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Effect of polythene mulch on corn

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In recent years, with the adoption of intensive agriculture, naturally available inputs are becoming a scarce and synthetic materials such as plastic films are replacing conventional mulching. Use of plastic film mulching, increased the intensity of cobbing and the longest cob of 19.2 cm with maximum number of 501 grain per cob. This resulted in maximum grain yield due to better moisture conservation (Mohapatra *et al.*, 1998). Polythene mulch increases the soil temperature and prevents the loss of nutrients and develop soil micro climate favorable for growth, development and early maturity of the crop.

Polythene mulch is the new technology developed in Japan and mostly used in China. It increases the soil temperature by 2.2 to 3.6^0 C than the normal cultivation (Tang and Xu, 1986). There is early germination under polythene mulch and initial crop growth is also better. It is creating better micro environment and better retention of soil moisture, increase in temperature leading ultimately to higher yield. Better germination and early corn initiation and flowering were also observed under polythene mulch (Mahale *et al*., 2002).

The polythene mulch helps to improve soil structure and soil micro-flora, reduces fertilizer leaching, evaporation and weed problem. Thus, increasing the levels of available nutrients and moisture in the soil. Therefore, polythene mulch has a positive effect on growth, yield and quality of maize (Kulkarni *et al*., 1998).

Transparent polythene mulch absorbs very little solar radiation and transmits 85-95 per cent through it. The under surface of transparent polythene mulch is usually cover with condensed water droplets. This water as well as polythene is transparent to the incoming short wave radiation but it is opaque to outgoing long wave radiation. The heat lost to the atmosphere from a bare soil is retained by transparent polythene mulch and therefore, the soil temperature is $4\text{-}8^0$C higher at 5 cm depth and $3\text{-}5^0$C higher at 10 cm depth, compared to bare soil.

Growth character:

Werminghausen *et al*. (1981) conducted 21 silage maize trials in 1980 at 35-710 m alt. and reported that crop emergence was 4-19 (av. 9.3) days earlier and flag leaf emergence 7-21 (av. 12.5) days earlier than without polythene mulch. Mulching increased the DM content of whole plants, ears and the rest of the plant by 7, 9 and 2 per cent and dry matter yields by 39, 46 and 54 per cent, respectively.

Wells *et al.* (1988) reported after conducting a field experiment at plant science, New Hampshore University, USA on sweet corn that early germination, dry matter production and plant canopy increased were significantly higher under clear polythene mulch as compared to black polythene mulch and bare soil treatments.

Brar and Khera (1988) reported that seedling emergence was earlier by 9 and 7 days and it was also completed earlier by 8 and 3 days and significant increase in plant height under white and black polythene mulch, respectively over control.

Kalaghatagi *et al*. (1990) reported that irrigation at 0.8 IW/CPE ratio with black polythene mulch spread between the rows significantly increased the dry matter at harvest, leaf area at 60 days after sowing.

Nakui *et al*. (1995) conducted the field experiment in Tokachi District on maize and reported that transparent plastic film mulch increased soil temperature by about 4.5 degrees centigrade which advanced crop maturity by 1-2 weeks. Total plant dry matter and ear dry matter were 28-32 % and 52-55 % higher with mulching, respectively.

Kulkarni *et al*. (1998) reported from a field experiment conducted at College of Agricultural Sciences, Dharwad on maize that plant height at harvest, dry matter production and LAI at 60 days improved considerably and significantly under black polythene mulch as compared to

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