EFFECT OF DIFFERENT INTERCROPPING RATIOS ON YIELD AND ECONOMICS OF SESAME (SESAMUM INDICUM) + GROUNDNUT (ARACHIS HYPOGAEA) INTERCROPPING SYSTEM

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ABSTRACT

A field experiment was conducted at the Agronomy Farm, College of Agriculture, Dapoli Dist. Ratnagiri to study the performance of sesame (Sesamum indicum) + Groundnut (Arachis hypogaea) intercropping system under different levels of sulphur in Lateritic soils of konkan. The results indicated that the treatment T5 (sesame + groundnut in 3:1) and the treatment T7 (i.e. sesame + groundnut in 1:3 ratio) ratio recorded significantly higher grain and dry pod yield of sesame and groundnut respectively, which was at par with the treatment T6 (i.e. sesame + groundnut in 1:2 ratio), whereas the LER, crop equivalent yield and B: C ratio were significantly higher observed in the treatment T6 (i.e. sesame + groundnut in 1:2 ratio).

INTRODUCTION

Oil seeds form the largest agriculture commodity after cereals in India sharing 15.7 per cent of the country’s gross cropped area and accounting for nearly 5 per cent of gross national product and 10 per cent of the value of all agricultural products (Anonymous 2004). India has 14 per cent of world’s area under oil seeds, which accounts for less than 10 per cent of the world’s production (Hedge and Kiresur, 1999).

Most of the research work and approaches with respect to develop the production technologies for oilseeds in the past have been confined to individual crops, but now there is need to work with cropping systems that farmers can practice to exploit location specific agro-climatic conditions for enhanced production. Considering the limited net sown area, it will be necessary to raise the cropping intensity so as to grow more crops on the same piece of land. In konkan region, groundnut gaining popularity due to its high yield potential. Among the various oil seed crops grown in the country, sesame (Sesamum indicum) commonly known, as “Til” is the most important edible oil seed crop. It is the oldest oil seed crop known and cultivated by man. Sesame is the short duration crop and fits well in various cropping systems. In this region there is no dearth of water up to march due to well irrigation resources, therefore, the present investigation was undertaken.

MATERIAL AND METHODS

A field experiment was conducted at Agronomy Farm, college of Agriculture, Dapoli in split plot design during Rabi season of 2005-06 consisting of 21 treatment combinations and replicated thrice. The soil of experimental plot was clay loam in texture and acidic in reaction with medium in available nitrogen, low in available phosphorus high in available potash and low in available sulphur. The treatment combination consisted of different intercropping ratios (T1 - Sole crop sesame T2 - Sole crop groundnut, T3 - sesame + groundnut (1:1), T4 - Sesame + Groundnut (2:1), T5 - sesame + Groundnut (3:1), T6 - sesame + groundnut (1:2), T7 - sesame + groundnut (1:3) as main plot treatment and three levels of sulphur (S1 = control, S2 = 30 kg ha⁻¹, S3 = 60 kg ha⁻¹) as sub plot treatments. The gross and net plot size was 3.60 m × 4.20 m and 3.00 m × 3.90 m respectively. The variety JLT-7 of sesame and TG-26 of groundnut were used in this investigation. The distance between rows in both the crops was 30 cm. Sesame seed was sown by
drilling in line 30 cm apart and 7.5 cm (4444 plants/ha) spacing between plants was maintained by thinning out extra plant within lines. The plant population for groundnut was 3,33,333/ha in case of sole crops. The plant population was varying in case of intercropping as per the row proportion. The recommended dose of fertilizer for the sesame, basal dose of 25 kg P₂O₅/ha through DAP (Diammonium phosphate) and 25 kg K₂O through Muriate of potash were placed at the depth of about 5 cm at the time of sowing and nitrogen was applied through urea and DAP (Diammonium phosphate) in two equal splits, first dose was applied at sowing and second at 30 days after sowing. For the groundnut basal dose of 25 kg N/ha and 50 kg P₂O₅/ha was given through DAP (Diammonium phosphate) and urea at the time of sowing. Sulphur was applied as per the treatments through elemental sulphur.

