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Correlation Analysis for Seed Yield and Its Contributing Traits in Isabgol Genotypes

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The present investigation was carried out at main experiment station Horticulture, Department of Horticulture, NDUA&T, Kumarganj, Faizabad (U.P.) to study the correlation analysis for seed yield and its contributing traits on 42 genotypes of Isabgol. The experiment was laid out during rabi season (2011-12) in randomized block design replicated twice with the plant spacing 30x10 cm. The study revealed that the seed yield per plant was highly significant and positively correlated with number of spike per plant (0.628), while it had significant and positively correlated with number of branches per plant (0.342). On the basis of genotypic and phenotypic correlation coefficient, which is good indicator for selection is can be concluded that to increase the seed yield per plant, the character number of spikes per plant must be considered because these characters had highly significant and positive correlation with seed yield per plant. Therefore, direct selection for number of spike per plant would be effective for seed yield improvement in Isabgol.

Keywords: Isabgol, Genotypic coefficient of variation and phenotypic coefficient of variation, Seed yield.

Isabgol (*Plantago ovata* Forsk.) is one of the most important and export potential medicinal crop of India, which is also known as Psyllium, Isabghula and 'Spogel' seeds. In Indian language, it is known as Isabgul, Issabagolu, Ispaghol, Isakol, Isphagol, etc. It belongs to family Plantaginaceae and is indigenous to the Mediterranean region and west Asia extending up to Sutlaj and Sindh in West Pakistan. In India it was introduced during the Mugal period and its commercial cultivation is mainly covered in Gujarat. However, the cultivation of Isabgol is spreading to other non-traditional part of the country such as Rajasthan, Haryana, Punjab, U.P., Maharashtra and Karnataka. At present the crop is grown in an area over 50,000 ha. At present India is the largest producer of Isabgol seed and husk, 90% of total production being exported all over the world. Although, it can be grown in all type of soils, but the light and well drained sandy loam having pH 7-8, has been found best for its successful cultivation and seed

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production. Since, the crop is recently introduced in the eastern region of Uttar Pradesh and found successfully to grow under marginal lands and rain fed conditions; however, among the cultural practices particularly identification of genotypes, suitable for eastern U.P. conditions is major limiting factor for its cultivation.

To exploit the potentiality of Isabgol several crop improvement programmes have been under taken. Yield is a complex character, which depends up on many independent contributing characters. Efforts are being made to increase its productivity by developing superior varieties. However, yield is a complex character; its direct improvement is difficult. Knowledge in respect of the nature and magnitude of associations of yield with various component characters is a pre – requisite to bring improvement in the desired direction. Yield is a polygenic character which highly influenced by the fluctuations in environment. A crop breeding programme, aimed at increasing the plant productivity requires consideration not only of yield but also of its components that have a direct or indirect bearing on yield. The necessity of coefficient of correlation to describe the degree of association between independent and dependent variables. Correlation studies further provide the characters essential for crop improvement effectively. Keeping, these in mind the present investigation was carried out.

MATERIALS AND METHODS

The present investigation was carried out at Main Experiment Station, Department of Horticulture, Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad (U.P.) to study the correlation analysis for seed yield and its contributing traits on 42 genotypes of Isabgol during the rabi season 2011-12 in randomized block design replicated twice with the plant spacing 30x10 cm. Agro –climatically the location of experiment site represents the humid climatic conditions having three climatic seasons i.e. summer, rainy, winter and this region falls under agro climatic zone namely Eastern plains. The soil of experiment was Sandy loam in texture with 7.9 pH and 0.29 EC, having low levels of nitrogen (165.1), medium in available phosphorous (32.31kg /ha) and potassium (266.1kg/ha). The healthy seed was sown at 30x10 cm spacing with the depth of 3 cm in the narrow furrow opened on 29th November, 2011. All the cultural practices were followed to maintain the good growth of crop. The crop was harvested when the spike turned reddish-brown colour and lower leaves dried up and start yellowing of upper leaves. The data were recorded on five randomly selected plants from each genotype in each replication for eight characters viz,. plant height, numbers of branches per plant, days taken to first emergence of spike, days taken to 50% flowering, number of spike per plant, test weight, number of seeds per spike and seed yield per plant. The mean values of the five selected plants in each treatment were used for statistical analysis. The experimental data recorded were statistically analysed the procedure suggested by Panse and Sukhatme (1967). Phenotypic and genotypic coefficients of correlation were computed by the method suggested by Al-Jibouri *et al.* (1958).

RESULTS AND DISCUSSIONS

The phenotypic and genotypic correlation coefficients were estimated among eight characters in 42 genotypes (Table 1 and 2) respectively. The phenotypic correlation includes a genotypic effect, which provides information about total association between the observable characters. Genotypic correlation provided a measure of genetic association between the characters and normally used in crop improvement , while environmental as well as genetic architecture of a genotype plays a great role in achieving higher yield combined with better quality. The correlation studies were carried out to reveal the nature and extent of association between seed yield, plant and spike growth and other related traits. Seed yield is economically important trait in crop improvement of Isabgol.

