Genetic Variability in Ridge Gourd (*Luffa acutangula* (L.) Roxb.)

K. Akhila* and Devi Singh

Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj – 211007, India

*Corresponding author

**Abstract**

An experiment was conducted on Genetic variability in the eighteen genotypes of Ridge Gourd during 2019-20 at the Research Field of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The observations were recorded on various yield and yield contributing characters. The results from the present investigation revealed that On the basis of Based on mean performance for fruit yield per plant (2.720 kg) and fruit yield ((24.480t/ha -1)), genotypes 2017/RIGHYB-5 were considered suitable genotypes in Prayagraj climatic condition. Coefficient of variation revealed that high magnitude of GCV and PCV were recorded for Fruit yield/ ha (ton) and Average fruit weight (g). The heritability estimates were found to be high (more than 60%). The genetic advance and genetic advance as percent of mean estimates were found to be high (more than 20%). Genotypic correlation coefficient analysis revealed that fruit yield plant-1 (kg) showed positive significant association with Fruit length (cm) (0.598**), Fruit diameter (cm) (0.741**), Rind thickness (mm) (0.514**), Flash thickness (mm) (0.523**), Number of fruit per plant (0.666**), Vine length (cm) at 90 DAS (0.275*) and Average fruit weight (g) (0.944**) at genotypic level. Whereas Phenotypic correlation coefficient analysis revealed that fruit yield plant-1 (kg) showed positive significant association with Fruit length (cm) (0.573**), Fruit diameter (cm) (0.709**), Rind thickness (mm) (0.509**), Flash thickness (mm) (0.504**), Number of fruit per plant (0.607**), Average fruit weight (g) (0.924**) and Vine length (cm) at 90 DAS (0.270*) at phenotypic level.

**Keywords**

Ridge gourd, Genotypes, Genetic variability, Heritability

**Article Info**

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**Introduction**

Ridge gourd [*Luffa acutangula* (L.)Roxb.], popularly known as Kalitori and also called as angled gourd, angled loofah, Chinese okra, silky gourd and ribbed gourd, belongs to genus *Luffa* of “Cucurbitaceae” family and has chromosome number 2n = 26.

India has the credibility of producing 169.478 million tonnes of vegetables covering an area of 9.542 million hectares in 2014-15 (NHB, 2014-15) securing the second status among the vegetable producing countries of the world but the per capita availability of vegetables in India is as low as 160 gm as against the recommended 300 g per day by FAO.
Fruit contain moisture 92.5g, protein 0.5g, fat 0.5g, carbohydrate 3.4g, energy 17 k cal, calcium 18mg, vitamin C 5mg, riboflavin 0.01mg, phosphorous 26mg, iron 0.5mg and carotene 33µg per 100 g of edible portion (Sheshadri and Parthasarthy, 1980). Besides their use as vegetables, it is also used for various purposes. The fiber obtained from the mature dry fruit is used in industry for filters of various sorts, good pot holders, table mats, bath room mats, slipper and shoe soles. The fiber is also proved to be a good insulator for various purposes. Sometimes the dry fruits which gave good storability are used for ornamental purposes also. It is emetic and traditionally used for the treatment of stomach ailment and fever (Chakravarthy, 1959).

The success of any crop improvement programme largely depends upon the nature and magnitude of genetic variability existing in the breeding material. This study on genetic variability and divergence elucidates information on genetic parameters. Further, path-coefficient technique provides the information on the direct and indirect contribution of individual characters towards yield. Based on these studies, the importance of individual character is marked to facilitate the selection programme for larger gains. Generally, diverse germplasm are expected to give high hybrid vigour. Hence, it necessitates studying the genetic divergence among the existing genotypes for identification of parents for hybridization programme.

Materials and Methods

The present research work entitled, “Genetic variability in Ridge Gourd (Luffa acu
tangula (L.) Roxb.)” was conducted to study the variability, heritability, genetic advance, and correlation and their effect on yield and yield contributing traits. On 18 genotypes of Ridge Gourd collected from different institutes, research stations and private seed companies.

