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Response of Nutrient Omission on the Performance of Rapeseed at Parwanipur, Bara, Nepal

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Abstract

The field experiment was conducted to study the effect of nutrient on growth, yield and yield attributes of promising rapeseed genotypes, and assess the economics of nutrient management in Strip Plot Design at the station of Directorate of Agricultural Research, Parwanipur, Bara during winter season of 2019 with two rapeseed genotypes (Morang Tori 2 and ACC 9109) in horizontal stripe and six combination of nutrient doses of NPKS (60:40:20:20 kg NPKS/ ha (N1), 0:40:20:20 kg NPKS/ ha (N2), 60:0:20:20 kg NPKS/ha (N3), 60:40:0:20 kg NPKS/ ha (N4), 60:40:20:0 kg NPKS/ ha (N5) and 0:0:0:0 kg NPKS/ ha. (N0) in vertical strip with three replications. The results revealed that at N1 treated plot the plant height at 30 DAS (64.53 cm), 60 DAS (84.22 cm), 90 DAS (104.62 cm, no. of primary (8.50) and secondary (41.50) branches, siliquae/ plant (138.15), seed/siliqua (15.33), test weight of seed (3.45 gm), yield (1072.5 Kg/ha.), B: C ratio (1.94) were higher as compared to control treatment or N0. The interaction of ACC 9109 and 60:40:20:20 Kg NPKS/ha gives highest yield (1343 Kg/ha) with highest B: C ratio of 2.442 and interaction of ACC 9109 and control plot (315 Kg/ha) gives lowest yield with B: C ratio of 0.882. It was concluded that the cultivation of ACC 9109 with 60:40:20:20 Kg NPKS/ha can improve crop growth, grain yield and profitability of rapeseed in Parwanipur, Bara, Nepal.

Keywords: genotypes, nutrient omission, productivity

Introduction

Oil seed crop is third most important crop in Nepal after cereals and pulses occupying 8.421% of total cultivated area in Nepal (MOALD, 2020). *Terai* and *inner terai* region covers 77% of the total oilseed crop area followed by hills (21%) and the mountain (2%) (Tari, 2016). In the year 2075/76, the total cropped area under oilseed crop is 2, 60,307 ha. with total production of 2, 80,530 mt and an average yield of 1.08 mt/ha (MOALD, 2020). The total cropped area under rapeseed is 169769 ha. with total production of 1,71,499 mt and an average productivity of 1,010 kg/ha (MOALD, 2017). Oilseed form a main source of energy and fat. Among many oil seed crops, rapeseed (*Brassica campestris L. vartoria*) (Local name: tori) is one of the most important crop in Nepal and farmers prefer it as catch crop, cover crop, inter crop and relay crop. It is also grown as mixed crop with wheat, lentil, linseed, chickpea etc. Due to lagging research efforts to increase the oil seed yield, the yield level in the farmer's field is far below than the varietal yield potential. The potential yields, IAAS Station yield and farmer's field yield of rapeseed and mustard are 1.1 t/ha, 1.00 t/ha and 0.71t/ha respectively. The yield gaps between the potential and farmers' field yield is 0.39 t/ha, the yield gap between potential and research station yield is 0.1 t/ha and the yield gap between research station and farmers' field yield is 0.29 t/ha (Amgain et al., 2005). Among the various factors responsible for lower production of rapeseed and mustard, the choice of proper cultivars suited to the agro-eco-zone and various agronomic management factors including poor nutrient management practices are the prime ones.In the context of Nepal, the varieties available are not of remarkable quality with low yield and not adaptable to wider location. In addition, there is availability of few numbers of improved genotype of rapeseed and only 5% area is cultivated under improved rapeseed genotype (NORP, 2001).Most of the farmers use high amount of chemical fertilizer haphazardly since there is little information available on NPK requirement for oil seed crop production in Nepal. The oilseed production systems in our country is mainly affected by mainly two factors, first the ignorance of farmers to this crop and regarding oilseed as secondary crop as compared to major crops (rice, wheat and maize).Research done at National Oilseed Research Program, Nawalpur, Sarlahishows low or no use of fertilizer and manures, declining inherent soil fertility and imbalance use of NPK decreases 29.48% of yield of Toria (Ghimire, 2003). Similarly, studies of nutrient management done in terai and inner terai conditions of Nepal showed that among all the inputs, the chemical fertilizer has an important place in tori production (Ghimire et al*.,* 2001; Chaudhary and Mishra, 2008). This crop has a wide dimension in terms of its need, economy, industry, and day to day consumption but still it is most neglected crop and less effort is made for its research and varietal evaluation. Fertilizer is considered as an important factor which has a huge impact on sustainable agriculture (Roelck et al., 2004). The yield response is related to indigenous nutrient supply which determines the yield in omission plots (Dobermann et al., 2003). Knowledge of soil capacity to supply major nutrients N, P, K and other nutrients is the pre-requisite regarding increasing yield and nutrient use efficiency of crops. Recommended doses of fertilizer will not be suitable in all fields and at the same time a large variability in soil nutrient supplying capacity exists among field. The nutrient omission plot technique is basically a practice in which we fertilize a plot with adequate amount of nutrient and at the same time in similar condition another plot is let unfertilized or in control so as to study the indigenous supply of nutrient in the field/ soil fertility (Regmi et. al., 2002; Dobermann, 2003).

