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Effect on yield attributes, yield and economics of different Soybean varieties for Bundelkhand region in M.P.

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Abstract
The experiment entitled, "Effect on Yield attributes, Yield and Economics of different Soybean varieties for Bundelkhand region in M.P" was conducted in *kharif* 2018-19 at Research Farm, J.N.K.V.V., College of Agriculture, Tikamgarh (M.P.). The experiment was laid out in Randomized block design allocating fourteen varieties of soybean.

For yield attributing character the variety NRC 37 gave the significantly higher number of pods and seeds than most of the remaining varieties. However, this was followed by JS 20-69. The variety JS 20-34 showed poor yield attribute characters. The variation in pod bearing ability among the varieties may be due to variability in the varietal's inheritance. The varieties NRC 37 recorded significantly higher seed index (13.03 g) showed bigger seed size than other tested varieties. Thereafter, the varieties JS 20-69 and JS 90-41 performed equally well in this parameter (12.00 to 11.02 g). Almost the significantly lowest seed index was noticed in varieties JS 93-05 and NRC 86 (7.92 to 7.93 g). For yield and economics study the variety NRC 37 produced significantly higher seed and Stover yield and proved drought tolerant at flowering and pod formation stage than that of other tested varieties. However, the second best variety was JS 20-69. The other varieties viz. JS 335, JS 95-60, and JS 20-29, also yielded the lowest, because these were adversely affected due to drought. Accordingly, the variety NRC 37 resulted in significantly. The highest harvest index (28.60%) as compared to the remaining varieties of soybean. However, the next best varieties were JS 20-69 (27.36%) and the lowest harvest index is JS 20-29 (25.53%). Amongst the fourteen varieties under test, NRC 37 gave the maximum net monetary return of and B:C ratio This was followed by JS 20-69 and B:C ratio.

Keywords: Soybean, yield attributes, yield characteristics

1. Introduction
Cultivated soybean [Glycine max (L.) Merr.], one of the major crops, is used for animal feed and human foods (Carter *et al*., 2004). Soybean, one of the nature's most versatile crops, is increasingly becoming an important food and cash crop in the tropics due to its high protein content (40%), high oil content (20%), and adaptability to various growing environments (Smith *et al*., 1995; Tukamuhabwa *et al*., 2001; Wilcox, 2004; McKevith, 2005; Golbitz, 2007) [2, 4, 5, 1]

Soybean origin dates back to 2800 BC in China. The cultivation of soybean disseminated from North China to Korea, Europe and USA. In India, the soybean crop was introduced somewhere between 187080. But it was only around 1934-35 that India gave some stimulus to sowing of yellow seeded varieties at Pune, Baroda, Pusa, Coimbatore, Indore and some other places. Systematic research work on different aspects of soybean cultivation was initiated in mid-sixties in Jawaharlal Nehru Krishi Vishwa Vidhyalaya, Jabalpur (M.P.) and G.B. Pant University of Agriculture and Technology, Pantnagar (U.P.) by introducing improved yellow-seeded varieties from United States of America The varieties with higher dry matter production and its proper distribution towards reproductive organic results in higher productivity. Dry matter production can be increased by selecting varieties with high photosynthetic rate. The rate of photosynthesis can be increased by proper nutrition which in turn increases the chlorophyll content of leaves and leaf area (Singh *et al*. 2013) [3].

2. Material and methods

The experiment entitled, "Evaluation of different soybean varieties for growth, yield attributes and yield in Bundelkhand region of M.P.'' was conducted in kharif 2018 at Research Farm, Jawaharlal Nehru Krishi Vishwa Vidhyalaya, College of Agriculture, Tikamgarh (Madhya Pradesh). The analytical works were done in the laboratory of Department of Agronomy, College of Agriculture, Tikamgarh (M.P.).

The experiment was laid out in randomized block design (RBD) with three replications. The treatments comprised 14 soybean varieties.

Table 1: Treatments (14 soybean varieties)

T1	JS 20-29	T8	JS 90-41
T2	JS 95-60	T9	JS 335
T3	JS 93-05	T10	RVS 2001-04
T4	JS 97-52	T11	RVS 2001-18
T5	JS 20-69	T12	NRC 86
T6	JS 20-34	T13	NRC 37
T7	JS 20-98	T14	MACS 1520

Table 2: Layout

Design	Randomized Block Design
Replication	03
Treatment	14
Gross plot size	5.0m x 4.2m = 21 m2
Net plot size	4.0m x 3.0m = 12 m2
Distance between replication	1 m
Distance between plot	0.5 m
Row to row spacing	30 cm
Dose of fertilizers	20N:60P2O5: 20K2O:20Skg ha-1
Seed rate	100 kg ha-1

3. Result

3.1 Yield attributes

In the final analysis after harvest, the yield attributes viz. number of seeds (pod-1), number of pods (plant-1), pod length (cm) and seed index (g) were recorded.

