*Int.J.Curr.Microbiol.App.Sci* (2022) *11*(02): 423-431

*International Journal of Current Microbiology and Applied Sciences*
*ISSN: 2319-7706* **Volume 11 Number 02 (2022)**
Journal homepage: http://www.ijcmas.com

**Original Research Article** https://doi.org/10.20546/ijcmas.2022.1102.048

# Correlation and Path Analysis Studies in Early Generation Populations Derived from Commercial Hybrids of Ridge Gourd (*Luffa acutangla* L.)

**E. P. Madhuri[1]*, Shashikanth Evoor[1], V. D. Gasti[1], G. Raghavendra[2] and Bapurayagouda Patil[3]**

*[1]Department of Vegetable Science, [2]Department of BCI,*
*[3]Department of Seed Science and Technology, University of Horticultural Sciences, Bagalkot, India*

**Corresponding author*

**Keywords**

Ridge gourd, vegetable crop, tropical climbing herb

**Article Info**

***Received:***
02 January 2022
***Accepted:***
05 February 2022
***Available Online:***
10 February 2022

**A B S T R A C T**

In this experiment, correlation and path analysis in $F_2$ populations of two commercial hybrids i.e., Naga and NS-3 were studied for growth, earliness, yield and quality parameters by using unreplicated trials in College of Horticulture, UHS, Bagalkot, during Jan-March 2018. The results revealed that vine length at 60 DAP, number of fruits per vine, average fruit weight, fruit length, fruit diameter had significant positive correlation with fruit yield per plant, whereas days to first female flowering, days to first male flowering and sex ratio had significant negative association with fruit yield per plant, the associations of these characters is in the desirable direction. Thus, selection for these characters will improve the yield. Path coefficient studies revealed that number of fruits per vine, fruit length and fruit diameter showed direct positive effects on fruit yield per vine, whereas days to first male and female flowering and sex ratio showed direct negative effects on fruit yield per vine.

## Introduction

Ridge gourd (*Luffa acutangula* L.) is one of the important cucurbitaceous vegetable crop. The name "*Luffa* or *Loofah"* is an Arabic origin and refers to the spongy characteristic of the mature fruit (Bose and Som, 1986). Its origin is not definitely known, although wild forms are available in India (Sunda Island and Java). There are eight species of *Luffa* originated in Indian sub-continent of which only two L. *acutangula* and L. *cylindrical* are commercially cultivated, while, others are wild types. It is a tropical climbing herb and cultivated all most all parts of India and can be grown in all types of soils and in naturalized tropics and subtropics it can be grown in summer or rainy season. It is propagated by seeds.

Yield is a complex character and it is mainly depends upon a large number of influencing

characters and their interactions. Thus, the knowledge of association (correlation) of these characters with yield will be useful to formulate selection strategies and for further improvement of yield. Thus, determination of association between characters has a considerable importance in selection practices, since it helps in the construction of selection indices.

However, the correlation study alone does not reveal the direct and indirect contribution of individual character towards the yield. In order to have clearer picture of association of direct and indirect yield components with observed correlation, the path coefficient technique developed by Wright (1921) would be helpful. This technique helps in estimating direct and indirect contribution of various components in building up the total correlation towards yield (Wright, 1921) On the basis of these studies the importance of individual characters is marked to facilitate the selection programme for better gains. Path coefficient analysis gives an idea about contribution of each independent character to yield. Hence, in this experiment correlation and path analysis were studied in $F_2$ populations.

## Materials and Methods

The present research was conducted at the main campus of University of Horticultural Sciences, Bagalkot. College of Horticulture, Bagalkot, Karnataka, India, in Jan-March, 2018. Two commercial hybrids i.e., Naga and NS-3 were selected in order to develop the experimental material required for the correlation and path analysis studies in $F_2$ generation. After selfing of these two hybrids $F_2$ seeds were obtained, we used these seeds for the main experiment for correlation studies. The experimental design was unreplicated trials, because in $F_2$ population each plant behaves as a single genotype so there was no need of replications in this experiment. Sowing in the main field was done on 6$^{th}$ Jan 2018 at field of Vegetable Science, College of Horticulture, Bagalkot. Seeds were treated with hot water (50°c for four hours) for better germination. Treated seeds were sown in portrays which were filled with coco peat and seedlings were transplanted to main field at 18 days after germination. Correlation and path analysis were evaluated for growth, earliness, yield and quality parameters. The observations recorded were mentioned in tables.

