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Wheat of the Future Based in the Past

In the past few years, winds of change are blowing through wheat fields. Wheat – a fundamental ingredient in bread and many other foods – contains more nutrients per weight than meat, milk, potatoes, fruits and vegetables. It is a part of our national identity. Canada is well known throughout the world for its bread wheat.

The change is not based on transgenic crops, scientists in white lab coats, boardroom decisions, stock market hype, or millions of dollars in public relations efforts. The new wheat is emerging from the fields of caring and conscientious farmers, locally-owned flour mills, artisan bakeries, and the organic farming movement. Consumers seeking healthy food help to fan the flames – particularly those consumers who are having difficulty tolerating conventional modern wheat. It is a grass-roots, community based movement – building literally from the ground up.

First, organic farmers began to ask for bread wheat varieties that were more suitable for organic farms where herbicides, fungicides and synthetic fertilizers are replaced with healthy soil and careful management. They also needed choices of varieties that were suitable according to the region and soil type. Stricter organic rules demanded that all organic seed be from organic sources. Conventional wheat from conventional seed sources was just not cutting the mustard.

Clusters of organic farmers in Europe, the US, and Canada organized field trials to asses wheat varieties – both modern and heritage – that would be appropriate. In the Maritimes, the Maritime Certified Organic Growers (MCOG) in co-operation with Speerville Mill and the New Brunswick government began such efforts in 1998 with the help of the Heritage Seed Program and like-minded growers and millers in the US and Canada. Organic farmers in the region were recruited to grow wheat. The price of organic wheat started to rise, making it more worthwhile to grow bread wheat – considered one of the more challenging organic crops to grow because of the quality requirements (minimum 13.5% protein, no fusarium, adequate dryness, and harvested at the correct time to prevent sprouting).

Meanwhile the demand for locally-grown organic stone-ground flour was outstripping supply. The beauty of stone-ground whole wheat flour is its sweet and nutty flavour, and superior nutritional value compared to steel-roller-milled flour. It contains the grain components in their original proportions and includes the germ. (Stone grinding distributes the germ oil evenly without exposing it to the excess heat that can cause flour to become rancid and much of the vitamin content to be destroyed.) But stone-ground whole wheat flour needs to be fresh. It shouldn't be stored for months and months, or transported thousands of kilometers in a hot truck. This is also part of its beauty. It should be processed locally and used fresh. It is the domain of small community-based business, not large multinationals.

Trials over a number of years in the Maritimes indicate that heritage wheats have equal potential with modern wheat cultivars for organic production. Yields were more affected by location and management practices than variety. Yields of heritage varieties were sometimes shown to be as high as conventionally grown wheat on well-managed fields. Bake tests showed that heritage varieties were as good or better for baking. Results indicated that some modern and some heritage wheats showed promise on organic farms in the Maritimes. The top heritage selections in 2000 were Acadia and Selkirk.

Acadia *is a wheat that was developed from a selection made in 1937 at the Experimental Farm in Indian Head Saskatchewan. It was grown in tests in Eastern Canada starting in 1942 and recommended for licence in 1951 as 'a wheat for use in Eastern Canada' where it was a consistently high yielder showing remarkably good strength and vigour of growth. Kerry Smith, an organic farmer in Alberta with encyclopedic knowledge of heritage wheats, noted that Acadia was not considered suitable in the Prairies because of inferior baking quality. "Wheat is highly site specific. What works in one area may be totally unsuitable in another." That's why farmers need a diversity of seed to choose from. According to the old research station reports, Acadia and Selkirk were the most prominent bread wheats grown in the Maritimes in the 1950s. This was a time when the Maritimes were much more self-sufficient in wheat production.*

After four years of nurturing the heritage wheat varieties and growing them on organic farms, some hopeful news is coming from bakers who have tried Acadia wheat. It seems that people who normally have sensitivities to wheat may have an easier time with the older variety. Some people who have had to switch away from wheat to spelt bread are finding that Acadia bread is all right for them. People who are normally sensitive to gluten, however, are less likely to be able to tolerate any wheat, heritage or not.

Oak Haven Bakery in Granville Ferry Nova Scotia produces spelt and kamut bread, pita packs, and granola for weekly distribution throughout the Annapolis Valley and Halifax Metro area. I asked Doug Brown, who earns the bulk of his family's living from the bakery, if he thinks there is potential in heritage bread wheats. "Definitely!" Doug asked some of his wheat sensitive customers if they would try bread made with Acadia wheat and all but one of the respondents said that they did not suffer allergic symptoms after eating bread baked with Acadia wheat. One person who normally breaks out in a rash and has throat constriction when exposed to wheat said that the Acadia wheat produced a much more subdued allergic response. *If more people ate bread made with a heritage wheat like Acadia, would fewer people develop the sensitivities to wheat that we see now?*

Doug, who buys all his certified organic flour and grain products from Speerville Mill, thinks there is room for a price differential in heritage wheats as long as people understand what it is they are buying. "People pay $4.00 per loaf for the spelt or kamut bread, but they won't spend $3.00 for bread made with regular wheat." Doug relishes the idea of being able to offer Acadia wheat loaves to his customers because the bread rises better and it holds its shape better than spelt or kamut. "The taste is really good too."

