

Effectiveness of organic mulches in vegetable pea under rainfed mid hills

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SUMMARY

In the present investigation five mulch materials viz, FYM, forest litter, pine needle, green twigs and wheat straw were applied on vegetable pea cv. Arkel sown during spring-summer of 1997-98 and 1998-99 under mid hill conditions of Uttaranchal. Results indicated that mulching with FYM conserved maximum soil moisture accompanied with highest reduction in soil temperature and produced highest pod yield per plot (4.55 kg), number of seeds per pod (5.43), pod length (7.98 cm), number of pods per plant (8.67), number of branches per plant (3.00) and plant height (6.78 cm).

Key words : Pea, Organic mulches, FYM, Forest litter.

Vegetable pea is an important crop of Uttaranchal hills. It covers an extensive area during spring summer (December to May) and rainy autumn (August to November) seasons. Availability of congenial temperature during the months for growth and development affords off-season nature of the crop. But, both crops suffer from moisture stress at flowering and fruiting stages (i.e. during March to April and October, respectively) (Fig. 1). Although the crop requires nominal irrigation (Tayel et al., 1990) but appropriate soil moisture regime is indispensable at critical stages of crop production (Wu and Pu, 1999). Mulching has been proved as efficient technique to conserve the soil moisture and regulate soil temperature (El-Hady and Lofty, 1990; Tayel et al., 1990; Wu and Pu, 1999) and protects the soil from run-off (Smolikowski et al., 2001). Organic mulches have additional advantage to improve the soil texture and structure. However, very little works have been done in the vegetable pea under rainfed hill conditions.

MATERIALS AND METHODS

Present investigation was conducted at Hill campus, Ranichauri (2000 m altitude) the rainfed mid hills of Uttaranchal during spring-summings of 1997-98 & 1998-99. The experiments were laid out in randomized block design with three replications. Experimental materials consisted of vegetable pea cultivar 'Arkel' sown during second fortnight of December in plots of 2.8 m² at 25 x 5 cm spacing and five mulches viz., FYM (Farm Yard Manure), forest litter, pine needle (*Pinus roxburghii*),

green twigs and wheat straw along with a control plot with no mulch. Mulches were applied in the first week of March maintaining a thickness of 10 cm. Soil moisture was determined by sampling the soil from 15 cm depth at weekly interval in April and averaged. Soil temperature was measured by inserting the thermometer at the same depth. Data were also recorded on plant growth and pod yield characters (Table 1).

RESULTS AND DISCUSSION

Analysis of variance indicated significant influence of different mulch materials on the parameters studied. Maximum soil moisture content (22.20%) was obtained in plots mulched with FYM followed by forest litter (20.40%) and green twigs (20.32%) (Table 1). High soil moisture with organic mulches was accompanied with low soil temperature viz., 15.5 °C, 16.00 °C, and 18.75 °C, respectively. Such inverse relationship was due to cooling effect of high moisture. However, plastic mulches have been reported to exhibit a linear relationship between soil moisture and soil temperature because of green house effect (Arya and Mathew, 1993; Wu and Pu, 1999).

Mulching with FYM resulted in high pod yield per plot (4.55 kg), number of seeds per pod (5.43), pod length (7.98 cm), number of pods per plant (8.67), number of branches (3.00) and plant height (57.80 cm). Forest litter exhibited statistically either at par (pod length) or low values for these traits. Better performance of the crop under application of structurally similar humified materials was probably due to better soil moisture conservation,

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