Production Potential and Economics of Soybean, *Glycine Max* (L). *Meril* Based Crop Sequence in Vertisols of Andhra Pradesh

Dr. M. Sree Rekha  
Asst. Professor Dept. of Agronomy Agricultural College, Bapatla  
522 101 Gunter dist., AP  
email: msreerekha@yahoo.com

Dr. S. Dhurua  
Associate Professor & Head Dept. of Entomology Agricultural College, Naira Srikkulam dist, AP

Abstract: A field experiment was conducted for three years from 2002-2004 to study the production potential of soybean based crop sequences in vertisols of Andhra Pradesh. The experiment was laid out in randomized block design. Treatments comprised of nine different rabi crops grown on residual moisture (Bengalgram, coriander, safflower, mustard, soybean, sunflower, redgram, blackgram and wheat) after kharif soybean. Among the nine crop sequences, soybean – coriander recorded maximum soybean equivalent yield, net returns and C:B ratio followed by soybean – mustard sequence.

Keywords: C:B Ratio, Cropping System, Net Returns, Soybean Equivalent Yield.

I. INTRODUCTION

Among the oilseed crops, soybean occupied third place in the edible oil scenario of India next to groundnut and mustard. The wonder crop soybean with 40-42% protein and 20-22% oil has significant role to play in Indian Agriculture to meet protein and oil requirements. The demand for soybean in the country is almost double than that of total production which can be augmented by growing the crop in sequence with other crops. Apart from increasing its production, there are also reports that grain legumes play an important role in improving and maintaining soil fertility and increasing the growth and yield of succeeding crops.[2]

The area under soybean has increased tremendously as an alternative crop for cotton during recent years especially in Northern Telangana region of Andhra Pradesh and particularly in Adilabad district. In view of the facts, present study was conducted to find out the best sequence ‘rabi’ crop after ‘kharif’ soybean under rainfed conditions of vertisols in Adilabad district in Andhra Pradesh.

II. MATERIALS & METHODS

A field experiment was conducted at Agricultural Research Station, Adilabad, located in Northern Telangana Zone of Andhra Pradesh during three kharif and rabi seasons of 2002-05 on same plot in randomized block design replicated thrice. The soil of experimental site was black, clayey with pH 7.6, organic carbon 0.36%, available nitrogen 273 kg ha\(^{-1}\), 10.75 Kg P\(_2\)O\(_5\) ha\(^{-1}\) and 347.2 Kg K\(_2\)O ha\(^{-1}\). During Kharif soybean was sown in the last week of June as sole crop with the objective to find out the sequence rabi crop. Single super phosphate was the source of phosphorus for Kharif Soybean fertilized with 30:60:40 NPK kg ha\(^{-1}\). Rabi crops were sown during October III week after harvest of kharif soybean. The fertiliser doses applied for rabi crops in kg ha\(^{-1}\) of N, P\(_2\)O\(_5\), K\(_2\)O were as follows: 20-50-0 for bengalgram, blackgram and redgram, 30-20-40 for coriander, 50-30-30 for mustard, 60-40-30 for sunflower and safflower, 50-20-40 for wheat and 60-30-40 for soybean. The crop varieties used for the trial were JS335 (kharif and rabi); ICCV-2 (Bengalgram); LBG-20 (Blackgram); Sadhana (Coriander), PT-303(Mustard), KBSH-I(Sunflower);A-1(Safflower);Asha (Redgram); Sonalika (Wheat). All the rabi crops were grown under residual soil moisture. Rainfall received in kharif and rabi seasons during crop growth in 2002-03; 2003-04; 2004-05 was 586.4, 943.7 and 651.4 mm in 27, 49 and 32 rainy days, respectively. Final crop yields (kharif and rabi) were recorded and the total gross returns, net returns, C:B ratio were calculated on the basis of prevailing market prices of the produce. For comparison of cropping sequences, the yield of all rabi crops were converted into soybean equivalent yields on price basis.

III. RESULTS & DISCUSSION

Crop Productivity:

Soybean grown as kharif crop matured in 92.97 and 98 days respectively during 2002,2003 and 2004. Soybean yield was 1646,1481 and 1330 kg ha\(^{-1}\) respectively in 2002,2003 and 2004 with a mean yield of 1485 kg ha\(^{-1}\). During rabi seasons, the productivity of safflower was highest followed by bengalgram and coriander in 2002 and 2003 while in 2004 coriander out yielded the other rabi crops (Table 1).

