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# Genotypic and phenotypic correlation studies in brinjal (*Solanum melongena* L.)

**Mayur Kumar Sonagara, Dr. BN Patel, Dr. Kalyan Rao Patil, Mihir M Pandya, Dr. AD Kalola, Juned Memon and Unnati Vaghela**

**Abstract**
The study conducted to know the association among different morpho-economical traits of brinjal. Total Ninety-six brinjal (*Solanum melongena* L.) genotypes were evaluated for computing genotypic and phenotypic coefficient of correlations for yield and its contributing characters for two year consecutively in two seasons. There was a strong correlation in brinjal genotypes, branches per plant, plant height, average fruit weight and fruits per plant had significant and positive associations with fruit yield per plant at genotypic and phenotypic levels in all environments.

**Keywords:** Brinjal, genotypic correlation, phenotypic correlation

## Introduction
Brinjal (*Solanum melongena* L.) is one of the principal vegetable crops cultivated in almost all parts of the Indian plains for its tender fruits. It is grown year-round except at higher altitudes. Tender fruits of brinjal contain protein, minerals, vitamins and iron (Gurbuz *et al.*, 2018) [1]. One-hundred-gram edible portion of brinjal fruits possesses 5.9 g carbohydrates, 1.4 g protein, 0.3 g fats, 1.3 g fibre, 124 I.U Vitamin A, 11 mg Vitamin C. It also contains minerals like chlorine 52.0 mg, phosphorus 47.0 mg and 44.0 mg sulphur. Fruits are well utilized in Indian System of Medicine. Principal states producing this crop are West Bengal, Orissa, Gujarat, Bihar, Madhya Pradesh, Chhattisgarh, Karnataka, Maharashtra, Andhra Pradesh and Tamil Nadu. Brinjal being indigenous to India, variation in plant type, stem color, leaf size, leaf tip, midrib colour, fruit size, fruit shape, fruit colour, fruit yield, cooking quality and tolerance to pest and disease is apparent (Ullah *et al*., 2014) [2]. The main objective is to study the extent of genetic variability with respect to yield, yield components and quality of fruits. Knowledge on the structure of the genetic variability within ecotypes of a region is of great help to draft programs for character improvement (Rathi *et al*., 2011) [3].

## Materials and Methods
The experiment was conducted during *Kharif-Rabi* 2020-21 and *Kharif-Rabi* 2021-22, at two different locations i.e., Anand and Vadodara of Gujarat, under the jurisdiction of Anand Agricultural University. In Anand Main Vegetable Research Station, AAU, Anand is located in Agro Climatic Zone-III (Middle Gujarat) of Gujarat state. Geographically, Anand is situated at 22° 35' N latitude and 72° 55' E longitude with an elevation of 45.1 meters above the mean sea level. Pulses Research Station, AAU, Vadodara is located in Middle Gujarat Agroclimatic Zone-III. Geographically, Vadodara is situated at 22° 19' N latitude and 73° 11' E longitude with an elevation of 37.5 meters above the mean sea level. The experimental material is comprised of 96 genotypes of Brinjal which were obtained from the Main Vegetable Research Station, Anand Agricultural University, Anand (Table 1). All four experiments were laid out in a randomized block design with three replications. Six weeks old healthy seedlings were transplanted along the sides of ridges laid at 60 cm spacing. The plant-to-plant distance was maintained as 60 cm. All the recommended packages of practices for raising a healthy crop were followed. Observations were recorded on five randomly selected plants of each accession for thirteen various characters. Thirteen characters viz., days to 50% flowering, branches per plant, plant height (cm), fruit length (cm), fruit girth (cm), average fruit weight (g), fruits per plant, fruit yield per plant (kg), total phenols (mg/100 g), total soluble solid (°brix), anthocyanin content (mg/100 g), moisture content (%), and test weight (g).

The genotypic and phenotypic correlation coefficients were worked out by using covariance technique reviewed by Singh and Choudhary (1985) [4].

