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EFFECT OF ORGANIC AND BIO - MULCHES ON GROWTH ATTRIBUTES OF BABYCORN VARIETY COBC 1

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ABSTRACT

Investigations were carried out to study the effect of organic and bio-mulches in the cultivation of babycorn (Zea*mays* L.) at the Orchard, Department of Horticulture, Faculty of Agriculture, Annamalai University during 2000-2002. The experiment was laid out in a Randomized Block Design with eight treatments replicated thrice. The treatments consisted of application of four organic mulches viz., sugarcane trash mulch at 10 cm thickness, water hyacinth residue at 5 cm thickness, sawdust at 2 cm thickness and coirpith at 2 cm thickness and cultivation of bio-mulches viz., coriander, mint and fenugreek. Significant effects due to application of organic mulches and cultivation of bio-mulches were found in the growth andyield parameters of babycorn. The highest response for plant characters was recorded due to the application of sugarcane trash at 10 cm thickness. It was closely followed by the application of coirpith at 2 cm thickness.

Key words: baby corn, organic mulches, bio-mulches, growth attributes

INTRODUCTION

Babycorn is the dehusked maize ear, harvested within 2-3 days of silking, i.e. prior to fertilization (Pandey *et al.*, 1998). It is a genotype of *Zea mays* L. Babycorn cultivation provides tremendous avenues for diversification, value addition and revenue generation. After successful venture in many South-East Asian countries, it is gaining fast popularity in Indian market too, particularly in metropolitan cities. Good quality and higher green-fodder yield for its cultivation adds enormously to total economic returns besides higher profit per unit area, compared with green maize. Mulching is one of the ways for recycling the organic waste materials. Mulching is not only an effective way to recycle organic waste material but also helps to minimize

evaporation of water, control weed infestation, reduce runoff and soil loss, increase soil moisture status, control soil temperature fluctuation and improve physical, chemical and biological properties of soil which lead to better yield of crops.

Sugarcane produces 10-12 tonnes of dry leaves per hectare per year. These leaves are generally called trash. In India, it is estimated that 26.6 million tonnes of sugarcane trash is produced every year. Sugarcane trash mulching has been reported to be useful in many crops (Nagarajan*et al,* 1987 and Palaniappan, 2002). Secondly coirpith is a renewable agro waste arising out of the extraction of fibre from husk of the coconut. Extraction of 1 kg of coir fibre generates 2 kg of coirpith. In India, it is estimated that 0.5 million tonnes of coirpith is produced every year. It's disposal is a problem in coir industry and it is a pollutant of the environment. On the other hand, there are reports stating that coirpith can be used as mulching material (Ramaswami, 2000).

MATERIALS AND METHODS

Investigation was carried out to assess the use of organic and bio mulches in the cultivation of baby corn at orchard, Department of Horticulture during 2001-2002. The experiment was conducted with four organic mulches viz., sugarcane trash mulch at 10 cm thickness, water hyacinth residue at 5 cm thickness, sawdust at 2 cm thickness and coir pith at 2 cm thickness and cultivation of three bio-mulches viz., coriander, mint and fenugreek. which were treated viz., T_0 -control, T_1-Dried water hyacinth at 10 cm thickness, T_2-Sugarcane trash at 10 cm thickness, T_3-coir pith at 2 cm thickness T_4-Sawdust at 2 cm thickness, T_5-Mint was sown 20 DAS main crop T_6-coriander was sown 15 DAS main crop and T_7-Fenugreek was sown 15 DAS main crop.There were eight treatments replicated thrice in Randomized block design (RBD).

According to the treatment schedule, mulching was practiced after 15 days of crop germination. The mulch materials used were sugarcane trash at 10 cm thickness (12 t ha^{-1}), coir pith at 2 cm thickness (10 t ha^{-1}). Sawdust 2 cm thickness (10 t ha^{-1}) and crop residue at 10 cm thickness (10 t ha^{-1}). For the bio-mulches, seeds of fenugreek and coriander were sown and cuttings of mint were planted 20 DAS of main crop. The

most important component in baby corn production technology is the avoidance of pollination by the way of detasselling. If the silk is pollinated, the kernels and the cobs become hard. Removal of tassels or detasselling is known to improve the quality of young cob by directing the products of photosynthesis away from growth and maintenance of the tassels. Hence, detasselling was done. The observations were recorded and subjected for statistical analysis (Panse and Sukhatme, 1967).

