THE IRRIGATOR

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Promising Future for Solid Seeded Dry Beans

Jeff Ewen, PAg, Ministry of Agriculture

Irrigated dry bean production in Saskatchewan has been at a steady 5,000 to 6,000 acres for at least the last 10 years. Growing the acreage has been a struggle due to the cost of the specialized equipment, distance from processors, and lack of experience.

After consultation with many stakeholders in the dry bean industry it was realized that adapting a system for solid seeded dry beans would be the major answer to the majority of the concerns for production of dry beans in Saskatchewan. Solid seeding would take out the need for the majority of the specialized equipment and allow producers to use the equipment already required for growing all other crops on their farm. The use of this same equipment would reduce total cost of production for dry beans. If acres were to increase, interest for processors to establish facilities in the province or facilitate transportation to their facilities in neighboring provinces would be attractive. In time, growers would become experienced and have the production system tailored similar to growing lentils or field peas.

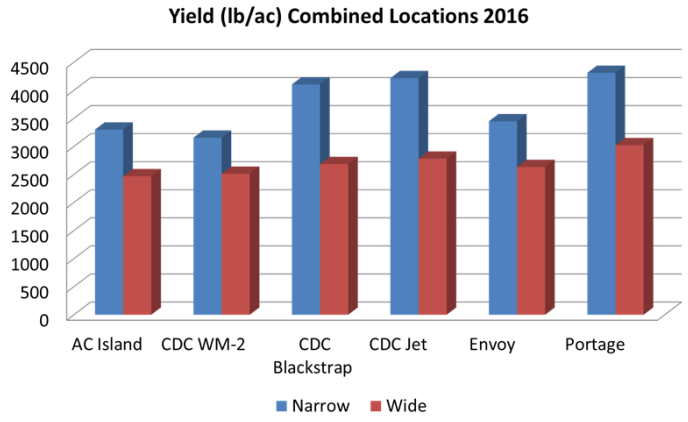
Solid seeded dry beans have been a goal from the breeding prospective for many years out of the Crop Development Centre (CDC) at the University of Saskatchewan. The CDC only grows, tests, and selects their varieties from narrow row (solid seeded) plots which are also evaluated for early maturity and pod clearance for swathing or direct harvest. The CDC program has been successfully breeding many market classes of beans including pinto, black, navy, cranberry, and yellow.

In 2016 the Irrigation Crop Diversification Corporation (ICDC) with help from the CDC established a direct comparison between narrow row and wide row dry bean production. This project took place at two sites Riverhurst and Outlook in replicated small plots. The varieties CDC Jet and CDC Blackstrap were tested in the black bean market class, Envoy and Portage in the navy market class, and CDC White Mountain 2 (WM2)

Table 1: Dry Bean Yield as Influenced by Variety and Row Spacing

	Outlook		Riverhurst		Average	
	lbs/ac		lbs/ac		lbs/ac	
	Wide	Narrow	Wide	Narrow	Wide	Narrow
Pinto						
AC Island	2415.1	3327.6	2954.2	3270.3	2684.7	3299
CDC WM-2	2292.3	3202.9	2643.6	3107.5	2468	3155.2
Black						
CDC Blackstrap	2506.4	3831	2516	4380	2511.2	*4105.5*
CDC Jet	2994.9	4032.1	3050.5	4401.4	3022.7	4216.8
Navy						
Envoy	2343.9	3171.9	2923.6	3723.5	*2633.8*	3447.7
Portage	2534.6	4164.9	3026.2	4456.2	2780.4	4310.5

Figure 1: Combined Location Yield comparison of Narrow vs Wide Row



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Irrigation Conference and AGM

All irrigators are encouraged to attend the Annual Irrigation Conference and AGM.

December 5 & 6, 2017
in Moose Jaw, SK

In this Issue:

ICDC Horticulture Demonstration Program: Year 3 Preview

Joel Peru, PAg, Ministry of Agriculture

ICDC is wrapping up its third year of the horticulture demonstration program. This year the program consisted of 9 projects looking at high value crops including red peppers, tomatoes, broccoli, cauliflower, raspberries, haskap, strawberries, shelling peas, sui choy and Bok Choy. These demonstrations are intended to show Saskatchewan's ability to grow these crops and find the most profitable means of doing so. These projects demonstrated different agronomic practices such as using disease resistant cultivars, fertility and water management regimes. Operational practices were also demonstrated and include sequential plantings, transplanting vs direct seeding and using new technologies such as photoselective netting. All trials were replicated and showcased different varieties which demonstrated what performs best in the Outlook area of the province. Table 1 gives a brief objective and description for each project in the 2017 horticulture program.

