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# Evaluation of Chickpea (*Cicer arietinum L.*) Germplasm for Yield and Yield Attributing Traits in Eastern Plain Zone of Uttar Pradesh

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

The present research consists of the 40 genotypes of chickpea (*Cicer arietinum* L.) was carried out at the Department of the Genetics and Plant Breeding, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during *Rabi* 2018-19 in Randomized Block Design with three replications with an aim to determine genetic variability, correlation, direct and indirect relationship between yield and its component characters. Significant variability existed for all characters. Based on the mean performance, high seed yield was found for the GPK-1058 followed by BKG-21164, BKG-26212 and IPC-06127. High heritability (>70%) coupled with high genetic advance (>20) were being observed for the 100 seed weight. Seed yield per plant exhibited positive and highly significant correlations with biological yield per plant, harvest index, pods per plant, secondary branches per plant, primary branches per plant at both genotypic and phenotypic level. Path analysis at both genotypic and phenotypic level identified biological yield per plant followed by harvest index, 100 seed weight, secondary branches and seeds per pod important direct components for seed yield per plant. Thus, due consideration should be given to these characters during the selection.

## Introduction

Chickpea, a member of Fabaceae, is a self-pollinated true diploid (2 n = 2 x = 16) with genome size of 738 Mbp. It is an ancient cool season food legume crop cultivated by man and has been found in Middle Eastern archaeological sites dated 7500–6800 BC. Its cultivation is mainly concentrated in semiarid environments. It is grown in more than 50 countries on an area of 13.2m ha, producing approximately 11.62 m tonnes annually. India ranks first in the world's production and area by contributing around 70.7 % to the world's total production. It is one of the most important food legume plants in sustainable agriculture system because of its low production cost, wider adaptation, ability to fix atmospheric nitrogen and fit in various crop rotations and presence of prolific tap root system. Chickpea can fix atmospheric nitrogen up to 140 kg/ha through its symbiotic association with Rhizobium and meets its 80 % requirement. It is a rich source of quality

protein (20–22 %) to the predominantly vegetarian population in Indian subcontinent, other South Asian countries and the Middle East. Besides proteins, it is rich in fibre and minerals (phosphorus, calcium, magnesium, iron and zinc), and its lipid fraction is high in unsaturated fatty acids. Chickpea seed has 38-59% carbohydrate, 3% fiber, 4.8-5.5% oil, 3% ash, 0.2% calcium and 0.3% phosphorus. Digestibility of protein varies from 76-78% and its carbohydrate from 57-60%**.** Raw whole seeds contain per 100 g: 357 calories, 4.5-15.69% moisture, 14.9-24.6 g protein, 0.8-6.4 % fat, 2.1-11.7 g fiber, 2-4.8 g ash, 140-440 mg Ca, 190-382 mg P, 9 mg Fe, 0-225 mg b-carotene equivalent, 0.21-1.1 mg thiamine, 0.12-0.33 mg riboflavin, and 1.3-2.9 mg niacin.

The area of chickpea in worldwide is 13.9 million hectares and production is 13.7 million tonnes. In India area of chickpea is 9.93 million ha, production is 9.53 million tonnes and productivity is 960 kg/ha. In UP area of chickpea is 5.77 lakh ha, production is 4.75 lakh tonnes and productivity is 824 kg/ha. The production of chickpea has been on a decline due to non-availability of early maturity, high yielding, input-responsive varieties, resistant/tolerant to various biotic and abiotic stresses and their suitability in prevailing crop rotation. Therefore, there is an urgent need to evolve high yielding varieties having high protein content and resistant to major biotic and abiotic stresses with suitability for different ago-climatic conditions and cropping systems.

As per the present scenario the population of our country has been increasing at an alarming pace. So there is an urgent need for the release of varieties with the higher yield which can be able the match the decreasing production of the pulses and serve as the source of nutritional security for the people of our country.

## Materials and Methods

A germplasm collection of 40 varieties/strains of chickpea (*Cicer arietinum* L.) comprising indigenous as well as exotic genotypes, constituted the experimental materials for this study. These genotypes exhibiting wide spectrum of variability for various agronomic and morphological characters were obtained from the pulse section, Department of Genetics and Plant Breeding, Sam Higginbottom Institute of Agriculture Technology and Sciences, Prayagraj, 211007. The present experiment was carried out in *Rabi* 2018-19 in Randomised Block Design. The treatments were being replicated three times. The net area was around 120m2 with a plot size of 1*1 m2 the row to row spacing 30 cm and plant to plant distance 10cm. Soil in this region is sandy loam and alkaline in nature.

