THE IRRIGATOR

November 2023

Research Director's Corner

Gursahib Singh Ph.D. , Research Director
Irrigation Crop Diversification Corporation

Hello Irrigators,

As the sun sets on another challenging summer in 2023, I want to extend my warm greetings and take a moment to reflect on the experiences we've all encountered. Undoubtedly, each of you has a story to tell, and I am here to share some insights from my perspective on the 2023 field season.

You might have already come across these headlines in the Western Producer:

"Sask. irrigation interrupted due to concerns over pump."

"Sask. RM declares ag disaster despite irrigation."

These stories serve as a reminder that 2023 was a year riddled with trials for us at ICDC. From battling insects (blister beetles and grasshoppers), prompting multiple rounds of spraying, to managing irrigation systems in one of the driest years of the past decade, we faced our fair share of challenges.

Amidst these adversities, I'm pleased to report that we navigated through to achieve yet another successful research year at ICDC. This accomplishment wouldn't have been possible without the dedication of our entire ICDC team, including our full-time staff, support staff, and the hardworking summer students. I also want to extend my heartfelt appreciation to the Ministry employees stationed at Outlook and the AAFC staff at CSIDC. Your unwavering commitment has truly made a difference in our endeavors.

This year held a special significance as it marked our station field day (CSIDC field day) revival following its pause due to the COVID-19 pandemic. Welcoming close to 200 attendees and serving over 300 meals at lunch, the field day was a true triumph. The credit for this accomplishment goes to our ICDC/SIPA directors, the Ministry staff, and the AAFC team, who seamlessly collaborated to bring this event to fruition.

As we take stock of the expansive scope of the 2023 research program at ICDC, it becomes clear that diversity and innovation continue to define our pursuits. Guided by a proactive approach and responsive to industry demands, this year has seen us venture into new territory. A standout among these endeavors, spotlighted during our field day, was our exploration of the application of foliar nitrogen-fixing bacteria (Envita/Utrisha) in both wheat and canola (generous financial support from Saskwheat and Saskcanola). Another avenue we delved into was the examination of the benefits of humic acid in canola and flax (project again supported by SaskCanola and SaskFlax). Additionally, we investigated various granular inoculant products available for peas, striving to discern their relative benefits (supported by Sask. Pulse Growers).

Despite the prevailing dry conditions this year, our plots were not exempt from encountering a variety of endemic diseases. Notably, we observed the presence of fusarium head blight, stripe rust, stem rust, leaf spots, and bacterial leaf streak. Impressively, each of these diseases became a focal point of independent research projects. It satisfies me to report that our disease-focused experiments yielded positive outcomes even in 2023 weather conditions. As previously highlighted, insects emerged as a significant concern throughout the year. We had

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Research Director's Corner

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dedicated individual studies to address this challenge, focusing on areas such as lygus bug impact in flax, flea beetle behavior in canola, and grasshopper damage in cereal crops. Although we struggled to maintain insect populations below the threshold in other on-site projects, I'm pleased to share that our dedicated insect study provided sufficient insect pressure to differentiate between treatments effectively.

Our pursuits also extended to projects and ideas from our invaluable irrigators and farmers. At ICDC, we're committed to fostering collaboration and innovation. We're eager to hear your ideas and explore avenues through which we can collectively make strides. If you have a potential idea, please reach out to any of our staff members. It's our hope that through collaboration, we can transform ideas into action.

This year, ICDC is on the cusp of concluding several major projects spanning multiple years. We intend to consolidate the results of these endeavors into our Research and Demonstration report, with plans to actively engage in winter extension events. These platforms will allow us to delve into the outcomes of these projects and share insights with the wider community.

With our sights set on the horizon, I'm excited about the future and its potential for further agricultural research advancements. As we bid farewell to the challenges of 2023, we look forward to the future with enthusiasm and a commitment to pushing the boundaries of agricultural research at ICDC.

Dr. Singh presenting at field day in Outlook.

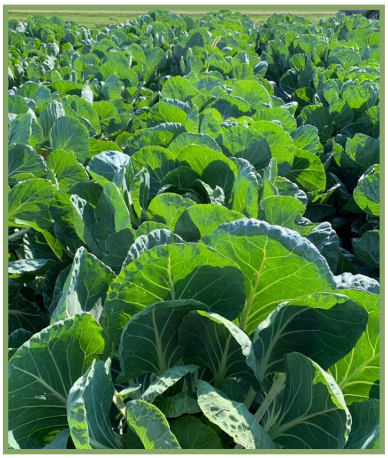
2023 ICDC staff. Shannon, Damian, Gursahib, Angela, Lacey, Brenda, Bottom: Chastan, Tristen , Bekah, Spencer. Missing: Ted, Maddie, Garry

2023 Horticulture Update

Cara Drury, PAg, Irrigation Agrologist, Outlook
Saskatchewan Ministry of Agriculture

What does it take to be a Brussel sprouts grower?

