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Productivity Assessment Some Peanut Imported Genotypes Under Newly Reclaimed Soils Condition

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ABSTRACT

To evaluate twenty peanut (*Arachis hypogaea*, L.) genotypes, A field experiment was conducted at Agriculture Faculty Farm, New Valley University, El-Kharga Oasis, New Valley Governorate, Egypt during 2020 and 2021 summer season. The tested genotypes were named as line 3, 4, 6, 8, 9, 10, 13, 18, 25, 26, 27, 28, 34, 35, 41, 43, 50,13R, 27R and NC as a check variety. The experiment was laid out in a randomized complete block design, using three replications. The results of the study manifest that significant distinction line 3, 4, 10, 13, 26, 28, 35, 41 and 27R at most traits compared to check variety (NC) in both seasons. In addition, Line 4 had the highest fresh, dry, pods and seeds weights/plant and gave the highest pods, seed, oil yields/fad. in the two growing seasons. Furthermore, Line 28 recorded the biggest number of branches/plant while Line 27R gave the biggest number of pods and seeds/plant in both seasons. Thus, sowing the lines 3, 4, 10, 13, 26, 28, 35, 41 and 27R, especially the lines 4 and 26 may be the suitable choice under newly reclaimed soils condition.

Keywords: Productivity assessment, Peanut genotypes, Sandy soil

Introduction

Peanut or groundnut (*Arachis hypogaea*, L.) is one of the most important legume seed and vegetable oil crops in the world. Peanut crop is considered one of the important export crops, in addition to being a multi-use crop, and it is characterized by its high net yield compared to other crops **(Ali et al., 2014, Arya et al., 2016 &Abd El-Monem and Said 2018).** Peanut seed is rich in edible oil and proteins, so it called as 'oilseeds king'. Peanut seeds contain about 47–53% oil; 25–36% protein; 10–15% carbohydrate and are rich sources of phosphorus, vitamins B and E **(Aravind et al., 2022). Nigam et al. (2006)** reported that with a little exception, peanut productivity still to be low in most development countries. Even though many high yielding varieties releasing. The multifarious uses of peanuts include oil production from seeds, human food, animal feeding, hay or silage, and cake making, therefore it is one of the most important legume seed and oil crops in the world. The breeding objectives in peanut focus to increasing yield, tolerance to biotic and abiotic stresses, and improving oil and nutritional quality. However, limited genetic variability in the cultivated germplasm and difficulties in hybridization have slowed down the progress in peanut breeding **(Pratap& Kumar, 2016)**. **Mahmoud et al., (2020)** evaluated the sixteen genotypes yield potential of peanuts, and they reported that genotypes named 7, 11 and 16 recorded the highest pods yields while genotypes named 13 and 15 produced the lowest pods yields. Significant variations were observed among peanut varieties for yield and yield components traits (no. of pods/plant, dry weight of pods/plant, pods yield/fad, no. of seeds/plant, dry weight of seeds/plant, dry weight of 100 seeds, seeds yield/fad, shelling %, harvest index, crop index and migration coefficient as well as pods, seed and oil yields/fad) were observed, except the number of seeds/pod and migration coefficient traits which were insignificant **(Samaha et al., 2019).** Manifest differences among peanut varieties of the phenotypic traits were recorded by **Sabry et al., (2022).** Significant variations among the peanut tested varieties were observed for all the studied traits (no. of primary branches, pods/plant, no. of seeds/pod, and per plant, grain yield (kg/ha) and 100-seeds weight (g)) except the number of primary branches per plant **(Yoseph et al., 2022).**

Peanut is one of the most important crops that can be cultivated in reclamation lands, especially sandy and light soils. In Egypt, peanut cultivated area was nearly about 143000 fad with average of productivity about 730 Kg/fad in 2021 year **(FAOSTAT 2023)**. New Valley Governorate is characterized by the availability of large areas of sandy and light lands, in which peanut cultivation is the ideal choice in the summer season. Finding high-yielding and high-quality varieties of peanuts is a prerequisite for expanding the cultivated area, as well as for increasing production and profitability for farmers. Therefore, the objective of this study was to evaluate the production of twenty of imported genotypes of peanut under the New Valley Governorate conditions, compared to one of the most widespread varieties NC cv. in Egyptian agriculture.

