



International Journal of Graduate Research and Review

ISSN: 2467-9283



Indexing and Abstracting

*InfoBase Index, Cosmos, Open Academic Journals Index (OAJI),
InfoBase Index, Cosmos, ResearchGate, CiteFactor, Scholar
Stear, JourInfo, ISRA: Journal-Impact-Factor (JIF), Root
Indexing etc*

Impact Factors*

IBI factor: 3

Impact factor (OAJI): 0.101

Vol-7, Issue-2

May 2021



SEM-Biotech
Publishing



Research Article

Identification of High Yielding Early Groundnut Genotypes through Co-ordinated Varietal Trial

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Article Information

Received: 15 March 2021

Revised version received: 21 May 2021

Accepted: 23 May 2021

Published: 25 May 2021

Cite this article as:

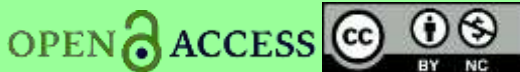
B.P. Yadav et al. (2021) Int. J. Grad. Res. Rev. Vol 7(2): 76-78.

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Peer reviewed under authority of IJGRR

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Abstract

Groundnut is the major summer season oil seed crop in Nepal. There are high demand of early groundnut as early groundnut helps succeeding crops like mustard and wheat preventing them from post anthesis hot winds. Coordinated varietal trial was conducted for four years in three different location. With an objective to identify the high yielding early growing genotypes, ORP, Nawalpur has been continuously doing Coordinated varietal trial in 3 different location (Sarlahi, Surkhet and Nepalgunj) for 4 years in RCBD design with 9 genotypes. Two genotypes ICGV 9358 (2121 kg/ha) and ICGV 05155 (1901 kg/ha) showed highest yield as compared to check varieties i.e. Jayanti (1861 kg/ha) and Baidehi (18144 kg/ha). While seeing the overall observation, ICGV 95358 has highest Pods per plant (40.2), Hundred Seed Weights (44.6) and Shelling Percentage (72.1), and yield (2121) and low maturity day (25.1 DAS). Similarly, other elite genotypes found through this research were ICGV 07214 and ICGV 05155. These identified early elite genotypes of Groundnut can be further evaluated for Coordinated farmer's Field trial and in near future can be released as high yielding early genotypes of Groundnut.

Keywords: coordinated varietal trial (CVT); oil seed; high yielding; early genotypes.

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Introduction

Groundnut (*Arachis hypogaea*) is one of the major summer season oil seed crops in Nepal and consist of economical as well as health values. During seventies, groundnut cultivation in Nepal was confined only in kitchen garden, however, this crop was commercially grown with the beginning of early eighties and the total area was around 6,000 ha while the area was increased up to 10,000 ha during nineties. In recent year 2017/18, groundnut area was 3112 ha, production 4867 mt and productivity 1.564 mt/ha

(MoALD, 2019). The Agriculture has been a major sector which has been affected by the effect of climate change. In this context of climate change, it has been indispensable to identify the climate smart varieties. Early varieties of groundnut can be one of the climate smart varieties as it benefits for the succeeding crops. In context to ground nut – rape seed –groundnut, early harvest of the groundnut assures the early sowing of rapeseed. Rape seed sowing in early period (1st week of Aswin to 1st week of Kartik) helps



to avoid the hot winds during the pod formation and at repining stage which prevent the shriveled seed, less yield and oil content. Generally, ground nut is grown in river basin side (Thakur *et al.*, 2013). The early varieties of ground nut can be harvested before the heavy flood on Sharwan and Bhadra. In addition to this, early varieties ensure the planting of the spring ground nut as well. Till the date, there are 7 varieties of groundnut are grown in Nepal. Among which only 3 of them are early varieties i.e. Badehi, Jayanti and Sambridhhi (ORP Annual Report., 2018). There is little number of early varieties in ground nut. Early varieties possess the qualities of climatic benefits and are highly demanded by farmers. It is important for the varietal development work on early groundnut.

Method and Methodology

With the objective of the identifying high yielding early genotypes of groundnut, Oil Seed Research Program is continuously conducting varietal trail with the exotic genotypes receive from ICRISAT. With the 9 genotypes (including Jayanti and Baidehi as check), ORP, Nawalpur has been continuously doing Coordinated varietal trial in 3 different location (Sarlahi, Surkhet and Nepalgunj) for 4 years i.e 2014 to 2018 (ORP Annual Report., 2015; ORP Annual Report., ORP Annual Report.,2016, ORP Annual Report., 2017 and ORP Annual Report, 2018). CVT was conducted in randomized complete block design with three replications with plot size seven rows of 5m length (10.5m²). Planting was done with spacing row to row 30cm and plant to plant 15cm. Agronomic practice for groundnut cultivation as recommended from ORP was used with the fertilizer dose of 20:40:20 kg/ha. Data on parameters days to flowering (DF), days to maturity (DM), Yield (Y), shelling % and 100 Seed Weight (100 SW) were recorded and Combined analysis of variance (ANOVA) was done using Meta-R.