The technique of random sampling was adopted for the observation of the 12 quantitative characters namely days to 50 percent flowering, plant height, number of primary branches per plant, number of secondary branches per plant, number of pods per plant, pod length, number of seeds per pod, days to maturity, biological yield per plant, 100 seed weight, harvest index and seed yield per plant. Recommended practices were applied to raise a healthy crop. Metric data on 12 quantitative characters were taken at different stages of growth.

The experimental data thus recorded on these characters were subjected to statistical and biometrical analysis for Analysis of variance (Fisher, 1936), different genetic parameters Coefficient of variation (GCV, PCV) (Burton, 1952),estimation of heritability (Burton and De Vane, 1953), genetic advance (Johnson, *et al.*, 1995), correlation coefficient analysis (Al-Jibouri, *et al.*, 1958) and path analysis (Dewey and Lu, 1959).

Correlation coefficient estimates degree of association of different component characters of yield among themselves and with the yield. The correlation studies between various yields attribute with yield provides a basis for further breeding programme.

Path coefficient analysis measures the direct effect of variable upon another and permits the separation of the correlation coefficient into components of direct and indirect effects. Information on the variability and correlation studies among the economic characters of the crop is of great value to plant breeders. It will not only, help to understand the desirable and undesirable relationship of economic characters but also help in assessing the scope of simultaneous improvement of two or more attributes.

## Results and Discussion

### Genetic variability

Genetic variance and phenotypic variance of days to 50% flowering is (7.028 and 7.82), plant height (10.15 and 17.43), no. of primary branches per plant (0.053 and 0.09), number of secondary branches (1.09 and 2.17), no. of pods per plant (30.95 and 42.01), pod length(0.01 and 0.02), number of seeds per pod (0.05 and 0.12), days to maturity (17.75 and 18.94), 100 seed weight (16.32 and 17.46), biological yield (1.86 and 2.61), harvest index (8.75 and 15.93) and seed yield per plant (0.73 and 0.93). Genotypic coefficient of variation ranged from 3.78 (days to maturity) to 24.89 (Number of pods per plant) (Fig. 1, Table 1 and 2).

**Table.1** Analysis of variance for 12 different quantitative characters in chickpea

| Characters | Mean sum of squares | | |
|---|---|---|---|
| | Replication (d.f.= 2) | Treatments (d.f.= 39) | Error (d.f.= 78) |
| Days to 50% flowering | 1.075 | 21.876** | 0.79 |
| Plant height | 9.87 | 37.72* | 7.28 |
| Primary branches | 0.05 | 0.19** | 0.04 |
| Secondary branches | 1.04 | 4.36* | 1.08 |
| No. Of pod per plant | 18.925 | 103.91** | 11.06 |
| Pod Length | 0.03 | 0.04** | 0.01 |
| Number of seed per pod | 0.02 | 0.22* | 0.06 |
| Days to maturity | 2.233 | 54.44** | 1.19 |
| 100 seed weight | 1.57 | 50.1** | 1.13 |
| Biological yield | 0.972 | 6.323** | 0.74 |
| Harvest index | 5.86 | 33.429** | 7.18 |
| Seed yield / plant | 0.493 | 2.392** | 0.204 |

**Table.2** Estimation of genetic variability parameters for different quantitative characters

| Characters | Vg | Vp | GCV | PCV | $h^2$ (%) | GA | GA a % of mean |
|---|---|---|---|---|---|---|---|
| **Days to 50% flowering** | 7.028 | 7.82 | 3.859 | 4.071 | 89.90 | 5.177 | 7.536 |
| **Plant height** | 10.15 | 17.43 | 7.71 | 10.108 | 58.20 | 5.008 | 12.126 |
| **Primary branches** | 0.053 | 0.09 | 9.06 | 11.905 | 57.90 | 0.362 | 14.209 |
| **Secondary branches** | 1.096 | 2.17 | 15.999 | 22.525 | 50.40 | 1.532 | 23.408 |
| **No. Of pod per plant** | 30.95 | 42.01 | 24.892 | 29.001 | 73.70 | 9.837 | 11.012 |
| **Pod length** | 0.011 | 0.02 | 5.798 | 7.657 | 57.30 | 0.167 | 9.044 |
| **Number of seed per pod** | 0.053 | 0.12 | 15.27 | 22.681 | 45.30 | 0.321 | 21.177 |
| **Days to maturity** | 17.75 | 18.94 | 3.782 | 3.907 | 93.70 | 8.402 | 7.543 |
| **100 seed weight** | 16.32 | 17.46 | 24.83 | 25.676 | 93.50 | 8.048 | 49.463 |
| **Biological yield** | 1.86 | 2.61 | 10.089 | 11.938 | 71.40 | 2.375 | 17.565 |
| **Harvest index** | 8.75 | 15.93 | 8.544 | 11.529 | 54.9 | 4.516 | 13.044 |
| **Seed yield / plant** | 0.73 | 0.93 | 18.137 | 20.518 | 78.1 | 1.555 | 33.028 |

