https://doi.org/10.29321/MAJ.10.A03115

Madras agric. J. 65 (9): 576—579, Sep., 1978.

Response of Chillies to the Drip Irrigation

R.K. SIVANAPPAN[1], ARUNA RAJAGOPAL[2] and D. PALANISWAMY[3]

A study to find out the water requirement of Chilli crop and its response to drip irrigation, has clearly revealed that by adopting drip system of irrigation in the place of the conventional furrow system, economy in water utilization to the extent of 62 per cent can be achieved. Besides the huge water economy, the yield was increased by about 25 per cent and weed infestation was reduced by 50 per cent. Though the initial cost for laying out this system may be on the higher side for small and marginal farmers considering its water use efficiency and economy it is not so.

In farm irrigation practices, furrow irrigation, border irrigation, basin irrigation, corrugation irrigation and sprinkler irrigation are commonly adopted. Drip irrigation or trickle irrigation is a relatively new method. This system came into existence some ten years ago in Israel and the concept has spread all over the world including India. Considerable efforts have been made in recent years for developing this method fostering maximum economy of water use. In this system, it is possible to reduce or even eliminate the two common forms of water losses by conveyance and evaporation from soil surface, as water is applied here directly to the plant root zone with a network of tubings. This paper presents the results of a study made on chilli crop in two seasons.

MATERIALS AND METHODS

This study was conducted at the Orchard of Tamil Nadu Agricultural University, Coimbatore during February to July, 1973 and September, 1976 to March, 1977 with the popular Chilli variety K.1 adopting a randomised block design with eight replications. The following were the treatments, i) Drip irrigation through alkathene pipes with holes (T_1) ii) Drip irrigation through alkathene pipes with holes and sockets (T_2) iii) The furrow method of irrigation-control (c). The experiments could not be conducted for want of lands during 1974 and 1975. Normal package of practices for K.1 chilli were adopted. However, a spacing of 75 x 30 cm. was maintained in all treatments.

The annual rainfall was about 600 mm. and maximum and minimum temperature were 32° and 16°C respectively. The EC of irrigation water is 1.0 mhos /cm. The texture of soil is clay-loam. The field capacity is 25 per cent and the wilting point is 12 per cent. The pH value is 8.0.

One circular galvanized iron tank of 1.8 cm diameter and 120 cm height

1-3 Tamil Nadu Agricultural University, Coimbatore-3.

