

## Effect of n management on rice grain maturation

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Heavy application of N fertilizer are frequently needed to achieve high rice yields, yet N fertilizer can delay crop maturity leading to severely weather damaged grain. The experiment below aimed to examine various fertilizer application rates and times on grain maturation time of the 2 major rice varieties grown in N.S.W.

### Methods

Rice varieties M7 and Pelde were combining sown in October 1985 into 35 x 2m plots. The 2 varieties were factorially combined with 2 replicates of 7 N application treatments. N was applied at PERMANENT FLOOD (PF) and/or PANICLE INITIATION (PI) in the following combinations - 0/0 (N at PF/N at PI) 120/0, 240/0, 60/60, 120/120, 0/120 or 0/240. Crops with these N combinations were sampled 3 times per week from March 12 to April 30. The crops were declared mature when moisture was less than 22%. Rainfall and evaporation data from Yanco were used to predict the number of days on which harvesting was delayed each year between early March and late May.

### Results and Discussion

The Pelde crop always had significantly lower grain moisture than the M7 crop, and Pelde reached harvestable moisture some 10 days before M7. An examination of Yanco weather data showed that 1 year in 2 would have a major rain event in this interval, further delaying harvest of M7.

**Table 1. Effect of N application rate and time on M7 grain moisture (%).**

N at PF/N at PI	March			/			April				
	12	19	27	1	4	9	14	21	23	30	
0/0	40	34	26	24	24	21	19	20	18	18	
120/0	54	47	35	32	29	29	28	24	21	20	
240/0	58	51	46	37	34	33	39	29	26	23	
60/60	51	41	36	30	27	26	24	23	20	19	
120/120	53	48	41	37	35	31	30	25	25	22	
0/120	41	34	30	26	25	22	21	21	29	18	
0/240	45	40	35	32	30	27	25	24	21	20	
LSD p = 0.05	5	6	4	4	4	4	2	3	9	2	

N application to M7 delayed maturity by up to 1 month with the delay increasing with increasing N rate (Table 1). For instance 120kg ha<sup>-1</sup> at PF delayed maturity by 14 days. During the interval 1 or 2 heavy rainfall events (greater than 1 to 2 days evaporation) would occur, lowering grain quality. Higher rates further delayed maturity and much of the increased grain quality normally due to the increased N rate would be lost because of delayed harvest and consequent exposure to sequences of grain wetting and drying leading to extensive grain cracking. When N application was delayed until PI, applying 120 kg ha<sup>-1</sup> at PI did not greatly influence M7 maturation time, but 240kg N ha<sup>-1</sup> at PI increased time to maturation by 14 days. N application time and rate has less effect on Pelde crop maturation time. Unfertilized Pelde matured on April 8, while 240kg N at PI delayed maturity by 1 week.

Maximum yield and quality of both varieties occurred when 120kg N ha<sup>-1</sup> was applied at PF. These results show that excessive N application not only reduces yield, it also delays harvest and can reduce grain quality.

