DISSERTATION-I

SUBMITTED BY

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In partial fulfillment for the award of the degree

Of

Master of Science in Horticulture

(Vegetable Science)

Under Guidance of

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14th May, 2018

DECLARATION

I hereby declare that this synopsis entitled **"Genetic Correlation and Path Analysis in Okra (*Abelmoschus esculentus* (L.) Monech)''**is an authentic record of my work carried out at Lovely Professional university as requirement for the degree of **Master of Science** in discipline of **Horticulture (Vegetable Science)**, under the guidance of Dr. Sanjay Singh Assistant Professor, Department of Horticulture , School of Agriculture and no part of this synopsis has been submitted for any other degree programme.

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M.Sc Horticulture (Vegetable Science)

CERTIFICATE

This is to certify that this synopsis entitled **" Genetic Correlation and Path Analysis in Okra (*Abelmoschus esculentus* (L.) Monech)"**is submitted in the partial fulfillment of the requirement for the degree of **Master of Science** in discipline of **Horticulture (Vegetable Science)** is a research work carried out by **Ashita Rana (Registration No. 11719678)** under my supervision and that no part of this synopsis has been submitted for any other degree programme.

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INTRODUCTION

Okra (*Abelmoschus esculentus* L. Moench) is an important vegetable of tropical and sub-tropical part of the world, mainly grown for its tender fruits, which are cooked and consumed as vegetable **(Chattopadhyay et al., 2011).** The genus is accepted to be of Asiatic origin but the origin of cultivated species A.*esculentus* is disputed to be India, Ethopia,West Africa and Tropical asia.India is the largest producer of okra in the world. The major okra (bhindi) growing states are Uttar Pradesh, Orissa, Bihar, and West bengal. Okra is an annual vegetable crop propagated from seed in tropical and subtropical regions of the world. (**Vegetables, tubers crops and spices by S.Thamburaj and Narendra Singh)**

The root and stem are useful for clearing cane juice in the preparation of jaggary.Grubben in 1977 reported that 100 gm consumable unripe okra fruit contain 10.4gm dry matter, 3,100 calorie energy,1.8gm protein ,90mg calcium, 1.0mg iron, 0.1mg carotene, 0.07mg thiamin, 0.08mg riboflavin, 0.08 mg niacin and 18 mg vitamin C. Okra is a polyploidy crop ,which belongs to the family Malvaceae and is a self-pollinated crop. Occurrence of out crossing to an extent of 4 – 19 percent with the maximum of 42.2 per cent is noticed with the insect assisted pollination **Kumar N. (2006))**

For the improvememt in the yield and other characters, information about genetic variability is of great importance and is a prerequisite for the effective selection or screening of superior/elite genotypes. The progress in breeding for the economic characters that are mostly environmentally influenced is determined by the magnitude and nature of their genetic variability So, it is essential to partition or subdivide the overall variability into its heritable and non heritable components with the help of genetic parameters like genetic co-efficient of variation, heritability and genetic advance**. Gandhi et al. (2001))**

Exploitation of variability is of a great importance and prerequisite for the effective screening of superior genotypes. Magnitude and nature of genetic variability determined the progress of breeding for the economic characters and plays an important role in a crop in selecting the best genotypes for making rapid improvement in yield and other desirable characters

The correlation measures the mutual relationship between different traits of a plant, it helps to access the best yield contributing traits. Path analysis deals with a close system of variables that are linearly related. It specifies the causes and generally measures their relative importance. Path analysis spilt the correlation coefficient into the measures of direct and indirect effect and determines direct and indirect contribution to the various characters towards the yield. Information derived from correlation studies will reveal the possibility of simultaneous improvement of various attributes and also helps in increasing the efficiency of selection of complex inherited traits. Genotypic and phenotypic correlation coefficient will be computed by adopting the procedure of **Dewey and Lu (1959)**

OBJECTIVE

1) To study the different parameters of genetic variability and performance of genotypes in okra.
2) To study the interrelationship between yield and yield contributing traits through correlation analysis (Phenotypic and Genotypic level)
3) To find out direct and indirect effects of various characters on yield

REVIEW OF LITERATURE

GENETIC VARIABILITY

Duggi *et al*. (2013) reported that high values of PCV with correspondingly high values of GCV were observed for the characters viz., number of primary branches and number of fruits per plant which indicated the presence of substantial variability thus suggesting good scope for improvement through selection.