Figure 2: Pepper Trial at CISDC

These projects were developed by the Saskatchewan Ministry of Agriculture's vegetable specialist, Connie Achtymichuk, and fruit specialist, Forrest Scharf. A major objective of this program is to help existing producers solve current operational and agronomic issues they are having on their operations. The Saskatchewan Fruit Growers' Association and the Saskatchewan Vegetable Growers' Association (SVGA) communicate with the Ministry specialists and help identify their research and demonstration needs.

These projects also are intended to show new or prospective Saskatchewan producers the opportunities of horticulture crops. This year's program was featured at numerous tours and field days including: SVGA Annual Field Day, Saskatchewan Horticulture Association's Industry Tour, CSIDC Field Day, ICDC Afternoon Tour and the SIPA/CSIDC Evening Tour. The results of

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Project Title	Project Objective
Strawberry and Raspberry water and fertilizer management demonstration	Demonstrate proper water and fertilizer to help make the industry more sustainable. This project will also demonstrate differences between standard cultivars and newer genotypes under Saskatchewan growing conditions.
Use of photoselective netting to improve productivity of dwarf sour cherry, haskap, and saskatoon berry	Photo-selective netting can enhance orchard productivity, increase growth rate, reduce disease and insect pressure, and improve fruit quality. In addition; the netting reduces pest pressure, and protects plants from the drying effects of winds, hail, et cetera.
Demonstration of Sweet LaRouge Type Red Peppers	1) Demonstrate the potential to produce la rouge type red peppers commercially. 2) Provide opportunities for producers and buyers to see the crops being grown. 3) Compare cultivars for suitability in SK conditions and market.
Demonstration of Cauliflower for season long supply	1) Demonstrate the potential to provide season long supply of fresh cauliflower. 2) Compare direct seeding versus transplanting for production efficiency. 3) Provide opportunities for producers and buyers to see the crops being grown. 4) Compare cultivars for suitability in SK conditions and market.
Demonstration of Bok Choy for season long supply	1) Demonstrate the potential to provide season long supply of fresh broccoli for market. 2) Provide opportunities for producers and buyers to see the crops being grown. 3) Compare cultivars for suitability in SK conditions and market.
Demonstration of shelling peas for mechanical harvest	1) Demonstrate the potential to provide season long supply of fresh peas for fresh and processing markets. 2) Provide opportunities for producers and buyers to see the crops being grown. 3) Compare cultivars for suitability in SK conditions and market.
Demonstration of Sui Choy (Napa Cabbage)for season long supply	1) Demonstrate the potential to provide season long supply of fresh sui choy for market. 2) Provide opportunities for producers and buyers to see the crops being grown. 3) Compare cultivars for suitability in SK conditions and market.
Demonstration of Broccoli for season long supply	1) Demonstrate the potential to provide season long supply of fresh broccoli 2) Compare direct seeding versus transplanting for production efficiency. 3) Provide opportunities for producers and buyers to see the crops being grown. 4) Compare cultivars for suitability in SK conditions and market.
Demonstration of Late Blight Resistant Tomates	1)Demonstrate the potential to produce late blight resistant tomatoes commercially in high tunnels in SK 2) Provide opportunities for producers and buyers to see the crops being grown. 3) Compare cultivars for suitability in SK conditions and market.

Table 1: 2017 ICDC Horticulture Project Titles and Objectives

ICDC Horticulture Demonstration Program: Year 3 Preview *continued from page 2*

Figure 1: Broccoli Trial at CSIDC

these projects will be presented to the producer groups as well at other extension events. These projects will include an economic analysis of growing these crops, which will paint a clear picture of how profitable they can be. For example, red peppers wholesale at $2.97/lb, Broccoli at $7.74/lb and tomatoes at $2.27/lb. From the harvest that has already been completed at the time of writing this article, growing these crops in Saskatchewan provides a very high gross return. An estimate of the net return/acre will be provided in the final report. Existing producers or people who are interested in taking advantage of growing high value crops can contact the Crops and Irrigation Branch in the Saskatchewan Ministry of Agriculture for advice and assistance.

This is the second year that additional ICDC staff was hired specifically for the program. Wali Soomro, ICDC Horticulture Technologist, carried out this program with the help of ICDC, CSIDC and Ministry staff. There is a tremendous amount of labour and team work that goes into these horticultural projects due to the labour intensive nature of fruit and vegetable production.

The results of these projects will be presented at the 2017 SIPA/ICDC conference in Moose Jaw on December 5th. For more information or suggestions for next year's program, contact Joel Peru at joel.peru@mail.gov.sk or (306) 860-7201.