Experimental site

The study was conducted in the Research Field, Department of Horticulture, Naini Agriculture Institute, SHUATS, Prayagraj, located between 25.87° North latitude 81.15° East latitude. The altitude is 78 meters above the mean sea level.

Soil type

The soil type of experimental field was sandy loam with average fertility level and pH in the range of 7.0 to 8.0.

Climate

Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj, falls under the humid subtropical zone. Maximum rainfall received during the period between July and the end of September. However, occasional showers are also very common in the month of June, December and January. The winter month will usually cool and dry. The summer is hot and dry western hot wind start from April and end at onset of monsoon.

Results and Discussion

Analysis of variance showed significant differences among the genotypes for the eighteen characters studied. Analysis of variance showed significant difference among the genotypes for the different characters at 0.1% and 5% significance.

Similar finding for variance have also been reported by Ramakant et al., (2008), Parameshwarappa et al., (2008), Kumar et al., (2012), Reddy et al., (2013), Rani and Kumar (2013) and Narayanan and Murugan (2013), Singh et al., 2015 and Paul et al., 2015 reported significant mean sum of square for various quantitative and quality traits in cow pea (Table 1–7).
Table 1 List of genotypes were used in the present investigation

| Sl. No. | Genotype Symbol | Genotypes               |
|---------|----------------|-------------------------|
| 1       | G1             | 2018/ RIG HYB-1         |
| 2       | G2             | 2018/ RIG HYB-2         |
| 3       | G3             | 2018/ RIG HYB-3         |
| 4       | G4             | 2018/ RIG HYB-4         |
| 5       | G5             | 2018/ RIG HYB-5         |
| 6       | G6             | 2018/ RIG HYB-6         |
| 7       | G7             | 2018/ RIG HYB-7         |
| 8       | G8             | 2017/ RIG HYB-1         |
| 9       | G9             | 2017/ RIG HYB-2         |
| 10      | G10            | 2017/ RIG HYB-5         |
| 11      | G11            | 2017/ RIG HYB-6         |
| 12      | G12            | 2017/ RIG VAR-1         |
| 13      | G13            | 2017/ RIG VAR-2         |
| 14      | G14            | 2017/ RIG VAR-3         |
| 15      | G15            | 2017/ RIG VAR-4         |
| 16      | G16            | 2017/ RIG VAR-5         |
| 17      | G17            | 2017/ RIG VAR-6         |
| 18      | G18            | Rekha                   |

Table 2 Analysis of variance for 18 characters in 18 genotypes of ridge gourd

| Sl. No. | Character                              | Mean sum of square                  |
|---------|----------------------------------------|-------------------------------------|
|         |                                        | Replications (df = 2) | Treatments (df = 17) | Error (df = 34) |
| 1       | Vine Length (cm) at 90 DAS             | 104.18                             | 3956.21              | 69.81           |
| 2       | Days to first female flower            | 0.339                              | 33.79                | 2.78            |
| 3       | Days to first male Flower              | 0.643                              | 28.62                | 2.75            |
| 4       | Node to first male flower              | 0.076                              | 1.488                | 0.004           |
| 5       | Node to first female flower            | 0.84                               | 29.64                | 0.85            |
| 6       | Days to 50% flowering                  | 3.622                              | 40.44                | 2.55            |
| 7       | Days to first harvest                  | 0.218                              | 33.07                | 2.94            |
| 8       | Days to last harvest                   | 4.149                              | 50.03                | 1.909           |
| 9       | Fruit length (cm)                      | 1.28                               | 118.69               | 1.034           |
| 10      | Fruit diameter (mm)                    | 2.804                              | 130.54               | 1.55            |
| 11      | Rind thickness (mm)                    | 0.0154                             | 1.465                | 0.0276          |
| 12      | Flesh thickness (cm)                   | 0.0136                             | 1.530                | 0.025           |
| 13      | Number of fruits per plant             | 1.182                              | 10.90                | 0.50            |
| 14      | Average fruit weight (g)               | 6.85                               | 67.21                | 1.96            |
| 15      | Fruit yield per plant (kg)             | 142.77                             | 2083.24              | 55.21           |
| 16      | Fruit yield per ha (ton)               | 0.084                              | 0.829                | 0.024           |
| 17      | TSS                                     | 0.158                              | 0.096                | 0.157           |
| 18      | Vitamin C (mg)                         | 0.77                               | 0.255                | 0.232           |