Materials and Methods

To evaluate twenty peanut genotypes, A field experiment was conducted at Agriculture Faculty Farm, New Valley University, El-Kharga Oasis, New Valley governorate, Egypt during 2020 and 2021 summer season. The genotypes were named as line 3, 4, 6, 8, 9, 10, 13, 18, 25, 26, 27, 28, 34, 35, 41, 43, 50,13R, 27R and NC as a check variety. Genotypes source countries are shown at Table 1.

The experiment was laid out in a randomized complete block design, using three replications. Each replicate held twenty experimental unit, area of each one 10.5 m^2 included six rows at 3.5 m long and 0.50 m width to a single row. The physical and chemical analysis of soil field trials are presented for 2020 and 2021 seasons in Table 2.

Table 1: Source country of the pea nut lines (genotypes) under study

Line	Source Country	Line	Source Country	Line	Source Country	Line	Source Country
3	Brazil	**10**	Malawi	**27**	Israel	**43**	China, Hubei
4	Brazil, Sao Paulo	**13**	Zambia	**28**	Israel	**50**	Mexico
6	Brazil	**18**	Israel	**34**	China	**13R**	Brazil, Sao Paulo
8	Malawi	**25**	Israel	**35**	China	**27R**	Israel
9	Malawi	**26**	Israel	**41**	China, Hubei	**NC**	America

Table 2: Analysis of soil field experiment for 2020 and 2021 seasons.

Season	pH	EC (ds m^{-1})	O M (g/kg^{-1})	Nutrient content, mg kg^{-1}						Particle size distribution			Textural class
				N		P		K					
				Total	Available	Total	Available	Total	Available	Clay	Silt	Sand	
2020	7.97 ±0.06	0.27 ±0.04	1.08 ±0.2	160.6 ±11.3	28.20 ± 2.44	63.30 ±6.68	4.86 ±0.81	248.0 ±12.2	150.0 ±8.76	6.83 ±0.45	11.25 ±0.43	81.92 ±0.31	Sandy
2021	7.95 ±0.07	0.28 ±0.05	1.11 ±0.2	162.4 ±12.2	30.20 ± 2.34	64.30 ±6.75	5.66 ±0.92	253.0 ±14.2	159.0 ±8.96	6.85 ±0.54	11.26 ±0.49	81.89 ±0.31	

Mono calcium super phosphate (15% P_2O_5) at a rate of 200 kg/fad and calcium sulphate (80% $CaSO_4 – 2H_2O$) at a rate of one ton/fad were used as a source of phosphorus and calcium added before planting. Peanut seeds were planted at 15th and 20th April, in 2020 and 2021 season, respectively. All other cultural practices as recommended for peanut production were done.

At harvest, five guarded plants from each plot were chosen randomly to measure the following traits i.e., fresh weight/plant (g), number of branches/plants, dry weight/plant (g), number of pods/plant, pods weight/plant(g), seeds number/plant, seeds weight/plant (g) and 100-seed weight. Pods and seed yields (kg/fad) were estimated on plot basis. The seed oil content was estimated using Soxhlet apparatus according to **A.O.A.C. (1995).** Oil yield in kg/fad was calculated by multiplication of seeds oil percentage by seed yield in kg/fad.