Goswami *et al*.(2016) observed, that phenotypic coefficient of variation was higher for width of fruit (27.11) followed by number of fruits per plant (19.80), Length of internode (17.23), number of branches per plant (16.99), yield per plant (14.31), length of fruits (13.13), length of first fruiting node (11.49), number of node per plant (10.97) and plant height (10.82).

HERITABILITY

Thirupathi Reddy M *et al* (2012) reported that heritability was of high magnitude (>60.00 %) for plant height (90.00 %), number of branches per plant (73.00 %), internodal length (94.00%), days to 50% flowering (87.00 %), first flowering node (87.00 %), first fruiting node (86.00 %), fruit length (97.00 %), fruit width (87.00 %), fruit weight (91.00 %), total number of fruits per plant (87.00 %), number of marketable fruits per plant (90.00 %), total yield per plant (88.00 %), marketable yield per plant (90 %),

Goswami *et al.(*2016) found that the highest value of broad sense heritability was recorded for plant height (99.40%) followed by number of fruits per plant (97.60%), length of first fruiting node (96.80%), width of fruits (93.30%), length of fruits (92.90%), days to flowering (92.40%), number of nodes per plant (91.10%), yield per plant (88.20%), length of internode (77.10%) and number of branches per plant (35.40%)

CORRELATION ANALYSIS

Kale *et al.* (1989) reported positive and significant correlation of leaf area withother charcters like fruit length, number of fruits per plant in okra.

Vijay and Manohar (1990) reported that diameter of okra fruit show negative and significant correlation with yield per plant. This indicates that increase in one trait may generally be accompanied by corresponding decrease in the other trait.

Hazare and Basu (2000) reported that fruit yield per plant was significantly and positively correlated with plant height, whereas on the other hand, days to first flowering showed negative association with number of fruits per plant.

Niranjan and Mishra (2003) found that in general, the genotypic correlations were higher than the corresponding phenotypic correlation for all the character combinations.

Bendale *et al.* (2003) reported that the characters like pod length, pod weight, plant height, nodes per plant and number of pods per plant showed a positive correlation with the total yield.

Duzyaman *et al*.(2003) investigated that pod weight and diameter were positively correlated with total yield. Early flowering was negatively correlated with total yield. Pod weight per plant was associated with average pod weight, pod width and flesh thickness.

Jaiprakashnarayan and Mulge (2004). In the present study, plant height had significant positive correlation with internodal length, fruit length, total number of fruits per plant, number of marketable fruits per plant, total yield per plant and marketable yield per plant

Patro and Ravishankar (2004) observed that fruit yield per plant have significant and positive correlation with number of branches per plant, fruit length and fruit weight. Significant negative correlation of fruit yield per plant was recorded with plant height and number of days taken to first pod setting.

Sureshbabu *et al.* (2004) noted that the significant phenotypic and genotypic correlation with yield was shown by fruit length and fruits per plant.

Bhalekar *et al.* (2005) observed that fruit length, inter-nodal length, number of fruits per plant and number of branches per plant had positive and strong correlation with fruit yield.

Ghosh (2005) reported that fruit yield per plant was recorded significantly positively correlated with fruiting span, inter-nodal length, number of seeds per fruit, plant height at maturity and weight of fruit.

Akinyele and Oseikita (2006) observed that the seed yield per plant showed significant positive correlation with number of pods per plant, height at flowering, pod width and weight of hundred seeds.