Result and Discussions

In the combined analysis (ANOVA) for the genotypes, days to flowering, shelling percentage and yield was found to be significant where as other parameter were not significant. Similarly, in the case of the environment, all the parameters were found highly significant. In contrast, Genotype and Environment interaction was found insignificant to all the parameters which indicate that there is no any relation between genotypes and environment and the performance of genotypes remain same in all the environment. In the combined analysis (ANOVA) for the genotypes, ICGV 00350 (28.9 DAS) and ICGV 07213 (29 DAS) was found to be early flowering than check varieties i.e. Jayanti (29.2) and Baidehi (29.3). ICGV 00350 had recorded lowest maturity days i.e. 124.8 among the genotypes followed by ICGV 95358 (25.1) ICGV 95358 had recorded for the highest pods per plants i.e. 40.2 followed by ICGV05155 (38.1) and ICGV07214 (37.6) whereas check varieties Jayanti and Baidehi accounts for 37.2 and 36.4 respectively. All other genotypes (ICGV 07213, ICGV 98077, ICGV 98089, ICGV 00350) had less pods per plants than the check varieties. Although genotypes were insignificant to Hundred Seed Weights (HSW), ICGV 98077 accounts for the highest HGW i.e 46.8 whereas check Badehi has 45.3 gram. Highest shelling percentage was observed in ICGV 9538 with value of 72.1 % followed by ICGV07213 (71.9%) and ICGV 07214 (71.4). In case of yield (kg/ha) only 2 genotypes ICGV 9358 (2121 kg/ha) and ICGV 05155 (1901 kg/ha) showed highest yield as compared to check varieties i.e. Jayanti (1861 kg/ha) and Baidehi (1814 kg/ha). While seeing the overall observation, ICGV 95358 has highest Pods per plant (40.2), Hundred Seed Weights (44.6) and Shelling Percentage (72.1), and yield (2121) and low maturity day (25.1 DAS).

Table 1: Combined ANNOVA of Early genotypes of Groundnut.

s.n o	genotypes	Days to Flowering	Days to Maturity	Pods per plant	Hundred Seed Weight	Shelling Percentage	Yield per ha (kg/ha)
1	ICGV95358	31.7	125.1	40.2	44.6	72.1	2121
2	ICGV07213	29	126.3	35.9	40.5	71.9	1602
3	ICGV07214	30.7	125.5	37.6	41.4	71.4	1841
4	ICGV98077	31.6	125.9	34.3	46.8	70.5	1790.5
5	ICGV98089	31.5	126.3	35.3	42.8	68.5	1638.3
6	ICGV00350	28.9	124.8	36.3	44.7	70.8	1693.8
7	ICGV05155	31.8	125.9	38.1	42.7	70.6	1901.8
8	Jayanti	29.2	125.7	37.2	41.8	70.3	1861.9
9	Baidehi	29.3	125.1	36.4	45.3	70	1881.8
Grand Mean		30.41	125.6	36.8	43.39	70.69	1814.68
Genotypes		0	1	0.96	0.13	0.04	0.04
Environment		0	0	0	0.02	0.01	0
G*E		0.93	1	1	1	0.74	0.39
CV		12.71	10.08	39.75	12.9	3.86	17.59
LSD		3.13	10.08	11.85	4.53	2.21	325.28



Similarly, other elite genotypes found through this research were ICGV 07214 and ICGV 05155. These identified early elite genotypes of Groundnut can be further evaluated for Coordinated farmer's Field trial and in near future can be eased as high yielding early genotypes of Groundnut. The overall performance of early groundnut genotypes in CVT is represented in Table 1.

Conclusion

Due to the prevailing hindrance of climate change effect, it is indispensable to identify the high yielding and early varieties of groundnut. In context to Nepal, due to the lack of manpower and high equipment, it is hard to develop its own new genotypes. For the time being, screening of exotic varieties is the best way to find the elite, purposive genotypes and gradually develops its own technology to produce new genotypes. In this CVT, ICGV 07214, ICGV 05155 and ICGV 95358 are the early and high yielding genotypes which in near can be released in future for the Nepalese farmer.

Acknowledgment

Acknowledgement are adhered with Nepal Agricultural Research Council, Singha Durbar Plaza, Bagmati Province, Nepal who is the responsible for the introduction of the genotypes of Groundnut in Nepal. Acknowledgement goes to Oil Seed Research Program, Nawalpur, Sarlahi, Province no 2, NARC, Nepal and its team for executing the different research like nursery trial, initial evaluation trial and coordination trail in the field. Agricultural Research Directorate, Dasrathpur, Surkhet, Karnali Province, NARC, Nepal and Agricultural Research Directorate, Khajura,

Nepalgunj Province no 5, NARC, Nepal along with their team are highly acknowledge for conducting varietal coordination trail.

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