**Fig.1** Bar diagram depicting estimates of GCV and PCV for 12 quantitative characters in chickpea

**Table.3** Estimation of genotypic correlation for 12 yield component traits with seed yield in chickpea

| **Characters** | Days to 50% flowering | Plant height | Primary branches | Secondary branches | Number of pod per plant | Pod length | Number of seed per pod | Days to maturity | 100 seed weight | Biological yield | Harvest index | Seed yield per plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | 1 | -0.0233 | 0.2159* | 0.2114* | 0.0971 | -0.2476** | -0.0495 | 0.8969** | -0.0530 | 0.0647 | 0.0383 | 0.0485 |
| Plant height | | 1 | -0.1838* | -0.1516 | 0.0229 | 0.4318** | -0.3170** | 0.0025 | 0.2785** | 0.3120** | -0.0726 | 0.1461 |
| Primary branches | | | 1 | 0.6572** | 0.3005** | -0.1430 | -0.0785 | 0.2846** | 0.2299* | 0.0302 | 0.5341** | 0.2496** |
| Secondary branches | | | | 1 | 0.7855** | 0.1286 | -0.1179 | 0.1995* | 0.1231 | 0.4397** | 0.8207** | 0.6364** |
| Number of pod per plant | | | | | 1 | 0.1900* | 0.0760 | 0.1355 | -0.0956 | 0.5963** | 0.8499** | 0.7444** |
| Pod length | | | | | | 1 | -0.1431 | -0.2930** | 0.7508 | 0.2461** | 0.1598 | 0.2051* |
| Number of seed per pod | | | | | | | 1 | -0.0376 | -0.3054** | -0.2414** | -0.1227 | -0.1890* |
| Days to maturity | | | | | | | | 1 | -0.0889 | 0.1419 | 0.1506 | 0.1479 |
| 100 seed weight | | | | | | | | | 1 | 0.1562 | 0.0384 | 0.0968 |
| Biological yield | | | | | | | | | | 1 | 0.8082** | 0.9631** |
| Harvest index | | | | | | | | | | | 1 | 0.9333** |
| Seed yield per plant | | | | | | | | | | | | 1 |

**Table.4** Estimation of phenotypic correlation for 12 yield component traits with seed yield in chickpea

| **Characters** | Days to 50% flowering | Plant height | Primary branches | Secondary branches | Number of pod per plant | Pod length | Number of seed per pod | Days to maturity | 100 seed weight | Biological yield | Harvest index | Seed yield per plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | 1 | -0.0098 | 0.1687 | 0.1364 | 0.0720 | -0.1780 | -0.0695 | 0.8182** | -0.0483 | 0.0461 | 0.0041 | 0.0246 |
| Plant height | | 1 | -0.1153 | -0.0151 | 0.0696 | 0.2752 | -0.1212 | 0.0043 | 0.2119* | 0.2058* | -0.0640 | 0.0813 |
| Primary branches | | | 1 | 0.4537** | 0.2516** | 0.0317 | -0.0303 | 0.2316* | 0.1898* | 0.1002 | 0.3136** | 0.2261* |
| Secondary branches | | | | 1 | 0.6732* | 0.0135* | 0.0116 | 0.1443 | 0.1011 | 0.3139** | 0.5301** | 0.4927** |
| Number of pod per plant | | | | | 1 | 0.1379 | 0.0943 | 0.1185 | -0.0704 | 0.5156** | 0.5832** | 0.6472** |
| Pod length | | | | | | 1 | -0.0202 | 0.2179* | 0.5447** | 0.1767 | 0.1060 | 0.1534 |
| Number of seed per pod | | | | | | | 1 | -0.0633 | -0.2008 | -0.0977 | -0.1391 | -0.1289 |
| Days to maturity | | | | | | | | 1 | -0.0829 | 0.1165 | 0.0826 | 0.1163 |
| 100 seed weight | | | | | | | | | 1 | 0.0972 | 0.0257 | 0.0669 |
| Biological yield | | | | | | | | | | 1 | 0.4529** | 0.8656** |
| Harvest index | | | | | | | | | | | 1 | 0.8327** |
| Seed yield per plant | | | | | | | | | | | | 1 |

