

Potential for lupins in relation to other grain legumes as a source of plant protein for human consumption

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PROTEIN
2FOOD



Europa investeert in
zijn platteland



Field trials 2015-2018



Primary location:

- *Anthroposol (former histosol, 'dalgrond')*
- *sandy soil*
- *OM 6-10%*
- *pH 5,0*



Field trials 2015-2018

Variety trials:

- *L. angustifolius: 11 varieties and 11 breeding lines*
- *L. albus: 10 varieties and 11 breeding lines*

Comparison to Faba beans (winter and summer) and Soya

Agronomic

- *Sowing density*
- *Effect of crop protection (fungicides)*

Variety trials *L. angustifolius*

Variety	Earliness		2015-2018	2015		2016		2017		2018	
			<i>av.index</i>	<i>t/ha</i>	<i>index</i>	<i>t/ha</i>	<i>index</i>	<i>t/ha</i>	<i>index</i>	<i>t/ha</i>	<i>index</i>
				<i>ppm</i>		<i>ppm</i>		<i>ppm</i>		<i>ppm</i>	
Haags Blaue	ve	<i>yield</i>	86	2.62 ^a	87	2.04 ^{ab}	85				
		<i>alkaloid</i>			135		307				
Primadonna	ve	<i>yield</i>	93	2.80 ^a	93	1.71 ^{ab}	71			3.31 ^c	115
		<i>alkaloid</i>			161		292			<i>n.a.</i>	
Boruta	e	<i>yield</i>	71	3.02 ^a	100	1.47 ^a	61	1.77 ^{ab}	70	1.52 ^a	53
		<i>alkaloid</i>			114		208		<i>n.a.</i>		<i>n.a.</i>
Regent	e	<i>yield</i>	104	3.22 ^a	106	3.39 ^c	142	2.47 ^b	98	2.06 ^{ab}	71
		<i>alkaloid</i>			133		73		<i>n.a.</i>		<i>n.a.</i>
Iris	r	<i>yield</i>	100	3.02 ^a	100	2.39 ^b	100	2.52 ^b	100	2.88 ^{bc}	100
		<i>alkaloid</i>			122		97		<i>n.a.</i>		<i>n.a.</i>
Boregine	l	<i>yield</i>	72	2.66 ^a	88	1.95 ^{ab}	81	1.20 ^a	48		
		<i>alkaloid</i>			432		364		<i>n.a.</i>		

earliness: ve = very early, e = early, r = regular, l = late, vl = very late

Variety trials L. albus

Variety	Earliness		2015-2018	2015		2016		2017		2018	
			<i>av.index</i>	<i>t/ha</i>	<i>index</i>	<i>t/ha</i>	<i>index</i>	<i>t/ha</i>	<i>index</i>	<i>t/ha</i>	<i>index</i>
				<i>ppm</i>		<i>ppm</i>		<i>ppm</i>		<i>ppm</i>	
Boros	ve	<i>yield</i>	100	1.99 ^a	100	1.21 ^b	100	3.20 ^a	100	2.41 ^a	100
		<i>alkaloid</i>		76		53		237		n.a.	
Butan	e	<i>yield</i>	89			0.65 ^{ab}	54	2.83 ^a	88	2.98 ^{ab}	124
		<i>alkaloid</i>				n.a.		249		n.a.	
Amiga	r	<i>yield</i>	47	1.88 ^a	95	0.00^a	0				
		<i>alkaloid</i>				n.a.					
Feodora	r	<i>yield</i>	80			0.00 ^a	0	3.39 ^a	106	3.22 ^{ab}	134
		<i>alkaloid</i>				n.a.		n.a.		n.a.	
Figaro	r	<i>yield</i>	112							2.71 ^a	112
		<i>alkaloid</i>								n.a.	
Sulimo	l	<i>yield</i>	159							3.83 ^b	159
		<i>alkaloid</i>								n.a.	

earliness: ve = very early, e = early, r = regular, l = late, vl = very late

Effect of sowing density on yield

	Sowing density		Predictions	Regression model		
	% of target	pl/m ²	t/ha	2015 t/ha	2016 t/ha	2017 t/ha
L. angustifolius Non-branching	50%	60	2.45^{ab}	2.76	2.20	2.19
	75%	90	2.64^{ab}	2.84	2.57	2.26
	100%	120	2.61^{ab}	2.80		2.47
	125%	150	2.66^{ab}	2.74	2.15	2.88
Branching	50%	45	2.26^a	2.86	2.05	1.65
	75%	68	2.44^{ab}	2.92	2.22	2.03
	100%	90	2.81^b	3.02	2.39	
	125%	112	2.77^b	3.15	2.34	2.52



Effect of crop protection yield

	2015			2017		
	yield no fung. t/ha	yield fung	yield increase %	yield no fung. t/ha	yield fung	yield increase %
L. angustifolius						
Primadonna	2.8 ^a	3.0 ^a	6%			
Boruta				1.8 ^{ns}	2.2 ^{ns}	26%
Regent	3.2 ^a	2.9 ^a	-9%	2.5 ^{ns}	2.4 ^{ns}	-4%
Iris	3.0 ^a	3.1 ^a	4%	1.0 ^{ns}	1.1 ^{ns}	13%
Wars				1.2 ^{ns}	1.2 ^{ns}	-2%
Boregine				1.2 ^{ns}	2.2 ^{ns}	81%
L. albus	3.0^a	3.0^a	0%	1.5^{ns}	1.8^{ns}	23%
Boros	2.0 ^a	2.3 ^a	14%	3.2 ^{ns}	3.0 ^{ns}	-6%
Butan				2.8 ^{ns}	3.2 ^{ns}	13%
Amiga	1.9 ^a	2.8 ^b	49%			
Feodora				3.4 ^{ns}	4.2 ^{ns}	23%
	1.9^a	2.5^b	32%	3.1^{ns}	3.5^{ns}	10%

Caramba (1,2 l/ha) and Signum (1,6 l/ha)

Protein content and yield

		2016-2018	2016		2017		2018	
		av. kg pr./ha	% in dm	kg pr./ha	% in dm	kg pr./ha	% in dm	kg pr./ha
L. angustifolius	Haags Blaue	619	35.7 ^b	619 ^{bc}				
	Primadonna	698	35.6 ^b	516 ^{ab}			31.3 ^{abc}	879 ^{bc}
	Boruta	476	36.7 ^{bc}	458 ^{ab}	39.2 ^c	594 ^a	29.1 ^{ab}	376 ^a
	Regent	820	35.5 ^b	1024 ^d	37.5 ^{bc}	794 ^{ab}	36.9 ^{def}	644 ^{ab}
	Iris	868	38.7 ^c	788 ^c	39.7 ^c	1002 ^b	32.9 ^{bcd}	813 ^{bc}
L. albus	Boros	670	36.1 ^b	373 ^a	35.3 ^b	962 ^b	33.0 ^{bcd}	675 ^{ab}
	Butan	874			35.7 ^b	857 ^{ab}	34.8 ^{cde}	890 ^{bc}
	Feodora	1060			38.5 ^c	1064 ^b	38.7 ^{ef}	1057 ^{cd}
	Figaro	887					38.5 ^{ef}	887 ^{bc}
	Sulimo	1294					39.6 ^f	1294 ^d
V. faba	Fuego	1330	28.6 ^a	1009 ^d	32.7 ^a	2016 ^c	27.8 ^a	964 ^{bcd}
G. max	Adsoy	943	43.5 ^d	1114 ^d	42.6 ^d	771 ^{ab}		

* Protein as N-Kjeldahl x 6.25



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Thank you for your attention

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