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Research Article

CORRELATION STUDIES ON YIELD AND ITS COMPONENTS IN ISABGOL (*Plantago ovata* Forsk)

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Abstract- Simple genotypic correlation coefficients were calculated from eight genotypes of isabgol (*Plantago ovata* Forsk) during rabi season (2014-2015). Experiment was laid out in a randomized block design with three replications at the Medicinal Plants Unit, Botanical Garden, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India. Unhusked seed yield exhibited positive and significant correlation with number of tillers plant^{-1}, dry matter accumulation, spike length, number of spikes plant^{-1} and number of seeds spike^{-1} whereas plant height, number of leaves plant^{-1} and days taken for 50 % flowering exhibited negative and non-significant correlation with unhusked seed yield. These correlated yield components suggested that it may be good selection criteria to improve seed yield of isabgol crop.

Keywords- *Plantago ovata*, seed yield, Correlation coefficient.

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Introduction

Isabgol (*Plantago ovata* Forsk) is an important medicinal crop and ayurvedic herbs. Isabgol (*Plantago ovate* Forsk) (2n=8) belonging to family 'Plantaginaceae' was introduced into India from West Asia during Moghul period. Out of 200 species of this genus, only ten species occur in India [10].

Medicinally important part of isabgol is mucilage, which is a polysaccharide coating on the seed. It is a popular medicine in Ayurvedic and Unani systems for treating problems like constipation, chronic diarrhea, dysentery, reducing cholesterol and treatment of cancer. The seed of *Plantago* is commonly recommended for the treatment of chronic amoebic dysentery.

The production of isabgol in India on commercial scale though had been started during the last four decades; its cultivation is largely confined to north- west India and especially in Gujarat followed by Rajasthan, Punjab and Haryana.

This region is noted for the presence of favorable climatic conditions and cropping systems suitable for growing isabgol as a winter- season crop, which made Gujarat as a major producer of isabgol husk and seed in India Dinesh kumar and Jha, 2000 [4]. Recently, other parts of India, especially Maharashtra and Karnataka have introduced isabgol but is yet to be popularized on a larger scale.

Correlation studies give an idea about the contribution of different characters to seed yield. Therefore, the present study was undertaken to assess the correlation coefficient of various desirable characters in eight genotypes of isabgol, which will help in isolating promising lines for hybridization programmes and to explore yield potential of isabgol.

Materials and Methods

The present study was carried out during Rabi season (November 2014 to March 2015) at the Medicinal Plants Unit, Botanical Garden, Tamil Nadu Agricultural University, Coimbatore. Eight promising genotypes of isabgol were collected from Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat and sown in Rabi season of 2014- 2015 [Table-1]. Randomized Block Design with three replication was used for experiment.

Table-1 *Isabgol (Plantago ovata Forsk.) genotypes investigated for study and their source of collection*

Genotypes	Source
Niharika	DMAPR, Anand, Gujarat
DPO-1	DMAPR, Anand, Gujarat
DPO-4	DMAPR, Anand, Gujarat
DPO-14	DMAPR, Anand, Gujarat
GI-2	DMAPR, Anand, Gujarat
DPO-174	DMAPR, Anand, Gujarat
DPO-186	DMAPR, Anand, Gujarat
DPO-385	DMAPR, Anand, Gujarat

DMAPR stands for Directorate of Medicinal and Aromatic Plants Research

Agro-morphological observations were recorded on five randomly selected plants on each accession per replication for days taken for sprouting, germination percentage, plant height (cm), number of tillers plant^{-1}and number of leaves plant^{-1} Were recorded. The physiological attributes like Leaf Area (cm^2), Leaf Area Index, Crop Growth Rate (g m^{-2}day^{-1}), Chlorophyll content (mg g^{-1}) and Dry Matter Accumulation (q ha^{-1}) were recorded at different growth stages of the crop. The yield components such as days taken for 50 % flowering, length of spike (cm), number of spikes plant^{-1}, number of seeds spike^{-1}, seed yield plant^{-1} (g plant^{-1}), unhusked seed yield hectare^{-1} (kg ha^{-1}), husk yield hectare^{-1} (kg ha^{-1}), seed to husk ratio, test weight (g) and harvest index (%) were recorded. The quality attributes *viz.,* swelling factor (cc g^{-1}), protein content (mg g^{-1}), fibre content (%) and ascorbic acid (mg 100g^{-1}) were analyzed after harvest. Correlation coefficients for yield and other traits in all the 8 genotypes were worked out as suggested by Johnson, *et al*.,1955 [6].