* and ** indicate significant at 5 % and 1% level, respectively.
Table.3 Mean performance of eighteen genotypes of ridge gourd

| Genotypes       | Vine Length (cm at 90 DAS) | Days to first female flower | Days to first male Flower | Node to first male flowering | Node to first female flowering | Days to 50% flowering | Days to first harvest | Days to last harvest | Fruit length (cm) |
|-----------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-------------------------------|-----------------------|---------------------|---------------------|-------------------|
| 1 2018/RIGHYB - 1 | 319.64                      | 41.02                       | 36.11                      | 3.26                       | 9.72                          | 44.04                 | 51.28               | 82.64               | 23.03             |
| 2 2018/RIGHYB - 2 | 297.8                       | 42.94                       | 38.31                      | 3.33                       | 12.15                         | 45.89                 | 56.02               | 85.95               | 17.55             |
| 3 2018/RIGHYB - 3 | 305.2                       | 44.93                       | 40.42                      | 4.45                       | 15.01                         | 48.13                 | 56.69               | 86.28               | 27.68             |
| 4 2018/RIGHYB - 4 | 326.1                       | 39.8                        | 34.89                      | 3.04                       | 7.87                          | 42.45                 | 49.88               | 79.78               | 27.99             |
| 5 2018/RIGHYB - 5 | 233.07                      | 48.94                       | 44.56                      | 5.15                       | 18.9                          | 50.48                 | 59.37               | 89.51               | 21.71             |
| 6 2018/RIGHYB - 6 | 239.69                      | 45.87                       | 41.36                      | 4.61                       | 15.97                         | 49.78                 | 57.43               | 90.67               | 29.08             |
| 7 2018/RIGHYB - 7 | 219.69                      | 47.57                       | 43.12                      | 4.2                        | 12.68                         | 50.39                 | 56.44               | 88.53               | 24.6              |
| 8 2017/RIGHYB - 1 | 278.01                      | 48.82                       | 43.78                      | 5.19                       | 17.48                         | 51.91                 | 59.21               | 91.75               | 30.65             |
| 9 2017/RIGHYB - 2 | 284.54                      | 47.06                       | 42.9                       | 4.7                        | 17.15                         | 50.77                 | 58.4                | 90.46               | 31.75             |
| 10 2017/RIGHYB - 5| 241.98                      | 49.36                       | 45                         | 4.28                       | 14.73                         | 53.48                 | 60.38               | 94.21               | 14.53             |
| 11 2017/RIGHYB - 6| 290.8                       | 48.75                       | 43.76                      | 4.25                       | 13.2                          | 52.34                 | 60.62               | 92.2                | 17.93             |
| 12 2017/RIGVAR - 1| 270.08                      | 46.87                       | 47.42                      | 4.31                       | 13.83                         | 53.97                 | 60.22               | 93.46               | 16.3              |
| 13 2017/RIGVAR - 2| 207.48                      | 49.43                       | 44.65                      | 4.29                       | 16.26                         | 51.77                 | 59.52               | 89.2                | 19.11             |
| 14 2017/RIGVAR - 3| 236.3                       | 47.88                       | 43.44                      | 4.94                       | 17.02                         | 52.31                 | 58.67               | 88.61               | 21.12             |
| 15 2017/RIGVAR - 4| 280.55                      | 48.18                       | 43.72                      | 4.32                       | 14.65                         | 51.8                  | 59.55               | 91.43               | 16.02             |
| 16 2017/RIGVAR - 5| 267.27                      | 46.22                       | 46.86                      | 4.39                       | 16.38                         | 54.55                 | 62.15               | 93.26               | 16.44             |
| 17 2017/RIGVAR - 6| 257.97                      | 49.4                        | 45.31                      | 4.43                       | 17.24                         | 52.72                 | 60.04               | 92.32               | 17.12             |
| 18 Rekha         | 192.18                      | 52.15                       | 47.45                      | 5.74                       | 20.44                         | 57.86                 | 63.48               | 96.26               | 16.8              |
| Mean             | 263.7972                    | 46.955                      | 42.9478                    | 4.3822                     | 15.0378                       | 50.8133               | 58.2972             | 89.8067             | 21.6339           |
| C.V.             | 2.5863                      | 3.3511                      | 3.7566                     | 1.5874                     | 6.0737                        | 3.1265                | 3.1926              | 1.4277              | 4.139             |
| S.E.             | 3.9391                      | 0.9085                      | 0.9315                     | 0.0402                     | 0.5273                        | 0.9172                | 1.0746              | 0.7402              | 0.517             |
| C.D. 5%          | 11.321                      | 2.6109                      | 2.6771                     | 0.1154                     | 1.5155                        | 2.6362                | 3.0883              | 2.1274              | 1.4858            |
| Range Lowest     | 192.18                      | 39.8                        | 34.89                      | 3.04                       | 7.87                          | 42.45                 | 49.88               | 79.78               | 14.53             |
| Range Highest    | 326.1                       | 52.15                       | 47.45                      | 5.74                       | 20.44                         | 57.86                 | 63.48               | 96.26               | 31.75             |
Table 4 Mean performance of eighteen genotypes of ridge gourd

