Eco. Env. & Cons. 30 (4) : 2024; pp. (1627-1630)
Copyright@ EM International
ISSN 0971–765X

DOI No.: http://doi.org/10.53550/EEC.2024.v30i04.028

Assessment of Yield and Economic Performance of Groundnut Cultivars in the Godavari Zone, Andhra Pradesh, India

G. Chalapathi Rao[1], P. Ammaji[2], K. Madhavi[3] and D. Sudhakara Rao[4]

[1]Department of Agronomy, Agricultural College, ANGRAU, Bapatla, A.P., India
[2,3]Department of Agronomy, Agricultural College, Rajamahendravaram, ANGRAU, Guntur 522 034, Andhra Pradesh, India
[4]Department of Biochemistry, Agricultural College, Rajamahendravaram, ANGRAU, Guntur 522 034, Andhra Pradesh, India

(Received 2 March, 2024; Accepted 16 July, 2024)

ABSTRACT

The present investigation, entitled "Assessment of Yield and Economic Performance of Groundnut Cultivars in the Godavari Zone, Andhra Pradesh" was carried out at the Agricultural College Farm, Rajamahendravarm, during the *rabi* season of 2022-23. The experiment was designed as a randomized block trial comprising 10 treatments: T1: Kadiri Lepakshi, T2: Kadiri-6, T3: Dheeraj, T4: Kadiri Amaravathi, T5: Kadiri-9, T6: Dharani, T7: Kadiri Chitravathi, T8: Kadiri Harithandhra, T9: Nitya Harithaand T10: TCGS-1694, with three replications for each treatment. The results showed that Kadiri Lepakshi recorded outperformed the other varieties in terms of pod yield, haulm yield and economics. These findings indicate that Kadiri Lepakshi is particularly well-suited for the uplands of the Godavari region. The superior performance of this variety could significantly enhance groundnut production in the area.

***Key words**: High-yielding varieties, Leguminous crop, Production, Dry matter accumulation, test weight and Haulm yield.*

Introduction

Groundnut (*Arachis hypogaea* L.), popularly known as the "King of Oilseeds," is a major leguminous oilseed crop. It is rich in nutritional fibre, minerals, and vitamins such as thiamine, riboflavin and niacin, and contains 48–51% oil, 26-28% protein, and 11.5% starch (Naresha *et al*., 2018). Groundnut is also used in the preparation of various value-added products like roasted and salted nuts and peanut butter (Prasad *et al*., 2009).

Globally, groundnut is grown on 327 lakh hectares with a production of 539 lakh tonnes and a productivity of 1648 kg per hectare (FAOSTAT, 2021). In India, it is cultivated over an area of 4.9 million hectares with a production of 9.25 million tonnes and an average productivity of 1893 kg per hectare. In Andhra Pradesh, groundnut occupies 0.87 million hectares, producing 0.78 million tonnes with a productivity of 894 kg per hectare (Directorate of Economics and Statistics, Andhra Pradesh, 2020-2021).

Low groundnut productivity is primarily due to cultivation under rainfed conditions and the lack of suitable varieties appropriate for the season and region. The adoption of improved varieties, coupled with better management practices and technologies,

([1]M. Sc (Ag) Scholar, [2]Professor, [3]Professor & Head, [4]Professor

can help farmers increase productivity (Hanif *et al*., 2021). Varieties play a vital role in the success of groundnut cultivation, with yields potentially increasing by 30 to 89% through the adoption of high-yielding varieties (Reddy *et al.,* 2000).

In Andhra Pradesh, groundnut is a traditional crop in the Godavari zone and the upland areas of Godavari have considerable potential for increased groundnut production. However, a lack of awareness among farmers about improved varieties and best management practices has resulted in lower productivity. Additionally, there is a lack of information on suitable high-yielding varieties for the upland areas of the Godavari zone of Andhra Pradesh. Hence, the present study focuses on the performance of yield and economics of groundnut cultivars in the Godavari zone.

Materials and Methods

A field experiment was conducted on the sandy loam soil of the Agricultural College Farm, Rajamahendravaram, during the *rabi* season of 2022. The site is situated at an altitude of 46 meters above Mean Sea Level (MSL), at 16° 06'N latitude and 081° 49'E longitude. The experimental site's soil was slightly acidic, low in available nitrogen, organic carbon, and available phosphorus, but medium in available potassium. During the crop growth period, a total rainfall of 32.6 mm was received over three rainy days.

