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M Jayanth Kumar
Ph.D., Scholar, Department of Vegetable Science, Kittur Rani Channamma College of Horticulture, University of Horticultural Sciences, Bagalkote, Arabhavi, Karnataka, India

Dr. G Kranthi Rekha
Assistant Professor, Department of Vegetable Science, College of Horticulture, Dr. Y.S.R. Horticultural University, Venkataramannagudem, West Godavari, Andhra Pradesh, India, India

Dr. C Venkata Ramana
Senior Scientist, Department of Horticulture, Horticultural Research Station, Dr. Y.S.R. Horticultural University, Lam, Guntur, Andhra Pradesh, India, India

Dr. A Rajani
Senior Scientist, Department of Horticulture, Horticultural Research Station, Dr. Y.S.R. Horticultural University, Lam, Guntur, Andhra Pradesh, India, India

Dr. DR Salomi Suneetha
Professor,
Department of Biochemistry, Dean of Student Affairs, Dr. Y.S.R. Horticultural University, Venkataramannagudem, West Godavari, Andhra Pradesh, India

Corresponding Author:
M Jayanth Kumar
Ph.D., Scholar, Department of Vegetable Science, Kittur Rani Channamma College of Horticulture, University of Horticultural Sciences, Bagalkote, Arabhavi, Karnataka, India

Correlation and path analysis for growth, yield and quality traits in snake gourd (*Trichosanthes anguina* L.)

M Jayanth Kumar, Dr. G Kranthi Rekha, Dr. C Venkata Ramana, Dr. A Rajani and Dr. DR Salomi Suneetha

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Abstract
In late Kharif 2021–22, a Randomized Block Design was employed to cultivate thirty-two genotypes of snake gourd for the purpose of assessing correlation coefficient and path coefficient analysis. The correlation coefficient analysis revealed a notable and positive correlation between various traits such as fruit yield per vine, number of fruits per vine, flesh thickness, fruit set percentage, fruit length, average fruit weight, number of female flowers per vine, number of seeds per fruit, and TSS at both phenotypic and genotypic levels. Path analysis further indicated significant positive direct effects at the genotypic level, particularly from node to first female flower, number of female flowers per vine, fruit set percentage, fruit girth, average fruit weight, number of seeds per fruit, and fibre content. At the phenotypic level, average fruit weight and number of fruits per vine also exhibited significant positive direct effects. Based on the comprehensive findings of this study, it was concluded that in the selection of superior genotypes, priority should be given to fruit yield per vine, followed by number of female flowers per vine, average fruit weight, and fruit set percentage.

Keywords: Snake gourd, Genotypes, Correlation, Path co-efficient analysis

Introduction

The vegetable crop known as snake gourd (*Trichosanthes anguina* (L.) 2n=2x=22) is an annual, herbaceous, climbing kind. It is a member of the tribe Trichosantheae, sub-family Cucurbitoideae, and family Cucurbitaceae. Its birthplace is the Indo-Malayan area. *Trichosanthes anguina's* progenitor is thought to have been the wild species of the plant. It is extensively dispersed throughout Asia, spanning China and Japan in one direction and Malaya to North Australia in another. Currently, Mauritius and Central and East Java are also home to snake gourd cultivation. The majority of India's cultivation takes place in South India; however, it is also grown in Punjab, Delhi, Uttar Pradesh, Bihar, Gujarat, and other regions.

According to Ahmed *et al*. (2000) [1], it is an excellent source of minerals, fiber, and nutrients that make the food nutritious and healthful. Protein (0.5%), fat (0.3%), minerals (0.5%), fiber (0.5%), and carbs (3.3%) are all present in significant amounts in it. Because of the high concentration of flavonoids, carotenoids, phenolic acids, etc., it has therapeutic significance. According to Ojiako and Igwe (2008) [8], the main mineral elements are potassium (121.6 mg/100 g), phosphorus (135 mg/100 g), sodium, magnesium, and zinc. The plant is utilized in Ayurvedic and Siddha medicinal practices in addition to its pharmacological and therapeutical qualities, which include anti-diabetic, hepatoprotective, cytotoxic, and anti-inflammatory effects. Snake gourd typically yields more per unit area, yet its average production in India lags behind that of neighbouring countries, limited to a mere 3-4 months annually. Despite its economic and medicinal significance, there has been insufficient focus on tailored crop enhancement programs, resulting in stagnant productivity and limited acceptance. Enhancing vegetable productivity hinges greatly on varietal enhancements, particularly in selecting genotypes for improved yield and quality. Snake gourd, a monoecious and predominantly cross-pollinated crop, boasts numerous cultivars with diverse fruit sizes, shapes, and colors in India.

