ISSN: 2467-9283

INTERNATIONAL JOURNAL OF GRADUATE RESEARCH AND REVIEW

website: www.ijgrr.org

INDEXING & ABSTRACTING

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.

ISSN : 2467-9283
International Journal of Graduate Research and Review
A Multidisciplinary Journal

Research Article

Identification of High Yielding Genotype of Introduced foreign Groundnut Genotype

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Article Information

Received: 15 April 2020
Revised version received: 19 May 2020
Accepted: 21 May 2020
Published: 29 May 2020

Cite this article as:
B.P. Yadav et al. (2020) Int. J. Grad. Res. Rev. Vol 6(2): 40-42.

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Peer reviewed under authority of IJGRR

Abstract

Groundnut is also one of the major oil crops of Nepal. The yield of groundnut is very low as compare to neighboring countries. The domestic demand of groundnut is increasing day by day. Therefore, it is urgent need of the country for the development of high yielding varieties using groundnut diversity. Due to lack of the infrastructure for breeding, for the time being, introduction of new genotype from other countries can be way to screen out the promising lines. With the objective of finding the high yielding genotype, IYT was conducted with introduced 9 promising lines. Among them, Jayanti (2390 kg/ha) followed by ICGV 05155 (2171 kg/ha) and ICGV 99089 (2112 kg/ha) were found to be high yielding genotypes. These genotypes can be used in the breeding program for the production of desired genotypes. Introduction is not only the way, Nepal should develop its own man power and infrastructure of the breeding its own noble genotypes.

Keywords: Groundnut; Genotypes; Introduction; Diversity; Promising lines

Introduction

Ground nut, one of the native world crops, is a tropical legume mainly grown to produce oil and for human and animal consumption. There is no authentic data when domestication occurred but it probably first took place in the valleys of the Parana and Paraguay River systems in the Gran Chaco area of South America (J. Smartt, 1994). With the economic view, each and every part of the ground nut plant are useful. The oilcakes are highly proteinaceous and can be used as a feed of livestock. During dry season, the groundnut straw can be used as hay for the livestock. Groundnut are considered as highly nutritious food and used in the treatments of mal nutrition of the children (Briend, 2001). Groundnut is even beneficial to human health as wel. It consist of unsaturated fatty acid which helps to maintain the cholestrol level and prevent fro the heart disease. They also helps to maintin the blood sugars. Groundnut is produced predominantly in developing countries and is cultivated in 27.94 million ha over the world with a total production of 47.09 million tons during 2016 (FAO, 2017). China is considered as highest groundnut producing country. China cultivate groundnut in 4.6 million hectares with the production of 17 million tonnes with productivity of 3.7 tons/ha. In case of Nepal, groundnut is used as good quality cooking oil/vegetable ghee, confectionery and snacks.

In context to Nepal, ground nut is used as vegetable oil, confectionery and snacks. In the initial period, ground nut was only confined to the kitchen garden however, in recent year groundnut is growing popularity. Ground nut is grown in upland in rain fed condition during rainy season and it is also grown in river basin as well (Thakur et al., 2013). In Nepal, it is grown in 2836 ha, with the production of 42220 tons with the productivity of 1.4 ton/ ha which is very low to that of china (3.7 ton/ha) and India (5.2 ton/ha) (MOALD, 2017). In case of Nepal, there is no mega varieties which can give the productivity more than (3.5 ton/ ha). There is strong domestic demand of oils in the country. Yield potential of groundnut is higher than other oilseed crops in Nepal. Therefore, it is indispensable need of the development of high yielding varieties using groundnut diversity. Breeding work in Nepal is not so advanced, even though conservation of native genetic resources has been started since 1986 (Joshi, 2017). So, due to lack of manpower and infrastructure, creation of variation in the groundnut to create new genotype with new genetic character is presently difficult Nepal. So, for the time being, introduction of new genotype from other countries and selection of the best yielding variety with high adaptive capacity to this climate can be way to screen out the promising line.

Materials and Methods

The research was conducted according to the mandate and research format of Nepal Agricultural research Council (NARC) in 2017 A.D. In the initial condition, there were 40 exotic genotypes of ground collected from ICRISTAT. The 40 genotypes were evaluated under Observation nursery (OBN) in Oil Seed Research Program (ORP), Sarlahi. From the OBN, 9 promising genotypes were selected which were later on evaluated under Initial Evaluation trial (IET).

A total of eleven genotypes including two checks Jayanti and Baidehi were tested 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), grain yield (GY), shelling % and 100 grain weight (100 GW) were recorded and analysis of variance (ANOVA) was done using crop stat.

Result and Discussion

Days to flowering in the evaluated genotypes were significantly different. ICGV 07213 was found to be early flowering (26.0 DAS) followed by 26.7 DAS in ICGV 0338 and ICGV 91114 whereas ICGV 05155 and ICGV 99089 were late flowering type (29.0 DAS). Trait like Days to maturity, pods/plant, Seedling percentage and 100 seed weight were found to be insignificant. The yield (kg/ ha)) was significantly different among the genotype. The highest yield (2390 kg/ha) was obtained from Jayanti followed by ICGV 05155 (2171 kg/ha) and ICGV 99089 (2112 kg/ha) respectively. 100 GW of tested genotypes ranged between 42.3 g to 55.0 g whereas days to maturity ranged in between 111.3 DAS to 114.7 DAS. The overall performance of early groundnut genotypes in IET is represented below in Table 1.

Table 1: Yield and ancillary characters in IET early maturity groundnut, 2074/75.

EN	Genotypes	DF	DM	Pods/pl	Yield (kg/ha)	Shelling (%)	100 SW (g)
1	ICGV 07213	28.0	113.0	25.7	1695	78.3	51.3
2	ICGV 06319	26.0	113.0	25.3	1600	77.7	55.0
3	ICGV 07214	27.0	112.3	24.0	1778	75.3	42.3
4	ICGV 00338	26.7	111.3	20.0	1286	74.7	53.3
5	ICGV 05155	29.0	114.7	22.3	2171	79.3	49.0
6	ICGV 03189	28.3	114.3	22.0	1255	77.0	47.7
7	ICGV 99089	29.0	113.0	24.7	2112	76.0	49.3
8	ICGV 00350	28.7	114.3	23.7	1418	77.0	51.7
9	ICGV 91114	26.7	112.7	31.7	1677	77.0	50.3
10	Baidehi	27.7	112.7	29.3	1386	77.3	42.7
11	Jayanti	27.3	113.0	27.7	2390	74.3	51.7
	GM	27.7	113.1	25.1	1706	76.7	49.5
	F test	**	NS	NS	**	NS	NS
	CV %	3	1.1	17.7	11.5	3.3	10.4
	LSD	1.42	2.04	7.57	333.99	4.29	8.74

The principle of the plant breeding is creation of variation and selection from the variation. The variation can be created but mutation and crossing activities. But in case of Nepal, at present there is no manpower and infrastructure for the creating variation through crossing and mutation activities. In such scenario, Selection of promising line from the introduced line is the best way for the identification of the promising lines. While seeing the history of the ground nut development in Nepal, all the release varieties of Groundnut such as Rajarshi, Badeshi, Jayanti, Janaki, Jyoti, B-4 and Sambriddhi are the exotic line introduce from ICRISAT. All the line tested in IET was also introduces line. In this research, ICGV 05155 (2171 kg/ha) and ICGV 99089 (2112 kg/ha), shows maximum yield among all the tested genotypes which may be due to either environmental or genetic factors, or both combined (Louwaars and Marrewijk 1996). In future, ICGV 05155 and ICGV 99089 can be the promising line for the variety registration. In addition, this high yielding genotypes can be crossed with the local genotypes for the development of high yielding variety with wide range of adaptive capacity.

Conclusion

We are far behind in groundnut cultivation due to different constraint. However, globally groundnut is important crop with oil seed, nutrition, health and forage aspect. It also has high economic importance as the demand of ground nut is growing annually. While comparing the data of the Nepal and other neighbouring country, productivity of the ground is very low. IT is prime need to find out a suitable mega variety for Nepal which can have wider range of adaptability and can give good yield. For this ICGV 05155 and ICGV 99089 can be used in the breeding program for the production of desired genotypes. Introduction is not only the way to find the best genotype as Nepal should develop its own man power and infrastructure of the crossing of high yielding foreign genotype and local landrace with adaptive range.

Conflict of Interest

The authors declare that there is no conflict of interest with present publication.

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