621.43 : 551.586

MOISTURE CONSERVATION IN SOIL UNDER A VEGETAL COVER

The dry-weight percentage of soil-moisture under a 15 cm thick grass cover was found to be constantly in excess over that under bare soil. In a uniform soil plot of 50 m × 50 m area, one half is left barren and in another half grass was grown. The soil belongs to red loamy type formed due to weathering of local Khondalitic rocks of Eastern Ghats. The barren half is maintained by weekly mowing the grass without disturbing the surface soil.

A simultaneous collection of soil samples at 15 cm, depth in both halves was made repeatedly during the rainy season of 1976. Samples were collected after a six hour lapse if and when there was a rainfall to ensure completion of 'infiltration'.

2. The variation of soil moistures in the two conditions during the observation period is shown in Fig. 1 along with the rainfall. The moisture percentage under vegetal cover is regularly in excess over that in the bare soil. The 'excess' amount, however, varied during the period. The amount

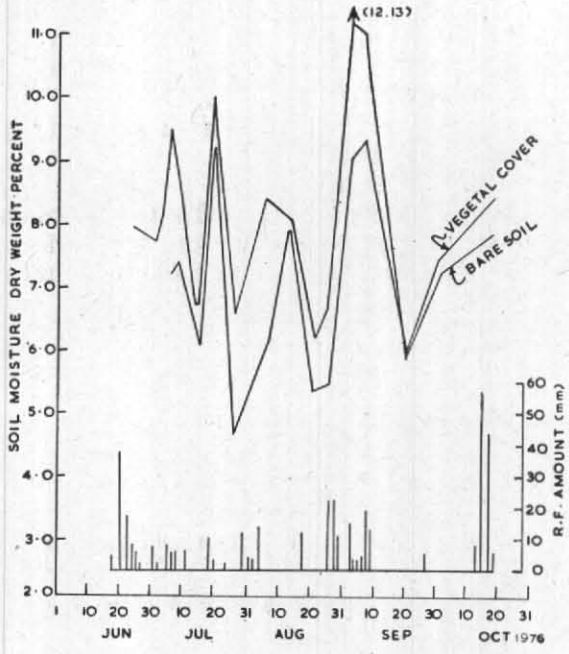

Fig. 1. Variation of moisture content under vegetal cover and bare soil conditions

TABLE 1

Random sampling data of soil-moisture percentages from grass cover and bare soil

Date (1976)	Sample No.	Soil moisture dry weight percentage	
		Vegetal cover	Bare soil
26 Jul	1	6·58	4·32
	2	5·56	4·97
	3	5·72	4·63
	4	6·07	4·43
	5	4·80	4·92
Mean		5·74	4·65
Standard deviation		0·346	0·066
17 Aug	1	7·44	8·26
	2	6·61	5·38
	3	6·47	5·74
	4	6·49	4·32
	5	8·50	5·65
	6	6·04	4·04
Mean		6·93	5·57
Standard deviation		0·671	1·868

has a maximum value of 3.08 per cent on 2 Sep 1976 (V.C.-12·13 per cent and B.S.-9·05 per cent) and a minimum value of 0·2 per cent on 21 Sep 1976 (V.C.-6·04 per cent and B.S.-5·84 per cent). The 'excess' character is present not only after rainy days, when the moisture content is high but during dry spells also, though there is a relative fall in both the moisture contents.

3. To confirm, whether the character is laterally also true, few samples were taken at random twice during the period from both the sites of the plot. The observations are shown in Table 1. While the standard deviation among the bare soil samples was large, consistency exists for samples under grass cover. The 'mean excess value' comes around 1 per cent.

4. The common concept that any vegetated surface is liable to extract more moisture due to evapotranspiration (Penman 1948, Veihmeyer and Brooks 1954) needs consideration of type of vegetation also. Monteith (1965) mentioned the possibility of a 'low evapotranspiration rate due to the negligible extraction of moisture from soil by non vascular vegetation like grass'. He further mentioned the role of 'albedo' in determining evaporation from soil. A bare wet soil which has an 'albedo' of 9-15 per cent receives higher radiant energy than grass with an 'albedo' of 15-30 per cent. Herbert *et al.* (1964) referred to the 'shelter effect' provided by the vegetal cover

wherein the kinetic energy needed for the water molecules to escape is impeded by installing a 'blanket' over soil for wind movement. The effect is similar to soil and paper mulches reported by Smith (1931) in conserving moisture.

5. As such, the bare soil undergoing active evaporation is depleting the moisture rapidly at 15 cm depth. A limited areal divergence also is possible due to inherent inhomogenities in bare soil exposition (Reynolds 1974). Futher, the interception of rain water by grass, which leads to effective percolation later, will also be an additional factor to determine the higher moisture content. However, as the results are for a brief period and preliminary in nature, further study is necessary for detailed understanding of the phenomenon.

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