www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(4): 746-747

www.thepharmajournal.com
Received: 04-02-2021
Accepted: 18-03-2021

Navneet Singh
Research Scholar, Department of Vegetable Science, ANDUA and T, Kumarganj, Ayodhya, Uttar Pradesh, India

VP Pandey
Professor, Department of Vegetable Science, ANDUA and T, Kumarganj, Ayodhya, Uttar Pradesh, India

Shaunak Singh
Department of Vegetable Science, ANDUA and T, Kumarganj, Ayodhya, Uttar Pradesh, India

Shivendra Pratap Singh
Research Scholar, Department of Genetics and Plant Breeding, ANDUA and T, Kumarganj, Ayodhya, Uttar Pradesh, India

Pooshpendra Singh Dixit
SRF, Department of Vegetable Science, CSAUA and T, Kalyanpur, Kanpur, Uttar Pradesh, India

Corresponding Author:
Navneet Singh
Research Scholar, Department of Vegetable Science, ANDUA and T, Kumarganj, Ayodhya, Uttar Pradesh, India

Studies on character association and path analysis in ajwain (*Trachyspermum ammi* L.)

Navneet Singh, VP Pandey, Shaunak Singh, Shivendra Pratap Singh and Pooshpendra Singh Dixit

Abstract
The present investigation was conducted during December, 2017 to May, 2018 at Main Experimental Station of Vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya (U.P.). The field experiment was laid out in Agumented Block Design with 60 genotypes along with four check to estimate correlation and path coefficient for ten yield contributing traits and identification of superior recombinants for their utilization in crop improvement programme. Most important traits yield per plant had exhibited highly significant and positive correlation exerted by germination % (0.50373) followed by days to maturity (0.40709), weight of grain per umbel (0.2797). However, negative direct effect was found in days to 50% flowering (-0.2151) and plant height (-0.0313) on fruit yield per plant. Direct contribution of these traits indicates the scope of improvements through selection for number of umbels per plant and yield per plant in the available germplasm.

Keywords: Ajwain *Trachyspermum ammi* L., correlation, path analysis, augmented block design

Introduction
India is well known as "land of spices" among the world since long back. We have been cultivating precious species for fulfilled our various needs since ages. The seed spices have emerged as one of the most important group of spice crop of our country. India is the largest producer, consumer and exporter of seed spices in the world. Ajwain plays a major role in the group of seed spices. Moreover, references are also available with regard to Indian spices and their uses in Vedas (6000 B.C.) & by Manu (4000 B.C.).

Ajwain, (*Trachyspermum ammi* L.) is one of the most important seed spice crop belongs to the family Apiaceae and having chromosome no. 2n = 2x = 18. It is also known as Bishop's weed and Yamini in Sanskrit it cultivated mainly for seed, herb and volatile oil. It originated in the eastern Mediterranean region, extensively grown in Iran, Egypt, Afghanistan and chiefly in India. India is the largest producer and exporter and consumer of the ajwain seed in the world. In India, during the year 2017-2018 area under the ajwain crop is 31 mha and production and productivity is 27 metric tons and 0.87 kg/ha respectively. (Anonymous, 2017-18) [1].

Constituents present in the seeds include-sugars, tannins and glycosides. Oil of ajwain is a colorless to brownish liquids, processing a characteristics odour and a sharp burning taste. On standing, a part of the thymol may separate from of crystal, which is sold in Indian market under the name of "Ajwain ka phul" or "Satt Ajwain" and it much valued in medicine as it has nearly all the properties of ajwain seeds. The seeds are aromatic which acts as stimulants and are carminative. They are used as medicine in certain disease like cholera, bite, nervous disorder, cough and cold, dysentery, diarrhea, hysteria and spasmodic infections of bowels. Externally ajwain is applied in mixtures to relive rheumatic and neurologic pains. A tea-spoonful of seeds with a little salt is a common domestic remedy for indigestion from irregular diet. For stomach, cough and in digestion, the seeds are masticated, swallowed and this is followed by a glass of hot water. They are also useful in skin diseases. The leaves are used as a vermicide. Even the roots of ajwain plant are reported to be diuretic and carminative. The leaves are reported to have diuretics properties here as, roots are a purgative. The oil is widely used as flavoring agent in liquors and culinary preparation. It is also used in cosmetics and medicinal preparation like infantile colic and flatulence. It considered as a good vermicides against hookworm. Thus, ajwain is one of the most valuable spices for use in medicine, thereby improving diuretic properties. Oleic and linoleic acid forms the dominant fatty acids. The main constituent of ajwain oil is anethole.

Yield is the final product of various characters, which directly or indirectly influence the growth of plant. The correlation coefficient gives an idea about the various associations existing between the yield and yield components. It only reveals the direction and magnitude of association between any two characters but the path coefficient analysis helps in partitioning the correlation into direct and indirect effects of various yield and yield component. The theory of path coefficient for statistical analysis of causes and effects, which gives critical examination of specific forces to produce a correlation. Therefore, correlation studies coupled with path coefficient analysis are powerful tool to study the character association and their final impact on yields, which help the selection procedure accordingly.