## Results and Discussion

The overall result of correlation studies revealed that fruit yield per plant was strongly and positively associated at genotypic and phenotypic levels with branches per plant, plant height, fruit length, average fruit weight and fruits per plant indicating that selection for these attributes would lead to higher fruit yield per plant. It established negative but non-significant association between total phenols and anthocyanin content, to improve total phenols and anthocyanin content with fruit yield per plant is not possible because of their inverse relation.

In contrast, days to 50% flowering exhibited significant negative association with fruit yield per plant which is desirable in that direction. Therefore, it could be suggested that selection of early maturing genotypes ultimately increases fruit yield per plant. Generally, the nature of inter-trait correlations may enhance or retard the selection progress. A positive association between component traits indicates that the selection for improvement in one of the yield components would result in a concomitant increase in the other.

**Table 1:** List of brinjal genotypes and their source

| Sr. No. | Genotype | Sr. No. | Genotype | Sr. No. | Genotype | Sr. No. | Genotype |
|---|---|---|---|---|---|---|---|
| 1 | GP-BRJ-1 | 25 | GP-BRJ-79 | 49 | GP-BRJ-173 | 73 | GP-BRJ-242 |
| 2 | GP-BRJ-2 | 26 | GP-BRJ-86 | 50 | GP-BRJ-177 | 74 | GP-BRJ-244 |
| 3 | GP-BRJ-7 | 27 | GP-BRJ-88 | 51 | GP-BRJ-179 | 75 | GP-BRJ-247 |
| 4 | GP-BRJ-8 | 28 | GP-BRJ-89 | 52 | GP-BRJ-183 | 76 | GP-BRJ-249 |
| 5 | GP-BRJ-12 | 29 | GP-BRJ-95 | 53 | GP-BRJ-185 | 77 | GP-BRJ-253 |
| 6 | GP-BRJ-13 | 30 | GP-BRJ-98 | 54 | GP-BRJ-189 | 78 | GP-BRJ-254 |
| 7 | GP-BRJ-17 | 31 | GP-BRJ-99 | 55 | GP-BRJ-191 | 79 | GP-BRJ-255 |
| 8 | GP-BRJ-21 | 32 | GP-BRJ-103 | 56 | GP-BRJ-192 | 80 | GP-BRJ-260 |
| 9 | GP-BRJ-25 | 33 | GP- BRJ-115 | 57 | GP-BRJ-194 | 81 | GP-BRJ-264 |
| 10 | GP-BRJ-27 | 34 | GP-BRJ-120 | 58 | GP-BRJ-195 | 82 | GP-BRJ-265 |
| 11 | GP-BRJ-29 | 35 | GP-BRJ-122 | 59 | GP-BRJ-199 | 83 | GP-BRJ-269 |
| 12 | GP-BRJ-30 | 36 | GP-BRJ-126 | 60 | GP-BRJ-202 | 84 | GP-BRJ-274 |
| 13 | GP-BRJ-32 | 37 | GP-BRJ-127 | 61 | GP-BRJ-206 | 85 | GP-BRJ-275 |
| 14 | GP-BRJ-39 | 38 | GP-BRJ-129 | 62 | GP-BRJ-208 | 86 | GP-BRJ-278 |
| 15 | GP-BRJ-40 | 39 | GP-BRJ-132 | 63 | GP-BRJ-213 | 87 | GP-BRJ-279 |
| 16 | GP-BRJ-43 | 40 | GP-BRJ-134 | 64 | GP-BRJ-221 | 88 | GP-BRJ-282 |
| 17 | GP-BRJ-45 | 41 | GP-BRJ-139 | 65 | GP-BRJ-224 | 89 | GP-BRJ-286 |
| 18 | GP-BRJ-52 | 42 | GP-BRJ-141 | 66 | GP-BRJ-225 | 90 | GP-BRJ-288 |
| 19 | GP-BRJ-55 | 43 | GP-BRJ-144 | 67 | GP-BRJ-229 | 91 | GOB 1 |
| 20 | GP-BRJ-62 | 44 | GP-BRJ-148 | 68 | GP-BRJ-230 | 92 | GAOB 2 |
| 21 | GP-BRJ-64 | 45 | GP-BRJ-158 | 69 | GP-BRJ-233 | 93 | GRB 5 |
| 22 | GP-BRJ-66 | 46 | GP-BRJ-159 | 70 | GP-BRJ-237 | 94 | GAB 6 |
| 23 | GP-BRJ-71 | 47 | GP-BRJ-168 | 71 | GP-BRJ-238 | 95 | Punjab Sadabahar |
| 24 | GP-BRJ-72 | 48 | GP-BRJ-169 | 72 | GP-BRJ-240 | 96 | Swarn Mani |