The broad objective of this study is to enhance the productivity of promising rapeseed genotype using the appropriate nutrient management condition. The specific objectives are:

1. To study the growth, yield attributes and yield of promising rapeseed genotype,
2. To study the nutrient use efficiency,
3. To find out the economics of nutrient management.

Hypothesis

Null hypothesis: There is no significant difference on productivity of rapeseed genotypes under different nutrient management condition.

Alternate hypothesis: There is significant difference on productivity of rapeseed genotype under different nutrient management condition.

Materials and Methods

The experiment was carried out at the station of Directorate of Agricultural Research, Parwanipur, Bara district during the winter season (October 2019 to February 2020). Each plot was designed to maintain 3 m width and 5 m length. Each plot contained 10 rows in 15 m^2 area. Row to row spacing of 50cm was applied and continuous sowing was done on lines (50cm × continuous). The space between the treatments was 0.5 m and space between the blocks was 1 m. The experiment was replicated thrice in stripe plot design having plot size of 15 m^2. Two genotypes of rapeseed i.e. Morang Tori 2 and ACC 9109 were allocated in horizontal strip and six different nutrient doses of NPKS in vertical strip i.e. N1(+NPKS)= 60:40:20:20 kg NPKS/ ha, N2 (-N)= 0:40:20:20 kg NPKS/ ha, N3(-P)= 60:0:20:20 kg NPKS/ha, N4(-K)= 60:40:0:20 kg NPKS/ ha, N5(-S)= 60:40:20:0 kg NPKS/ ha, N0(-NPKS)= 0:0:0:0 kg NPKS/ ha. Sowing was done manually on 26th October, 2019. Cultural practices like Pre-emergence weedicide Pendimethalin 30% EC @ 0.75 kg a.i/ha was applied at the time of sowing and light irrigation was done at pre-blooming period. Half dose of urea (46% N) and full doses of single super phosphate (16% P_2O_5), muriate of potash (60% K_2O) and Sulphur powder (90% S) was applied at the time of sowing while remaining half dose of urea was top dressed at 25 DAS. Ten plants were tagged for taking phenological observations. The days to flowering was recorded from the date of sowing, when 75% plants in each plot got 1st flower initiation stage. Similarly, days to maturity was recorded when the 75% of the plant undergone physiological maturity. Biometric observation such as plant height, number of primary and secondary branches per plant were measured three times at 30 days interval such as 30, 60 and 90DAS from randomly selected 10 plants per plot. Number of siliquaeper plant was counted from randomly selected ten plants after harvest from net plot and averaged. Number of seeds per silique was counted from the selected 20 siliquae harvested from net plot and averaged. Manual harvesting was done. Dried seeds (8% moisture content with the help of moisture meter) of each plot was weighed and subsequently converted into yield kg/ha. Thousand Grain weight was determined by weighing 1000 seeds with the help of electronic balance form each plot. Partial factor productivity and total factor productivity were calculated. Economic analysis was done by calculating cost of cultivation, gross return, net return and benefit: cost ratio. Analysis of Variance (ANOVA) for all recorded parameters was done using MS-Excel and GenStat version 18 Software.

