Seeding Rates of Normal Leaf and Semi-leafless Field Peas

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Introduction

The recommended seeding rate for field peas in Saskatchewan is to establish 8 plants per square foot (Saskatchewan Pulse Crop Development Board 1997). This converts to 72 plants per square yard or 86 plants per square meter. Semi-leafless field peas have a much more open canopy than normal leaf field peas. This study was set up to determine if semi-leafless types would respond to higher seeding rates due to the openness of their canopy.

Procedure

Two varieties of each leaftype were grown at four seeding rates (60, 80, 100, and 120 seeds/m*). Seeding rates were adjusted to account for any germination less than 95%. Grande and Bohatyr were the normal leaf varieties, and Carneval and Highlight were the semi-leafless. The test was set up as a 16 entry randomized complete block design. It was grown in 1995, 1996, and 1997 at Watrous, and in 1997 at Morse. The test was grown on stubble at Watrous in 1997, all other sites were grown on summer-fallow. All locations had four replicates, one replicate was dropped from the Morse data. Emergence counts and yield were measured on each plot.

Results and Discussion

Table 1 shows the yield results from all sites. Yields shown are averages of the two varieties of each leaftype. The data in table 1 indicates that for most of the locations and the combined analysis the lowest seeding rate (60 seeds/m*) resulted in significantly lower yields than the other three rates. Only the normal leaf type in 1996 resulted in significant differences in yield among the 80, 100, and 120 seeds/m^2 seeding rates.

Table 1. Yield Results of Normal Leaf and Semi-leafless Field Peas at Various Seeding Rates

Treatment	Watrous '95	Watrous '96	Watrous '97	Morse '97	All
	Yield (kg/ha)				
Normal Leaf					
60 seeds/m2	3494	2949	1716	2508	2677
80 seeds/m2	3897	3211	1934	2679	2947
100 seeds/m2	3700	3636	1865	2752	3004
120 seeds/m2	4177	3322	1907	2827	3075
Semi-leafless					
60 seeds/m2	3691	2868	1541	2326	2624
80 seeds/m2	3963	3198	1674	2761	2865
100 seeds/m2	3785	3222	1713	2698	2865
120 seeds/m^2	4022	3399	1754	2799	3006
LSD	354	259	143	225	224

Table 2 indicates the significance of main and interaction effects at all locations, and in the combined analysis. Locations are considered fixed in the corn bined analysis.

Table 2. Analysis of Variance Results

Source	df	Wtrs '95	Wtrs '96	Wtrs '97	Mrse '97	All
		F value				
Variety within leaftype	2	12.70**	35.38**	4.48*	3.97*	27.46**
Seed Rate	3	7.05**	9.05**	4.52**	6.84**	22.28**
Leaftype	1	0.33^{NS}	1.93^{NS}	18.73**	0.47^{NS}	4.20**
Variety within leaftype*Rate	6	1.57^{NS}	2.60*	0.94^{NS}	0.84^{NS}	1.04^{NS}
Leaftype*Rate	3	0.78^{NS}	1.92^{NS}	0.35^{NS}	0.67^{NS}	0.38^{NS}
Variety within leaftype*Loc	6					13.39**
Seed Rate*Location	9					2.14*
Leaftype*location	3					2.10^{NS}
Variety(leaftype)*Rate*Loc	18					1.81*
Leaftype*Rate*Location	9					1.28^{NS}

There was much more variation between varieties than there was between leaftypes. The analysis also indicates that there was no significant leaftype by seed rate interaction in any of the environments. The leaftype by rate by location interaction was also not significant. This indicates that the normal leaf and semi-leafless types responded the same way to the various seeding rates, and this response was consistent across environments.

Figure 1 shows percent emergence averaged across locations. This data indicates part of the reason why increasing seeding rates too high is not beneficial. As rates increase the seedling to seedling competition becomes greater and percent emergence declines.

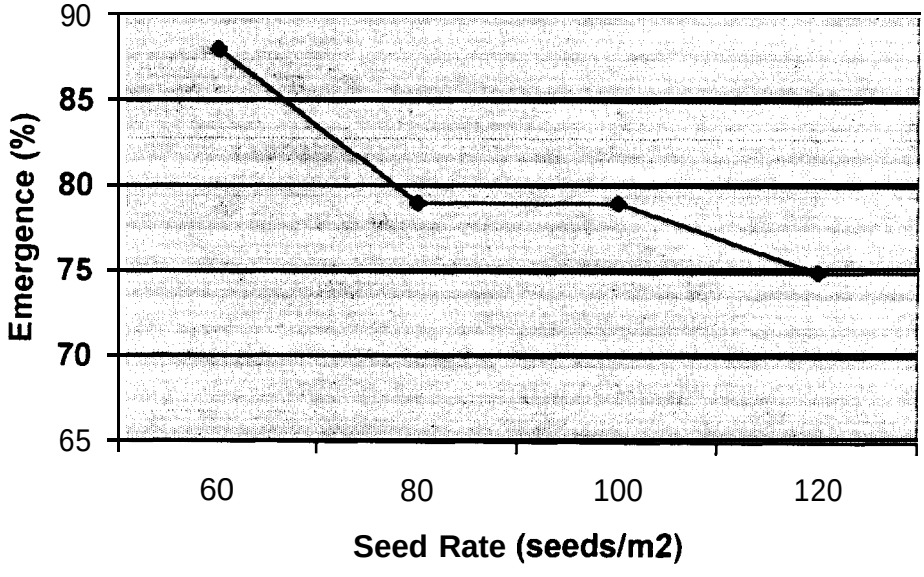

Fig. 1. Percent emergence of field peas at various seeding rates.

Conclusions

The suggested seeding rate of 8 plants per square foot for field peas held true for both normal leaf and semi-leafless types in this study. Seeding at higher rates than this may increase yield slightly, but the increase would be unlikely to offset the seed costs. Decreasing seeding rates below the optimum caused significant yield losses, even under weed free conditions.

Achieving the optimum seeding rate is critical for maximizing returns on seed costs. Table 3 gives a few examples of target seeding rates using different seed weights.

Table 3. Suggested Seeding Rates for Various Seed Weights

Seed Weight (g/1000)	Seeding Rate (kg/ha)	Seeding Rate (bu/ac)
150	129	1.9
200	172	2.5
250	216	3.1
300	260	3.7

These rates may need to be increased by an additional 10% to account for seed damage during seeding (Saskatchewan Pulse Crop Development Board 1997). Rates must also be increased if germination is low. Optimum rates should be calculated on individual seed lots as there is a great range of seed weights between varieties, but there can also be significant differences in seed weights of lots of the same variety from different seed sources.

References

Baker, R. 1998. Personal Communication

Saskatchewan Pulse Crop Development Board 1997. Pulse Production Manual. Saskatchewan Pulse Crop Development Board, Saskatoon, SK