| Genotypes        | Fruit diameter (mm) | Rind thickness (mm) | Flesh thickness (cm) | Number ox fruit per plant | Average fruit weight (g) | Fruit yield per Plant (kg) | Fruit yield/ ha (ton) | TSS | Vitamin C (mg) |
|------------------|---------------------|--------------------|---------------------|--------------------------|--------------------------|----------------------------|-----------------------|-----|----------------|
| **1 2018/RIGHYB - 1** | 43.370              | 3.560              | 3.630               | 13.240                   | 140.050                  | 1.850                      | 16.650                | 4.060 | 3.100          |
| **2 2018/RIGHYB - 2** | 42.860              | 4.600              | 4.650               | 13.970                   | 126.510                  | 1.770                      | 15.930                | 3.940 | 4.070          |
| **3 2018/RIGHYB - 3** | 38.710              | 3.190              | 3.140               | 14.210                   | 143.160                  | 1.990                      | 17.910                | 3.980 | 3.880          |
| **4 2018/RIGHYB - 4** | 45.360              | 3.370              | 3.570               | 13.660                   | 154.630                  | 2.120                      | 19.080                | 3.890 | 4.350          |
| **5 2018/RIGHYB - 5** | 41.120              | 3.250              | 3.190               | 12.990                   | 116.190                  | 1.510                      | 13.590                | 4.330 | 4.090          |
| **6 2018/RIGHYB - 6** | 39.170              | 3.040              | 2.920               | 14.010                   | 133.470                  | 1.870                      | 16.830                | 4.050 | 4.050          |
| **7 2018/RIGHYB - 7** | 53.850              | 4.830              | 4.830               | 13.140                   | 164.040                  | 2.150                      | 19.350                | 4.150 | 4.170          |
| **8 2017/RIGHYB - 1** | 47.510              | 3.380              | 3.350               | 12.280                   | 152.140                  | 1.860                      | 16.740                | 3.810 | 4.020          |
| **9 2017/RIGHYB - 2** | 59.780              | 4.140              | 4.030               | 14.950                   | 182.820                  | 2.720                      | 24.480                | 4.070 | 4.010          |
| **10 2017/RIGHYB - 5** | 48.550              | 5.140              | 5.100               | 12.520                   | 160.480                  | 2.000                      | 18.000                | 4.200 | 4.260          |
| **11 2017/RIGHYB - 6** | 44.490              | 3.240              | 3.260               | 13.450                   | 147.310                  | 1.970                      | 17.730                | 4.100 | 4.370          |
| **12 2017/RIGVAR - 1** | 45.370              | 3.440              | 3.710               | 10.480                   | 116.690                  | 1.210                      | 10.890                | 3.870 | 4.480          |
| **13 2017/RIGVAR - 2** | 48.780              | 4.040              | 4.140               | 9.600                    | 117.430                  | 1.100                      | 9.900                 | 3.690 | 4.170          |
| **14 2017/RIGVAR - 3** | 36.940              | 2.630              | 2.580               | 12.170                   | 98.540                   | 1.190                      | 10.710                | 4.070 | 4.010          |
| **15 2017/RIGVAR - 4** | 43.680              | 3.450              | 3.690               | 10.640                   | 105.130                  | 1.110                      | 9.990                 | 4.160 | 4.280          |
| **16 2017/RIGVAR - 5** | 41.620              | 3.540              | 3.300               | 11.310                   | 107.320                  | 1.210                      | 10.890                | 4.120 | 4.090          |
| **17 2017/RIGVAR - 6** | 40.380              | 3.350              | 3.310               | 10.740                   | 111.640                  | 1.200                      | 10.800                | 3.790 | 4.150          |
| **18 Rekha**      | 44.660              | 3.510              | 3.580               | 6.980                    | 108.600                  | 0.760                      | 6.840                 | 3.770 | 3.870          |
| **Mean**          | 44.789              | 3.650              | 3.666               | 12.241                   | 132.564                  | 1.644                      | 14.795                | 4.003 | 4.079          |
| **C.V.**          | 2.973               | 2.540              | 5.040               | 5.252                    | 2.538                    | 5.432                      | 5.432                 | 12.105 | 12.073       |
| **S.E.**          | 0.769               | 0.054              | 0.107               | 0.371                    | 1.943                    | 0.052                      | 0.464                 | 0.280 | 0.284          |
| **C.D. 5%**       | 2.210               | 0.154              | 0.307               | 1.067                    | 5.584                    | 0.148                      | 1.334                 | -     | -              |
| **Range Lowest**  | 36.940              | 2.630              | 2.580               | 6.980                    | 98.540                   | 0.760                      | 6.840                 | 3.690 | 3.100          |
| **Range Highest** | 59.780              | 5.140              | 5.100               | 14.950                   | 182.820                  | 2.720                      | 24.480                | 4.330 | 4.480          |
Table 5 Estimation of genetic variability, GCV, PCV, Heritability, genetic advance and genetic advance as per cent of mean for 18 characters in ridge gourd genotypes