## Results and Discussion

### Character association in $F_2$ population of Naga

Vine length at 60 days after planting had significant and positive correlation with number of fruits per vine, fruit yield per plant and vine length at 90 days after planting, so fruit yield can be increased by selecting the plants which shows higher vine length because higher vine length simultaneously increases the number of fruits per vine so that obviously yield can be increased. These results were shown in conformity with the results of Chowdary *et al.*, (2014) and Koppad *et al.,* (2016) in ridge gourd. Number of secondary branches at 90 days after planting had significant and positive association with node of first female flowering and node of first male flowering. Days to first male flowering had significant positive association with days to first female flowering, node to first female flowering and node to first male flowering. Days to 1$^{st}$ female flowering had significant positive association with Node of 1st female flowering, node of first male flowering and it is negatively correlated with number of fruits per vine and fruit yield per vine. This is one of the desirable trait to explore, because it denotes that early maturing plants will going to give higher yield because this trait is negatively correlated with node number to first female flower. So by selecting these plants we can improve the yield as well as earliness. Similar results were also observed by Prasanna *et al.,* (2002), Choudhary *et al.,* (2008), Choudhary *et al.,* (2014) and Hanumegowda *et al.,* (2012) in ridge gourd.

Node of first female flowering had significant and positive correlation with node of first male flowering, which indicates that the plants which produce fruits in earliest nodes will also going to

give more number of fruits per vine which ultimately increases the fruit yield per plant. Similarly sex ratio had significant and negative correlation with number of fruits per vine and also yield per vine, that means lesser sex ratio is advantageous to increase the yield. These results in agree with the findings of Choudhary *et al.,* (2008) and Hanumegowda *et al.,* (2012) in ridge gourd. Average fruit weight had highly significant and positive correlation with fruit length, fruit diameter and fruit yield per vine. Fruit length had highly significant and positive correlation with fruit diameter and fruit yield per plant. Fruit diameter also had significant and positive correlation with fruit yield per plant.

These traits can be considered for simultaneously improvement of yield along with these traits. These results are in agreement with the findings of Hanumegowda *et al.,* (2012), Choudhary *et al.,* (2014) and Choudhary *et al.,* (2008) in ridge gourd (Table-1).

## Character association in $F_2$ population of NS-3 (Table-2)

Vine length had significant and positive correlation with number of primary branches at 90 days after planting. Days to first male flowering had significant and positive association with days to first female flowering, node to first female flowering, node to first male flowering. Days to first female flowering had significant positive association with node of first female flowering and node of first male flowering.

Similarly node of first female flowering had significant and positive correlation with node of first male flowering. Whereas, sex ratio had significant and negative correlation with fruit yield per vine which is desirable character for further selection, lesser the sex ratio more will be the number of fruit set ultimately higher yield. Similar results were also observed by Prasanna *et al.,* (2002), Choudhary *et al.,* (2008) and Hanumegouda *et al.,* (2012) in ridge gourd.

Number of fruits per vine had significant and positive correlation with fruit yield per vine. Whereas, average fruit weight had highly significant and positive correlation with fruit length, fruit diameter and fruit yield per vine. Fruit length had highly significant and positive correlation with fruit diameter and fruit yield per plant. Similarly fruit diameter had highly significant and positive correlation with fruit yield per plant. Similar results were also noticed by Choudhary *et al.,* (2008), Hanumegowda *et al.,* (2012) and Gayen and Hossain (2006) in ridge gourd.

## Path coefficient analysis on yield per plant in $F_2$population of Naga

Number of secondary branches at 90 DAP, days to first male flowering have positive direct effect on fruit yield per vine. Khatoon *et al.,* (2016), Dubey *et al.,* (2013) and Narasannanavar *et al.,* (2014) observed the same results in ridge gourd. Node of first male flowering has positive direct effect on fruit yield per vine. Similar results were obtained from Narasannanavar *et al.,* (2014), Khan *et al.,* (2015) and Khatoon *et al.,* (2016) in ridge gourd. Number of fruits per vine, average fruit weight, fruit length and fruit diameter has high positive and significant direct effect on fruit yield per vine.