Results and Discussion

Plant Height

The results showed that at 30 DAS, superiority in plant height was obtained by attaining theheight of 64.53 cm in N1 (+NPKS) followed by 58.37 cm in N3 (-P). Plant height was lowest at control plot N0 (34.07cm). At 60 DAS the plant height was maximum at N1 (+NPKS) (84.22cm). Shortest plant height of 48.08cm was obtained control plot. At 90 DAS, height of plant was maximum in N1 or +NPKS (104.62). Shortest plant height of 62.25cm was obtained in N0. In fully fertilized plot with required amount of NPKS, the increase in cell elongation, cell division, vegetative growth and increment in plant height is attributed to the balanced nutrition (Kamrunnahar et al., 2017). Whereas, the shortest plant height in unfertilized plots might have been due to low soil fertility level in thestudy area. The results shows that if any of the nutrient is less than its threshold level in the soil, retardation in plant height is seen (Landon, 1991).

The results of interaction effect on plant height shows that, at 30 DAS and 60 DAS there was no significant difference on plant height while, at 90 DAS the interaction effect has highly significant difference on plant height. Statistically superior plant height was found in interaction of ACC 9109 and 60:40:20:20 Kg NPKS/ha while inferior plant height was found in interaction of Morang Tori 2 and control plot (-NPKS).

Days to Flowering and Days to Maturity

There was significant difference in Days to flowering due to nutrient doses. The Days to flowering was found statistically superior in N0 or in control plot (51.33) followed by N1 or +NPKS (42.17) but was statistically par at N2 or –N plot (41.17), N3 or –P (40.83), N4 or –K plot (40.83) and N5 or –S plot (40.83). The varieties does not show any significant difference in Days to flowering. Gibberellic acid is the main component for flowering and P levels were positively correlated with gibberellin levels. P is also responsible in synthesis of energy rich compound i.e. ADP and ATP which are responsible to metabolic activities in plants. Similarly, K is responsible for translocation of carbohydrates and from source (photosynthetic part) to apical meristem and flower buds (Eshghi & Tafazoli, 2006).

The maximum days to maturity was found in control plot or –NPKS (109.83) followed by N4 or –K plot (99.83) and N5 or –S plot (96.83). The Days to maturity was statistically at par in N3 or –P plot (94), N1 or –N plot (92.17) and N2 or –N plot (91.83). Increase in day to maturity with N rate may be that N promotes more vegetative growth and thus, the crop continue to grow for a long time in the field. In nitrogen omitted plot there is less vegetative growth where maturity arises faster (91.83) Kutcher et al. (2005).

The highest day to flowering (delay in flowering) was found in interaction of Morang Tori 2 and control plot (55.67 days) while least day to flowering (early flowering) was found in interaction of Morang Tori 2 and 60:0:20:20 Kg NPKS/ha (39.67 days) which was statistically similar to interaction on Morang Tori 2 and 60:40:0:20 Kg NPKS/ha (39.67 days).

Results depicts significant difference on Days to maturity due to interaction. Interaction of ACC 9109 and control plot shows highest day to mature (110 days) while least days to mature (90.67 days) was found in interaction of Morang Tori 2 and 60:40:20:20 Kg NPKS/ha.

