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EFFECT OF PADDY STRAW MULCH ON THE EVAPOTRANSPIRATION LOSSES AND WATER USE EFFICIENCY IN SUMMER MUNG CROP UNDER RAIPUR CONDITIONS

In Chhattisgarh region of Madhya Pradesh, under multiple cropping system mung crop is grown during summer season wherever irrigation facilities are available. The evapotranspirational losses increase not only due to harsh weather conditions that prevail during summer season, but also due to advective losses as the mung crop is grown only in pockets where irrigation is available.

Surface mulches play an important role in checking evaporation losses and conserving soil moisture for the growth of the plants (Gupta 1974). Several investigators studied the effectiveness of mulches on plant growth (Moody *et al.* 1963, Parihar *et al.* 1968, Bansal *et al.* 1971 and Yadav 1974).

An experiment was conducted at Zonal Agricultural Research Station (Rice Zone) of Jawaharlal Nehru Krishi Vishwa Vidyalaya, at Raipur during summer 1983 on mung crop (Variety : Pusa Baisakhi) using paddy straw as surface mulch @ 4t/ha. The plot size was 40×40m and paddy straw was applied as mulch in 20×40m plot and other plot was left without mulch. Evapotranspirational losses were measured in both the plots using volumetric lysimeters. The biomass and grain yield observations were recorded in each plot separately.

(*a*) *Evapotranspiration* — The evapotranspiration (ET) values during different growth stages of mung crop under mulch and no mulch plots are as shown below:

Growth stage	*Evapotranspiraton (mm)*	
	mulch	*no mulch*
Seedling	56.2	105.7
Vegetative	197.2	277.0
Reproductive	167.9	195.5
Maturity	217.1	213.5
Total	638.9	791.7

The ET values in mulched plot were significantly lower than that of no mulch plot until vegetative stage. During the reproductive stage, the difference in ET was comparatively less and during maturity stage ET values were slightly higher in mulch plot as compared to no mulch plot. This is because the effect of mulch was multified due to self-mulching of the crop after the full vegetative growth.

The weekly pattern of ET/EO (ratio of evapotranspiration to plan evaporation also known as crop coefficient) in respect of both mulched and no mulch plots are shown in Fig 1. The difference of crop coefficient (ET/EO) in mulched and no mulch plots can clearly be seen from the time of application of mulch to 20th standard meteorological week, *i. e.*, upto completion of vegetative stage. Afterward the difference reduced considerably due to self-mulching of the crop in no mulch plot.

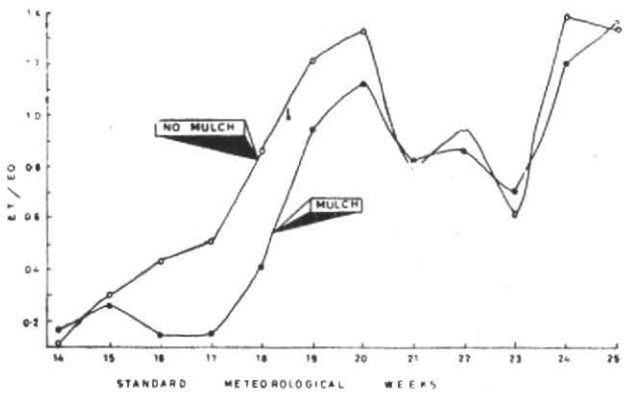

Fig. 1. Pattern of ET/EO during the crop growing season under mulch and no mulch plots

(*b*) *Water use efficiency* — The water use efficiency in respect of total biomass production as well as grain yield production was worked out as shown below :

Treatment	ET (mm)	Biomass production (kg/ha)	Water use efficiency (kg/ha/mm of ET)	Grain yield production (kg/ha)	Wd_1 use efficiency cm (kg/ha/mm of ET)
Mulch	638.9	3478	5.44	1395	2.18
No mulch	791.7	3057	3.86	1179	1.49

Thus, it can be seen that the application of paddy straw mulch increased the total biomass and grain yield production of mung crop by 14 and 18 per cent respectively and decreased the ET losses by 19 per cent and hence the water use efficiency in biomass and grain yield production of mung crop was increased by 41 and 46 per cent respectively.

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