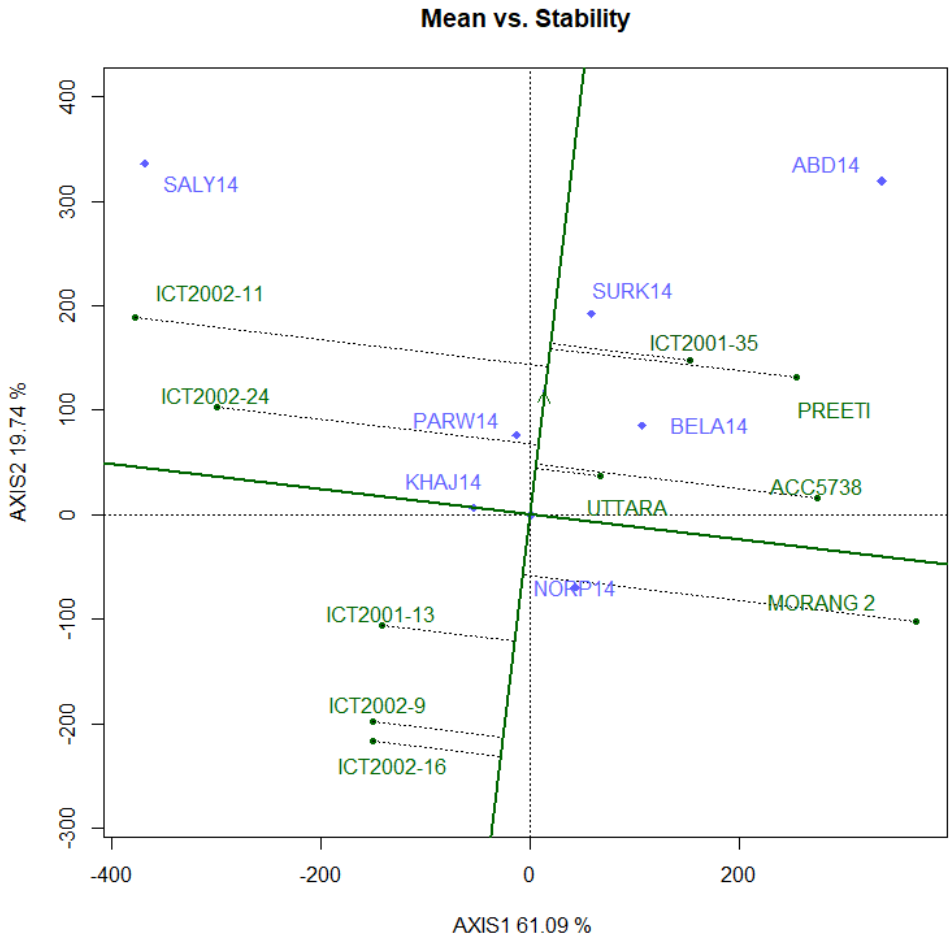


Fig. 2: Stability Analysis for Rapeseed

Conclusion

As there is no high research technology to produce new genotypes in Nepal. So, it is the best way to examine the exotic with high oil content (46%). By the continuous trial and analysis of the different exotic and landraces of genotypes of rapeseed, ICT 2001-35 had been identified as high yielding variety and released as Nawalpur tori 4 for Nepali farmer. This variety contain 4.65%, Mositure, 46.48% fat and 23.22 % protein. Nawalpur tori 4 is new hope for the farmer and may play pivotal role to meet the national demand of the country.

Conflict of Interest

The authors declare that there is no conflict of interest with present publication.

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.

Arora RK, Paroda RS and Engels MM (1991). Plant genetic resources activities: International perspective. *(in) Plant Genetic Resource, Conservation and Management–Concepts and Approaches:* 351–85.

Chaudhary BP (2001) Effect of crop geometry, nitrogen and weed management on mustard (*Brassica juncea*). M.Sc. Ag. Thesis, Rajendra Agricultural University, Bihar, Pusa, India.

Ghimire TB, Chaudhary RN and Ray SP (2000) Quantification of yield limiting constraints in toria production. *Annual report, NORP, 2000/2001. 61-62.*

Hasanuzzaman M, Karim MF and Ullah MJ (2008) Growth dynamic of rapeseed (Brassica campestris L.) cv. SAU Sarisha-1 as influenced by irrigation levels and row spacing. *Australian Journal of Basic and Applied Sciences* **2**(4): 794-799.

MoALD (2018) Statistical Information on Nepalese Agriculture, 2016/17. Ministry of Agriculture and Livestock Development, Agri-Business Promotion and Statistics Division, Sighdurbar, Kathmandu, Nepal.

Prasai HK and Yadhav HN (1999) Performance evaluation of mustard at Banigama, Morang, *Annual Report, Regional Agriculture Region Station, Tarahara, Nepal:* 141-143.