Beyond its nutritional value, it enjoys significant market demand. Given its nutritional and medicinal importance, there's a pressing need for enhancement efforts. The identification of improved varieties showcasing high yield and quality, alongside broader adaptability, would offer substantial benefits to farmers.

Materials and Methods

The study was carried out at the Dr. Y.S.R. Horticultural University's College of Horticulture in Venkataramannagudem, West Godavari District. The study took place in the latter half of the 2021–22 kharif season, with a Randomized Block design that was duplicated twice. The growth yield and quality parameters of thirty-two snake gourd genotypes were assessed. Genotypes were obtained from the Thrissur NBPGR regional station. For the crop to develop healthily, the experimental site was well-prepared, and cultural practices such as training, pruning, weeding, irrigation, fertilizer application, and plant protection measures were followed. Up to four months after planting, observations on the growth factors were kept track of. At the right times, data on yield and yield characteristics were gathered.

Data analysis

The correlation coefficient was computed to ascertain the relationship between characteristics and yield as well as between the yield components. After Al-jibouri *et al.* (1958) [6], correlation coefficients were calculated. Using the phenotypic correlation values of yield components on yield, as recommended by Dewey and Lu (1959) [4], path coefficient analysis was performed. With the use of statistical software programs such as INDOSTAT, standard path coefficients standardized partial regression coefficients - were produced.

Results and Discussion

The correlation coefficient serves as a basis for choosing a preferred plant type by indicating the relationship between two traits. It makes it possible to recognize characters, or combinations of characters, that may be valuable as a high yield indication. Research on the relationship between component characteristics and yield might help in designing a successful selection process. Through their correlations, the study's twenty characters' interrelationships were determined (Fig. 1&2, Table 1&2). The correlation coefficient indicated that there was a significant and positive correlation between fruit yield per vine and number of fruits per vine (r_g= 0.528, r_p= 0.517), flesh thickness (r_g= 0.629, r_p= 0.518), fruit set percentage (r_g= 0.506, r_p= 0.476), fruit length (r_g= 0.288, r_p= 0.289), average fruit weight(r_g= 0.814, r_p= 0.799), number of female flowers per vine (r_g= 0.769, r_p= 0.609), number of seeds per fruit (r_g= 0.384, r_p= 0.373) and TSS (r_g= 0.351, r_p= 0.288) at phenotypic and genotypic levels. Similar results were obtained by Padmaraja (2011) [9], Khan *et al.* (2016) [7] and Sivabhodh (2018) [11] in snake gourd and Sravani (2021) in ridge gourd.

The characters that showed significant negative association with fruit yield per vine at phenotypic and genotypic levels were days to first female flower opening (r_g= -0.354, r_p= -0.325), days to first male flower opening (r_g= -0.403, r_p= -0.378), node of first female flower (r_g= -0.497, r_p= -0.408) and sex ratio (r_g= -0.818, r_p= -0.513). This indicates that the improvement in these traits may result in decrease the fruit yield per vine. These findings are in agreement with the results reported by Padmaraja (2011) [9] and Sivabhodh (2018) [11] in snake gourd and are contradictory with the findings Khan *et al.* (2016) [7] in snake gourd.

Path coefficient analysis dissects correlation coefficients into direct and indirect effects to gauge the relative importance of each trait. Since yield is a complex polygenic trait, direct selection may not be reliable due to its susceptibility to environmental influences. Thus, it becomes crucial to pinpoint the specific traits that could lead to yield improvement. While correlations provide insights into the constituents of yield, they fail to offer a precise understanding of the direct and indirect contributions of these traits. Therefore, combining correlation with path analysis offers a more comprehensive view of the cause-and-effect relationship between different traits (Wright, 1921) [13]. The findings of the present study, as presented in Tables 3 and 4, indicate that the R-values were 0.156 and 0.128 at the genotypic and phenotypic levels, respectively. This suggests that 99.84% and 99.87% of the variation in the dependent variable can be explained by the independent variables studied (Figures 3 and 4). Path analysis reveals significant positive direct effects at the genotypic level for traits such as node to first female flower (0.265), number of female flowers per vine (0.835), fruit set percentage (1.590), fruit girth (0.493), average fruit weight (0.805), number of seeds per fruit (0.557), and fiber content (0.225). Similarly, at the phenotypic level, significant positive direct effects were observed for average fruit weight (0.821) and number of fruits per vine (0.488).These results were in accordance with the findings of Padmaraja (2011) [9], Rana and Pandit (2011) [10], Khan *et al.* (2016) [7] and Sivabhodh (2018) [11] in snake gourd, Bharathi *et al.* (2005) [3] in spine gourd and Ahmed *et al.* (2005) [2] and Husna *et al.* (2011) [5] in bottle gourd.

