



EFFECT OF SURFACE MULCHES AND DIFFERENT DEPTH OF IRRIGATION LEVELS IN BANANA Cv. ROBUSTA

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ABSTRACT

A field experiment was conducted on red loamy soil, to assess the depth of irrigation, mulching effects and requirement of water for banana production. Among the treatments 2.5 cm depth of irrigation with 10 kg paddy straw as surface soil mulch at 6 days interval registered higher number of Hands/bunch (9.495). Bunch Length (88.495 cm), Bunch Weight (29.55 kg) and Minimum Water Use (3766 cm). The results clearly indicated that even with the maximum number of irrigation (63) given during the crop period, it is possible to save up to 35 to 40 per cent water using paddy straw as surface soil mulch with 2.5 cm depth of irrigation at 6 days intervals.

Keywords- Depth, Irrigation, Water requirement, Mulch, Soil Moisture.

Introduction

Mulching plays an important role in water requirement and productivity of irrigated crops by reducing evaporation losses, modify the soil temperature and controlling weeds. The growth and productivity of banana is influenced by soil moisture. Banana being a shallow rooted crops, it is highly sensitive to soil moisture stress. Many a time the crop is irrigated frequently resulting in large scale wastage of water either by deep percolation or by way check this wastage of water. Nutrients and conserve the soil moisture and to increase the productivity, it is necessary to adopt proved package of practices, particularly, in situ moisture conservation by mulching. Traditionally the farmers use paddy straw, sunflower waste, sugarcane trash for mulching the banana crop. This study was conducted the different depth of irrigation, irrigation intervals in ring system with paddy straw mulching for moisture conservation and improving the production of Banana.

Materials and methods:

A field experiment was conducted during cropping seasons of 2009 to 2010 at Agricultural Research Station, Kathalagere, University of Agricultural Sciences, Bangalore. The treatment details include for depths of irrigation viz.

1. 2.5 cm soil depth of irrigation with 10 kg paddy straw mulch in 6 days intervals
2. 3.5 cm soil depth of irrigation in 6 days intervals
3. 4.5 cm soil depth of irrigation in 6 days intervals
4. 5.5 cm soil depth irrigation in 6 days intervals
5. 6.5 cm ring and basin system of irrigation in 6 days intervals
6. 2.5 cm soil depth of irrigation with 10 kg paddy straw mulch in 12 days intervals
7. 3.5 cm soil depth of irrigation in 12 days intervals
8. 4.5 cm soil depth of irrigation in 12 days intervals
9. 5.5 cm soil depth of irrigation in 12 days intervals
10. 6.5 cm ring and basin system of irrigation in 12 days intervals

The 6 and 12 days irrigation intervals, 5 levels of irrigation with three replication in FRBD design of experimentation.

Banana Cv. Robusta was used in this experiment and the soil type was red loam. Banana suckers were planted at 2 m X 2 m distance and given with a uniform recommended dose of fertilizers. The suitable plant protection measures were taken and the treatments were imposed at sixty days after planting. Observations were recorded once in two months. The soil moisture content was recorded before and after each irrigation throughout the cropping season.

Results and Discussion:

Among the different depths of irrigations 2.5 cm depth of irrigation with 10 kg paddy straw as surface soil mulch at 6 days once irrigation recorded significantly higher Number of Hands per Bunch in (9.06 and 9.93), Bunch Length (86.66 and 90.33 cm) and Bunch Weight (29.00 and 30.10 kg) during 1999 and 2000, respectively (Table 1) followed by 6.5 cm depth of irrigation with 6 days irrigation intervals recorded number of Hands per Bunch in (8.40 and 9.20) Bunch Length (81.66 and 85.33 cm) and Bunch Weight (28.66 and 29.00 kg) during 2004 and 2005 respectively (Table 1).

The higher yield and yield attributes characters recorded with 2.5 cm depth of irrigation and 10 kg of paddy straw mulch at 6 days irrigation interval may be attributed to constant supply of moisture as paddy straw has conserved the moisture besides controlling the weeds. The results are in conformity with studies of Raman, et al., 2002 and Hassan, et al., 2002.