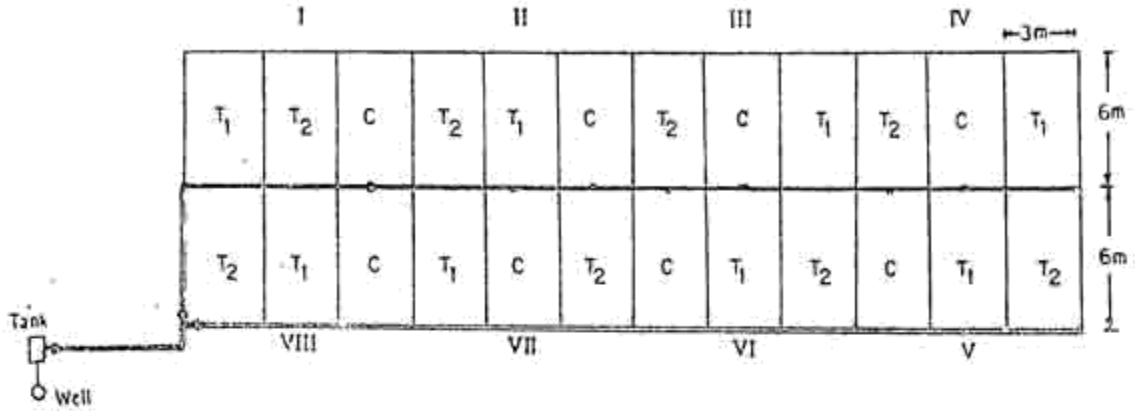

FIG.1 DRIP IRRIGATION LAY OUT FOR CHILLIES

installed on a concrete block at about 1.5 metres above field level, filled with water, was the source of irrigation. Galvanised iron pipes of 5 cm diameter with gatevalves provided at the entrance were used to deliver water from the tank to drip system. A separate 5 cm diameter G.I. pipe was used to distribute water to the control plot in order to measure the water correctly. Alkathene pipes of 1.25 cm diameter and 12.5 metre lengh with holes or without sockets depending upon treatment were fitted to the 'T' spaced at 75 cm on the main which is the spacing allowed for the crop. These pipes were laid on the surface of the ridges which were utilised for raising crop. The seedlings were planted at 30 cm spacing and correspondingly holes(orifices) of 1 mm diameter drilled on the pipes at 30 cm interval (Fig.1). In treatment 2, apart from the holes, protective sockets made of polythene of 2.5 cm length and 1.25 diameter were provided against each hole on the alkathene pipe to prevent clogging of the holes by mud or soil and also to make the water to properly drip at the root zone instead of forced delivery in the form of spray. The drip

Fig. 2. Drip Irrigation for Chillies

treatment plots received irrigation daily or once in two days while, the control plots received irrigation once in five to seven days (Fig.)

RESULTS AND DISCUSSION

a) **Water economy** : The drip treatment plots (in summer) received in all 41.77 cm water in 90 irrigations while the control plots received 109.71 cm water in 22 irrigations excluding rainfall which amounted to 20.75 cm. The results thus, revealed that quantum of water saved by the drip method was

TABLE I. Effect of drip irrigation on plant height.

Treatment	Mean height of plant (in cm)	Per cent on standard	F.Test
Alkathene pipe	99.75	104.12	
" "	97.39	102.70	N.S.
Furrow system	94.86	100·00	

61.9 per cent in a crop period of 213 days. Similarly, in winter season the water used in drip was 30.2 cm and in control plots it was 81.2 cm. So water saving was 63 per cent. The rainfall was 32.25 cm during 180 days cropping. In other words, with the available quantum of water, the area of irrigation can be increased by three folds if this new system of irrigation is adop-

TABLE II. Effect of Drip irrigation on yield

	RED WET POD Yield in (kg/ha)			Mean	S.E. of season Mean	C.D. P=0.05
	T1	T2	C			
Season (Summer 1973)	6080	5987	4233	5433	26.38	75.73
Season (Winter 1976)	3988	3920	3733	3880		
Mean	5034	4954	—			
Per cent on control	126.3	124.2	100.0			

S.E. (of treatment means) = 32.31
C.D. (P = 0.05) = 92.76

TABLE III. Effect of drip irrigation on weed growth

Season	Average weed weight in kg/plot (size 6m x 3m) T1	T2	C	Mean	S.E. (Season means)	C.D. P=0.05
Season - I Summer	6.750	7.320	12.250	8.77	0.175	0.503
Season - II (Winter)	9.125	8.100	15.350	10.86		
Mean	7.94	7.71				
Percentage decrease on control S.E. treatment means = 0.214						
C.D. (P=0.05) =0·617						

ted in the place of the conventional one. The cost of the system works out to Rs. 3000-4000 per acre and compared to the economy of water use, the cost is not much.

b) **Plant height :** The data gathered in respect of mean height of plants in the different treatments are presented in Table I.

The results revealed that there was no significant difference in plant height due to treatments. In other words, it showed that even at 1/3 of quantum of water utilised in the drip system, the crop growth was comparable with that of conventional system of irrigation.

c) **Pod yield :** The yield data obtained in the two seasons are presented in Table II.

From the above data, it may be seen that the yield in the two drip treatments, was significantly more than the conventional furrow method of irrigation and the saving of water thereby was 62 per cent during the first and second year.

d) **Weed control :** Weed growth was less in drip irrigation treatments due to limited wet area of soil surface.

The Table III gives the average weight of weed, removed in the different plots. It was seen that there was significant reduction (50 per cent) in the weed growth in the drip plot compared to control plot.