At the genotypic level, notable negative direct impacts were evident in flesh thickness (-0.356) and the number of fruits per vine (-1.592). Conversely, a significant positive correlation coefficient (0.821) was observed between average fruit weight and fruit yield per vine. This correlation was influenced by high positive indirect effects from fruit length (0.419) and flesh thickness (0.302), but was negatively impacted by factors such as days to first male flower opening (-0.304), node to first female flower (-0.444), and sex ratio (-0.310). Moderate positive indirect effects were noted from the number of female flowers per vine (-0.248) and the number of seeds per fruit (0.239), with low positive effects from TSS (0.143). Conversely, days to first female flower opening (-0.102), vitamin C content (-0.148), and acidity content (-0.162) exhibited negative indirect effects, while other factors showed negligible contributions at the genotypic level. At the phenotypic level, a high positive indirect effect was observed from fruit length (0.403), countered by negative effects from node to first female flower (-0.360). Moderately positive indirect impacts were seen from days to first male flower opening (0.294), the number of female flowers per vine (0.201), flesh thickness (0.281), and the number of seeds per fruit (0.233). Conversely, low negative indirect effects were noted from the sex ratio (-0.192), vitamin C content (-0.118), and acidity content (-0.149), while other factors made minimal contributions overall. This analysis highlights varying degrees of influence among different traits on fruit yield, with some exerting more significant effects than others.

Table 1: Genotypic correlation coefficients for different characters of snake gourd genotypes

Character	DFMO	DFFO	NFMF	NFFF	NMFV	NFFV	SR	FS	FL	FG	AFW	FT	NSPF	NFPV	VC	AC	K	TSS	FC	FYPV
DFMO	1.00	0.279*	-0.269*	0.110	0.363**	-0.266*	0.369**	-0.032	-0.109	-0.042	-0.377**	-0.754**	-0.677**	-0.012	-0.057	-0.234	0.098	0.126	0.026	-0.403**
DFFO		1.00	0.316*	-0.106	-0.069	-0.447**	0.467**	-0.444**	-0.041	-0.172	-0.126	-0.303*	-0.340**	-0.411**	0.708**	0.086	-0.011	-0.278*	0.189	-0.354**
NFMF			1.00	0.483**	-0.317*	-0.126	-0.019	-0.256*	0.198	-0.127	-0.005	0.295*	0.069	-0.245	0.035	-0.032	-0.111	-0.262*	-0.074	-0.105
NFFF				1.00	0.184	-0.513**	0.799**	0.077	0.033	-0.201	-0.551**	-0.337**	-0.400**	-0.043	-0.131	-0.175	0.313*	0.039	0.051	-0.497**
NMFV					1.00	-0.083	0.339**	0.081	0.099	-0.257*	-0.057	-0.473**	-0.116	0.036	0.054	0.084	0.172	0.038	0.179	-0.084
NFFV						1.00	-0.958**	0.769**	-0.194	0.510**	0.308*	0.628**	0.299*	0.884**	-0.216	0.102	0.205	0.237	0.285*	0.769**
SR							1.00	-0.776**	0.361**	-0.602**	-0.384**	-0.854**	-0.397**	-0.830**	0.394**	-0.023	-0.073	-0.212	-0.123	-0.818**
FS								1.00	-0.291*	0.378**	-0.041	0.404**	0.056	0.941**	0.081	-0.181	0.071	0.378**	-0.079	0.506**
FL									1.00	-0.656**	0.520**	-0.077	0.128	-0.304*	-0.212	0.013	-0.079	-0.080	0.367**	0.288*
FG										1.00	-0.120	0.493**	-0.052	0.493**	0.163	-0.342**	-0.016	0.127	-0.226	0.119
AFW											1.00	0.374**	0.297*	-0.356**	-0.183	-0.201	-0.080	0.178	0.057	0.814**
FT												1.00	0.655**	0.443**	0.268*	-0.121	-0.113	0.119	0.000	0.629**
NSPF													1.00	0.095	0.271*	0.130	-0.018	0.199	0.098	0.384**
NFPV														1.00	-0.012	-0.123	0.130	0.357**	0.165	0.528**
VC															1.00	0.114	-0.464**	0.053	0.234	-0.101
AC																1.00	-0.107	-0.443**	0.174	-0.174
K																	1.00	0.074	-0.288*	-0.002
TSS																		1.00	0.222	0.351**
FC																			1.00	0.108