The experiment was laid out in a randomized block design comprising 10 treatments: T1: Kadiri Lepakshi, T2: Kadiri-6, T3: Dheeraj, T4: Kadiri Amaravathi, T5: Kadiri-9, T6: Dharani, T7: Kadiri Chitravathi, T8: Kadiri Harithandhra, T9: Nitya Haritha and T10: TCGS-1694, each replicated three times. The row-to-row distance was 30 cm and the plant-to-plant distance was 10 cm. The recommended doses of 20 kg N, 40 kg P_2O_5, and 40 kg K_2O per hectare were applied through urea, single super phosphate and muriate of potash, respectively. Thinning and gap filling were done as needed and weeding & hoeing were carried out depending on weed intensity at critical stages of crop weed competition.

Observations were recorded on five randomly selected plants from each replication. The readings from these five plants were averaged replication-wise and the mean data were used for statistical analysis. Data were collected on various characters such as the number of primary branches per plant, dry matter accumulation (kg ha^{-1}), number of pods per plant, number of filled pods per plant, pod yield (kg ha^{-1}), hundred kernel weight (g) and kernel yield (kg ha^{-1}). The number of branches per plant and dry matter production were recorded at 30-day intervals during the growth season, while yield characteristics were measured at harvest.

Results and Discussion

Yield

Pod and haulm yield were remarkably influenced by the tested varieties (Table 1). Among the varieties tested, Kadiri Lepakshi produced significantly higher pod and kernel yields, outperforming the other varieties. This improvement in yield can be attributed to the enhanced yield-attributing characters of Kadiri Lepakshi, such as the number of pods per plant, number of filled pods per plant, number of kernels per pod and shelling percentage. Similar findings have been reported by Chandini *et al*. (2022) and Akram *et al*. (2021). The lowest pod yield was recorded with Kadiri Amaravathi. Differences in yields among the varieties can be attributed to their genetic potential to utilize and translocate photosynthates from source to sink. Groundnut pod yield primarily depends on the ability to partition photosynthates from growth parameters to developing pods, leading to more filled pods per plant and higher kernel weight, thereby increasing pod yield (Labana *et al*., 1980).

Among the tested varieties, Kadiri Lepakshi also recorded the highest haulm yield, significantly surpassing all other varieties, followed by TCGS-1694, which was on par with Kadiri Chitravathi, Kadiri-9, and Kadiri Harithandhra. The lowest haulm yield was recorded with Dheeraj. Studies by Chandini *et al*. (2022), Akram *et al*. (2021) and Kumari and Reddy (2017) also noted that Kadiri Lepakshi produced the highest haulm yield. The differences in morphological characters of the varieties likely contributed to the increased haulm yield, which can be attributed to the genetic makeup of the genotype and environmental conditions.

Economics

Kadiri Lepakshi achieved the highest gross returns, net returns, and B:C ratio, significantly outperforming all other varieties, followed by TCGS-1694,

Table 1. Yield and economics as influenced by groundnut varieties

Treatments	Pod yield (kg ha^{-1})	Haulm yield (kg ha^{-1})	Gross returns (Rs. ha^{-1})	Net returns (Rs. ha^{-1})	B:C ratio
T_1-Kadiri Lepakshi	3460	4832	225234	156859	2.3
T_2-Kadiri-6	2341	3582	152704	82229	1.2
T_3-Dheeraj	2362	3324	153783	83308	1.2
T_4-Kadiri Amaravathi	2138	3629	139820	73845	1.1
T_5-Kadiri-9	2793	3923	181837	111362	1.6
T_6-Dharani	2528	3634	164668	94193	1.3
T_7-Kadiri Chitravathi	2828	4101	184245	115870	1.7
T_8-Kadiri Harithandhra	2589	3752	164671	96296	1.4
T_9-Nitya Haritha	2276	3378	148359	77884	1.1
T_{10}-TCGS 1694	3036	4250	197643	129268	1.9
SEm (±)	126.3	178	7899	7899	0.1
CD (P=0.05)	404.3	567	25269	25269	0.4

which was on par with Kadiri Chitravathi and Kadiri-9 (Table 1). The lowest net returns and B:C ratio was obtained with Nitya Haritha and Kadiri Amaravathi. Studies by Alaudurai *et al*. (2022), Akram *et al*. (2021), Sreenivasulu *et al*. (2021), Sangeetha *et al*. (2017) and Priya *et al*. (2016, 2015) noted that Kadiri Lepakshi, TCGS-1694, Kadiri Chitravathi, and Kadiri-9 recorded higher gross and net returns, likely because gross and net returns are directly proportional to pod yield.

Conclusion

Among the different varieties tested, Kadiri Lepakshi, TCGS 1694, Kadiri Chitravathi, and Kadiri-9 showed their superiority over the other tested varieties. However, the Kadiri Lepakshi variety was found to be better suited for the uplands of the Godavari region. In the absence of Kadiri Lepakshi, the next most suitable varieties are TCGS-1694, Kadiri-9 and Kadiri Chitravathi.