There are market opportunities for Brussel sprouts in Saskatchewan, as well as in other provinces. Canada currently imports approximately 11,500 mt of Brussels sprouts and produces only 6,800 mt (Statistics Canada). Saskatchewan is currently reporting 100 acres of production, amounting to 120 mt of marketed production. When looking at the farmgate value, it equals out to roughly $7,240/ac (Statistics Canada). These numbers can make Brussels sprouts seem like a crop to consider, but is it really worth it?



These tasty little cabbages are a staple for many Thanksgiving suppers, but what does it take to grow them? Production considerations start off similar to many crops: crop rotation, pre-emergent herbicide, fertilizer, and pesticide applications. But unlike other crops, you now need to add in starting seedlings, transplanting, available and approved pesticide options, topping, how to harvest, labor requirements, storage, packaging and the marketing of a perishable product. An eye for detail, the opportunity to focus on timely field applications and the understanding of fresh product marketing is needed when managing this crop.

For a full look at the production cycle of Brussels sprouts the Saskatchewan Vegetable Growers' Association (SVGA) has contracted ICDC to run an Agricultural Demonstration Of Practices and Technologies (ADOPT) trial, Brussels sprout varieties for fresh market in Saskatchewan. Preliminary results have been quite exciting, and the crop is looking great. Finalized results and a detailed account for production considerations will be available this winter, published in the ICDC Annual Research and Demonstration Report, as well as discussed at the Irrigation Saskatchewan Annual Conference in December. For more information about this crop or other irrigated horticulture production please contact: Cara Drury PAg, Irrigation Agrologist, Ministry of Agriculture cara.drury@gov.sk.ca.

Adaption of Fertigation for Irrigation Producers

Sara Ingell, AAg, Irrigation Agrologist, Outlook
Saskatchewan Ministry of Agriculture

Fertigation is a tool available to irrigation producers to apply nitrogen fertilizers effectively and efficiently to crops in split applications. Split applications help to better match the timing of the nitrogen applications to the soil with the timing of plant uptake of nitrogen from the soil. As the plants grow and roots systems advance, they become more competitive with soil microbes which in turns leads to less denitrification and nitrous oxide emissions from the soil.

Historically, potatoes have been the most common crop that fertigation is utilized. This is due to potatoes having high nitrogen needs over a wider window of time than most crops, as well as the fact that they are a relatively inefficient crop at capturing nitrogen from the soil. Fertigation has been used for crops like canola and wheat, however there isn't a consensus recommendation as to the best time for applying nitrogen through the pivot. In 2023, ICDC conducted a one year Agricultural and Demonstration of Practices and Technologies (ADOPT) project demonstrating fertigation on canola, wheat, and dry beans. This demonstration will help inform on optimal timing for fertigating commonly grown crops under irrigation. There is also focus on 4R fertilizer management strategies (right source, right rate, right time, and right place) and practices that will improve productivity and sustainability. Stay tuned for the final results in ICDC's Research and Demonstration Report.

Fertigation is a best management practice for producers to help reduce nitrous oxide emissions in irrigated crop production. If producers are interested in setting up fertigation on their operations, funding is available through the Sustainable Canadian Agricultural Partnership in the Irrigation Efficiency Program.

For more information on fertigation please contact: Sara Ingell AAg, Irrigation Agrologist, Ministry of Agriculture sara.ingell@gov.sk.ca.

Saskatchewan Irrigation Information Booklet

Saskatchewan is committed to growing the agriculture irrigation sector. The Provincial Growth Plan has targets of 85,000 acres of new irrigation by the year 2030. In the three year period from 2020-2022 the province experienced growth of over 35,000 acres of new irrigation. Recent analysis has shown that irrigation increased the value of primary production by $869.00 per acre annually in the Lake Diefenbaker Development Area. The Saskatchewan Irrigation Information Booklet is a new annual publication that will provide an overview of Saskatchewan's irrigation industry by detailing statistical information and data. This booklet will provide data on irrigated acres and districts in the province, crops being grown under irrigation, and climatic data. This publication can be accessed on the Government of Saskatchewan webpage under the Irrigation section. For more information please contact:

