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Effect of intercropping on growth in mullai (*Jasminum auriculatum*)

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ABSTRACT

An investigation was conducted to study the influence of intercropping on growth parameters in mullai. The experiment was carried out in RBD consisted of 10 treatments with three replications. The treatments consisted of growing of intercrops *viz.,* dolichos bean, vegetable cowpea and cluster bean grown in three different spacings (30 x 15 cm, 45 x 15 cm and 60 x 15 cm). Sole jasmine, without any intercrop was treated as a control. The various growth parameters were recorded and statistically analyzed. Among the growth parameters recorded the highest number of secondary shoots, number of leaves, productive shoots and plant spread were recorded the highest in the vegetable cowpea intercropped at a spacing of 45 × 15 cm. The plant height showed a non significant effect, however, the highest plant height and number of primary shoots were recorded in control.

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Key words : Mullai, Intercropping, Growth parameter

INTRODUCTION

Mullai (*Jasminum auriculatum*) is an important flower crop of commercial importance. In most places after pruning of jasmine to regulate flowering for longer duration, the field is left over without raising any intercrops. In some places, farmers raise some legumes like black gram or green gram grown on a small scale for their home consumption. This traditional practice of intercropping legumes along jasmine is practiced only in few places. Intercropping system involves growing two or more crops of contrasting habit with the assumption that they could exploit the total environment more efficiently than a monoculture and results in increased overall production (yield) per unit area Okigbo and Greenland (1976). To achieve maximum productivity from intercropping systems, ideal crops need to be chosen for better compatibility *i.e.*, the growth rhythm, duration and capacity of photosynthesis at low light intensities are some of the important considerations in the relation of a companion crop. Intercropping system with legumes not only helps in utilization of nitrogen being fixed in the current growing season, but also helps in residual build up of nutrients in the soil rather wholly depleting the soil nutrients. As vegetables come to harvest earlier than pulses, like blackgram or greengram and in addition to the reports of the earlier workers who repeatedly suggested vegetable cowpea, cluster bean and dolichos bean were used as intercrops in this present study. Hence, having this idea as background, the present investigation was conducted to study the influence of intercropping on growth parameters in mullai.

MATERIALS AND METHODS

Field experiment was carried out at Orathur village of Cuddalore district in mullai during the year 2002-2003. Three year old bushes of uniform growth and vigour raised by layering were utilized for this study. The bushes were pruned during the last week of December. The experiment was laid out in a Randomized Block Design with ten treatments and replicated thrice. The treatments consisted of growing of intercrops *viz.,* dolichos bean, vegetable cowpea and cluster bean grown in three different spacing (30 x 15 cm, 45 x 15 cm and 60 x 15 cm). Sole jasmine, without any inter crop was treated as a control. The required quantity of organic manure (FYM @ 25 t ha^{-1}) was given as a basal dose and the recommended dose of inorganic fertilizers (120: 240: 240g NPK $plant^{-1}$) was applied in four equal splits from pruning at 30 days intervals. Vermiwash @ 1:5 dilution was sprayed at monthly intervals after pruning, during the entire period of crop growth. The seeds of vegetable cowpea (var. CO.2), cluster bean (Pusa Sadabahar) and dolichos bean (Arka Vijay) were sown as per treatment (or) schedule. To sow one hectare, the seed requirement was 30-40 kg for cluster bean, 15 kg for vegetable cowpea and 25-30 kg for dolichos bean. Two-three seeds were sown in each hill. After the germination of seeds, the seedlings were thinned out and maintained as one seedling per hill. Crop management practices were followed as per the recommendation.Observations were recorded in five plants tagged at random in each replication at different stages on the following characters in all the intercrops *viz.,* vegetable cowpea, cluster bean and dolichos bean.

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Data on growth parameters *viz.,* plant height, number of primary and secondary shoots, number of leaves, leaf area, productive shoots and plant spread were taken at harvest and recorded treatment-wise and analysed statistically (Panse and Sukhatme, 1967).

RESULTS AND DISCUSSION

The results of the present investigation showed that there was a significant difference in growth parameters of mullai due to intercropping (Table 1).

