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Evaluation of Different Mulches for Weed Management in Pea *(Pisum sativum* L.)

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ABSTRACT

An on-farm trial was conducted during **rabi** seasons of the years 2006-07 and 2007-08 at farmers' fields in Bangalore Rural District of Karnataka to study the effect of different mulches for controlling weeds in edible pea (*Pisum sativum* L.). The treatments comprised five mulches viz., white polythene, black polythene, wheat straw, newspaper and saw dust as well as hand weeding and a weedy check. Variety 'Pusa Harbhajan' was planted on a plot size of 5 x 1.6 m^2 using randomized complete block (RCB) design, having three replications. All the parameters except plant height were significantly affected by different treatments. Maximum number of pods/plant (50.87, 48.40 and 35.87), number of seeds/pod (5.83, 5.80 and 5.50) and pod yield (2707, 2613 and 2512 kg/ha) were recorded in hand weeding, newspaper and black polythene treatments, respectively, whereas minimum values in these parameters were recorded in weedy check. All mulches were effective and gave better results than weedy check, but due to their better performance newspaper and black polythene mulching were recommended for the environment friendly and sustainable control of weeds and realizing better yields of edible pea.

Key words : Pea, mulches, weed management, non-chemical control

INTRODUCTION

Pea (*Pisum sativum* L.) belongs to the family Papilionaceae and is a well-known vegetable of the temperate regions. It is annual in habit and self pollinated, and this herbaceous plant is the major food ingredient of vegetarian diets and meets the dietary requirements of the people throughout the world. It also contains most of the essential nutrients like fibre and protein. Bangalore rural is one of the major pea producing districts in Karnataka. To increase productivity of pea sustainable weed control methods are needed and also to fulfil the WTO regimes non-chemical weed control should be kept into focus to meet the international market needs. Cultural weed management largely involves manipulating farming practices to suppress weed growth and production, while promoting the development of the desired plant. Well recognized aspects of cultural control include preventing the spread of weeds between fields or sites, rotating crops, encouraging the competitiveness of desired species, soil solarization, timely planting and harvest. Other cultural control methods include the use of mulches cover crops and intercropping (Lemerle and Murphy, 2000). Keeping in view the importance of cultural weed control practices in pea, an experiment was conducted to study the effect of different mulches and to find out the most suitable and economical mulch for weed control in pea.

MATERIALS AND METHODS

To study the effect of various mulches on yield and yield components of pea, an on-farm trial was conducted at farmers' fields in Bangalore Rural District of Karnataka during **rabi** season of 2006-08. The experiment was laid out in randomized complete block design with three replications. The crop was raised following recommended package of practices except weed management. Pea variety 'Pusa Harbhajan' was planted on a plot size of 5 x 1.6 m^2 on 30 October, 2006 and 2007. The soil of the trial site was red sandy clay loam with pH of 6.4 having low nitrogen (219.60 kg/ha), medium phosphorus (31.69 kg/ha) and potash (298.80 kg/ha) content. The treatments included five mulches viz., black polythene, white polythene, newspaper, saw dust 1 kg/m^2, wheat straw 1.5 kg/m^2 as well as hand weeding and weedy check. During the course of studies, the data were recorded on weed density (number/m^2) two weeks after treatment and at the time of first picking, Days to 50% pod formation, number of pods/plant, number of seeds/pod and pod yield (kg/ha). The data for each parameter were

subjected to analysis of variance technique and the means were separated by LSD test (Steel and Torrie,1984).

RESULTS AND DISCUSSION

Weed Density/m^2 Two Weeks after Treatment

Statistical analysis of the data revealed that weed density/m^2 was significantly affected by different treatments (Table 1). The data depicted that maximum (40.33) weed density/m^2 was recorded in the weedy check, while the minimum (9.33 and 13.33) weed density/m^2 was recorded in hand weeding and newspaper, respectively. All the remaining treatments produced statistically similar results. The difference in weed population in different treatments can be attributed to the fact that some mulches were more effective for weed control than the others. Our results are in line with those reported by Monks *et al.* (1997) who concluded that hand weeding and some mulches provided satisfactory weed control.

