

## Diammonium phosphate as a source of N and P for sorghum in the South Burnett

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Most sorghum growers in the South Burnett apply phosphorus to sorghum on krasnozem and euchrozem soils, but until recently nitrogen was only sparingly used. Phosphorus, as superphosphate, is usually banded near the seed at planting and nitrogen as urea broadcast before planting or sidedressed 4-6 weeks after planting. During the period 1976-1979 a series of experiments were carried out to study N rates and application strategies with sorghum in the presence of phosphorus banded at planting. Results showed response to planting applications of either 20 or 40 kg N ha only, but also indicated a possible N x P interaction. A series of experiments were started in 1979 to study possible N and P interaction effects.

### Methods

One experiment was carried out in each of the 1979-80 and 1980-81 seasons with treatments as shown in Table 1. In 1979-80 the base rates of N and P were 38 and 40 kg ha respectively, while in 1980-81 they were 76 and 80 kg ha<sup>-1</sup>, with extra diammonium phosphate (D.A.P.) treatments included as shown. Both sites had NO<sub>3</sub>-N figures below 10 p.p.m. and 0.005 M H<sub>2</sub>SO<sub>4</sub> extractable P values around 20 p.p.m. Grain yields, and the N and P content both of whole plants sampled at anthesis, and grain, were measured.

**Table 1: Treatments and Grain Yield (kg ha<sup>-1</sup>)**

Treatments	1979/80		1980/81		Yield of Grain	
	N	P	N	P	1979/80	1980/81
Control					2 317	1 526
Urea, banded at planting (b.a.p.)	38		76		2 598	1 658
Superphosphate (b.a.p.)		40		80	2 887	1 857
Urea (pre-plant) + super (b.a.p.)	38	40	76	80	2 830	1 864
Urea + Super, mixed (b.a.p.)	38	40	76	80	3 106	2 119
D.A.P. (1) (b.a.p.)			19	20		1 932
D.A.P. (2) (b.a.p.)	38	40	38	40	3 725	2 284
D.A.P. (3) (b.a.p.)			76	80		3 073
L.S.D. 5%					619	419

### Results and Discussion

In both years plants suffered severe moisture stress conditions after flowering, resulting in reduced grain yield. However, in both seasons the highest rate of D.A.P. significantly (P1:0.01) out yielded all other treatments, including the equivalent rates of N and P as urea and superphosphate. Results support previous data, which indicated a strong N x P interaction and also show the superiority of D.A.P. as a source of these elements and offer sorghum growers an alternative source of N and P which will give a better financial return.

Miller et al. (1) have demonstrated the increased uptake of phosphorus by plants when NH<sub>4</sub><sup>+</sup> ions are present in the phosphate band. The better yields from D.A.P. than from a urea and superphosphate mixture could be due to the higher soil solution P produced by D.A.P. (2).

Percentages of N and P in plant material from the 1979/80 season were significantly (P <0.01) higher in the D.A.P. treatment than in any other, but this result was not reflected in grain analyses.

1. Miller, M.H., Mamaril, C.P., and Blair, G.J. 1970. Agron. J. 62 : 524-527.

2. Isensee, A.R. 1968. Diss. Abstr. 29B. No. 1 : 14-15.