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Screening of groundnut genotypes

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ABSTRACT

Groundnut (*Arachis hypogaea L.*) is one of the important oil seed leguminous crops grown in India which accounts for 45 per cent of the total area under oil seeds and 55 per cent of the total oil seed production.Keeping this view a field trial was conducted at farmers field sananandal village Tiruvannamalai. The experiment was laid out in randomized block design with three replications and seven groundnut Genotypes *viz.,*. TMV-7, TMV-13, TMV-14, VRI-2, JL-24, CO-3 and CO-4. The result revealed that overall combined analysis of various genotypes have shown significant result for growth and yield attributes. The higher growth attributes plant height at harvest (51.35 cm), leaf area index at 60 days (5.03), dry matter production (7878 kg ha^{-1}). The higher yield attributes number of pods (24.23), pod yield (2280 kg ha^{-1}), haulm yield (4885 kg ha^{-1}) of groundnut were recorded in the genotype JL-24. All the genotypes differ significantly which each other in respect of growth, yield and productivity. The least value of growth, yield attributes and yield recorded in the genotypes TMV-14.

Key words: *Groundnut, Genotype, Screening and yield*

Introduction

Groundnut ((*Arachis hypogaea*), one of the principal economic crops, ranked as the second most important cultivated grain legume and the fourth largest edible oilseed crop in the world is grown in more than 100 countries. India is the second largest producer of groundnut in the world (Mohanty *et al.,* 2022). Oil seeds are one of the major sources of fat and protein for human diet and groundnut is the major source of protein (25%) and oil (48%).In India groundnut is grown in an area of 39.19 lakh ha with the average production of 71.78 lakh tonnes. In Tamil Nadu, it is cultivated in an area of 346 lakh ha with the production of 8.92 lakh tonnes. Globally 50% of the groundnut is used for oil extraction, 37% for confectionery and 12% for seed purpose Jeyaramraja and Fantahun Woldesenbet (2014). Non adoption of improved varieties, poor management practices, low yield potential of varieties and the cultivation restricted to the rainfed area are the major constraint factor attributed for the lower productivity in Tamil Nadu. Availability of improved varieties with high yield potential and the possibility of raising them all through the year,offers now immense scope to increase the productivity.

Materials and Methods

A field experiment was conducted with seven groundnut genotypes to screen efficient genotypes on a sandy clay loam soil. The groundnut genotypes

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viz., TMV-7, TMV- 13, TMV-14,VRI-2, JL-24, CO-3 and CO-4 were selected for this study. The treatments were replicated thrice in a randomized block design with a plot size of 5x4m. The experiment soil was neutral in reaction (7.18) with low salt status (0.11 dsm^{-1}) and organic carbon content (0.31 %). The available major nutrient status showed low N (192.5 kg ha^{-1}), medium P (7.25 kg ha^{-1}) and k (290 kg ha^{-1}) availability. The soil was deficient in Sulphur (8.17 mg kg^{-1}) and Zn (0.487 mg kg^{-1}) availability while rests of the nutrients were sufficient in status. The recommended NPK fertilizers (25:50:75 kg NPK ha^{-1}) were applied as Urea, SSP and Muriate of potash.

Necessary plant protection and production measures were carried out. Plant growth and yield attributes such as plant height, number of pods $plant^{-1}$ and 100 kernel weight were recorded besides registering pod and haulm yield.

The data generated for all the attributes were subjected to statistical analysis to find out the significance as suggested by Gomez (1984). The statistical differences between the means were tested using the least significance differences (LSD) at 0.05 level of probability simple relationship between various attributes were also studied and presented.

Results and Discussion

Growth Attributes

Plant height

The response of groundnut genotypes were studied by recording growth attributes at harvest stage and furnished Table 1. Plant height at harvest stage, JL-24 (51.35) recorded significantly highest plant height over rest of genotypes. However the genotype TMV-14 (43.15) recorded significantly lowest plant height among all the genotypes. Application of gypsum along with RDF increase the growth attributes of all the groundnut genotypes.

