Journal of Natural Sciences Research www.iiste.org
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.5, No.17, 2015

Yield Potential of Promising Groundnut Genotypes Planted at ARI Mingora Swat

Naeem Ahmad Mohammad Rahim Ahmad Zada Muhammad Junaid Akhtar Ali
Agricultural Research Institute Mingora, Swat. Khyber Pakhtunkhwa-Pakistan

Abstract:
Studies were carried out on various groundnut genotypes at Agriculture Research Station (N) Mingora, Swat to find out the most suitable, well adapted, high and stable yielding variety for its successful cultivation throughout Malakand division. Based on yield and yield components data, it was concluded that genotypes PG-759, SP-96 and PG-931 are high yielding genotypes in this area. It is therefore suggested that these genotypes may be recommended for commercial cultivation in the agro-climatic conditions of Malakand division.

Introduction

Groundnut (*Arachis hypogaea. L.*) is an important leguminous crop which is used as a source of oil, livestock forage and food for human consumption. It is grown throughout the tropical, sub-tropical and warm temperate zones of the world. Groundnut is grown primarily on barani lands in Pakistan and is an important cash crop for the farmers in these areas during Kharif season. It is an oilseed crop with 40-50% oil contents. The remaining portion can be used as meal for food or feed (25-30% proteins). As a crop groundnut ranks 13th in importance in the world. The annual production ranges 70,000 - 80,000 tons. In Pakistan it is grown on an area of 102400 hectares with a total production of 114700 tons and an average yield of 1121 kg/ha. (G.O.P. 2004). In NWFP during the same period it was grown on an area of 9100 ha with a total production of 13900 tons and an average yield of 1525 kg/ha. (G.O.P. 2004). Groundnut is a potential crop for both rain-fed and irrigated lands of Malakand division and can easily be adjusted in the prevailing cropping patterns. Santos (1998) reported that BRS151 Amendoim L 7 is a large seeded groundnut variety for Brazil with average pod yield of 1850 kg ha^{-1} under rainfed and 4500 kg ha^{-1} under irrigated condition, against check variety with 1700 kg ha^{-1} and 3500 kg ha^{-1} under rainfed and irrigated condition, respectively. Gao *et al*., (1996) released Nonghua 22 for early maturity and high yield. The variety was tested at four locations with average pod yield of 4021 and 4116 kg ha^{-1} during 1992 and 1993 against the check variety with 3454 and 3607 kg ha^{-1} average pod yield during the same period. Ayub Khan and Muhammad Rahim (1998) evaluated 20 Genotypes and reported that genotypes Cina (4528 kg ha^{-1}), BARD 479, PG 542, 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 SP-96 (check) with 2409 kg ha^{-1}) at 5% level of probability. Suzuki (1992) released an early maturing variety with a name of Yuderakka registered as Norine II for suitability under their own climatic conditions. Shah *et al* (1993) reported that pod yield was positively correlated with pods/plant and 100-kernel weight. Shah (1988) reported yield variation between years among peanut genotypes of barani areas. The present study is aimed to investigate and select the most desirable, early maturing, insects-pest resistant, well-adapted, high and stable yielding variety/genotypes of groundnut for rain-fed as well as irrigated lands of Malakand division.

Materials and methods

The evaluation trial of different groundnut genotypes was conducted during the year 2001 at ARS, Mingora, Swat. Seed of different genotypes was obtained from NARC, AARI and Chakwal. The field was thoroughly prepared and fertilizer at the rate of 20:60:60 kg NPK/ha was applied before sowing. The experiment was laid out in randomized complete block design with three replication and 20 treatments with plot size of 4 x 1.8 m or 7.2 m^2 i.e. 4 rows, 4 meter long with spacing of 45 cm. Plant to plant distance was kept 30 cm, with a sowing depth of 2-3 cm. Sowing was done, using Kera method. Two irrigations were applied during the whole cropping season. Digging of the pods was started at maturity. The plants from each plot were labeled and kept separated. Required cultural practices and pest control measures were adopted at appropriate intervals to raise a good crop. The pods were collected and yield data in kg/ha were recorded. The seed yield and other relevant data on different Genotypes were collected according to standard procedure.

Results and Discussion

1. Maturity and Plant Height (cm)

Data on days to maturity and plant height is presented in table-1. Days to maturity remained significant at 5% level of probability. Genotypes ICGS-147 and ICGS-108 each were early in maturity with 177 days, while genotypes PG-481 and PG-479 each were late maturing with 182 days. Plant height revealed significant differences at ($P \leq 0.05$). It was evident from the average data that maximum plant height of 63.2 cm was recorded for variety PG-951, while minimum plant height of 29.0 and 27.2 cm was recorded for genotypes PG-910 and SP-96 respectively. The variation in days to maturity and plant height may be attributed to specific

genetic characteristic of these genotypes.