**Table.5** Estimation of path coefficient at genotypic level for twelve yield component characters with seed yield in chickpea

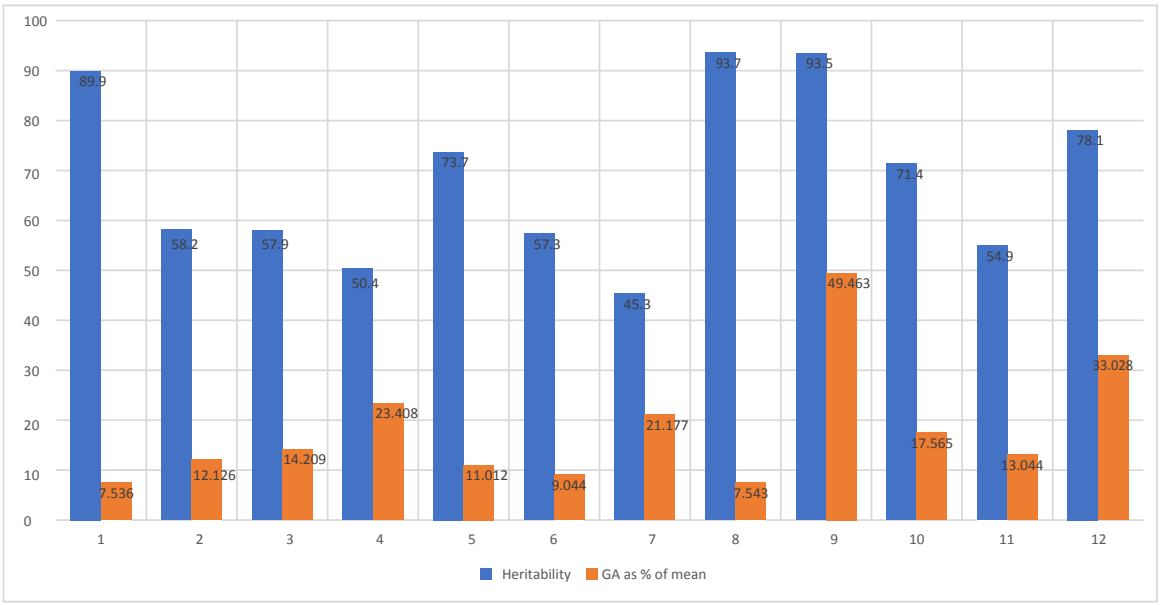
| Characters | Days to 50% flowering | Plant height | Primary branches | Secondary branches | Number of pod per plant | Pod length | Number of seed per pod | Days to maturity | 100 seed weight | Biological yield | Harvest index | **Seed yield per plant** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | **-0.0486** | 0.00 | -0.0075 | 0.0127 | 0.0009 | 0.0114 | -0.0006 | 0.0262 | -0.0013 | 0.0399 | 0.0154 | **0.0485** |
| Plant height | 0.0011 | **0.0012** | 0.0064 | -0.0091 | 0.0002 | -0.0199 | -0.0041 | 0.0001 | 0.0069 | 0.1925 | -0.0291 | **0.1461** |
| Primary branches | -0.0105 | -0.0002 | **-0.0346** | 0.0396 | 0.0028 | 0.0066 | -0.001 | 0.0083 | 0.0057 | 0.0186 | 0.2143 | **0.2496**** |
| Secondary branches | -0.0103 | -0.0002 | -0.0227 | **0.0602** | 0.0074 | -0.0059 | -0.0015 | 0.0058 | 0.003 | 0.2713 | 0.3293 | **0.6364**** |
| Number of pod per plant | -0.0047 | 0.00 | -0.0104 | 0.0473 | **0.0094** | -0.0088 | 0.001 | 0.004 | -0.0024 | 0.3679 | 0.341 | **0.7444**** |
| Pod length | 0.012 | 0.0005 | 0.0049 | 0.0077 | 0.0018 | **-0.0461** | -0.0018 | -0.0086 | 0.0185 | 0.1519 | 0.0641 | **0.2051*** |
| Number of seed per pod | 0.0024 | -0.0004 | 0.0027 | -0.0071 | 0.0007 | 0.0066 | **0.0128** | -0.0011 | -0.0075 | -0.1489 | -0.0492 | **-0.1890*** |
| Days to maturity | -0.0436 | 0.00 | -0.0098 | 0.012 | 0.0013 | 0.0135 | -0.0005 | **0.0293** | -0.0022 | 0.0876 | 0.0604 | **0.1479** |
| 100 seed weight | 0.0026 | 0.0003 | -0.008 | 0.0074 | -0.0009 | -0.0346 | 0.0039 | -0.0026 | **0.0247** | 0.0964 | 0.0154 | **0.0968** |
| Biological yield | -0.0031 | 0.0004 | -0.001 | 0.0265 | 0.0056 | -0.0113 | -0.0031 | 0.0042 | 0.0039 | **0.617** | 0.3243 | **0.9631**** |
| Harvest index | -0.0019 | -0.0001 | -0.0185 | 0.0494 | 0.008 | -0.0074 | -0.0016 | 0.0044 | 0.0009 | 0.4987 | **0.4012** | **0.9333**** |