This positive direct effect shows the direct association with the increase in the yield. These results were in accordance with the findings of Narasannanavar *et al.,* (2014), Ananthan and Krishnamoorthy (2017) and Khatoon *et al.,* (2016) in ridge gourd. These direct positive effects were influence directly in increasing the yield of the crop, selecting the traits which directly influence the yield will be more desirable for the crop improvement.

Days to first female flowering have negative significant direct effect on fruit yield per vine, these results are same as the results obtained from Narasannanavar *et al.,* (2014), Khatoon *et al.,* (2016) and Dubey *et al.,* (2013a). Node of first female flowering has negative direct effect on fruit yield per vine.

**Table.1** Estimation of correlation coefficients in segregating population of Naga hybrid of ridge gourd

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **1.0000** | 0.8875** | 0.1021 | 0.0274 | 0.0289 | -0.1089 | -0.1102 | -0.1318 | -0.0423 | -0.0526 | 0.1673 * | 0.0308 | 0.0168 | -0.1722* | 0.0097 | 0.0388 | 0.1411* |
| **2** | | **1.0000** | 0.0417 | 0.0275 | 0.0020 | -0.0877 | -0.0978 | -0.1769* | -0.0657 | -0.0496 | 0.1445 * | -0.0019 | -0.0134 | -0.1613* | -0.0255 | -0.0422 | 0.1075 |
| **3** | | | **1.0000** | 0.0550 | 0.0760 | 0.0717 | 0.0718 | 0.1178 | 0.1772 * | -0.0234 | 0.1261 | 0.0334 | 0.0001 | -0.0271 | 0.0420 | 0.0532 | 0.0937 |
| **4** | | | | **1.0000** | 0.9102** | 0.1177 | 0.1261 | 0.1607* | 0.1448 * | 0.0706 | -0.0913 | 0.0325 | 0.0150 | 0.0671 | -0.1350 | -0.1351 | -0.0449 |
| **5** | | | | | **1.0000** | 0.0970 | 0.1049 | 0.1634* | 0.1578* | 0.0410 | -0.0375 | 0.0994 | 0.0769 | 0.0933 | -0.1282 | -0.0872 | 0.0463 |
| **6** | | | | | | **1.0000** | 0.9877** | 0.7993** | 0.6940** | 0.0391 | -0.2067** | 0.0141 | -0.0071 | -0.0255 | -0.0309 | -0.0181 | -0.1386* |
| **7** | | | | | | | **1.0000** | 0.8095** | 0.6996** | 0.0317 | -0.2080** | 0.0052 | -0.0160 | -0.0222 | -0.0198 | -0.0006 | -0.1481* |
| **8** | | | | | | | | **1.0000** | 0.8735** | 0.0358 | -0.1652* | 0.0617 | 0.0517 | 0.0876 | 0.0529 | 0.0123 | -0.0749 |
| **9** | | | | | | | | | **1.0000** | 0.0766 | -0.1023 | 0.0411 | 0.0097 | -0.0440 | 0.0232 | -0.0346 | -0.0445 |
| **10** | | | | | | | | | | **1.0000** | -0.2412** | -0.0753 | -0.0645 | 0.0224 | -0.0232 | -0.0355 | -0.2086** |
| **11** | | | | | | | | | | | **1.0000** | 0.0200 | 0.0159 | 0.0821 | 0.1651* | 0.1804** | 0.6421** |
| **12** | | | | | | | | | | | | **1.0000** | 0.9710** | 0.6062** | 0.0258 | 0.0917 | 0.7550** |
| **13** | | | | | | | | | | | | | **1.0000** | 0.6510** | 0.0291 | 0.0952 | 0.7335** |
| **14** | | | | | | | | | | | | | | **1.0000** | 0.0761 | 0.1109 | 0.5003** |
| **15** | | | | | | | | | | | | | | | **1.0000** | 0.8247** | 0.1346* |
| **16** | | | | | | | | | | | | | | | | **1.0000** | 0.1813** |
| **17** | | | | | | | | | | | | | | | | | **1.0000** |

*significant at p=0.01 **significant at p=0.05

1- Vine length at 60DAP 4- Number of secondary branches at 60DAP 7-Days to1st female flowering 10- Sex ratio 13- Fruit length 16- Vit-C

2- Vine length at 90DAP 5- Number of secondary branches at 90DAP 8-Node of 1st female flowering 11-Number of fruits per vine 14- Fruit diameter 17-Fruit yield per vine

3- Number of primary branches at 90DAP 6- Days to 1st male flowering 9-Node of 1st male flowering 12- Average fruit weight 15- TSS