**Table 2:** Genotypic ($r_g$) and phenotypic ($r_p$) correlation coefficients among different characters in 96 genotypes of brinjal at Anand during *Kharif-Rabi* 2020-21 ($E_1$)

| Characters | | Days to 50% flowering | Branches per plant | Plant height | Fruit length | Fruit girth | Average fruit weight | Fruits per plant | Total phenols | Total soluble solid | Anthocyanin content | Moisture content | Test weight | Fruit yield per plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | rg | 1.0000 | -0.1660 | -0.0619 | -0.0829 | -0.1357 | 0.0824 | -0.0909 | 0.1227 | -0.1964 | -0.1143 | -0.1215 | -0.1966 | -0.0857 |
| | rp | 1.0000 | -0.0789 | -0.0725 | -0.0789 | -0.1237 | 0.0799 | -0.0912 | 0.1136 | -0.1911 ** | -0.1045 | -0.1153 | -0.1933 ** | -0.1267 |
| Branches per plant | rg | | 1.0000 | -0.0527 | -0.0495 | 0.0361 | 0.0520 | -0.0984 | 0.0057 | 0.0494 | 0.1867 | 0.1232 | -0.0298 | 0.1580* |
| | rp | | 1.0000 | -0.0730 | -0.0397 | 0.0646 | 0.0736 | -0.0640 | 0.0095 | -0.0078 | 0.1513 * | 0.1085 | -0.0346 | 0.1798* |
| Plant height | rg | | | 1.0000 | 0.0170 | -0.0685 | 0.0167 | -0.0778 | -0.1086 | -0.0465 | -0.0236 | -0.0196 | -0.1857 | 0.1808* |
| | rp | | | 1.0000 | 0.0216 | -0.0381 | 0.0017 | -0.0482 | -0.1002 | -0.0216 | -0.0243 | -0.0092 | -0.1627 * | 0.1678* |
| Fruit length | rg | | | | 1.0000 | -0.4108 ** | 0.0461 | -0.1239 | 0.0609 | 0.0606 | 0.2423 * | -0.1870 | -0.1380 | 0.0118 |
| | rp | | | | 1.0000 | -0.3722 ** | 0.0398 | -0.1106 | 0.0576 | 0.0462 | 0.2327 ** | -0.1244 | -0.1249 | 0.0059 |
| Fruit girth | rg | | | | | 1.0000 | 0.3670 ** | -0.2384 * | -0.1290 | 0.0891 | -0.0713 | 0.3331 ** | 0.243 * | 0.0801 |
| | rp | | | | | 1.0000 | 0.3174 ** | -0.1904 ** | -0.1150 | 0.0588 | -0.0649 | 0.2358 ** | 0.2315 ** | 0.0062 |
| Average fruit weight | rg | | | | | | 1.0000 | -0.8249 ** | -0.0079 | 0.1523 | 0.1680 | -0.0348 | 0.0673 | 0.1896 ** |
| | rp | | | | | | 1.0000 | -0.7653 ** | -0.0064 | 0.1135 | 0.1513 * | -0.0038 | 0.0501 | 0.1534 ** |
| Fruits per plant | rg | | | | | | | 1.0000 | -0.0035 | -0.0825 | -0.0174 | 0.0219 | 0.0468 | 0.4548 ** |
| | rp | | | | | | | 1.0000 | -0.0008 | -0.0836 | -0.0170 | -0.0015 | 0.0385 | 0.3818 ** |
| Total phenols | rg | | | | | | | | 1.0000 | 0.3561 ** | 0.2694 ** | -0.1306 | 0.1720 | -0.1722 |
| | rp | | | | | | | | 1.0000 | 0.3238 ** | 0.2681 ** | -0.1108 | 0.1695 * | -0.1056 |
| Total soluble solid | rg | | | | | | | | | 1.0000 | 0.1860 | -0.1733 | 0.1699 | 0.1238 |
| | rp | | | | | | | | | 1.0000 | 0.1691 * | -0.1665 * | 0.1513 * | 0.0407 |
| Anthocyanin content | rg | | | | | | | | | | 1.0000 | -0.0973 | 0.0532 | -0.0091 |
| | rp | | | | | | | | | | 1.0000 | -0.0802 | 0.0529 | -0.0080 |
| Moisture content | rg | | | | | | | | | | | 1.0000 | 0.2528 * | -0.0905 |
| | rp | | | | | | | | | | | 1.0000 | 0.1868 ** | -0.0477 |
| Test weight | rg | | | | | | | | | | | | 1.0000 | -0.1509 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | rp | | | | | | | | | | | | 1.0000 | -0.0648 |
| Fruit yield per plant | rg | | | | | | | | | | | | | 1.0000 |
| | rp | | | | | | | | | | | | | 1.0000 |