Table 1

Effect of Genotypes and Nutrient Doses on Plant Height, Days to Flowering and Days to Maturity of Rapeseed at during Winter, 2019 at the Station of Directorate of Agricultural Research, Parwanipur, Bara

Factors	Plant height at 30DAS	Plant height at 60DAS	Plant height at 90DAS	Days to flowering	Days to maturity
Genotype (a)					
Morang Tori 2	51.58	65.10	85.40	43.22	97.17
ACC 9109	50.59	68.03	87.00	42.56	97.67
SEm_a(±)	0.574	1.48	0.354	0.297	0.18
LSD_a	3.49	9.01	2.15	1.805	1.095
CVa (%)	1.9	3.9	0.7	1.2%	0.3
F-test (a)	NS	NS	NS	NS	NS
Fertilizer (b)					
+NPKS 60:40:20:20 (N1)	64.53^{a}	84.22^{a}	104.62^{a}	42.17^{b}	92.17^{d}
-N 0:40:20:20 (N2)	53.53^{b}	65.25^{bc}	82.83^{c}	41.17^{b}	91.83^{d}
-P 60:0:20:20 (N3)	58.37^{b}	70.32^{b}	88.50^{b}	40.83^{b}	94.0^{d}
-K 60:40:0:20 (N4)	52.23^{b}	71.75^{b}	89.50^{b}	40.83^{b}	99.83^{b}
-S 60:40:20:0 (N5)	44.03^{c}	59.07^{c}	89.50^{b}	40.83^{b}	96.83^{c}
-NPKS 0:0:0:0 (N6)	34.07^{d}	48.8^{d}	62.25^{d}	51.33^{a}	109.83^{a}
SEm_b(±)	1.887	2.17	0.87	0.421	0.70
LSD_b	5.94	6.85	2.77	1.325	2.209
CVb (%)	6.4	5.7	1.8	1.7%	1.2
F-test (b)	**	**	**	**	NS
Interaction (c)					
SEm_c(±)	2.5	2.8	1.172	0.599	0.91
LSD_c	7.39	8.62	3.44	1.794	2.696
CVc (%)	9.1	4.8	2.4	2.1%	1.7
F-test (c)	NS	NS	**	**	*
Grand mean	51.13	66.57	86.20	42.89	97.42

Mean followed by common letter(s) within each column are not significantly different; NS= non-significant, * = significantly different at 5%, ** = significantly different at 1%, SEm= Standard Error Mean, LSD=Least Significant Difference, CV= Coefficient of Variation

Yield Attributes and Yield

Number of Primary and Secondary Branches

Morang tori 2 has more number of primary branches (6.17) than ACC 9109 (4.72). The secondary branches are more in ACC 9109 (29.44) than Morang tori 2 (16.78).On the basis of observed results, statistically superior primary branches was found in N1 or +NPKS plot (8.50) followed by N2 or –N plot (6.00) and inferior in N0 or control plot (3.333).

The number of secondary branches differs with application of different doses of nutrients and the variation obtained in research varied from highest branches in N1 (41.50) and lowest branches in N6 (6.67).

Phosphorus is known for better rooting in plants and in –P plots, its deficiency may have retarded rooting and thus transport of nutrients decreases which hinder the formation of branches.

Siliquae Per Plant and Seed Per Siliqua

Least and highest number of siliquae was recorded in N0 or –NPKS plot (47.50) and N1 or +NPKS plot (138.15). The number of siliquae per plant being less in phosphorus omitted plot may be due to the reason that P is mainly responsible for better rooting, formation of flower buds, formation of root, structure or architecture of root, activity of root i.e. absorption of nutrients (Williamson *et al.*, 2001) from the soil resulting in formation of reproductive structure and siliquae development.

Highest number of seed was recorded in N1 or +NPKS plot (15.33) and least number of seed was recorded in N0 or –NPKS plot (10.00). Seed of rape is mainly a fat globule with much oil content than protein. It has been observed that increasing sulphur application increases oil, and glucosinolates of seeds (Haneklaus et al., 1999).

