Manual Terminal Clipping on Yield and Nutrient Uptake of Sesame Varieties

S. Kokilavani, R. Jagannathan and S.K. Natarajan

Department of Agricultural Meteorology, Tamil Nadu Agricultural University, Coimbatore – 641 003, Tamil Nadu, India.

Abstract: A field experiment was conducted at eastern block of Tamil Nadu Agricultural University, Coimbatore during summer (Feb-May) 2005 to examine the influence of morphological adaptation through terminal clipping on yield and nutrient uptake in selected varieties of sesame. The trial was conducted in Factorial Randomized Block Design (FRBD) with three replications employing two factors viz., varieties (SVPR 1, TMV 3 and TMV 4) and morphological adaptation by terminal clipping (at 15, 25, 35, 45 days after sowing and no clipping). The outcome of the study point out that terminal clipping done at 35 DAS favourably improved the yield trait, nutrient uptake and yield of the sesame variety SVPR 1. The variety TMV 4 was also considered as a suitable substitute in recording equal yield parameter, nutrient uptake and yield for the same clipping practice.

Key words: Sesame, terminal clipping, nutrient uptake, yield

INTRODUCTION

Sesame (Sesamum indicum L.) is an antique oilseed crop of India, cultivated in 2.5 M ha of land (14% of total area under oilseed crops). However, the productivity of sesame in India is only 335 kg per hectare as against the genetic potential of around 2000 kg per hectare[1]. The improved varieties of sesame have recorded a higher seed yield over the existing local types. The specific reasons identified for the low yield of sesame in India is due its cultivation under sub-marginal lands without due importance to the choice of appropriate season, high yielding variety, nutrient management and new agro-technological packages[2]. Since it is raised as an irrigated crop during summer season, its agronomic practices are required to be standardized for realizing yield potential. Nutrient uptake by a crop, considered being an important factor in determining the yield. Besides, clipping of terminal leaves which activates the dormant lateral buds to produce more branches is an important operation for increasing sesame yield[3]. Since limited data are available on these aspects and it is essential to evaluate the agronomic practices such as terminal clipping, varieties, yield and nutrient uptake. Hence an experiment was planned to fulfill these objectives.

MATERIALS AND METHODS

A field experiment was conducted during summer season (Feb–May) of 2005 at Eastern block of Tamil Nadu Agricultural University, Coimbatore Tamil Nadu, India to identify appropriate variety that could manœuvre the impact of manual clipping at different stages on yield and nutrient uptake in sesame for maximizing productivity. The soil of the experimental site was sandy clay loam in texture, low in available nitrogen (236.5 kg ha⁻¹), and medium in available phosphorus (14.4 kg ha⁻¹) and high in available potassium (394.6 kg ha⁻¹). The experiment was performed in Factorial Randomized Block Design (FRBD) with two factors (Factor I: varieties (SVPR 1, TMV 3, TMV 4), Factor II: (manual terminal clipping done at 15,25,35,45 days after sowing (DAS) and no clipping) with three replications. Nitrogen (N) was supplied through urea, phosphorus (P) through single super phosphate and potassium (K) through muriate of potash as basal at the rate of 35: 23: 23 kg NPK ha⁻¹, respectively. The total number of capsules present in the main stem and all branches of the plant was added together in each of five sample plants at harvest and the mean value was calculated. After complete threshing and cleaning, the seeds were sun dried treatment wise to eight per cent moisture level. The crop was harvested separately from the plots when the leaves and stems were turned yellow and processed and the seed yield was recorded.

The plant samples collected were oven dried at 70°C till constant weight was obtained. The powdered samples were analyzed for N, P and K content using standard procedures of N by micro-kjeldahl method (Yoshida et al.[4], P by colorimetrically (Jackson,[5] and K by Flame photometer[5]).

Corresponding Author: S. Kokilavani, Department of Agricultural Meteorology, Tamil Nadu Agricultural University, Coimbatore – 641 003, Tamil Nadu, India.
RESULTS AND DISCUSSIONS

Yield and Yield Components: Capsule, the most important parameter for yield of sesame was found to be significantly influenced by varieties and terminal clipping (Table 1). Among the varieties, SVPR 1 recorded higher number capsules per plant (101.1) and this was analogous with TMV 4. The terminal clipping practice at 35 DAS recorded more number of capsules per plant (105.5). The clipping practice might have effectively altered the crop architecture, which in turn increased the lateral branches that led to greater ability for development of source and sink features in sesame. The valuable impact of terminal clipping on yield attribute was also reported by Imayavaramban[6]. The maximum seed yield of 1010 kg per hectare (Table 1) was produced by SVPR 1. This was due to more number of branches and capsules per plant. Similar results were given by Kathiresan et al[7]. Clipping at 35 DAS recorded maximum seed yield of 1125 Kg per hectare. This was due to orientation of more number of lateral branches per plant.