RESULTS AND DISCUSSION

All the treatments exhibited significant differences for the trait plant height measured at harvest during the two subsequent cropping seasons. The pattern of change was observed to be similar in both the years of experimentation. It was found that highest plant height (185.29 and 182.68 cm) was recorded in T_2(sugarcane trash) followed by T_3 (coir pith). The treatments T_1 (water hyacinth residue) and T_5 (Coriander as bio-mulch) did not express statistically significantly differences among themselves in improving the plant height of baby corn. However, the least plant height of 121.23 and 120.43 cm was recorded in the untreated control (Table 1).

The results pertaining to number of leaves per plant is presented in table 2. Significant positive variation was exhibited by all the treatments when compared to control. The highest response was noticed in trash mulch (T_2) which recorded 41.47 and 41.92 per cent more number of leaves when compared to control (T_0) during the two successive cropping seasons. This was followed by T_3 which was significant in increasing the number of leaves to a tune of 32.72 and 33.14 per cent when compared to control in the first and second crop respectively. However the effect of treatments T_1, T_6, T_5, T_7T_4 and T_0 were insignificant in exhibiting differences for this trait.

Leaf area index, significant variation was noticed in all the treatments during both the crop seasons (Table 3). Among the various mulch materials tried, highest mean values of 6.97 and 6.80 were recorded because of the application of sugarcane trash at 10 cm thickness. The next best treatment was found to be T_3 which recorded 6.52 and 6.49 as values in the respective seasons. The treatments T_3, T_1, T_6, T_5, T_7 and T_4 were on par with each other. The least mean values of 4.82 and 5.23 were recorded in control.

The mean performance for dry matter production is presented in the table 4. Significant positive variation was exhibited by all the treatments when compared to control. Similar changes were observed between the treatments during two subsequent cropping seasons. Among the various treatments tried, mulching with sugarcane trash had resulted in the highest DMP of 12.14 and 11.77 t ha^{-1} during both crop seasons which was followed by T_3 with a DMP of 11.75 and 11.43 t ha^{-1}. The treatments $T_5$and T_7were on par with each other. The untreated control had resulted in the lowest DMP of 5.03 and 4.99 t ha^{-1} in the respective seasons.

The plant height was greatly influenced by mulching using sugarcane trash at 10 cm thickness and coirpith at 2cm thickness. The next best result was obtained from coriander bio-mulching followed by water hyacinth residue mulching. Similar results were earlier reported by Kadirvelu and Rajan (1970) in sugarcane, Khera*et al* (1975) in forage crops using sugarcane trash mulching, Burgos and Talbert (1996) in sweet corn intercroping andSoliappan and Dason (1998) in cotton and black gram intercropping. The increase in plant height may be due to maintenance of soil temperature, moisture, increased nutrient supply and increased activity of microorganisms (Mohan Singh, 1991).Mulching significantly increased the number of leaves per plant. The best value for increased number of leaves per plant was observed under mulching with sugarcane trash at 10 cm thickness followed by coir pith mulching, water hyacinth residue mulching and coriander bio-mulching. The obtained result was in concordance with findings of Olasantan (1991) who reported that the leaf number of tomato increased when it was intercropped with cowpea. The least values were obtained in control followed by sawdust mulching and they were on par with each other.The leaf area index was almost the same in all the treatments. The maximum LAI value was observed in T3 (sugarcane trash mulching). This is in consonance with findings of Nimje (1996) in soybean. The next best value of LAI was observed in T_2 (water hyacinth residue mulching) followed by T_3 (Coir pith mulching) and T_6 (Coriander bio-mulching). This is in line with findings of Kehar Singh and Balyan (2000) in Sorghum and guar (fodder) intercropping.Mulching with sugarcane trash, coir pith and water hyacinth residue significantly influenced the dry matter production. The maximum dry matterproduction was observed in T_3 (sugarcane trash mulching). The present result is in concordance with Yadav*et al.*

(1987) in sugarcane, Rajgopal and Velu (1995) in soybean. Keharsingh and Balyan (2000) reported that Sorghum and guar intercropping lead to better crop growth which in turn resulted in greater dry matter production.

