

## Effect of Irrigation and Fertilizer use on Nitrogen Fractions in Sundhia Jowar (S 1049)\*

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*Sundhia Jowar* is widely grown in Gujarat because of its good qualities such as quick maturity, profuse tillering and its high protein content. The important factors which influence the quality of fodder are soil moisture and nutrient availability. Both quality and yield will be affected if any one of these are in short supply. Restricted moisture supply and heavy nitrogen applications may retard the conversion of absorbed nitrogen into protein, leading to the accumulation of nitrogen in different forms. When the cattle is fed on this type of fodder there is often a possibility of death of the animal. This study has been undertaken to see the effect of irrigation intervals and fertilization (N and P) on the nitrogen fractions in the *Sundhia Jowar*.

A field experiment was carried out on *Goradu* soil (Sandy loam) at the Institute of Agriculture Farm, Anand, Gujarat, during the summer season of 1973. Split plot design was adopted with 3 intervals of irrigation (6, 9 and 12 days) as main plot treatments and 3 levels of nitrogen (40, 80 and 120 kg N/ha) and 2 levels of  $P_2O_5$  (30 and 60 kg  $P_2O_5$ /ha) as sub-plot treatments. The crop was harvested at 51 days. Fodder was analysed for nitrogen fractions viz., total-N, nitrate-N, ammoniacal-N and amide-N.

Total-N was estimated by kjeldahl method (Jackson, 1958). Nitrate-N and ammoniacal-N were determined as per Hanway and Englehorn (1958) and amide-N was analysed, following the procedure suggested by Auld and Edwardesker (1937)

*Effect of irrigation on nitrogen fractions:* The irrigation intervals showed signifi-

cant influence on the total-N and amide-N (Table I). An irrigation interval of 12 days has shown maximum amounts of all nitrogen fractions studied followed by 9 days interval. With increase in the interval of irrigation there was a corresponding increase in the contents of amide-N and total-N. Accumulation of N in different nitrogen fractions due to low moisture supply is in agreement with the earlier results reported by Purohit (1960), Hanway and Englehorn (1958) and McKenzie *et al.* (1963).

*Effect of nitrogen levels on nitrogen fractions:* Nitrogen levels enhanced the different nitrogen fractions (Table 1) Application of 120kg/ha showed the highest amount of all the nitrogen fractions. The levels of added nitrogen showed a progressive raise in the contents of total-N, nitrate-N, amide-N and to some extent ammoniacal-N. Similar

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results were obtained by Purohit (1960), Hojjati *et al.* (1973).

*Effect of phosphorus on nitrogen fractions*: Though there was a tendency of increase in the amounts of total-N, nitrate-N and ammoniacal-N with the rates of phosphorus application, the effects were not statistically significant (Table I). Such observations were made by some workers like Shah and Mehta (1960) and Suzuki and Macleod (1970). Increase in the phosphorus level lead to a small decrease in the nitrate-N content. This behaviour is in line with that reported by Cauntliffe (1973).

*Effect of interactions (I x N, I x P, N x P and I x N x P on nitrogen fractions*: None of the interactions studied revealed significant differences in the nitrogen fractions (data not furnished) Of the various factors studied, moisture supply and nitrogen rates have greater effect on nitrogen fractions in the *jowar* fodder.

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TABLE I Effect of irrigation, nitrogen and phosphorus on nitrogen fractions in *Sundhia towar*  
(Percent on oven dry basis)

Treatment	Total-N	Nitrate-N	Ammoniacal-N	Amide-N
Irrigation interval				
I <sub>1</sub> 6 days	1.53	0.083	0.080	0.147
I <sub>2</sub> 9 days	1.88	0.094	0.094	0.183
I <sub>3</sub> 12 days	1.83	0.107	0.098	0.196
Nitrogen level				
N1 40 kg N/ha	1.56	0.089	0.079	0.150
N2 80 kg N/ha	1.68	0.091	0.093	0.180
N3 120 kg N/ha	1.78	0.124	0.095	0.185
Phosphorus level				
P1 30 kg P <sub>2</sub> O <sub>5</sub> /ha	1.65	0.099	0.089	0.173
P2 60 kg P <sub>2</sub> O <sub>5</sub> /ha	1.70	0.091	0.092	0.177
CD for irrigation at 5%	0.115	NS	NS	0.020
CD for nitrogen at 5%	0.100	0.017	0.009	0.016
CD for phosphorus at 5%	NS	NS	NS	NS

NS : Not significant