

Building Canada's New Strategy



2006 PRRCG Report

Inside:

- New ideas for Canada's system
- Spotlight on key issues
- First look at new crop varieties

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Building Canada's new strategy

The winds of change blew strong in Banff, Alta., as the committees of the PRRCG recommended new crop lines amid intensive discussion of new ideas for Canadian research and development.

With all the challenges facing Canadian agriculture, a clear bright spot is the promise of new crop varieties with improvements and innovations to support the industry and shape a new, more prosperous future.

That fact provided an air of optimism and renewal to the picturesque alpine setting, as the Prairie Registration Recommending Committee for Grain (PRRCG) held its annual rite of passage for potential new crop varieties in Banff, Alta.

In all, the four newly independent crop committees of the PRRCG recommended more than 30 new crop lines for registration, each with a range of important new production and market benefits. But it wasn't just crop upgrades that lent the crisp mountain air a feeling of change.

New ideas to dramatically shift the very future of Canada's crop development system – how it's funded, how it operates, who it benefits – were front and centre. A series of thought-provoking presentations and a lively panel discussion brought to light the major issues and fueled debate on how to build a new strategy to re-energize crop development and keep Canadian agriculture competitive.

For years, the PRRCG had been a forum for talk of major change. In 2006, it was clear that time of change had arrived.

In fact, the year would be the last for the PRRCG as it has been known. With the completion of new structural changes that have been underway, 2007 will mark the first meeting of the new Prairie Grain Development Committee – a name change that reflects a formal shift in power and independence from the main body to each of the PRRCG's former subcommittees.

Those former subcommittees – for years known as the Wheat, Rye and Triticale Subcommittee, the Barley and Oat Subcommittee, the Pulse and Special Crops Subcommittee and the Oilseeds Subcommittee – have undergone a transition to become, in name and practice,

formal independent recommending committees. Each new committee has undergone a transition to deal directly with the Canadian Food Inspection Agency's (CFIA) Variety Registration Office, including operating under its own procedures, as approved by the CFIA.

The new Prairie Grain Development Committee will continue an umbrella function to facilitate joint meetings and speak on issues of shared vision. It will consist of the four new committees, along with the Western Canadian Canola / Rapeseed Recommending Committee.

Along with updates on structural changes, 2006 PRRCG meeting discussion focused on the farm income crises, Canada's challenges in keeping up with competitors, the implications of genetic ownership and host of other pressing issues, all of which further underscored the need for new approaches to crop research and development.

This Meristem Land and Science 2006 PRRCG Report: Building Canada's new strategy is a guide to all the changes and new crop lines to come. It provides a window on a new course for Canada's crop industry – a powerful economic force with widespread bearing on thousands of livelihoods, vast areas of land, the food system and public health.

The road to variety registration

The key steps and the role of PRRCG

The steps toward variety registration constitute a long process for the many crop lines developed every year at breeding programs across Western Canada.

The breeding work itself can take from six to 10 years or more, depending on the crop and the approach. This is followed by several years of Prairie-wide testing, as well as a thorough evaluation by the region's top crop experts, who have operated under the PRRCG banner.

The best performers are recommended for federal variety registration to the CFIA's Variety Registration Office, which makes final decisions. This journey can be broken down into five key stages.

1. Developing a breeding strategy

The first stage begins at the crop breeding level. Plant breeding institutions, with broad input from a variety of stakeholders, develop breeding strategies based on a wide range of production and market factors. Whether the goal is to find a niche and fill it, boost the performance of tried and true variety types, or come up with an innovative groundbreaker, the strategy ultimately settles on targeting a complex mix of traits. These include everything from agronomic, yield and quality characteristics, to resistance against important diseases and pests.

2. Creating genetic variability for traits of interest

Searching for this cocktail of traits and pulling them together involves years of breeding and selection. Breeders begin by selecting parental germplasm from various sources, based on the goal of the breeding project. Populations are then produced, assessed for the traits of interest and selected for advancement. The process is repeated for several generations until the package of desired traits of are "fixed."

Lines put forward for registration are typically the product of six to 10 years of breeding. In some cases, this time may be reduced through the use of off-season nurseries or advanced breeding and selection techniques.

3. Prairie-wide testing of top prospects

Once breeders are satisfied they've developed a crop line with potentially beneficial traits, the line can be put forward for testing across the region. These Prairie-wide tests - known as the "co-op" trials - are a co-operative effort among breeding institutions and others to facilitate testing under a broad range of soil and climatic conditions. These trials

are administered by committees that have operated under the PRRCG, which includes nearly all the major Prairie crop development researchers, along with industry, producers and various end-user representatives.

4. Evaluation and recommendations

The crop lines that survive this rigorous testing can be put forward by the plant breeder for support of registration at the PRRCG meeting, held every February. Since 1989, the PRRCG's mandate has been to act as a recommending body to the CFIA, which makes all final decisions on which candidate lines are approved for federal variety registration. PRRCG members critically examine the data generated on the candidate lines and decide which to recommend to CFIA. Depending on the crop, candidate lines must have demonstrated equal-to-or-better-than performance over standard or "check" varieties, to gain support for registration.

Recently, the PRRCG has undergone a transition to shift formal recommending power to each of the former PRRCG subcommittees. These four subcommittees essentially operated independently, with the PRRCG executive umbrella providing a rubber stamp on subcommittee recommending decisions. However, the new structure will allow the new committees to handle their own appeals processes, operate under their own CFIA-approved procedures and deal directly with CFIA. As a result, 2007 will mark the first meeting of the former PRRCG participants under the new name "Prairie Grain Development Committee," which will continue an umbrella function to facilitate joint meetings and speak on issues of common interest.

