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The Effect of Mulches in Cabbage Production Under Tirap District of Arunachal Pradesh

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INTRODUCTION

In India the total area under vegetable production is 10.26 million ha with total production of 184.40 million tones. The top three highest producing states of India are- Uttar Pradesh (15.40 %, 283.16 million tons), West Bengal (15 %, 276.95 million tonnes) and Madhya Pradesh (9.5%, 175.48 million tonnes) respectively. The total area of the Arunachal Pradesh is 2.6 million tones and production is only 16.6 million tones. The Arunachal Pradesh is a state which maximum population is engaged in agricultural & allied activities for their livelihood. The topography of Arunachal Pradesh is undulating, so productivity is low of all crops. So, the need of moment is to increase the productivity/unit land by applying technical knowhow.

Soil temperature is modified by mulches to various degrees. Plastic mulches warm the soil more quickly, increasing early plant development in the cooler months. However, under high temperature conditions during the summer, plastic may warm the soil to temperatures that might be deleterious to plant growth. Organic mulches act as insulation, helping keep soil cooler and, therefore, should be applied in the hot seasons.

In Tirap district of Arunachal Pradesh, during summer & winter seasons, the temperature is high (ranges from 28^0C- 35^0C), so during this season plastic mulches can adversely affect to crop. Meanwhile the winter season dry, deficit in soil moisture status, weed occurrence is very high thus resulting low yield of all crops reported by KVK Tirap. Keeping all these facts, we decided to conduct On Farm Trial in winter seasonal crops. And we assessed the "OFT on Effect of black Plastic mulching in cabbage production" during Rabi season, 2016-17.

The two types of much (Treatment)- Organic much (paddy straw) and the black polythene was used in OFT. The Variety- Golden Acre seed were sown in well prepared nursery on 10th October, 2016 at KVK farm. The trials area per farmer's field was 150 ft^2 (30 feet x 50 feet). Fields were well ploughed and applied manure@ 2 kg/ft^2 during last ploughing @15 days before planting. The proper care- irrigation, weeding etc. were followed time to time. The 25 days old seedling were distributed and planted @ 40 cm x 20 cm spacing at 05 locations on 5-6 November, 2016 in Nutan Basti, Lekhi and Sipini villages which were earlier had decided.

Black polythene mulching

Black polythene mulching

Table no- 1: Effect of mulches on cabbage yields

Parameters	Treatment		
	Control	Paddy Straw	Black Polythene
Plant height (30 DAT)	10.38	14.57	16,31
Plant height (60 DAT)	16.58	23.89	27.22
Weed infestation (%)	56.38	9.12	00.80
Stem length (cm)	8.22	10.02	13.89
Root length (cm)	9.86	15.76	18.22
Thickness of head (cm)	7.26	10.64	13.26
Diameter of head (cm)	14.70	18.03	21.95
Gross weight /plant (kg)	0.97	01.81	02.49
Marketable weight/plant (kg)	0.72	01.38	02.10
Gross yield (t/ha)	58.31	79.26	132.78
Marketable (t/ha)	46.32	64.21	112.46

From table no-1, it is clear that control (no mulch) resulted the minimum plant height – 10.38 cm (30 DAT), while paddy straw reported 14.57 cm following by black polythene (16.31 cm). The study proved that mulches check the water evaporation during growth period of cabbage hence plant height reported better than control. The black polythene performed superiority over paddy straw mulching means the straws could not save water evaporation as much black polythene due to its degradable nature. After 60 DAT, the minimum plant height recorded with control (16.58 cm) followed by paddy straw (23.58 cm) & black polythene (27.22 cm) respectively.

Regarding weed infestation, the control reported 56.38 % followed by paddy straw (9.12 %) & black polythene (0.80 %) respectively. The data clearly showing the positive effect of mulching over control. we found that mulches reduced weed growth by making conditions unfavorable for germination of weed seeds and by providing physical barrier for emerging weeds. A good mulch layer can save many hours of laborious weeding.

The maximum stem length 18.22 cm reported with black polythene followed by paddy straw (10.02 cm) while minimum recorded with 8.22 cm. Similarly the maximum root length 18.22 cm & 15.76 cm recorded with mulches over control (9.86 cm). The maximum thickness of heard (13.26 cm) recorded with black polythene followed by paddy straw (10.64 cm). The maximum diameter of head (cm) recorded with black polythene (21.95 cm) followed by paddy straw (18.03 cm) the lowest with control (14.70 cm). This is very clear from results that the moisture retention is prominently the most common reason for which mulch is applied to soil. Mulch is used to protect the soil from direct exposure to the sun which would evaporate moisture from the soil surface and cause drying of the soil profile. The protective interface established by the mulch stops raindrop splash by absorbing the impact energy of the rain, hence reducing soil surface crust formation. The mulch also slows soil surface runoff allowing a longer infiltration time. These features result in improved water infiltration rates and higher soil moisture.

The maximum gross weight/plant & marketable weight/plant recorded with black polythene (2.49 kg & 2.10 kg) followed by paddy straw (1.84 kg & 1.38 kg) while the minimum yielded by control (0.97 kg & 0.72 kg) respectively. And the gross yield (t/ha) & marketable yield (t/ha) recorded with black polythene (132.78 & 112.46) while lowest produced under control (58.31 t/ha & 46.32 t/ha).

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The black plastic mulch does warm the soil and also reduce the weed competition. Other organic mulch too weeds germination and smother emerging weeds. This can offer a barrier against weeds, moisture loss, nutrient loss, erosion, insect and disease injury while encouraging plant establishment and an earlier crop of potentially higher quality.