Weed Density at First Picking

Weed densities at first picking were significantly affected by different mulches (Table 1). The data exhibited that maximum (33.0) weeds/m^2 were recorded in weedy check; however, these were statistically at par with wheat straw, saw dust and white polythene (27.67, 26.67 and 26.67), respectively. The minimum (10.33) weeds/m^2 were recorded for white polythene. These results showed that some mulches like newspaper, hand weeding and black polythene controlled the weeds significantly as compared to weedy check and rest of the mulches. The results are in conformity with those of Gurcharan *et al.* (1994) who stated that all weed control treatments including hand weeding, resulted in significant weed control as compared to weedy check.

Days to 50% Pod Formation

Days to 50% pod formation were significantly affected by various treatments (Table 1). The statistical analysis of the data depicted that maximum number of days to 50% pod formation (99.33) was observed for black polythene. However, it was statistically at par with white polythene, wheat straw, hand weeding and weedy check. Minimum number of days (93.33 and 94.0) was observed in saw dust and newspaper. However, it was statistically similar with white polythene, wheat straw, hand weeding and weedy check. These results indicated that overall effects of various mulches on days to 50% pod formation were similar with the only exception of newspaper and saw dust.

Table 1. Effect of mulching and other weed control treatments on weed density, pod formation, yield attributing characters and yield of pea (Pooled data of two years)

Treatments	Weed density/ m^2 2 WAT	Weed density/ m^2 at first picking	Days to 50% pod formation	No. of pods/ plant	No. of seeds/ pod	Pod yield (kg/ha)
Black polythene	20.00	26.67	96.00	35.87	4.33	2512.00
White polythene	18.67	18.33	99.33	35.00	4.36	1784.00
Newspaper	13.33	10.33	94.00	48.40	5.80	2613.00
Saw dust	27.33	26.67	93.33	36.53	5.50	1920.00
Wheat straw	23.67	27.67	96.00	31.63	4.46	1702.00
Hand weeding	09.33	14.00	97.33	50.87	5.83	2704.00
Weedy check	40.33	33.00	95.00	30.03	4.26	1610.00
LSD (P=0.05)	6.07	11.32	5.25	6.65	0.50	375.98

WAT–Weeks after treatment.

Number of Pods/Plant

Number of pods/plant was also significantly affected by mulches (Table 1). Maximum (50.87 and 48.40) pods/plant were observed in hand weeding and newspaper treatments, whereas minimum (30.03) pods/plant were observed in weedy check and were statistically at par with white polythene (35.00), black polythene (35.87), saw dust (35.53) and wheat straw (31.63). The greater number of pods/plant in hand weeding and newspaper treatments were due to good weed management by these treatments as

compared to rest of the treatments. The results of James *et al.* (2006) also supported our findings stating that mulches were more effective in controlling weed as compared to herbicides.

Number of Seeds/Pod

Number of seeds/pod were also significantly affected by various mulches (Table 1). The data indicated that maximum (5.83) seeds/pod were recorded in hand weeding. However, these were statistically similar with newspaper and black polythene (5.8 and 5.5), respectively. Minimum (4.26) seeds/pod were observed in weedy check plots. These were statistically at par with rest of the treatments. The maximum seeds/pod were due to the fact that plants allocated maximum resources of nutrients to the crop due to no competition in hand weeding treatment and the maximum inhibition of weed growth by newspaper. Consequently, these treatments performed well in the yield components. These results are in conformity to the findings of James *et al.* (2006) who reported that maximum number of seeds/pod was recorded in plots where weeds were controlled.

Pod Yield (kg/ha)

Analysis of variance of the data revealed that pod yield was significantly affected by different mulches (Table 1). The data depicted that maximum 2704 kg/ha yield was observed in hand weeding. However, it was statistically at par with newspaper and black polythene (2613 and 2512 kg/ha) mulches. Minimum (1610 kg/ha) pea yield was recorded in weedy check; however, it was statistically similar with white polythene, saw dust and wheat straw (1784, 1920 and 1702 kg/ha), respectively. Maximum yield was recorded in hand weeding due to lack of weed competition with pea crop in field and in mulches like newspaper and black polythene due to better suppression of weeds by mulches. Our results are in line with those reported by Makus *et al.* (1994), Greer and Dole (2003) and Olabode *et al*. (2007). The reasons for low yield in some of the mulches may be due to its ineffective weed control by these mulches. Townley and Wright (1994) who stated that good weed control was critical for attaining high pea crop yield.

Among mulches, black polythene and newspaper produced better results than wheat straw, saw dust and white polythene. Therefore, newspapers and black polythene are recommended for the environment friendly and sustainable control of weeds and realizing good yields of edible pea.

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