The observation on plant height was not found to be significant among the treatments. However, the treatment T_1 was found to produce the highest plant height (154.73 cm) and increased number of primary shoots (32.16).The lowest value for plant height and number of primary branches (148.26 cm and 25.31, respectively) were recorded in T_5 (Jasmine + vegetable cowpea (30 ×15 cm)). Similar results on increased plant height and number of primary shoots due to intercropping in legumes were reported by Lakshminarayanan (2004) in *Jasminum sambac*. The increase in plant height and number of primary shoots in the sole jasmine (T_1) had occurred because there was no competition for nutrients and water required for growth and development immediately after pruning. Further, the vegetative growth rate at this stage was very fast. Similar results were also reported by Prasad and Mohan (1995) in brinjal + coriander and brinjal + fenugreek intercropping. Therefore, raising intercrop reduce or affect the vegetative growth of main crop in the earlier stage, thus producing the lowest plant height and reduced number of primary shoots. But at later stage, when intercrops grown were ploughed in-situ and when the residues were added to the soil, the growth characters of jasmine was gradually improved. This is due to the decomposition of the green matter in the soil and subsequent enrichment of nutrient resources in the soil.

The intercropping system had favoured significantly the number of secondary shoots. The treatment T_6, where vegetable cowpea intercropped at a spacing of 45 × 15 cm recorded the highest number of secondary shoots (9.447) and the lowest number of secondary shoots (8.678) was recorded in the treatment T_1 (Sole jasmine). A similar report on increased growth parameters of main crop due to intercropping was also observed by Padhi (2001) in maize + runner bean intercropping system. At the earlier stages in intercropped plots, the growth was found to be affected by the intercrops due to the competition for resources *viz.,* sunlight and water among the main crop and intercrops. But it was found to increase in the later growth stage of the crop. This is attributed by

growing of intercrops and ploughing the residues (green matter) to the soil so that the growth characters of jasmine (main crop) gradually improved. This might have occurred due to the decomposition of the green matter in the soil and subsequent enrichment of nutrient resources in the soil.

In the present study, the maximum number of leaves and leaf area were found to be significantly affected by intercropping in jasmine crop. The treatment T_6 where jasmine was intercropped with vegetable cowpea at a spacing of 45 × 15 cm registered 293.59 leaves and leaf area of 73.25 m^2 and was found at par with T_7 where jasmine was intercropped with vegetable cowpea (60 ×15 cm). The lowest values of number of leaves (265.76) and leaf area (66.54 cm^2) were recorded in the treatment T_1 (Sole jasmine). The present finding was supported by the views of Reddy (2004) in baby corn. This positive effect might be due to the complementary effect of legumes which was ploughed in-situ, have favoured in terms of the biological nitrogen fixation, suppression of weed growth and check on soil moisture retention because of canopy covers of legumes, might have favoured good nutrient status of the soil and in turn favoured better nutrient supply to the plants, resulted in highest number of leaves and leaf area. The present study is in concordance with the findings of Pandita *et al.* (1998) who reported that sorghum and guar intercropping system lead to better crop growth might be the reason for the increased leaf area. Moreover, this could also be due to the maximum contribution of organic carbon and available N to the soil through the decay of root nodules of cowpea. The more number of root nodules was also counted in cowpea among other intercrops.

The maximum number of productive shoots (235.98) and plant spread (2.55 m^2) were observed in the treatment T_6 where jasmine was intercropped with vegetable cowpea at a spacing of 45 × 15 cm. The lowest number of productive shoots (214.29) and plant spread (2.40) were observed in T_1 (Sole jasmine). These favorable results may have occurred due to the additional supply of nitrogen due to intercropping would have increased the productive shoot number and plant spread resulted due to the increased number of leaves and thereby, greater supply of food materials through increased photosynthesis, rapid cell division and cell elongation in meristematic region which ultimately gave significant number of productive shoots. Similar results have been recorded by Mishra and Solanki (1996) in cowpea.

The highest number of productive shoot and plant spread under jasmine + vegetable cowpea intercropping system could also be due to the availability of optimum interspaces between rows which would have helped the intercrops to grow better and resulted in relatively less space availability for growth of weeds from early stages of crop growth. Further, legumes make part of N availability to the main crop. This is in line with the findings of Gautam *et al.* (1985) in intercropping of pearl millet with cowpea.

Thus, from the present investigation, it could inferred that, growing of vegetable cowpea at a spacing of 45 × 15 cm in pruned fields was found to be more advantagious for obtaining maximum growth parameters in mullai (*Jasminum auriculatum*).

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