GAU Res. J. 1998, 23 (2) : 103-105

Drip Irrigation in Summer Groundnut (*Arachis hypogaea* L.)*

N. R Ghetia, M. K. Khistaria, V. D. Khanpara and D. D. Malavia

Department of Agronomy, Gujarat Agricultural University, Junagadh Campus, Junagadh-362 001

Groundnut is the most important oilseed crop grown in India. It is mostly grown in *kharif* season, although it performs very well during summer. Because of high potentiality and high productivity the yield is two to three folds more as compared to *kharif* cultivation. Among the various factors determining the crop yield, water and nutrient management are the two major inputs which are becoming scare and costly day-by-day. The information on how these costly resources can effectively be used is scare for this region. Therefore, an attempt has been made to study the economic feasibility of drip irrigation in summer groundnut.

A field experiment was conducted during the summer season of 1994-95 at the Instructional Farm, Gujarat Agricultural University, Junagadh. The experiment comprising of nine treatment combinations was laid out in split plot design with four replications on medium black clayey soil with medium in available nitrogen and low in available phosphorus. Three main plot treatments viz., surface irrigation (1.0 CPE) with fertilizer applied in soil, drip irrigation (0.8 CPE) with fertilizer applied in soil and drip irrigation (0.8 CPE) with fertilizer applied through drip and three sub plot treatments viz., 100% of recommended dose of N and P, 75% of recommended dose of N and P and 50% of recommended dose of N and P. Irrigation of 50 mm depth was applied at 1.0 CPE (100% of CPE) in surface irrigation method at an interval of 8-10 days. In case of drip irrigation the required quantity of water was applied at 0.8 fraction of CPE (80% of CPE) on alternate day. The groundnut CV. GG-2 was sown on 4th February, 1994 using recommended seed rate of 125 kg kernel ha^{-1} keeping inter and intra row spacing of 30 and 10 cm respectively. The lateral pipes were laid out in plot at 60 cm distance. The drippers were fitted on lateral line at the distance of 45 cm. Normal operating pressure was maintained at 1.2 kg/cm^2.

Perusal of data (Table 1) revealed that treatment drip irrigation with fertigation (1_3) produced significantly higher plant height (14.35 cm), plant spread (26.67 cm), shelling percentage (72.03%) and test weight (33.40 g) over their respective surface irrigation method. The direct application of fertilizer to root zone through fertigation might have promoted physiological processes and nutrients uptake, that might have

*Part of M. S. (Agri.) thesis submitted by senior author to the Gujarat Agricultural University.

TABLE 1

Growth and yield attributes of summer groundnut as influenced by methods of irrigation and fertilizer application under varying levels of N and P.

Treatment	Plant height 90 DAS (cm)	Plant spread 90 DAS (cm)	Shelling (%)	Test weight (g)	Water required (mm)	Saving of water (%)	Pod yield (q ha^{-1})	Haulm yield (q ha^{-1})	Net realization (Rs ha^{-1})
[I] Methods of irrigation									
I_1 = Surface irrigation (Ferti. applied in soil)	10.05	19.12	69.81	32.33	700	—	17.50	34.80	14624
I_2 = Drip irrigation (Ferti. applied in soil)	14.20	26.02	70.93	33.30	600	14.28	21.77	45.17	15876
I_3 = Drip irrigation (Ferti. applied through drip)	14.35	26.67	72.03	33.40	600	14.28	24.18	47.97	19067
C. D. (P = 0.05)	**1.11**	**0.91**	**1.22**	**0.84**	—	—	**3.48**	**1.52**	—
[F] Levels of N and P (kg ha^{-1})									
F_1 = 25.00 + 50.00	13.62	25.77	71.27	33.07	—	—	21.80	46.36	17352
F_2 = 18.75 + 37.50	12.96	23.87	71.16	32.97	—	—	21.24	42.64	16632
F_3 = 12.50 + 25.00	12.02	22.17	70.35	33.00	—	—	20.41	38.94	15595
C. D (P = 0.05)	**0.85**	**0.58**	**0.65**	**N.S.**	—	—	**N.S.**	**4.07**	—

ultimately resulted in higher plant growth. Similar results were also reported by Anon. (1994). The maximum pod yield (24.18 q ha^{-1}) and haulm yield (47.97 q ha^{-1}) were recorded under the treatment of drip irrigation with fertigation which were significantly higher over their respective surface irrigation method with fertilizer applied in soil (I_1). The magnitude of increase in pod and haulm yield due to drip irrigation with fertigation over surface method of irrigation were 13.81 and 13.78 per cent respectively. The higher pod and haulm yield under drip irrigation with fertigation could be attributed to the readily available nitrogen and phosphorus fertilizers in the vicinity of the root zone due to fertigation treatment, resulting in more efficient utilization of applied fertilizers than placement or band method (Hapase, 1993). The maximum net realization of Rs 19067 ha^{-1} was secured under drip irrigation with fertigation. The lowest net realization of Rs. 14624 ha^{-1} was realized with surface method of irrigation (I_1). A critical examination of data (Table 1) revealed that application of 100 per cent of recommended dose (25 N + 50 P_2O_5 kg ha^{-1}) of nitrogen and phosphorus tended to be advantageous for attaining higher plant height (13.62 cm), plant spread (25.77 cm), shelling percentage (71.27 %) and haulm yield (46.36 q ha^{-1}) over 50 per cent recommended dose of nitrogen and phosphorus. However, the application of 100 per cent of recommended dose of nitrogen and phosphorus was remained at par with 75 per cent of recommended dose of nitrogen and phosphorus in all the parameters except plant spread. The similar trends was also observed by Bhalerao *et al.* (1993). The test weight and pod yield of summer groundnut remained unaffected due to various levels of nitrogen and phosphorus. The maximum net realization of Rs. 17352 ha^{-1} was recorded with the treatment of 100 per cent recommended dose of N and P. It was found higher by 720 and 1757 Rs ha^{-1} over 75 and 50 per cent recommended dose of N and P respectively.

(Received on 4th Dec., 1996)

REFERENCES

Anonymous (1994). Comparative evaluation of different methods of irrigation and their economic feasibility for summer groundnut. Recommendations made in 30th AGRESCO metting held at GAU, Junagadh.

Bhalerao, P. D.; Jadhao, P. N. and Fulzel (1993). Effect of production factors on yield of *kharif* groundnut *J. Maharashtra Agric. Univ.*, **18** (3) : 412-416.

Hapase, D. G. (1993). Status, scope and potential for micro irrigation in sugarcane farming system paper : National Workshop on Micro-Irrigation techniques in sugarcane agriculture held at Pune, Feb., 1993.