Nick Stam, better known as Nick the Dutch Baker, has a thriving business in the Moncton area of New Brunswick. About ten percent of the bread he sells is made with certified organic wheat from Speerville Mill. He sells a two-pound organic 12-grain loaf for $3.45. Nick has 11 children and a demanding business, but he takes time to express his excitement about baking with heritage wheat. "Acadia flour works nicer and has more jump to it than the modern wheat."

Like Doug, he has taken the time to ask customers to try Acadia wheat bread, but most of his customers are not sensitive to wheat. He has talked with two people who are normally sensitive to wheat. One person has digestive upset when consuming wheat products, and found no negative effects with Acadia. The other person is severely sensitive to gluten, and did react to the Acadia wheat bread. Nick said a lot of his customers were curious and excited about the idea of the heritage wheat, and his French customers were particularly enamoured with the name 'Acadia'.

Is it a coincidence that Acadia wheat should make a comeback after 50 years in the heart of the Acadian population in the Maritimes?

Anyone who knows Nancy Cantafio of Debec New Brunswick is aware of her true dedication to whole foods. For the last 20 years, she has used her knack for making the most delicious meals and baked goods out of locally-grown organic food her business and her life. She was one of the lucky bakers that got a test run with Acadia wheat. "It's great for bread and the taste is amazing. But I also love it for making pasta, flatbreads, cookies and pancakes. I wish I had more." Yes, it is tempting to gobble it all down, but some needs to be saved for seed.

Murray Bunnett and other family members run Bunnett Family Farms near Petitcodiac New Brunswick, a short distance from Moncton. They began their transition to organic agriculture in the early 90s, and now are a major supplier of certified organic wheat and oats to Speerville Mill. Their success is growing. Each Thursday evening they sell Speerville Mill products as well as other products from their farm to the public. Last year they were surprised to see over 300 people arrive at their farm for the annual open house. This is unheard of for a farm that grows grain, hogs, and beef in a sparsely populated part of the Maritimes!

Murray is a very practical farmer and business man, who has to make daily dollars and cents decisions to keep the farms viable. He saves seed from Borden winter wheat – a variety that is "hard to get now" because of all the winter wheats he is familiar with, it has the "highest winter survival".

Winter wheat is an ecological crop because it is planted in late summer and keeps the soil covered during the fall, winter, and early spring when the risk of erosion losses are highest. Murray and his brother David grow a lot of winter grains, including winter wheat and spelt, and they need to know that it will pull through the winter and produce a crop the next summer. Borden has 93% survival on average, so they reduce risk and cost by saving the Borden seed year after year. David even postulates that their saved seed

would be different – and more appropriate for their farm – than any Borden they could purchase from elsewhere… if they could find it.

Another grower who carefully saves a portion of his winter wheat crop for seeding every year is David Ling. David and his wife Edith run Fair Acres Farm in Winsloe, PEI. David started farming when he was twelve. He took over the farm at age 16 when his dad died. He's been saving seed from his unnamed winter wheat for "fifteen or twenty years" and it's "not running out."

'Running out' happens when the seed saved produces a smaller and smaller-grained crop each year. It is important to maintain soil humous levels and grade the seed properly to prevent seed from running out.

David also grows a traditional livestock grain mix of heritage oats, barley and peas all together in the same field. This is not a common practice anymore because herbicides used for barley would not be suitable for peas. Also, synthetic fertilizer use may cause such lush growth in the crop that it would 'lodge', or fall over.

The purpose of having the peas in the mix is to take advantage of their ability to fix atmospheric nitrogen using small nodules on their roots. Does this mixture mature at the same time? Most years it does. "Even though the peas are not all mature, if the oats and barley are ready, I find that peas dry down well with air drawn through the pile.

After a few food days the peas will be as hard as bullets." I still don't get it, wouldn't it be easier to grow each crop separately? "Three together are a sure thing," David explains patiently. "I know that no matter what kind of year I have, at least one of these grains will do well and fill in the spaces if another isn't doing well. And I get 15% protein from the mix. Perfect for my livestock."

David uses 'Gary' oats, and 'Century' peas that he's been growing since the 60s. He also uses 'Charlottetown 80', a barley that was developed in the 1880s. [2 pictures] "It's not a good crop all alone, but it sure works well in the mixture." (A pure barley crop grown on sod ground with good soil fertility can yield one and a quarter ton per acre).

