

CROP SPECIES FOR MAXIMUM PRODUCTION AND GOOD AGRONOMIC PRACTICE¹

A.E. Slinkard

Crop Development Centre
University of Saskatchewan
Saskatoon, Saskatchewan S7N 0W0

About 25 million acres of land are in crop each year in Saskatchewan. The cereals (wheat, barley, oats, rye and mixed grains) were grown on nearly 85% of this acreage in 1972. Wheat and barley were grown on nearly 75% of this acreage (Table 1). Thus, Saskatchewan traditionally has been considered a cereal grain producing province and the quality of Saskatchewan - and Canadian - grown red spring wheat is famous the world over. However, this also resulted in what has been termed a one-crop economy which caused dire economic consequences for the wheat producers in the late 60's and early 70's.

Increased production and market development of rapeseed materially assisted in recovery from this severe case of one-crop economy. Unfortunately, rapeseed cannot be grown in all areas of the province. In addition, Saskatchewan should not rely on only one non-cereal crop. Accordingly, the Crop Development Centre and the Crop Science Department have embarked on an intensified research program to help diversify crop production in Saskatchewan. Primary emphasis is being placed on feed wheat, feed barley and alternate crops. Feed wheat and feed barley are still cereals, but they open a different market and thus are important in that certain areas of Saskatchewan cannot grow other cash crops competitively.

¹Presented at Soil Fertility Workshop, Saskatoon, Sask., Feb. 6, 1974.

The alternate crops under study are the pulse crops (the large-seeded, edible legumes) which are characterized by a high protein content. The wisdom of this approach was evident last year with the world-wide protein shortage resulting in ridiculously high prices for protein supplements such as soybean meal at over \$400 per ton. We are also increasing efforts on flax as a direct result of renewed market interest in both linseed oil and high protein linseed meal. Canada Agriculture at Saskatoon is continuing their outstanding research program on rapeseed and recently have initiated an intensified program on sunflowers. Thus, both Canada Agriculture and the University of Saskatchewan are providing Saskatchewan farmers with a wider array of field crops, helping them avoid reliance on a one-crop economy.

Let us look at the current status of the research program on the pulses. Most of the research to date has been on field peas and fababeans; but we are also looking at lentils, dry beans, chickpeas and lupines. We have written-off soybeans, mung beans, azuki beans, flatpeas and vetches as not being adapted to Saskatchewan conditions.

In field peas, Dr. Youngs at the National Research Council, Prairie Regional Laboratory, Saskatoon, has developed a pilot plant which grinds peas into pea flour and then separates the pea flour into a high protein (65%) fraction and a starch fraction. The pea protein concentrate can be used in a wide array of feeds and foods as a source of high quality protein. The pea starch may find use as a desliming agent in the potash industry, paper sizing or industrial fermentation. The potential of this process is so promising that ~~the~~ Newfield Seeds, Ltd., Nipawin, has installed a larger scale pilot plant to produce pea protein concentrate (PPC) and pea starch in large

lots. Commercial feed and food processors can process these large lots through their plants and obtain some idea of possible processing problems and enable them to estimate the value of the PPC and the pea starch.

We know that we can grow field peas in Saskatchewan, at least in the Parklands (Table 2), and we know that we can process it into valuable PPC. However, we still need more research on additional uses for this PPC, developing uses for the pea starch and determining the economic aspects from planting to sale of the processed product. Currently, we are trying to improve on the agronomic practices involved in field pea production. With primary emphasis on weed control. In addition, we are breeding for a higher protein content of the pea seed. We have some high protein lines that we are using for parents, but they have no yield potential.

Research by Dr. La Rue at the NRC Prairie Regional Laboratory, Saskatoon, has shown that field peas fix about 30% of the nitrogen found in the above ground portion of the plant. This means that they still obtain most of their nitrogen from the soil, contrary to the belief of many early researchers. The decaying roots and straw do release some nitrogen for succeeding crops, but the amount varies widely.

The fababean is another high protein crop receiving considerable research effort. About 4,000 acres were grown in Saskatchewan in 1973. Dr. Rowland is concentrating on the agronomic and genetic research on fababeans. Fababeans appear to fix a larger proportion of their nitrogen than peas. However, current varieties are from Europe and will not mature in cool, wet areas of the province.