| Sl. No. | Character                                | Genotypic coefficient of variation | Phenotypic coefficient of variation | Heritability in broad sense (h²b) | Genetic Advance | Genetic Advance as % of mean |
|---------|-----------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|-----------------|-----------------------------|
| 1       | Vine Length (cm) at 90 DAS              | 13.57                             | 13.97                             | 94.90                            | 72.22           | 27.24                       |
| 2       | Days to first female flower             | 6.26                              | 7.19                              | 75.80                            | 5.26            | 11.22                       |
| 3       | Days to first male Flower               | 7.53                              | 8.49                              | 78.70                            | 5.87            | 13.77                       |
| 4       | Node to first male flower               | 15.783                            | 15.854                            | 99.100                           | 1.442           | 32.36                       |
| 5       | Node to first female flower             | 20.133                            | 21.013                            | 91.80                            | 6.11            | 39.73                       |
| 6       | Days to 50% flowering                   | 7.020                             | 7.699                             | 83.20                            | 6.67            | 13.188                      |
| 7       | Days to first harvest                   | 5.449                             | 6.197                             | 77.30                            | 5.73            | 9.869                       |
| 8       | Days to last harvest                    | 4.459                             | 4.717                             | 89.400                           | 7.80            | 8.68                        |
| 9       | Fruit length (cm)                       | 27.177                            | 27.533                            | 97.400                           | 12.73           | 55.260                      |
| 10      | Fruit diameter (mm)                     | 14.33                             | 14.58                             | 96.50                            | 13.27           | 29.003                      |
| 11      | Rind thickness (mm)                     | 18.523                            | 19.050                            | 94.500                           | 1.387           | 37.102                      |
| 12      | Flesh thickness (cm)                    | 19.006                            | 19.475                            | 95.200                           | 1.424           | 38.211                      |
| 13      | Number of fruits p plant                | 14.868                            | 15.907                            | 87.400                           | 3.585           | 28.629                      |
| 14      | Average fruit weight (g)                | 29.499                            | 30.802                            | 91.700                           | 9.201           | 58.196                      |
| 15      | Fruit yield per plant (kg)              | 18.802                            | 19.554                            | 92.400                           | 51.498          | 37.240                      |
| 16      | Fruit yield/ ha (ton)                   | 29.499                            | 30.802                            | 91.700                           | 1.002           | 58.196                      |
| 17      | TSS                                      | 3.539                             | 9.171                             | 14.900                           | 0.114           | 2.813                       |
| 18      | Vitamin C (mg)                          | 2.153                             | 12.075                            | 3.200                            | 0.032           | 0.791                       |
Table 6: Genotypic correlation (rg) between yield and yield attributes for eighteen characters in Ridge Gourd genotypes