All data were analyzed using analysis of variance with SAS Statistical Software Package **(v.9.2, 2008).** The resulted means were compared using Dunnett test at 0.05 level of significant **(Dunnett (1964), Gomez and Gomez (1984) & Kanji, (2006).**

Results and discussions

The results in **Table 3** show highly significant differences (P<0.01) among the studied genotypes in field weight, dry weight, and no. of branches/plant during the two seasons. As compared with the standard variety (NC), the lines 3, 4, 10, 13, 26, 28, 35, 41 and 27R surpassed significantly in fresh and dry weights/plant where, line 4 recorded the heaviest field and dry weights/plant in both seasons. NC variety had the biggest fresh and dry weights/plant compared to the lines 6, 8, 18, 25, 34, 43 and 13R in both seasons. The rest lines were on the par with the standard variety (NC) in both seasons. The lines 3, 4, 10, 13, 28, 35 and 27R significantly surpassed the standard variety (NC) in branches number/plant in both seasons. The branches number/plant of lines 8, 9, 26, 27, 41, 43 and 13R in both seasons were in the par to the standard variety (NC). On the other hand, the lines 6, 18, 25 and 34 were lower than the check variety in branches number/plant in both seasons. These results out leading to large variations in the genetic behavior of the studied genotypes. These results point to big variations in genetic behavior of the studied genotypes and its interaction with environmental conditions led to differ in plant fresh and dry weight as well as branches number. This finding as in same par with those reported by **Kaba et al., (2014), Abd El-Monem and Said (2018), Samaha et al., (2019), Yoseph et al., (2022) and Sabry et al., (2022)** who reported that there is diversity in the genotypes of peanuts, followed by differences in its performance and productivity.

Table 3: Means of fresh weight/plant(g), dry weight/plant(g) and branches No./plant means ± SD of twenty peanut genotypes in 2020 and 2021 season.

Characters	fresh Weight/plant(g)		Dry weight/plant(g)		Branches No./plant	
Season	2020	2021	2020	2021	2020	2021
Genotypes	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Line 3	382.29±15.48	363.28±12.19	146.76±7.40	149.76±2.94	12.67±0.83	12.87±0.12
Line 4	503.42±18.75	502.14±18.41	196.59±5.51	178.49±6.60	12.73±0.46	12.53±0.50
Line 6	228.10±19.88	275.67±13.12	96.76±4.27	91.14 ±7.58	7.20 ±0.35	7.87 ±0.50
Line 8	201.03±16.63	208.64±15.13	81.74±4.52	81.00 ±2.43	10.33±0.70	10.13±0.23
Line 9	291.19±15.65	294.16±10.11	128.37±4.13	121.14±4.79	11.73±0.70	11.67±0.58
Line 10	333.58±16.66	359.24±14.47	146.07±3.14	149.54±8.95	12.80±0.20	12.60±0.20
Line 13	488.28±12.14	469.82±17.33	175.64±8.30	169.76±6.74	12.93±0.70	12.73±0.31
Line 18	205.42±19.57	195.17±13.19	97.27±6.26	88.10 ±7.04	7.27 ±0.58	7.47 ±0.50
Line 25	202.41±14.06	256.50±17.61	83.13±9.52	114.58±6.13	9.07 ±0.92	8.24 ±0.21
Line 26	440.28±12.83	479.37±11.08	174.93±2.92	172.99±3.19	11.13±0.50	10.00 ±0.72
Line 27	318.70±12.66	352.67±17.52	128.58±4.40	128.33±3.60	11.60±60	11.87±0.81
Line 28	371.61±16.68	398.42±15.82	149.20±7.00	152.36±3.26	13.00±0.35	13.07±0.42
Line 34	183.17±17.10	226.88±14.54	77.07 ±6.31	103.16±3.24	8.80 ±0.35	8.53 ±0.23
Line 35	384.12±14.47	383.92±12.01	146.11±2.49	149.35±5.62	12.73±0.23	12.40 ±0.40
Line 41	384.04±12.71	383.60±12.06	146.61±3.45	150.7±4.87	10.53±0.12	11.13±0.42
Line 43	249.14±18.74	271.43±11.32	108.19±5.27	98.55 ±7.30	11.40±0.35	11.27±0.61
Line 50	297.57±16.89	294.00±14.54	142.83±4.30	139.26±7.81	11.27±0.31	11.00±0.40
Line 13R	274.93±17.81	277.91±14.80	103.13±2.13	101.73±4.45	10.33±0.310	10.60±0.35
Line 27R	402.73±18.27	383.35±19.16	145.93±7.21	148.48±5.23	12.73±0.42	12.87±0.50
NC	303.03±11.19	323.86±12.12	133.16±4.57	132.65±4.48	11.40±0.20	11.07±0.46
F_{test}	**	**	**	**	**	**
$D_{0.05}$	18.82	31.44	10.60	12.35	1.20	1.15