RESULTS AND DISCUSSION

Productivity of intercrops: The yield, economics and intercropping indices of sesame and groundnut were significantly influenced by different intercropping ratios (Table 1). In 3:1 row ratio, the adverse effect of competition between component crops was reduced hence sesame intercrop enjoyed increased availability of nitrogen and sulphur owing to higher nitrogen fixation by groundnut. Therefore widely spaced sesame in 3:1 ratio attained full growth and gave significantly higher grain yield of sesame and decreased with decreasing row ratio. Similar trend was observed in case of groundnut. These results were earlier reported by Khistaria et al., (1997) and Hari Krishna and Reddy (2005).

Land equivalent ratio: The maximum LER value of 1.46 was recorded with planting of one row of Sesame intercropped in two rows of groundnut. It is concluded that normal planting of sesame at 30 cm intercropped with two rows of groundnut would be the most efficient profitable intercropping system under lateritic soil condition. Similar observations were made by Mandal and Mahapatra (1990) and Mandal et al., (1990).

Crop equivalent yield: The crop equivalent yield of different intercropping ratios in terms of sesame and groundnut yield clearly indicated the advantage of intercropping ratios compared with the sole crops. The highest sesame equivalent yield was recorded with the treatment

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Grain yield (q/ha)</th>
<th>Pod yield (q/ha)</th>
<th>LER</th>
<th>Sesame equivalent yield</th>
<th>Groundnut Pod equivalent yield</th>
<th>B: C ratio</th>
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</thead>
<tbody>
<tr>
<td>T1: Sole sesame</td>
<td>4.77</td>
<td>-</td>
<td>1.00</td>
<td>4.77</td>
<td>15.91</td>
<td>1.19</td>
</tr>
<tr>
<td>T2: Sole groundnut</td>
<td>-</td>
<td>21.60</td>
<td>1.00</td>
<td>6.48</td>
<td>21.60</td>
<td>1.50</td>
</tr>
<tr>
<td>T3: S + G (1:1)</td>
<td>3.89</td>
<td>12.55</td>
<td>1.45</td>
<td>7.66</td>
<td>38.07</td>
<td>1.70</td>
</tr>
<tr>
<td>T4: S + G (2:1)</td>
<td>4.34</td>
<td>8.09</td>
<td>1.32</td>
<td>6.77</td>
<td>30.65</td>
<td>1.55</td>
</tr>
<tr>
<td>T5: S + G (3:1)</td>
<td>5.34</td>
<td>5.42</td>
<td>1.43</td>
<td>6.97</td>
<td>28.65</td>
<td>1.60</td>
</tr>
<tr>
<td>T6: S + G (1:2)</td>
<td>3.52</td>
<td>15.02</td>
<td>1.46</td>
<td>8.03</td>
<td>41.77</td>
<td>1.75</td>
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<tr>
<td>T7: S + G (1:3)</td>
<td>2.47</td>
<td>15.78</td>
<td>1.29</td>
<td>7.20</td>
<td>39.79</td>
<td>1.63</td>
</tr>
</tbody>
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S.E. ± 0.25 0.451 0.17 0.89 3.94 0.14
C.D. 0.79 1.42 0.52 2.75 12.13 0.43

Price for sesame Rs. 50 /kg
Price for groundnut dry pod Rs. 15/kg
T6 (i.e. sesame + groundnut in 1:2 ratio), which was closely followed by T5 (i.e. sesame + groundnut in 1:1 ratio), T1 (i.e. sesame + groundnut in 1:3 ratio), T3 (i.e. sesame + groundnut in 3:1 ratio) and T4 (i.e. sesame + groundnut in 2:1 ratio) but found significantly superior over sole sesame.

The treatment T6 (i.e. sesame + groundnut in 1:2 ratio) recorded maximum groundnut equivalent yield, which was followed by treatments T7 (i.e. sesame + groundnut in 1:3 ratio), T3 (i.e. sesame + groundnut in 1:1 ratio) and T4 (i.e. sesame + groundnut in 2:1 ratio) whereas there was no remarkable difference was observed among T6, T7, T3 and T4. However, the mean data indicated the overall advantage of alternate row arrangement of sesame + groundnut.

**Economics:** The benefit: cost ratio was highest in intercropping of sesame and groundnut in 1:2 proportion (1.75), while the cropping of sole sesame and sole groundnut had benefit cost ratio of 1.19 and 1.50, respectively but found at par with each other. Thus, it clearly indicated that growing of sesame in groundnut in 1:2 ratios seemed to be viable and acceptable proportion. The results were in accordance with the findings of Sethi et al. (1992) Nageshwar Lal et al., (1995) and Bhilare et al., (2001).

REFERENCES