3.2 Pod length (cm)

The data pertaining to pod length as influenced by different soybean varieties saw statistically analyzed and given in Table.1.1.

The perusal of data in Table clearly reveals that the pod length was significantly affected by different soybean varieties.

The soybean variety NRC-37 produced significantly higher pod length (4.77 cm) and followed by JS 20-69 (4.48 cm) The significantly lowest pod length was 16.66 was recorded with the soybean variety JS 20- 34.

3.3 Number of pods plant-1

The perusal of data in Table clearly reveals that the number of pods plant-1 was significantly affected by different soybean varieties. The soybean variety NRC-37 produced significantly higher number of pods (30.64 plant-1) and followed by JS 20-69 (26.93 plant-1), JS 90-41 (23.47 plant-1) and JS 93-05 (20.38 plant-1) and which were found statistically varieties JS-335, JS 20-98, RVS 2001-04, JS 20-29 and JS 95-60 at par. The significantly lowest number of pods plant-1 was 16.66 was recorded with the soybean variety JS 20-34.

3.4 Seed index (g)

The data in Table clearly reveals that seed index (g) was significantly affected by different soybean varieties. The soybean variety NRC-37 exhibited significantly higher seed index (13.03 g) followed by followed by JS 20-69 (12.00 g), JS 90-41 (11.02 g). The significantly lowest seed index of 7.93 g was recorded in variety NRC-86.

3.5 Number of seeds pod-1

The perusal of data in Table clearly reveals that the number of seeds pod-1 was significantly affected by different soybean varieties. The soybean variety JS-95-60 produced significantly higher number of seeds (3.67 pod-1) and followed by NRC-37 (2.98 pod-1), The significantly lowest number of seeds pod1 was 2.71 was recorded with the soybean variety JS 20-34.

3.6 Number of primary branches plant-1

The data pertaining to number of branches plant-1 at different growth stages (40, 60, and 80 DAS) of soybean were influenced by different variety and statistically analyzed and shown in Table.

The data revealed that at 40 DAS of plant growth stage the maximum number of branches plant-1 was significantly recorded (4.39) under variety NRC-37 followed by JS 20-69 (3.36), JS 90-41 (2.94) and JS 93-05 (2.58) and these varieties JS-335, JS 20-98, RVS 2001-04, JS 20-29 and JS 95-60 were at par. The minimum number of branches plant-1 was recorded under JS 20-34 (2.18).

Table 3: Average pod length, pods plant-1, seeds pod-1, and seed index of different soybean varieties at different growth stages.

Treatment	Varieties	Pod length	Pods plant-1	Seeds pod-1	Seed index	primary branches plant-1		
						40	60	80
		(cm)				DAS	DAS	DAS
T1	JS 20-29	4.07	18.98	2.75	9.20	2.30	3.28	3.94
T2	JS 95-60	4.13	18.16	3.67	8.05	2.27	3.25	3.90
T3	JS 93-05	4.30	20.38	2.65	7.92	2.58	3.68	4.42
T4	JS 97-52	4.13	17.44	2.78	7.98	2.21	3.15	3.78
T5	JS 20-69	4.48	26.93	2.87	12.00	3.36	4.80	5.76
T6	JS 20-34	3.64	16.66	2.71	8.12	2.18	3.12	3.74
T7	JS 20-98	4.09	19.26	2.72	8.33	2.33	3.33	4.00
T8	JS 90-41	4.38	23.47	2.80	11.02	2.94	4.20	5.04
T9	JS 335	4.16	19.56	2.78	8.44	2.36	3.38	4.05
T10	RVS 2001-04	4.16	18.87	2.76	8.32	2.31	3.30	3.96
T11	JS 2001-18	4.13	17.58	2.75	7.99	2.23	3.18	3.82
T12	NRC 86	4.08	17.02	2.72	7.93	2.20	3.15	3.78
T13	NRC 37	4.77	30.64	2.98	13.03	4.39	6.27	6.72
T14	MACS -1520	4.12	17.71	2.75	8.01	2.24	3.20	3.84
SEM		0.15	0.93	0.11	0.31	0.10	0.15	0.17
CD (P=0.05%)		0.46	2.80	0.32	0.94	0.31	0.44	0.50

4. Yields character

4.1 Seed yield and Stover yield (kg ha-1)

The seed yield and Stover yield (kg ha-1) of soybean were significantly affected by different soybean varieties. Among the different varieties, seed and stover yield were significantly found higher in variety NRC-37 (2402.57 and 6000 kg ha-1) followed by JS 20-69 (2058.06 and5459.50 kg ha-1), Also above all varieties at par remaining JS 20-29 and NRC-86. The significantly lowest seed and Stover yield of 1351.30 and 3942.06 kg ha-1 was recorded from JS 20-29, which was statistically at par with NRC-86 (1383.00 and 4025.84 kg ha-1).