**** = highly significant different according to F test (p ≤ 0.01) between different means of treatments.**

Displayed results in **Table 4** exhibit highly significant differences (P<0.01) among the studied genotypes in numbers of pods, seeds/plant, and pods weight/plant during the two seasons.

The lines 3, 4, 10, 13, 26, 28, 35, 41 and 27R surpassed stander variety (NC) in pods and seeds number/plant during both seasons where, the biggest numbers were recorded with 27R line in both seasons. In contrast, stander variety (NC) surpassed lines 6, 8, 18, 25,34, 43 and 13R in pods and seeds numbers/plant in the two seasons and, line 27 in pods number in first seasons only. While the other lines (9&50 in the two seasons as well as lines 27 in the second season) did not differed significantly to NC. The diversity in the gene makeup effect and its interaction with environment conditions was the reason in these differences among studied peanut genotypes.

Also, the lines 3, 4, 10, 13, 26, 28, 35, 41 and 27R surpassed check variety (NC) in pods weight/plant during both seasons where line 4 had the heaviest pods/plant 99.80±2.42 and 92.15±4.47 g/plant in the first and second season, respectively. On the other hand, NC variety recorded significant increase in pods weight/plant compared to the lines 6, 8, 18, 25,34, 43 and 13R in pods weight/plant in the two seasons. The lines 9, 27 and 50 were statistically similar in pods weight/plant with standard variety (NC) in both seasons. These results point to big variations in the genetic behavior of the studied genotypes and its interaction with environmental conditions led to differ in plant fresh and dry weight as well as branches number Which resulted in an increase in the amount of dry matter formed and thus an increase in the number and weight of pods and seeds for superior genotypes. This finding as in same line with those reported by **Sarkees (2015), Gowthami& Ananda (2017), Samaha et al., (2019), Patel et al., (2022) and Bekele et al., (2022)** who reported that there is diversity in the genotypes of peanut, followed by differences in its performance and productivity.

Table 4: Means of pods number/plant, seeds number/plant and pods weight/plant (g) mean ± SD of twenty peanut genotypes in 2020 and 2021 season.

