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INFLUENCE OF ORGANIC AND BIO - MULCHING ON WEED MANAGEMENT IN BABY CORN CULTIVATION

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INTRODUCTION

Baby corn 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. Babycorn is used in a variety of traditional and continental dishes besides being canned. It has high nutritive value comparable to many vegetables (ParodaShashi, 1994). Babycorn, being a relatively new introduction in our country requires the development of suitable production technology in realizing higher yield and monetary returns before it could be popularized among the growers. Depending on agro climatic conditions, 3-4 crops of babycorn are taken in a *year* recording high returns.

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 tonne's 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. Its 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).

Water hyacinth, an aquatic weed is a global problem, particularly more severe in tropical nations like India. It is a fast growing, high nutrient utilizing and widely adaptable weed. It spreads and affects the quality and quantity of water resource. It has the capacity to double itself within a short period ranging from 1.5 to 12.5 days. Its annual productivity is about 100 tonnes (dry basis) per ha of water surface. Mulching is one of the ways to recycle this problematic aquatic weed by which its economic value can be recognized.

Another weed controlling aspect is growing compatible and suitable crops as bio-mulches. Unlike intercrops, the choice of bio-mulches lies in selecting them based on duration and compatibility with no antagonistic effect on crop plants. Here, no alteration in spacing of main crop and no fertilizer application is done to benefit the bio-mulches. In turn, the crops are chosen in such a way that they too contribute for economic returns (Abdul Baki*et al*, 1997).

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.

Periodical harvest was done once in two days after 2 or 3 days of silking. The cobs were removed one by one as a single plant is capable of yielding up to 3 cobs. The total duration of harvest extended over a period of ten days. Cobs were stored at low temperature immediately after harvest to prevent deterioration in quality. The weed biometrics were taken at harvest and recorded treatment wise. The weed population was counted from 4 quadrates of 0.25 m^2 area in each plot. Later the data were added together to record the weed number per meter square. The weeds in sample quadrats were collected from each plot separately. They were clipped off the roots oven dried at 65 °C ± 5° C till a constant weight was obtained. The oven dried weight of weed biomass was recorded and computed to kg ha^{-1}.

RESULTS AND DISCUSSION

All the treatments had significant influence on the weed count m^{-2} during the two seasons of cultivation (Table 1). The most desirable character, lowest number of weeds (7.38 and 6.62 m^{-2}) was observed when sugarcane trash was applied at 10 cm thickness and this was closely followed by coir pith application at 2 cm thickness which recorded the weed count of 8.84 and 8.51 m^{-2} during both the crop seasons. The treatments Ti, T_6 and T_5 were statistically insignificant among themselves. However, the highest weed count of 33.72 and 32.19m^{-2} were recorded in the control in the first and second crop respectively.

All the treatments exhibited significant difference for the trait weed biomass during two subsequent cropping seasons. The pattern of change was observed to be similar in both the years of experimentation. It was found that least weed biomass (16.20 and 16.16 kg ha^{-1}) was recorded in T_2 (sugarcane trash) followed by T3 (coir pith). The treatments T1, T_6andT_5did not express statistically significant differences among themselves. However, the

highest weed biomass of 47.23 and 47.40 kg ha^{-1} was recorded in the control in the first and second crop respectively (Table 2).

Mulching with sugarcane, coir pith and water hyacinth residue significantly influenced the weed count at harvest. But, mulching with sawdust and bio-mulching were not that effective when compared to the former. The minimum weed count was observed when sugarcane trash mulching at 10 cm thickness was practiced followed by coir pith mulching at 2 cm thickness. These results were supported by Gavin and Brain (1982) and Dilipkumar*et al.* (1990) who reported lowest weed population under various mulching. Similarly, Kathiresan*et al.* (1991) found that sugarcane trash mulching conserved soil moisture by avoiding weed growth insugarcane. The minimum weed count at harvest due to mulching may be due to non-availability of sunlight, moisture and air, which are required for growth of weeds.The weed biomass was significantly decreased by mulching with sugarcane trash but the decrease in weed biomass was not obtained desirably with mulching using water hyacinth residue, coir pith and by means of intercropping as compared to sugarcane trash mulching. But sawdust mulching was totally inefficient in controlling weeds and weed biomass. This is in line with the findings of Kaliappa (1980) in Sorghum, Mann and Chokar (1989) in sugarcane ratoon and Singh and Singh (1995) in sugarcane reported who reported least weed biomass using various mulch materials. Similarly, Patil and Jitendra Pandey (1996) in pigeon pea and cowpea intercropping and Sinha *et al.* (1999) in maize and potato intercropping reported low weed biomass. The reduced weed biomass in intercropped plots might be attributed to relatively less space available for the growth of the weeds from the early stage of crop growth and more shading effect due to fast growth of babycorn plant and intercropped plant

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. Water hyacinth residue was applied at 5 cm thickness. As it is light in weight, this also did not contribute to density. So coirpith mulching and water hyacinth residue mulching were not that effective in increasing the growth components. And On the bio-mulching practice, coriander gave a good cover over the soil. Mint was slow growing and fenugreek though fast growing did not provide good ground cover. So mint and fenugreek bio-mulching were not effective in increasing the growth components as that of coriander bio-mulching. The noteworthy low growth of babycorn with saw dust mulch was probably because of its chemical components, which acted as growth retardant.

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Table 1. Effect of organic and bio-mulches on weed count (m'^2)

Treatments	**I Crop (2001)**	**II Crop (2002)**
T_0 - Control	33.72	32.19
T_1 - Water hyacinth residue at 5 cm thickness	10.03	9.78

T_2 - Sugarcane trash at 10 cm thickness	7.38	6.62
T_3 - Coirpith at 2 cm thickness	8.84	8.5.1
T_4 - Sawdust at 2 cm thickness	17.69	17.65
T_5 - Mint as bio-mulch	11.46	11.68
T_6 - Coriander as bio-mulch	11.00	10.75
T_7- Fenugreek as bio-mulch	15.48	15.81
S.Ed.	0.59	0.49
CD (p=0.05)	1.18	0.99

Table 2. Effect of organic and bio-mulches on the weed biomass (kg ha^{-1})

Treatments	**I Crop (2001)**	**II Crop (2002)**
T_0 - Control	47.23	47.40
T, - Water hyacinth residue at 5 cm thickness	22.41	22.24
T_2 - Sugarcane trash at 10 cm thickness	16.20	16.16
T_3 - Coirpith at 2 cm thickness	19.47	18.99
T_4 - Sawdust at 2 cm thickness	35.82	36.27

T_5 - Mint as bio-mulch	23.26	23.28
T_6 - Coriander as bio-mulch	22.73	22.53
T_7 - Fenugreek as bio-mulch	26.20	26.10
S.Ed.	1.46	1.25
CD (p=0.05)	2.93	2.51