*, ** Significant at 5% and 1% levels, respectively

**Table 3:** Genotypic ($r_g$) and phenotypic ($r_p$) correlation coefficients among 13 characters in 96 genotypes of brinjal at Vadodara during *Kharif-Rabi* 2020-21 ($E_2$)

| Characters | | Days to 50% flowering | Branches per plant | Plant height | Fruit length | Fruit girth | Average fruit weight | Fruits per plant | Total phenols | Total soluble solid | Anthocyanin content | Moisture content | Test weight | Fruit yield per plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | rg | 1.0000 | -0.2247 * | 0.0277 | -0.1181 | -0.0045 | 0.067 | -0.0303 | 0.041 | -0.0787 | -0.1055 | -0.2533 * | -0.1138 | -0.2059 * |
| | rp | 1.0000 | -0.1715 * | 0.0339 | -0.1144 | -0.0099 | 0.0223 | -0.0243 | 0.0329 | -0.0695 | -0.0937 | -0.1794 * | -0.0879 | -0.0807 |
| Branches per plant | rg | | 1.0000 | -0.0886 | 0.0473 | 0.1843 | -0.0128 | -0.0561 | -0.0675 | 0.0771 | 0.2260 * | 0.1084 | 0.0659 | 0.2244* |
| | rp | | 1.0000 | -0.0814 | 0.0412 | 0.1109 | -0.0433 | -0.0114 | -0.056 | 0.0294 | 0.1946 ** | 0.07 | 0.0477 | 0.1845* |
| Plant height | rg | | | 1.0000 | 0.0182 | -0.1397 | 0.0164 | -0.0206 | -0.1337 | -0.0149 | -0.0831 | -0.0194 | -0.3043 ** | 0.1871* |
| | rp | | | 1.0000 | 0.0212 | -0.126 | 0.0149 | -0.0059 | -0.1306 | -0.0332 | -0.0773 | 0.0112 | -0.2762 ** | 0.1742* |
| Fruit length | rg | | | | 1.0000 | -0.3965 ** | 0.0023 | -0.0654 | 0.0088 | 0.0389 | 0.2529 * | -0.165 | -0.1282 | 0.0647 |
| | rp | | | | 1.0000 | -0.3702 ** | 0.0081 | -0.047 | 0.0065 | 0.015 | 0.2457 ** | -0.1087 | -0.1192 | 0.0271 |
| Fruit girth | rg | | | | | 1.0000 | 0.2993 ** | -0.2129 * | -0.1023 | 0.1045 | -0.0609 | 0.3497 ** | 0.2397 * | 0.0995 |