**Table.2** Estimation of correlation coefficients in segregating population of NS-3 hybrid of ridge gourd

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **1.0000** | 0.8211** | 0.1569* | 0.0072 | -0.0167 | 0.0140 | 0.0160 | -0.0034 | 0.0298 | -0.0602 | 0.0680 | -0.0098 | -0.0456 | 0.0227 | 0.1050 | 0.1687* | 0.0370 |
| **2** | | **1.0000** | 0.0889 | 0.0320 | -0.0082 | 0.1145 | 0.1107 | 0.0433 | 0.0798 | -0.1056 | 0.0845 | -0.0385 | -0.0738 | 0.0975 | 0.0680 | 0.1819** | 0.0121 |
| **3** | | | **1.0000** | 0.0694 | -0.0067 | 0.0118 | 0.0001 | 0.0206 | 0.0358 | 0.0014 | -0.0817 | -0.0252 | -0.0011 | -0.0538 | 0.0501 | -0.0096 | - 0.0465 |
| **4** | | | | **1.0000** | 0.5994** | - 0.0067 | 0.0076 | 0.0233 | 0.0278 | -0.0097 | -0.0368 | -0.0274 | -0.0438 | 0.0792 | 0.0207 | 0.0531 | -0.0415 |
| **5** | | | | | **1.0000** | - 0.0659 | -0.0448 | -0.0909 | -0.0841 | -0.1291 | 0.1562* | 0.1487* | 0.1568* | 0.0153 | 0.1030 | 0.1456* | 0.2082 |
| **6** | | | | | | **1.0000** | 0.9913** | 0.8780** | 0.8018** | -0.0734 | 0.0712 | 0.0742 | 0.0806 | 0.0738 | -0.0984 | 0.0287 | 0.0725 |
| **7** | | | | | | | **1.0000** | 0.8828** | 0.8006** | -0.0781 | 0.0694 | 0.0786 | 0.0845 | 0.0689 | -0.0843 | 0.0263 | 0.0783 |
| **8** | | | | | | | | **1.0000** | 0.9096** | -0.0435 | 0.0948 | 0.0734 | 0.0761 | 0.0029 | -0.1227 | -0.0360 | 0.1035 |
| **9** | | | | | | | | | **1.0000** | -0.0044 | 0.0919 | 0.0830 | 0.0888 | -0.0069 | -0.0773 | 0.0372 | 0.1220 |
| **10** | | | | | | | | | | **1.0000** | -0.0857 | -0.1019 | -0.0945 | -0.0788 | - 0.1358* | -0.0926 | -0.1497* |
| **11** | | | | | | | | | | | **1.0000** | 0.1318 | 0.1264 | -0.0356 | 0.0363 | 0.0619 | 0.6475** |
| **12** | | | | | | | | | | | | **1.0000** | 0.9753** | 0.2547** | -0.0266 | 0.0039 | 0.8053** |
| **13** | | | | | | | | | | | | | **1.0000** | 0.2321** | -0.0628 | -0.0251 | 0.7850** |
| **14** | | | | | | | | | | | | | | **1.0000** | -0.0304 | 0.0767 | 0.1440* |
| **15** | | | | | | | | | | | | | | | **1.0000** | 0.6302** | 0.0165 |
| **16** | | | | | | | | | | | | | | | | **1.0000** | 0.0249 |
| **17** | | | | | | | | | | | | | | | | | **1.0000** |

*significant at p=0.01 **significant at p=0.05

1- Vine length at 60DAP 4- Number of secondary branches at 60DAP 7-Days to 1st female flowering 10- Sex ratio 13- Fruit length 16- Vit-C

2- Vine length at 90DAP) 5- Number of secondary branches at 90DAP 8-Node of 1st female flowering 11-Number of fruits per vine 14- Fruit diameter 17-Fruit yield per vine

3- Number of primary branches at 90DAP 6- Days to 1st male flowering 9-Node of1st male flowering 12- Average fruit weight 15- TSS

