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GENETIC VARIABILITY STUDIES OF A NOVEL HEALTH PROMOTING LEAFY VEGETABLE RUCOLA *(Eruca sativa)*

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Abstract

Rucola is one of the important leafy vegetables of the 'Brassicaceae' family which is commonly consumed as raw salad. Seven rocula genotypes were evaluated during *Rabi* season 2021-2022 at the experimental farm of Sher-e-Bangla Agricultural University (SAU), Dhaka for genetic variability analysis and were compared with mustard genotype. The results showed that the genotypes were significantly variable for the studied traits. The phenotypic variances and phenotypic coefficient of variations were higher than genotypic variances and genotypic coefficient of variations suggesting the environmental effects on the phenotypic expression of those traits. The high heritability was observed for all the traits except the number of leaves per plant (51.24). Fresh yield per plant showed a significant positive genotypic correlation with number of leaves per plant (0.986) and number of siliquae per plant (0.845) while a significant phenotypic correlation with days to 50% flowering (0.466), plant height (0.473), number of leaves per plant (0.705), leaf length (0.547), days to maturity (0.405) and number of siliquae per plant (0.797). Moreover, seed yield per plant had significant positive correlation with thousand seed weight (0.971) while a non-significant positive correlation with leaf breadth (0.258), number of siliquae per plant (0.030), siliquae length (0.314) and pedicel length (0.168) at both genotypic and phenotypic levels. The results suggest that rucola can be cultivated in the agro-climatic condition of Bangladesh and needs for further genetic improvement of this health promoting crop. This is also the first scientific report of rucola cultivation in Bangladesh.

Keywords: Correlation, Genetic variability, Heritability, Leafy vegetable, Rucola

Introduction

Rucola is a leafy annual vegetable belonging to the mustard family 'Brassicaceae' (Doležalová *et al.*, 2013). The somatic chromosome number of this species is 2n = 22. It is named differently in different countries such as rucola (Italy), arugula (USA), salatrauke (Germany), eruca (Spain) and roquette (France) (Rahim, 2016a). Rucola is native to the Mediterranean region (Goz *et al.*, 2006) and cultivated since Roman times and further introduced and distributed in different countries and continents. It is now commercially grown in Europe (Italy, France and Portugal and

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Czech Republic), Egypt, Turkey, and America (Indiana and Midwest). Rucola is a cool loving plant and grows best in winter. This plant shows rapid leaf growth during winter, but switch to skyward in hot weather and starts to bloom and seed setting. Rucola plants reach about 20-100 cm in height (Rahim, 2016a; Rahim, 2016b). The leaves are succulent, lobed and elongate. All parts of the plant except root are edible (leaves, flowers, siliquae and young and mature seeds). Fresh green rucola leaves are frequently and popularly used in pizza topping and pasta (Doležalová *et al.*, 2013). It is used as a condiment for different delicious meats and fish dishes. Besides, it can be used as salad (raw), cooked and functional plants (Kim *et al.*, 2006) but raw rucola is good for a higher exposure to bioactive phytochemicals like glucosinolates, their hydrolysis products, and also phenolics, flavonoids, and vitamins such as vitamin C (Bennett *et al.*, 2006). It is quite popular as salad with tomatoes, olives and cheese. In addition, the seeds of this species are used to extract edible oil in some part of India (Huang *et al.*, 2014). Now-a-days, the health benefits of vegetables are well-recognized due to the availability of health promoting natural phytochemicals. Rucola possesses a great medicinal value. The capability of this plant to control certain human diseases and disorders like diabetes, cancer, cardiovascular diseases has already been proven from scientific research. According to National Nutrient Database (Standard Reference) of the United States, 100 g of fresh leaves contain only 25 Kcal energy while rich in folic acid (97 µg or 24%), vitamin A (2373 IU), vitamin C (15 mg), vitamin K (108.6 µg) and vitamin B-complexs (Anon., 2016a). Besides, it holds considerable amount of flavonoid compounds specifically flavonol (antioxidant) which act against skin, lung and oral cavity cancers. Rucola leaves also contain ample amounts of minerals like copper and iron and small amounts of calcium, potassium, manganese, and phosphorus. Green rucola leaves are the richest sources of many phytochemicals such as sulfuraphane, glutathione, thiocyanates and isothiocyanates (Barillari *et al.*, 2005; Matthews, 2011). Sulfuraphan can inhibit histone deacetylase, which is known to involve in the development of cancer cells. These phytochemicals are known to fight against prostate, breast, cervical, colon, ovarian cancers. According to the estimation of the Rural Industries Research and Development Corporation (RIRDC) of Australia, green rucola leaves have more anti-cancer potential than other commonly consumed cruciferous vegetable. Since fresh green rucola leaves are usually used in salad, hence its chlorophyll blocks the carcinogenic effects of heterocyclic amines released from fried and grilled meats at higher temperature (Anon., 2016b). It contains alpha-lipoic acid that lowers glucose levels and increases insulin sensitivity (Anon., 2016c). So far, the cultivation of rucola was not noticed anywhere in Bangladesh (Anon., 2016c). However, for the first time, research with this novel health promoting plant has been started by the research group of Department of Genetics and Plant Breeding, Sher-e-Bangla Agricultural University, Dhaka since 2014. Rucola is suitable for growing around the year in Bangladesh but winter season is the best for leaf growth and production. It starts flowering and seed production at the end of winter and beginning of spring. Rucola produce leaves throughout the year, so a little place in the homestead and 4/5 tubs in balcony or roof top is good enough for year-round leaf production (Anon., 2016c).

