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Correlation studies in bottle gourd (*Lagenaria Siceraria Mol. Standl.*) germplasms in garo hills of Meghalaya, India

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ABSTRACT

An experiment was carried out at Research farm, Department of Horticulture, North Eastern Hill University, Tura Campus, Meghalaya to study the character association and contribution for quantitative characters in 30 bottle gourd genotypes during 2019. The experiment was conducted using a randomized block design with three replications. Correlation analysis was carried out to study the character association and contribution for twenty-one quantitative characters , namely vine length (cm), internode length (cm), petiole length (cm), number of primary branches, Node no. at which first female flower appears, days to 50% flowering, sex ratio, days to first fruit harvest, number of marketable fruit harvest, days to last fruit harvest, number of leaves, fruit length (cm), peduncle length (cm), fruit width (cm), fruit weight (g), number of fruits per plant, yield of marketable fruits (kg) per plant, yield (t/ha), number ,of seeds per fruit, 100 seed weight (g) and seed L-B ratio for the identification of appropriate selection indices. Phenotypic and genotypic correlation coefficient analysis revealed that Fruit weight, Number of fruits per plant, number of primary branches, number of marketable fruit harvest, fruit width, vine length, number of leaves and number of seeds per fruit had significant positive correlation, while days to first fruit harvest and peduncle length had shown negative correlation and other characters viz; days to last fruit harvest, hundred seed weight, internode length, days to 50% flowering, node number at which first female flower appears and sex ratio had shown non-significant correlation coefficient with marketable yield.

Keywords: Character association, Character contribution, Correlation analysis, Germplasm, Yield components

INTRODUCTION

Bottle gourd is an important vegetable crop having diploid chromosome number of 2n=22 belongs to the family Cucurbitaceae. Meghalaya is one of the seven sisters state in North-Eastern India which covers an area of approximately 22,430 square kilometers situated at 25.57°N and 91.88°S. The altitude of Meghalaya ranges from 150 meters to 1961 meters. The area under vegetable cultivation in Meghalaya is 49.28 thousand hectares and production is 517.76 thousand metric tonnes. Whereas, area under bottle gourd cultivation in Meghalaya is 0.76 thousand hectare and production is 9.43 thousand metric tonnes (NHB, 2018-19). There are number of local cultivars with wide range of variability in fruit size, fruit shape and fruit colour available in Garo Hills of Meghalaya but a very limited attempt has been made for genetic improvement of this crop in Garo Hills Region of Meghalaya. According to Jain and Singh (2016), different plant parts of bottle gourd have several medicinal properties. It has a good number of vitamins and minerals. Its fruit contains 95.54% moisture, vitamin C (10.1 g), vitamin A (16 IU), thiamine (0.029 g), riboflavin (0.022 g), niacin (0.320 g), carbohydrates (3.39 g), fats (0.02 g) and potassium (150 mg)/100g (USDA, 2018). According to Srivastava *et al.,* 2002, bottle gourd is composed of 96.1% moisture, 0.1% fat, 0.5% minerals, 0.6% fiber, 2.5 carbohydrates, 12 Kcal energy, 0.7mg/100g iron, 0.03mg/100g thiamine, 0.2 mg/100g niacin and 0.01 mg/100griboflavin and according to Parle and Satbir, 2011, it is a gourd source of antioxidant and phenols which also contains 10.10 mg/100g ascorbic acid, 5.80 g/100g total sugar, 5.22 g/100g reducing sugar and 1.31g/100g starch. Bottle gourd have a rich source of nutrients *viz;* potassium, vitamin-C, protein, sulphur and phosphorus. The fruits of bottle gourd can be used as vegetable or making sweets like, halva, kheer, pedha and barfi and pickles. Even patients can easily digest it as a vegetable. The leaf decoction is an excellent treatment for curing jaundice. The fruit has a cooling effect having a cardiatonic properties.