4.2 Harvest index

It is evident from the data in Table 2.1 that harvest index (%) was numerically affected by different soybean varieties. The harvest index of 28.60% was recorded numerically higher with variety NRC-37 as compared to other soybean varieties. The numerically lowest harvest index of 25.53% was recorded in variety JS 20-29.

5. Economics

The data pertaining to economic in terms of cost of cultivation, Gross Monetary Return (GMR), Net Monetary Return (NMR) and Benefit Cost ratio (B:C) are summarized in Table 4.10 and Figure 13. It is evident from the data that cost of cultivation of ₹ 22183 ha-1 among different soybean varieties was same as inputs used and cultural operations performed were similar in all varieties.

5.1 Ross monetary return (₹ ha-1)

The perusal of data in Table 4.10 reveals that gross monetary return (GMR) of ₹ 87663 ha-1 was recorded the highest with NRC-37 and followed by JS 20-69 (₹ 75413 ha- 1) and the lowest gross monetary return of ₹ 49873 ha-1 was recorded with variety JS 20-29.

5.2 Net monetary return (₹ ha-1)

It is evident from the data in Table. 4.10 that net monetary return (NMR) of ₹ 65480 ha-1 was recorded the highest with NRC-37 closely followed by JS 20-69 (₹ 53230 ha-1) and the lowest net monetary return of ₹ 27690 ha-1 was recorded with JS 20-29.

5.3 Net B:C ratio

The perusal of data in Table. 4.10 reveals that NRC-37 exhibited the highest net benefit cost ratio of 2.95 and closely followed by JS 20-69 (2.40) and the lowest net benefit cost ratio of 1.25 was recorded in variety JS 20- 29.

Table 4: Average Seed yield (kg ha-1), Stover yield (kg ha-1), Biological yield (kg ha-1) and Harvest index of different soybean varieties at different growth stages

Treatment	Varieties	Seed yield kg ha -1	Stover yield kg ha-1	Harvest index (%)	Economics		
					GMR (₹/h)	NMR (₹/h)	B:C Ratio
T1	JS 20-29	1351.30	3942.06	25.53	49873	27690	1.25
T2	JS 95-60	1541.79	4466.67	25.61	56872	34689	1.56
T3	JS 93-05	1647.50	4646.67	26.17	60645	38462	1.73
T4	JS 97-52	1502.77	4358.13	25.58	55437	33254	1.50
T5	JS 20-69	2058.06	5459.50	27.36	75413	53230	2.40
T6	JS 20-34	1572.36	4559.85	25.64	58004	35821	1.61
T7	JS 20-98	1617.37	4593.33	26.02	59568	37384	1.69
T8	JS 90-41	1783.33	4919.67	26.65	65535	43352	1.95
T9	JS 335	1637.57	4634.24	26.09	60295	38112	1.72
T10	RVS 2001-04	1596.29	4572.47	25.88	58830	36647	1.65
T11	JS 2001-18	1519.38	4420.98	25.58	56065	33882	1.53
T12	NRC 86	1383.00	4025.84	25.90	51034	28851	1.30
T13	NRC 37	2402.57	6000.00	28.60	87663	65480	2.95
T14	MACS -1520	1538.41	4473.33	25.66	56764	34581	1.56
SEM		65.93	150.85	0.55			
CD (P=0.05%)		197.79	452.54	1.64			

6. Conclusion

The overall performance in study of NRC 37 in respect to seed yield and yield components was superior to other varieties. Soybean variety JS 20-34 was showed that the extra early 50% flower and maturity of crop in Bundelkhand region of M.P. variety NRC 37 occurred by and highest suitable for the agro -climatic condition of Bundelkhand region of Madhya Pradesh. This gave the highest net monetary return Rs. 65480 ha-1 with net B:C ratio of 2.95.

7. References

1. Golbitz P. Soya and Oilseed Bluebook. Soyatech, Inc., Bar Harbor, ME McKevith, B. (2005). Nutritional aspects of oilseeds. Nutr. Bull. 2007; 30:1326.
2. Smith J, Woodworth JB, Dashiell KE. Government policy and farm- level technologies: The expansion of soybean in Nigeria. IITA Res. 1995; 11:14-18.
3. Singh Yogendra, Singh Praveen, Sharma RD, Marko GS, Namdeo KN. Effect of organics sources of nutrients on growth, yield quality of lentil genotypes. Annals of Plant and Soil Research. 2013; 15(2):134-137.
4. Tukamuhabwa P, Dashiell KE, Assafo-Adjei B. Determination of yield loss caused by soybean rust (Phakopsorapachyrhizi Syd.) in four genotypes of soybeans. Afr. Crop Sci. Conf. Proc. 2001; 5:423-26.
5. Wilcox JR. World distribution and tradeof soybean. In: Soybeans: Improvement, Production and Uses, 3rd edn, Boerma, H.R. and Specht, J. E. (eds.). Agron. Monogr. 16. ASA, Madison, WI, 2004, 1-14.