**Table.3** Estimation of path coefficients in segregating population of Naga hybrid of ridge gourd

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | rG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **-0.0083** | 0.0227 | -0.0009 | -0.0016 | 0.0016 | -0.0068 | 0.0085 | 0.0020 | -0.0006 | 0.0001 | 0.1032 | 0.0215 | 0.0007 | -0.0003 | -0.0004 | -0.0012 | 0.1411 |
| **2** | -0.0074 | **0.0256** | -0.0003 | -0.0016 | 0.0001 | -0.0054 | 0.0076 | 0.0026 | -0.0010 | 0.0001 | 0.0891 | -0.0013 | -0.0006 | -0.0003 | -0.0010 | 0.0013 | 0.1075 |
| **3** | -0.0008 | 0.0011 | **-0.0084** | -0.0032 | 0.0042 | 0.0044 | -0.0056 | -0.0017 | 0.0026 | 0.0001 | 0.0778 | 0.0233 | 0.0000 | 0.0000 | 0.0017 | -0.0016 | 0.0937 |
| **4** | -0.0002 | 0.0007 | -0.0005 | **-0.0576** | 0.0497 | 0.0073 | -0.0098 | -0.0024 | 0.0021 | -0.0002 | -0.0563 | 0.0227 | 0.0007 | 0.0001 | -0.0053 | 0.0041 | -0.0449 |
| **5** | -0.0002 | 0.0001 | -0.0006 | -0.0524 | **0.0546** | 0.0060 | -0.0081 | -0.0024 | 0.0023 | -0.0001 | -0.0232 | 0.0693 | 0.0034 | 0.0002 | -0.0051 | 0.0026 | 0.0463 |
| **6** | 0.0009 | -0.0022 | -0.0006 | -0.0068 | 0.0053 | **0.0620** | -0.0766 | -0.0118 | 0.0101 | -0.0001 | -0.1275 | 0.0098 | -0.0003 | 0.0000 | -0.0012 | 0.0005 | -0.1386 |
| **7** | 0.0009 | -0.0025 | -0.0006 | -0.0073 | 0.0057 | 0.0612 | **-0.0776** | -0.0120 | 0.0102 | -0.0001 | -0.1283 | 0.0036 | -0.0007 | 0.0000 | -0.0008 | 0.0000 | -0.1481 |
| **8** | 0.0011 | -0.0045 | -0.0010 | -0.0093 | 0.0089 | 0.0496 | -0.0628 | **-0.0148** | 0.0127 | -0.0001 | -0.1019 | 0.0430 | 0.0023 | 0.0002 | 0.0021 | -0.0004 | -0.0749 |
| **9** | 0.0004 | -0.0017 | -0.0015 | -0.0083 | 0.0086 | 0.0430 | -0.0543 | -0.0129 | **0.0146** | -0.0002 | -0.0631 | 0.0286 | 0.0004 | -0.0001 | 0.0009 | 0.0010 | -0.0445 |
| **10** | 0.0004 | -0.0013 | 0.0002 | -0.0041 | 0.0022 | 0.0024 | -0.0025 | -0.0005 | 0.0011 | **-0.0028** | -0.1488 | -0.0525 | -0.0028 | 0.0000 | -0.0009 | 0.0011 | -0.2086 |
| **11** | -0.0014 | 0.0037 | -0.0011 | 0.0053 | -0.0020 | -0.0128 | 0.0161 | 0.0024 | -0.0015 | 0.0007 | **0.6168** | 0.0139 | 0.0007 | 0.0001 | 0.0065 | -0.0055 | 0.6421 |
| **12** | -0.0003 | 0.0000 | -0.0003 | -0.0019 | 0.0054 | 0.0009 | -0.0004 | -0.0009 | 0.0006 | 0.0002 | 0.0123 | **0.6974** | 0.0426 | 0.0011 | 0.0010 | -0.0028 | 0.7550 |
| **13** | -0.0001 | -0.0003 | 0.0000 | -0.0009 | 0.0042 | -0.0004 | 0.0012 | -0.0008 | 0.0001 | 0.0002 | 0.0098 | 0.6772 | **0.0439** | 0.0011 | 0.0011 | -0.0029 | 0.7335 |
| **14** | 0.0014 | -0.0041 | 0.0002 | -0.0039 | 0.0051 | -0.0016 | 0.0017 | -0.0013 | -0.0006 | -0.0001 | 0.0506 | 0.4228 | 0.0286 | **0.0017** | 0.0030 | -0.0034 | 0.5003 |
| **15** | -0.0001 | -0.0007 | -0.0004 | 0.0078 | -0.0070 | -0.0019 | 0.0015 | -0.0008 | 0.0003 | 0.0001 | 0.1018 | 0.0180 | 0.0013 | 0.0001 | **0.0394** | -0.0250 | 0.1346 |
| **16** | -0.0003 | -0.0011 | -0.0004 | 0.0078 | -0.0048 | -0.0011 | 0.0000 | -0.0002 | -0.0005 | 0.0001 | 0.1113 | 0.0639 | 0.0042 | 0.0002 | 0.0325 | **-0.0303** | 0.1813 |

