

RELATIVE YIELDS OF FIELD PEAS  
AND FABABEANS ON STUBBLE AND FALLOW

\*  
D.J. Warnock and H.M. Austenson  
Crop Science Dept., Univ. of Sask.

Soil Fertility Workshop  
Saskatoon, Sask.  
Feb. 6-7, 1974

\* Presented by D.J. Warnock

Recent interest in special crops in Saskatchewan prompted the Saskatchewan Wheat Pool to initiate a study of field peas and fababeans. Particular emphasis was placed on results of yield evaluation, protein analysis, and soil sampling for  $\text{NO}_3\text{-N}$ .

Plots at four locations (Table 1) were placed on stubble and fallow with fertilized and unfertilized treatments.

Table 1. Location, soil characteristics, fertilizer and cropping history of field pea and fababean tests, 1973.

Location	Soil Zone	Estimated Assoc.	Texture	Fertilizer	Rate (lb/acre)		Stubble Crops	
					Fallow	Stubble	1972	1971
Bellevue	Thin Black	Blaine Lake	SiL	16-20-0	100	125	Barley	Rapeseed
Tisdale	Grey Black	Tisdale	SiClL	11-48-0	50	50	Wheat	Fallow
Yorkton	Thick Black	Canora	SiClL	16-20-0	72	72	Flax	Fallow
Westbend	Thin Black	Oxbow	L-ClL	11-48-0	63	91	Barley	Wheat

Plots were about 0.2 acres in size and were seeded and harvested with the farmer's equipment. Samples were taken from the plots for yield and protein determinations. Soil samples were taken in the spring, summer and fall and  $\text{NO}_3\text{-N}$  analysis was done at the soil testing lab. Protein analysis was done by the Sask. Wheat Pool.

Preparation for seeding included adequate cultivation and application of trifluralin. Fertilizer was applied according to soil test recommendations. Trapper peas were seeded at 100 pounds per acre at all four locations. Diana fababeans were seeded at Bellevue and Erfordia fababeans were seeded at other locations, all at 125 pounds per acre. Appropriate inoculum was used with all seed. Seeding was delayed due to rain and consequently fababean plots failed to mature before being frozen, except at Tisdale. The trials

were analyzed as a 4 x 2 x 2 Factorial Completely Randomized Design.

Results - Yields - Yields of peas were less variable than yields of fababeans (Table 2). Fababean plots at Yorkton were excluded from the analysis due to late seeding and two foot row spacings of plants.

Table 2. Mean grain yields (lb/a) of field peas and fababeans at four locations in Saskatchewan in 1973

Location	Peas		Fababeans	
	Fallow	Stubble	Fallow	Stubble
Bellevue	2520	2610	2150	1450
Tisdale	2820	2230	1910	1040
Yorkton	2880	1970	(1110)	(1080)
Westbend	3180	3310	2250	1960
Means	2850	2530(88.8%) (3 loc <sup>ns</sup> ) →	2100	1485 (70.7%)

Differences in pea yield due to location and method of land preparation were highly significant. Fallow yields among locations were less variable than stubble yields. At Yorkton and Tisdale fallow yields of peas were much higher than stubble yields while at Westbend and Bellevue stubble plots gave a higher yield than fallow. Consequently, location x land preparation interaction gave highly significant differences in yield. While there was no difference due to fertilization, fertilizer x location interaction was highly significant due to the yield depression at Bellevue on fertilized plots.

Fababean yields among locations were highly variable due to late seeding and consequent frost before maturity. Aschochyta and Fusarium infections in plots at Tisdale contributed to reduced yields there. Yield differences due to location and land preparation were highly significant. Location x land preparation interaction produced highly significant differences.

Weed problems contributed to some yield depression at Tisdale on stubble plots, Yorkton stubble peas and Bellevue stubble beans.

Protein content: Protein analysis was conducted on samples within plots which were averaged to give plot values. No effort was made to remove green seed from the sample.

Differences in protein content of peas due to location (Table 3) were highly significant. There were significant differences due to method of land preparation and high protein content of stubble pea plots at Tisdale contributed to a highly significant location x land preparation interaction. Depressed protein content on Yorkton fallow and Tisdale stubble plots with fertilization contributed to a significant fertilizer x location interaction and fertilizer x location x land preparation interaction. Pea yields and protein content had a low positive correlation which was not significant.

Table 3. Mean percentage protein in field peas and fababeans at four locations in Saskatchewan, 1973.

Location	Peas (8.6% H <sub>2</sub> O)		Fababeans (7.7% H <sub>2</sub> O)	
	Fallow	Stubble	Fallow	Stubble
Bellevue	25.1	24.8	26.2	25.3
Tisdale	22.2	24.8	27.4	26.6
Yorkton	23.4	23.2	27.6	28.1
Westbend	23.9	23.5	26.9	26.8
Mean	23.7	24.1	27.0	26.7

Differences in protein content of fababeans due to location and land preparation were highly significant. High values from Yorkton stubble plots caused highly significant differences due to location x land preparation interaction. The highly significant negative correlation between yield and protein content of fababeans from these plots may be questioned as most plots were very immature when harvested.

Casual observation of rainfall data would not relate high rainfall with low protein content of the seed.

Soil NO<sub>3</sub>-N: Fall levels of NO<sub>3</sub>-N were lower than spring levels except on stubble plots at Bellevue and Westbend which were low in the spring (Table 4).

Table 4. Mean soil nitrate-N levels (lb/acre) to a depth of 24 inches for field pea and fababean plots for four locations in Saskatchewan in 1973.

Time of Sampling	PEAS		FABABEANS	
	Fallow	Stubble	Fallow	Stubble
Spring	78	63	78	63
Summer	61	64	79	61
Fall	47	46	51	37

Addition of small amounts of N as fertilizer in the spring did not appear to affect subsequent N levels. Adjacent fields of rapeseed at Tisdale and wheat at Bellevue had fall NO<sub>3</sub>-N levels about equal to the legume plots (Table 5).

Table 5. Soil nitrate-N levels (lb/acre) to a depth of 24 inches on fields adjacent to plots at Tisdale and Bellevue, 1973.

Location	Land Preparation	1973		Fall Test	
				Peas	Fababeans
Tisdale	Stubble	Fallow	46	48	28
	Fallow	Rapeseed	50	53	46
Bellevue	Stubble	Fallow	53	35	19
	Fallow	Wheat	45	40	20

Conclusions:

Results from these trials suggest the potential for growing peas on stubble with acceptable yields as compared to fallow. Stubble pea plots at Yorkton and Tisdale suffered from weeds and flooding which may have contributed to their reduced yields. Fababeans on fallow plots appeared to have better yields than stubble. Fertilization did not give any yield differences however fertilizer testing may be required to provide additional information on fertilizer response of this species. Varieties of fababeans with shorter growing season would be desirable in reducing maturity problems encountered at harvest.