

Effect of external nitrate supply on nodulation of lupins II. comparison of eighteen lines of lupinus angustifolius

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Modulation of lupins is inhibited by increasing external nitrate supply (1). No information is available regarding the relative tolerance to nitrate of different lupin lines. In this experiment, growth and nodulation of 18 lines were compared.

Methods

A description of the method, including the composition of the nutrient solution, is given elsewhere (1). Nitrate treatments of 2 and 8m14 were used, as this represents the range typically encountered in the field. Treatments were replicated three times and plants were harvested after 7 weeks.

Results and discussion

Nodule weight; at 8 mtl nitrate averaged 5.57 mg per plant compared with 12.52 mg at 2 mM ($P < .001$). Although there was large variability in nodulation within lines, it was apparent that nodulation of some lines, including Chittick and Illyarrie, was less sensitive to external nitrate

than that of others, such as Wandoo (Table 1). Thus, there is potential for the selection of *L. angustifolius* lines capable of fixing nitrogen in soils of high N status.

Table 1. Variation in nodulation between 18 lupin lines.

Maturity Group	Line	Nodule Dry Wt. 8mM nitrate mg plant ⁻¹	Nodule Wt. [#] 8mM 2mM	Nodule Wt. Shoot Wt.			
				2mM	8mM		
Early	Unicrop	7.67 abc	42.4 abcd	3.07 ab	A	1.45 abc	B
	Illyarrie	9.44 a	71.4 a	2.63 a	A	1.57 ab	B
	Yandee	6.28 abode	46.7 abcd	2.79 bc	A	1.30 abcde	B
	Danja	9.33 a	49.9 abcd	3.08 ab	A	1.60 ab	B
	75A/259	1.69 f	43.3 abcd	1.13 g	A	0.40 f	A
	75A/261	4.95 bcde	37.9 bcd	2.45 bcd	A	1.00 abcdef	B
Midseason	Chittick	9.98 a	61.1 abc	2.70 bc	A	1.74 a	B
	Wandoo	4.46 bcde	28.8 d	3.60 a	A	1.34 abcd	B
	75A/257	3.09 def	32.9 cd	2.73 bc	A	0.88 bcdef	B
	75A/258	2.86 def	37.3 bcd	1.46 fg	A	0.77 bcdef	A
	Uniharvest	3.86 bcdef	32.0 cd	2.59 bc	A	0.82 bcdef	B
Late	Marri	4.69 bcde	30.7 cd	2.36 bcde	A	0.70 cdef	B
	73A/230	2.28 ef	27.0 d	1.55 efg	A	0.44 ef	B
	73A/231	3.59 cdef	41.3 bcd	1.66 defg	A	0.63 cdef	B
	73A/232	2.99 def	28.5 d	1.92 cdefg	A	0.56 def	B
	73A/233	2.85 def	32.8 cd	1.73 defg	A	0.60 cdef	B
	73A/234	6.97 abcd	64.4 ab	2.72 bc	A	1.75 a	B
	73A/235	8.14 ab	55.1 abcd	2.04 cdef	A	1.81 a	A

Means followed by the same letter are not significantly different ($P > .05$) using Duncan's Multiple Vence Test. Lower case letters refer to columns, upper case refer to rows. Nodule weight in 8 mM nitrate as a percentage of average nodule weight for that line in 2 mM nitrate.

1. Cowie, A.L., Jessop, R.S. and MacLeod D.A. 1987. Proc. 4th. Aust. Agron. Conf., Melbourne.