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Yield is considered to be a complex, polygenic and highly variable character determined by cumulative effects of its component characters. Therefore, direct selection for yield may not be very effective and precise. Thus, it becomes necessary to find out the direction and degree of association between two characters at phenotypic and genotypic levels. Genetic correlation between two characters may be due to pleiotropy. The degree of correlation due to pleiotropy expresses the extent with which two characters are controlled by the same genes, but pleiotropic genes do not necessarily cause an observable correlation due to dependence on the allele frequencies. The phenotypic correlation is a non-additive combination of both the genetic and environmental correlations. For characters with low heritabilities, phenotypic correlation is determined mainly by the environmental correlation, whereas for characters with high heritabilities, the genetic correlation is more important in determining the phenotypic correlation (Chakraborty, 2015).

The various characters under study may have an association with each other and may affect the total fruit yield per plant. The phenotypic and genotypic correlation coefficients among 21 characters were worked out to study the correlation of yield with other yield attributing characters.

MATERIALS AND METHODS

Field experiments for germplasm evaluation for various horticultural traits and study relationship of yield with its quality attributing characters in bottle gourd germplasms was conducted in randomized block design with 3 replications during 2019 Research farm, Department of Horticulture, North Eastern Hill University, Tura Campus, Meghalaya (25°31' N latitude and 90° 13'E longitude and 527 m above MSL). Thirty germplasm accessions of bottle gourd were obtained from Garo Hills Districts of Meghalaya, India. The soil was well drained sandy loam having pH 5.82 and the crop was grown. The spacing between the rows was kept 2X2 m both ways i.e. row to row and plant to plant. The crop was grown under rainfed condition. The seeds were sown on 11th May, 2019 and harvesting started from 23rd July, 2019. All the recommended cultural practices by ICAR were adopted for proper growth and stand of the crop during the cropping period. Bowers were constructed to support the standing crop. The observations were recorded according to NBPGR descriptor for bottle gourd. Data were recorded on nine randomly selected plants with respect to characters *viz.*, vine length (cm), internode length (cm), petiole length (cm), no. of primary branches, node no. at which first female flower appears, days to 50% flowering, days to first fruit harvest, number of marketable fruit harvest, days to last fruit harvest, number of leaves, fruit length (cm), peduncle length (cm), fruit width (cm), fruit weight (g), number of fruits per plant, yield of marketable fruits (kg) per plant, yield (t/ha), number of seeds per fruit, 100 seed weight (g) and seed L-B ratio. The mean values of genotypes in each replication were used for analysis. The data were analyzed as per Randomized Block Design or RBD (Panse and Sukhatme 1969).

RESULTS AND DISCUSSION

Correlation studies reveal the magnitude of association between the yield and its attributing trait which is essential for planning a sound breeding programme. The various characters under study may have an association with each other and may affect the total fruit yield per plant. The phenotypic and genotypic correlation coefficients among 21 characters were worked out and results revealed highest positive phenotypic correlation coefficients for total yield (t/ha) which were found with fruit weight (0.82**), number of fruits per plant (0.79**), number of primary branches (0.60**), number of marketable fruit harvest (0.57**), fruit width (0.44**), vine length(0.37**), number of leaves (0.27**) and number of seeds per fruit (0.26*). All these correlation coefficients were positive relation, moderately significant and highly significant (P= 1%). While, the characters days to first fruit harvest (-0.28**) and peduncle length (-0.21*) was having negative correlation coefficient with yield. Other characters were found to have non-significant correlation coefficient with yield namely, days to last fruit harvest (0.15NS), Hundred seed weight (0.08NS), internode length (0.04NS), days to 50% flowering (-0.01NS), node number at which first female flower appears (-0.02NS) and sex ratio (-0.14NS).