A crop improvement program has various activities such as building up a gene pool with variable germplasm, selection of individual from the gene pool and utilization of selected individual to evolve a superior line (Kempthorne, 1957). The genetic variability present in the population, heritability of economically important characters and correlation coefficients of those characters is very important before setting up an effective breeding program. If a plant breeding program is to advance most rapidly and efficiently, knowledge of the phenotypic and particularly of the genotypic interrelationships among and between the yield contributing characters is necessary. The quantification of genotypic correlation for determining the relationships among agronomic characters in diverse population is an effective tool for crop improvement (Bello *et al.*, 2006). Therefore, it is very important to know the genetic variability, heritability, genetic advance and interrelationship among the yield contributing traits of "Rucola" in Bangladesh condition to utilize the potential health benefits of this crop.

Materials and Methods

A total of nine genotypes were used in this experiment (Table 1), of which eight rucola and one mustard. The seeds were collected from Department of Genetics and Plant Breeding, Sher-e-Bangla Agricultural University (SAU), Dhaka, Bangladesh. The entire experiment was carried out at the experiment field of Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh during *Robi* season 2021-2022. The experiment was laid out at randomized complete bock design (RCBD) with 3 replications and the genotypes were distributed to each plot with each block randomly. The unit plot was 5 m with 4 rows and lines to line and plant to plant distances were 30 cm and 15 cm, respectively. The experimental area was fertilized with chemical fertilizers and cowdung including Urea: TSP: MP @ 55: 160: 160 Kg/ha. Total amount of TSP, MP, along with half of the urea were applied at the time of final land preparation as a basal dose. The second half of the urea was top-dressed at the time of flower initiation. The standard cultural practiced were done during the entire experiment. Plants were harvested at the age 36 days after sowing for fresh vegetative yield which is the economic yield of the plant as well. The siliqua was harvested separately for each genotype when 80% of plants was mature. The data were recorded on ten randomly selected plants for different traits including days to 50% flowering, plant height (cm), number of leaves per plant, leaf length (cm), leaf breadth (cm), fresh yield (g), days to maturity, number of siliquae per plant, siliquae length (cm), pedicel length (cm), number of seeds per siliqua, thousand seed weight (g) and seed yield per plant (g). The recorded data were analyzed using an open source software RStudio. The phenotypic and genotypic variances were determined as per Johnson *et al.,* (1955). Heritability and genetic advance were estimated according to Singh and Chaudhury (1985).

