

Original Research Article

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Identification of Suitable Varieties of Soybean for Various Soil Types in Different Climatic Conditions

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ABSTRACT

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In the present investigation, effort has been made to identify most suitable variety of soybean in light, medium and heavy soils under different climatic conditions by conducting experiment in three State Agricultural Universities jurisdiction of Maharashtra (Vasantrao Naik Marathwada Agricultural University, Parbhani, Mahatma Phule Agricultural University, Rahuri and Dr.Panjabrao Deshmukh Agricultural University, Akola) at three locations viz., Parbhani, Amravati and Jalgaon during the year 2007-2008 to 2009-2010 on three different soil types viz., light, medium and heavy soils at each location with eight soybean varieties viz., TAMS 38, TAMS 98-21, MAUS 71, MAUS 47, MAUS 32, DS 228, MACS 450 and JS 335. On an average of three years data (2007-2008 to 2009-2010), the variety TAMS 98-21 ranked first in light and heavy soil, whereas, the variety MAUS 71 ranked first in medium type of soil. On an average of twenty seven trials conducted during three years in light, medium and heavy soil at the same location across the soil types, the variety MAUS 71 ranked first (1881 kg/ha) followed by TAMS 98-21 (1872 kg/ha). The yield levels of JS 335 (1816 kg/ha) and MACS 450 (1813 kg/ha) were found almost at par.

Introduction

Soybean has been now established as oilseed as well as pulse crop. It was emerged as cheapest alternate source of high quality protein food and edible oil (Agarwal *et al.*, 2010). It is a triple beneficiary crop, which contains about 20 percent of oil which is high in essential fatty acids (Omega-6 and Omega-3) and 38 to 42 percent high quality protein with 6.4 percent lysine (Samra and Ramchandra, 2009). In India, the area and

production of soybean has extensively increased up to 10.7 million hectare during 2012 (Anonymous, 2012). Unfortunately there has been no significant increase in the productivity. As compared to the productivity of United States of America, Brazil, Argentina and China, India's productivity is still very low. Soybean need a soil that is warm, moist, well supplied with air and provides good contact between the seed and soil for rapid germination (Hans *et al.*, 1997). However, area under soybean has been

increased to more than 32 lakh hectares irrespective to ideal soil type and suitable variety resulting in poor average productivity, which remains constant around 10 to 12 quintals since last 25 years in Maharashtra (Anonymous, 2005). Therefore, effort has been made to identify most suitable variety of soybean in light, medium and heavy soils under different climatic conditions by conducting experiment in three State Agricultural Universities jurisdiction of Maharashtra.

Materials and Methods

An experiment was conducted in three State Agricultural Universities jurisdiction of Maharashtra (Vasantrao Naik Marathwada Agricultural University, Parbhani, Mahatma Phule Agricultural University, Rahuri and Dr. Panjabrao Deshmukh Agricultural University, Akola) at three locations viz., Parbhani, Amravati and Jalgaon during the year 2007-2008 to 2009-2010 on three different soil types viz., light, medium and heavy soils at

each location with eight soybean varieties viz., TAMS 38, TAMS 98-21, MAUS 71, MAUS 47, MAUS 32, DS 228, MACS 450 and JS 335. The experiment was conducted in Randomized Block Design. The gross and net plot size was 3.60 x 5.00 m² and 2.70 x 4.50 m², respectively. Recommended fertilizer dose (30:60:30:20 NPK and S kg/ha) and plant protection schedule was followed during the period of investigation.

Results and Discussion

In light soil type, on an average of three trials conducted during 2007 to 2009 at Parbhani, the variety JS 335 recorded highest seed yield (2094 kg/ha), whereas the varieties viz., MAUS 32 (1554 kg/ha) and TAMS 98-21 (2107 kg/ha) ranked first at Amrawati and Jalgaon location, respectively. On pooled basis, on an average of nine trials, the variety TAMS 98-21 (1717 kg/ha) ranked first followed by MACS 450 and MAUS 71 (both 1686 kg/ha) (Table 1).

Table.1 Pooled analysis of seed yield (kg/ha) of different soybean varieties tested on light soil for three years each at Parbhani, Amrawati and Jalgaon location during *khari*f, 2007-08 to 2009-10

Varieties	Seed yield (kg/ha)			
	Parbhani (3)*	Amrawati (3)*	Jalgaon (3)*	Location pooled (9)
DS 228	1685	1406	1853	1648
JS 335	2094	1124	1720	1646
MACS 450	1968	1301	1788	1686
TAMS 38	1631	1226	1475	1444
TAMS 98-21	1891	1151	2107	1717
MAUS 32	1776	1554	1814	1581
MAUS 71	2016	1242	1800	1686
MAUS 47	1935	1367	1633	1645
SE _±	43.90	47.90	49.16	127.40
CD at 5 %	94.15	102.73	105.44	273.25
Grand Mean	1875	1296	1774	1632