Singh *et al*. (2007) reported that number of fruits per plant was positively and significantly correlated with length of fruit, weight of fruit, chlorophyll content of leaves and yield per plant, while it was negatively significant with number of ridges per fruit.

Sharma and Prasad (2010) found that the positive significant correlation for days to 50% flowering with days to first harvest, number of pod per plant with pod yield per plant and pod yield per plot and pod yield per plant with pod yield per plot and negative correlation was observed for pod weight with number of pod per plant

Chaukhande *et al.* (2011) revealed that the yield per plant exhibit positive and significant correlation with plant height, number of flowering nodes on main stem, number of fruits per plant and average weight of fruit

Sawant *et al* (2014) reported that among the yield contributing characters themselves, the plant height was positively and significantly correlated with internodal length, number of nodes per plant, number of fruits per plant, length of fruit, chlorophyll content of leaves and yield per plant.

This indicated the importance of the character plant height in increasing the number of nodes perplant, number of fruits per plant, internodal length, length of fruit, chlorophyll content of leaves and yield per plant.

Shivaramegowda *et al*.(2016) reported that there was positive significant correlation among fruit length and fruit weight (r=0.48 at *P*=0.01). Fruit girth had significant correlation with number of fruits per plant (r=0.39) and fruit weight (r=0.38) at *P*=0.01. The yield per plant had strong significant correlation with number of fruits per plant (r=0.79) and fruit weight (r=0.78), fruit girth (r=0.46) and number of primary branches (r=0.35) at *P*=0.01. Number of fruits per plant, fruit weight, fruit girth and number of primary branches were important traits for selecting high yielding germplasm in Okra

Thulasiram *et al.* (2017) recorded that in genotypic correlation yield per plant was positively and significantly correlated with plant height (r= 0.552), number of leaves per plant (r = 0.516), number of lobes per leaves (r= 0.634), number of primary branches (r= 0.604), number of nodes per plant (r= 0.825) and number of fruits per plant (r= 0.994). However on the other hand in phenotypic correlation yield per plant also showed positively and significantly correlated with plant height (r= 0.437), number of leaves per plant (r= 0.439), number of primary branches (r= 0.449), number of nodes per plant (r= 0.714) and number of fruits per plant (r= 0.747).

PATH ANALYSIS

Ariyo *et al*. (1987) who reported largest negative direct effect of plant height on pod yield

Subrata *et al.* (2004) found that number of fruits per plant and fruit weight had positive and high direct effect on fruit yield, indicating their importance as reliable selection criteria for improvement of yield in okra.

Sarkar *et al.* (2004) investigated that path coefficient analysis with partitioning of phenotypic correlation revealed that number of fruits per plant and fruit weight had positive and high direct effect on fruit yield of okra.

Jaiprakashnarayan and Mulge (2004) reported that number of nodes per plant and direct effect on yield per plant, while indirect effect via number of fruits and weight of fruit was found to be high and positive. Thus it resulted into the positive association of number of nodes per plant and yield per plant.

Mehta *et al.* (2006) revealed that fruit girth had the maximum direct effect followed by fruit length towards fruit yield. Thus, the fruit yield in okra can be improved by selecting for higher fruit length, fruit girth and average fruit weight simultaneously.

Ramanjinappa *et al*. (2011) revealed that in path coefficient analysis, number of fruit per plant had the highest direct influence towards fruit yield per plant followed by number of seed per fruit, harvest index and number of nodes per plant.

Sibsankar *et al* (2012) reported in path coefficient analyses, that the top priority should be given to selection based on numbers of fruit per plant and fruit weight for yield improvement and could be considered while formulating selection indices in the improvement of okra.

Gangashetti *et al*. (2013) investigated that path analysis depicted high effect on number fruit per plant, fruit weight, plant height, and number of branches per plant with fruit yield per plant. To release importance of fruit yield, direct selection can be practices for the characters.