In all of these alternate crops such as field peas, fababeans, lentils, flax and sunflowers, effective weed control is a prerequisite to an economic yield. Dr. Ashford is conducting research on weed control in these alternate crops and his results appear promising; for example, Treflan (trifluralin) does an excellent job of controlling wild oats in fababeans and field peas if properly incorporated prior to seeding.

SUMMARY

Spring wheat and barley will continue to be the two major crops in Saskatchewan. However, improved varieties and improved management practices will result in increased acreages of rapeseed, flax, field peas, fababeans, and other crops. This, in turn, will help prevent reliance on a one-crop economy as occurred in the late 60's and early 70's.

TABLE 1
FIELD CROPS IN
SASKATCHEWAN IN 1972

CROP	ACRES (000'S)	YIELD PER ACRE (BUSHEL'S)	TOTAL PRODUCTION (000 BUSHEL'S)
WHEAT	13,900	23.5	326,000
BARLEY	4,600	38.5	177,000
OATS	1,690	46.7	79,000
RAPESEED	1,500	16.5	24,800
FLAX	700	14.0	9,800
RYE (FALL)	280	18.0	5,030
MIXED GRAINS	220	40.9	9,000
MUSTARD SEED	140	14.2	1,988
SUNFLOWER	23	27.2	6,256
BUCKWHEAT	5	11.8	65
FIELD PEAS	5	20.0	100
POTATOES	3,000 ACRES	158.3 CWT.	475,000 CWT.
TAME HAY	1,800,000 ACRES	1.39 TONS	2,500,000 TONS

*SUNFLOWER SEED WEIGHS 24 LB. PER BUSHEL

TABLE 2
SASKATCHEWAN
FIELD PEA ACREAGE

YEAR	ACRES
1967	800
1968	1,000
1969	1,700
1970	2,500
1971	8,000
1972	5,000
1973	10,000 - 16,000
1974	?

DISCUSSION OF DR. AL ALINKARD'S PAPER ENTITLED: "CROP SPECIES FOR MAXIMUM PRODUCTION AND GOOD AGRONOMIC PRACTICE"

Question: What variety of field peas would you recommend or is there more than one?

Al Slinkard: There are 3 licensed varieties of peas; Century, Trapper, and Triumph. Triumph was licensed in 1973, it is higher yielding in most areas of the province except the extreme northern fringe of the cultivated areas. The reason for this is that it is a little later maturing, which is okay except up there. It is a little too late for the Melfort area and north to Nipawin. For example, this year yields were down in that area because of the late maturity. So I am in favor of Trapper. Now, most of our tests indicate that Century and Trapper are fairly comparable in yield but Trapper is smaller seeded and if you go by what we propose as our standard seeding rate of 8 seeds per square foot the smaller seeded Trapper will require 110 lbs/acre whereas, the larger seeded Century will require about 170 lbs of seed per acre. This represents a seeding rate difference of one bushel in favor of Trapper, the small seeded variety, and the yields are usually comparable in most areas.

Question: Can you give us some yield estimates and also the current price for field peas and fababeans?

Al Slinkard: Yield estimates for field peas - Newfield seeds of Nipawin for example, had 1,000 acres under contract, and averaged a yield of 24.8 bus/acre which is a realistic figure for this year in that general area. Now yields in that area suffered from high moisture conditions and because of that were well below the yield potential for this crop. Now, the price of peas - you know if you don't have any - and you want some awful bad - you might even offer a dollar a pound for them. I have heard figures, 42 cents/lb; 33 cents/lb; 27 cents/lb, but I haven't heard of anybody selling any. So you ask me the price of peas, I don't have any idea.

Question: What about the second half of that question - fababeans?

Al Slinkard: Well, apparently there is a fairly well established price for fababeans because there are some available, one price I have seen advertised for seed purposes is 24 cents/lb. As for the yields of fababeans, Dr. Austenson is going to be talking about that question tomorrow afternoon and I will defer the answer until that time.

Question: What is the percent protein in the recommended varieties of field peas?

Al Slinkard: The three recommended varieties of field peas are all what I call low protein varieties. They average, depending on who you talk to - the range is terrific, the lowest value we have heard is 12.6% and they range on up to a high of 28%. So there is a tremendous variation. If you want to narrow that down, I would say that most of them will average in the range of 20 to 24% protein. For example this 1000 acres up north at Nipawin this year averaged 22.8%. We are hoping to breed something which will produce a little higher protein content. Now fababeans, on the other hand, have a protein content of 3, 4, maybe 5 percent higher than field peas, grown under comparable conditions.