*Figures in parenthesis indicate number of trials

Table.2 Pooled analysis of seed yield (kg/ha) of different soybean varieties tested on medium type of soil for three years each at Parbhani, Amrawati and Jalgaon location during *kharif*, 2007-08 to 2009-10

Varieties	Seed yield (kg/ha)			
	Parbhani (3)*	Amrawati (3)	Jalgaon (3)	Location pooled (9)
DS 228	2060	1364	1990	1805
JS 335	2322	1496	1904	1907
MACS 450	2105	1637	1885	1875
TAMS 38	1943	1487	1802	1744
TAMS 98-21	2140	1268	2289	1899
MAUS 32	2090	1036	1745	1624
MAUS 71	2432	1519	1955	1968
MAUS 47	1977	1187	1810	1658
SE_±	49.24	49.24	47.90	119.72
CD at 5 %	105.60	105.60	102.73	256.77
Grand Mean	2134	1374	1923	1810

*Figures in parenthesis indicate number of trials

Table.3 Pooled analysis of seed yield (kg/ha) of different soybean varieties tested on heavy type of soil for three years each at Parbhani, Amrawati and Jalgaon location during *kharif*, 2007-08 to 2009-10

Varieties	Seed yield (kg/ha)			
	Parbhani (3)*	Amrawati (3)	Jalgaon (3)	Location pooled (9)
DS 228	1968	1171	2270	1803
JS 335	2196	1413	2083	1897
MACS 450	2232	1335	2069	1879
TAMS 38	2141	1620	1960	1907
TAMS 98-21	2194	1363	2449	2002
MAUS 32	2499	1290	2167	1985
MAUS 71	2658	1163	2151	1991
MAUS 47	2090	1300	1919	1770
SE_±	47.53	49.24	49.35	136.11
CD at 5 %	101.95	105.60	105.84	291.92
Grand Mean	2247	1332	2134	1904

*Figures in parenthesis indicate number of trials

Table.4 Mean seed yield (kg/ha) of different soybean varieties tested on light, medium and heavy type of soil for three years each at Parbhani, Amrawati and Jalgaon location during *kharif*, 2007-08 to 2009-10

Varieties	Mean seed yield (kg/ha)			
	Light soil (9)	Medium soil (9)	Heavy soil (9)	Mean (27)
DS 228	1648	1805	1803	1752
JS 335	1646	1907	1897	1816
MACS 450	1686	1875	1879	1813
TAMS 38	1444	1744	1907	1698
TAMS 98-21	1717	1899	2002	1872
MAUS 32	1581	1624	1985	1730
MAUS 71	1686	1968	1991	1881
MAUS 47	1645	1658	1770	1691
SE_±	127.40	119.72	136.11	
CD at 5 %	273.25	256.77	291.92	
Grand Mean	1632	1810	1904	

*Figures in parenthesis indicate number of trials

In medium type of soil, the variety MAUS 71 (2432 kg/ha) at Parbhani, MACS 450 (1637 kg/ha) at Amrawati and TAMS 98-21 (2289 kg/ha) recorded highest seed yield on an average of three trials conducted each at Parbhani, Amrawati and Jalgaon during 2007-2009. On pooled basis across the locations, the variety MAUS 71 (1968 kg/ha) recorded highest seed yield followed by JS 335 (1907 kg/ha) and TAMS 98-21 (1899 kg/ha) (Table 2).

In heavy type of soil, on an average of three trials conducted during 2007-2009 at Parbhani, Amravati and Jalgaon location, the variety MAUS 71 (2658 kg/ha) at Parbhani, TAMS 38 (1620 kg/ha) at Amrawati and TAMS 98-21 (2449 kg/ha) at Jalgaon recorded highest seed yield.

On pooled basis on an average of nine trials conducted across the locations, the variety TAMS 98-21(2002 kg/ha) recorded highest seed yield followed by MAUS 71 (1991 kg/ha) and MAUS 32 (1998 kg/ha), respectively (Table 3). On an average of

twenty seven trials conducted across the soil types in light, medium and heavy soil and locations at Parbhani, Amrawati and Jalgaon for three years (nine trials at each location) during 2007-2008 to 2009-2010, the variety MAUS 71 (1881.7 kg/ha) ranked first followed by in light and heavy soil, whereas, the variety MAUS 71 ranked first in medium type of soil.

On an average of twenty seven trials conducted during three years, in light, medium and heavy soil at the same location across the soil types, the variety MAUS 71 ranked first (1881 kg/ha) followed by TAMS 98-21 (1872 kg/ha). The yield levels of JS 335 (1816 kg/ha) and MACS 450 (1813 kg/ha) was found almost at par (Table 4).

On the basis of present study, it can be concluded that the soybean variety TAMS 98-21 is suitable for light and heavy soils whereas variety MAUS 71 is suitable for medium soil. Variety MAUS 71 has proved better performance irrespective of soil types with wider adoptability in Maharashtra state.

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