

N topdressing requirements for rice

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Until recently virtually all the fertilizer N requirements of rice were applied just prior to PERMANENT FLOODING (PF) however, this sometimes resulted in over-vigorous and highly sterile crops. Now there is increased interest in topdressing rice crops near PANICLE INITIATION (PI). The major difficulty with this technique has been to identify N deficient crops and to determine the quantity of N required optimising yield. The experiments below were undertaken to develop crop assessment techniques which individual farmers could use to ascertain N topdressing requirements.

Methods

In the first experiment rice (*Oryza sativa* L. cv M7) was drill sown into plots each 2 x 25 m at the Yanco Agricultural Institute on October 21, 1985. The crop was flood irrigated 3 times before PF on November 20. Five N rates (0, 60, 120, 180, 240kg N ha⁻¹) applied as urea to dry soil immediately prior to PF were factorially combined with the same 5 rates at PI. There were three replicates of the 5 x 5 factorial.

The second experiment was established with 14 farmers' paddies scattered throughout the N.S.W. rice growing areas. N rates at each site varied according to what each farmer was using. For example, if a farmer intended to apply 100kg N ha⁻¹, the rates applied at PF were 0, 50, 100, 150, 200 and 250 kg N ha⁻¹. There were 4 replicates of each N rate in 30 x 2.5m plots. At five sites 4 rates (typically 0, 40, 80, 120kg N ha⁻¹) were factorially combined with the 6 PF rates. Shoot number, height and weight were measured at PI, while grain weight, panicle number and floret sterility were measured at harvest.

Results and Discussion

Shoot number at PI increased from 500 to over 2000 m⁻² as N rate applied to the Yanco crop at PF increased from 0 to 240kg ha⁻¹. Fertilization at PI increased yield by up to 3.2t ha⁻¹ on plots with 500 to 1000 shoots m⁻². Individual plot data from the 14 commercial crops was very variable, but indicated that across all sites yield increased as shoot number increased to approximately 1000 shoots m⁻². Plot yield often fell as shoot number exceeded 1250 shoots m⁻². At some sites there was a very rapid fall in yield where there were more than 1000 shoots m⁻² at PI. This was most common on sites fertilized at PI. Data then was combined to produce 3D graphics relating shoot number of PI, N applied at PI and grain yield. This information was then used for the recommendations in Table 1. This table is based on 1 year's work, and we expect considerable modification will be necessary as more data are collected and assessed.

Table 1. PI Topdressing recommendations based on 1985/86 Trials.

Shoot No. per Square Metre at PI	Suggested N rate at PI kg N ha ⁻¹	Comments
Less than 500	Approx. 75	Yield limited by too few shoots
500-800	100 - 75	N definitely required
800-1000	Approx. 50 *	Near optimum shoot number
		Too much N results in increased sterility
1000-1250	50 - 0*	Rapid increase in cold weather sterility risk
* Only applies to warm areas.		