Banana consumed 9.75 mm of water per day at 2.5 cm depth of irrigation with 386 day crop durations. However maximum number of irrigation were given to (63) with 6 days irrigation intervals with 10kg paddy straw as surface mulch (Table 2). The number of days recorded between shooting to harvesting was minimum (87 days) in 2.5 cm soil depth of irrigation with 10 kg paddy straw mulch in 6 days irrigation intervals (Table 3). The results are in line with the findings of Krishna et al., 1980. However 2.5 cm depth of irrigation with 10 kg paddy straw mulch in 12 days irrigation intervals consumed 7.80 mm of water per day with 386 day crop durations minimum number of irrigation were given to (36), the number of days taken to shooting to harvesting was 95 days (Table 2)

Banana, being a mesophytic nature plant, required a huge amount of water because of the large foliage area and high pseudostem. The total water applied varied from 3013 to 6799

mm at both the levels (Table 2). These results are in conformity with the findings of Bovee, 1975.

The optimum moisture can be maintained for maximum production with 63 irrigation using paddy straw as a mulching material (Shmueli 1953, Arsott., 1965).

From the results of the present investigation it may be concluded that wherever, the scarcity of water is there for banana production. 65 is the optimum number of irrigation with 10 kg paddy straw as mulching materials for economics production of Banana

Table 1: Effect of depth of irrigation and paddy straw mulch on No. of Hands per Bunch, Bunch length and Bunch Weight of Banana

Treatments	No. of Hands/ Bunch			Bunch Length (cm)			Bunch weight (cm)		
	2009	2010	Mean	2009	2010	Mean	2009	2010	Mean
T ₁	9.06	9.93	9.49	86.66	90.33	88.49	29.00	30.10	29.55
T ₂	8.33	8.76	8.54	78.33	79.33	78.83	26.00	26.16	26.08
T ₃	8.03	8.36	8.19	76.33	75.33	75.83	26.00	26.86	26.43
T ₄	8.00	8.56	8.25	74.66	75.66	75.16	26.66	27.33	26.99
T ₅	8.40	9.20	8.80	81.66	85.33	83.49	28.66	29.00	28.99
T ₆	8.40	8.86	8.63	78.00	85.00	81.50	26.66	27.33	28.83
T ₇	8.23	8.36	8.29	77.00	77.00	77.00	25.66	24.90	26.99
T ₈	8.16	8.23	8.19	75.33	75.33	75.33	24.33	25.00	24.66
T ₉	8.06	8.43	8.24	74.33	74.00	74.16	25.66	26.40	26.03
T ₁₀	8.16	9.16	8.60	75.00	81.33	78.16	25.33	27.00	26.16
F Test	**	**		**	**		**	**	
SEM ±	0.141	0.1833		1.648	2.529		0.6506	0.7242	
CD (0.05)	0.645	0.5446		4.89	7.516		1.933	2.1517	
CV%	2.92	3.61		3.67	5.50		4.27	4.64	

Table 2: Total water requirement per day consumption and number of irrigation under different depth of irrigation

Sl. No.	Treatments	Particulars									
		T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀
1	Irrigation intervals (days)	6	6	6	6	6	12	12	12	12	12
2	Depth of irrigation (cm)	2.5	3.5	4.5	5.5	6.5	2.5	3.5	4.5	5.5	6.5
3	Water consumed during vegetative Phase (mm)	1593	2010	2060	2640	3266	1030	1035	1233	1593	1742
4	Water consumed during reproductive Phase (mm)	573	1190	1533	1600	1933	383	555	793	887	967
5	Total water requirement	3766	4800	5193	5840	6799	3013	3190	3626	4080	4309
6	Crop duration (days)	386	381	378	378	382	386	378	378	370	385
7	Per day consumption (mm)	9.75	15.59	13.73	15.44	17.79	7.80	8.43	9.59	11.02	11.19
8	Total number of irrigation given in cropping period	63	61	61	60	59	35	35	35	35	35

Table 3: Effect of depth of irrigation and paddy straw mulch on crop duration, days to shoot and shooting to harvesting intervals of Banana

Treatments	Crop Duration	Days to shoot date of flowering (Days)	Shooting to Harvesting
i ₁	386	299	87
i ₂	381	269	112
i ₃	378	257	121
i ₄	378	256	122
i ₅	382	254	128
i ₆	386	291	95
i ₇	378	267	111
i ₈	378	268	110
i ₉	370	265	105
i ₁₀	385	260	125

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