**Table.6** Estimation of path coefficient at phenotypic level for twelve yield component characters with seed yield in chickpea

| Characters | Days to 50% flowering | Plant height | Primary branches | Secondary branches | Number of pod per plant | Pod length | Number of seed per pod | Days to maturity | 100 seed weight | Biological yield | Harvest index | Seed Yield per plant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | **-0.0175** | 0.0001 | -0.0027 | 0.001 | 0.0009 | 0.0031 | -0.0004 | 0.0101 | -0.0004 | 0.0283 | 0.0022 | **0.0246** |
| Plant height | 0.0002 | **-0.0091** | 0.0019 | -0.0001 | 0.0008 | -0.0048 | -0.0007 | 0.0001 | 0.0019 | 0.1263 | -0.0352 | **0.0813** |
| Primary branches | -0.0029 | 0.001 | **-0.0162** | 0.0035 | 0.003 | -0.0005 | -0.0002 | 0.0028 | 0.0017 | 0.0615 | 0.1724 | **0.2261*** |
| Secondary branches | -0.0024 | 0.0001 | -0.0074 | **0.0077** | 0.0081 | -0.0002 | 0.0001 | 0.0018 | 0.0009 | 0.1926 | 0.2914 | **0.4927**** |
| Number of pod per plant | -0.0013 | -0.0006 | -0.0041 | 0.0052 | **0.012** | -0.0024 | 0.0005 | 0.0015 | -0.0006 | 0.3164 | 0.3206 | **0.6472**** |
| Pod length | 0.0031 | -0.0025 | -0.0005 | 0.0001 | 0.0017 | **-0.0173** | -0.0001 | -0.0027 | 0.0049 | 0.1084 | 0.0583 | **0.1534** |
| Number of seed per pod | 0.0012 | 0.0011 | 0.0005 | 0.0001 | 0.0011 | 0.0003 | **0.0058** | -0.0008 | -0.0018 | -0.06 | -0.0764 | **-0.1289** |
| Days to maturity | -0.0143 | 0.00 | -0.0038 | 0.0011 | 0.0014 | 0.0038 | -0.0004 | **0.0123** | -0.0007 | 0.0715 | 0.0454 | **0.1163** |
| 100 seed weight | 0.0008 | -0.0019 | -0.0031 | 0.0008 | -0.0008 | -0.0094 | -0.0012 | 0.001 | **0.0089** | 0.0596 | 0.0141 | **0.0669** |
| Biological yield | -0.0008 | -0.0019 | -0.0016 | 0.0024 | 0.0062 | -0.0031 | -0.0006 | 0.0014 | 0.0009 | **0.6137** | 0.249 | **0.8656**** |
| Harvest index | -0.0001 | 0.0006 | -0.0051 | 0.0041 | 0.007 | -0.0018 | -0.0008 | 0.001 | 0.0002 | 0.2779 | **0.5497** | **0.8327**** |

