

Nitrogen x seeding rate interactions in wheat in Northern N.S.W.

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When nutrient deficiency is corrected, one of the most obvious responses in cereal growth is increased tillering, placing increased demands on soil moisture reserves. Should moisture subsequently be limiting during the grain filling period, fertilized crops have a tendency to "hay off", and the beneficial effect of fertilizing is lost. The likelihood of this occurring can be minimised if, at normal sowing times, wheat seeding rates are restricted to 20-25 kg/ ha, and weeds are controlled. Much higher rates are commonly used.

In 1974 and 1975, three trials were conducted on nitrogen deficient soils at Inverell, to study the effects of nitrogen fertilizer and seeding rate on plant tillering, tiller survival and grain yield in wheat (cv Gatcher). All trial sites received phosphorus fertilizer at sowing. Table 1 shows tiller and head counts per metre of row and grain yields; firstly for each seeding rate averaged over all N rates, and secondly for each N rate averaged over all seeding rates.

TABLE 1. Effect of seeding and nitrogen fertilizer rate on plant tillering, head numbers and grain yield in wheat.

kg/ha	Trial A			Trial B			Trial C		
	Til./m	Hds./m	t/ha	Til./m	Hds./m	t/ha	Til./m	Hds./m	t/ha
Seed									
14	30	27	1.93	54	44	3.05	26	24	1.12
22	42	35	2.04	63	54	3.30	36	28	1.36
34	51	38	2.04	71	58	3.14	41	33	1.54
47	59	40	2.04	76	59	3.21	49	35	1.57
68	73	48	2.04	83	68	3.15	60	41	1.51
NITROGEN									
0	44	31	1.33	61	49	2.32	41	28	1.11
20	50	35	1.70	65	55	2.64	41	31	1.34
40	50	42	2.03	71	60	3.11	43	31	1.39
50-60	53	38	2.14	74	56	3.40	42	35	1.57
90	55	39	2.43	74	64	3.70	44	34	1.53
120	54	40	2.46	71	56	3.84	43	35	1.60

In trials A and B, seeding rates above 22 kg/ha did not result in any yield advantage, even though more tillers and heads were produced. Plant tillering, tiller survival, and head size were enhanced at the lower seeding rates. In Trial C, the most severely moisture stressed, a higher seeding rate was necessary to compete with Polygonum convolvulus, for which chemical control proved ineffective. Yields increased in response to N on all sites.