| | rp | | | | | 1.0000 | 0.2904 ** | -0.2037 ** | -0.0981 | 0.0867 | -0.057 | 0.3011 ** | 0.2232 ** | 0.0561 |
| Average fruit weight | rg | | | | | | 1.0000 | -0.8555 ** | 0.0807 | 0.092 | 0.1737 | -0.0685 | 0.071 | 0.2673 ** |
| | rp | | | | | | 1.0000 | -0.7827 ** | 0.0749 | 0.0759 | 0.1613 * | -0.0577 | 0.0631 | 0.2132 ** |
| Fruits per plant | rg | | | | | | | 1.0000 | -0.0658 | -0.0612 | -0.0466 | 0.0652 | 0.0065 | 0.4386 ** |
| | rp | | | | | | | 1.0000 | -0.0685 | -0.0545 | -0.0475 | 0.0864 | -0.002 | 0.4041 ** |
| Total phenols | rg | | | | | | | | 1.0000 | 0.3247 ** | 0.2636 ** | -0.0792 | 0.1714 | -0.1546 |
| | rp | | | | | | | | 1.0000 | 0.2805 ** | 0.2626 ** | -0.0627 | 0.1673 * | -0.1054 |
| Total soluble solid | rg | | | | | | | | | 1.0000 | 0.1594 | -0.1105 | 0.1651 | -0.0083 |
| | rp | | | | | | | | | 1.0000 | 0.1373 | -0.0972 | 0.1184 | -0.0500 |
| Anthocyanin content | rg | | | | | | | | | | 1.0000 | -0.0563 | 0.0454 | -0.0422 |
| | rp | | | | | | | | | | 1.0000 | -0.0441 | 0.0445 | -0.0278 |
| Moisture content | rg | | | | | | | | | | | 1.0000 | 0.1974 | 0.1409 |
| | rp | | | | | | | | | | | 1.0000 | 0.1434 * | 0.0723 |
| Test weight | rg | | | | | | | | | | | | 1.0000 | -0.1954 |
| | rp | | | | | | | | | | | | 1.0000 | -0.1412 |
| Fruit yield per plant | rg | | | | | | | | | | | | | 1.0000 |
| | rp | | | | | | | | | | | | | 1.0000 |

*, ** Significant at 5% and 1% levels, respectively

**Table 4:** Genotypic ($r_g$) and phenotypic ($r_p$) correlation coefficients among 13 characters in 96 genotypes of brinjal at Anand during *Kharif-Rabi* 2021-22 ($E_3$)

