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Plastic Mulch: A Protection of Vegetable in Ladakh Region

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Introduction

Fruit and vegetable growers in Ladakh face many challenges by frosts and freezes. There is a need for improved production technology to enable farmers to remain on the farmland and to produce fruit and vegetable successfully in harsh weather. There is a need to invest in development of new and innovative production technologies which play a prominent role in maintaining a fruits and vegetable in Ladakhregion .

Mulching:

With the increasing demand of horticultural products and health consciousness among people it has become imperative for us to produce more as well as good quality produce to sustain in the local, national as well as international markets. Apart from using high yielding varieties and good agricultural practices, there is a need to utilize environmental/biological energy for higher production. Effective and economical utilization of natural resources by low cost technologies is judicious and adaptable. Mulch, being a natural resource, has become one of the most effective technologies for optimum yield and quality enhancement of crops besides reducing the cost of production.

The English word mulch is probably derived from the German word “molsch” meaning soft, beginning to decay, which apparently referred to the gardeners. Mulching is the process of covering the soil surface to create congenial conditions for the crop growth. This may include moisture conservation, temperature moderation, weed control, etc. When compared to other mulches plastic mulches are impermeable to water; it therefore prevents direct evaporation of moisture from the soil and thus limits the water losses and soil erosion over the surface. Plastic mulches are one of the important components of plasticulture and

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have been used commercially for the production of vegetables since the early 1960's, and their usage is still increasing throughout the world. Plastic mulches provide many positive advantages for the user, such as increased yields, earlier maturing crops, crops of higher quality, enhanced insect management, and weed control. They also allow other components, such as drip irrigation, to achieve maximum efficiency. The selection of which mulch type to use will depend on factors such as the crop to be grown, season of the year, whether double or triple cropping is contemplated, and if insect management is desired.

Coloured plastic mulch:

The colour of mulch largely determines its energy-radiating behaviour and its influence on the microclimate around a plant. Black plastic mulch has been extensively used for vegetable production in Ladakh region. Black plastic film do not allow sunlight to pass onto the soil. Hence, it arrests weed growth completely because photosynthesis do not take in absence of sunlight. Black mulch absorbs most ultraviolet (UV), visible, and infrared wavelengths (IR) of incoming solar radiation and re-radiates absorbed energy in the form of thermal radiation or long wavelength infrared radiation. Much of the solar energy absorbed by black plastic mulch is lost to the atmosphere through radiation and forced convection. The efficiency with which black mulch increases soil temperature can be improved by optimizing conditions for transferring heat from the mulch to the soil. Because thermal conductivity of the soil is high relative to that of air, much of the energy absorbed by black plastic can be transferred to the soil by conduction if contact is good between the plastic mulch and the soil surface. Soil temperature under black plastic mulch during the day time is generally 2 to 5ºC higher at 10 cm depth compared to that of no mulched soil in summer. Although a variety of vegetables can be grown successfully using plastic mulches; tomato, capsicum, brinjal, muskmelon, watermelon and cucumber have shown significant response. Use of plastic mulch results in harvesting crop 1–2 weeks earlier as compared to traditional growing practices, which often significantly increases market advantages. The black plastic mulch resulted in an 80% reduction in weed biomass (Grassbaugh et al., 2004). Rajablariani et al. (2012) studied the effect of coloured plastic mulches (black, blue, clear, red, silver on black) yield of tomato cv. Super Chief. They reported that that soil temperature increased under the various colored plastic mulches about 3 to 6 °C more than it in bare soil. Soil temperature was highest under blue mulch followed by red and clear plastic silver on black had the lowest

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soil temperature among all the plastic mulches. The light transmitter plastics advanced earliness and the highest early yield was obtained in clear plastic mulch. He also evaluated that black and silver/black plastic mulches suppressed weeds which were encouraged under clear, blue and red mulches. The plastic mulches resulted in an 84-98% reduction in weed biomass. Return on investment of use of black polythene mulch has been worked out in hybrid tomato production.Singh *et al*., (2009) found that use of black polyethylene mulch plus drip irrigation further raised the tomato yield by 57.87 t/ha. Similarly Patel et al., (2009) Black plastic mulch increased pod yield of okra by 29.65% over no mulch.

For every Rupee investment in purchase and laying of plastic mulch, twenty five fold return has been observed. Therefore, mulching technology offers high return on investment besides saving 20–30 per cent water. The technology is highly suitable for large scale adoption by farmers in Ladakh and expected to be the second most mass adopted plasticulture technology in horticultural crops next to greenhouse.Different Vegetables grown under Black Mulch in Ladakh region.

References:

Grassbaugh, E. M., Regnier, E. E. and Bennett, M.A. (2004). Comparison of Organic and Inorganic Mulches for Heirloom Tomato Production, In Proc. XXVI IHC–Sustainability of Horticultural Systems, Eds. L. Bertschinger and J.D. Anderson ActaHorticulturae. International Society for Horticultural Science. 638.

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Rajablariani, H., Hassan Khan, F. and Rafezi, R. (2012). Effect at colored plastic mulches on yield at tomato and weed biomass. International Journal of Environmental Science and Development. 3(6) : 590-593.

Singh, R., Kumar, S., Nangare, D.D. and Meena, M. S. (2009). Drip irrigation and black polyethylene mulch influence on growth, yield and water-use efficiency of tomato," African Journal of Agricultural Research. vol. 4(12) : 1427-1430

Patel DB, Patel RH, Patel RB.(2009). Effect of drip irrigation, mulch and nitrogen fertigation on yield and yield attributes of okra (Abelmoschus esculentus). Indian Journal Agricultural Sciences. 79: 12-5.