| Character                        | Days to first male flowering | Days to first female flower | Days to 50% flowering | Days to last harvest | Fruit length (cm) | Fruit diameter (cm) | Rind thickness (mm) | Flash thickness (mm) | Number of fruit per plant | TSS | Vitamin C | Average fruit weight (g) | Fruit yield (t ha⁻¹) | Fruit yield plant⁻¹ (kg) |
|---------------------------------|------------------------------|-----------------------------|-----------------------|---------------------|-------------------|-------------------|---------------------|---------------------|--------------------------|-----|-----------|--------------------------|-------------------|--------------------------|
| Vine length (cm) at 90 DAS      | 1.00                         | -                           | 0.756**               | 0.656**             | 0.670**           | 0.687**           | 0.672**             | 0.605**             | 0.583**                  | -0.24| 0.23      | 0.436**                  | 0.07              | 0.275*                   |
| Days to first female flower     | 1.00                         | 0.892**                     | 0.892**               | 0.904**             | 0.921**           | 0.986**           | 0.896**             | -0.329*             | 0.13                     | 0.13| 0.24      | -0.22                    | -0.18             | -0.26                    |
| Days to first male flowering    | 1.00                         | 0.796**                     | 0.791**               | 0.993**             | 0.852**           | 0.971**           | 0.498**             | -0.05               | -0.15                    | 0.597**| 0.24      | 0.423**                  | 0.560**           | 0.407**                  |
| Node to first male flowering    | 1.00                         | 0.956**                     | 0.820**               | 0.867**             | 0.792**           | -0.02             | -0.295*             | 0.366**             | -0.460**                  | 0.04| -0.07     | -0.361**                 | -0.07             | -0.26                    |
| Node to first female flowering  | 1.00                         | 0.803**                     | 0.901**               | 0.781**             | -0.09             | -0.08             | -0.21              | -0.334*             | 0.463**                  | 0.21| 0.07      | -0.424**                 | -0.367**          | -0.367**                 |
| Days to 50% flowering           | 1.00                         | 0.845**                     | 0.962**               | 0.515**             | -0.04             | -0.13             | -0.738**            | -0.410**            | -0.25                    | 0.571**| -0.07     | -0.398**                 | -0.375**          | -0.375**                 |
| Days to first harvest           | 1.00                         | 0.854**                     | -0.503**              | -0.05               | -0.09             | -0.18             | -0.640**            | 0.392**             | 0.551**                  | 0.512**| -0.07     | -0.375**                 | -0.375**          | -0.375**                 |
| Days to last harvest            | 1.00                         | -0.456**                    | 0.08                  | 0.06                | 0.01              | 0.559**           | 0.21               | -0.557**            | -0.377**                 | -0.04| -0.22     | -0.377**                 | -0.377**          | -0.377**                 |
| Fruit length (cm)               | 1.00                         | 0.295**                     | -0.17                 | -0.15               | 0.636**           | 0.538**           | 0.26               | 0.678**             | 0.15                     | 0.598**| 0.15      | 0.598**                  | 0.15              | 0.598**                  |
| Fruit diameter (cm)             | 1.00                         | 0.655*                      | 0.700**               | 0.16                | -0.09             | -0.12             | 0.560**             | 0.07               | 0.741**                  | 0.07| 0.741**   | 0.741**                  | 0.741**           | 0.741**                  |
| Rind thickness (mm)             | 1.00                         | 0.10                        | 0.26                 | -0.10               | -0.15             | 0.382**           | -0.22              | 0.382**             | -0.02                    | 0.514**| 0.514**  | 0.514**                  | 0.514**           | 0.514**                  |
| Flash thickness (mm)            | 1.00                         | -0.11                       | 0.13                 | -0.15               | -0.26             | 0.381**           | 0.06               | 0.523**             | 0.523**                  | 0.523**| 0.523**  | 0.523**                  | 0.523**           | 0.523**                  |
| Number of fruit per plant       | 1.00                         | 0.01                        | 0.13                 | -0.10               | -0.21             | 0.382**           | -0.22              | 0.382**             | -0.22                    | 0.514**| 0.514**  | 0.514**                  | 0.514**           | 0.514**                  |
| TSS                             | 1.00                         | 0.05                        | 0.13                 | -0.15               | -0.26             | 0.381**           | 0.06               | 0.523**             | 0.523**                  | 0.523**| 0.523**  | 0.523**                  | 0.523**           | 0.523**                  |
| Vitamin C                       | 1.00                         | 0.00                        | 0.23                 | 0.444**             | 0.07              | 1.00              | 1.00               | 0.07               | 1.00                     | 1.00| 0.07      | 1.00                     | 1.00              | 1.00                     |
| *, ** significant at 5% and 1% level, respectively

