GAU Res. J. 1996. 22 (1) : 1-3

Influence of Irrigation, Nitrogen and Phosphorus Levels on Onion (*Allium cepa*)

S. G. Sadaria, D. D. Malavia, V. D. Khanpara, M. G. Dudhatra, M. N. Vyas and R. K. Mathukia

College of Agriculture, Gujarat Agricultural University, Junagadh-362 0001

ABSTRACT

An experiment was conducted during the winter (*rabi*) seasons of 1991-92 to 1993-94 to study the response of onion (*Allium cepa* L.) to different levels of irrigation, nitrogen and phosphorus. Irrigation at 1.4 IW/CPE ratio significantly increased bulb yield. The maximum net return was realised with 1.4 IW/CPE schedule, while the maximum WUE was registered with 1.2 IW/CPE ratio. Application of 75 kg N/ha was found to be the optimum dose in respect of bulb yield, net return and WUE. Though the effect of P on bulb yield was found non-significant, 37.5 kg P_2O_5/ha registered numerically higher bulb yield, net return and WUE.

(Received on 14th Nov., 1996)

INTRODUCTION

In the recent past oinion (*Allium cepa* L.) has became important commercial crop in South Saurashtra region of Gujarat. Increasing popularity of onion necessitated to increase its production by proper schedule of irrigation and optimum nutrient dose as these are the most scarce and costly inputs in the region. The present study, therefore, was undertaken to evaluate the response of onion to irrigation, nitrogen and phosphorus.

MATERIALS AND METHODS

The field experiment was conducted during the *rabi* seasons of 1991-92 to 1993-94 at the Instructional Farm, College of Agriculture, Gujarat Agricultural University, Junagadh. The soil of the experimental site was clayey in texture with pH 8.2 and 0.30 dS/m EC having 0.42% organic carbon, 21 kg/ha available P and 270 kg/ha available K. The soil had 60.55% saturation point with 1.42 g/cm^3 bulk density. The treatments comprised 3 levels each of irrigation (1.0, 1.2 and 1.4 IW/CPE ratios) as main plots, nitrogen (50, 75 and 100 kg N/ha) and phosphorus (25, 37.5 and 50 kg P_2O_5/ha) as sub plots were tried in split plot design and replicated thrice. Onion variety "Junagadh Local" (Pilipatti) was transplanted at spacing of 10 cm X 10 cm. Treatment-wise full P in the form of single super phosphate and half N as urea were applied at basal dose, and the remaining half N in form of urea was top-dressed at 30 days after transplanting. An uniform dose of 50 kg K_2O/ha was given to the crop. Initial two irrigations were applied uniformally to achieve better establishment of seedlings.

TABLE 1

Bulb yield, net return and WUE by onion as influenced by irrigation, nitrogen and phosphorus.

Treatments	Bulb yield (q/ha)				Mean net return (Rs/ha)	Water use efficiency (q/ha-cm)			
	1991-92	1992-93	1993-94	Pooled		1991-92	1992-93	1993-94	Mean
Irrigation (IW/CPE)									
1.0	229.4	209.6	201.8	213.6	5000	4.17	4.19	4.04	4.13
1.2	287.5	259.0	246.2	264.3	9520	4.42	4.32	4.10	4.28
1.4	307.3	285.9	285.9	293.1	11940	4.10	4.08	4.08	4.09
C. D. (P = 0.05)	39.4	43.4	33.2	17.6	—	—	—	—	—
Nitrogen (kg/ha)									
50	263.2	247.3	239.9	250.1	8345	4.05	4.12	4.00	4.06
75	274.7	254.3	249.4	259.5	9117	4.23	4.24	4.16	4.21
100	284.5	252.9	244.6	261.4	9190	4.38	4.22	4.08	4.23
C. D. (P = 0.05)	10.3	NS	NS	6.2	—	—	—	—	—
Phosphorus (kg P_2O_5/ha)									
25	257.2	248.7	243.9	250.0	8194	3.96	4.15	4.07	4.06
37.5	281.1	254.7	246.5	260.8	9091	4.32	4.25	4.11	4.06
550	285.8	251.3	243.5	260.2	8787	4.40	4.19	4.06	4.22
C. D. (P = 0.05)	10.3	NS	NS	NS	—	—	—	—	—

RESULTS AND DISCUSSION

Irrigation

Scheduling irrgation at 1.4 IW/CPE ratio significantly increased the bulb yield of onion during all the three years and in pooled results too, but remained at par with irrigation at 1.2 IW/CPE ratio during 1991-92 and 1992-93. The maximum net return of Rs. 11940/ha was realised with irrigation at 1.4 IW/CPE ratio, while the maximum WUE was recorded with irrigation at 1.2 IW/CPE ratio during all the three years. The results are in accordance with those of Patel *et al.* (1992) and Rana and Sharma (1993).

Nitrogen

Application of N did not cause significant variation in bulb yield during 1992-93 and 1993-94, however, application of 100 kg N/ha, being at par with 75 kg N/ha, recorded significantly the highest bulb yield during 1991-92 and in pooled results. N @ 100 kg/ha gave higher net return of Rs. 9190/ha and WUE of 4.23 q/ha-cm, though not so much higher compared with 75 kg N/ha. The results confirm the findings of Porwal and Singh (1993) and Vachhani and Patel (1993).

Phosphorus

Application of graded levels of P did not show any significant increase in bulb yield during 1992-93, 1993-94 and in pooled results. During 1991-92, application of 50 kg P_2O_5/ha recorded significantly the highest bulb yield but found at par with that of 37.5 kg P_2O_5/ha. The higher net return of Rs 9091/ha and WUE of 4.23 q/ha cm were registered with application of 37.5 kg P_2O_5/ha. Patel *et al.* (1992) and Vachhani and Patel (1993) observed positive response of onion to applied P.

It was concluded that irrigation at 1.4 or 1.2 IW/CPE ratio alongwith application of 75 kg N + 37.5 kg P_2O_5/ha to onion crop would be beneficial to obtain higher yield, monetary return and WUE under south Saurashtra agro-climatic conditions.

REFERENCES

Patel, K. P., Patel, J. C., Patel, B. S. and Sadaria, S. G. 1992. Yield and nutrient uptake by onion as influenced by irrigation, nitrogen and phosphorus. *Indian Journal of Agronomy*, **37** (2) : 397-398.

Porwal, M. K. and Singh, M. M. 1993. Effect of nitrogen and weed management on onion. *Indian Journal of Agronomy*, **38** (1) : 74-77.

Rana, D. S. and Sharma, R. P. 1993. Growth analysis and bulb yield of onion as affected by irrigation and nitrogen. *Indian Journal of Agronomy*, **38** (4) : 676-677.

Vachhani, M. U. and Patel, Z. G. 1993. Effect of nitrogen, phosphorus and potash on bulb yield and quality of onion. *Indian Journal of Agronomy*, **38** (2) : 333-334.