*Significant at 5% level **significant at 1% level

DFMO	Days to first male flower opening	FL	Fruit length (cm)	K	Potassium (mg/100 g)
DFFO	Days to first female flower opening	FG	Fruit girth (cm)	TSS	TSS (ºBrix)
NFMF	Node to first male flower	AFW	Average fruit weight (g)	FC	Fibre content (g/100 g)
NFFF	Node to first female flower	FT	Flesh thickness (cm)	FYPV	Fruit yield per vine (kg)
NMFV	Number of male flowers per vine	NSPF	Number of seeds per fruit		
NFFV	Number of female flowers per vine	NFPV	Number of fruits per vine		
SR	Sex ratio (%)	VC	Vitamin C content (mg/100 g)		
FS	Fruit set (%)	AC	Acidity content (percent)		

Table 2: Phenotypic correlation coefficients for different characters of snake gourd genotypes

Character	DFMO	DFFO	NFMF	NFFF	NMFV	NFFV	SR	FS	FL	FG	AFW	FT	NSPF	NFPV	VC	AC	K	TSS	FC	FYPV
DFMO	1.00	0.279*	-0.181	0.154	0.277*	-0.184	0.196	-0.030	-0.102	-0.017	-0.358**	-0.602**	-0.653**	-0.009	-0.037	-0.217	0.091	0.101	-0.009	-0.378**
DFFO		1.00	0.216	-0.043	-0.095	-0.357**	0.289*	-0.395**	-0.019	-0.176	-0.113	-0.222	-0.338**	-0.379**	0.059	0.073	-0.011	-0.218	0.170	-0.325**
NFMF			1.00	0.179	-0.082	-0.205	0.196	-0.070	0.097	-0.082	-0.008	0.134	0.056	-0.163	0.090	-0.002	-0.077	-0.139	0.206	-0.059
NFFF				1.00	0.090	-0.243	0.312*	0.010	0.011	-0.121	-0.438**	-0.253*	-0.329**	-0.057	-0.149	-0.147	0.255*	0.029	-0.117	-0.408**
NMFV					1.00	-0.087	0.225	0.039	0.014	-0.129	-0.084	-0.322**	-0.084	0.048	0.005	0.060	0.139	0.153	0.201	-0.049
NFFV						1.00	-0.840**	0.501**	-0.059	0.336**	0.245	0.473**	0.230	0.731**	-0.182	0.116	0.174	0.189	0.057	0.609**
SR							1.00	-0.359**	0.094	-0.361**	-0.234	-0.465**	-0.235	-0.583**	0.223	-0.008	-0.058	-0.115	0.014	-0.513**
FS								1.00	-0.255*	0.313*	-0.080	0.301*	0.069	0.897**	0.004	-0.166	0.059	0.343**	-0.160	0.476**
FL									1.00	-0.471**	0.491**	-0.047	0.109	-0.234	-0.198	0.022	-0.073	-0.089	0.255*	0.289*
FG										1.00	-0.086	0.352**	-0.011	0.413**	0.126	-0.236	-0.013	0.085	-0.014	0.120
AFW											1.00	0.342**	0.284*	-0.066	-0.144	-0.181	-0.073	0.093	0.074	0.799**

FT											1.00	0.546**	0.327**	0.166	-0.086	-0.087	0.055	0.032	0.518**
NSPF												1.00	0.096	0.193	0.129	-0.019	0.145	0.091	0.373**
NFPV													1.00	-0.005	-0.112	0.118	0.341**	0.012	0.517**
VC														1.00	0.099	-0.376**	0.071	0.162	-0.078
AC															1.00	-0.105	-0.380**	0.136	-0.162
K																1.00	0.067	-0.225	-0.000
TSS																	1.00	0.122	0.288*
FC																		1.00	0.137

*Significant at 5% level **significant at 1% level

DFMO	Days to first male flower opening	FL	Fruit length (cm)	K	Potassium (mg/100 g)
DFFO	Days to first female flower opening	FG	Fruit girth (cm)	TSS	TSS (ºBrix)
NFMF	Node to first male flower	AFW	Average fruit weight (g)	FC	Fibre content (g/100 g)
NFFF	Node to first female flower	FT	Flesh thickness (cm)	FYPV	Fruit yield per vine (kg)
NMFV	Number of male flowers per vine	NSPF	Number of seeds per fruit		
NFFV	Number of female flowers per vine	NFPV	Number of fruits per vine		
SR	Sex ratio (%)	VC	Vitamin C content (mg/100 g)		
FS	Fruit set (%)	AC	Acidity content (percent)		

Table 3: Path coefficient analysis for different characters of snake gourd genotypes at genotypic level