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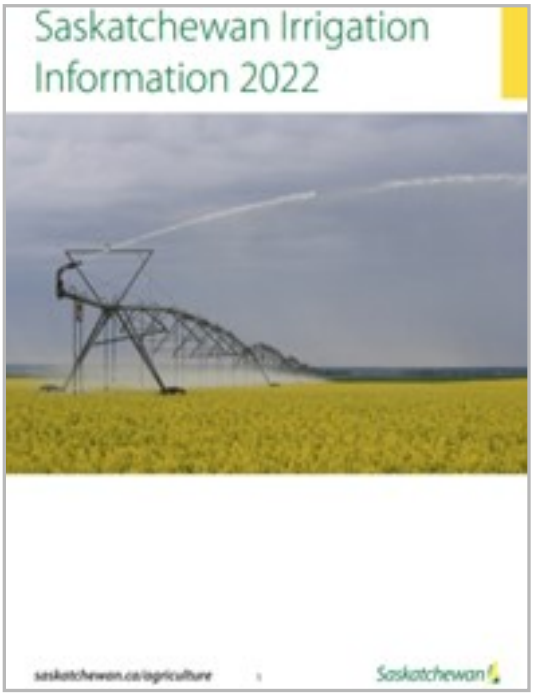


A New Pulse on the Prairies

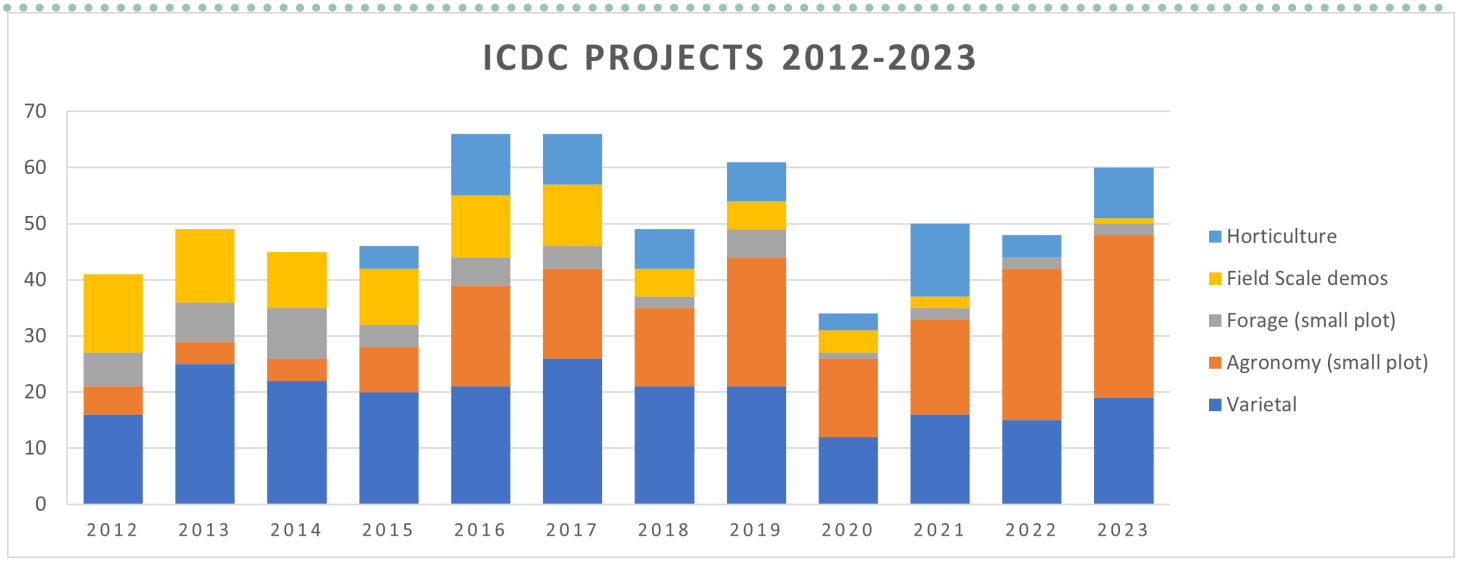
Alireza Akhavan, PhD, AAG, Provincial Disease Specialist, Regina,
Morgan Coté, AAg, Irrigation Agrologist, Outlook
Saskatchewan Ministry of Agriculture

Common bean (*Phaseolus vulgaris* L.) is consumed worldwide as a source of protein. In Saskatchewan, dry beans are mostly produced in the irrigated area surrounding the Lake Diefenbaker reservoir. High yield is achieved when drought stress is eliminated particularly during the flowering and pod-filling stages. Several bacterial diseases affect common bean. These include common bacterial blight (CBB), halo blight, and bacterial brown spot. Although all three are considered important, CBB causes economic loss worldwide, and seems to be more prevalent in Saskatchewan.

Common bacterial blight is caused by *Xanthomonas axonopodis* pv. *phaseoli* (*Xap*). Despite being seed-transmitted, CBB is considered a foliar disease. Initially, symptoms appear as small, water-soaked leaf lesions that enlarge and become necrotic. Often, lesions have a chlorotic boundary. Individual lesions may coalesce causing plants to look burnt. Symptoms may also be observed on stems, pods, and seeds. Pod lesions are circular with chlorotic margins and may look greasy. As disease progresses, pod lesions may appear brown to red. Infected seeds can be identified by yellow to brown spots. Germination of diseased seed is reduced, and seeds have low vigour. Sometimes infected seeds have no visible symptoms and can germinate vigorously while they carry many bacterial cells leading to disease development at a later stage.

Overhead irrigation has effects like rain; it can favour bacterial dispersal from colonized to healthy leaves and plants. This is the key factor in increasing the disease in a field. Overhead irrigation and rain may also help the bacterial population to enter the plants through leaf openings and develop symptoms subsequently. Both overhead irrigation and rain form a layer of water on the host plant surface, which results in an ideal multiplication site for this pathogenic bacterium. The film of water also helps to increase nutrient release from plant leaves, which can enhance the availability of nutrient sources for the pathogen.

Since CBB is a seed-borne pathogen, using disease-free seed is critical, particularly when growing on cropland with overhead irrigation or in wet areas. This is important because all outbreaks of the disease have resulted from planting infected seed. Producers must also be careful not to over irrigate. Sound rotation practices may also help decrease the pathogen, as the pathogen was shown to be able to stay viable over winter in stubble in some bean-growing areas. Copper-based bactericides can be applied to manage bacterial blights in season, but their effectiveness may be limited when the environmental condition is conducive for the development of the disease.



2023 ICDC program

Cereals	
Fungicide Timing to Mitigate Fusarium Head Blight in Cereal Crops	Fall Rye Variety Eval for Irrigation vs Dry Land Production
Oat N Response	Saskatchewan Variety Performance
Saskatchewan Variety Performance Group Regional Oat Trial	Saskatchewan Variety Performance Group Regional Durum Trials
Standing up with your own stalk: Do the plant growth regulators available for spring wheat improve the productivity of current CWRS varie-	Efficacy of fungicides active ingredient for fusarium head blight (FHB) and deoxynivalenol (DON) management in wheat.
Saskatchewan Variety Performance Group Regional Wheat Trials - Hex 1 Wheat	Saskatchewan Variety Performance Group Regional Wheat Trials - Hex 2 Wheat
Optimum Management of Oats Can Vary Between Varieties	Demonstration of Wireworm Control in Spring Wheat
Demonstration of cover crop option following row drop harvest on Irrigated land	Demonstrating the Efficacy of Foliar-Applied Nitrogen Fixing Bacteria for Wheat
Do Barley Varieties Differ in Response N Fertility, PGR, and Fungicide?	Development of Field-Ready Cultivars of Canada Western Soft White Spring Wheat
Saskatchewan Variety Performance Group Regional Wheat Trials – Win-	Demonstrating oat seeding rate as a cultural control method for control-

Oilseeds	
Canola Variety Trial	Response of Canola and Flax to Humic acid coated P fertilizer (MAP) rates
Demonstrating benefits of seeding date and rate on canola yield and quality	Demonstrating the Efficacy of Foliar-Applied Nitrogen Fixing Bacteria for Canola
Lygus in flax	Saskatchewan Variety Performance Group Regional Flax Trials
Growing hybrid and composite mustard under irrigation in Saskatchewan	Flax Seeding Dates and Seeding Rates

Specialty	
Lupin Herbicide treatments for crop tolerance on early varieties	Hemp Seeding Date Demonstration for Grain Production
Grasshopper control with cultural methods	Efficacy of GWN 9790
Fertigation Demonstration on Wheat, Canola, and Dry Beans	

Pulses	
Demonstration of Lupin as an Alternative to Field Pea or Lentil	Short Season Soybean Regional Variety Trial – Herbicide Tolerant
Effect of Tillage Management and Seeding Date on Dry Bean Establishment and Yield.	When does it pay to apply fungicide to faba beans in sk and what does the weather have to with it?
Biological Inoculant Trial in Pulses	Long Season Soybean Regional Variety Trials - herbicide Tolerant
Conventional Soybean Variety Trial - Irrigated vs dryland	P Fertilizer Rate Response in Irrigated Dry Bean
Saskatchewan Variety Performance Group Pea Trials	Saskatchewan Variety Performance Group Faba Bean Trials
Adaptation of Novel Pulse Crops	

Horticulture	
Fall Foliar Application of Low Biuret Urea to Improve Sour Cherry Overwintering Success in Saskatchewan	Containerized Soilless Blueberry Production Grown under Protected Culture in Saskatchewan
Training Apples on Trellis Wire to Create a High-density Wall Production System	Determining size profiles of Saskatchewan grown cantaloupe for a retail market
Demonstration of commercial chicory production	Efficacy of increased pollinator habitat and forage on pumpkin produc-
Brussels Sprout varieties for fresh and processing markets in Saskatchewan	Screening Cauliflower and Broccoli Cultivars for Heat Tolerance

Forage	
Developing Target Yield Nitrogen Fertilizer Recommendations for Irrigated Silage and Grain Corn	Varietal Assessment of Forage Seed Production
Demonstration of Barley Under seeded with Ryegrass for Forage Produc-	Demonstrating Forage Options in Cropping Rotations

Soil	
Strategies to Build Sustainable Phosphorus Levels and Optimize Water Use Efficiencies on Low P Soil.	

For more information on ICDC's projects visit the ICDC website under *ICDC Program* to view project lists and objectives or under ICDC Publications for project results. Website: https://irrigationsaskatchewan.com/icdc/

Advancing Agricultural Research and Innovation: ICDC's Collaborative Growth and Future Possibilities

Gursahib Singh Ph.D. , Research Director
Irrigation Crop Diversification Corporation

ICDC maintains robust collaborations with the SK Ministry of Agriculture and Industry, particularly with commodity groups. Acknowledging ICDC's potential as a research hub, the ministry and commodity groups have crafted a strategy to allocate grant funds to ICDC to bolster infrastructure and acquire necessary equipment.

ICDC research program has witnessed remarkable expansion in recent years. It was originally initiated under the leadership of our former research director, Garry Hnatowich, and has continued to progress with the current ICDC team. Our strong partnerships with AAFC, the Ministry, and commodity groups have established a solid foundation for essential irrigation-related research in the province. During meetings earlier this year between ICDC staff and representatives from the Ministry, Saskwheat, Saskcanola, and Saskatchewan Pulse Growers (SPG), a compelling proposal was presented, outlining the specific needs (equipment) to enhance our research capabilities. The distinctive value of ICDC as an irrigated site resonated deeply with all stakeholders. Building on these alliances and our positive momentum, we skillfully navigated the funding process to ensure the acquisition of necessary resources, further accelerating ICDC's growth trajectory.

As a testament to this collaboration, the Ministry and commodity groups, who have collectively pledged a grant amounting to $600,000 for ICDC's equipment procurement, distributed as follows:

- SK Ministry: $100,000
- Saskatchewan Wheat Development Commission: $200,000
- Saskatchewan Pulse Growers: $200,000
- Saskatchewan Canola Development Commission: $100,000

Presently, ICDC benefits from access to the small plot research equipment housed at CSIDC, courtesy of our workplace arrangement with AAFC. However, given the substantial scope of both programs (AAFC and ICDC), our staff occasionally encounters delays when seeking to utilize essential equipment during busy periods. Regrettably, this situation has somewhat impacted the progress of our research initiatives. Considering these considerations, ICDC's board of directors endorsed a comprehensive wish list and subsequently shared it with our funding partners.

Outlined below are a series of upcoming enhancements that we anticipate integrating into our site within the upcoming year, providing a revealing glimpse into the evolution of our capabilities. The investments earmarked for equipment at ICDC encompass vital assets, notably a small plot combine and variable rate irrigation system. Additionally, among our planned acquisitions, we have identified attachments for ICDC-owned Lee Spider Classic high clearance equipment, a research-focused drone (a technology exhibiting promising results in agricultural research), a dockage machine, a tissue sample grinder, and plot mowers. This collective endeavor underscores our steadfast commitment to advancing agricultural research and fostering innovation, amplifying ICDC's essential contributions to the industry and its prospective developments.

Concluding on a note of gratitude, we sincerely thank all our funding partners for recognizing the potential of investing in ICDC. We aspire to reciprocate their support through the excellence of our renowned research program.

Funding partners provide ICDC with grant dollars for capital investments to enhance research capabilities.

Sask Wheat Development Commission
Saskatchewan Pulse Growers
SaskCanola
Saskatchewan

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Sara Ingell, **AAg,** Provincial Irrigation Agrologist, (306) 860-6514 Specialty Areas: Agronomy and Irrigation Scheduling

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