Test Weight and Yield

The highest test wt. was found in +NPKS (3.45 gm) and lowest in –NPKS (2.96 gm). The test wt. at –P, -K, -N, and –S were statistically at par having values of 3.248 gm, 3.240 gm, 3.212 gm, and 3.272 gm respectively. The results depicts that Nitrogen has major role in 1000 seed weight.

ACC 9109 produces 886 kg/ha and morang tori 2 produces 513 kg/ha. The highest seed yield was obtained in N1 or +NPKS plot i.e 1072.5.8 kg /ha. The lowest seed yield was obtained in N6 (315.5 kg/ha). With the application of recommended NPKS fertilizer could be due to their combined positive effects. This response might be ascribed to adequate supply of these nutrients that resulted in higher production of photosynthates and their translocation to sink (Rana *et al.,* 2005).The interaction effect of genotype and nutrient management was significant on yield and yield components of rapeseed. The highest number of secondary branches (51.33), number of siliquae per plant (152.67), seeds per siliqua (15.6) and yield (1343 Kg/ha) were recorded in the interaction between ACC 9109 and +NPKS (60:40:20:20 Kg NPKS/ha). The lowest values of these parameters secondary branches (7.67), seeds per siliqua (10) and yield (315 Kg/ha) were found in the interaction between ACC 9109 and control plot or (-NPKS) while siliquae per plant was lowest in interaction of Morang Tori 2 and control plot. But primary branches were found maximum (10.3) in the interaction between Morang Tori 2 and +NPKS (60:40:20:20 Kg NPKS/ha) and minimum (3.33) in interaction of Morang Tori 2 and control plot which is similar to ACC 9109 and control plot interaction. There was no significant effect on test weight due to interaction.

Table 2

Effect of Genotypes and Nutrient Doses on Yield and Yield Attributing Characters of Rapeseed during Winter, 2019 at the Station of Directorate of Agricultural Research, Parwanipur, Bara

Factors	Primary branches	Secondary branches	Siliquae/ plant	Seed/ Silique	Test wt (gm)	Yield (kg/ha)
Genotype (a)						
Morang Tori 2	6.17	16.78	83.16	13.27	3.153	513
ACC 9109	4.72	29.44	90.72	13.16	3.311	886
SEm_a(±)	0.196	1.124	1.851	0.078	0.032	14.2
LSD_a	1.195	6.841	11.26	0.478	0.19	86.4
CVa (%)	6.2	8.4	3.7	1.0	1.7	3.5%
F-test (a)	*	*	NS	NS	NS	*
Fertilizer (b)						
+NPKS 60:40:20:20 (N1)	8.50^{a}	41.50^{a}	138.15^{a}	15.33^{a}	3.45^{a}	1072.5^{a}
-N 0:40:20:20 (N2)	6.00^{b}	21.00^{c}	84.33^{bc}	14.33^{b}	3.212^{b}	638.2^{c}
-P 60:0:20:20 (N3)	4.50^{c}	20.33^{c}	79.00^{c}	13.33^{c}	3.248^{b}	731.7^{b}
-K 60:40:0:20 (N4)	4.83^{c}	20.33^{c}	85.33^{b}	13.33^{c}	3.240^{b}	699.7^{bc}
-S 60:40:20:0 (N5)	5.50^{bc}	28.83^{b}	87.33^{b}	13.33^{c}	3.272^{b}	738.5^{b}
-NPKS 0:0:0:0 (N6)	3.33^{d}	6.67^{d}	47.50^{d}	10.00^{d}	2.96^{c}	315.5^{d}
SEm_b(±)	0.306	0.98	1.887	0.187	0.039	22.1
LSD_b	0.964	5.953	5.94	0.591	0.12	69.6
CVb (%)	9.7	7.3	3.8	2.5	2.1	5.5
F-test (b)	**	**	**	**	**	**
Interaction (c)						
SEm_c(±)	0.473	1.942	3.024	0.254	0.063	33.0