Table 1: Phenotypic correlation coefficients among different characters of bottle gourd

Characters	VL	IL	PL	NOPB	NFFF	DFPF	SR	DFFH	NMFH	DLFH	NOL	FL	PDL	FW	FWT	NF/P	NS/F	HSW	SLBR	YKG/P	YT/H
VL	1 **	0.05 NS	-0.01 NS	0.13 NS	-0.04 NS	0.15 NS	0.14 NS	-0.39 **	0.26*	0.29**	0.46**	-0.16 NS	-0.01 NS	0.18 NS	0.18 NS	0.41**	0.23 *	1 **	0.05 NS	0.18 NS	0.37 **
IL	0.05 NS	1**	0.05 NS	-0.05 NS	-0.29**	0.08 NS	-0.03 NS	0.14 NS	-0.05 NS	-0.03 NS	0.03 NS	-0.04 NS	0.05 NS	0.09NS	-0.09 NS	0.15 NS	-0.01 NS	0.05NS	1**	-0.01NS	0.04 NS
PL	-0.01 NS	0.01 NS	1**	-0.07 NS	-0.20 NS	0.19 NS	-0.20 NS	-0.04 NS	0.08 NS	-0.23*	-0.25 *	0.39**	0.12 NS	0.01NS	0.06NS	-0.08 NS	-0.33 **	-0.01 NS	0.05 NS	0.06 NS	-0.07 NS
NOPB	0.13 NS	-0.05 NS	-0.07 NS	1**	-0.03NS	-0.04 NS	-0.28**	-0.08 NS	0.45**	0.19 NS	0.24 *	-0.12NS	-0.09NS	0.35**	0.52 **	0.48 **	0.22 *	0.13 NS	-0.05 NS	0.52 **	0.60**
NFFF	-0.03 NS	-0.29 **	-0.20 NS	-0.03 NS	1**	-0.05 NS	0.20 NS	-0.02 NS	0.03 NS	0.17 NS	0.21 *	-0.01 NS	-0.08 NS	0.19 NS	-0.01 NS	-0.1 NS	0.03NS	-0.03 NS	-0.29 **	-0.01 NS	-0.02 NS
DFPF	0.15 NS	0.08 NS	0.19 NS	-0.04NS	-0.05 NS	1 **	-0.12 NS	0.11 NS	-0.08 NS	0.14 NS	-0.11NS	0.26*	0.15 NS	-0.08 NS	-0.05 NS	-0.02 NS	-0.02 NS	0.15NS	0.08 NS	-0.05 NS	-0.01 NS
SR	0.14 NS	-0.03 NS	-0.20NS	-0.27**	0.20 NS	-0.12 NS	1**	0.09 NS	-0.06 NS	-0.01 NS	0.14NS	0.09 NS	-0.02 NS	-0.07 NS	-0.19NS	-0.04NS	0.30 **	0.14 NS	-0.03 NS	-0.19 NS	-0.14 NS
DFFH	-0.39 **	0.14 NS	-0.03 NS	-0.08 NS	-0.01 NS	0.11 NS	0.09 NS	1 **	-0.32**	-0.03 NS	-0.26 *	0.15 NS	0.07 NS	-0.14 NS	-0.22 *	-0.23 *	0.07NS	-0.39 **	0.14 NS	-0.23*	-0.28 **
NMFH	0.26 *	-0.04 NS	0.08 NS	0.45 **	0.02 NS	-0.08 NS	-0.06 NS	-0.32 **	1 **	0.07 NS	0.40 **	-0.10 NS	-0.20 *	0.08 NS	0.43**	0.50 **	0.07 NS	0.26 *	-0.04 NS	0.44 **	0.57 **
DLFH	0.29 **	-0.03 NS	-0.23 *	0.19 NS	0.17 NS	0.14 NS	-0.01 NS	-0.03 NS	0.07 NS	1**	0.19 NS	-0.13 NS	-0.09 NS	0.24 *	0.01 NS	0.16 NS	0.30 **	0.29 **	-0.03 NS	0.01 NS	0.15NS