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Table 7 Phenotypic correlation (r_p) between yield and yield attributes for eighteen characters in Ridged gourd genotypes

| Character                        | TSS         | Vitamin C    | Average fruit weight (g) | Fruit yield (t ha\(^{-1}\)) | Fruit yield plant (kg) |
|----------------------------------|-------------|--------------|--------------------------|----------------------------|------------------------|
| Fruit yield (t ha\(^{-1}\))      | 0.19        | 0.17         | 0.02                     | 0.270*                     |
| Fruit yield plant (kg)            | 1.00        | 1.00         | 0.04                     | 1.00                       |

| Vine length (cm) at 90 DAS       | 1.00        | -0.0907 ***  | -0.5823 ***              | -0.6480 ***                |
| Days to first female flowering   | 1.00        | 0.8604 ***   | 0.7990 ***               | 0.7671 ***                 |
| Days to first male flowering     | 1.00        | 0.7345 ***   | 0.7406 ***               | 0.9221 ***                 |
| Node to first flowering          | 1.00        | 0.7571 ***   | 0.7525 ***               | 0.7413 ***                 |
| Days to 50% flowering            | 1.00        | 0.8403 ***   | 0.8403 ***               | 0.00 ***                   |
| Fruit length (cm)                | 1.00        | 0.6315 ***   | 0.6265 ***               | 0.15 ***                   |
| Rind thickness (mm)              | 1.00        | 0.9650 ***   | 0.0111 ***               | 0.3673 *                   |
| Flash thickness (mm)             | 1.00        | 0.08 ***     | 0.03 ***                 | 0.8599 ***                 |
| Number of fruit per plant        | 1.00        | -0.5650 ***  | -0.03 ***                | 0.24 ***                   |
| TSS                              | 1.00        | 0.01 *       | -0.5980 ***              | -0.08 ***                  |
| Vitamin C                        | 1.00        | 0.02         | 0.08                     | 0.04                       |
| Average fruit weight (g)         | 1.00        | 0.15         | 0.924*                   | 1.00                       |

*, ** significant at 5% and 1% level, respectively

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The genotype 2017/RIGHYB-5 was recorded high Fruit yield (2.72 kg/plant and 24.48 ton/ha), whereas minimum Fruit yield per plant and per hectare was observed in genotype Rekha with (0.76 kg/plant and 6.84 ton/ha).