5. CFIA Variety Registration Office grants final approval

Crop lines that fall under the mandate of the new recommending committees that have traditionally operated under the PRRCG banner, must still be assessed through the committee system before they can advance for consideration be recommended for registration. The committee recommendations are forwarded to the CFIA's Variety Registration Office, which uses them as a basis to determine if the crop lines will be granted final approval as new registered varieties for Canada. A decision on most lines is made within a year of the committee recommendation, and the large majority of these are accepted, barring unforeseen plant safety or market concerns.

Time for a new game plan

Public variety development needs serious change to attract new funding and build a strong future.

What is the future of public variety development in Canada?

It's a question that in recent years has been a lightning rod for debate in Canadian agriculture.

Despite a strong track record of success and proven high investment value, public variety development has grappled with determining its role and finding stable funding support, as agriculture enters a new era with a range of social, political and economic pressures.

One person in a unique position to provide perspective on the answer is Dr. Gordon Dorrell, the now retired former Assistant Deputy Minister of Agriculture and Agri-Food Canada's Research Branch. In a plenary presentation at the 2006 PRRCG meeting, Dorrell recapped the history of public variety development and delivered advice on how best to ensure a strong system for the future.

"You've got a good system that works, but you need more resources," Dorrell told the roughly 300 PRRCG participants, representing a cross section of scientists, farmers and other industry representatives. "You need to replace some facilities, and you need to develop a common plan that can be shared with decision makers at an early stage."

There are a lot of challenges, he says. "At the end of the day though, you need to build on your strengths and consider proposing some serious changes to the way you do business. The status quo is not sustainable."

Adjusting to new playing field

Public variety development has long played a critical role in the success of Canadian agriculture, says Dorrell. However, as governments with limited resources face rising demands for funding from many sectors, agricultural research and development has come to be viewed by some politicians and officials as a luxury they can't afford.

With the farm income crisis of recent years and a host of other challenges such as BSE and avian flu, agriculture is typically considered a problem rather than an economic opportunity.

The result has been a slowdown in both federal and provincial funding of agricultural research and development, he says. The impact has been buffered to some extent by new provincial expenditures in Alberta, Ontario and Quebec, in support of market initiatives such as specialty crops, horticulture and dairy. But overall there has been a

fundamental re-balancing of both the funding and delivery of agricultural research and development in Canada.

With the decline in direct federal delivery, the private sector has increased plant breeding in a number of crops. Also, producer associations and commodity groups have raised funds through check-offs to fund or leverage funding for their own specific objectives.

"Clearly, there are more players and there is more research being done," says Dorrell. "Therefore, I would say this re-balancing is a positive element in our history."

Political funding dilemma

Despite this, the fundamental problem of a lack of adequate funding for variety development remains a major issue in several key crop areas. Finding additional public funding to address this need is a difficult challenge.

"Politicians are faced with a serious dilemma," says Dorrell. "They know about the return on investment from variety development. They've heard it before and it makes sense to them. They're constrained however by the finite funds allocated to each so-called political sector. The reality in agriculture is that we are a political problem and opportunities tend to be associated with responding to farm income issues."

Complicating matters is the evolution of public policy. For a long time, there was an understanding that the federal government would conduct research across Canada to introduce, improve and protect crops. Provinces would conduct extension and focus on crops adapted to their region. Universities would educate agriculturalists and conduct academic research.

"It was a very simple policy, with everything neat and tidy," says Dorrell. "However, those lines of responsibility were blurred immediately, and we ended up with a variety of cooperation and competition. This led to organizations trying to coordinate specific activities across provinces and funding jurisdictions. Typically, cooperation worked when it was in peoples' vested interest to cooperate."

Governments generally adhered to the principle that they would intervene only when there is market failure, he says. Once the private sector demonstrated an interest and capacity to provide competitive varieties in a specific crop area, public programs in those areas tended to be re-focused.

"As a result, public breeding moved away from hybrid crops to open-pollinated crops, and the private sector has filled in very well," observes Dorrell, citing canola and corn.

However, more recently, agricultural research and development policy has been affected by the expansion of crop protection companies into variety development using plant biotechnology. This has contributed new issues related to ownership and access to genetics and genetic processes, which have placed restrictions on variety development and lead to new concerns and new relationships between the public and private sectors.

The result is potential for a continued strong role for public variety development, particularly in areas where the public effort remains competitive and valuable, and in areas that warrant protection of the public interest.

Image problem key hurdle

Maintaining and strengthening this effort where it makes sense is a worthy objective, but the narrow prospects for attracting new funding remain. A key hurdle is the political and public perception of Canadian agriculture as a money drain.

"The farm crises that have occurred over the past few years – BSE, avian flu, droughts, floods, the list goes on, these have costs rising to the billions. When you couple this with the costs of the ongoing stabilization of farm income, the average taxpayer is probably surprised that the public funding for variety development is as high as it is."

The bottom line? "I'm not optimistic you're going to have great success asking the public sector to do more of the same with more money, regardless of the return on investment," says Dorrell. "There are just too many people looking for more money at the present time."

Time to act now

There is, however, a silver lining, he says. "Anytime governments change, they're looking for new initiatives. They're looking for new ideas to solve problems and make them look good. We're in one of those times."

Public variety development also has clear strengths to work with, he says. There is broad support of the need for enhanced variety development, and the public network has a good track record of delivering value.

Farmer organizations now have a history of collecting money and participating in strategic decisions on scientific direction. Different levels of government have considerable experience in cooperating with each other. Also, perhaps most important, variety development resources are viewed generally by Canadians and politicians as a political asset.

A vision for a new model

The public variety development sector should build on these strengths and consider proposing some major changes to how it operates, suggests Dorrell.

"You have a tremendous base. I suggest you consider your shared values and your willingness to cooperate. Develop a strategy to develop an integrated public variety development system that combines all your programs, and that moves forward into a common planning basis."