NOL	0.46 **	0.03 NS	-0.24 *	0.24 *	0.21 *	-0.11 NS	0.14 NS	-0.26*	0.40 **	0.19 NS	1 **	-0.45 **	-0.14NS	0.07 NS	0.04NS	0.36 **	0.05NS	0.46 **	0.03 NS	0.04 NS	0.27 **
FL	-0.16 NS	-0.04 NS	0.39 **	-0.11 NS	-0.01 NS	0.25*	0.09 NS	0.15 NS	-0.11 NS	-0.13 NS	-0.45**	1 **	0.26 *	0.01 NS	-0.16 NS	-0.11 NS	0.08 NS	-0.16 NS	-0.04 NS	-0.16 NS	-0.11 NS
PDL	-0.01 NS	0.05 NS	0.12NS	-0.09 NS	-0.08 NS	0.15 NS	-0.02 NS	0.07 NS	-0.20 *	-0.09 NS	-0.14 NS	0.26 *	1 **	0.07 NS	-0.10 NS	-0.26 *	-0.01 NS	-0.01 NS	0.05 NS	-0.10 NS	-0.21*
FW	0.18 NS	0.09 NS	0.01 NS	0.34**	0.19 NS	-0.08 NS	-0.07 NS	-0.14 NS	0.08NS	0.24*	0.07 NS	0.01 NS	0.07NS	1 **	0.31**	0.36 **	0.37 **	0.18 NS	0.09 NS	0.31**	0.44 **
FWT	0.17 NS	-0.09 NS	0.06 NS	0.52 **	-0.01 NS	-0.05 NS	-0.19 NS	-0.22*	0.43 **	0.01 NS	0.04 NS	-0.16NS	-0.10 NS	0.31**	1 **	0.42**	0.03 NS	0.17 NS	-0.09 NS	0.16 **	0.82 **
NF/P	0.41 **	0.15 NS	-0.07 NS	0.48**	-0.1 NS	-0.03 NS	-0.04 NS	-0.23 *	0.50 **	0.16NS	0.36 **	-0.11NS	0.26 *	0.36**	0.42 **	1 **	0.34 **	0.41 **	0.15 NS	0.42 **	0.79 **
NS/F	0.22 *	-0.01 NS	-0.32**	0.22*	0.03 NS	-0.02 NS	0.30**	0.07 NS	0.07 NS	0.30 **	0.05 NS	0.08 NS	-0.01 NS	0.37**	0.03 NS	0.34**	1 **	0.228 *	-0.01 NS	0.03 NS	0.26 **
HSW	0.10NS	0.01 NS	-0.30**	0.08 NS	0.06NS	-0.11 NS	0.46**	0.09 NS	-0.00 NS	0.26 *	0.04 NS	0.09 NS	0.01 NS	0.31 **	-0.08 NS	0.18 NS	0.78 **	1**	0.01 NS	-0.08NS	0.08 NS
SLBR	-0.17 NS	-0.10 NS	-0.14 NS	-0.05 NS	0.21*	-0.06 NS	-0.02 NS	0.11 NS	0.01 NS	-0.02 NS	0.19 NS	0.25 *	0.28 **	-0.11 NS	0.01 NS	-0.09 NS	-0.29 **	-0.17 S	1 **	0.01 NS	-0.09 NS
YKG/P	0.37 **	0.04 NS	-0.04 NS	0.60 **	-0.03 NS	-0.02 NS	-0.14 NS	-0.28**	0.57 **	0.15 NS	0.27 **	-0.18 NS	-0.21 *	0.44 **	0.82 **	0.79 **	0.26 *	0.37 **	0.04 NS	1 **	1**
YT/H	0.37 **	0.04 NS	-0.04 NS	0.60 **	-0.02 NS	-0.01 NS	-0.14 NS	-0.28 **	0.57 **	0.15 NS	0.27 **	-0.18 NS	-0.21 *	0.44 **	0.82 **	0.79 **	0.26 *	0.37 **	0.04NS	1 **	1 **

