EVALUATION OF YIELD AND YIELD RELATED TRAITS OF VARIOUS GROUNDNUT GENOTYPES UNDER CLIMATIC CONDITIONS OF QUETTA

1Shaheen Ijaz1, Abdul Waris2, Muhammad Arif3, Rehmatullah4, and Muhammad Saleem5

1Directorate of Agriculture Research, (Floriculture), ARI, Sariab, Quetta, Balochistan, Pakistan
2Directorate of Agriculture Research (Cotton) ARI, Sariab, Quetta, Balochistan, Pakistan,
3Directorate of Agriculture Research, (Potato Seed Production), Pishin, Balochistan, Pakistan
4Directorate of Agriculture Research (Fruit), ARI, Sariab, Quetta, Balochistan, Pakistan
5Directorate of Agriculture Research (Potato Seed Production), Pishin, Balochistan, Pakistan

Corresponding Author Email: razaquesoomro@hotmail.com

ABSTRACT
Six groundnut genotypes (Golden, BARD 479, BARI 2000, PG-1166, PG-1169 and PG-1190) were evaluated for yield and yield related parameters under climatic condition of Agriculture Research Institute Sariab Quetta during spring 2013. The experiment was laid out in randomized complete block design with four replications. Significant differences were observed among the genotypes for all the parameters under study. The genotype BARI 2000 outperformed the rest of genotypes in yield pod yield (1261kg ha⁻¹) followed by Golden (1162kg ha⁻¹). For yield contributing characters like number of pod plant⁻¹, 20 pods length, and 100 kernels weight, genotype BARI-2000 again showed good result that are 40.25, 72, 25cm and 128.75g respectively. The genotype PG-1166 produced minimum dry pod yield of 640kgha⁻¹. The genotype BARI-2000 is recommended for general cultivation in the Quetta area and further use in breeding programmes for Ground nut varietal development process.

Key Words: Groundnut, Genotypes, Yield performance, Balochistan, Pakistan

INTRODUCTION
Groundnut is a kharif cash crop grown on well drained sandy loam soils on marginal lands of Pakistan. It is important oil seed as well as food and feed crop. Its kernel is rich in both oil (43-55%) and protein (25-28%). In Pakistan, it is utilized as roasted nuts, salting and in confectionery. It is not only grown for grain yield but also the haulm is important by-product used for livestock feed. Groundnut is the potential oil seed crop of arid farming in Pakistan. About 58% rainfed area of Balochistan remain fallow during summer season. This results in annual low income from the rainfed lands and an increased soil erosion problem during monsoon rains. Groundnut, being a drought tolerant high-income generating and environment friendly crop, can be a substitute crop for these areas.