Saskatchewan Soybean Field Day and Roadshow

Garry Hnatowich, PAg, Research Director, ICDC

In 2017 Saskatchewan producers planted an estimated 850,000 acres of soybean. As I write this, the crop is not fully harvested and overall yields remain unknown. However, given the low growing season precipitation in wide areas of southern Saskatchewan, provincial soybean results are likely variable. Regardless, given the record acres planted, this is likely a crop that will continue to glean interest.

Given this, the Saskatchewan Ministry of Agriculture (SMA) partnered with ICDC to host a Soybean Field Day on August 17, 2017. The event was championed by Sherri Roberts, Regional Crop Specialist (Weyburn) and sponsored by the Saskatchewan Pulse Growers, Syngenta and Farm Chem. The morning focused on soybean agronomy with Dr. Dale Tomasiewicz (AAFC) discussing his study on soybean irrigation scheduling and water management. Seed treatments and treating issues were discussed by Marc Mercier (Syngenta) and Ryan Floyde (FarmChem) while I highlighted soybean varieties, N & P fertility, inoculation, seeding rate, row spacing and seeding date trials.

After a barbeque lunch the 50 participants loaded onto a bus and toured three commercial soybean fields within the Outlook region. The primary focus of the afternoon tour was on soybean diseases. Our tour leader was Dr. Dean Malvick, Plant Pathologist from the University of Minnesota. Dr. Malvick sent participants in a seek and find exercise in each field, then identified and coached attendees as to diseases found and those likely to appear as soybean production in the province becomes common.

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Field day participants identify diseases in soybeans

2017 Tile Drainage Workshop

Kelly Farden PAg, Manager-Agronomy Services, Crops and Irrigation Branch

Tile drainage is a water management tool that can help address crop production challenges related to high water tables, water logging, and/or salinity. However, proper planning, design, and construction are essential to ensure that tile drainage installations function properly and provide the intended benefits. A workshop was recently held in Outlook on March 21 and 22 in which attendees were able to learn about sub-surface drainage design and water management principals as well as become informed on the provinces new drainage regulations.

The majority of the workshop consisted of Dr. Gary Sands, University of Minnesota, and Dr. Tom Scherer, North Dakota State University, providing technical overviews of the various design and management principals and concepts that go into properly designing tile drainage projects. The workshop was developed to be interactive so that attendees could work through their own design projects.

Dr. Sands started the workshop by stating that the golden rule of drainage is to drain only when it is necessary for good soil conditions and crop growth and not a drop more. He then went on to emphasize that the most important consideration with regards to tile drainage installation is SAFETY. This includes ensuring that you have contacted Sask 1st Call (1-866-828-4888) to locate all buried utility lines prior to excavation and then also taking great care when working within any excavated trenches or holes. However, long before any construction and installation of drains can take place, a number of planning and regulatory considerations must occur.

In the initial planning phase some of the considerations for the project should include:

1. Soils - The texture of the soils in the field will impact the moisture holding capacity, infiltration rate, and saturated conductivity. These will all be considered when determining the spacing for the tile lines.

2. Topography - Is the lay of the land conducive for tile installation? Flat to gently sloping land will be more conducive to tile installation projects then complex knob and kettle topographies with steep slopes. *Soil and topography maps can be made available from the Ministry of Agriculture for much of the irrigated land in the province.*

3. Crops - The types of crops to be grown and their sensitivity to excess moisture should be considered when planning the project. A crop with a high production cost and low sensitivity to excess moisture may warrant a more aggressive tile design.

4. Outlet - This is a fundamental consideration, if there is no adequate outlet then there is no need to consider proceeding with the project. Networks of district drains exist in many of Saskatchewan's irrigation districts. In most cases these drains will be considered to be adequate outlets for drainage water. However, prior to construction the proponent must receive all necessary permits and approvals from the Water Security Agency, the irrigation district and in some cases neighbouring landowners and the RM. In many cases there may be a need for a pumped lift station if the outlet is not at a low enough elevation.

5. Drainage Coefficient - This is the amount of water to be drained in a 24 hour period. Consideration should be given to climate and crops grown. In most cases drainage coefficients will be set between 1/4 inch and 1/2 inch per day. The drainage coefficient, tile depth, and the soils saturated conductivity are all considered when determining the spacing of the tile.

After all of this has been considered, the planner can then move on to developing the system layout. Many irrigated fields will only require targeted improvements, therefore it is important to clearly identify the problem areas so that the project is not over or under designed. A proper layout will ensure that the drainage is uniform throughout the field.

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2017 Tile Drainage Workshop *continued from page 4*

Other important considerations include the grade and size of the tile. Maintaining the proper minimum grade will ensure that water continues to flow within the tile. Minimum grade standards are available in drainage guides such as the Minnesota Drainage Guide. Tile size will depend on grade, drainage coefficient, material, and size of area drained. It is important to use the proper size of tile for both laterals and mains to ensure bottlenecks do not occur in the system. Various tools and calculators are available to help planners determine the size of tile to use.