rG = dependent character **bolded values indicates direct effect on yield**

**Significant at 0.05 *significant at 0.01 Residual effect= 0.1863

1- Vine length at 60DAP(cm)
2- Vine length at 90DAP(cm)
3- Number of primary branches at 90DAP
4- Number of secondary branches at 60DAP
5- Number of secondary branches at 90DAP
6- Days to 1st male flowering
7-Days to 1st female flowering
8-Node of 1st female flowering
9-Node of 1st male flowering
10- Sex ratio
11-Number of fruits per vine
12- Average fruit weight (g)
13- Fruit length(cm)
14- Fruit diameter(cm)
15-TSS(°Brix)
16- Vit-C (mg/100g)
17-rG

**Table.4** Estimation of path coefficients in segregating population of NS-3 hybrid of ridge gourd

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | rG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **0.0202** | -0.0157 | 0.0022 | -0.0001 | -0.0004 | -0.0029 | 0.0022 | 0.0001 | 0.0028 | 0.0020 | 0.0371 | -0.0071 | 0.0001 | -0.0003 | 0.0026 | -0.0057 | 0.0370 |
| **2** | 0.0166 | **-0.0192** | 0.0012 | -0.0006 | -0.0002 | -0.0238 | 0.0155 | -0.0011 | 0.0076 | 0.0034 | 0.0461 | -0.0281 | 0.0002 | -0.0011 | 0.0017 | -0.0061 | 0.0121 |
| **3** | 0.0032 | -0.0017 | **0.0139** | -0.0013 | -0.0002 | -0.0025 | 0.0000 | -0.0005 | 0.0034 | 0.0000 | -0.0446 | -0.0184 | 0.0000 | 0.0006 | 0.0012 | 0.0003 | -0.0465 |
| **4** | 0.0001 | -0.0006 | 0.0010 | **-0.0182** | 0.0135 | 0.0014 | 0.0011 | -0.0006 | 0.0026 | 0.0003 | -0.0201 | -0.0200 | 0.0001 | -0.0009 | 0.0005 | -0.0018 | -0.0415 |
| **5** | -0.0003 | 0.0002 | -0.0001 | -0.0109 | **0.0226** | 0.0137 | -0.0063 | 0.0024 | -0.0080 | 0.0042 | 0.0852 | 0.1087 | -0.0005 | -0.0002 | 0.0025 | -0.0049 | 0.2082 |
| **6** | 0.0003 | -0.0022 | 0.0002 | 0.0001 | -0.0015 | **-0.2077** | 0.1387 | -0.0228 | 0.0764 | 0.0024 | 0.0389 | 0.0543 | -0.0003 | -0.0009 | -0.0024 | -0.0010 | 0.0725 |
| **7** | 0.0003 | -0.0021 | 0.0000 | -0.0001 | -0.0010 | -0.2059 | **0.1400** | -0.0229 | 0.0762 | 0.0025 | 0.0378 | 0.0575 | -0.0003 | -0.0008 | -0.0021 | -0.0009 | 0.0783 |
| **8** | -0.0001 | -0.0008 | 0.0003 | -0.0004 | -0.0021 | -0.1824 | 0.1236 | **-0.0260** | 0.0866 | 0.0014 | 0.0517 | 0.0537 | -0.0002 | 0.0000 | -0.0030 | 0.0012 | 0.1035 |
| **9** | 0.0006 | -0.0015 | 0.0005 | -0.0005 | -0.0019 | -0.1665 | 0.1121 | -0.0236 | **0.0952** | 0.0001 | 0.0502 | 0.0607 | -0.0003 | 0.0001 | -0.0019 | -0.0013 | 0.1220 |
| **10** | -0.0012 | 0.0020 | 0.0000 | 0.0002 | -0.0029 | 0.0152 | -0.0109 | 0.0011 | -0.0004 | **-0.0326** | -0.0468 | -0.0745 | 0.0003 | 0.0009 | -0.0033 | 0.0031 | -0.1497 |
| **11** | 0.0014 | -0.0016 | -0.0011 | 0.0007 | 0.0035 | -0.0148 | 0.0097 | -0.0025 | 0.0088 | 0.0028 | **0.5454** | 0.0964 | -0.0004 | 0.0004 | 0.0009 | -0.0021 | 0.6475 |
| **12** | -0.0002 | 0.0007 | -0.0003 | 0.0005 | 0.0034 | -0.0154 | 0.0110 | -0.0019 | 0.0079 | 0.0033 | 0.0719 | **0.7312** | -0.0031 | -0.0030 | -0.0006 | 0.0001 | 0.8053 |
| **13** | -0.0009 | 0.0014 | 0.0000 | 0.0008 | 0.0035 | -0.0167 | 0.0118 | -0.0020 | 0.0085 | 0.0031 | 0.0689 | 0.7132 | **-0.0031** | -0.0027 | -0.0015 | 0.0008 | 0.7850 |
| **14** | 0.0005 | -0.0019 | -0.0007 | -0.0014 | 0.0003 | -0.0153 | 0.0096 | -0.0001 | -0.0007 | 0.0026 | -0.0194 | 0.1862 | -0.0007 | **-0.0117** | -0.0007 | -0.0026 | 0.1440 |
| **15** | 0.0021 | -0.0013 | 0.0007 | -0.0004 | 0.0023 | 0.0204 | -0.0118 | 0.0032 | -0.0074 | 0.0044 | 0.0198 | -0.0194 | 0.0002 | 0.0004 | **0.0244** | -00212 | 0.0165 |
| **16** | 0.0034 | -0.0035 | -0.0001 | -0.0010 | 0.0033 | -0.0060 | 0.0037 | 0.0009 | 0.0035 | 0.0030 | 0.0338 | 0.0029 | 0.0001 | -0.0009 | 0.0154 | **-0.0336** | 0.0249 |