VL-vine length, PL-petiole length, NOPB-number of primary branches, NFF-Node number at which first female flower appears, DFPF-days to fifty percent flowering, SR-sex ratio, DFFH-days to first fruit harvest, NMFH-number of marketable fruit harvest, NOL-number of leaves, FL-fruit length, PDL-peduncle length, FW-fruit width, FWT-fruit weight, NF/P- number of fruits per plant, NS/F-number of seeds per fruit, HSW- hundred seed weight, SLBR-seed length breadth ratio, YKg/P-yield kg per plant, YT/H-Yield tonnes per hectare

Table 2: Genotypic correlation coefficients among different characters of bottle gourd

Characters	VL	IL	PL	NOPB	NFFF	DFPF	SR	DFFH	NMFH	DLFH	NOL	FL	PDL	FW	FWT	NF/P	NS/F	HSW	SLBR	YKG/P	YT/H
VL	1 **	0.24 NS	-0.05 NS	0.38 *	-0.04 NS	0.23 NS	0.17 NS	-0.60 **	0.46 *	0.53 **	0.68 **	-0.18 NS	0.01 NS	0.34 NS	0.26 NS	0.65 **	0.31 NS	0.16 NS	-0.19 NS	0.55 **	0.37 **
IL	0.24 NS	1 **	0.31 NS	-0.03 NS	-0.52 **	0.21NS	-0.01 NS	0.23 NS	-0.09 NS	-0.28 NS	-0.02 NS	-0.06 NS	0.11NS	0.02 NS	0.09 NS	0.19 NS	-0.03 NS	-0.05 NS	-0.37 *	0.10 NS	0.10 NS
PL	-0.05 NS	0.31 NS	1 **	-0.03 NS	-0.18 NS	0.41 *	-0.24 NS	0.26NS	0.10 NS	-0.03 NS	-0.32NS	0.58 **	0.01 NS	-0.01 NS	0.01 NS	-0.16 NS	0.48 **	0.50 **	-0.05 NS	-0.09 NS	-0.09 NS
NOPB	0.38*	-0.03 NS	-0.03 NS	1 **	0.05 NS	-0.12 NS	0.41 *	0.45 *	0.76 **	0.63 **	0.41 *	-0.19 NS	-0.23 NS	0.63 **	0.73 **	0.82 **	0.36 NS	0.26 NS	-0.06 NS	0.88 **	0.88 **
NFFF	-0.04 NS	-0.52 **	-0.18 NS	0.05 NS	1 **	-0.26 NS	0.21 NS	-0.30 NS	-0.09 NS	0.26 NS	0.25 NS	-0.04 NS	-0.04 NS	0.19 NS	0.05 NS	-0.11 NS	0.05 NS	0.05 NS	0.41 *	0.01 NS	0.01 NS
DFPF	0.23 NS	0.21NS	0.41*	-0.12 NS	-0.26 NS	1 **	-0.19 NS	0.17 NS	-0.13 NS	0.01 NS	-0.13 NS	0.34 NS	0.29 NS	-0.11 NS	-0.01 NS	0.01 NS	-0.01 NS	-0.09 NS	-0.01 NS	-0.05 NS	-0.05 NS
SR	0.17NS	-0.01 NS	-0.24 NS	-0.41 *	0.21 NS	-0.19 NS	1 **	0.10 NS	-0.07 NS	-0.02 NS	0.16 NS	0.09 NS	-0.01 NS	-0.09 NS	-0.21 NS	-0.05 NS	0.32 NS	0.50 **	-0.12 NS	-0.15 NS	-0.15 NS
DFFH	-0.60 **	0.23 NS	0.26 NS	-0.45 *	-0.30 NS	0.17 NS	0.10 NS	1 **	-0.62 **	-0.35 NS	-0.54 **	0.20NS	0.02 NS	-0.23 NS	-0.35 NS	-0.45 *	0.11 NS	0.19 NS	0.03 NS	-0.46 *	-0.28 *