Table 1. Name of the genotypes used in the study

Sl. No.	Advanced populations	Source
1.	Ru/19/GPB-006	GPB[1], SAU[2]
2.	Ru/19/GPB-007	GPB, SAU
3.	Ru/19/GPB-008	GPB, SAU
4.	Ru/19/GPB-009	GPB, SAU
5.	Ru/19/GPB-0010	GPB, SAU
6.	Ru/19/GPB-0011	GPB, SAU
7.	Ru/19/GPB-0012	GPB, SAU
8.	Ru/19/GPB-0015	GPB, SAU
9.	Bra/19/GPB-0089	GPB, SAU

[1]GPB: Department of Genetics and Plant Breeding
[2]SAU: Sher-e-Bangla Agricultural University

Results and Discussion

Morphological characteristics

Rucola is an annual herbaceous plant (Fig. 1). It forms a rosette of basal leaves. They are pinnatifid-oblanceolate with several small lateral lobes and a larger terminal lobe for most of the genotypes except G3 and G5 (Fig. 1). The G3 and G5 showed narrow leaves as compared to rest of the genotypes. Most of the rucola genotypes were late flowering except G3 (42 days) and G5 (42.67 days) compared to mustard genotype G9 (31.33 days) (Table 2). Shinwari *et al.* (2013) reported that a range of 57-99 days for 50% flowering period in rucola genotypes. Similarly, furthermost rucola genotypes were higher in height except G3 (76.45 cm) and G5 (72.37 cm) compared to mustard (G9, 85.07 cm) (Table 2). The maximum plant height 153 cm and minimum 17 cm were reported by Huang *et al.* (2014) in *Eruca sativa*. Shinwari *et al.*, (2013) reported a range 45.0-263.7 cm for plant height in rucola. All the rucola genotypes contained higher number of leaves compared to G9 which had only 12.8 leaves per plant (Table 2). The narrower leaves were recorded in the G3 (1.44 cm) and G5 (1.57 cm) whereas the shorter in leaf length were found in G3 (14.88 cm), G5 (15.59 cm) and G9 (15.59 cm) (Fig. 2 and Table 2). The average leaf length and breadth were 23.83 cm 5.64 cm, respectively (Table 2). The rucola genotype G9 had higher fresh weight of leaves compared to mustard (59.71 g). The maximum fresh weight of leaves was observed in G8 (125.2) harvested at the 35 days after sowing followed by G7 (86.67) and G1 (86.40) (Table 2). Further, the earliest siliqua maturity was recorded in mustard G9 (mustard genotype) which requires only 78.33 days while the rucola genotypes were mostly late maturing except G3 (80.33 days) and G5 (88.33 days) (Table 2). The rucola genotypes had higher number of siliquae per plant than mustard (G9, 98) except G4 (95.60) and G5 (91.67) while the maximum in G8 (173.47) (Table 2). The maximum 474 and minimum only 3 siliquae per plant were reported by Huang *et al.* (2014) in rucola. The highest siliquae length was found mustard (G9, 6.47 cm) followed by G5 (6.41 cm) and G3 (6.35 cm) and lowest in G4 (2.63 cm) followed by G1 (2.72 cm) (Table 2). The maximum pedicel length was found in rucola G5 (2.10 cm) followed by G3 (1.83 cm) and mustard (G9, 1.60 cm) whereas the minimum in G4 (0.44 cm). Among the rucola genotypes, G3 (68.91) and G5 (51.81) showed higher number of seeds per siliqua as compared to mustard G9 (24.64). The remaining rucola genotypes had lower number of seeds per siliqua (Table 2). All the rucola genotypes showed much lower 1000-seed weight as compared to mustard (2.82 g) while the lowest in G3 (0.09 g) and G5(0.09 g) (Table 2). The maximum seed yield per plant was found in mustard G9 (6.69 g) whereas all the rucola genotypes showed much lower seed yield per plant (Table 2). Average 7.9 g seed yield per plant was also reported in rucola by Shinwari *et al.* (2013) which is much more than in Bangladesh. In addition, two rucola genotypes (G3 and G5) exhibited extremely smaller sized seeds (Fig. 3) as compared to other rucola and mustard genotypes analyzed in the study. The higher number of seeds per siliquae in G3 and G5 might be due to their smaller seeds and seed weight. Although they had highest number of seeds per silique but lowest seed yield per plant.