Results and Discussion

The seed yield exhibited positive significant correlation at genotypic levels for number of seeds spike^{-1}, number of spikes plant^{-1}, number of tillers plant^{-1}, dry matter accumulation and length of spike. Similar observations were recorded by Bhagat, 1980 [2]; Lal, *et al*., 1999 [8] and Aher and Aher, 2013 [1] in *Plantago ovata* where they found that there was positive correlation between yield and yield associated characters in isabgol [Table-2]. The characters like plant height, number of leaves and days taken for 50 per cent flowering were negatively correlated with unhusked seed yield in the present study. Similar observations were made by Maurya and Sinha, 1989 [10] in fenugreek, Dinesh and Jha, 2000 [4] *in Plantago ovata*, Khan *et al*., 2010 [7] and Rameez Iftikhar, *et al*.,2012 [5] in wheat where they found that plant height was negatively correlated with yield. Bhagyalakshami, *et al*., 1990 [3] found that there was negative correlation between days taken for 50 % flowering and seed yield in chilli. Their conclusions generally are in agreement with the results of the present study. This suggests that productive seed yield is the most important selection criterion for improving the isabgol productivity.

Table-2 *Genotypic correlation coefficient analysis for yield and yield attributing traits in isabgol (Plantago ovata) genotypes*

	Plant Height	Number of leaves per plant	Number of tillers per plant	Dry matter accumulation	Days taken for 50 % flowering	Length of spike	Number of spikes per plant	Number of seeds per spike	Unhusked seed yield per hectare	Husk yield per hectare	Test weight	Harvest index	Swelling factor
Plant Height	1	0.591	0.014	-0.223	0.222	0.106	-0.303	-0.22	-0.188	-0.381	0.058	-0.361	-0.451
Number of leaves per plant		1	-0.342	-0.589	0.698	-0.56	-0.684	-0.623	-0.64	-0.614	-0.086	-0.668	-0.556
Number of tillers per plant			1	0.655	-0.412	0.689	0.844**	0.823*	0.882**	0.828*	0.842**	0.773*	0.836**
Dry matter accumulation				1	-0.362	0.806*	0.720*	0.890**	0.867**	0.823*	0.448	0.458	0.740*
Days taken for 50 % flowering					1	-0.445	-0.508	-0.625	-0.474	-0.493	-0.181	-0.514	-0.546
Length of spike						1	0.607	0.726*	0.822*	0.776*	0.611	0.445	0.601
Number of spikes per plant							1	0.862**	0.902**	0.767*	0.508	0.936**	0.794*
Number of seeds per spike								1	0.931**	0.859**	0.512	0.680	0.854**
Unhusked seed yield per hectare									1	0.903**	0.621	0.767*	0.820*
Husk yield per hectare										1	0.757*	0.662	0.946**
Test weight											1	0.488	0.747*
Harvest index												1	0.712*
Swelling factor													1

Conclusion

The present experiment reveals that the yield components such as seeds spike^{-1}, number of spikes plant^{-1}, number of tillers plant^{-1}, dry matter accumulation and length of spike have positive correlation with yield. The characters like plant height, number of leaves and days taken for 50 per cent flowering were negatively correlated with unhusked seed yield in the present study.

Application of Research: As isabgol is geographically oriented in Rajasthan, Gujarat, Madhya Pradesh areas, we studied the correlation aspects to select the highest yielding cultivar in Coimbatore condition. Further these selections should be analyzed for few more seasons.

Research Category: Medicinal and Aromatic Crops

Abbreviations:
LA- Leaf Area
LAI- Leaf Area Index
CGR Crop Growth Rate

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References

[1] Aher A.R. and Aher B.M. (2013) *Bioinfolet.,* 10(3 A), 822-827.
[2] Bhagat N. R. (1980) *Crop Improv*., 7, 60-63.
[3] Bhagyalakshmi P.V., C. Ravishankar D. Subrahmanyam and V.G. Babu. (1990) *South Indian Hort*., 38, 15-17.
[4] Dinesh Kumar and Jha B. K. (2000) *Indian J. Hort*., 57(3), 264-267.
[5] Iftikhar R., Khaliq I., Ijaz M. and Rashid M.A.R. (2012) *American- Eurasian J. Agric. & Environ. Sci*., 12 (3), 389-392.
[6] Johnson H.W., Robinson H.F. and Comstock R.E. (1955) *Agronomy J*., 47, 314–318.
[7] Khan A.J., Azam F. and Ali A. (2010) *Pak. J. Bot*., 42(1),259-267.
[8] Lal R.K., Sharma J.R. and Misra H.O. (1999) *J. of Medicinal and Aromatic Pl. Sci*., 21, 34-37.
[9] Maurya K. R. and Sinha R.P. (1989) *Ind. Cocoa Arec. Spices J.,* XIII, 55–57.
[10] Trease G.E. and Evans W.C. (1978) *Pharmacognosy 11th Ed. Cassell and Coller Mac Millan Publishers, London.*