Character	DFMO	DFFO	NFMF	NFFF	NMFV	NFFV	SR	FS	FL	FG	AFW	FT	NSPF	NFPV	VC	AC	K	TSS	FC	FYPV
DFMO	0.172	0.048	-0.046	0.019	0.062	-0.045	0.063	-0.005	-0.018	0.007	-0.065	-0.130	-0.116	-0.002	-0.010	-0.040	0.017	0.021	0.004	-0.403
DFFO	0.052	0.188	0.059	-0.020	-0.013	-0.084	0.088	-0.084	-0.007	-0.032	-0.023	-0.057	-0.064	-0.077	0.013	0.016	-0.002	-0.052	0.035	-0.354
NFMF	-0.024	0.029	0.092	0.044	-0.029	-0.011	-0.001	-0.023	0.018	-0.030	-0.000	0.027	0.006	-0.022	0.003	-0.003	-0.010	-0.024	-0.006	-0.105
NFFF	0.029	-0.028	0.128	0.265	0.048	-0.136	0.211	0.020	0.009	-0.053	-0.146	-0.089	-0.106	-0.011	-0.034	-0.046	0.083	-0.010	0.013	-0.497
NMFV	0.001	-0.000	-0.000	0.000	0.002	-0.000	0.000	-0.000	0.000	-0.000	-0.000	-0.001	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	-0.084
NFFV	-0.222	-0.373	-0.105	-0.428	-0.069	0.835	-0.801	0.642	-0.162	0.426	0.257	0.525	0.250	0.739	-0.180	0.085	0.172	0.198	0.238	0.769
SR	0.037	0.047	-0.002	0.081	0.034	-0.097	0.102	-0.079	0.037	-0.061	-0.039	-0.087	-0.040	-0.084	0.040	0.002	-0.007	-0.021	-0.012	-0.818
FS	-0.051	-0.707	-0.408	0.123	-0.129	1.223	-1.235	1.590	-0.463	0.602	-0.066	0.643	0.090	1.497	0.130	-0.288	0.113	0.602	-0.126	0.506
FL	-0.006	-0.002	0.012	0.002	0.006	-0.012	0.022	-0.018	0.063	-0.041	0.032	-0.004	0.008	-0.019	-0.013	0.000	-0.005	-0.005	0.023	0.288
FG	0.020	-0.085	-0.161	-0.099	-0.127	0.251	-0.297	0.187	-0.324	0.493	-0.059	0.243	-0.025	0.243	0.080	-0.169	-0.008	0.062	-0.112	0.119
AFW	-0.304	-0.102	-0.004	-0.444	-0.046	0.248	-0.310	-0.033	0.419	-0.097	0.805	0.302	0.239	-0.028	-0.148	-0.162	-0.064	0.143	0.046	0.814
FT	0.269	0.108	-0.105	0.120	0.168	-0.224	0.304	-0.144	0.027	-0.175	-0.133	-0.356	-0.233	-0.157	-0.095	0.043	0.040	-0.042	0.000	0.629
NSPF	-0.377	-0.189	0.039	-0.223	-0.064	0.167	-0.221	0.031	0.071	-0.029	0.166	0.365	0.557	0.053	0.151	0.072	-0.010	0.111	0.054	0.384
NFPV	0.019	0.654	0.390	0.069	0.058	-1.408	1.322	-1.499	0.484	-0.785	0.056	-0.705	-0.151	-1.592	0.020	0.196	-0.207	-0.568	-0.264	0.528
VC	0.009	-0.011	-0.006	0.021	-0.009	0.035	-0.065	-0.013	0.035	-0.027	0.030	-0.044	-0.045	0.002	-0.166	-0.019	0.077	-0.008	-0.038	-0.101
AC	-0.011	0.004	-0.001	-0.008	0.004	0.005	0.001	-0.009	0.000	-0.017	-0.010	-0.006	0.006	-0.006	0.005	0.050	-0.005	-0.022	0.008	-0.174
K	-0.011	0.001	0.012	-0.036	-0.019	-0.023	0.008	-0.008	0.009	0.001	0.009	0.013	0.002	-0.015	0.053	0.012	-0.115	-0.008	0.033	-0.002
TSS	-0.009	0.020	0.019	0.003	-0.002	-0.017	0.015	-0.028	0.006	-0.009	-0.013	-0.008	-0.014	-0.026	-0.004	0.033	-0.005	-0.074	-0.016	0.351
FC	0.005	0.042	-0.016	0.011	0.040	0.064	-0.027	-0.017	0.082	-0.051	0.013	-0.000	0.022	0.037	0.052	0.039	-0.065	0.050	0.225	0.108

Residual Effect = 0.156

DFMO	Days to first male flower opening	FL	Fruit length (cm)	K	Potassium (mg/100 g)
DFFO	Days to first female flower opening	FG	Fruit girth (cm)	TSS	TSS (ºBrix)
NFMF	Node to first male flower	AFW	Average fruit weight (g)	FC	Fibre content (g/100 g)
NFFF	Node to first female flower	FT	Flesh thickness (cm)	FYPV	Fruit yield per vine (kg)