Fig. 1. Rucola genotypes used in the study

Fig. 2. Leaves of rucola genotypes used in the study

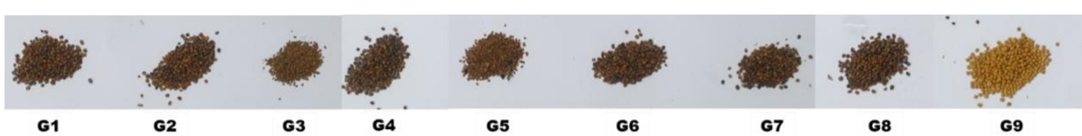

Fig. 3. Seed color of rucola genotypes used in the study

Genetic Variability

The analysis of variance (ANOVA) for 13 quantitative traits, including days to 50% flowering (DFF), plant height (PH), number of leaves per plant (NLP), leaf length (LL), leaf breadth (LB), fresh yield (FY), days to maturity (DM), number of siliquae per plant (NSP), siliqua length (SL), pedicel length (PL), number of seeds per siliqua (NSS), thousand seed weight (TSW), and seed yield per plant (SYP) showed highly significant differences among the tested rucola genotypes (Table 3) which suggests there are inherent genetic variations among tested genotypes. Therefore, the genetic improvement through phenotyping selection for these traits on tested genotypes would be effective. The phenotypic variances (σ^2p) were higher than the genotypic variance (σ^2g) for the evaluated traits suggested the influences of environment on the phenotypic expression of these traits (Table 3). The higher σ^2g were found for DFF, PH, LL, FY, DM, NSP and NSP (Table 3). The results indicating the occurrence of high genetic variability for these traits. The phenotypic coefficient of variation (PCV) was also higher than the genotypic coefficient of variation (GCV) for all the traits, which indicates the variations among genotypes were not only due to the genetic variations but also environmental influences. The PCV ranged from 12.71 to 129.02 whereas the GCV ranged from 12.40 to 128.97 (Table 3). Heritability was classified as low (0-30%), moderate (30- 60%) and high (60% and above) (Robinson *et al.*, 1949). Likewise, the genetic advance as a percentage of the mean (GAPM) was classified as low (0 -10%), moderate (10-20%) and high (20% and more) (Johnson *et al.*, 1955). The high broad sense heritability was detected for most of the evaluated traits except NLP. Nevertheless, the high broad base heritability with high genetic advance in percentage of mean were observed for DFF, PH, LL, LB, FY, DM, SL, PL, NSS, TSW and SYP (Table 3), which indicates that these traits under additive genetic control and selection would be effective (Panse and Sukhatme, 1967; Synrem *et al.*, 2014).