rG = dependent character **bolded values indicates direct effect on yield;** **Significant at 0.05 *significant at 0.01

1- Vine length at 60DAP(cm)
2- Vine length at 90DAP(cm)
3- Number of primary branches at 90DAP
4- Number of secondary branches at 60DAP
5- Number of secondary branches at 90DAP
6- Days to 1st male flowering
7-Days to 1st female flowering
8-Node of 1st female flowering
9-Node of 1st male flowering
10- Sex ratio
11-Number of fruits per vine
12- Average fruit weight (g)
13- Fruit length(cm)
14- Fruit diameter(cm)
15-TSS(°Brix)
16- Vit-C (mg/100g)
17-rG

These results are same as the results obtained from Narasannanavar *et al.,* (2014), Khan *et al.,* (2015) and Yadav *et al.,* (2007). Sex ratio has negative significant direct effect on fruit yield per vine, same results were obtained by Husna *et al.,* (2014), Khatoon *et al.,* (2016) and Ananthan and Krishnamurthy (2017) (Table-3).

## Path coefficient analysis on yield per plant in $F_2$population of NS-3

Average fruit weight exhibited the highest positive direct effect on fruit yield per vine followed by number of fruits per vine, these results are in accordance with the results obtained from Narasannanavar *et al.,* (2014) and Khatoon *et al.,* (2016). Vine length, number of primary branches at 90DAP, number of secondary branches at 90 days after planting showed direct positive effects on yield per plant, These results were in agreement with the results of Khatoon *et al.,* (2016) in ridge gourd.

Days to first female flowering had direct positive effect on fruit yield per plant, number of fruits per vine, average fruit weight, fruit length and fruit diameter had direct positive effect on fruit yield per plant, These results are in line with the results obtained from Narasannanavar *et al.,* (2014), Ananthan and Krishnamurthy (2017) and Khatoon *et al.,* (2016).

Node of 1st female flowering showed indirect positive effects on days to 1st female flowering, node of 1st male flowering, number of fruits per vine and average fruit weight, Same results were obtained by Husna *et al.,* (2014), Khatoon *et al.,* (2016) and Ananthan and Krishnamurthy (2017). Number of fruits per vine had indirect positive effects for the traits such as number of secondary branches at 90 days after planting, days to 1st female flowering, node of 1st male flowering, sex ratio and average fruit weight. These results are in line with the results obtained from Narasannanavar *et al.,* (2014), Ananthan and Krishnamurthy (2017) and Khatoon *et al.,* (2016). Node of 1st female flowering shown direct negative effect on yield per plant, Same results were obtained by Husna *et al.,* (2014), Khatoon *et al.,* (2016) and Ananthan and Krishnamurthy (2017).