NMFH	0.46 *	-0.09 NS	0.10 NS	0.76 **	-0.09 NS	-0.13 NS	-0.07 NS	-0.62 **	1 **	0.18 NS	0.45 *	-0.11 NS	-0.31 NS	0.08 NS	0.52 **	0.69 **	0.07 NS	-0.05 NS	-0.18 NS	0.67 **	0.57 **
DLFH	0.53 **	-0.28 NS	-0.33 NS	0.63 **	0.26 NS	0.08 NS	-0.02 NS	-0.35 NS	0.18 NS	1**	0.35 NS	-0.21 NS	-0.07 NS	0.37 *	0.15 NS	0.38 *	0.49 **	0.42 *	-0.07 NS	0.26 NS	0.26 NS
NOL	0.68 **	-0.02 NS	-0.32 NS	0.41 *	0.25 NS	-0.12NS	0.16 NS	-0.54 **	0.45 *	0.35 NS	1 **	-0.51 **	-0.17 NS	0.12 NS	0.08 NS	0.48 **	0.06 NS	0.01 NS	0.30 NS	0.34 NS	0.27 **
FL	-0.18 NS	-0.06 NS	0.58 **	-0.19 NS	-0.04 NS	0.33 NS	0.09 NS	0.20 NS	-0.11 NS	-0.21 NS	-0.51 **	1**	0.32 NS	0.01 NS	-0.17 NS	-0.14 NS	0.09 NS	0.12 NS	-0.47 **	-0.19 NS	-0.19 NS
PDL	0.01 NS	0.11 NS	0.01 NS	-0.2 NS	-0.04 NS	0.29 NS	-0.01 NS	0.02 NS	-0.31 NS	-0.07 NS	-0.17 NS	0.32 NS	1**	0.08NS	-0.19 NS	-0.35 NS	-0.01 NS	0.06 NS	-0.59 **	-0.27 NS	-0.21 *
FW	0.34 NS	0.02 NS	-0.01 NS	0.63 **	0.19 NS	-0.11 NS	-0.09 NS	-0.23 NS	0.08 NS	0.37 *	0.12NS	0.0 NS	0.08 NS	1 **	0.39 *	0.48 **	0.41 *	0.43 *	-0.26 NS	0.52 **	0.44 **
FWT	0.26 NS	0.01 NS	0.01 NS	0.73 **	0.04NS	-0.01 NS	-0.21 NS	-0.35 NS	0.52 **	0.15 NS	0.08 NS	-0.17 NS	-0.19 NS	0.39 *	1 **	0.54 **	0.04 NS	-0.09 NS	0.06 NS	0.87 **	0.87 **
NF/P	0.65 **	0.19 NS	-0.16 NS	0.82 **	-0.11 NS	0.01 NS	-0.05 NS	-0.45 *	0.69 **	0.38*	0.48 **	-0.14 NS	-0.35 NS	0.48 **	0.54 **	1 **	0.42 *	0.25 NS	-0.19 NS	0.90 **	0.90 **
NS/F	0.30 NS	-0.02 NS	-0.48 **	0.36 NS	0.05 NS	-0.01 NS	0.32 NS	0.11 NS	0.07NS	0.49 **	0.06 NS	0.09 NS	-0.01 NS	0.41 *	0.04 NS	0.42 *	1 **	0.94 **	-0.57 **	0.29 NS	0.26 **
HSW	0.16 NS	-0.04 NS	-0.50 **	0.26 NS	0.05 NS	-0.09 NS	0.50 **	0.19 NS	-0.05 NS	0.42 *	0.01 NS	0.12 NS	0.06 NS	0.43 *	-0.09 NS	0.25 NS	0.94 **	1 **	-0.61 **	0.11 NS	0.11 NS
SLBR	-0.19 NS	-0.37 *	-0.05 NS	-0.06 NS	0.41 *	-0.01 NS	-0.12 NS	0.03 NS	-0.18 NS	-0.07 NS	0.30 NS	-0.47 **	-0.59 **	-0.26 NS	0.06 NS	-0.19 NS	-0.57 **	-0.61 **	1 **	-0.09 NS	-0.09 NS
YKG/P	0.54 **	0.10 NS	-0.09 NS	0.88**	0.01 NS	-0.05 NS	-0.15 S	-0.46 *	0.67 **	0.26 NS	0.34 NS	-0.19 NS	-0.27NS	0.5 **	0.87 **	0.90 **	0.29 NS	0.11NS	-0.09 S	1 **	1 **
YT/H	0.54 **	0.10 NS	-0.09 NS	0.88 **	0.01 NS	-0.05 NS	-0.15 S	-0.46*	0.67 **	0.26 NS	0.34NS	-0.19 S	-0.27 S	0.52 **	0.87 **	0.90 **	0.29 NS	0.11NS	-0.09NS	1**	1 **