Correlation studies

The correlation among studied characters with yield is the important criteria for phenotypic selection (Mekonnen *et al.*, 2014). Since yield is a polygene character and greatly influenced by the environment. The phenotypic selection based on simply yield is ineffective. Therefore, correlation coefficients among various yield contributing traits aid the selection process in breeding program. The genotypic and phenotypic correlation coefficients among thirteen characters are presented in Table 3 and Table 4. The genotypic correlation coefficients were higher than phenotypic correlation coefficients for the evaluated traits. Fresh yield (FY) of rucola leaves had a highly significant positive correlation with number of leaves per plant (NLP) and number of siliquae per plant (NSP) at the genotypic level, while NLP, NSP and leaf length (LL) at the phenotypic level. It had significant positive correlation with days to 50% flowering (DFF), plant height (PH), days to maturity (DM), whereas significant negative correlation with siliquae length and 1000-seed weight (TSW) at the phenotypic level only. DFF showed significant positive correlation with plant height (PH), NLP, NSP, leaf length (LL), leaf breadth (LB) and DM while significant negative correlation with siliquae length (SL), pedicel length (PL) and number of seeds per siliquae (NSS) at both the genotypic and the phenotypic levels. PH had significant positive correlation with NLP, LL, LB and DM whereas significant negative correlation with SL, PL, and NSS at both the genotypic and the phenotypic levels. Huang *et al.* (2014) found similar results in *Eruca sativa*. Moreover, it had significant positive correlation with FY and NSP at the phenotypic level only.

Table 2. Mean performance of rucola genotypes used in the study

Genotypes	DFF	PH	NLP	LL	LB	FY	DM	NSP	SL	PL	NSS	TSW	SYP
G1	81.33a	144.31a	17.87ab	28.85ab	6.717ab	86.40b	144.33a	117.00c	2.72b	0.49d	15.09d	0.53b	1.63c
G2	81.33a	134.59a	16.67b	27.64bc	6.76ab	70.38c	145.67a	100.72de	2.78b	0.46d	14.59d	0.43d	0.77e
G3	42.00c	76.45b	14.93bc	14.88d	1.44c	79.67b	80.33c	108.00cd	6.35a	1.83b	68.91a	0.09e	0.60e
G4	81.33a	130.85a	17.27ab	25.84c	6.52ab	85.00b	145.67a	95.60de	2.63b	0.44d	15.57d	0.39d	1.38cd
G5	40.67c	72.37b	16.4b	15.59d	1.57c	80.67b	88.33b	91.67e	6.41a	2.10a	51.81b	0.09e	0.58e
G6	80.00ab	139.08a	16.40b	27.41bc	7.12ab	85.00b	141.67a	101.40de	2.76b	0.46d	16.99d	0.47c	1.02de
G7	80.67ab	142.39a	18.07ab	28.35abc	6.87ab	86.67b	142.67a	142.67b	2.81b	0.53d	17.61d	0.50bc	1.72bc
G8	79.00b	144.36a	20.77a	30.37a	7.84a	125.20a	138.67a	173.47a	2.69b	0.55d	15.40d	0.49bc	2.21b
G9	31.33d	85.07b	11.80c	15.59d	5.9b	59.71d	78.33c	98.00de	6.47a	1.60a	24.64c	2.82a	6.69a
Grand mean	66.41	118.83	16.69	23.83	5.64	84.29	122.85	114.28	3.96	0.94	26.74	0.65	1.84

DFF, Days to 50% flowering; PH, Plant height (cm); NLP, Number of leaves per plant; LL, Leaf length (cm); LB, Leaf breadth (cm); FY, Fresh yield (g); DM, Days to maturity; NSP, Number of siliquae per plant; SL, Siliquae length (cm); PL, Pedicel length (cm); NSS, Number of seeds per siliqua; TSW, Thousand seed weight (g) and SYP, Seed yield per plant (g). Letters indicates significant differences among genotypes.