Table-1. Days to Maturity and Plant Height (cm) of Groundnut Genotypes evaluation Trial

S. No.	Genotypes	Days to maturity	Plant Height (cm)
1	PG-931	178.0 D-F	40.7 FG
2	PG-759	178.0 D-F	45.2 EFG
3	PG-479	**182.0 A**	25.4 H
4	Pl-429629	178.0 C-E	44.6 EFG
5	Pl-279688	**182.0 A**	50.3 CDE
6	PG-481	177.7 EF	44.6 EFG
7	PG-864	178.0 DEF	46.8 D-G
8	Pl-338337	178.3 CDE	50.0 CDE
9	PG-951	177.0 E	**63.2 A**
10	PG-910	179.0 BCD	**29.0 H**
11	SP-96	179.3 BC	**27.2 H**
12	BARD-479	179.0 BCD	42.8 EFG
13	ICGV-90045	178.3 CDE	41.5 FG
14	SP-2000	178.3 CDE	48.0 DEF
15	ICGV-88448	178.3 CDE	46.5 D-G
16	SP-2002	177.7 EF	53.8 BCD
17	ICGS-147	**177.0 F**	39.0 G
18	ICGS-108	**177.0 F**	58.8 AB
19	B-51	178.0 DEF	57.1 ABC
20	ICGS-07 (Check)	179.7 B	60.9 AB
LSD value at (P≤ 0.05)		66	8.02

2. Pods/Plant and Kernels/Pod

Data on pods/plant and kernels/pod is presented in table-2. Pods per plant revealed significant differences at (P≤ 0.05). It is evident from the data that maximum pod/plant of 51.3 were recorded for genotype PG-759, while minimum pods/plant of 20.7 each were recorded for genotypes BARD-479 and ICGV-90045. Data on kernels/pod also revealed significant differences at (P≤ 0.05). Maximum kernels/pod of 2.3 were recorded for variety PG-951, while minimum kernels/pod of 1.4 were recorded for variety PG-910. Variation among kernels per pod is largely due to genetic characteristics of the variety, however fertility and nature of soil could also be the cause of this variation.

Table-2. Pods/plant and Kernels/pod of Groundnut Genotypes evaluation Trial

S. No.	Genotypes	Pods per plant	Kernels per pod
1	PG-931	31.3 BC	2.0 ABC
2	PG-759	**51.3 A**	2.0 ABC
3	PG-479	25.4 BCD	2.0 ABC
4	Pl-429629	26.6 BCD	2.0 BC
5	Pl-279688	27.4 BCD	2.2 AB
6	PG-481	28.1 BCD	1.6 DE
7	PG-864	22.6 CD	1.7 CDE
8	Pl-338337	31.0 BC	2.0 ABC
9	PG-951	23.1 CD	**2.3 A**
10	PG-910	25.5 BCD	**1.4 E**
11	SP-96	34.0 B	2.0 ABC
12	BARD-479	**20.7 D**	2.0 ABC
13	ICGV-90045	**20.7 D**	1.9 BCD
14	SP-2000	24.6 BCD	1.9 BC
15	ICGV-88448	29.8 BCD	2.0 ABC
16	SP-2002	25.8 BCD	2.1 ABC
17	ICGS-147	26.3 BCD	1.8 CDE
18	ICGS-108	23.8 CD	1.9 BCD
19	B-51	22.5 CD	1.6 DE
20	ICGS-07 (Check)	28.8 BCD	1.9 BCD
LSD value at (P≤ 0.05)		10.17	0.35

3. 20 Pods Length and 100 Kernels Weight

Data on 20 pods length and 100 kernels weight is presented in table-3. Significant variation was observed for 20 pods length among different genotypes at (P≤ 0.05). Genotype PG-759 had maximum 20 pods length of 72.9 cm, followed by variety SP-96 with 72.5 cm, while minimum 20 pods length of 37.4 cm was recorded for genotype B-51. Data on 100 kernels weight also showed significant differences at (P≤ 0.05). The average data showed that maximum weight of 103.9 gm was recorded for genotype PG-759, while minimum 100 kernels weight of 39.1 gm was recorded for genotype B-51. Genetic character of each variety has a dominant role for this variation, however, this could also be attributed to change in soil fertility and soil structure.