Numerous researchers investigated the productive potential of groundnut genotypes under different agro-ecological zones. Khan et al. (2001) evaluated 12 groundnut genotypes at three locations in Malakand division, Pakistan and reported significant differences for yield and its attributes. Taran et al. (1998) evaluated six groundnut genotypes at Lasbella, Baluchistan, Pakistan and reported significant differences for yield within and over the years. On average, variety ICGS (E)-46 gave maximum yield of 1341 kg ha⁻¹ with uniform maturity and minimum pod yield1225 kg ha⁻¹ was recorded for variety ICGS (E)-95. Prakash et al.(1998) tested groundnut variety R-8808 at five locations (Bijapur, Bellary, Lelgaum, Raichur and Dhawad) at Karanataka, India and obtained 30% (1300 kg ha⁻¹) more yield than check variety JL-24 (1000 kg ha⁻¹). Kale et al.(1999) reported that groundnut variety TAG-24 produced significantly highest pod yield of 2665 kg ha⁻¹ against the local check variety with 2032 kg ha⁻¹ in 11 varieties trial at Mumbai, India. Manoraran et al. (1989) reported that cross JL-24 x Co-2 produced average pod yield of 1790 and 2060 kg ha⁻¹ under rainfed and irrigated conditions, respectively at Uther Pradesh, India. The crop took 100-105 days to maturity. Rajeshwari (1998) conducted an experiment on 11-groundnut genotypes and observed that genotype K 134, ICGS 65 and ICGS 44 was likely to be more adaptable to rainfed conditions of Northern Coastal zone of Andhra Pradesh, India. Khan and Rahim (1998) evaluated 13 genotypes of groundnut for two years at ARS, Swat, Pakistan and reported that genotypes SP-96 (4078 kg ha⁻¹), ICGS 99 kg ha⁻¹, ICGS 18 (4042 kg ha⁻¹) and BARD 699 (4016 Kg ha⁻¹) produced significantly the highest pod yield. Santos (1998) reported that a large seeded groundnut variety for Brazil (BRS 151 Amendoin L 7) produced average pod yield 1850 kg ha⁻¹ under rainfed and 4500 kg ha⁻¹ under irrigated conditions. Gao et al. (1996) tested an early groundnut variety, Nonghua 22 at four locations in China and reported pod yield of 4021 and 4116 kg ha⁻¹. Khan et al. (1998) evaluated 20 genotypes at Swat, Pakistan and reported that
genotypes, Cina (4528 kg ha⁻¹), BARD 479 (3889 kg ha⁻¹), PG 542 (3889 kg ha⁻¹), ICGS 50 (3889 kg ha⁻¹), ICGV 86028 (3798 kg ha⁻¹) and ICGS 7326 (3611 kg ha⁻¹) produced significantly the highest pod yield against Swat Phalli-96 (check) with 2409 kg ha⁻¹. This present study was carried out to evaluate six high yielding groundnut genotypes under climatic condition of Quetta, Balochistan for commercial cultivation in this area.

MATERIALS AND METHODS
The seeds of six (6) Groundnut Genotypes (Golden, BARD 479, BARI 2000, PG-1166, PG-1169 and PG-1190) were evaluated at Agriculture Research Institute Sariab Quetta during the year spring 2013. Seed of these varieties was obtained from NARC, Islamabad and BARI, Chakwal. Seeds were sown with the help of single row cotton drill. The trial was sown in first week of April in Randomized Complete Block Design with four replications. The plot size was kept at 4 m x 1.8 m. The rows were spaced at 45 cm apart. Fertilizers at the rate of 60 – 60 – 25 NPK kg ha⁻¹ in form of Urea, Nitrophos and SOP were applied before sowing. Gypsum at 500 kg ha⁻¹ was also applied at flowering stage, 6 irrigations were given at proper time and insecticides were applied as and when required. Digging of pods was started at maturity. The randomly twenty selected plants from each plot were labeled and kept separately. The observations recorded for yield and yield components during the course of trial included: Days to maturity, Pods plant⁻¹, 20-pods length (cm), 100-kernels weight (g) and Pod yield (kg ha⁻¹).

Data collected and analysis
Days to maturity
For recording days to maturity at the end of flowering stage in each plot, 10 plants were uprooted. The number of mature pods (mature pod is one which shows dark brownish and yellow veins on the inner side of shell with brownish yellow kernel testa) of the total were counted. When plants showed an average of more than 60% mature pods, it was considered best time for recording maturity data (Khan et al., 2009).

Pods Plant⁻¹
In order to record pods plant⁻¹ data, twenty (20) plants were randomly selected from each plot and Numbers of pods plant⁻¹ were counted on average and recorded.

100-kernels weight
The 100 kernel weight is a measure of seed size. It is the weight in grams of 100 seeds from each plant.

20-pods length
For recording data to 20-pods length, randomly selected 20 pods from each plot and were placed in vertical position along with measuring scale.

Pod yield (kg ha⁻¹)
In order to record pod yield (kg ha⁻¹), plants of each plot were harvested, sun dried and weighed to record pod yield per plot, converted into pod yield (kg ha⁻¹) by using following formula (Khan et al., 2009):

\[
\text{Pod yield plot}^{-1} (\text{kg}) = \frac{\text{Pod yield plot}^{-1} (\text{kg})}{\text{Plot size (m}^2)} \times 10,000 \text{ m}^2
\]

Statistical Analysis
Data were subjected to statistical analysis for analysis of variance (ANOVA) following the method described by Gomez & Gomez (1984). The significance of differences among the means was compared by using Least Significant Difference (LSD) Test (Steel & Torrie, 1984).