Residual effect: 0.0754

**Fig 2** Bar diagram depicting estimates of heritability and genetic advance for 12 quantitative characters in chickpea




1-Days to 50% flowering, 2-Plant height, 3-No. of primary branches per plant, 4-No. of secondary branches per plant, 5- No. of pods per plant, 6-Pod Length, 7- No. of seeds per pod, 8- Days to maturity, 9- 100 seed weight, 10- Biological yield per plant, 11-Harvest Index, 12- Seed Yield per plant

**Fig 2:**

**Fig.3** Genotypic path diagram for seed yield per plant for 12 yield component traits

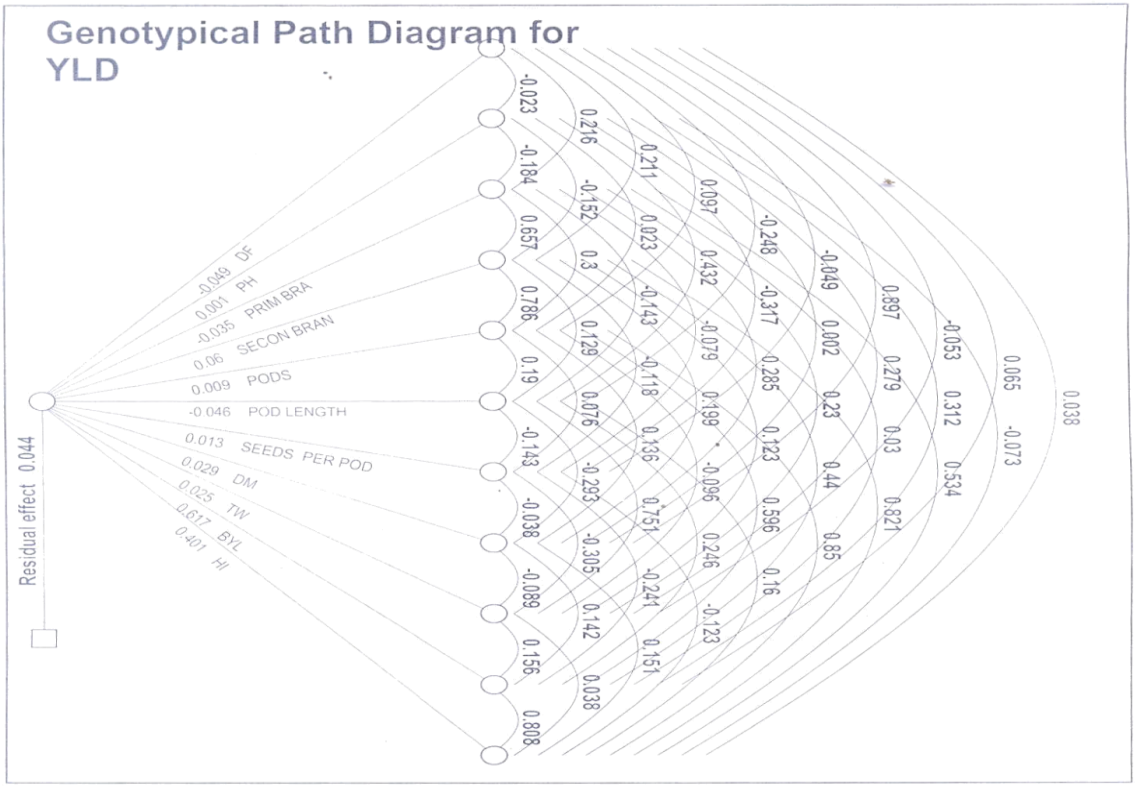
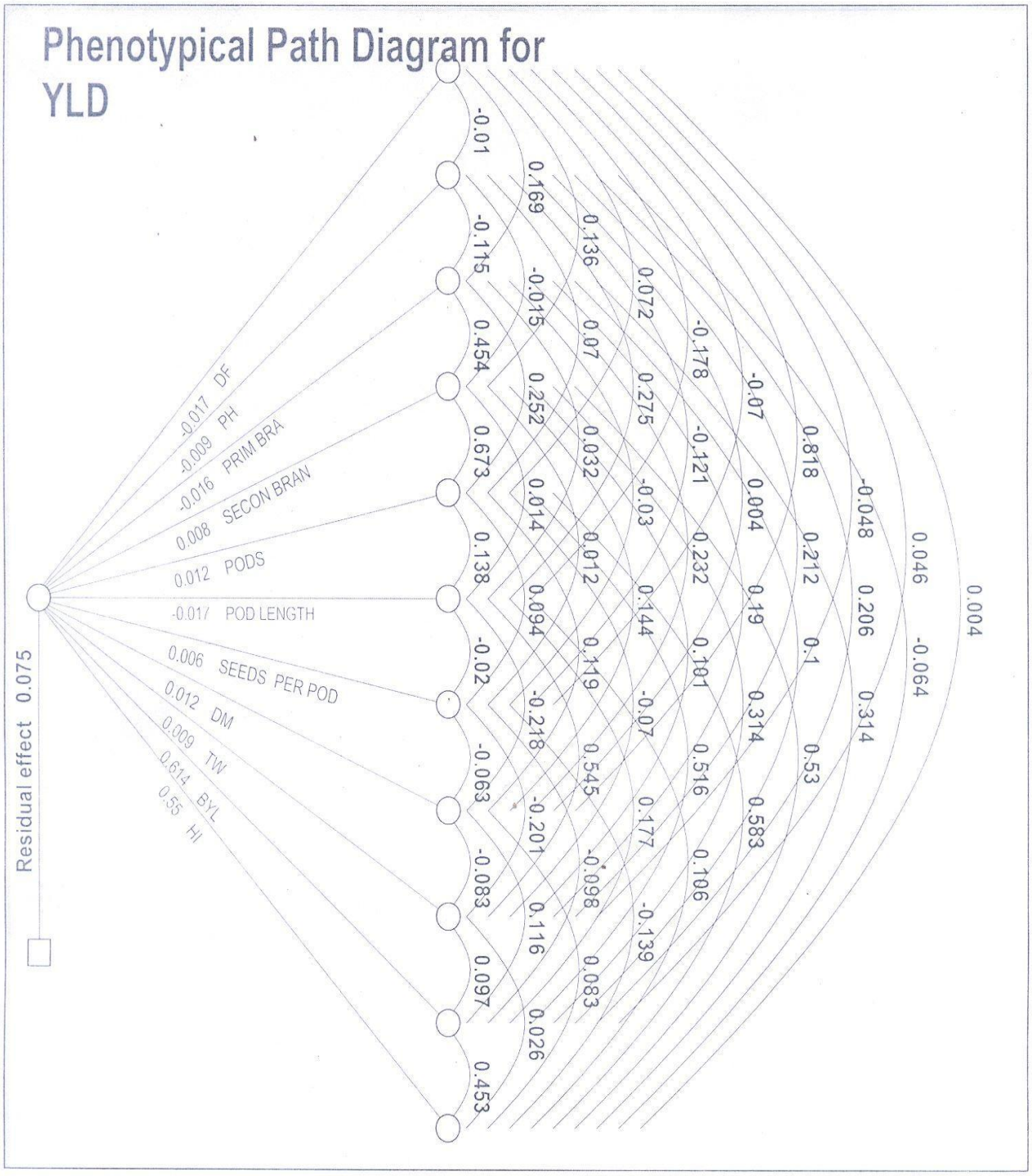


