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Comparasion of Different Weed Control Techinques in Maize

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I. Introduction

In the world maize is grown as food and fodder crop. It plays an important role in the over all progress of national economy. It not only the source of food for the increasing population, but also supplies the raw material for domestic industry. It is used for the production of corn oil, corn starch, corn flakes, gluten, germ cake, lactic acids, alcohol and acetone as well as used in the paper industries, textile and fermentation etc. In spite of its high yield potentialities, average maize yield in Pakistan is still very low a compared to other maize producing countries of the world. Improvement in average yield per hectare can be made if superior genotypes combined with appropriate production technology i.e. herbicide application are developed and adopted by growers.

Nyakatawa (1997) studied the effect of sorghum stover and tree leaf mulches on seed yields and yield components of maize (*Zea mays* L.), sorghum (*Sorghum bicolor* L.), and sunflower (*Helianthus annus* L.) crops in tied ridges under rainfed conditions at Chiredzi Research Station in 1993/94 and 1994/95 seasons. Mulching significantly increased maize seed and stover yields by 26% in 1993/94 and showed some improvement in total soil water content and water use efficiency over the control treatment in 1994/95 season. Seed yield of sunflower was significantly correlated (r = 0.55) to cumulative soil water content in 1994/95. Stover yield for sunflower was significantly correlated (r = 0.60) to cumulative soil water content in 1994/95. The results from this study suggest that sorghum stover and dry tree leaf mulches had significant beneficial effects on maize performance in a year with good and well distributed rainfall whereas for sorghum and sunflower, the benefits were higher in the drier year. Miura and Watanabe (2002) evaluated the effect of living mulch, we examined the weed biomass and the growth and yield of sweet corn (*Zea mays* L.) cultivated with three legume living mulches without the application of herbicide and without tillage. The living mulch plants alfalfa (*Medicago sativa* L.), red clover (*Trifolium pratense* L.) and white clover (*Trifolium repens* L.) were seeded in autumn. During the corn growth period in the following year, weed growth was effectively suppressed by all three living mulch plants. Both growth rate and yield of sweet corn with white clover living mulch were comparable to the conventional cultivation, but alfalfa and red clover living mulches caused the yield reduction in sweet corn. The percentage of stand was thought to have been reduced due to the competition for light and nutrients. The nitrogen absorption rate of sweet corn increased with its growth. On the other hand, the nitrogen absorption rate of living mulch plants decreased with the growth of sweet corn. These results suggest that competition between sweet corn 558.56 cm^2 was produced by and living mulch plants for nitrogen would be small. We concluded that white clover is the best of the three legume living mulch plants for weed control without significantly affecting sweet corn production. Sanchez *et al.* (2008) evaluated mulches usable in organic production in high tunnels for their ability to suppress weeds.

II. Materials and Methods

A field trial was carried out at Agricultural Research Institute Tarnab, Peshawar. The treatments were wheat straw, saw dust, polyethylene (white), polyethylene (black), newspaper, Primextra Gold 720SC, hand weeding and weedy check. The treatment were assigned to Randomized Complete Block (RCB) design and replicated four times.

The effect of all these treatments was studied on

1. Weed density (m^{-2})
2. Fresh weed biomass (g m^{-2})
3. Leaf area (cm^2)
4. Cob length (cm)

The data recording on the aforesaid parameter were subjected to ANOVA Technique by using MSTATC Computer soft ware and means were separated by

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using Fisher protected LSD test. (Steel and Torrie, 1980).

III. Results and Discussion

a) Weed Density m^{-2}

Statistical analysis of the data revealed that number of weeds m^{-2} were significantly ($P \leq 0.05$) affected by various mulches in maize crop (Table-1). Mean values of the data shown in Table-2 indicated that maximum weeds (110.8 m^{-2}) were recorded in weedy check plots, while among the herbicidal and mulch treatments minimum weeds (6.5 and 20.0 m^{-2}) were recorded in Primextra Gold 720SC and polyethylene (black) treated plots, respectively. Weed density was significantly affected by different treatments. So Primextra Gold 720SC indicated best control of grasses as well as broad leaf weeds. Our results are in agreement with the work of Schonbeck (1998). They reported that weed control methods significantly affected weed density m^{-2}.

b) Fresh weed biomass (g m^{-2})

Analysis of the data presented in Table-1 showed that fresh weed biomass was significantly ($P \leq 0.05$) affected by various mulches in maize crop. Mean values of the data presented in Table-2 indicated that maximum fresh weight of 210.69 and 116.47g were recorded in weedy check and wheat straw plots. While minimum (6.25 and 43.43g) were recorded in Primextra Gold 720SC and polyethylene (black). Our results are in line with those reported by Ngouajio and Ernest (2004).