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Soybean yield (kg ha(^{-1}))</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean – Bengalgram</td>
<td>1646</td>
<td>1481</td>
<td>1330</td>
<td>1485</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Kharif and Rabi crop yields (kg ha\(^{-1}\)) in soybean based cropping system

Copyright © 2015 IJAIR, All right reserved
The productivity of different sequences was expressed as soybean equivalent yield (SEY). Soybean – coriander sequence recorded maximum soybean seed equivalents followed by soybean-mustard sequence in 2002 and 2003 respectively. This may be due to the higher price of coriander and mustard in 2002 and 2003 (Table 1). In 2004, soybean – mustard sequence recorded maximum soybean seed equivalents of 2690 kg ha\(^{-1}\) followed by soybean-sunflower sequence with 2675 kg ha\(^{-1}\). This is also due to higher market price of mustard and sunflower in 2004 (Table 1). However, mean of three consecutive years show that soybean – coriander sequence recorded maximum soybean equivalent yields (3028 kg ha\(^{-1}\)) followed by soybean – mustard (2827 kg ha\(^{-1}\)) and soybean – bengalgram (2721 kg ha\(^{-1}\)) sequence (Table 1). Soybean – wheat and soybean – redgram sequence recorded lowest mean equivalent yields of 1626 kg ha\(^{-1}\) and 1650 kg ha\(^{-1}\) (Table 1). Soybean – safflower and soybean – bengalgram were reported as profitable sequences in Vidarbha region of Maharashtra [3]. In Krishna-Godavari zone of Andhra Pradesh, soybean-mustard followed by soybean-bengalgram was reported as remunerative. [4]

### IV. ECONOMICS

#### Gross Returns:

In 2002, maximum gross returns were obtained with soybean – coriander (Rs 47661 ha\(^{-1}\)) sequence followed by soybean – mustard (Rs 41183 ha\(^{-1}\)) and soybean – safflower (Rs 41023 ha\(^{-1}\)). In 2003 also maximum gross returns were obtained with soybean – coriander (Rs 54321 ha\(^{-1}\)) followed by soybean – mustard sequence (Rs 46695 ha\(^{-1}\)). However, in 2004, maximum gross returns were with soybean – mustard sequence followed by soybean – safflower sequence. Perusal of mean data indicated that soybean – coriander sequence recorded maximum gross returns of Rs 44312 ha\(^{-1}\) followed by soybean – mustard (Rs 40052 ha\(^{-1}\)) and soybean – bengalgram (Rs 35786 ha\(^{-1}\)). This can be attributed not only to their yields but mainly to the higher market price, which prevailed in 2002 and 2003 for coriander, and in 2004 for mustard and sunflower (Table 2).

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Gross returns Kharif &amp; Rabi (Rs ha(^{-1}))</th>
<th>Net Returns (Rs ha(^{-1}))</th>
<th>C:B ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2002</td>
<td>2003</td>
<td>2004</td>
</tr>
<tr>
<td>Soybean – Coriander</td>
<td>40541</td>
<td>36503</td>
<td>30264</td>
</tr>
<tr>
<td>Soybean – Mustard</td>
<td>47661</td>
<td>54321</td>
<td>30956</td>
</tr>
<tr>
<td>Soybean – Safflower</td>
<td>41183</td>
<td>46695</td>
<td>32280</td>
</tr>
<tr>
<td>Soybean – Sunflower</td>
<td>24489</td>
<td>31134</td>
<td>23392</td>
</tr>
<tr>
<td>Soybean – Bengalgram</td>
<td>26531</td>
<td>20914</td>
<td>3210</td>
</tr>
<tr>
<td>Soybean – Blackgram</td>
<td>41023</td>
<td>35035</td>
<td>28652</td>
</tr>
<tr>
<td>Soybean – Wheat</td>
<td>35343</td>
<td>24289</td>
<td>19904</td>
</tr>
<tr>
<td>Soybean – Redgram</td>
<td>24541</td>
<td>24125</td>
<td>18565</td>
</tr>
<tr>
<td>Soybean – Blackgram</td>
<td>23781</td>
<td>22708</td>
<td>17626</td>
</tr>
<tr>
<td>CV %</td>
<td>6.0</td>
<td>9.0</td>
<td>21.9</td>
</tr>
</tbody>
</table>

Vidarbha region of Maharashtra [3]. Yield and net returns were highest with soybean – bengalgram sequence for Vindhyan plateau of Madhya Pradesh. [5].

Perusal of pooled cost benefit ratio of three years under study indicated that soybean – coriander was remunerative crop sequence with maximum C:B ratio of 5.01 followed by soybean – mustard with C:B ratio of 4.91 (Table 2).

Thus from the present findings, it can be concluded that soybean – coriander followed by soybean – mustard was economically profitable crop sequence under rainfed conditions for black soils of Adilabad in Northern Telangana region of Andhra Pradesh.

REFERENCES


AUTHOR'S PROFILE

Dr. M. Sree Rekha
Asst. Professor Dept. of Agronomy Agricultural College, Bapatla
522 101 Guntur dist., AP
email: msreerekha@yahoo.com

Dr. S. Dhurua
Associate Professor & Head Dept. of Entomolgy Agricultural College, Naira Srikakulam dist, AP

Copyright © 2015 IJAIR, All right reserved