

## **Pomegranate Grown in Drip and Furrow Irrigation System in Saline Water Condition of Semi-Arid Areas**

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Management of Salt Affected Soils and Use of Saline Water in Agriculture

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### **Abstract**

A Pomegranate fruit tree experiment lay out and planted in August 2003 in Management of Salt Affected Soils and Use of Saline Water in Agriculture (ICAR) at R.B.S. College, Bichpuri, Agra.. The Ganash variety of pomegranate was under taken in the experiment. The plant height and girth of stem were higher in drip irrigation system. The plant height and girth was significantly higher in ET 1.0 in comparison to ET 0.5. The increase in water salinity level decreased the plant height and stem girth. The fruit yield of pomegranate was 10.7 % higher in drip system over surface system, 34 % yield decreased in EC<sub>iw</sub> 12 dS/ m when compared with BAW. The yield decreased 26.9 % in ET 0.5 in compared with ET 1.0 in drip irrigation system.

**Keywords :** Pomgranate, growth, drip and furrow irrigation, saline water

### **Introduction**

The study was conducted by a number of workers to compare performance of drip irrigation with surface irrigation. It was reported that drip irrigation results in water saving , increase in crop yield , better quality of produce, early maturity and better use of inputs especially for wide-spaced vegetable and horticultural crops compared to surface irrigation (1). However, different factors of soil, plant and climate effect the performance of irrigation method differently and the experimental results of drip irrigation are location –specific . The drip irrigation is reported to perform better in light sandy soils and water scarcity regions under deep ground water table conditions, but the performance of the drip irrigation should be tested under adverse conditions of shallow water table and heavy soils. There for, field experiment was conducted at R.B.S.College Research farm in sandy loam soils with deep ground saline water condition to study the comparative

performance of drip irrigation with surface irrigation.

### **Material and Methods**

The experiment was conducted in pomegranate fruit trees at Research farm of RBSCollege of Agriculture Bichpuri, Agra, during 2007-08. The experimental soil was sandy loam soil having pH8.1. EC<sub>e</sub> 1.9 (dS/m) and organic carbon 0.35%. The treatment of the experiment was three levels of water salinity (BAW, Eciw 8 and 12 dS/m, with two Irrigation Schedule (ET levels 0.5 and1.0) in two method of irrigation drip and surface method of water application. The plant to plant and row to row distance was 3.5m x 3.5m and one replication 3 pomegranate plants was planted. The experiment was laid out in Randomized block design with three replication.. The pomegranate variety Gnash was planted in October 2003. All other cultural practices as per

crop were applied in the experiment in year to year. The all study of plant and fruit were conducted three times in a year

i.e. February, June and October in every year.

Table 1 Effect of different treatments on plant height and stem girth of pomegranate and yield attributes and fruit yield(Av.two years)

Treat.	Plant height (cm) (AV. Two years)			Stem girth (cm) (AV. Two years)			No. of fruits/ plant	Diameter/fruit (cm)	Fruit yield kg/plant	Fruit yield t/ha.
	Oct.	Feb.	June	Oct.	Feb.	June				
Method of irrigation										
Furrow	241.4	246.8	255.7	18.9	21.8	25.5	42.2	17.5	16.3	11.8
Drip	254.2	261.3	269.1	19.7	23.0	26.2	48.3	18.2	16.3	13.2
Ldd(0.05)	1.5	1.7	2.1	0.6	0.6	0.8/	1.2	0.5	0.1	0.3
ECiw levels (dS/m)										
BAW	260.0	266.9	274.7	21.7	24.2	28.7	49.2	18.8	17.6	14.3
8	245.9	252.3	261.1	18.8	22.4	26.0	50.8	18.1	17.0	13.8
12	237.6	243.1	251.4	17.6	20.9	22.9	35.9	15.7	11.6	00.9
LSD(0.05)	1.9	2.1	2.5	0.6	0.8	0.9	1.4	0.6	0.6	0.4
Irrigation Schedule (ET0)										
0.5	240.4	246.1	255.5	18.5	22.7	24.6	41.6	16.8	13.1	10.6
1.0	255.2	262.0	269.2	20.2	23.1	27.1	48.6	18.8	17.8	14.5
LSD(0.05)	1.5	1.7	2.1	0.8	0.5	0.6	2.0	0.8	0.5	0.3

### Results and Discussion

The pomegranate plant height and stem girth was recorded in three times in a year i.e. June, February and October Table2. The plant height and stem girth increases with the age of plant and significantly increases with method of irrigation system. In drip irrigation system plant was taller than surface irrigation system. The water salinity also significant. The taller plants were observed in BAW and significantly smaller plant in Eciw 12 dS/m similarly stem girth was

recorded in this salinity. The ET levels so significant in plant height and stem girth of pomegranate trees. The ET 1.0 significantly taller plant and more stem girth were recorded and compared with ET 0.5 (3) reported same results.

The pomegranate yield attributes were recorded and presented in Table3. The higher number of fruit 12.6% and diameter 3.8% were found in drip with compared with surface irrigation system. Further, table3 clearly indicated that increase salinity levels decrease the number of fruit and

diameter of pomegranate fruit. The ET 1.0 found significantly higher number of fruit and diameter compared with ET 0.5 (2) reported same results.

The pomegranate fruit yield data presented in Table3. It is clearly indicated the method of irrigation system found significantly in fruit per plant and fruit yield t ha<sup>-1</sup>. The drip irrigation system significantly higher yield 10.7% produced in compared with surface irrigation system. The irrigation water

salinity was also significant in fruit yield per plant and fruit yield t ha<sup>-1</sup>.The BAW and Eciw 8 dS/m was non significant difference in fruit yield per plant and fruit yield t/ha-1.The use of ECiw 12 dS/m water for irrigation decrease the yield of pomegranate 34% in compared with BAW. The ET levels were also found significant in yield per plant and yield t ha-1. The higher yield was recorded with ET 1.0.In the ET 0.5 was decreased the fruit yield 26.9% compared with ET 1.

**Table 2 Ece (dS/m) in Drip irrigation system**

BAW	SOIL DEPTH(CM)	Feb.2007			June 2007		
		15	30	45	15	30	45
0.5	0-15	4.3	4.4	4.4	4.5	5.0	5.2
	15-30	4.1	4.1	4.3	4.9	5.2	5.4
1.0	0-15	4.9	4.9	5.1	5.2	5.1	5.7
	15-30	4.6	4.8	4.9	5.7	5.4	5.8
<b>Eciw-8</b>							
0.5	0-15	8.3	8.9	9.7	10.2	10.5	11.1
	15-30	8.8	9.3	9.9	11.3	10.9	11.8
1.0	0-15	9.4	9.9	10.1	11.8	12.5	13.2
	15-30	9.8	10.2	10.1	12.2	13.1	13.9
<b>Eciw-12</b>							
0.5	0-15	10.3	10.9	11.2	12.9	13.2	14.8
	15-30	10.5	11.3	11.0	14.3	14.0	15.4
1.0	0-15	11.1	11.9	11.8	14.6	17.2	17.9

Soil salinity was monitored in two times once a year and presented in Table3.The soil sampling was collect in 15, 30 and 45 cm apart to the stem of the plant. The minimum Ece was observed in BAW irrigated treatments and highest in Eciw12dS/m irrigated plots. In the month of Feb. the Ece was low in all treatments and month of June this value increase for apply the maximum irrigation in saline water. The first layer Ece was low than second layer (15-30cm) in all the treatments. The salinity was increase in the soil for distance of 30 and 45 cm.

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