Characters	Pods no./plant		Seed no./plant		Pods Weight/plant(g)	
Season	2020	2021	2020	2021	2020	2021
Genotypes	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Line 3	61.53±6.18	58.87±3.43	81.53±3.14	83.27±4,28	91.53±5.82	88.46±4.06
Line 4	63.87±6.87	59.97±3.40	82.47±3.64	83.07±4.99	99.80±2.42	92.15±4.47
Line 6	32.53±3.67	33.60±3.14	55.80±2.80	60.13±5.01	69.13±4.02	58.78±3.39
Line 8	28.91±5.47	32.67±2.31	53.53±4.55	52.40±4.36	60.20±4.73	57.10±2.07
Line 9	41.40±2.60	47.07±1.81	73.93±5.32	67.80±2.55	73.93±4.72	52.04±4.22
Line 10	51.47±5.75	54.40±3.61	81.67±5.52	81.87±1.79	90.00±3.89	87.20±6.52
Line 13	53.80±2.99	56.27±2.83	89.07±4.16	82.07±3.24	95.73±4.16	87.17±7.02
Line 18	32.67±5.28	31.93±1.75	43.47±3.01	48.73±3.86	53.47±3.01	49.19±2.91
Line 25	33.93±2.16	32.20±3.29	49.53±4.27	50.00±2.00	59.53±4.27	54.69±1.69
Line 26	53.73±2.01	54.43±3.07	90.47±4.96	85.03±3.77	98.47±3.92	88.36±4.91
Line 27	34.13±5.33	42.13±3.01	74.87±3.59	74.87±4.60	84.87±3.59	66.86±4.35
Line 28	56.40±4.13	53.93±2.10	84.67±4.74	82.60±5.33	91.33±3.53	87.32±7.12
Line 34	32.20±3.30	31.73±1.92	60.53±5.02	58.80±4.01	68.87±2.69	53.39±390
Line 35	52.67±5.80	53.00±2.55	90.20±5.50	83.27±3.19	98.53±3.41	85.48±3.54
Line 41	50.96±5.99	53.93±3.32	87.13±4.88	84.20±4.76	92.47±3.88	85.91±4.65
Line 43	34.13±4.96	29.73±5.96	58.47±3.11	57.20±3.10	68.80±2.91	61.54±7.86
Line 50	45.07±2.77	44.73±3.48	75.40±4.91	75.33±2.02	87.07±4.50	80.09±4.19
Line 13R	33.00±4.69	34.60±4.06	58.33±3.06	59.33±3.36	68.33±3.06	61.31±5.54
Line 27R	64.18±3.70	62.07±1.81	95.47±2.19	92.67±3.48	94.13±5.22	91.89±509
NC	41.87±4.50	42.40±3.74	72.20±5.30	70.60±1.97	81.53±2.20	74.77±2.73
F_{test}	**	**	**	**	**	**
$D_{0.05}$	6.49	5.26	8.01	7.74	8.33	10.42

**** = highly significant different according to F test (p ≤ 0.01) between different means of treatments.**

Recorded data **in Table 5** exhibit highly significant differences (P<0.01) among the studied genotypes in seed weight/plant, 100-seed weight, and oil percentage during the two seasons.

The lines 3, 4, 10, 13, 26, 28, 35, 41 and 27R exceed stander variety NC in seeds weight/plant where line 4 had the heaviest seeds/plant 44.19±2.27 and 43.22±1.45 g in the sequential two seasons, and in contrast, stander variety (NC) surpassed lines 6, 8, 18, 25, 43 and 13R seeds weight/plant in both seasons. While the other lines 9, 27 and 50 in two seasons as well as lines 34 in the first season did not differ significantly to NC.

Also, the lines 6, 8, 9, 18, 25, 41, 43 and 13R surpassed stander variety (NC) in 100-seeds weight in both seasons where line 18 recorded the highest weights of 100- seeds 68.23±3.35 and 74.05±1.12 g in the successive two seasons. On the other hand, NC variety override significant the lines 13, 26 and 28 in 100-seeds weight in both seasons. The lines 3, 4, 10, 27, 34, 35, 50 and 27R were statistically similar in 100-seeds weight with standard variety (NC) in both seasons.

Peanut genotypes appeared rapprochement in oil percentage between NC variety and most genotypes in the two seasons except, the lines 34&43 which suppressed NC in both seasons as well as 27R in the second season only while, lines 3,25, 28 and 50 were lower than NC in the two seasons. These results point to big variations in genetic behavior of the studied genotypes and its interaction with environmental conditions led to differ in seed filling and oil content. This finding as in same par with those reported by **Akhtar et al., (2013), Kumar et al., (2014), Krishna et al., (2015), Samaha et al., (2019), Yoseph et al., (2022) and Kokkanti et al., (2022)** who reported that there is diversity in the genotypes of peanut, followed by differences in its performance and productivity.

Table 5: Means of seeds weight/plant (g), 100-seeds weight (g) and oil content (%) means ± SD of twenty peanut genotypes in 2020 and 2021 season.