| Characters | | Days to 50% flowering | Branches per plant | Plant height | Fruit length | Fruit girth | Average fruit weight | Fruits per plant | Total phenols | Total soluble solid | Anthocyanin content | Moisture content | Test weight | Fruit yield per plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | rg | 1.0000 | -0.1784 | -0.0950 | -0.0135 | -0.1562 | 0.0754 | -0.0021 | 0.0604 | -0.2062 * | -0.1338 | -0.0971 | -0.1648 | -0.0803 |
| | rp | 1.0000 | -0.1924 ** | -0.0489 | -0.0171 | -0.1333 | 0.0621 | -0.0023 | 0.0537 | -0.1597 * | -0.1154 | -0.0807 | -0.1569 * | -0.0378 |
| Branches per plant | rg | | 1.0000 | -0.0254 | 0.0613 | 0.0376 | -0.0811 | 0.0066 | -0.0781 | 0.0324 | 0.1684 | -0.0412 | 0.0230 | 0.2371 ** |
| | rp | | 1.0000 | 0.0265 | 0.0500 | 0.0274 | -0.0245 | -0.0042 | -0.0656 | 0.0670 | 0.1272 | 0.0137 | 0.0305 | 0.2160 ** |
| Plant height | rg | | | 1.0000 | 0.0427 | -0.0699 | -0.0060 | -0.0007 | -0.1429 | -0.0186 | -0.1212 | -0.0228 | -0.1881 | 0.2860 ** |
| | rp | | | 1.0000 | 0.0264 | -0.0613 | 0.0034 | 0.0092 | -0.1284 | -0.0209 | -0.1114 | 0.0236 | -0.1745 * | 0.2524 ** |
| Fruit length | rg | | | | 1.0000 | -0.4255 ** | -0.0592 | 0.0906 | 0.0438 | 0.1119 | 0.2324 * | -0.1697 | -0.1124 | 0.2131 * |
| | rp | | | | 1.0000 | -0.4045 ** | -0.0494 | 0.0778 | 0.0399 | 0.0842 | 0.2237 ** | -0.1070 | -0.1070 | 0.1560 * |
| Fruit girth | rg | | | | | 1.0000 | 0.2169 * | -0.1997* | -0.1416 | -0.0006 | -0.0850 | 0.357 ** | 0.2464 * | 0.1284 |
| | rp | | | | | 1.0000 | 0.196 ** | -0.1648 * | -0.1243 | 0.0206 | -0.0796 | 0.2689 ** | 0.2180 ** | 0.0846 |
| Average fruit weight | rg | | | | | | 1.0000 | -0.8021 ** | 0.0163 | 0.1172 | 0.1697 | -0.0382 | 0.1076 | 0.1814 ** |
| | rp | | | | | | 1.0000 | -0.7556 ** | 0.0156 | 0.1010 | 0.1585 * | -0.0003 | 0.0997 | 0.1699 ** |
| Fruits per plant | rg | | | | | | | 1.0000 | 0.0507 | -0.0629 | -0.0492 | -0.0267 | -0.0710 | 0.3184 ** |
| | rp | | | | | | | 1.0000 | 0.0555 | -0.0600 | -0.0539 | 0.0079 | -0.0774 | 0.2604 * |
| Total phenols | rg | | | | | | | | 1.0000 | 0.2735 ** | 0.2646 ** | -0.1160 | 0.1879 ** | -0.0457 |
| | rp | | | | | | | | 1.0000 | 0.2966 ** | 0.2655 ** | -0.1325 | 0.1987 | -0.0553 |
| Total soluble solid | rg | | | | | | | | | 1.0000 | 0.165 * | -0.1699 * | 0.1247 | -0.0023 |
| | rp | | | | | | | | | 1.0000 | 0.1780 | -0.2283 * | 0.1378 | 0.0296 |
| Anthocyanin content | rg | | | | | | | | | | 1.0000 | -0.0719 | 0.0665 | -0.0046 |
| | rp | | | | | | | | | | 1.0000 | -0.0845 | 0.0715 | -0.0070 |
| Moisture content | rg | | | | | | | | | | | 1.0000 | 0.2181 ** | -0.1902 ** |
| | rp | | | | | | | | | | | 1.0000 | 0.2534 * | -0.1690 |
| Test weight | rg | | | | | | | | | | | | 1.0000 | -0.0183 |
| | rp | | | | | | | | | | | | 1.0000 | -0.0152 |
| Fruit yield per plant | rg | | | | | | | | | | | | | 1.0000 |
| | rp | | | | | | | | | | | | | 1.0000 |

**Table 5:** Genotypic ($r_g$) and phenotypic ($r_p$) correlation coefficients among 13 characters in 96 genotypes of brinjal at Vadodara during *Kharif-Rabi* 2021-22 ($E_4$)

