

DRY BEANS IN SASKATCHEWAN

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Rapid changes are occurring in the grain industry in western Canada. The effort to diversify will accelerate with removal of freight subsidies. The pulse industry is expanding rapidly. The dry bean sector of the industry is growing every year in western Canada. The Alberta and Manitoba dry bean industries continue to expand. The Saskatchewan dry bean industry is now beginning to develop.

From the standpoint of including annual legumes in crop rotations in Saskatchewan, if one of every five acres of crop production included a pulse crop (a five year rotation), it would become necessary to market about 6 to 8 million acres of pulses every year. Is this possible? Ten years ago no one imagined that in 1995 Saskatchewan would produce over 2 million acres of pulses. Adding the dry bean crop to the mix of pulses will occur at a rapid pace once a low cost method of production is developed. The cleaning and processing infrastructure is already in place. The crop has a ready market in the United States and other regions. Irrigated land use patterns are changing in traditional dry bean growing areas of the US. As water use policy becomes influenced by other industries such as tourism, water resources divert to higher value crops such as vegetables. In 1995 several US based companies are contracting dry bean production under irrigation in the Lake Diefenbaker area of Saskatchewan. The production technology adopted in this area is the traditional row crop production system used widely in the US, Manitoba and Alberta. Current estimates of 1995 production are about 3000 acres of dry bean in Saskatchewan. Most production will be pinto, but reds and blacks will also be grown.

Dry bean research efforts at the Crop Development Centre and the Department of Agricultural and Bioresource Engineering at the University of Saskatchewan are focused on developing a low cost harvesting system that will allow the production of the crop on dryland in the Dark Brown soil zone. The two main areas of research are plant breeding and harvest equipment modification. The plant breeding objective is to develop earlier maturing cultivars with improved harvestability. The engineering research is geared to developing low cost header modifications that will reduce the variability of harvestability under commercial growing conditions. Successful achievement of these research goals will reduce the cost of production and spur rapid expansion of the dry bean sector. This technology will also be applicable in traditional dry bean growing areas.

A promising technology for improved harvesting technology is in the final stages of research. The next step in this research stream is gearing up for field testing with a manufacturer. Cutterbar losses for Othello pinto bean in 1994 at Saskatoon (dryland) and Outlook (irrigated) were substantially reduced using a combination of reel and guard modification. This technology is patented.

The plant breeding research effort is also achieving some success. Two black bean cultivars were released in 1994. Proposed names for these are CD Espresso and CDC Nighthawk. Each was released to a small seed company for seed multiplication. Both are in the winter increase stage in 1995. Both lines have early maturity and upright canopies suitable for swathing if plant development is normal. A small white cultivar was released in 1995. Within the next few years, pintos, reds, green northern and pinks will become available. All lines will be early maturing and suitable for narrow row cultivation on dryland.

One of the main objectives of the bean breeding program is harvestability for direct cut systems. All yield trials are grown in narrow rows and harvested directly with a small plot combine.

Breeding lines with improved canopy characteristics are now entering registration trials. Entries in the Prairie Bean Cooperative Trial - Narrow Rows were rated for pod clearance at 4 locations in 1994. This rating estimates the percentage of pods that completely clear the cutterbar of the combine used for direct harvesting. Othello pinto is used as the check cultivar for pintos in this trial. Ratings for Othello were mean pod clearance of 31% with a range of 11-50%. Breeding line 92144 pinto was rated at mean pod clearance of 67% with a range of 46-85%. This line outyielded Othello by 19%. The increased yield was undoubtedly related to harvestability improvement, not biological yield improvement.

A new concept in germplasm development was initiated through a new project in 1994 with the assistance of SIDC through the Partnership Agreement on Water Based Economic Development at SIDC. Part of this project involves evaluating the agronomic and genetic merit of the non-shattering pod trait. At the same time we are developing improved germplasm with this characteristic in collaboration with the bean breeding program of the Centro Intemacional de Agricultura Tropical (CIAT) in Colombia. This project will allow rapid development of adapted germplasm with improved canopy characteristics for direct harvesting as well as initial development of resistance to bacterial blight diseases.

A graduate student project carried out by Blaine Recksiedler is underway. The agronomic value of the non-shattering trait was evaluated in 1994 by measuring direct harvest losses from replicated F₂-derived F₄ plots of 4 breeding populations. Two replicates were grown at Outlook and Saskatoon. Breeding lines that uniformly expressed the non-shattering trait showed significantly less harvest loss than lines expressing normal pods. In addition, expression of the non-shattering trait is associated with increased pod curvature. Breeding lines with strong expression of curvature also showed significantly reduced harvest loss. This research will be expanded in 1995 further evaluate the contribution of the non-shattering trait to improved harvestability.

Genetic studies of the non-shattering characteristic were conducted in 1994. Preliminary results show the trait is controlled by a single gene. Plants that exhibit the trait show no obvious reduction in harvest index. Threshability and seed quality are also unaffected. Confirmation of the genetic studies is planned for 1995.

All avenues of research, development, and marketing of dry bean in Saskatchewan indicate that this crop will become an important pulse crop in the near future. By lowering production costs and by reducing production risks, growers in the Dark Brown soil zone will become competitive producers of this crop over the next 5 years.