Table 1 : Mean squares for weed density m^{-2} and fresh weed biomass (g m^{-2}) as affected by different mulches in maize

Source	D.F.	Weed density m^{-2}	Fresh weed biomass (gm^{-2})
Replications	3	104.375	179.828
Treatments	7	4250.768**	15548.729**
Error	21	49.875	117.743
C.V (%)		18.55	14.12

D.F. =Degree of Freedom
** = significant at 5% level of probability.

Table 2 : Weed density m^{-2} and fresh weed biomass (g m^{-2}) as affected by different mulches in maize

Treatments	Weed density m^{-2}	Fresh weed biomass (gm^{-2})
Wheat straw	56.0 b	116.47 b *
Saw dust	35.5 c	76.24 c
Polyethylene (white)	24.5 d	52.39 de
Polyethylene (black)	20.0 d	43.43 e
Newspaper	28.0 cd	59.67 d
Primextra Gold 720SC	6.5 e	6.25 f
Hand weeding	23.3 e	49.79 de
Weedy check	110.8 a	210.69 a
LSD value at 5%	10.39	15.96

* Means followed by different letters in the respective column are significantly different by LSD test at 5% probability level.

c) Leaf area plant^{-1} (cm^2)

Statistical analysis of the data revealed that leaf area was significantly ($P \leq 0.05$) affected by different treatments (Table-3). Mean values of the data shown in Table 4 revealed that maximum leaf area of 561.23 and 558.56 cm^2 was produced by Primextra Gold 720SC and polyethylene (black) treated plots respectively. The minimum (464.34 cm^2) leaf area was recorded in weedy check plots. As leaf is the basic photosynthetic machinery for plant food, hence its size would directly affect the yield and yield components of crop. These results were in great agreement with the work of Liedgens *et al.* (2004). They observed that cultural weed control gave greatest leaf area at teaseling.

d) Cob length (cm)

Analysis of the data showed that different mulch treatments had a non- significant ($P \leq 0.05$) effect on cob length (Table-3). The data presented in Table-4 indicated that maximum cob length of 17.79 cm was recorded in Primextra Gold 720SC plots, while minimum cob length of 16.44 cm was observed in weedy check plots. However the cob length in the best treatment is statistical similar with the rest of the treatments.

Table 3 : Mean squares for leaf area plant^{-1} (cm^2) and cob length (cm) as affected by different mulches in maize

Source	D.F.	Leaf area (cm^2)	Cob length (cm)
Replications	3	390.123	0.754
Treatments	7	4880.522**	1.068
Error	21	483.458	1.229
C.V (%)		4.17	6.47

** = significant at 5% level of probability.
D.F. =Degree of Freedom

Table 4 : Leaf area plant^{-1} (cm^2) and cob length (cm) as affected by different mulches in maize

Treatments	Leaf area (cm^2)	Cob length (cm)
Wheat straw	487.60 c *	16.59
Saw dust	525.03 b	16.79
Polyethylene (white)	534.10 ab	17.28
Polyethylene (black)	558.56 a	17.71

Newspaper	530.23 ab	16.97
Primextra Gold 720SC	561.23 a	17.79
Hand weeding	555.81 ab	17.55
Weedy check	464.34 c	16.44
LSD value at 5%	32.33	NS

* Means followed by different letters in the respective column are significantly different by LSD test at 5% probability level.
NS = Non-significant.

e) Conclusion and Recommendation

From our data it was concluded that Primextra Gold 720SC proved the best for controlling weeds in maize crop. Further research is needed in future for weed control in maize.

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