Materials and Methods

The present investigation entitled "Assessing genetic variability and association studies in Ajwain (*Trachyspermum ammi* L.)" was carried out during Rabi season of 2017-18 at Main Experiment Station (Vegetable Research Farm), Narendra Nagar (Kumarganj), Ayodhya (U.P.) India. The experiment findings during the course of investigation are being presented in this chapter. Details of the method and techniques followed in the experiment are given below. Geographically Narendra Nagar falls under humid sub-tropical climate and is located in between 24.470 and 26.560 N latitude and 82.120 and 83.980 E longitude at an altitude of 113 m above the mean sea level in the Gangetic Alluvial Plains of Eastern Uttar Pradesh.

A path coefficient is a standardized partial regression coefficient. It measures the direct and indirect effects of one variable on the other and allows partitioning of the total correlation coefficient between two variables into direct and indirect components. The estimates of direct and indirect effects were calculated by the path coefficient analysis as suggested by Wright (1921) [8] and elaborated by Dewey and Lu (1959) [2] at both phenotypic and genotypic levels.

Result and Discussion

In the present study the direct effect of several components on seed yield per plant was estimated. A perusal of Table 1 indicated the simple path effect of different characters on seed yield per plant at phenotypic level. The maximum positive direct effect on fruit yield per plant was exerted by germination % followed by days to maturity, weight of grain per umbel. However, negative direct effect was found in days to 50% flowering and plant height on fruit yield per plant resulted substantial negative direct effect on seed yield per plant with having residual effect. The present findings are supported by Sharma *et al.* (2008) [7], Gurpuz (2001) [5], Garg *et al.* (2003) [3], Lal *et al.* (2007) [6] and Ghanshyam *et al.* (2015) [4].

Regarding indirect contribution of traits characters like germination %, days to maturity and weight of grain per umbel via yield per plant. Test weight followed by plant height, number of umbels per plant exerted substantial indirect effect via days to maturity. The maximum positive direct effect on fruit yield per plant was exerted by germination % (0.50373) followed by days to maturity (0.40709), weight of grain per umbel (0.2797). However, negative direct effect was found in days to 50% flowering (-0.2151) and plant height (-0.0313) on fruit yield per plant. Indirect contribution of traits characters like germination % (0.353), days to maturity (0.212) and weight of grain per umbel (0.209) via yield per plant. Test weight (0.2298) followed by plant height (0.1911), number of umbels per plant (0.1170) exerted substantial indirect effect via days to maturity resulted substantial negative direct effect on seed yield per plant with having residual effect (0.334).

Table 1: Simple path analysis for ten characters in ajwain

Characters	Germination %	Days of 50% flowering	No. of branches/plant	No. of umbels/plant	No. of umblets/umble	Wt. of grain/umble (g)	Plant height (cm)	Days to maturity	Test weight (g)	r with yield/plant (g)
Germination %	0.50373	-0.04120	0.00168	-0.00168	-0.00585	-0.04392	0.00479	-0.06466	0.00002	0.353
Days of 50% flowering	0.09648	-0.21512	0.01022	0.00431	-0.02181	-0.09857	-0.01058	0.08632	-0.00001	-0.149
No. of Branches/plant	0.00934	-0.02422	0.09080	0.01132	-0.01816	-0.04634	-0.00642	-0.05538	0.00002	-0.039
No. of Umbels/plant	-0.05638	-0.06178	0.06854	0.01499	-0.01292	-0.04552	-0.01434	0.11704	-0.00001	0.010
No. of Umblets/Umble	-0.03369	0.05362	-0.01884	-0.00221	0.08751	0.02408	0.00069	-0.01251	-0.00002	0.099
Wt. of grain/Umble (g)	-0.07909	0.07581	-0.01504	-0.00244	0.00753	0.27972	0.00701	-0.06428	-0.00001	0.209
Plant height (cm)	-0.07710	-0.07270	0.01861	0.00687	-0.00194	-0.06263	-0.03130	0.19117	-0.00003	-0.029
Days to maturity	-0.08001	-0.04561	-0.01235	0.00431	-0.00269	-0.04417	-0.01470	0.40709	-0.00005	0.212
Test weight (g)	-0.15234	-0.03903	-0.02167	0.00215	0.02337	0.04324	-0.01086	0.22982	-0.00008	0.075

References

1. Anonymous. Horticulture data base. National Horticulture Board, Ministry of Agriculture, Gurgaon, Haryana 2017-18.
2. Dewey DR, Lu KH. A correlation and path coefficient analysis of components of crested wheat grass seed productin. Agron. Journal 1959;51:515-518.
3. Garg VK, Shukla S, Singh PK. Genetic association in fennel grown in sodic soil. Journal Spices and Aromatic Crops 2003;12(2):171-173.
4. Ghanshyam, Dodiya NS, Sharma SP, Jain HK, Dashora A. Assessment of genetic variability, correlation and path analysis for yield and its components in azwain (*Trachyspermum ammi* L.). Journal Spices and Aromatic Crops 2015;24(1):43–46.
5. Gurpuz B. Correlation and path analysis among yield components in winter resistant coriander (*Coriandrum sativum* L.) lines. Journal Agrculture Science 2001;71(11):730-732.
6. Lal RK. Association among agronomic traits and path analysis in fennel (*Foeniculum vulgare* Mill.). Journal Sustai. Agriculture 2007;30:21-29.
7. Sharma KC, Sastry EVD. Path analysis for seed yield and its component characters in fenugreek (*Trigonella foenum-graecum* L.). Journal of Spices and Aromatic Crops 2008;17(2):69-74.
8. Wright S. Correlation and causation. Journal Agriculture Research 1921;20:557-585.