

Original Article

EVALUATION OF MICRO-IRRIGATION, FERTIGATION AND WEED MANAGEMENT IN SUMMER GROUNDNUT

R.K. MATHUKIA, B.K. SAGARKA AND R.L. DAVARIA

Department of Agronomy, College of Agriculture, Junagadh Agricultural University, Junagadh-362001 (Gujarat)

Email: hakazmi79@gmail.com

Received: 8 May 2014, Revised and Accepted: 4 June 2014

ABSTRACT

A field investigation was carried out at Junagadh during the summer seasons of 2011 and 2012 to evaluate the comparative efficacy of irrigation methods, fertigation and weed management in groundnut. The results revealed that irrigation-fertigation through sub-surface drip system was proved to be superior in respect of pod yield, weed biomass, WUE and economics. Among weed management practices, two hand weedings at 30 and 60 DAS was found to be the most effective in controlling weeds along with higher pod yield, WUE and net returns

Keywords: fertigation, drip, weed, irrigation, summer groundnut.

INTRODUCTION

The south Saurashtra region, an oil bowl of the country, is the most potential pocket for cultivation of summer groundnut too. But scarcity of irrigation water especially during summer months restricts its area. Adoption of micro-irrigation methods under such a situation not only offers a quite good water economy but also provides high yield and fertilizer use efficiency as well as lessens the weed infestation. Keeping these points in view, the present experiment was carried out to evaluate the efficacy of different methods of irrigation, fertigation and weed management in summer groundnut.

MATERIALS AND METHODS

A field experiment was conducted during the summer seasons of 2011 and 2012 at Instructional Farm, Department of Agronomy, Junagadh Agricultural University, Junagadh. The soil was clayey with pH 8.1 and EC 0.30 dS m⁻¹ having 0.73 % organic carbon, 17 kg ha⁻¹ available P and 240 kg ha⁻¹ available K. The treatments comprised four methods of irrigation (I₁- Surface drip + fertilizers applied to soil and I₂- Sub-surface drip + fertilizers applied to soil) as main plots and three weed management practices (W₁- Oxyfluorfen @ 0.24 kg a.i. ha⁻¹ as pre-emergence, W₂- Oxyfluorfen @ 0.24 kg a.i. ha⁻¹ as pre-emergence + 1 HW at 30 DAS and W₃- 2 HW at 30 and 60 DAS) as sub-plots were arranged in split plot design and replicated four times. The test variety 'GG 2' was sown at 30 cm row spacing in first week of February and harvested in last week of May during both the years. The crop was fertilized with 25-50 kg N-P₂O₅ ha⁻¹ through urea and diammonium phosphate. The laterals of drip system were laid out at 60 cm spacing (in alternate rows) and drippers of 4 LPH capacities were placed at 45 cm distance on each lateral. In case of sub-surface drip, the laterals were buried 10 cm below the soil surface. The micro-sprinklers of 35 LPH capacities were laid out at 2.5 m x 2.5 m spacing. Irrigations through drip and micro-sprinkler systems were scheduled at 0.8 CPF, while surface irrigation was scheduled at 1.0 IW:CPE with a water depth of 50 mm. The herbicide oxyfluorfen was sprayed to soil surface using 500 litres of water on the next day of sowing.

RESULTS AND DISCUSSION

Irrigation-fertigation

An appraisal of data bestowed in Table 1 expounds that different treatments of irrigation-fertigation exerted their significant influence on pod yield of groundnut during both the years as well as in pooled results. The treatment comprising sub-surface drip + fertigation recorded significantly the highest pod yield in individual and pooled results, while the haulm yield remained unaffected under different treatments. The sub-surface drip + fertigation also registered significantly the lowest dry weight of weeds and maximum water use efficiency (WUE). The maximum gross returns of 39740 Rs ha⁻¹ was realized with sub-surface drip + fertigation, while maximum net returns were accrued under micro-sprinkler method closely followed by sub-surface drip + fertigation. Devi Dayal (1997) also reported similar results.

Weed management

A perusal of data presented in Table 1 indicates that pod yield of groundnut significantly influenced by different weed management practices. Two hand weedings at 30 and 60 DAS registered significantly the highest pod yield during both the years and in pooled results. This treatment also resulted in significantly the lowest dry weight of weeds and maximum gross and net returns. Similar results were also obtained earlier (Anon., 1996).

On the basis of two years field study, it seems quite logical to conclude that irrigating summer groundnut through sub-surface drip system and fertigation along with manual weeding at 30 and 60 DAS was found to be advantageous in respect of yield, weed biomass, WUE and economics.

REFERENCES

1. Anon. AGRESO report 1996, Department of Agronomy, Gujarat Agricultural University, Junagadh.
2. Devi Dayal. Evaluation of methods of irrigation along with fertigation under varying levels of fertility in summer groundnut. Ph.D. thesis, 1997, GAU, Sardarkrushinagar.

Table 1. Effect of different treatments on yield of Groundnut, Weed Biomass, Wue and Economics

Treatments	Pod yield (q ha ⁻¹)			Haulm yield (q ha ⁻¹)	Weed dry weight (q ha ⁻¹)	WUE (kg ha ⁻¹ mm ⁻¹)	Gross returns (Rs ha ⁻¹)	Cost of cultivation (Rs ha ⁻¹)	Net returns (Rs ha ⁻¹)
	2011	2012	Pooled						
Irrigation-fertigation									
I ₁ -Surface drip + fertigation	21.79	15.93	18.86	32.74	20.73	3.56	34838	18247	16591
I ₂ -Sub-surface drip + fertigation	25.58	18.30	21.94	34.15	19.54	4.14	39740	18747	20993

fertigation									
I ₃ -Micro-sprinkler	23.39	17.14	20.27	35.69	23.83	3.82	37536	15527	22009
I ₄ -Surface irrigation	18.87	15.19	17.03	34.68	25.39	2.62	32481	11847	20634
CD (P=0.05)	2.40	1.64	1.35	NS	4.26	-	-	-	-
Weed management									
W ₁ -Oxyfluorfen	20.70	15.25	17.98	33.99	30.38	3.21	33761	15740	18021
W ₂ -Oxyfluorfen + 1 HW	22.73	15.88	19.31	35.13	24.55	3.45	35984	16080	19904
W ₃ -Oxyfluorfen + 2 HW	23.80	18.79	21.30	33.83	11.45	3.80	38709	16455	22254
CD (P=0.05)	1.68	1.23	1.01	NS	5.36	-	-	-	-