Table-3. 20 Pods length (cm) and 100 Kernels weight (gm) of Groundnut Genotypes evaluation Trial

S. No.	Genotypes	20 pod length (cm)	100 kernel wt. (gm)
1	PG-931	69.4 AB	93.3 ABC
2	PG-759	**72.9 A**	**103.9 A**
3	PG-479	68.0 ABC	76.7 A-F
4	Pl-429629	64.0 A-D	54.0 D-G
5	Pl-279688	68.1 ABC	46.7 FG
6	PG-481	64.6 A-D	69.6 B-G
7	PG-864	60.7 B-E	71.0 B-G
8	Pl-338337	64.5 A-D	80.0 A-E
9	PG-951	44.0 FG	80.3 A-E
10	PG-910	53.0 EF	47.0 FG
11	SP-96	**72.5 A**	97.3 AB
12	BARD-479	64.6 A-D	56.3 D-G
13	ICGV-90045	56.1 DE	81.0 A-D
14	SP-2000	60.8 B-E	63.8 C-G
15	ICGV-88448	56.4 DE	54.3 D-G
16	SP-2002	64.0 A-D	57 D-G
17	ICGS-147	58.0 DE	69.0 B-G
18	ICGS-108	58.5 CDE	89.7 ABC
19	B-51	**37.4 G**	**39.1 G**
20	ICGS-07 (Check)	61.4 B-E	48.6 EFG
LSD value at (P≤ 0.05)		9.79	32.24

4. Plant Population and Pod Yield (per ha.)

Data on plant population and pod yield is presented in table-4. Plant population remained non significant at 5% level of significance. Data on pod yield showed significant differences at 5% level of significance. It was observed that genotype PG-759 had maximum pod yield of 4954 kg/ha, followed by variety SP-96 with pod yield of 4815 kg/ha followed by genotype PG-931 with pod yield of 4556 kg/ha, while minimum pod yield of 1324 kg/ha and 1648 kg/ha were recorded for genotypes ICGV90045 and B-51 respectively. Variation in pod yield can be explained in terms of pods/plant and 100-kernel weight. Those genotypes with more pods/plant and 100-kernel weight had the highest grain yield and vice versa. Shah *et al* (1993). This may also be attributed to the specific genetic characteristics, soil fertility, soil structure and prevailing agro-climatic conditions.

Table-4. Plant population/ha and Pod Yield/ha of Groundnut Genotypes evaluation Trial

S. No.	Genotypes	Plant population/ plot	Pod yield kg/ha
1	PG-931	79028	4556 AB
2	PG-759	78611	4954 A
3	PG-479	78194	2852 D-G
4	Pl-429629	77639	2889 C-G
5	Pl-279688	77222	1287 G
6	PG-481	75833	3940A-E
7	PG-864	70694	1583 G
8	Pl-338337	78194	4074 A-E
9	PG-951	80972	4287 A-D
10	PG-910	73472	1620 G
11	SP-96	75833	4815 AB
12	BARD-479	75417	4306 A-D
13	ICGV-90045	72639	1324 G
14	SP-2000	77222	3269 B-F
15	ICGV-88448	77639	4491 ABC
16	SP-2002	76806	4037 A-E
17	ICGS-147	77639	4130 A-E
18	ICGS-108	76250	1977 FG
19	B-51	83750	1648 G
20	ICGS-07 (Check)	80900	2519EFG
LSD value at (P≤ 0.05)		N.S.	13.7

Literature cited

- Ayub Khan and Muhammad Rahim. 1998. High yielding groundnut genotypes for the North West Frontier Province, Pakistan. International Arachis Newsletter 18**:**18-19.
- Ayub Khan, N.J. Malik, M. Rahim and A. Khan. 1998. Evaluation of Peanut genotypes for harvest Index. Sarhad J. Agric. 14(5): 437-440
- Gao, L., Z. Jiang, B. Long, F. Feng and F. Deng. 1996. Breeding an early and high yielding groundnut variety Nonghua 22 in China. International Arachis Newsletter 16**:**8-9.
- Santos, R.C. dos. 1998. EMBRAPA release BSR 151 Amendoim L 7, a large seeded variety for Brazil. International Arachis Newsletter 19: 5-7.
- Shah S. G. M. 1988. Performance of some bunch type exotic Genotypes of groundnut under rainfed conditions of Punjab. Pakistan Journal of Agri. Res. 26(1): 21-23.
- Shah M.A., J. Rahim, S. Hassan, A. Rashid, and H. Jan. 1993. Screening of peanut genotypes for genetic parameters and protein content. Sarhad J. of Agriculture. 9(4): 317-321.
- Suzuki, M. 1992. A new early maturing groundnut variety (Yuderakka) registered as Norine II. Japanese Journal of Breeding. 42(1): 173.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Academic conference: http://www.iiste.org/conference/upcoming-conferences-call-for-paper/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar