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SCREENING OF VEGETABLE SOYBEAN ECOTYPES IN CUDDALORE DISTRICT OF TAMILNADU

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Abstract

Vegetable Soybean (*Glycine max* L. Merrill) may be defined as those which are harvested while the pod is still green and the seeds have developed to fill 80-90 percent of the pod width. Different accessions are adapted to different seasons and localities, which necessitates the cultivation of an appropriate line at specific location. With the above fact in mind, a pot culture experiment was laid out following the principles of a completely randomized design with three replications. Twenty accessions from three different sources *viz.,* Asian vegetable Research and Development Center (AVRDC), Taiwan, CSK Himachal Pradesh Krishi Viswa Vidayalaya (CSKHPKVV) and National Research Centre for Soybean, Indore (NRCS), were collected and tested. Upon critical appraisal of the results, the genotype AGS 292 appears to be a promising one for pod yield and other economic traits as indicated by their *per se* performance.

Key words: Soybean, cultivation, vegetables.

Introduction

Soybean is an annual self pollinated diploid legume. It is an excellent source of major nutrients. It is a highly efficient producer of protein and oil which are important to the nourishment of human beings. However, in most of the developing countries of Asia, there is still a need to improve processing industry for grain soybean. The present demand for soy protein cannot be met through the current processed soybean products alone. In this context, vegetable soybean has a great potential to supply the protein needs of Asians. Vegetable soybean is commercially grown in Taiwan, China, Japan, Korea and also in many South East Asian countries. Vegetable Soybean (*Glycine max* L. Merrill) may be defined as those which are harvested after the R_6 and before R_7 growth stage *i.e.,* while the pod is still green and the seeds have developed to fill 80-90 percent of the pod width (Fehr *et al*., 1971). Vegetable soybean is different from grain soybean by its larger seed size, softness, sweetness, flavour, aroma and texture. This vegetable is known for its unique taste and high nutritional value. Increasing interest and demand for vegetable soybean in many countries encouraged the scientists to broaden research on adaptation of this crop to tropical areas. Assuming five Kilogram of vegetable soybean consumption per capita per year @ 100 g/week for 50 weeks = 5kg), there would be a requirement of one million tonnes of vegetable soybean in India even when only 20 percent of the population prefer to consume it (Nawab Ali, 2001). It shows a great scope and potential for vegetable soybean in India. From the above facts it can be clearly seen that there exists a good scope to introduce this crop in India for cultivation due to its flavour and healthful characteristics. The performance of a crop differs to different photoperiod, temperature and other climatic conditions. Different accessions are adapted to different seasons and localities, which necessitates the cultivation of an appropriate line at specific location. This suggests a need to select genotypes for specific environment. It is therefore essential to test different varieties in each agro-climatic zone to select an ecotype suitable to that region.

Materials and Methods

The experiments were conducted in the orchard, Department of Horticulture, Faculty of Agriculture, Annamalai University. The site is geographically situated at 11° 24' N latitude 79°44' E longitude and at an altitude of +5.79 m above mean sea level in the Cuddalore District of Tamilnadu. The pot culture experiment was laid out

following the principles of a completely randomized design with three replications. Twenty accessions from three different sources *viz.,* Asian vegetable Research and Development Center (AVRDC), Taiwan, CSK Himachal Pradesh Krishi Viswa Vidayalaya (CSKHPKVV) and National Research Centre for Soybean, Indore (NRCS), were collected and their details are given in table 1. The experimental pots of one-foot height were filled with 6 Kg of soil collected from the Field . Five pots were maintained under each replication in all treatments. Seeds were sown at 2 cm depth with @ one seed per pot. Life irrigation was given immediately after sowing and subsequent irrigations were given on alternate days, depending upon the moisture requirements. Standard horticulture practices and plant protection measures were followed to maintain the plants healthy. Observations on various characters regarding growth, yield and quality were recorded.

Table 1: Details of vegetable soybean ecotypes collected

Ecotypes	Pedigree or Name	Source
AGS 184	-	AVRDC
AGS 186	Yoshida	AVRDC
AGS 187	Y-386	AVRDC
AGS 188	PI157424	AVRDC
AGS 190	Vesoy 4	AVRDC
AGS 291	Kinshu	AVRDC
AGS 292	Taisho Shiroge	AVRDC
AGS 295	-	AVRDC
AGS 334	Tzuzunoko × PI 157424	AVRDC
AGS 337	(SRF400×Tzuzunoko) × KS 1	AVRDC
AGS 339	KS 1 × [Ryokkoh ×(shih shih ×SRF 400)]	AVRDC
AGS 346	[Ryokkoh ×(shih shih ×SRF 400)] ×Emerald	AVRDC
AGS 352	KS 3 ×Neu Ta Pien 2	AVRDC
AGS 378	Ryokkoh×[(PI157424 ×KS 8) ×Neu Ta Pien2]	AVRDC
AGS 380	(Ryokkoh×Mikawashima) × Kuo China 1	AVRDC
	Harit soya	CSKHPKVV
	EC-389159	NRCS
	EC- 390981	NRCS
	EC-391152	NRCS
	EC-391181	NRCS

Table 2: Mean performance of different ecotypes for growth attributes in vegetable soybean.

Ecotypes	Number of days taken for germination	Plant height at harv-est (cm)	Number of nodes plant^{-1}	Number of bran -ches plant^{-1}	Number of days taken for fifty per cent flowering
AGS 184	4.21	35.20	7.80	4.20	35.33
AGS 186	4.25	35.40	7.50	4.00	36.66
AGS 187	4.03	34.10	8.60	5.00	32.66
AGS 188	4.18	33.50	8.20	4.60	34.00
AGS 190	4.10	33.40	8.50	4.90	33.66
AGS 291	3.96	34.70	10.00	6.00	31.33
AGS 292	3.86	35.80	11.00	6.50	29.66
AGS 295	4.23	32.00	7.80	4.30	35.66
AGS 334	3.99	34.40	9.70	5.80	32.00
AGS 337	4.25	35.00	8.00	4.50	36.66
AGS 339	4.00	34.00	9.50	5.50	32.33
AGS 346	3.95	34.80	10.30	6.10	31.33
AGS 352	4.10	33.60	8.40	4.80	33.33
AGS 378	3.90	35.20	10.60	6.30	30.66
AGS 380	4.14	33.00	8.30	4.70	34.66
HARIT SOYA	4.05	34.20	9.00	5.20	32.00
EC-389159	4.30	44.20	7.50	4.50	37.66
EC-390981	4.06	40.00	8.50	4.80	32.66
EC-391152	4.24	41.30	8.00	4.50	35.33
EC-391181	4.20	40.50	8.20	4.70	34.00
General Mean	4.10	35.72	8.82	5.05	33.15
SED	-	1.05	0.36	0.22	0.15
CD (P=0.05)	N.S	2.11	0.72	0.44	0.30

Results and Discussion

In the present study, twenty ecotypes of vegetable soybean adapted to varied geographical locations were raised to study the variability among themselves for various characters. The results obtained are discussed below with a view to identify the suitable ecotype for commercial cultivation. The first and foremost important criteria of choosing a desirable genotype are to select the one with superior mean performance for a specific trait. Generally good quality seeds will germinate earlier which inturn helps in early establishment of plants. The seeds which are bold in size and having higher test weight will have better establishment. In the present study, it was found that the ecotype AGS 292 had recorded the earliest germination, which is followed by AGS 378 and AGS 346.

It is a generally accepted fact that the bushy plants with more number of nodes and branches having shorter inter nodal length will have greater photosynthetic efficiency and thereby increased yield. Among the various ecotypes studied, the ecotype AGS 292 had recorded the moderate plant height with highest number of nodes and branches plant^{-1}. Earliness in

Table 3: Mean performance of different ecotypes for yield attributes in vegetable soybean.

Ecotypes	Total number of pods plant^{-1}	Pod length (cm)	Pod width (cm)	Weight of pods plant^{-1} (g)	Harvest index
AGS 184	18.50	4.70	1.32	37.62	39.11(38.71)
AGS 186	18.00	4.63	1.30	37.08	38.67(38.45)
AGS 187	20.50	5.01	1.38	39.14	39.84(39.14)
AGS 188	19.50	4.82	1.35	38.33	39.31(38.83)
AGS 190	19.60	4.90	1.36	39.80	40.20(39.35)
AGS 291	21.80	5.12	1.42	44.08	41.72(40.23)
AGS 292	22.80	5.29	1.48	46.83	42.44(40.65)
AGS 295	19.70	4.93	1.37	40.32	40.48(39.51)
AGS 334	21.40	5.10	1.40	43.20	41.54(40.12)
AGS 337	20.50	5.03	1.39	41.16	40.81(39.70)
AGS 339	21.20	5.08	1.40	42.76	41.41(40.05)
AGS 346	22.10	5.15	1.44	44.88	41.98(40.38)
AGS 352	20.20	5.00	1.38	40.86	40.68(39.62)
AGS 378	22.50	5.20	1.45	45.58	42.13(40.47)
AGS 380	20.00	5.00	1.38	41.52	41.00(39.81)
HARIT SOYA	21.00	5.05	1.39	42.03	41.17(39.91)
EC-389159	19.00	4.76	1.33	36.52	38.44(38.31)
EC-390981	20.60	5.02	1.39	40.50	40.55(39.55)
EC-391152	19.20	4.80	1.35	38.42	39.33(38.83)
EC-391181	19.60	4.85	1.35	39.12	39.83(39.13)
General Mean	20.36	4.97	1.38	40.99	40.53(39.54)
SED	0.13	0.02	0.01	0.48	0.05
CD (P=0.05)	0.26	0.05	0.02	0.96	0.10

Values in parenthesis are angular transformed

flowering is an important economic character, which takes less number of days for harvest and thus reducing the duration of the crop. This earliness in duration is advantageous in multiple cropping system. Earliness in flowering also leads to the production of better quality produce (Kanika, 1999). In the present study it was found that the ecotype AGS 292 had recorded least number of days for flowering and harvest. This was followed by the ecotypes AGS 378 and AGS 246.

Total number of pods plant^{-1} is the important yield components which directly influences the yield. Among the various ecotypes screened, it was observed that the ecotype AGS 292 had recorded the highest value for total number of pods. Pod size is an important yield component in vegetable soybean. Higher pod length and pod width coupled with higher test weight will increase the weight of pods considerably. It was observed that the ecotype AGS 292 had produced the maximum pod length and width besides weight of pods plant^{-1}. Any ecotype with highest harvest index will produce more yields due to effective translocation of photosynthates from the vegetative parts to reproductive parts. Usually early flowering and bushy ecotypes have higher harvest index. Among the twenty ecotypes studied, AGS 292 had recorded the highest harvest index followed by AGS 378 and AGS 346.

Vegetable soybean is a two-in-one crop, which provides both the protein and oil. Being a vegetable crop it should have consumer preference and is determined by the panel test score based on the size, hardness, sweetness and flavour. Sweetness of the vegetable soybean is based on the amount of total soluble solids present in it. As the highest values for the above said traits were noticed in the ecotype AGS 292, it has got the better palatability and cooking qualities. Upon critical appraisal of the results, the genotype AGS 292 appears to be a promising one for pod yield and other economic traits as indicated by their *per se* performance.

This was similar to the findings of Khadha (1992) who reported that AGS 292 was the best performer as it recorded the highest pod yield with the lowest number of marketable pods per five hundred gram in Kasetsart University, Kamphaengsaen, Nakhon Pathon, Thailand. He also stated that the yield components such as number of pods plant^{-1} and pod weight plant^{-1} were found to be determining the yield of marketable fresh vegetable soybean.

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