LSD_c	1.395	0.9459	9.413	0.748	0.19	97.6
CVc (%)	16.7	16.1	5.1	3.5	3.6	8.6
F-test (c)	*	*	**	*	NS	**
Grand mean	5.44	23.11	86.94	13.222	3.232	699

Mean followed by common letter(s) within each column are not significantly different; NS= non-significant, * = significantly different at 5%, ** = significantly different at 1%, SEm= Standard Error Mean, LSD=Least Significant Difference, CV= Coefficient of Variation

Economics of Rapeseed

Cost of cultivation was highest (Rs. 38514 thousand/ha) in no nutrient omission (+NPKS or N1) plot and least in –NPKS or N0 treatment (Rs. 25000 thousand/ha). The highest B: C ratio was found to be 1.94 from full dose of NPKS (N1) and the lowest BC ratio was 0.88 obtained from 0 NPKS (N0). The gross return was highest (Rs. 75075 thousand/ha) in no nutrient omission (+NPKS or N1) treatment and least in –NPKS or N0 treatment (Rs. 22085thousand/ha). On account of lower grain yields, unfertilized (-NPKS) treatments were unprofitable as evident from the losses in net income (Rs. -2915 thousand/ha) that was reflected in Benefit Cost ratio < 1.00 values (0.88). Gross return and net returns were recorded as higher for ACC 9109 (NRs. 62004 thousand/ha and 27995 thousand/ha respectively) than Morang Tori 2 (NRs. 35902 thousand/ha and 1893 thousand/ha respectively) making greater B: C ratio for ACC 9109 (1.77) than Morang Tori 2 (1.04).The interaction of genotype and nutrient management practices was found to be significant for cost of cultivation, gross return, net return and BC ratio.

Total Factor Productivity (TFP) and Partial Factor Productivity (PFP) of Rapeseed

High PFP and TFP was recorded in ACC 9109 having values of 2.83 and 0.080 respectively as compared to Morang Tori 2 having values of 1.57 and 0.044 respectively. Highly significant results were accorded in partial factor productivity (PFP) and Total factor productivity (TFP) of rapeseed due to nutrients. The results depicted highest PFP at –P (3.94) and the PFP at –NPKS was 0.

Similarly TFP was significantly highest in –P (0.11) and that of –NPKS was 0.

The interaction effect of genotype and nutrient had significant effect on PFP and TFP. The partial factor productivity (4.961) and total factor productivity (0.143) was highest at interaction of ACC 9109 and –P plot (60:0:20:20 Kg NPKS/ha). The TFP and PFP was lowest at interaction of both genotypes and control plot.

Table 3

Effect of Genotypes and Nutrient Doses on Economics, Partial Factor Productivity (PFP) and Total Factor Productivity (TFP) of Rapeseed during Winter, 2019 at the Wtation of Directorate of Agricultural Research, Parwanipur, Bara

Factors	BC	CC	NR	GR	PFP	TFP
Genotype(a)						
Morang Tori 2	1.04	-	1893	35902	1.57	0.044
ACC 9109	1.77	-	27995	62004	2.83	0.080
SEm_a(±)	0.027	0	994	994	0.074	0.0021
LSD_a	0.16	*	4873.7	6048.1	0.19	0.01
CVa (%)	3.4	0	11.5	3.5	5.8	6
F-test (a)	NS	NS	*	*	*	*
Fertilizer (b)						
+NPKS 60:40:20:20 (N1)	1.94[a]	38514.00[a]	36561[a]	75075[a]	2.70[b]	0.07[b]
-N 0:40:20:20 (N2)	1.23[d]	36165.00[b]	8507[d]	44672[c]	2.50[c]	0.05[d]
-P 60:0:20:20 (N3)	1.62[b]	31514.00[c]	19703[b]	51217[b]	3.94[a]	0.11[a]
-K 60:40:0:20 (N4)	1.32[cd]	36849.00[b]	12128[cd]	48977[bc]	2.04[d]	0.061[c]
-S 60:40:20:0 (N5)	1.43[c]	36014.00[b]	15681[bc]	51695[b]	2.03[d]	0.067[c]
-NPKS 0:0:0:0 (N6)	0.88[e]	25000.00[d]	-2915[e]	22085[d]	0[e]	0.00[e]
SEm_b(±)	0.047	0	1546.7	1546.7	0.063	0.0017
LSD_b	0.14	*	4873.7	4873.7	0.45	0.005
CVb (%)	5.8	0	17.9	5.5	5.0	4.9
F-test (b)	**	**	**	**	**	**
Interaction (c)						
SEm_c(±)	0.0693	0	2313.4	2313.4	0.1116	0.0033
LSD_c	0.20	*	6829.8	6829.8	0.36	0.010
CVc (%)	9.0	0	28.2	8.6	8.7	8.8
F-test (c)	**	**	**	**	**	**
Grand mean	1.41	34009.33	14944	48953.	2.517	0.06

