Bean Quest 2002: The Final Frontier

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Introduction

The agronomic, economic and genetic pieces of the jigsaw puzzle for developing a dryland bean industry in Saskatchewan are coming together. In 2002, dryland bean growers in Southeastern Saskatchewan made a profit using new varieties of black and pinto bean. Much of the credit for this goes to the hard work, homework, and perseverance of the crop clubs that have developed around the province in the past few years. The research and development effort of the past 10 years is finally starting to pay dividends in the dry bean sector of the pulse industry. In this paper, we would like to briefly summarize some of the key results of various dry bean research and development projects that have been underway in the past few years.

Agronomy of Dryland Bean Production

Research of agronomic systems for dryland bean production show conclusively that in drought conditions, bean crops in no till systems yield much more than beans grown with tillage. In wet years, crop yields of the two systems are about the same. In general, dry bean crops do not do well when drought conditions prevail during flowering and seed filling, much like most crops. Good moisture at seeding is very beneficial for good crop establishment, and timely rainfall in late July or early August is critical to achieve economic yield levels. Seeding early may help reduce the potential impact of late season drought, but this will also increase the risk of damage by early season frost. Research clearly shows that nitrogen fixation can be severely reduced under drought stress.

The seeding operation is a key factor in successful dryland bean production. An important research conclusion is that the currently recommended seeding rates are probably too high, assuming that all seed is of good quality and is not damaged during seeding. The best crops have uniform emergence and uniform seed distribution. Even distribution of plants within the seed row helps reduce weed competition, helps reduce disease pressure, and will increase both yield and uniformity of quality. The frost risk associated with early seeding can be counterbalanced by more efficient use of soil moisture.

Choosing early maturing varieties is one of the most important considerations in short season dryland regions like Saskatchewan. This is the best way to avoid late season frost damage that can reduce both yield and quality. An equally critical factor is good weed control. Good weed control systems are available. Growers contemplating dryland solid-seeded production systems should probably budget for two post emergent broadleaf weed control operations.

Diseases in Dry Bean Production Systems

Monitoring of disease occurrence in dryland production of several commercial dry bean fields across Saskatchewan from 1999-2001 revealed that anthracnose and common blight were not serious problems. This does not mean that these seed-borne diseases are unimportant. In fact, as production increases, and more seed is produced over a wider range of environments, seed-borne diseases will become extremely important. The disease situation, particularly for seed production, must be monitored closely every year. The irrigated regions of south-central Saskatchewan have great potential to become important areas for production of seed for dryland production, but an appropriate system of seed inspection and disease management will be essential for future success.
For solid seeded production systems, sclerotinia (white mold) can be expected to be a problem under irrigation every year, and will likely be a major concern for dryland production any time the second half of the growing season has above average moisture. Many susceptible crops, like canola, have been part of Saskatchewan crop rotations for many years, so it is virtually impossible to avoid this disease.

Crop Development Situation

In 2001, dry bean prices for most market classes started to rise near harvest, then continued to climb as the marketing complex accepted the scenario that no carryover was expected for the 2001 crop marketing year. This is the key feature of the successful dry bean production scenario in SE Saskatchewan in 2001. Growers improved their agronomy by climbing the learning curve based on the 2000 experiences with the crop. This means that dryland bean production will expand in 2002 because prices are expected to remain average or above through the next cropping cycle.

In 2002, Saskatchewan-based companies will offer dry bean production contracts for the first time. Potential growers are encouraged to start small, and match their production plans with their level of experience. Dry bean crops are responsive to slight changes in microclimate, so it is best to learn from smaller scale experience. A pilot crop insurance program in designated regions and for specific varieties will be in place in 2002. The pilot areas include 5 rural municipalities (RMs) in the Saskatoon-Rosthern area and eight RMs in SE Saskatchewan. Details are available from Saskatchewan Crop Insurance Corporation. Availability of risk management tools will be a key factor in development of higher value crops like dry bean.

Pinto beans grown on dryland Saskatchewan were delivered for commercial sale for the first time in 2001. Buyers were impressed by the bright, lighter coloured seed coats. This characteristic is associated with dry harvest conditions and with specific varieties. Early indications suggest that CDC Pintium has reasonable colour retention characteristics and plump seed shape, both desirable characteristics in some of the major markets like Mexico.

Genetic Improvement Situation

The bean breeding program at the Crop Development Centre will continue to focus on improving adaptation, improving canopy structure for dryland production systems, and reducing maturity of

future varieties. An additional focus will be expansion of the number of adapted market classes to help diversify the production base to match future export markets. The global dry bean industry is changing rapidly, and it is necessary to adapt to change as quickly as possible.

A key genetic objective is the development of early maturity combined with upright indeterminate growth. This combination of traits really does not exist anywhere else, but it is a key required feature for short season dryland areas like Saskatchewan. The indeterminate growth habit leads to more reliable yield in dry, warm summers, while the early maturity is an absolute requirement for cool, wet summers.

A second major objective in future dry bean breeding will be incorporation of common bacterial blight resistance. This will help ensure that the seed production system in Saskatchewan will be much more reliable and economical.

Summary

Recent experiences in research and development of the dry bean crop for dryland production systems in Saskatchewan show that we are entering the final stages of successful crop development. Committed growers and companies are rapidly developing a local base of knowledge for producing and exporting dry beans. Ongoing research in agronomy, plant pathology and genetic improvement will ensure that Saskatchewan growers will have access to better technology for this important sector of the pulse industry.

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