Sreevivas *et al.* (2015) found that number of fruits per plant had the maximum direct contribution (0.698) towards total yield followed by fruit weight (0.467), fruit girth (0.075) duration (0.042) and plant height (0.014). However, days to first flowering and fruit length exhibited negative direct effect. Hence, selection should be practiced for these characters in order to isolate superior plant types for improvement of fruit yield.

TECHNICAL PROGRAMME OF WORK

TECHNICAL PROGRAMME:-

Name of experiment: - Genetic variablity correlation and Path Analysis in okra under different cropping season

Location:- The experiment is being conducted on Agriculture Research Farm ,LPU, Phagwara

Experimental detail:-

1) Year of experiment =2018
2) Dose of fertilizer =Recommended dose (N P K)(19:19:19) as foliar application
3) No. of treatment =17
4) No. of replication = 3
5) Total number of plots = 51
6) Plot size = 350 meter square
7) Date of sowing = March (2018)
8) Experimental design = RBD
9) Crop and variety = Okra
10) Spacing = 45x20

EXPERIMENTAL LAYOUT (RBD Design)

R1	R2	R3
Genotype 1	Genotype 8	Genotype 12
Genotype 2	Genotype 9	Genotype 13
Genotype 3	Genotype 10	Genotype 14
Genotype 4	Genotype 11	Genotype 16
Genotype 5	Genotype 12	Genotype 17
Genotype 6	Genotype 13	Genotype 1
Genotype 7	Genotype 14	Genotype 2
Genotype 8	Genotype 15	Genotype 3
Genotype 9	Genotype 16	Genotype 4
Genotype 10	Genotype 17	Genotype 5
Genotype 11	Genotype 1	Genotype 6
Genotype 12	Genotype 2	Genotype 7
Genotype 13	Genotype 3	Genotype 8
Genotype 14	Genotype 4	Genotype 9
Genotype 15	Genotype 5	Genotype 10
Genotype 16	Genotype 6	Genotype11
Genotype17	Genotype 7	Genotype15

METHODOLOGY OF RESEARCH WORK

Parameters to be recorded:-

1) Plant height
2) Number of leaves per plant
3) Number of branches per plant
4) Leaf area
5) Internodal length
6) Nodes per plant
7) Days to 50% flowering
8) No of fruits per plant
9) Length of fruit
10) Weight of fruit
11) No of ridges
12) Diameter of fruit
13) Pod yield (q/ha)
14) Chlorophyll content of leaf (By Spectrophotometer)
15) Ascorbic acid content (Rangana 1986) titration method

Name of genotypes:- Material used for the experimental study comprises of 17 genotypes:-

S.NO	Name of genotype	S.NO	Name of genotype
V1	Hybrid Bhindi DS-92 (Doctor seeds)	V10	Bhindi seeds
V2	Madhvi(PK seeds)	V11	Bhushan (Tropical seeds)
V3	Jeenu (Onkar seeds)	V12	Rajani (Kalash seeds)
V4	Deepika (VNR seeds)	V13	Ankur-40 (Ankur seeds)
V5	Brar bhindi seeds	V14	Arka Anamika (

			Namdhari seeds)
V6	Deepti (Agro seeds)	V15	Annika
V7	Super anamika (Doctor seeds)	V16	P-8 (PAU)
V8	Paradise hybrid seeds	V17	Palam komal (CSK HP KV Palampur)
V9	Hy veg 155		

Varieties used as standard checks:- Arka Anamika

Palam Komal

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EXPECTED RESULT/RESEARCH OUTCOMES

Experimental research trial and data collection for parameters Plant height**,** Number of leaves per plant**,** Number of branches per plant**,** Leaf area**,** Internodal length**,** Nodes per plant**,** Days to 50% flowering**,** No of fruits per plant**,** Length of fruit**,** Weight of fruit**,** No of ridges**,** Diameter of fruit**,** Yield of fruit per plant**,** Chlorophyll content of leaf and ascorbic acid content is still under process so definite result cannot be interpreted.

1. To get the research publication.
2. To be aware about current or global advance research methodology.

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