NMFV	Number of male flowers per vine	NSPF	Number of seeds per fruit		
NFFV	Number of female flowers per vine	NFPV	Number of fruits per vine		
SR	Sex ratio (%)	VC	Vitamin C content (mg/100 g)		
FS	Fruit set (%)	AC	Acidity content (percent)		

Table 4: Path coefficient analysis for different characters of snake gourd genotypes at phenotypic level

Character	DFMO	DFFO	NFMF	NFFF	NMFV	NFFV	SR	FS	FL	FG	AFW	FT	NSPF	NFPV	VC	AC	K	TSS	FC	FYPV
DFMO	-0.028	-0.007	0.005	-0.004	-0.007	0.005	-0.005	0.000	0.002	0.000	0.010	0.016	0.018	0.000	0.001	0.006	-0.002	-0.002	0.000	-0.378
DFFO	0.003	0.012	0.002	-0.000	-0.001	-0.004	0.003	-0.004	-0.000	-0.002	-0.001	-0.002	-0.004	-0.004	0.000	0.000	-0.000	-0.002	0.002	-0.325
NFMF	-0.003	0.004	0.018	0.003	-0.001	-0.003	0.003	-0.001	0.001	-0.001	-0.000	0.002	0.001	-0.003	0.001	0.000	-0.001	-0.002	0.003	-0.059
NFFF	-0.000	0.000	-0.000	-0.004	-0.000	0.001	-0.001	-0.000	-0.000	0.000	0.002	0.001	0.001	0.000	0.000	0.000	-0.001	-0.000	0.000	-0.408
NMFV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.049
NFFV	0.013	0.026	0.015	0.018	0.006	-0.074	0.062	-0.037	0.004	-0.024	-0.018	-0.035	-0.017	-0.054	0.013	-0.008	-0.012	-0.014	-0.004	0.609
SR	-0.007	-0.011	-0.007	-0.012	-0.009	0.033	-0.039	0.014	-0.003	0.014	0.009	0.018	0.009	0.023	-0.008	0.000	0.002	0.004	-0.000	-0.513
FS	-0.004	-0.051	-0.009	0.001	0.005	0.065	-0.047	0.131	-0.033	0.041	-0.010	0.039	0.009	0.117	0.006	-0.021	0.007	0.045	-0.002	0.476
FL	-0.002	-0.000	0.002	0.000	0.000	-0.001	0.002	-0.006	0.024	-0.011	0.012	-0.001	0.002	-0.005	-0.004	0.000	-0.001	-0.002	0.006	0.289
FG	0.000	0.004	0.002	0.003	0.003	-0.008	0.009	-0.008	0.012	-0.026	0.002	-0.009	0.000	-0.010	-0.003	0.006	0.000	-0.002	0.000	0.120
AFW	-0.294	-0.093	-0.007	-0.360	-0.069	0.201	-0.192	-0.066	0.403	-0.070	0.821	0.281	0.233	-0.054	-0.118	-0.149	-0.059	0.077	0.060	0.799
FT	-0.017	-0.006	0.003	-0.007	-0.009	0.013	-0.013	0.008	-0.001	0.010	0.009	0.028	0.015	0.009	0.004	-0.002	-0.002	0.001	0.000	0.518
NSPF	-0.023	-0.012	0.002	-0.012	-0.003	0.008	-0.008	0.002	0.004	-0.000	0.010	0.019	0.036	0.003	0.007	0.004	-0.000	0.005	0.003	0.373
NFPV	-0.004	-0.185	-0.079	-0.028	0.023	0.357	-0.284	0.438	-0.114	0.202	-0.032	0.159	0.047	0.488	-0.002	-0.054	0.058	0.166	0.059	0.517
VC	-0.001	0.001	0.002	-0.003	0.000	-0.004	0.005	0.001	-0.005	0.003	-0.003	0.004	0.005	-0.000	0.025	0.002	-0.009	0.001	0.004	-0.078
AC	-0.015	0.005	-0.000	-0.010	0.004	0.008	-0.000	-0.011	0.001	-0.016	-0.012	-0.006	0.009	-0.008	0.007	0.070	-0.007	-0.027	0.009	-0.162
K	0.002	-0.000	-0.002	0.007	0.003	0.004	-0.001	0.001	-0.002	-0.000	-0.002	-0.002	-0.000	0.003	-0.010	-0.002	0.027	0.001	-0.006	-0.000
TSS	0.004	-0.008	-0.005	0.001	0.006	0.007	-0.004	0.013	-0.003	0.003	0.003	0.002	0.005	0.013	0.002	-0.014	0.002	0.039	0.004	0.288
FC	0.000	-0.001	-0.001	0.000	-0.001	-0.000	-0.000	0.000	-0.001	0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.000	0.001	-0.000	-0.006	0.137