In the present investigation, the estimates of genetic correlation coefficient between all the characters studied, showed close parallelism in direction with their corresponding phenotypic correlation coefficients. The characters which showed negative correlation at genotypic levels are also showed negative correlation at phenotypic levels.

The seed yield per plant exhibited highly significant and positive phenotypic correlation with number of spike per plant (0.628), while it had significant and positive association with number of branches per plant (0.342). Rest of the association showed non-significant and positive correlation among themselves.

Days taken to 1st emergence of spike showed highly significant and positive phenotypic association with plant height (0.628) while, it had non-significant and positive correlation with rest of the characters. Days taken to 50% flowering showed highly significant and positive correlation with plant height (0.578) and days taken to 1st emergence of spike (0.902). Number of spike per plant showed significant and positive association with days taken to 1st emergence of spike (0.312) and days taken to 50% flowering (0.354).

The number of seeds per spike showed significant and positive correlation at phenotypic level with number of branches per plant (0.309), while it had showed non-significant and positive association with plant height (0.106) and days taken to 1st emergence of spike and other characters showed non-significant and negative correlation with days taken to 50% flowering and number of spike per plant at phenotypic level.

The test weight (1000 seeds) showed non-significant and positive value with plant height (0.007), number of branches per plant (0.193) and number of seeds per spike (-0.174), while other characters showed non significant and negative association at phenotypic level with days taken to 1st emergence of spike (-0.093), days taken to 50% flowering (-0.014) and number of spike per plant (-0.043).

During the selection, these characters must be taken care. The high estimates genotypic and phenotypic correlation coefficients in Isabgol were observed for the various characters are broadly agreement with reports of Harphool *et al.* (1995), Sangan *et al.* (1992), Sharma *et al.* (2002) and Sivanenson *et al.* (2009). The similar trends were also observed by Bhagat(1980) in Isabgol, Raghve et. al. (1992) in chrysanthemum, Anuradha (1998), and Chauhan (2005) in gerbera for most of the traits.

In general genotypic correlation coefficients were higher in magnitude than the corresponding phenotypic correlation coefficients which might be due to masking or modifying effect between these characters. The correlation coefficients at genotypic level were higher than phenotypic correlation coefficients, which might

Table. 1: Phenotypic correlation coefficient between eight characters in Isabgol (2011-12)

Characters	Plant height	Number of branches per plant	Days taken to1st emergence of spike	Days taken to 50% flowering	Number of spike per plant	Number of seed per spike	Test weight (1000-seeds)	Seed yield per plant
Plant height	-	0.233	0.628**	0.578**	0.237	0.106	0.007	0.033
Number of branches per plant		-	0.259	0.250	0.254	0.309*	0.193	0.342*
Days taken to 1st emergence of spike			-	0.902**	0.312*	0.004	-0.093	0.001
Days taken to 50% flowering				-	0.354*	-0.011	-0.014	0.456
Number of spike per plant					-	-0.091	-0.043	0.628**
Number of seed spike						-	-0.174	0.189
Test weight (1000-seeds)							-	0.218
Seed yield per plant								-

*, ** = Significant at 0.05 % and 0.01 % probability level, respectively.

Table 2: Genotypic correlation coefficient between eight characters in Isabgol (2011-12)

Characters	Plant height	Number of branches per plant	Days taken to 1st emergence of spike	Days taken to 50% flowering	Number of spike per plant	Number of seed per spike	Test weight (1000-seeds)	Seed yield per plant
Plant height	-	0.310	0.637	0.609	0.248	0.111	0.005	0.031
Number of branches per plant		-	0.330	0.325	0.165	0.405	0.278	0.304
Days taken to 1st emergence of spike			-	0.957	0.327	-0.006	0.094	-0.003
Days taken to 50% flowering				-	0.353	-0.041	-0.015	0.059
Number of spike per plant					-	-0.098	-0.035	0.646
Number of seed spike						-	0.181	0.224
Test weight (1000-seeds)							-	0.245
Seed yield per plant								-

be due to masking effect of environment in the total expression of genotypes resulting in reduced phenotypic association.

CONCLUSION

The estimates of genotypic correlation coefficient between eight characters showed close parallelism in direction with their corresponding phenotypic correlation coefficient. The genotypic correlation in general, higher in magnitude than the corresponding phenotypic correlation coefficients. On the basis of genotypic and phenotypic correlation coefficient, which is good indicator for selection is can be concluded that to increase the seed yield per plant, the character number of spikes per plant must be considered because these characters had highly significant and positive correlation with seed yield per plant. We concluded that number of spikes per plant is an important character improvement of seed yield in Isabgol. Other characters such as number of branches per plant and number of seeds per spike can also be consider during breeding programme, while the character should be in proper combination attain ideal seed size and other seed qualities. Therefore, direct selection for these characters would be effective for seed yield improvement in Isabgol.

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