| Characters | | Days to 50% flowering | Branches per plant | Plant height | Fruit length | Fruit girth | Average fruit weight | Fruits per plant | Total phenols | Total soluble solid | Anthocyanin content | Moisture content | Test weight | Fruit yield per plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | rg | 1.0000 | -0.1135 | -0.0449 | -0.0996 | -0.1979 | -0.1365 | 0.0556 | 0.0244 | -0.0595 | -0.1487 | 0.0343 | -0.0142 | -0.0542 |
| | rp | 1.0000 | -0.1097 | -0.0118 | -0.0893 | -0.1479 * | -0.0946 | 0.0332 | 0.0230 | -0.0392 | -0.1361 | 0.0101 | -0.0038 | -0.00003 |
| Branches per plant | rg | | 1.0000 | -0.1278 | -0.0768 | 0.2183 * | 0.0515 | -0.0616 | -0.0948 | 0.2937 ** | 0.1442 | 0.1907 | 0.0949 | 0.1804* |
| | rp | | 1.0000 | -0.1053 | -0.0531 | 0.1541 * | 0.0296 | -0.0708 | -0.0713 | 0.2154 ** | 0.1049 | 0.0920 | 0.0347 | 0.1546* |
| Plant height | rg | | | 1.0000 | 0.0434 | -0.0056 | 0.0049 | 0.0169 | -0.1502 | -0.0427 | -0.0813 | -0.1256 | -0.3023 ** | 0.2388** |
| | rp | | | 1.0000 | 0.0459 | -0.0128 | -0.0060 | 0.0355 | -0.1425 * | -0.0166 | -0.0762 | -0.0913 | -0.2617 ** | 0.1569* |
| Fruit length | rg | | | | 1.0000 | -0.3377 ** | 0.0076 | -0.0834 | 0.0409 | 0.0530 | 0.2137 * | -0.2354 * | -0.1183 | 0.0368 |
| | rp | | | | 1.0000 | -0.324 ** | 0.0104 | -0.0748 | 0.0385 | 0.0586 | 0.2061 ** | -0.1768 * | -0.1223 | 0.0480 |
| Fruit girth | rg | | | | | 1.0000 | 0.3099 ** | -0.2684 ** | -0.1141 | 0.1402 | -0.0812 | 0.2976 ** | 0.1121 | 0.0527 |
| | rp | | | | | 1.0000 | 0.2545 ** | -0.2072 ** | -0.1074 | 0.1443 * | -0.0769 | 0.2206 ** | 0.0928 | 0.0597 |
| Average fruit weight | rg | | | | | | 1.0000 | -0.8255 ** | -0.0010 | 0.0804 | 0.2609 * | 0.0410 | 0.2066 * | 0.1710** |
| | rp | | | | | | 1.0000 | -0.781 ** | -0.0016 | 0.0618 | 0.2445 ** | -0.0146 | 0.1737 * | 0.1591** |
| Fruits per plant | rg | | | | | | | 1.0000 | -0.0012 | -0.0767 | -0.1295 | 0.0023 | -0.1358 | 0.2755 ** |
| | rp | | | | | | | 1.0000 | -0.0015 | -0.0678 | -0.1208 | 0.0133 | -0.1094 | 0.2660 ** |
| Total phenols | rg | | | | | | | | 1.0000 | 0.2808 ** | 0.2617 * | -0.1195 | 0.2228 * | -0.1251 |
| | rp | | | | | | | | 1.0000 | 0.2555 ** | 0.2608 ** | -0.0990 | 0.2134 ** | -0.0894 |
| Total soluble solid | rg | | | | | | | | | 1.0000 | 0.1631 | -0.2229 * | 0.1232 | -0.0047 |
| | rp | | | | | | | | | 1.0000 | 0.1478 * | -0.1627 * | 0.1094 | -0.0265 |
| Anthocyanin content | rg | | | | | | | | | | 1.0000 | -0.0597 | 0.0944 | -0.0104 |
| | rp | | | | | | | | | | 1.0000 | -0.0499 | 0.0907 | -0.0033 |
| Moisture content | rg | | | | | | | | | | | 1.0000 | 0.3394 ** | 0.00002 |
| | rp | | | | | | | | | | | 1.0000 | 0.2833 ** | -0.0324 |
| Test weight | rg | | | | | | | | | | | | 1.0000 | -0.2023 * |
| | rp | | | | | | | | | | | | 1.0000 | -0.1076 |
| Fruit yield per plant | rg | | | | | | | | | | | | | 1.0000 |
| | rp | | | | | | | | | | | | | 1.0000 |

*, ** Significant at 5% and 1% levels, respectively

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