Mean followed by common letter(s) within each column are not significantly different; NS= non-significant, * = significantly different at 5%, ** = significantly different at 1%, TFP= Total Factor Productivity, PFP= Partial Factor Productivity

Correlation

A positive significant to highly significant correlation of yield of rapeseed with PH60, PH90, no. of siliquae per plant, no. of secondary branches, test weight of seeds and seed per siliqua while yield had positive but non- significant association with PH30 and no. of primary branches. Here, Days to maturity exhibit negative highly significant and Days to flowering exhibit negative significant correlation with yield of rapeseed.

Table 4

Correlation between Yield and Yield Attributing Characteristics of Rapeseed at RARS, Parwanipur, Bara

	PH30	PH60	PH90	DF	DM	Silq/pl.	PB	SB	TW	Seed/ Silq.	Y
PH30	1										
PH60	0.82**	1									
PH90	0.58**	0.68**	1								
DF	-0.49**	-0.57**	-0.87**	1							
DM	-0.69**	-0.60**	-0.76**	0.72**	1						
Silq/ pl.	0.43**	0.45**	0.60**	-0.46**	-0.64**	1					
PB	0.54**	0.35*	0.53**	-0.35*	-0.58**	0.64**	1				
SB	0.32	0.40*	0.59**	-0.40*	-0.55**	0.78**	0.41*	1			
TW	0.18	0.20	0.27	-0.07	-0.24	0.58**	0.17	0.60**	1		
Seed/ silq.	0.61**	0.63**	0.84**	-0.68**	-0.80**	0.71**	0.68**	0.70**	0.30	1	
Y	0.33	0.40*	0.47**	-0.36*	-0.51**	0.73**	0.21	0.88**	0.64**	0.52**	1

Note: Significance at 1% level of probability (**), Significance at 5% level of probability (*), without (*) are non-significant

PH30= plant height at 30DAS, PH60= plant height at 60DAS, PH90= plant height at 90DAS, DF= Days of flowering, DM= Days of Maturity, silq/pl. = siliquae per plant, PB= Number of Primary Branches, SB= Number of Secondary Branches, TW= Test Weight, Seed/silq. = Seed per siliqua, Y= Yield

Conclusion

The results in the study shows that the yield of ACC 9109 was higher as compared to Morang Tori 2, it means that ACC 9109 is good option for farmers. Similarly, the results also revealed that the adopting 60:40:20:20 Kg NPKS/ha nutrient helps to get maximum yield with maximum profit for rapeseed as compared to –N, -P, -K, -S and –NPKS.

References

Amgain, L. P., &Timsina, J. (2005). Major agronomical research works at the Institute of Agriculture and Animal Sciences, Rampur, Chitwan, Nepal: a review. *Journal of the Institute of Agriculture and Animal Science*, *26*, 1-20.

Chaudhary, B.P., & Mishra, B. (2008). *Contribution of production factors in seed yield of mustard (Brassica juncea L.) under Terai and inner Terai conditions*. Proceedings of 27th National Winter Crops (Oilseeds) Workshop, Nepal Agricultural Research Council, National Oilseeds Research Programme (pp. 61-65). Nawalpur, Sarlahi, Nepal.