Residual Effect = 0.128

DFMO	Days to first male flower opening	FL	Fruit length (cm)	K	Potassium (mg/100 g)
DFFO	Days to first female flower opening	FG	Fruit girth (cm)	TSS	TSS (ºBrix)
NFMF	Node to first male flower	AFW	Average fruit weight (g)	FC	Fibre content (g/100 g)
NFFF	Node to first female flower	FT	Flesh thickness (cm)	FYPV	Fruit yield per vine (kg)
NMFV	Number of male flowers per vine	NSPF	Number of seeds per fruit		
NFFV	Number of female flowers per vine	NFPV	Number of fruits per vine		
SR	Sex ratio (%)	VC	Vitamin C content (mg/100 g)		
FS	Fruit set (%)	AC	Acidity content (percent)		

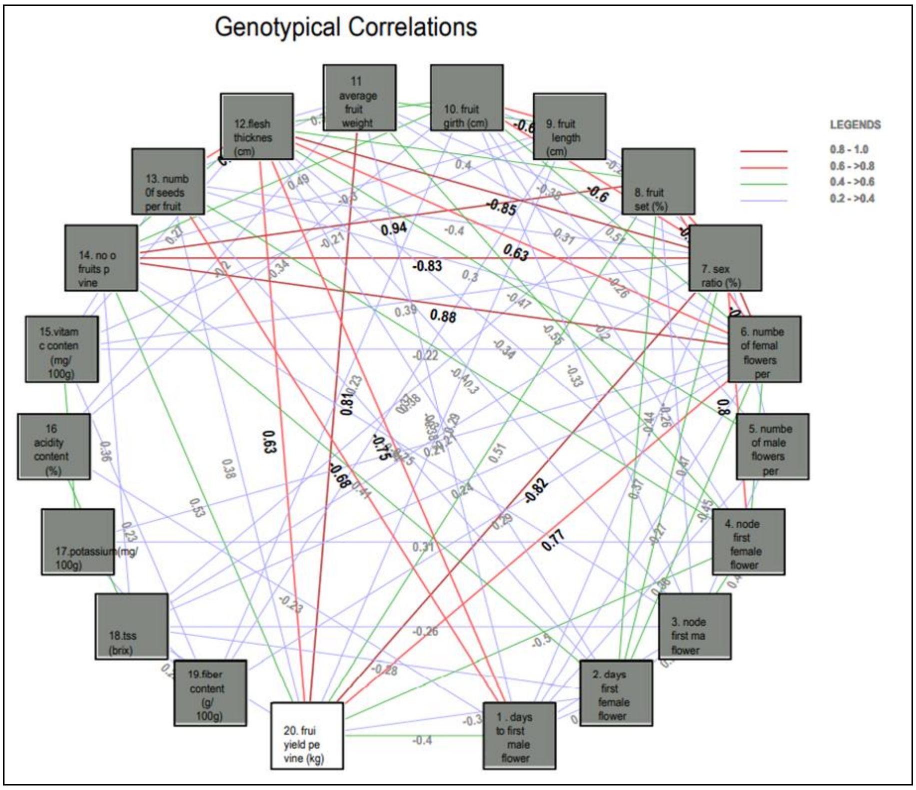

Fig 1: Genotypic correlation diagram among yield and its component traits in snake gourd genotypes