The study on genotypic and phenotypic coefficient of variation revealed that Higher magnitude of genotypic coefficient of variance (GCV) was recorded for Fruit yield/ ha (q) (29.499), Average fruit weight (g) (9.499) and Fruit length (cm) (27.177) Node to first female flower (20.133). Higher magnitude of phenotypic coefficient of variance (PCV) was recorded for Fruit yield/ ha (q) (30.083), Average fruit weight (g) (30.083) and Fruit length (cm) (27.533) Node to first female flower (20.013). The present findings are in accordance with the findings of Nath et al., (2009).

The heritability estimate were found to be high (>60) for almost all the characters viz., Vine Length (cm) at 90 DAS (94.90), Days to first female flower (75.80), Days to first male Flower (78.70), Node to first male flower (99.100), Node to first female flower (91.80), Days to 50% flowering (83.20), Days to first harvest (77.30), Days to last harvest (89.400), Fruit length (cm) (97.400), Fruit diameter (mm) (96.50), Rind thickness (mm) (94.500), Flesh thickness (cm) (95.200), Number of fruits p plant (87.400), Average fruit weight (g) (91.700), Fruit yield per plant (kg) (92.400) and Fruit yield/ ha (ton) (91.700).

The estimation of genetic advance for all the characters are presented in Genetic advance as percent mean was categorized as low (0-10%), moderate (10-20%) and (≥20%) as given by Johnson et al., (1955) and Falconer and Mackay (1996). Genetic advance as mean was highest for Vine Length (cm) at 90 DAS (72.22) and Fruit yield per plant (kg) (51.498). Genetic advance as per cent of mean was highest for Vine Length (cm) at 90 DAS (27.24), Node to first male flower (32.36), Node to first female flower (39.73), Fruit length (cm) (55.260), Fruit diameter (mm) (29.003), Rind thickness (mm) (37.102), Flesh thickness (cm) (38.211), Number of fruits p plant (28.629), Average fruit weight (g) (58.196), Fruit yield per plant (kg) (37.240) and Fruit yield/ ha (ton) (58.196).

Genotypic correlation coefficient analysis revealed that fruit yield plant¹ (kg) showed positive significant association with Fruit length (cm) (0.598**), Fruit diameter (cm) (0.741**), Rind thickness (mm) (0.514**), Flash thickness (mm) (0.523**), Number of fruit per plant (0.666**), Vine length (cm) at 90 DAS (0.275*) and Average fruit weight (g) (0.944**). While as negative significant association was observed with Days t first male flowering (-0.407**), Node to first female flowering (-0.367**), Days to 50% flowering (-0.398**), Days to first harvest (-0.375**) and TSS (-0.621**).

Phenotypic correlation coefficient analysis revealed that fruit yield plant¹ (kg) showed positive significant association with Fruit length (cm) (0.573**), Fruit diameter (cm) (0.709**), Rind thickness (mm) (0.509**), Flash thickness (mm) (0.504**), Number of fruit per plant (0.607**), Average fruit weight (g) (0.924**) and Vine length (cm) at 90 DAS (0.270*). While as negative significant association was observed with Days t first male flowering (-0.368**), Node to first female flowering (-0.341*), Days to 50% flowering (-0.365**), Days to first harvest (-0.329*) and TSS (-0.514**).

On the basis of mean performance of eighteen genotypes of Ridge Gourd, genotype, 2017/RIGHYB-5 (2.72 kg/plant and 24.48 ton/ha) was found superior in terms of Fruit yield/ha (ton). On the basis of Analysis of variance significant difference was recorded for all the quantitative and qualitative traits indicating presence of large amount of variability in the genotypes.

Hence it can be concluded that Ridge Gourd Genotype2017/RIGHYB-5 having highest yield can be utilized further for crop improvement programs.
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