Reducing non-productive program overlap and the duplication of programs and facilities is a key step, he says. "This can be difficult, because we all have particular vested interests. But this is a serious public perception problem that needs to be addressed."

The sector could develop a scaleable plan that was non-threatening and could become a pilot project, he says. "For example, take a particular crop and see how it could be managed as a consortium. Everybody would have their own money, but you would behave as a unit. This would include long-term planning for the replacement of senior staff.

"If I was a producer, I think I might be happier how my money was being spent, if I saw there was a high level of co-ordination and co-operation."

The talent to pull it off

All varieties coming out of this approach could be managed by the consortium, he says. "For once, we would have a common approach to royalties, ownership and issues like that, which have a tendency to confuse producers and others."

Any consortium should be managed jointly by all key players, including senior managers, scientists and producers, he says. End users should also be brought into the decision making process at an early stage. A few institutions operate this way already, but formalizing and promoting that process would improve delivery and address public concerns about duplication. "This can't be seen as just a science undertaking."

When it comes time for attracting new funding, it's crucial to solicit funds as part of targeted initiatives with specific benefits, he says. "Don't simply ask for a 10 percent increase to do more good things – that doesn't work anymore. But people like to support specific things that make sense, improve output and are more efficient."

Being unified, specific, consistent and realistic is critical to success when dealing with politicians and other funding decision makers, he says. "Obviously, there are many challenges, but I think you've got all the talent to pull it off."

Case study: Iowa's soybean success

Producer check-off support provides a critical anchor.

Dr. Walter Fehr's soybean breeding program at Iowa State University is recognized as one of most successful programs of its kind. But the program success isn't measured in varieties alone – its also measured by the partnerships that drive activity, the educational benefits for students and the overall impact on supporting a strong soybean industry.

At the 2006 PRRCG meeting, Fehr identified key ingredients that make his program effective and sustainable, providing Committee members with a case study as the plant breeding community continually strives for better systems.

Key ingredients

Nurturing young minds. When Fehr was an undergraduate student, he benefited greatly from the mentorship and opportunities provided by leading plant breeders at the University of Minnesota and Iowa State University.

"I had the privilege of working with three wonderful plant breeders," he says. "What I learned from them is it is possible to successfully integrate education, basic research and variety development at a university."

One of these breeders gave Fehr an internship and an independent research project. "That really ended up launching my career in plant breeding."

Training the next generation. As an educator at Iowa State University, Fehr has attempted to return the favor by providing many internship opportunities for promising students. "I have up to eight undergraduate student interns each fall, and part of their responsibility is to design a cultivar development program from start to finish for the traits that we work on."

Fehr also takes on many graduate students and places a strong emphasis on practical experience as part of their education, which typically includes managing a part of the cultivar development program. "One of the most gratifying things about being a university professor is watching a young person walk into your office who doesn't have a clue of how to manage a research program, and leave after their graduate studies with the confidence that they can do that."

This aspect is often overlooked when people attempt to assess the economic value of breeding programs, he says.

"I have no clue as to how I would help young people become managers of research programs if they didn't have the opportunity to do it working with me as a graduate student."

Focus on innovation. Working with a crop that enjoys strong private sector investment, Fehr has focused on areas of innovation that complement other efforts. "I've attempted to work in areas where the private sector is not interested, because the market receipt for seed is too small."

That has meant a lot of work with novel traits in areas that at first may not seem to have great economic potential. "For me, that's worked out very successfully. Because even if a novel trait fails, we'll have several graduate students who will earn their degrees working on the problem and figuring out what it means to try and integrate a novel trait into a soybean cultivar."

When a trait does work out, it typically delivers very strong value by opening new market opportunities, he notes.

Long-term farmer check-off support. Perhaps the greatest factor in the success of Fehr's program has been the unwavering funding support of soybean producers, who since 1972 has provided consistent funding to the program through a check-off program.

"When I began this program, I had federal and state funding for my salary, a technician and a couple of graduate students, but very little for current expense. In 1972 that all changed, and if it wasn't for that change I wouldn't be hear talking to you today."

The sustained funding has been an enormous advantage. "I don't have to tell any of you in this audience, how critical it is to a breeder to have those dollars coming in every year that you can count on. When I think of my interaction with the private sector, the first thing I think of are the farmers of Iowa and the outstanding support they have given to me."

Entrepreneurial partners. The second private sector group that's a critical partner for the program are entrepreneurial farmers and agribusiness people, who are looking to support novel ways to add value to the soybean crop.

"As a public breeder I'm at the mercy of somebody out there who has the guts to try to see whether these new traits will make any sense commercially," says Fehr. "When you have

the privilege I have, of working with these kinds of entrepreneurial individuals, it's very critical. My varieties would be nothing if these people weren't willing to try and take them to market."

A good example occurred a few years ago, after the Food and Drug Administration announced labeling requirements for trans fats. It so happened Fehr had two varieties in the pipeline with a potentially valuable healthy oil profile. A group of 35 farmers in southeast Iowa stepped up to the plate to help Fehr pursue the opportunity.

A short time later, these 35 farmers formed a limited liability corporation, capitalized it with their own funds, brought in two marketing people, contracted production and arranged a partnership to do the processing. "A national brand now has the oil already on the market, and basically they cannot get enough production to meet the demand."

Eye to the future. While the positives are many, a key challenge Fehr sees ahead is navigating restrictions on germplasm sharing that have emerged with the evolution of generic ownership rights. "We're running into situations in dealing with our private sector colleagues where either we can't access novel traits, or the terms are so onerous we wonder if it's worth the effort."

Still, with continued strong producer backing, he is very optimistic about the future for his program. "The support and cooperation I have from the soybean farmers of Iowa is a utopian situation for someone in the public sector. I think it's pretty difficult for anyone to have a better situation than what I enjoy."

Global perspective on research funding

Canada finds itself in a vulnerable position, as the world enters a watershed period for agricultural research and development.

The state of global funding for agricultural research took centre stage at the 2006 PRRCG meeting, as Dr. Phil Pardey of the University of Minnesota delivered an assessment of the latest trends and numbers.

"We are at a watershed, not just in Canada, but around the world, in terms of re-thinking the financing of agricultural research and development, and varietal improvement research in particular," says Pardey, a professor of applied economics, with extensive international experience measuring and assessing global investments in agricultural research

Key trends

Pardey's presentation unveiled several key developments for Canada to keep its eye on, as the grains industry in particular aims to remain competitive in a fast-changing global environment.

Asia leads charge for total R&D. China in particular has seen tremendous growth in its Gross Domestic Expenditures on research and development, investing at three times the level of Canada, says Pardey. India is another fast riser, now funding slightly more Canada.

These trends reflect a changing of the guard, where these countries are poised to surpass member countries of the Organization for Economic Co-operation and Development (OECD), which includes the world's leading economically developed countries.

"China and India are starting to leap over the OECD countries," he says. "We're seeing a major shift eastward to Asia."

Agricultural spending in flux. Public investment in agricultural research and development has risen from \$15.3 billion in 1981 to \$23.1 billion in 2000, which generally represents a relatively stable level of investment. However, in developed countries, investment has actually decreased in real terms over the period.

When both public and private investments are considered, the total investment globally rises to \$37 billion in 2000. "In the rich countries, there is now slightly more private investment than public investment," says Pardey.

Despite the increase in investment from developing countries that are now flexing more economic muscle on the global stage, OECD countries still lead in terms of research intensity, meaning those countries get more bang for each investment buck. "Research and development in the OECD tends to be more highly skilled," says Pardey. "The gap in research intensity between OECD and developing countries has actually grown."

Aussie grain challenge for Canada. Pardey, who is originally from Australia, used that country as an example of the modern evolution of research and development investment. Australia, particularly in agriculture, is viewed as a world leader in terms of both the level it invests and the model by which it invests. It is also Canada's key competitor for many grain export markets.

"Back in the mid-80s, there was a feeling that business as usual for financing Australian agricultural research wasn't sustainable, and for a period of about a decade there were a lot of new institutional changes," says Pardey.

The result was the creation of a number of semi-government, commodity-specific research and development councils, which evolved into Research and Development Corporations (RDCs). Each RDC was characterized by a defined industry, funding through a producer levy, agreements with government to match producer investment, producer involvement in goals and priorities and a strong emphasis on specific commercial applications. Also, in a key feature of the model, producer funding was quarantined from promotion and directed specifically to research and development.

The model has proven very successful as a funding mechanism for grains research, notes Pardey, with the GRDC now operating an annual budget of over \$120 million annually. The vast majority of those funds directed toward research, at a level at least several times more than what Canada invests on a comparative basis.

Economist's reality check

Canada's crop breeding system is a powerful economic asset that needs new ideas.

Plant breeding is an excellent investment. But no matter how many times that is proven, or how well it is understood, there's simply no getting around the farm income crisis and the need for a better model to sustain Canada's crop breeding effort.

That was the analysis presented by Dr. Richard Gray, head of agricultural economics at the University of Saskatchewan, in a plenary session at the 2006 PRRCG meeting.

Gray confirmed the impressive returns on plant breeding research – approximately 40 percent return on breeding investment for Canadian prairie crops as a whole – but he also delivered a reality check on how that success story is currently dwarfed and threatened by problems in agriculture.

"The farm sector is definitely facing a long-run farm income crisis," says Gray. "Despite a billion dollars in support, we're going to see negative net farm income again this year. If you take out government support, there hasn't been a year in the last five that agriculture has made a dollar."

No matter how good the returns, that situation makes the prospects slim for additional government funding for crop breeding. Still, says Gray, there's an opportunity for better funding and crop breeding models if the crop development community can come together with a unified vision and message.

"Governments are viewing agriculture as sort of a basketcase, thinking maybe if we just give it a bit of medicine it'll go away. But as others are saying, if we can get our institutions on track, if we can get further productivity improvements, agriculture can be a viable sector again."

Pushing forward a new agenda

The crop breeding community, with the strong economic returns it provides, is in a good position to help push that agenda forward, he says. Gray and colleagues recently conducted a study of the return on investment to farmers who support variety development through the Wheat and Barley Check-off Fund, administered by Western Grains Research Foundation (WGRF). It determined returns from wheat breeding research at a minimum 22 percent and returns from barley breeding research at a minimum 36 percent.

"I think that's why we've seen producer groups even in tough times say, 'yes, we are dedicated to more genetic research.'"

But while global returns to plant breeding research are high, Canada is in tough to keep up with competitors who are investing more dollars in this research. Producers are already investing through check-offs, and asking for more government funding is a difficult sell.

Health a major opportunity

One potentially powerful lever to attract additional government investment may be targeted initiatives for nutrition and functional food efforts, he notes. "Consumer health is a \$100 billion issue in Canada. Nutrition and functional food certainly can be part of the solution."

Health is an area uniquely suited to government support, he says. The benefits of crop varieties with enhanced nutritional or functional food value are captured by taxpayers in the form of quality of life and reduced health care costs. "Because the benefits are external, public good benefits, we can't expect market-driven solutions in this area."

One percent of Canada's health budget is \$1 billion dollars per year, he says. Those are big dollars agriculture could tap into. "Governments have been pre-occupied with treatment, very little on prevention. I think eventually they'll get their head around the idea that prevention is the better way to go. I think we do need a huge public investment in nutrition and functional foods development, particularly for the health of our wallets."

Strong potential in biofuels

Biofuels is another key area of opportunity, he says. Using crops for ethanol production has gotten the most attention but the conversion efficiency is better on biodiesel. Using biomass as a natural gas replacement also has strong potential.

"It's interesting that in North America, the natural gas price is above the liquid fuel price. So why not try to replace natural gas? That's something we can do with biofuels."

One approach is to ramp-up a strategy to address these opportunities, as part of a greatly enhanced public research and innovation strategy. "I think the discussions taking place saying can we do a better job of sharing and coordinating public research and industry needs, are worthwhile. If there's an indication that public research or publically funded research can be done more effectively, then we're more likely to get resources."

Opening access to public system

Bringing smaller private breeding firms into the fold is an important approach to any new model, he suggests. "I think we have to look carefully at creating some research platforms that industry and smaller firms can use." One idea is to offer open access to large, publicly accessible research budgets that require the users to allow free flow of the genetic or processes that result from that public investment.

Another model to consider, similar to Australia's Grains Research and Development Corporation (GRDC) system, is an industry controlled system, funded by a combination of producer check-off and public dollars.

Whatever the approach, now is not the time to stand still, says Gray. "From an economist's perspective, if you look at where the grain economy is right now, and you look at the investments in China and India, you really have to ask: Does the grains sector really have a future unless we get our act together? I think there is a growing sense in politicians minds that we have to find a long-term solution. I think it's time to exploit that rather than say 'let's give up' – I don't think anybody wants to do that."

Fuelling innovation

*How can Canada build a research strategy to remain competitive in agriculture?
A panel discussion of leading crop industry players tackled the big issues.*

Ski-touring buses, picturesque mountain scenery and alpine wildlife are not normally associated with crop production in Western Canada. But that was the case in 2006 as the PRRCG held its meeting in Banff, Alta.

The setting proved prophetic, as key crop development players took a lofty view of the big issues facing crop research and development in Western Canada, as part of a keynote panel discussion on "Fuelling Innovation – How to Build a Canadian Agricultural Research Strategy to Remain Competitive in a Global Environment."

Participants in the seven-member panel included:

- Dr. Keith Degenhardt, producer and Chair of Western Grains Research Foundation (WGRF)
- Gordon Cresswell, Tisdale, Sask., producer and director of Saskatchewan Flax Development Commission (SFDC)
- Don Macy, producer and Chair of the Alberta Producer Marketing Council (APMC)
- Kelvin Rothenber, producer and a member of Manitoba Pulse Growers Association (MPGA)
- Dr. Brian Rossnagel, plant breeder University of Saskatchewan (U of S)
- Dorothy Murrell, Chair of the Canadian Seed Trade Association (CSTA)
- Garth Hodges, Global Canola Manager with Bayer CropScience

The panel was moderated by Bill Greuel, of Saskatchewan Agriculture, Food and Rural Revitalization.

Below is a small collection of highlights from the discussion, which centred around four key topic areas.

Research priorities

Cresswell (SFDC): Some of the priorities we set out tend to become crisis management priorities. We need to move beyond that. On the flax side, we are trying to accomplish that, while at the same time striving to move away from some of the traditional things and more into the functional food side and health side.

Murrell (CSTA): The private sector does go through a continual analysis of research priority setting. We can be quite reactive in the short term. For example, in Fusarium in canola, it took one to two years, and now virtually all of the germplasm that's being released is resistant or carries some resistance. We can also be proactive in thinking of the

long-term. Again as an example in canola, our genetic modifications to provide herbicide tolerance and to enhance the oil quality have been very visionary on the part of the private sector players. And of course high-yielding hybrids – we believe these do actually provide value to producers.

What the private sector can do to be involved in broader priority setting? We believe perhaps we can be very focused on our work and may need to be more proactive and communicative with the larger industry and the value chain. Particularly with our primary customers, the farmers.

Degenhardt (WGRF): Western Grains Research Foundation is a funding organization and 90 percent of our money is spent strictly on funding research.

We're not interested in short-term funding. We're interested in long-term funding, because that's what research requires and that's what producers are interested in – the long-term. We discuss long-term needs and issues all the time as part of our planning process, and we do that with our research partners. We try to think of where we're going to be in five years and 10 years, both with our budgets and in terms of the research targets we're aiming for.

It's interesting that during some of the hardest times over the last five years we've seen check-offs increase and producers involvement with the check-offs increase, not decrease. Producers have stepped up to the plate, because they know they need research.

Funding

Hodges (Bayer CropScience): Our real challenge in the future is going to be some of our competitors, in Eastern Europe and further east into China. When we're thinking of research, we're thinking where do we start today that's going to get us where we want to be in 10 to 15 years time. So we need to visualize what we think the world will look like then, and not try to see it through the eyes of what the commodity price is like today.

There shouldn't be an internal competition for funding, private sector vs. the public sector. Rather, the focus should be on how can we together go out and try to meet some of these larger challenges out there, when we have larger governments and larger private and public sectors funding research than we have in Canada. There's not enough funding [in Canada], so I think foreign investment is also something we should encourage.

Degenhardt (WGRF): The question has been asked, should a portion of income support payments also be directed into administered research funds? Short, sweet – no. Would you take money from patient care in order to find a cure for the disease?

If we are looking at going forward with the new APF and looking at new ways to improve support research and innovation, we need new dollars. And that needs to be impressed upon both provincial and federal governments.

Rothenber (MPGA): We need to establish a vision on where research needs to go, come up with a plan and see how it can be implemented. We feel that the federal government needs to take the lead role as far as bringing all the levels together, but it needs to be a joint effort to organize this and to run it.

Rossnagel, (U of S): I had the opportunity to spend a fair bit of time in Australia right from the beginning of the Grains Research and Development Corporation program. The huge difference there is somehow, someone convinced producers in Australia that this was an investment.

Here in Canada, we really need to get people to understand that this is not a tax, this is an investment. By the same token, at a political level, we can't be looking on agriculture as a basketcase – an area we have to cough up money when there's a problem as opposed to an area where we can invest money so it becomes as self-sustaining as possible.

Murrell (CSTA): It's really quite clear in the broad picture that Canada does have to move forward in allocating resources to ag research. The statistics indicate that we are at the low end of the total investments in R&D, and yet agriculture provides 8 percent of our gross domestic product – there is an imbalance and we need to address it. Both public and private sector need to play a role here.

Ownership and benefits

Degenhardt (WGRF): As an organization, we've invested over \$40 million over 10 years, and the way we view it is, if you're funding a part of it, you should own a part of it. As part of our agreements with research institutions, a portion of royalties from the varieties we've helped support come back to WGRF.

Macyk (APMC): Ownership is a complicated area, but clearly we need to start talking about it. We need to grow support for research and development based on benefits and a high rate of return. And the fact is, if you don't own the technology, you're not going to benefit.

Cresswell (SFDC): At the end of the day, the whole value chain reaps benefits off of research. From a farmers perspective, I'd like to see other private industry be a

contributor along the way in some of the same ways that we are as producers.

Rossnagel (U of S): There are a plethora of ownership issues that invade universities, and every institution has different responses. As universities, we are supposed to be independent and support the public good, and I hope we can maintain that. But I think we stepped off a precipice when we started collecting royalties – now royalties have become something we depend on. The public system needs support to be able to do innovative research, and not just try to solve problems.

Strategies for innovation

Macyk (APMC): Priorities change. They change every year. We need a strategic management process that allows those priorities to change and be driven by the people who both pay for it and benefit from it.

In Alberta, we're going through a transformation, and part of that transformation is that research and development has become a much more inclusive process in the full continuum of the value chain. Some of the things we already see coming out of that are that there will be a process which incorporates farmers and industry and even those in the marketplace in directing and investing in research and development.

Hodges (Bayer CropScience): I believe we're having to compete with the investment moving east, in central and eastern Europe, Russia – these are the countries that are going to compete directly with Canadian agriculture. I think the question is, can we move Canadian agriculture to a higher value, more specialized area?

There are certain elements here where one needs to understand what the motivation is of the different parties – what the different parties can actually contribute.

In terms of roles, there's an incredible amount of credibility in the public sector. When anyone thinks of health benefits, funding that research in a credible organization, and then allowing the private sector to make investments in actually developing some of those products. If one looks at the pharmaceuticals world, this is what's happening.

Murrell (CSTA): Research and development is too important for us to lose ground, especially in genetics. Let's multiply the investment by 10. We need a commitment to attract future scientists, and a strategic management process in the area of renewal. Whatever the pillars are of a new Canadian agricultural research strategy, they need to foster greater R&D investment.

Prairie Recommending Committee for Wheat, Rye and Triticale

How can Canada build a research strategy to remain competitive in agriculture? A panel discussion of leading crop industry players tackled the big issues.

Key action

Formalizing independent committee. Final modifications to operating procedures were discussed, as part of the transition the of the former Wheat, Rye and Triticale Subcommittee into an independent recommending body, "the Prairie Recommending Committee for Wheat, Rye and Triticale" Under the new procedures, the committee deals directly with the CFIA in recommending candidate cultivars for registration.

Major KVD issues. Members discussed the onerous restrictions Kernel Visual Distinguishability is having on wheat development, particularly for winter wheat. Over the past three years, no new winter wheat varieties have been registered and the major reason has been KVD conflicts. Canada's quality assurance system for wheat has long relied on KVD as a segregation tool, but it is proving inadequate to accommodate breeding efforts for an expanded number of wheat classes.

In addition to winter wheat, there's indications KVD may also pose a substantial roadblock for the new hard white wheat class. At this year's meeting, the candidate line BW315A was recommended for registration, but not before lengthy debate regarding a KVD issue (the cultivar has a kernel shape similar to the soft white spring wheat class).

Spelt wheat protocols. Testing and evaluation protocols were accepted for new private spelt wheat trials. Spelt is a covered wheat species targeted at human food uses that has generated rising contract production and market interest in North America over the past decade.

Lines recommended

BW315A. CWHW wheat. Recommended for interim registration, to facilitate market testing. This next candidate for the new hard white wheat class has a solid overall package of disease resistance, yield potential and quality. While this class will take time to deliver CWRS performance, BW315A represents a significant improvement over the first CWHW varieties.

BW824. CWRS wheat. This line features tolerance to the Clearfield line of herbicides. It was developed using

conventional breeding techniques and high yield potential, equal to Superb. University of Saskatchewan, Crop Development Centre.

Kanata. CWHW wheat. This line has been interim registered since 2001, to facilitate market testing of the new hard white wheat class. With this status set to expire during 2006, the line was recommended for full registration. Kanata was developed along with Snowbird as the first varieties of the new class. Snowbird was identified as the major variety to push for production, but it has recently performed poorly under wet conditions. Full registration would allow Kanata to be used more as production alternative to Snowbird, while the industry waits for improved future varieties. Agriculture and Agri-Food Canada, Winnipeg.

PT213. CWRS wheat. This cultivar breaks all the rules and that's good news for wheat producers in northern areas. Typically, when wheat breeders increase early maturity, the sacrifice is lower yield potential. By the same token, higher yield usually means less protein. But PT213 succeeds with a strong package of all three key traits – in Parkland area testing it matured 1.6 days earlier than AC Barrie, yielded 9.2 percent more than AC Splendor and maintained protein concentration comparable to the checks. Agriculture and Agri-Food Canada, Swift Current.

BW342. CWRS wheat. Looks like a good replacement for AC Domain, with its high test weight and good sprouting resistance. Good falling number, with milling yields that exceeded the checks. Performs well in eastern Prairie, with excellent rust resistance. Agriculture and Agri-Food Canada, Winnipeg.

SWS349. CWSWS wheat. This latest soft wheat candidate performs like a proven winner. SWS349 combines an excellent agronomic package with increased test weight and very good quality. Agriculture and Agri-Food Canada, Lethbridge.

99SPELT9Z. Spring spelt wheat. This is the first awnless spring spelt to be registered for the prairies, offering higher yield, higher grain protein content, earlier maturity and stronger straw than CDC Nexon. University of Saskatchewan, Crop Development Centre.

Prairie Recommending Committee for Oat and Barley

The Prairie Recommending Committee for Oat and Barley evaluates lines based on agronomic, disease and quality performance.

Key action

Finalizing new committee. Last stages of modifications to operating procedures were discussed, as part of the transition of the former Barley and Oat Subcommittee into an independent recommending body, "the Prairie Recommending Committee for Oat and Barley." Under the new procedures, the committee deals directly with the CFIA in recommending candidate cultivars for registration.

Gene bank discussion. The committee heard a presentation and discussed how to better utilize Saskatoon-based Plant Gene Resources of Canada (PGRC), which is Canada's national gene bank. The gene bank is a top world source of barley, oat and wheat germplasm. It facilitates international sharing and provides this raw material to local breeding programs.

Low-phytate interest. Members discussed the key development of the first potential low-phytate barley variety for Canada. There is strong industry interest generated for this new type of barley, which essentially results in manure that contains less phosphorous. The new barley promises significant advantages for both growers and hog producers, providing a higher valued product to sell, which can reduce the impact of hog operations on the environment.

Disease guideline suggestions. The committee heard and discussed suggestions from the disease committee including, 1) that spot blotch be raised to a priority two disease in the western Prairie region, and that differences be noted between net form and spot form of net blotch, 2) that smuts, BYDV, stem rust and crown rust be made priority one diseases across the region, with minimum standards developed. If accepted in future, the changes would dramatically increase disease standards, particularly for the western Prairie.

Recommended lines

BT974. Six-row feed barley. Strong disease resistance overall, with scald the only priority one disease concern not met by this line. Good plumpness, uniformity and straw strength. Hyland Seeds / Agricore United

TRO4378. Two-row feed barley. Brings together a unique combination of a significant improvement in Fusarium head blight (FHB) resistance and reasonable spot blotch tolerance,

in a package similar to the best feed varieties for plumpness, uniformity and straw strength. Yield potential similar to AC Metcalfe. University of Saskatchewan, Crop Development Centre.

TRO4719. Two-row feed barley. High yield potential and very good kernel weight. Excellent adaptability across Prairies. Western Plant Breeders.

HB379. Two-row low-phytate hulless feed barley. Potentially the first Canadian low-phytate barley, which can reduce manure phosphorous and boost livestock efficiency. Has 75 percent less phytic acid than conventional barley. University of Saskatchewan, Crop Development Centre.

HB813. Two-row hulless waxy barley. Greater plumpness and kernel weight, but hull retention is also greater than CDC Rattan. High beta-glucan and low viscosity. May still have benefit for faster gelling of beta-glucan. Western Plant Breeders.

OT569. Milling oat. Strong package of yield potential, protein, kernel size, and test weight, with substantially better crown rust resistance. Seed Depot.

OT576. Milling oat. Top yielding line in past two years of co-ops – on average, 6 percent above AC Morgan. Targeted for western Prairie production and horse industry use. Agricore United.

OT582. Milling oat. Swedish line with higher yield potential and better lodging resistance than AC Morgan. Moderate resistance to crown rust. Svalof Weibull.

OT3006. Milling oat. Specialized variety designed for an industry partner. Combines very high milling yield with good beta-glucan. University of Saskatchewan, Crop Development Centre.

OT3017. Feed oat. Potential first low-lignan hull, high oil oat for Western Canada. A special whole grain oat with quality and energy equal to barley for livestock feed. University of Saskatchewan, Crop Development Centre.

Prairie Recommending Committee Pulse & Special Crops

The Prairie Recommending Committee Pulse & Special Crops evaluates lentils, beans, field peas and other special crops grown on the Prairies.

Key activity

Finalizing new committee. Final processes were discussed as part of the transition of the former Pulse and Special Crops Subcommittee to an independent recommending body, with the new name "Prairie Recommending Committee Pulse & Special Crops." The new committee has the power to deal directly with CFIA on recommending candidate cultivars and addressing issues.

Lupin trial added. The committee accepted guidelines for testing and support for registration of sweet lupin cultivars, which have generated new interest for production in Western Canada.

Pea co-op funding. Members discussed funding issues for the pea co-op. Rising costs of conducting the pea co-op brought up the need to increase the co-op entry fee, but those fees are already seen as being quite high. It is feared that if the entry fee is further increased it will reduce the number of lines entered, which may further threaten the co-op viability. The Committee also went through all procedures for registration trials of the various crops, and updated them to fit new standards and goals.

Recommended Lines

C99037. Annual Canarygrass (glabrous). A high yielding, brown-seeded line with glabrous hulls. University of Saskatchewan, Crop Development Centre.

GTS 546. A high yielding, early maturing navy (pea) bean line for the Canadian prairies, especially the Red River Valley of Manitoba. Resistant to race 73 of anthracnose. Gen-Tec Seeds Ltd.

L02B662. Pinto bean line with high yield potential, upright growth habit and lodging resistance. Resistant to race 73 of anthracnose, moderately resistant to white mould and resistant to yellow and orange strains of bacterial wilt. Agriculture and Agri-Food Canada, Lethbridge Research Centre.

1006S-1. Great Northern line with high yield potential, large seed size and resistant to race 73 of anthracnose. University of Saskatchewan, Crop Development Centre.

LGBC. A large green Clearfield (imidazolinone tolerant) lentil line similar to CDC Sedley. University of Saskatchewan, Crop Development Centre.

Cebeco 4149. Yellow field pea line with high yield and lodging resistance. Resistant to powdery mildew. Cebeco.

CDC 1007-6. Yellow field pea line with high yield, early maturity and rounder seed shape. Resistant to powdery mildew. University of Saskatchewan, Crop Development Centre.

CDC 1308T-10. Yellow field pea line with high yield and rounder seed shape. Resistant to powdery mildew. University of Saskatchewan, Crop Development Centre.

Prairie Recommending Committee for Oilseeds

The Prairie Recommending Committee for Oilseeds evaluates candidate lines based on agronomic performance, disease resistance and end-use quality.

Key action

Formalizing independent committee. Last stages of modifications to operating procedures were discussed, as part of the transition of the former Oilseeds Subcommittee into an independent recommending body, "the Prairie Recommending Committee for Oilseeds." Under the new procedures, the committee deals directly with the CFIA in recommending candidate cultivars of flax and condiment mustard for registration.

Variety Registration Office presentation. A presentation was given by the CFIA Variety Registration Office (VRO) on a preliminary proposal related to structural changes for the new committee. The CFIA expects to complete consultations on this preliminary proposal by end of March, 2006 and subject to the required approvals being received, commence consultations on a final proposal in April, 2006.

There are three elements to this proposal: the Consultative Framework, a Tiered Variety Registration System and Contract Registration, and options are being considered for each element.

- **Consultative Framework.** The preferred Consultative Framework would provide a permanent, inclusive mechanism for consultation on current and future crop specific issues and seed regulatory policy issues.
- **Tiered System.** The preferred option for a Tiered Variety Registration System would provide flexibility to respond to changing needs of crop kinds, while reducing obstacles to innovation, satisfying Canada's international obligations and maintaining confidence in the seed certification system.
- **Contract Registration.** The preferred option for Contract Registration is a risk-based system, which offers increased flexibility to accommodate varieties that would not otherwise be eligible for registration. It also offers improved regulatory enforcement.

Motion. In response to the presentation by the VRO, and concerning the Consultative Framework, a motion was put forward at the Oilseeds Subcommittee meeting and was supported by the membership. The motion reads, "Be it resolved that the PRCO, upon recognition by CFIA as a

Recommending Committee for condiment mustard and flax petition to be the Crop Specific Consultative Group for these crop kinds."

Line recommended

FP2161. Linseed flax (*L. usitatissimum*). A brown-seeded Linseed flax line that, when compared to the check, Flanders, matures significantly earlier (-3.0 days) and is significantly higher yielding in the short growing season in the Black and Grey Soil Zone and similar yielding in the longer growing season in the Black and Grey Soil Zone.

FP 2161 has significantly larger seeds than Flanders, with similar lodging resistance, oil content and iodine number; and significantly higher protein (meal) content than Flanders when tested across western Canada. It is immune to rust, race 371 and has similar wilt resistance as that of Flanders and NorLin. Agriculture and Agri-Food Canada, Morden, Man.

Profile of new PGDC

An overview of structure and mandate for the new Prairie Grain Development Committee.

The PRRCG is currently in a transition period during which the recommending function has shifted formally to the traditional PRRCG subcommittees. At next year's 2007 meeting, this shift will see the PRRCG name change to the Prairie Grain Development Committee (PGDC), which will continue an umbrella function for meetings and some collective initiatives.

The new committees are:

- Prairie Recommending Committee for Wheat, Rye and Triticale
- Prairie Recommending Committee for Oat and Barley
- Prairie Recommending Committee Pulse & Special Crops
- Prairie Recommending Committee for Oilseeds

The full membership of the PGDC consists of these members of the former four PRRCG subcommittees, along with the Western Canadian Canola/Rapeseed Recommending Committee.

The new Chair of the full PGDC is Dr. Kelly Turkington, a pathologist with Agriculture and Agri-Food Canada. New PGDC secretary is Bill Champan, a cereal specialist with Alberta Agriculture, Food and Rural Development.

Mandates

The PGDC has the following mandates:

1. To act as a forum for exchange of information relevant to the development of improved cultivars of grain crops for the western Canadian prairies.
2. To advise regulatory agencies regarding legislation and regulations governing grain breeding, cultivar production, and sector development.
3. To facilitate scientific discussion and communication of research priorities for the improvement of the prairie grain sector.
4. To facilitate and organize an annual meeting of the prairie grain recommending committees at a common place and time.

Structure

PGDC membership will be comprised of people who have an interest and expertise in one or more of the recommending committees and the grain commodities involved

The PGDC Board of Directors will be comprised of the Executive, two representatives from each of the registration recommending committees recognized by the CFIA plus one member at large. The "at large" member would be a reoccurring guest of the committees. Term would be three years.

The PGDC Executive is comprised of a Chair and a Secretary/Treasurer elected from the PGDC membership with three year terms of office with Chair and Secretary terms expiring in different years.

Technical review assistance

Meristem Land and Science gratefully acknowledges the following crop experts for their assistance in reviewing this 2006 PRRCG Report for technical accuracy. The PRRCG Chair reviewed components dealing with PRRCG executive action. Each subcommittee section was reviewed by the chair of that subcommittee. The technical review support of the following people is gratefully acknowledged.

- Dr. Scott Duguid, PRRCG Chair
- Dr. Michael Edney, Barley and Oat Committee Chair
- Dr. Stephen Fox, Wheat, Rye and Triticale Committee Chair
- Eric Klassen, Pulse and Special Crops Committee Chair
- Dr. Roger Rimmer, Oilseeds Committee Chair

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