Prior to considering tile drainage it is important to clearly understand your production challenges and what you want to accomplish. Tile drainage will only provide a benefit to lands that are impacted by elevated water tables. In saline soils, the tile drainage alone will not make the land more productive. Saline soils will require applications of significant quantities of water to leach the salts downward in the soil profile before they are likely to become more productive. A general rule of thumb is that it would take 6 inches of leaching water to pass through a foot of soil to decrease the salt content by 50%.

Installation of drainage tile bordering low lying saline area at CSIDC. Significant quantities of water will be added to the saline areas to leach salts downward in attempts to reclaim land. Installation took place in 2017.

Promising Future for Solid Seeded Dry Beans *continued from page 1*

and AAC Island in the pinto market class. The combination of results from both sites resulted in narrow row production yielding from 20 to 40% more than wide rows. The black and navy market class beans showed the highest yields in these trials. Table 1 and Figure 1 (page 1) show complete results.

The completion of this project showed promising results for narrow row dry bean production. The results prompted planning for the identical small plot project to try and replicate the same results in 2017. These results have also resulted in forming a field scale project for 2017 comparing CDC Blackstrap black beans in narrow rows seeded (10.5”) with an air seeder compared to wide row (22”) vacuum planted. The field scale demo also compared swathed and direct harvesting in the narrow row spacing. The 2017 projects have been successfully harvested and are in the process of formulating final results and reporting. Detailed reports will be available later this winter or early next year. Results will also be presented at the upcoming SIPA/ICDC Irrigation Conference in Moose Jaw this December.

For more information on the results from the 2016 project or information on the 2017 projects contact Jeff Ewen - Irrigation

Control Strategies for Sclerotinia on Irrigated Rotations

Gary Kruger, PAg, CCA, Ministry of Agriculture

Integrated pest management is essential for a balanced effective approach to control insects, mites, weeds and plant diseases in irrigated crops. Implementing this strategy limits the potential for development of resistance to the control methods within the pest population. Sclerotinia affects over 400 species of broadleaf plants and is a major pest common to our important economic broadleaf crops such as canola, sunflower, soybean, dry bean, and field pea. This disease has potential to severely reduce seed yields. The biological organism, Coniothyrium minitans, has been formulated into a commercial product known as Contans. It provides a biological control option for sclerotinia. It may be applied to irrigated soils in fall as a spray with a light harrowing to mix the product with the surface layer of soil or "fertigated" with fall irrigation water when recharging soil moisture following harvest. Fall is the best timing for the control agent because this provides more opportunity for the disease control organism to infect the sclerotia bodies within the plough layer.

Once the Contans organism is established at an adequate population in the soil, the lowest cost annual top-up rate to maintain the population of the Contans fungus in the soil is the least costly disease control for sclerotinia available. The major threat of sclerotinia in cropland comes from long term buildup of sclerotia bodies in annual cropped land from growing previous susceptible crops. This risk is enhanced by successive susceptible crops and occasionally can "break out" under ideal humidity conditions in any susceptible crop. The humid conditions within an irrigated crop canopy are an ideal environment to support the buildup of sclerotia bodies in the soil. Contans is able to systematically minimize this threat. Another strength of choosing Contans to control sclerotinia is that the strategy is not vulnerable to unfavourable weather conditions when the control agent needs to be applied. Untimely rainfall cannot derail control of sclerotinia because muddy soils prevented fungicide application at the correct stage of the vulnerable crop. The sclerotinia control agent is in the field attacking germinating sclerotia bodies whenever they decide to initiate growth.

The disease has potential to reduce canola and bean yields by as much as 50% under favourable disease conditions. 2017 was a drier summer with little early season rainfall. Sclerotinia infection in dryland fields were almost nonexistent. Irrigated fields faced a reduced threat because of the less humid weather, but that threat did not diminish to zero. A recent Agriculture Canada research study showed that crop rotation has minimal impact on sclerotinia because of its life cycle and breadth of hosts. Using the biological tool, Contans, is one way to reduce stress in your disease control decision making and improve your irrigated crop yields.

Saskatchewan Soybean Field Day and Roadshow *continued from page 3*

A post tour survey of registered participants revealed that the overwhelming majority felt the event increased their knowledge of soybean production and would consequently be used to make changes to their farm operation or agronomic consulting. Participants also clearly stated that the event should be repeated. Therefore ICDC and SMA are already planning an event next summer that will be all about beans – to include not only soybean but also dry bean. Look for more details on this, and other events planned for next summer, on our ICDC website at http://irrigationsaskatchewan.com/icdc/, details will be posted once events are finalized.

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