RESULTS AND DISCUSSION
Days to Maturity
Table 1 revealed that the all Groundnut genotypes were statistically significant for the trait number of days taken to maturity. The maximum days taken to maturity by the genotype PG-1190 (165.25) and Golden (161.25) were matured earlier than others. These results are in conformity with the findings of Ayub et al (2009), Ashutosh and Prashant (2014), and Taran et al (1998) Reported significant differences in maturity duration among Groundnut genotypes.

Number of pods plant⁻¹
Data presented in Table 1 revealed significant differences (P=0.05) in pods plant⁻¹. Maximum Number of pods (40.25) was recorded for BARI-2000, followed by Golden (39.25) while PG-1166 had minimum Number of pods plant⁻¹ (20). These results have support from the results recorded by Madiha et al (2013), Ahmad and Rahim (2007) observed significant differences for pod yield, 100 kernel wt. and pods/plant.

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20-pods length
Twenty pods length showed a significant difference among various genotypes (Table 1). Varieties Golden and BARI-2000 had maximum 20-pods length (71 cm), while variety PG – 1166 had minimum (65 cm) 20-pods length. These results are in conformity with the results obtained by Ayub et al (2009) who reported significant differences in twenty pods length among ground nut genotypes.

100-kernels weight
Data on 100-Kernels weight showed significant differences. Maximum 100-kernels weight was recorded for BARI 2000 (120.25g) followed by Golden (119g) while minimum 100 kernels weight of 112.25g was recorded for variety PG-1190. These results are in agreement with the findings of Ashutosh and Prashant (2014), Madiha et al (2013) reported significant differences in hundred (100) kernels weight among various ground nut genotypes.

Pod Yield kg/ha⁻¹.
Significant differences in pod yield kg/ha⁻¹ were observed among Ground nut genotypes. The BARI-2000 had maximum pod yield (1261.5kg ha⁻¹) while minimum pod yield (640kg ha⁻¹) was recorded for PG-1166, such variation in the yield of different genotypes have also been reported by Ashutosh and Prashant (2014), Madiha et al (2013), Khan et al (2001), Ayub et al (2009), and Taran et al (1998).

Table 1: Evaluation of Different Ground Nut Genotypes under Climatic Condition of Quetta

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to Maturity</th>
<th>No of pods plant⁻¹</th>
<th>20pods length (cm)</th>
<th>100kernels weight (gm)</th>
<th>Pod yield (kg/ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG-1166</td>
<td>163.00BC</td>
<td>20.000E</td>
<td>65.000C</td>
<td>115.50B</td>
<td>640.0E</td>
</tr>
<tr>
<td>BARD 479</td>
<td>164.25AB</td>
<td>30.250C</td>
<td>70.500AB</td>
<td>112.50C</td>
<td>942.5C</td>
</tr>
<tr>
<td>PG- 1190</td>
<td>165.25A</td>
<td>35.250B</td>
<td>68.500ABC</td>
<td>112.25C</td>
<td>792.5D</td>
</tr>
<tr>
<td>PG- 1169</td>
<td>164.00AB</td>
<td>28.500D</td>
<td>67.000BC</td>
<td>114.50BC</td>
<td>926.2C</td>
</tr>
<tr>
<td>Golden</td>
<td>161.25D</td>
<td>39.250A</td>
<td>71.000A</td>
<td>119.00A</td>
<td>1162.5B</td>
</tr>
<tr>
<td>BARI – 2000</td>
<td>162.00CD</td>
<td>40.250A</td>
<td>71.500A</td>
<td>120.25A</td>
<td>1261.5A</td>
</tr>
<tr>
<td>Grand Mean</td>
<td>163.29</td>
<td>32.250A</td>
<td>68.917</td>
<td>115.67</td>
<td>954.21</td>
</tr>
<tr>
<td>C.V</td>
<td>0.70</td>
<td>2.75</td>
<td>3.67</td>
<td>1.66</td>
<td>3.81</td>
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<td>LSD5%</td>
<td>0.8122</td>
<td>0.6280</td>
<td>1.7904</td>
<td>1.3601</td>
<td>25.685</td>
</tr>
</tbody>
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REFERENCES