SUMMARY

Among the different mulch materials tried, growth characters were significantly superior at sugarcane trash mulching followed by coirpith mulching, water hyacinth residue mulching, bio-mulching and sawdust mulching. The reason for the above result is that sugarcane trash when applied at 10 cm thickness gave high dense cover over the soil surface. So, this efficiently controlled the evaporation of water thereby retaining moremoisture and contributing for better growth. Since, coirpith was applied at athickness of 2 cm, it did not effectively controlled the water loss as well asweed penetration.

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Table 1. Effect of organic and bio-mulches on plant height (cm) of babycorn var. CoBC.1

Treatments	**I Crop (2001)**	**II Crop (2002)**
T_0 - Control	121.23	120.43
T_1 - Water hyacinth residue at 5 cm thickness	160.43	160.76
T_2 - Sugarcane trash at 10 cm thickness	185.29	182.68
T_3 - Coirpith at 2 cm thickness	169.59	173.64
T_4 - Sawdust at 2 cm thickness	130.09	129.98
T_5 - Mint as bio-mulch	147.73	147.90
T_6 - Coriander as bio-mulch	156.46	157.47
T_7 - Fenugreek as bio-mulch	138.87	138.65
S.Ed.	4.29	4.33
CD (p=0.05)	8.58	8.61

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Table 2. Effect of organic and bio-mulches on number of leaves per plant of baby corn var. Cobc.1

Treatments	**I Crop (2001)**	**II Crop (2002)**
T_0 - Control	9.09	9.06
T_1 - Water hyacinth residue at 5 cm thickness	11.91	11.97
T_2 - Sugarcane trash at 10 cm thickness	15.53	15.60
T_3 - Coirpith at 2 cm thickness	13.51	13.55
T_4 - Sawdust at 2 cm thickness	9.96	9.94
T_5 - Mint as bio-mulch	11.03	11.06
T_6 - Coriander as bio-mulch	11.25	11.70
T_7 - Fenugreek as bio-mulch	10.47	10.54
S.Ed	0.49	0.45
CD (p=0.05)	1.00	0.91

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Table 3. Effect of organic and bio-mulches on the leaf area index (LAI) of Baby corn var. CoBC.1

Treatments	**I Crop (2001)**	II **Crop (2002)**
T_0 - Control	4.82	5.23
T_1- Water hyacinth residue at 5 cm thickness	6.42	6.43
T_2 - Sugarcane trash at 10 cm thickness	6.97	6.80
T_3 - Coirpith at 2 cm thickness	6.52	6.49
T_4 - Sawdust at 2 cm thickness	6.21	6.22
T_5 - Mint as bio-mulch	6.26	6.28
T_6 - Coriander as bio-mulch	6.40	6.41
T_7 - Fenugreek as bio-mulch	6.25	6.27
S.Ed.	0.18	0.15
CD (p=0.05)		

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Table 4. Effect of organic and bio-mulches on the dry matter production (t ha^{-1}) of baby corn var. CoBC.1

Treatments	**I Crop (2001)**	**II Crop (2002)**
T_0 - Control	5.03	4.99
T_1 - Water hyacinth residue at 5 cm thickness	10.40	10.35
T_2 - Sugarcane trash at 10 cm thickness	12.14	11.77
T_3 - Coirpith at 2 cm thickness	11.75	11.43
T_4 - Sawdust at 2 cm thickness	7.30	7.31
T_5 - Mint as bio-mulch	8.26	8.32
T_6 - Coriander as bio-mulch	8.87	8.79
T_7 - Fenugreek as bio-mulch	8.23	8.16
S.Ed.	0.15	0.14
CD (p=0.05)		