VL-vine length, PL-petiole length, NOPB-number of primary branches, NFF-Node number at which first female flower appears, DFPF-days to fifty percent flowering, SR-sex ratio, DFFH-days to first fruit harvest, NMFH-number of marketable fruit harvest, NOL-number of leaves, FL-fruit length, PDL-peduncle length, FW-fruit width, FWT-fruit weight, NF/P- number of fruits per plant, NS/F-number of seeds per fruit, HSW- hundred seed weight, SLBR-seed length breadth ratio,YKg/P-yield kg per plant, YT/H-Yield tonnes per hectare

Most of the genetic correlations were slightly higher than the corresponding phenotypic correlation with similar directions. The above statement was in full agreement for association of yield per plant with all other traits. A positive with highly significant genotypic correlation was found between yield (t/ha) and number of fruits per plant (0.90**), number of primary branches (0.88**), fruit weight (0.87**), number of marketable fruit harvest (0.57**), fruit width (0.44**), vine length (0.37**), number of leaves (0.27**) and number of seeds per fruit (0.2662*). All these correlation coefficients were positive in relation, moderately significant and highly significant (P= 1%). While, the characters days to first fruit harvest (-0.28**) and peduncle length (-0.21*) was having negative correlation coefficient with yield.

Rest of the characters *viz*; internode length (0.11 NS), PL (-0.09NS), node number at which first female flower appears (0.01NS), days to 50% flowering (-0.05NS), sex ratio (-0.15NS), days to last fruit harvest (-0.26 NS), fruit length (-0.19 NS), hundred seed weight (0.11 NS), seed length-breadth ratio (-0.09 NS), showed negative/positive non-significant correlation coefficient with yield.

Husna *et al.,* (2011) studied genetic variability, correlation and path coefficient analysis in bottle gourd and correlation studies revealed that highest significant association of yield per plant was found with number of fruits per plant followed by fruit weight at genotypic and phenotypic level. Khule *et al.,* (2011) trialed correlation in 30 genotypes of sponge gourd and reported marketable fruit yield per plant exhibited significant positive correlation with number of fruits per plant and fruit length. They also found in general genotypic correlation coefficients were higher than the corresponding phenotypic correlation coefficients suggesting that the environmental influence reduces the relationship between yield and yield contributing characters of bottle gourd.

CONCLUSION

Yield is considered to be a complex, polygenic and highly variable character determined by cumulative effects of its component characters. Therefore, direct selection for yield may not be very effective and precise. Thus, it becomes necessary to find out the direction and degree of association between two characters at phenotypic and genotypic levels. In general, it was observed that estimates of genotypic correlation coefficients were in most cases higher than their corresponding phenotypic correlation coefficients. At both phenotypic and genotypic levels, Characters showing the highest and positive phenotypic correlation coefficients with total yield (t/ha) were fruit weight (0.82**), number of fruits per plant (0.79**), number of primary branches (0.60**), number of marketable fruit harvest (0.57**), fruit width (0.44**), vine length(0.37**), number of leaves(0.27**) and number of seeds per fruit (0.26*). Most of the genetic correlations were slightly higher than the corresponding phenotypic correlation and of similar directions. A positive and highly significant genotypic correlation was found between yield (t/ha) and number of fruits per plant (0.90**), number of primary branches (0.88**), fruit weight (0.87**), number of marketable fruit harvest (0.57**), fruit width (0.44**), vine length (0.37**), reducing sugar (0.39**), number of leaves(0.27**) and number of seeds per fruit (0.26*).

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