Irrigated summer fodder crops - nitrogen responses

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Nitrogen is required in large amounts by high yielding summer crops. Species vary in their response to N fertilizer and the effect on yield, crude protein and digestibility at rates >130kg N/ha was uncertain.

In an experiment conducted at Kyabram Research Institute (1983-84), we measured the response of Maize (XL72aa), Sweet Sorghum (Honeydrip), Millet (Shirohie) and Forage Sorghum (Cow Chow) under intensive flood irrigation, to 4 rates of nitrogen fertilizer 0, 100, 200, 300 kg N/ha in terms of DM yield, crude protein and digestibility. Millet and Forage Sorghum were cut 3 times during the growth season, while Maize and Sweet Sorghum were single harvests. The site was cropped to oats immediately prior to reduce soil nitrogen. N was applied as ammonium nitrate in 3 equal dressings at sowing, 45 days (after 1st cut of Millet and Forage Sorghum) and 90 days (2nd cut) after emergence. Final harvest was 135 days from emergence.

Table 1 shows an increase in protein with progressive additions of N fertilizer for each species, as well as distinct differences between species. The effects of crop type and rates of N fertilizer on in vitro digestibility and yield of digestible dry matter will also be discussed.

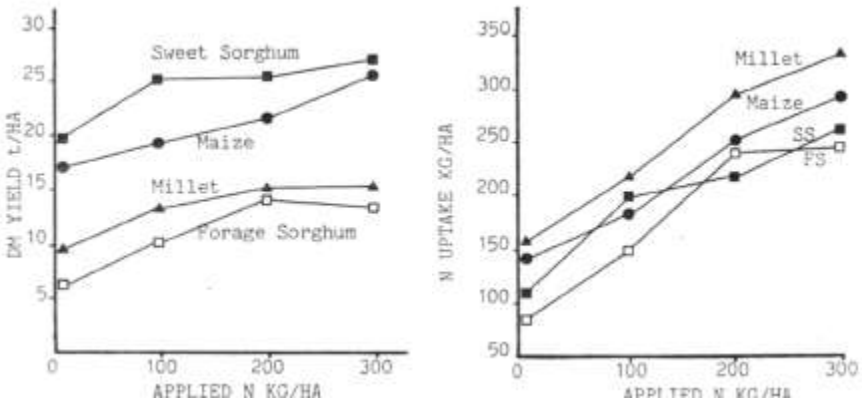

Figure 1: Above ground yields of Dry Matter and total Nitrogen. 5% LSD values for DM yields (t/ha) were Millet .68, Forage Sorghum 2.2, Sweet Sorghum 2.9 and Maize 2.6.

At this site, 300 kg/ha was insufficient N to maximise yield for Maize, however, there was little or no dry matter response above 200 kg N/ha for Sweet Sorghum, Millet and Forage Sorghum.

When no N was applied, Millet and Maize extracted approx. 150 kg N/ha while the Sweet and Forage Sorghums extracted about 100 kg/ha. Despite this difference all species responded similarly to applied N, with apparent uptake efficiencies of 53-60% over the range of 0-300 kg N/ha.

Table 1: Response of crude protein % to N fertilizer.

Nitrogen Rate kg/ha	Millet	Forage Sorghum	Sweet Sorghum	Maize
0	8.8	8.1	3.1	5.1
100	9.6	8.9	4.9	6.1
200	12.4	10.6	5.4	7.0
300	13.7	11.6	6.1	7.3