## References


Ananthan, M. and Krishnamoorthy, V., 2017. Genetic variability, correlation and path analysis in ridge gourd (*Luffa acutangula* (Roxb) L.). *Int. J. Curr. Microbiol. App. Sci*, 6 (6): 3022-3026.

Bose, T. K., and Som, M. G., 1986.*Vegetable crops in India*. Nayaprokash, Bidhausarani, Calculta, India pp.107-114.

Choudhary, B. R., Kumar, S. and Sharma, S. K., 2014.Evaluation and correlation for growth, yield and quality traits of ridge gourd (*Luffa acutangula* L.) under arid conditions. *Indian J. Agri. Sci,* 84(4): 498–502.

Choudhary, B. R., Pandey, S., Bhardwaj, D. R., Yadav, D. S. and Rai, M., 2008. Component analysis for quantitative traits in ridge gourd (*Luffa acutangula* L.).*Veg.Sci*,35(2): 144-147.

Dubey, R. K., Singh, V. and Upadhyay, G., 2013. Genetic variability and inter-relationship among some ridge gourd *(Luffa acutangula* L.*)* accessions under foot hills of Arunachal Pradesh. *J.Prog. Hort,* 45(1): 191-197.

Gayen, N., and Hossain, M. 2006. Study of heritability and genetic advance in bottle gourd [*Langenaria siceraria* (Mol.) Stand.]. *J. Intracad*, 10(4): 463-466.

Hanumegowda, K., Shirol, A. M., Mulge, R., Shantappa, T. and Prasadkumar, P., 2012. Correlation co-efficient studies in ridge gourd [*Luffa acutangula* (L.)Roxb.]. *Karnataka J. Agric. Sci,* 25(1): 21-29.

Husna, A., Maih, M. A., Begum, S., Shilpi, S. Z., and Islam, M. R., 2014. Genetic variability, correlation and path co-efficient analysis based on vegetative characters in bottle gourd (*Lagenaria siceraria* L.).*Adv. Agric. Biol,* 2(4): 161-165.

Khan, M. H., Bhuiyan, S. R., Saha, K. C., Bhuyin, M. R.and Ali, A. S. M. Y., 2015. Variability,

correlation and path co-efficient analysis of bitter gourd (*Momordica charantia* L). *Bangladesh J. Agri. Res*, 40(4): 607-618.

Khatoon, U., Dubey, R. K., Singh, V., Upadhyay, K. and Pandey, A. K., 2016. Selection parameters for fruit yield and related traits in *Luffa acutangula* (roxb.) L. *Bangladesh J. Bot*,45(1): 75-84.

Koppad, S. B., Chavan, M.and Hallur, R. H., 2016. Character association studies and path coefficient analysis for yield and yield attributing traits in ridge gourd [*Luffa acutangula* (L.) Roxb.]. *Electronic J. Plant Breed*,7(2) : 275-281.

Narasannavar, A., Gasti, V. D. and Malghan, S., 2014, Correlation and path analysis studies in ridge gourd [*Luffa acutangula* (L.)Roxb.] *Trends in Biosci*,7(13): 1603-1607.

Prasanna, S. C., Krishnappa, K. S. and Reddy, N. S., 2002. Correlation and path coefficient analysis studies in ridge gourd. *Agric. Sci*, 31(9/10): 150-152.

Wright, S., 1921. Correlation and causation. *J. Agric. Res*, 20(7): 557-585.

Yadav, H., Maurya, S. K. and Pooja, S. K., 2017. Genotype screening and character association studies in indeginous genotypes of ridge gourd [*Luffa acutangula* (Roxb.) L.]. *J.Pharmacognosy and Phytochem*, 6(5): 223-231.

**How to cite this article:**

Madhuri, E. P., Shashikanth Evoor, V. D. Gasti, G. Raghavendra and Bapurayagouda Patil. 2022. Correlation and Path Analysis Studies in Early Generation Populations Derived from Commercial Hybrids of Ridge Gourd (*Luffa acutangla* L.). *Int.J.Curr.Microbiol.App.Sci.* 11(02): 423-431.
doi: https://doi.org/10.20546/ijcmas.2022.1102.048