SVPR 1 in combination with 35 DAS clipping registered more seed yield of 1185 Kg per hectare. The increase in seed yield of sesame in clipped plants over non-clipped plants was owing to increase in more number of branches and capsules per plant.

Table 1: Influence of Clipping management (C) on yield attributes, nutrient uptake and yield of Sesame varieties (V)

<table>
<thead>
<tr>
<th>Variety</th>
<th>15 DAS</th>
<th>25 DAS</th>
<th>35 DAS</th>
<th>45 DAS</th>
<th>Mean</th>
<th>15 DAS</th>
<th>25 DAS</th>
<th>35 DAS</th>
<th>45 DAS</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVPR 1</td>
<td>95.9</td>
<td>108.5</td>
<td>122.7</td>
<td>78.4</td>
<td>99.8</td>
<td>101.1</td>
<td>995</td>
<td>1075</td>
<td>1185</td>
<td>861</td>
</tr>
<tr>
<td>TMV 3</td>
<td>90.0</td>
<td>102.4</td>
<td>115.4</td>
<td>81.0</td>
<td>91.6</td>
<td>96.1</td>
<td>956</td>
<td>1044</td>
<td>1171</td>
<td>934</td>
</tr>
<tr>
<td>TMV 4</td>
<td>53.4</td>
<td>70.6</td>
<td>78.3</td>
<td>45.2</td>
<td>55.4</td>
<td>60.6</td>
<td>733</td>
<td>880</td>
<td>1026</td>
<td>856</td>
</tr>
<tr>
<td>Mean</td>
<td>79.8</td>
<td>93.8</td>
<td>105.5</td>
<td>68.2</td>
<td>82.3</td>
<td>895</td>
<td>1000</td>
<td>1125</td>
<td>780</td>
<td>878</td>
</tr>
<tr>
<td>V</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>V</td>
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<tr>
<td>C</td>
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<td></td>
<td></td>
<td>V x C</td>
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<tr>
<td>S.Ed</td>
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<td></td>
<td></td>
<td></td>
<td>V</td>
<td></td>
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<tr>
<td>C.D.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>V x C</td>
<td></td>
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</tbody>
</table>

Nutrient Uptake: Both the varieties and terminal clipping done at different stages of sesame plants significantly influenced N, P and K uptake of sesame plants (Table 1). The variety SVPR 1 registered higher uptake of N (31.82 kg ha⁻¹), P (4.47 kg ha⁻¹) and K (29.60 kg ha⁻¹) and it was comparable with the variety TMV 4. The nutrient uptake of plants depends upon the dry matter accumulation of the plant, which is the result of positive growth characters. This was also reported Venkadachalam[8].

Terminal clipping done at 35 DAS recorded higher N, P and K uptake. Nipping which activated the production of more number of branches would have been enhanced the uptake of nutrients[3]. This might have been due to more dry matter production by the varieties which in turn resulted in the highest nutrient uptake. Kathiresan [9] work revealed that similar clipping had recorded higher uptake of NPK compared to control.

SVPR 1 clipped at 35 DAS recorded more N (36.20 kg ha⁻¹), P (4.98 kg ha⁻¹) and K (33.80 kg ha⁻¹) and remained on par with the treatment TMV 4 clipped at 35 DAS. The above varieties (SVPR 1 and TMV 4) and clipping time (35 DAS) performed better in individual effect and hence the interaction also found to be better. Similar result was reported by Venkadachalam[8].
In evaluating the varieties, SVPR 1 be evident for its superiority in yield trait namely number of capsule per plant, nutrient uptake and yield. With respect to clipping practice done at different intervals of growing phases, clipping at 35 DAS showed its supremacy over no clipping treatment for the characters studied. The terminal clipping of sesame necessitated the increased uptake of nutrients from the soil and this might be the cause for the increased uptake of NPK for 35 DAS clipping. Performance of SVPR 1 and TMV 4 establish extremely agreeable varieties for clipping at 35 DAS over rest of the treatment combination studied in progressing the yield attribute, nutrient uptake and yield.

REFERENCES