**Fig.4** Phenotypic path diagram for seed yield per plant for 12 yield component traits



Higher magnitude of genotypic coefficient of variation was for Number of pods per plant (24.89), 100 seed weight (24.83), seed yield per plant (18.14), number of secondary branches per plant (15.99), number of seeds per pod (15.27), biological yield per plant (10.09), number of primary branches per plant (9.06), harvest index (8.54), plant height (7.71), pod length (5.79), days to 50% flowering (3.86) and lowest estimates of genotypic coefficient for days to maturity (3.

Highest value of phenotypic coefficient of variation was recorded for Number of pods per plant (29.00), 100 seed weight (25.68), number of seeds per pod (22.68), number of secondary branches per plant (22.53), seed yield per plant (20.52), biological yield per plant (11.94), number of primary branches per plant (11.90), harvest index (11.53) plant height (10.11), pod length (7.66), days to 50% flowering (4.07) and lowest for days to maturity (3.91) Sandhu and Singh (2008). Heritabiity ranges from (45.30%) number of seeds per pod to (93.70%) days to maturity.

High heritability was observed for characters like days to maturity (93.70%), 100 seed weight (93.50%), days to 50% flowering (89.90%), seed yield per plant (78.10%), number of pods per plant (73.70 %), biological yield per plant (71.40%), plant height (58.20%), primary branches per plant (57.90%), pod length (57.30%), harvest index (54.90%), number of secondary branches (50.40%) and lowest for number of seed per pod (45.30%). High heritability for 100 seed weight, seed yield per plant, biological yield and number of pods per plant was also reported by Sandhu and Singh (2008), Singh *et al.,* (1973).

Genetic advance was recorded maximum for number of pods per plant (9.84) followed by days to maturity (8.40), 100 seed weight (9.04), days to 50% flowering (5.77), plant height (5.01), harvest index (4.52), biological yield per plant (2.37), seed yield per plant (1.56), secondary branches per plant (1.53), primary branches per plant (0.362), number of seeds per pod (0.321) and showed lowest genetic advance value for pod length (0.17). Highest genetic gain values for Harvest index, number of pod per plant was also reported by Raval (2001) and Parashuram (2003). Genetic advance (as a percent of mean) for different characters revealed that it varied from (7.53%) days to 50% flowering to (49.46%) 100 seed weight.

In present investigation characters like genetic advance (as percent of mean) is highest recorded for 100 seed weight (49.46%) followed by seed yield per plant (44.24%), number of secondary branches per plant (23.41%), number of seed per pod (21.18%) shows moderate genetic advance.

Biological yield per plant (17.57%), number of primary branches per plant (14.21%), harvest index (13.04%), plant height (12.13%), number of pods per plant (11.01%), days to maturity (7.54%) and days to 50% flowering (7.53%) shows low genetic advance. Low to moderate genetic advance expressed as percent of mean was recorded for days to 50% flowering and days to maturity was also reported by Raval (2001), Parashuram *et al.,* (2003) and Muhammad *et al.*, (2003) (Fig. 1–4).

## Correlation coefficient analysis

In table 3 and 4 the present study in genotypic correlation the seed yield per plant was found to be highly significant and positive correlation with biological yield per plant, harvest index, primary branches per plant, number of pods per plant and 100 seed weight. Plant height is having the positive and non-significant relationship with the seed yield per plant. Similar findings was also reported by Yadav *et al.,* (1990), Arora *et al.,* (2004), Singh *et al.,* (2008) and Sial *et al.,* (2003). In phenotypic correlation seed yield per plant was found to be highly significant and positive correlation with biological yield per plant, harvest index, primary branches per plant, number of pods per plant and 100 seed weight Dehal *et al.,* (2016), Tiwari *et al.,* (2016), Saroj *et al.,* (2013) and Shafique *et al.,* (2016).

## Path coefficient analysis

In table 5 and 6 the highest direct and positive effect on seed yield was exhibited by biological yield per plant followed by harvest index, while the 100 seed weight and number of seed per pod exhibit moderate direct positive effect. Thus these characters turned out to be the major component of seed yield Chopdar *et al.*, (2017), Dehal *et al.*, (2016), Shafique *et al.*, (2016) and Tiwari *et al.*, (2016).

From the path analysis study, it was apparent that maximum direct effects were exerted by biological yield per plant and harvest index. Both exhibited positive and significant correlations with seed yield therefore, these may be considered as the most important yield contributing characters. Hence, due emphasis should be placed on these characters while breeding for higher yield in chickpea.

It is concluded from the present study that all the 40 genotypes of chickpea showed significant differences among them. The values of GCV and PCV the relative amount of genotypic and phenotypic variation was high for seed yield per plant, indicating that the major portion of total variation was accounted by the genetic cause hence selection based on phenotypic performance would be rewarding for improvement in these traits. The Moderate heritability values were noticed for most of the characters except some such as days to 50% flowering, days to maturity, 100 seed weight shows high heritability. A low magnitude of genetic advance (<10%) expressed as a percent of mean was observed in respect of days to 50 flowering and pod length. The traits such as 100 seed weight, seed yield per plant, secondary branches per plant and number of seeds per pod exhibit high genetic advance (>20%) and rest other traits shows moderate genetic advance.

Mean performance results have shown that genotypes GPK-1058 and BKG-21264 shows the best performance for seed yield. Correlation and path analysis revealed that biological yield and harvest index have the positive correlation and direct effect on seed yield. Both the genotypes with these characters can be used for further improvement and development of chickpea.

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