Leaf Area Index

Leaf Area Index (LAI) at 60 DAS, the genotypes JL-24(5.03 dm^{-2}) recorded statistically highest LAI over all the genotypes while the genotype TMV-14 (2.45dm^{-2}) recorded significantly the lowest LAI over all the genotypes. Similar results may be obtained under irrigated condition variation in pod yield was found among peanut genotypes. Because JL-24 was high growth and yield potential compared to other genotypes (Aninbon *et al.*, 2021).

Dry matter production

Dry matter production at harvest, the genotype JL-24 (7878 kg ha^{-1}) recorded significantly the highest dry matter production over rest of the genotypes followed by VRI-2 (7508 kg ha^{-1}) and CO -4 (7436 kg ha^{-1}) which were at par with it. The genotype TMV-14(6185 kg ha^{-1}) recorded significantly the lowest dry matter production among all the genotypes. Some biochemical and genetic factors may be playing the major role in improving the growth attributes of that genotype (Gocher *et al.*, 2021).

Yield

Pod and haulm yield

The mean pod and haulm yield of genotypes varied from 1360 to 2280 kg and 4112 to 4885 kg ha^{-1} respectively. Higher pod and haulm yield was recorded with JL-24 (2280 kg ha^{-1} and 4885 kg ha^{-1}) followed by VRI-2 (2085 kg ha^{-1} and 4710 kg ha^{-1}) and CO 4 (2063 kg ha^{-1} and 4660 kg ha^{-1}). The variations

Table 1. Growth components of groundnut varieties under irrigated condition

Treatment	Plant height At Harvest (cm)	Leaf Area Index (LAI)	Dry matter production At 60 Days DMP) (At Harvest
T1-TMV7	45.26	3.16	6579
T2-TMV13	47.3	3.81	7049
T3-TMV14	43.15	2.45	6185
T4-VRI2	49.45	4.43	7508
T5-JL24	51.35	5.03	7878
T6-CO3	47.23	3.78	6924
T7-CO4	49.32	4.4	7436
S.Ed	0.82	0.09	60.17
C.D. at 5%	1.8	0.19	130.58

Table 2. Yield of groundnut varieties under irrigated condition

Treatments	Number of Pods Plant^{-1}	Pod Yield (kg ha^{-1})	Haulm Yield (kg ha^{-1})
T1-TMV7	16.69	1582	4284
T2-TMV13	19.3	1838	4498
T3-TMV14	15.16	1360	4112
T4-VRI2	22.28	2085	4710
T5-JL24	24.23	2280	4885
T6-CO3	18.35	1769	4442
T7-CO4	21.17	2063	4660
S.Ed	0.54	39.63	33.12
CD(p=0.05)	1.18	86	72

among different genotypes might be due to genetic makeup as well as the environment conditions. The groundnut genotype JL-24 performed best under both irrigated and moisture stress condition. Under irrigated condition JL-24 performed well due to availability of water at critical stage. Even moisture stress condition also JL-24 performed well due to higher activities at antioxidant enzyme activity. It was better adaptive genotype with higher pod yield Sunitha *et al.,* 2015. The genotype JL-24 recorded higher pod yield and haulm yield might be due to the genotype have shown lowest disease reaction for both stem rot and collor rot diseases identified when compared to other genotypes. The lowest pod yield was noted in TMV 14 (1360 kg ha^{-1}) and (4112 kg ha^{-1}) haulm yield which might be due to lesser photosynthesis rate as well as poor nutrient equisetum and utilization by these genotypes Rani*et al.,* 2018.

Conclusion

Among the treatments JL-24 (T_5) groundnut genotype was strikingly impressive in recording maximum growth, yield attributes and yield is due to its genetic makeup and this varietal character is most suitable to environmental condition in that particular area (Thiruvannamalai). This was followed by the treatments VRI-2 (T_4). The genotype TMV-14 (T_3) recorded the lesser growth, yield attributes and yield. It can be concluded that JL-24 performed well in Tiruvannamalai district.

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