Characters	Seed weight/plant		100-seed weight		Oil%	
Season	2020	2021	2020	2021	2020	2021
Genotypes	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Line 3	42.13±1.84	42.25±2.08	57.27±3.20	52.42±0.51	43.74±0.22	43.41±0.55
Line 4	44.19±2.27	43.22±1.45	59.14±1.86	52.90±2.02	44.51±0.56	44.18±0.60
Line 6	30.93±1.37	31.90±2.71	65.41±1.82	63.50±1.34	43.91±0.76	44.25±0.68
Line 8	31.15±2.52	29.94±1.67	65.24±3.23	66.78±1.42	44.01±0.60	44.01±0.60
Line 9	36.42±1.29	33.51±2.42	63.31±3.23	68.31±1.52	45.71±0.22	44.04±0.45
Line 10	42.71±2.56	41.98±1.03	58.62±3.87	52.67±1.78	44.45±0.45	44.45±0.60
Line 13	43.38±1.21	42.41±1.00	42.53±2.61	50.08±2.03	44.20±0.45	43.70±0.42
Line 18	29.05±1.64	26.78±1.51	68.23±3.35	74.05±1.12	44.44±0.49	43.78±0.44
Line 25	29.88±3.46	27.81±1.14	62.35±2.53	71.65±3.41	43.52±0.50	43.52±0.50
Line 26	42.74±3.43	42.20±2.49	46.50±1.60	51.17±2.44	44.52±0.40	44.52±0.61
Line 27	38.15±2.19	38.90±2.01	58.54±4.00	52.54±1.51	45.10±0.46	43.76±0.30
Line 28	42.36±1.64	42.05±1.19	41.45±1.11	50.50±2.20	43.35±0.57	43.35±0.57
Line 34	33.40±2.20	30.92±1.76	55.38±1.47	57.84±1.66	46.46±0.24	47.13±0.49
Line 35	44.00±1.60	42.17±3.24	52.36±3.87	53.27±2.13	45.63±0.31	45.63±0.31
Line 41	42.94±1.59	42.42±1.29	63.33±3.24	73.28±1.85	44.61±0.34	44.61±0.34
Line 43	31.27±3.33	30.43±2.66	62.66±0.72	65.88±3.03	46.34±0.49	47.17±0.29
Line 50	36.69±1.36	39.38±1.61	58.40±3.57	52.20±0.68	42.52±0.79	42.52±0.79
Line 13R	30.70±3.67	31.47±2.25	61.81±3.88	62.27±3.72	45.62±0.25	43.95±0.33
Line 27R	43.10±21.84	42.13±2.91	48.74±2.05	54.86±1.36	45.77±0.38	47.44±0.45
NC	36.74±3.47	37.70±2.49	54.88±3.62	56.92±0.91	45.14±0.65	44.94±0.48
F_{test}	**	**	**	**	**	**
$D_{0.05}$	5.22	4.16	5.98	5.09	1.08	1.28

**** = highly significant different according to F test (p ≤ 0.01) between different means of treatments.**

Results **in Table 6** declare highly significant differences (P<0.01) among the studied genotypes in pods, seeds, and oil yields/fad in the two seasons.

The lines 3, 4, 10, 13, 26, 28, 35, 41 and 27R outweigh stander variety NC in yields of pods, seeds, and oil/fad in the two seasons where, the line 4 had the highest pods yields 2238.00±15.7 and 2183.67±15.3 kg/fad, and the highest seeds yields 1029.72±10.9 and 1111.21±12.8 kg/fad, as well as the highest oil yields 458.37±8.24 kg/fad and 490.89±4.45 kg/fad in the sequential two seasons. In contrast, stander variety (NC) surpassed lines 6, 8, 18, 25, 43 and 13R in pods, seeds, and oil yields/fad in the two seasons and surpassed line 34 in oil yield the first season only and line 50 in the two seasons. While the other lines 9, 27, 34 and 50 in two seasons season did not differ significantly to NC in yields of pods or seeds/fad in both seasons. These results reflect huge variations in the genetic behavior of the studied genotypes and its interaction with environmental conditions led to differ in pods and seed weight/plant as well as oil percentage which resulted in variations in pods, seed and oil yields/fad. The results are in according with findings of **Maurya et al., (2014), Patidar et al., (2014), Yusuf et al., (2017), Weldu and Dejene (2019), Meresa et al., (2020), Kokkanti et al., (2022), Patel et al., (2022) and Wang et al., (2023),** who reported that there is diversity in the genotypes of peanut, followed by differences in its performance and productivity.