NLP had significant positive correlation with LL, FY, DM and NSP while significant negative correlation with SL, PL, 1000-seed weight (TSW) at both the genotypic and the phenotypic levels. LL had significant positive correlation with LB and DM whereas significant negative correlation with SL, PL and NSS at both the genotypic and the phenotypic levels. It had also significant positive correlation with FY and NSP at the phenotypic level only. LB had significant positive correlation with DM and NSP while significant negative correlation with SL, PL and NSS at both the genotypic and the phenotypic levels. DM had significant negative correlation with SL, PL and NSS at both the genotypic and the phenotypic levels. SL had significant positive correlation with PL and NSS at both the genotypic and the phenotypic levels. PL had significant positive correlation only with NSS at both the genotypic and the phenotypic levels. The rucola seed yield per plant (SYP) had a highly significant positive correlation with TSW at both the genotypic and the phenotypic level. It had a non-significant positive correlation with LB, NSP, Sl and PL at both the genotypic and the phenotypic levels. A similar result was reported by Banglian *et al.* (2014) and Shinwari *et al.* (2013) reported a non-significant positive correlation in *Eruca sativa*. The results disagreed with the finding of Gnanasekaran *et al.*, (2008) and Yol *et al.*, (2010) who observed negative and significance correlation of these traits with seed yield per plant in sesame. Moreover, SYP had significant negative correlation with DFF and NLP at the phenotypic level only. Plant breeders looks for genetic variation among plant characters to select desirable ones as the traits are correlated one with another and directly associated with yield, hence the correlation among these traits with yield would be helpful for selection suitable rucola genotypes in Bangladesh condition.

Table 3. Estimation of genetic parameters for different traits of rucola genotypes

Traits	GMS	CV (%)	σ^2_g	σ^2_P	σ^2_e	GCV	PCV	h^2_b	GA	GA (%)
DFF	1388.81**	1.74	462.49	463.83	1.34	32.38	32.43	99.71	44.24	66.62
PH	2907.09**	7.05	945.66	1015.78	70.12	25.88	26.82	93.10	61.12	51.44
NLP	17.77**	12.40	4.50	8.78	4.28	12.40	12.71	51.24	3.12	18.74
LL	125.92**	6.15	41.26	43.41	2.15	26.95	27.64	95.05	12. 90	54.12
LB	17.24**	18.48	5.39	6.47	1.08	41.17	45.13	83.24	4.36	77.38
FY	943.94**	6.19	305.55	332.82	27.26	20.74	21.64	91.81	34.50	40.93
DM	2805.18**	3.71	928.12	948.94	20.83	24.80	25.07	97.81	62.07	50.52
NSP	2186.60**	6.70	709.35	767.89	58.54	23.31	24.25	92.38	52.73	46.14
SL	10.15**	4.22	3.37	3.40	0.03	46.40	46.59	99.18	3.77	95.18
PL	1.42**	8.68	0.47	0.48	0.01	73.13	73.64	98.61	1.41	149.58
NSS	1172.25**	10.22	388.26	395.73	7.47	73.70	74.41	98.11	40.21	150.38
TSW	2.08**	3.85	0.693	0.694	0.001	128.97	129.02	99.91	1.72	265.56
SYP	10.82**	17.75	3.57	3.67	0.11	102.57	104.09	97.10	3.84	208.20

DFF, Days to 50% flowering; PH, Plant height (cm); NLP, Number of leaves per plant; LL, Leaf length (cm); LB, Leaf breadth (cm); FY, Fresh yield (g); DM, Days to maturity; NSP, Number of siliquae per plant; SL, Siliquae length (cm); PL, Pedicel length (cm); NSS, Number of seeds per siliqua; TSW, Thousand seed weight (g) and SYP, Seed yield per plant (g).

Table 4. Genotypic correlation among different traits of rucola genotypes

	DFF	PH	NLP	LL	LB	FY	DM	NSP	SL	PL	NSS	TSW
DFF												
PH	0.973**											
NLP	0.858**	0.776*										
LL	0.974**	0.984**	0.876 **									
LB	0.774*	0.941**	0.510	0.894**								
FY	0.485	0.495	0.986**	0.565	0.338							
DM	0.997**	0.982**	0.832**	0.983**	0.811**	0.444						
NSP	0.403	0.516	0.830*	0.560	0.454	0.845 **	0.362					
SL	-0.994**	-0.995**	-0.831**	-0.987**	-0.860**	-0.484	-0.999 **	-0.428				
PL	-0.959**	-0.991**	-0.684*	-0.966**	-0.930**	-0.372	-0.972**	-0.379	0.983**			
NSS	-0.746*	-0.869**	-0.442	-0.836**	-0.999**	-0.219	-0.807**	-0.298	0.820**	0.875**		
TSW	-0.444	-0.217	-0.753*	-0.295	0.244	-0.457	-0.374	-0.132	0.334	0.173	-0.231	
SYP	-0.434	-0.192	-0.617	-0.263	0.251	-0.308	-0.372	0.018	0.321	0.173	-0.234	0.985**

DFF, Days to 50% flowering; PH, Plant height (cm); NLP, Number of leaves per plant; LL, Leaf length (cm); LB, Leaf breadth (cm); FY, Fresh yield (g); DM, Days to maturity; NSP, Number of

Table 5. Phenotypic correlation among different traits of rucola genotypes

	DFF	PH	NLP	LL	LB	FY	DM	NSP	SL	PL	NSS	TSW
DFF												
PH	0.934**											
NLP	0.622**	0.596**										
LL	0.949**	0.966**	0.645**									
LB	0.707**	0.789**	0.292	0.773**								
FY	0.466*	0.472*	0.705 **	0.547**	0.291							
DM	0.986**	0.929**	0.575**	0.938**	0.752**	0.405*						
NSP	0.384*	0.494**	0.566**	0.534**	0.435*	0.797**	0.346					
SL	-0.988**	-0.956 **	-0.585**	-0.967**	-0.767**	-0.461*	-0.982**	-0.401*				
PL	-0.948**	-0.956**	-0.477*	-0.936**	-0.826**	-0.367	-0.949**	-0.369	0.9767**			
NSS	-0.738**	-0.826**	-0.308	-0.802**	-0.907**	-0.195	-0.799**	-0.289	0.805**	0.855 **		
TSW	-0.4423*	-0.210	-0.530**	-0.287	0.226	-0.439*	-0.370	-0.127	0.332	0.171	-0.228	
SYP	-0.429*	-0.189	-0.454*	-0.253	0.258	-0.281	-0.360	0.030	0.314	0.168	-0.219	0.971**

DFF, Days to 50% flowering; PH, Plant height (cm); NLP, Number of leaves per plant; LL, Leaf length (cm); LB, Leaf breadth (cm); FY, Fresh yield (g); DM, Days to maturity; NSP, Number of siliquae per plant; SL, Siliquae length (cm); PL, Pedicel length (cm); NSS, Number of seeds per siliqua; TSW, Thousand seed weight (g) and SYP, Seed yield per plant (g).

Conclusion

In the present study, genetic variability, heritability, genetic advance and correlation among yield and yield contributing trait of rucola genotypes were assessed which was newly introduced in Bangladesh by the research group of the Department of Genetics and Plant Breeding, SAU. The results suggest that the rucola genotypes is suitable for cultivation in Bangladesh. The genetic variability analysis showed that there was a significant variation among the studied genotypes for each character. The higher genotypic variance was found in days to 50% flowering, plant height, leaf length, fresh yield, days to 80% maturity, number of siliquae per plant and number of seeds per siliqua. The high broad sense heritability was detected for most of the evaluated traits except number of leaves per plant. Nevertheless, the high broad sense heritability with high genetic advance in percentage of mean were observed for days to 50% flowering, plant height, leaf length, leaf breadth, fresh yield, days to 80% maturity, siliquae length, pedicel length, number of seeds per siliqua, 1000-seed weight and seed yield per plant. Fresh yield of rucola leaves had a highly significant positive correlation with number of leaves per plant and number of siliquae per plant at the genotypic level, while number of leaves per plant, number of siliquae per plant and leaf length at the phenotypic level. Therefore, phenotypic selection would be effective for these traits. Further research can be carried out based on present findings for the genetic improvement of the novel health promoting crops in Bangladesh.

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Conflicts of Interest

The authors declare no conflicts of interest regarding publication of this manuscript.

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