Acknowledgement

I would like to express my gratitude to my Advisor Dr. P. Ammaji for for her wise counsel, inspiring guidance, meticulous, constant help, persistent encouragement, parental care and affection throughout my studies, research work and preparation of my thesis can never be forgotten. I would like to thank Dr. K. Madhavi, Dr. D. Sudhakara Rao, Dr. S. Dayakar for support and guidance. I must also thank my parents and friends for their immense support and assistance throughout my research work to complete the research successfully.

Conflict of interest

The authors declare that they have no conflict of interest.

References

Akram, S.K.V., Prasad, P.V.N., Chandrasekhar, K and Subbaiah, P.V. 2021a. Growth, yield and economics of groundnut (*Arachis hypogaea* L.) cultivars as affected by levels of nitrogen. *The Andhra Agricultural Journal*. 68 (2): 163-167.

Alagudurai, S., Thirunavukkarasu, S. and Sharmilabharathi, C. 2022. Performance of groundnut varieties in Kallakurichi district through farmer participatory mode. *International Journal of Plant & Soil Science*. 34(22): 831-834.

Anil, I.A., Sudhakar, P., Umamahesh, V. and Prathima, T. 2017. Effect of agroclimatic indices and yield in groundnut (*Arachis hypogaea* L.) at different dates of sowing. *Andhra Pradesh Journal of Agricultural Science*. 3(4): 261-264.

Chandini, S.K., Lakshmi, N.V., Rekha, M.S. and Babu, M.R. 2022. Effect of irrigation schedules on growth, yield characters and yield of groundnut varieties. *Biological Forum- An International Journal*. 14(4): 1148-1152.

Directorate of Economics and Statistics, Government of Andhra Pradesh. 2020-2021 (*www.des.ap.in)*

Food and Agriculture Organization of the United Nations Database of Agricultural Production (FAOSTAT, 2021-2022) *(http://www.fao.org/faostat).*

Hanif, N.A.K.A., Dhanushkodi, V., Amuthaselvi, G. and Ravi, M. 2021. Promotion of drought tolerant groundnut varieties in Tiruchirappalli district of Tamil Nadu through Interventions. *Journal of Krishi Vigyan.* 9(2): 177-182.

Kumari, C.R. and Reddy, B.S. 2017. Yielding ability of groundnut varieties in rainfed alfisols of Andhra

Pradesh.*Journal of Research ANGRAU.* 45(3): 28-35.

Labana, K.S., Singh, M., Sangha, A.S. and Jaswal, S.V. 1980. Variability and inter-relations among characters in F2 progeny of groundnut. *Journal of Research, Punjab Agricultural University.* 17(2): 107-114.

Naresha, R., Laxminarayana, P., Devi, K.S. and Narender, J. 2018. Effect of moisture regimes and phosphogypsum levels on yield, nutrient uptake and soil nutrient balance of rabi groundnut. *International Journal of Agriculture, Environment and Biotechnology*. 10(4): 489-498.

Prasad, P.V.V., Kakani V.G. and Upadhyaya H.D. 2009. Growth and production of groundnut in soils, plant growth and crop production, [Ed. Willy H. Verheye], In: *Encyclopedia of Life Support Systems Developed under the Auspices of UNESCO.* Eolss Publishers, Oxford, UK.

Priya, T.B., Subramanyam, D., Sumathi, V. and Naidu, M.V.S. 2016. Growth characters and yield of early *kharif* groundnut as influenced by varieties and plant populations. *IOSR Journal of Agriculture and Veterinary Science.* 9(5): 81-83.

Priya, T.B., Subramanyam, M. and Sumathi, V. 2015. Weed dynamics and yield of groundnut as influenced by varieties and plant population. *Indian Journal of Weed Science.* 47(1): 75-77.

Reddy, L.J., Nigam, S.N., Subrahmanyam, P., Ismael, F.M., Govinden, N. and Van der Merwe, P.J.A. 2000. Registration of groundnut cultivar Venus (ICGV 87853). *International Arachis Newsletter.* 20: 29-31.

Sangeetha, M., Shanmugam, P.S. and Selvan, N.T. 2017. Agronomic evaluation of groundnut varieties under rainfed conditions of Dharmapuri district. Tamil Nadu. *Journal of Oilseeds Research.* 34(1): 49-51.

Sreenivasulu, S., Divya, V., Sudhakar, P.S., Kumar, T.R., Prasad, J.V., Prasad, Y.G. and Prasad, J.V.N.S. 2021. Performance of drought tolerant groundnut variety in Chittoor District of Andhra Pradesh. *Journal Krishi Vigyan.* 10(1): 196-199.