Table 6: Means of pods/yield (kg/fad), seed yield (kg/fad) and oil yield (kg/fad) mean ± SD of twenty peanut genotypes in 2020 and 2021 season.

Characters	Pods yield/fad (kg)		Seed yield/fad (kg)		Oil yield/fad (kg)	
Season	2020	2021	2020	2021	2020	2021
Genotypes	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Line 3	1736.67±13.2	1792.33±13.3	802.33±12.5	872.93±14.5	350.95±6.64	378.89±6.60
Line 4	2238.00±15.7	2183.67±15.3	1029.72±10.9	1111.21±12.8	458.37±8.24	490.89±4.45
Line 6	1201.33±10.7	1201.00±15.7	629.17±13.9	660.68±10.3	276.30±8.40	292.38±9.02
Line 8	1111.33±19.3	1192.67±17.9	576.00±14.7	623.80±13.1	253.48±7.59	274.51±6.33
Line 9	1258.33±14.2	1387.33±17.7	680.70±11.5	709.17±12.05	311.14±5.25	312.38±8.30
Line 10	1394.33±18.5	1483.33±11.2	793.04±14.7	755.85±13.3	352.51±7.40	335.93±1.74
Line 13	1380.33±24.2	1417.00±15.1	751.29±17.2	760.27±18.2	332.05±4.31	332.26±8.19
Line 18	810.33±13.1	936.67±17.62	440.20±10.3	513.39±13.2	195.62±3.36	224.71±3.47
Line 25	1017.00±18.1	1057.33±18.2	514.69±12.1	530.90±14.6	223.97±2.92	231.112±8.99
Line 26	1851.67±14.8	2095.00±12.0	1022.03±10.6	1082.64±16.9	455.06±8.33	482.01±8.61
Line 27	1252.00±13.1	1349.67±1102	651.34±14.1	709.64±12.9	293.69±3.53	310.55±3.49
Line 28	1786.33±14.5	1422.67±20.7	1027.57±12.9	778.00±9.1	445.37±2.04	337.24±6.34
Line 34	864.67±15.1	1168.33±14.6	413.30±15.4	652.24±16.3	192.02±7.39	307.33±5.42
Line 35	1732.33±12.2	1812.33±13.3	852.61±14.4	909.52±15.2	389.09±8.53	415.02±5.74
Line 41	1686.67±11.9	1569.00±14.4	749.29±11.2	793.29±12.0	334.24±4.38	353.87±4.63
Line 43	1186.33±11.6	1235.67±20.7	563.83±15.6	621.71±13.8	261.26±7.44	293.24±5.00
Line 50	1215.00±17.6	1313.33±13.3	638.30±15.0	671.27±19.8	271.32±3.73	285.35±1.14
Line 13R	1189.00±13.1	1257.33±17.6	539.71±13.7	649.98±13.7	246.22±7.49	285.64±4.14
Line 27R	1506.33±17.9	1635.00±21.8	753.56±10.8	797.91±12.3	344.93±7.48	378.53±8.73
NC	1251.33±14.7	1349.67±14.0	671.53±12.3	706.87±15.3	303.09±3.04	318.09±1.67
F test	**	**	**	**	**	**
D $_{0.05}$	38.27	39.86	32.36	34.62	14.87	15.820

** = **highly significant different according to F test (p ≤ 0.01) between different means of treatments.**

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Conclusion:

From this study results we can conclude that the lines 3, 4, 10, 13, 26, 28, 35, 41 and 27R are promise genotypes and which need more studies under differences agriculture practices.

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