Basnet, K. B. (2005). Effect of different combinations of nutrient sources and weeding practice on the physiological characters of rapeseed in humid subtropical condition of Chitwan. *Journal of the Institute of Agriculture and Animal Science*, *26*, 51-55.

Dobermann, A., Witt, C., Abdulrachman, S., Gines, H. C., Nagarajan, R., Son, T. T., ...& Adviento, M. A. A. (2003). Soil fertility and indigenous nutrient supply in irrigated rice domains of Asia. *Agronomy Journal*, *95*(4), 913-923.

Eshghi, S., &Tafazoli, E. (2006). Possible role of non-structural carbohydrates in flower induction in strawberry. *The Journal of Horticultural Science and Biotechnology*, *81*(5), 854-858.

Ghimire, T.B. (2003). Assessment of factors responsible for yield decline in toria. In B.K. Joshi, S.L. Joshi & K.P. Paudyal, (eds.), *Proceedings of 2nd SAS-N Convention. Agricultural Research for Enhancing Livelihood of Nepalese People*, 30 July - 1 Aug. 2004. National Oilseed Research Program Nawalpur, Sarlahi.

Ghimire, T.B., Chaudhary, R.N. & Ray, S.P. (2001). *Quantification of yield limiting constraints in toria production in Nepal.* Proceedings of the National Winter Crop (oilseeds) Research Workshop, Nepal Agricultural Research Council (NARC)/ National Oilseed Research Program (NORP) (pp. 50-55), Nawalpur.

Haneklaus,S., Paulsen, H.M., Gupta, A.K.,Bloemand, E., & Schnug, E. (1999). *Proceedings of the 10th international rapeseed congress. Influence of sulfur fertilization on yield and quality of oilseed rape and mustard.* New Horizons for an Old Crop (pp. 1-5), Canberra, ACT, Australia.

Kamrunnahar, M., Ahmad, S., Iqbal, M., Akter, M., & Islam, A. (2017). Effects of some major plant nutrients on growth and yield of wet season rice. *Journal of Scientific Achievements*, *2*(4), 5-15.

Kutcher, H. R., Malhi, S. S., & Gill, K. S. (2005). Topography and management of nitrogen and fungicide affects diseases and productivity of canola. *Agronomy Journal*, *97*(2), 533-541.

Landon, J. R. (1991). *Booker tropical soil manual: A handbook for soil survey and agricultural land evaluation in the tropics and subtropics* (pp 474). Longman Scientific and Technical, Essex.

MOALD. (2017). *Statistical information on Nepalese agriculture*. Agri-Business Promotion and Statistics Division. Ministry of Agriculture and Livestock Development. Singhadurbar, Kathmandu, Nepal.

MOALD. (2020). *Statistical information on Nepalese agriculture*. Agri-Business Promotion and Statistics Division. Ministry of Agriculture and Livestock Development. Singhadurbar, Kathmandu, Nepal.

NORP. (2001) National Oilseed Research Program. Nawalpur, Sarlahi, Nepal, Annual Report.

Regmi, A. P., Ladha, J. K., Pathak, H., Pasuquin, E., Bueno, C., Dawe, D., & Pandey, S. P. (2002). Yield and soil fertility trends in a 20-year rice–rice–wheat experiment in Nepal. *Soil Science Society of America Journal*, *66*(3), 857-867.

Roelcke, M., Schleef, K. H., & Richter, J. (2004). Recent trends and recommendations for nitrogen fertilization in intensive agriculture in eastern China. 土壤圈*:* 英文版, *14*(4), 449-460.

Tari, S. (2016). *Present scenario of grain legumes and oilseed crops commercialization in Nepal*. Website: https://sndsblog.wordpress.com/2016/07/23/present-scenario-of-grain-legumes-and-oilseed-crops-commercilization-in-nepal/ (Retrieved on July 6, 2020).