

## Response of irrigated grain sorghum to split application on nitrogen. I. time to and duration of head exertion and anthesis

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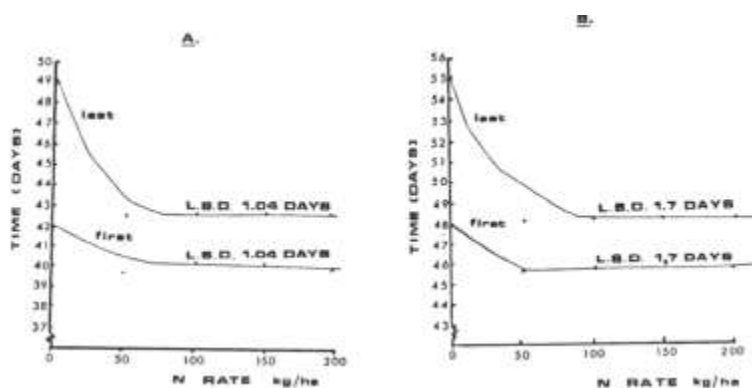
Split application of nitrogen provides the opportunity to increase N rate and thus yield provided the crop has not suffered N deficiency prior to N application (1), as plant development would be inhibited. This study examines the effect of split and all at-planting application of N on the time to and duration of head exertion and anthesis in sorghum, as these stages of plant development are susceptible to heat and moisture stress (limit head emergence or cause pollen sterility) and midge attack (during anthesis).

### Materials and methods

Goldfinger, a mid-season hybrid grain sorghum was sown on 13th January, 1983 in rows 85 cm apart on a black earth soil with medium N status (130 kg NO<sub>3</sub>-N ha<sup>-1</sup> to 70 cm). Nitrogen at 0, 50, 150 and 200 kg N ha<sup>-1</sup> was applied as urea, either all at planting or 50 kg N ha<sup>-1</sup> at planting and the balance either 24 or 44 days later, to four-row plots, 40 m in length. Three replicates were used. The data was collected from the centre two rows of each plot. The crop was regularly irrigated and sprayed for control of insects and zinc deficiency. Time from planting to the commencement and completion of head emergence and anthesis were assessed.

### Results and discussion

Effect of Various Rates of N (Gg/ha<sup>-1</sup>) on Time to and Duration of (A) Head Emergence and (B) Anthesis.



No significant differences due to the various times of N application occurred, despite some field evidence of the onset of N deficiency and greater crop unevenness in the plots receiving N latest. The advancement, by 7-8 days of the onset of head exertion and anthesis and shorter duration of each stage (4 and 2 days respectively) could reduce the risk of yield reduction due to heat stress by advancing the heat sensitive stages in spring sown crops. The limited duration of anthesis limits the exposure of the crop to midge attack, and would make assessment of populations easier and more reliable. In addition, only one spray would be necessary, with two or more probable in the unfertilized crop. These aspects should be included in the assessment of response of sorghum to nitrogen fertilizer application, and in crop models which are being developed to assist in decision making. Similar data need to be developed for rain-grown grain sorghum in a wide range of environments.

1. Cowie, A.M. (1973). PhD Thesis, Univ. of Qld.