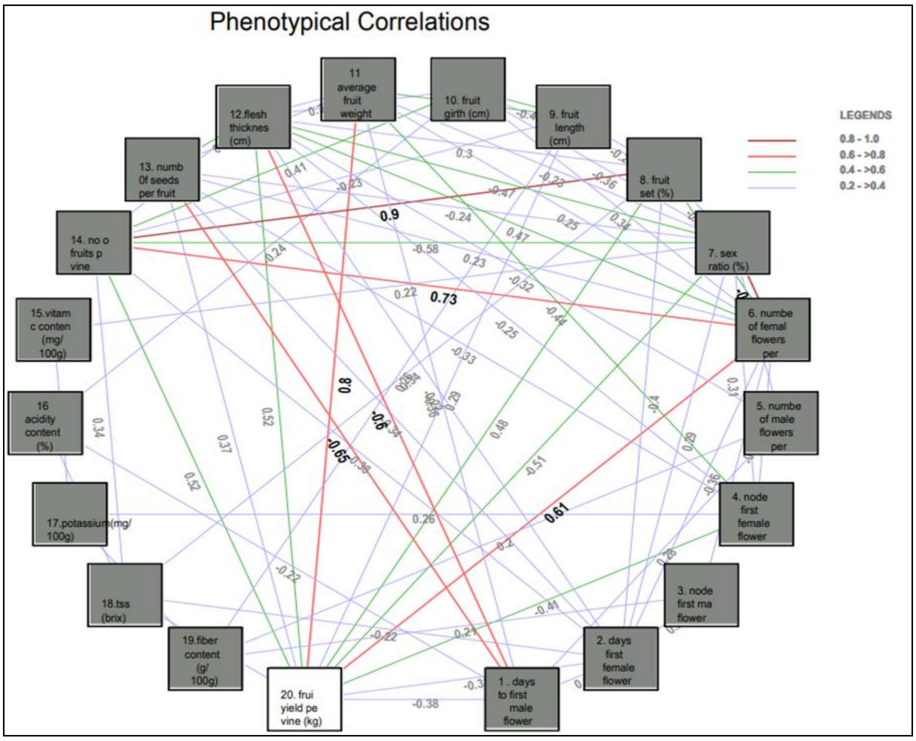

Fig 2: Phenotypic correlation diagram among yield and its component traits in snake gourd genotypes

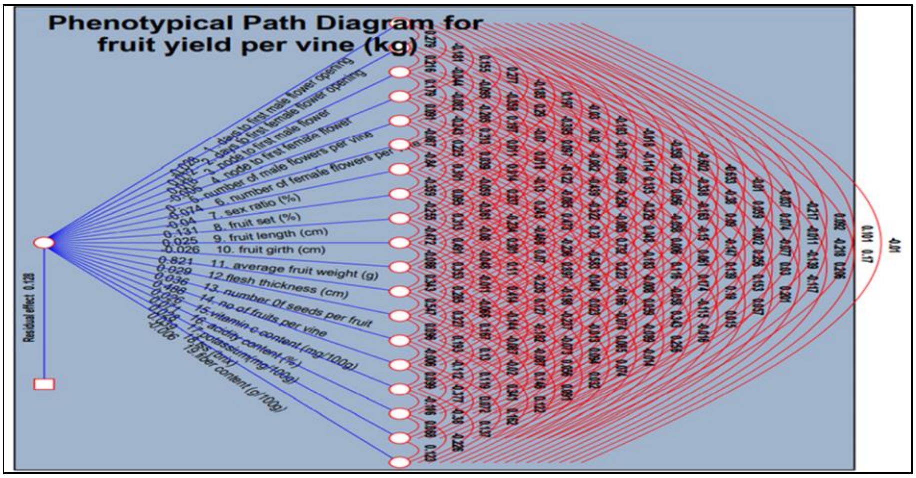

Fig 3: Phenotypical path diagram representing direct and indirect effects for fruit yield per vine (kg) in snake gourd genotypes

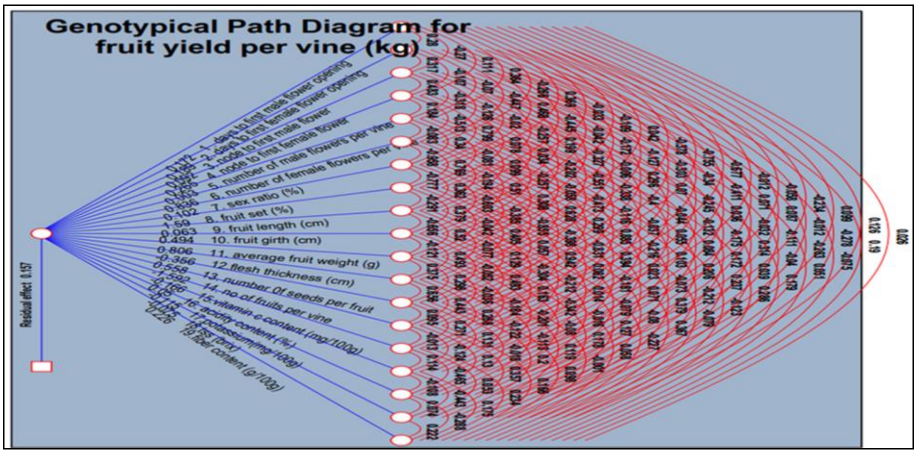

Fig 4: Genotypic path diagram representing direct and indirect effects for fruit yield per vine (kg) in snake gourd genotypes

Conclusion

Correlation and path analysis indicated that incorporating the following characteristics into a selection scheme for crop improvement in snake gourds could lead to an improvement in yield: node to first female flower, number of female flowers per vine, fruit set percentage, fruit girth, fruit length, average fruit weight, number of seeds per fruit, fiber content, TSS, flesh thickness, and number of fruits per vine.

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