What an ecological treasure chest this farm is! But I visited it for a purpose. Three long years of selection and field trials determined that out of fourteen heritage varieties, Acadia and Selkirk were most suited to our Maritime organic farms, and of superior quality for bread. Then a chance comment in passing from a visiting PEI grower: "Acadia and Selkirk! David Ling's been growing those for years!" We could have saved three years and twenty-nine thousand dollars by going directly to David Ling to ask his opinion. There is a lesson here.

I was dying to see the wheat he was growing. When asked, David shook his head. "I grew Acadia and Selkirk every year until three years ago. I've given it to another farmer to grow." So I asked him why he grew them all those years. They were developed

during a time when synthetic fertilizers were not used. Also, "the nutritional content and trace minerals are better than modern wheats." Did David ever test this assertion? "No."

Malcolm MacDonald lives on the outskirts of Charlottetown. He's been growing the Acadia-Selkirk mix now for 8-10 years. I had to know, why does he bother growing this heritage wheat mixture? Malcolm recognizes that this mix is not as high yielding as some of the other more modern wheats, "but I get a reasonable crop every year with fewer inputs."

Malcolm grows about 16 acres of the wheat and typically gets one to one and a quarter ton to the acre yield. He knows the milling quality is good, and he feels he has to protect the heritage. "My father used to grow Selkirk when I was growing up." Malcolm tried different wheats, and he tells the story of 'Max' a cultivar released with great fanfare and excitement because of its tremendous yield. "Max was susceptible to all kinds of disease, and the bottom fell out of the yield after three years." "I intend to keep growing the Acadia-Selkirk for some years to come," he promises.

Malcolm keeps some of the wheat for seed, some of it is used for feed, and he sells bags of wheat directly to people with their own mills. He reasons that other farmers might consider this type of marketing "more of a nuisance than I do," but he seems content with the arrangement. One willing customer is Gary and Junellen Clauseheide. Gary also grows wheat [photo] on their certified organic farm near Montague, PEI. The Clauseheides have their own mill and bake fresh bread for the Charlottetown market [photo].

Gary also contributed a jewel of information about Acadia – which he also used to grow. He explained that years ago, when wheat was cut, bound, and stooked in the field to dry, it produced excellent quality bread wheat.

Acadia was selected under these conditions. It is cut when not quite ripe – a little green still in the straw – and left in the field to dry. This makes it less likely to shatter (shedding valuable grain in the field) and it dries better because it is severed from the roots. Now the grain is combined later, and rain at harvest time may cause the grain to swell and shrink, causing baking quality to go down.

About a half hour north of the Clausheides is John McLaughlan's certified organic farm. John seems content enough to have had his arm twisted into growing a heritage variety called Selkirk [photo]. He is easy going on the surface, but very particular about keeping weeds out of his wheat fields, stopping in mid-sentence to run over and haul out a weedy intruder he notices out of the corner of his eye.

He has been very reliable about growing the Selkirk and keeping the seed separated from the other wheat he grows. This is a tedious, yet critical element of saving heritage seed. In 2000 he grew an annoyingly small amount of seed just to increase it, then in 2001 he grew 1.5 acres of it – quite an accomplishment when starting with just a few handfuls of

seed. When asked if he's impressed with the wheat, he says "I'm not jumping up and down with excitement over it, but I'm getting a decent crop."

Besides possible health benefits, and possible yield stability benefits, another reason for growing heritage wheats involves the future. North Dakota grower David Podoll has observed that modern wheats have a germplasm that is too narrow – every plant is the same. To grow the best wheat possible, he wants to be able to select the best plants from his crop and propagate them. This automatically selects the most adapted individuals in the population for local growing conditions. He cannot do this selection work if all the wheat plants are the same. The heritage wheat he's been working with, Coteau, shows variation in the field. If disease strikes for example, some plants may be more resistant, and he can select those for propagation next year. Simply saving one's own seed and grading it through screens so that only plump, disease-free kernels remain for planting is a form of 'selection'. This is known as horizontal resistance selection. Plants can also be selected for resilience in the face of pathogens, weather variability, and – you guessed it – the challenges climate change brings with it. It is a strategy for minimizing risk.

For horizontal resistance selection to work, however, the field of wheat has to have some genetic variability, or diversity in the way the individual plants respond to stresses. David and other growers in North Dakota are now assembling a number of modern and heritage varieties for trials this year. They will then mix the most promising ones to increase diversity and selection potential. When I told him about PEI farmers growing Acadia and Selkirk together, he paused. With a combination of excitement, awe, and admiration, he gushed: "A modern landrace… wow!"

Another person who is pretty excited about heritage varieties is Stu Fleischhaker, who founded and runs Speerville Mill in New Brunswick. He has been growing Acadia wheat for four seasons, starting with only a few pounds from Dr. Hans Nass at the Charlottetown Research Station. In 2001 he grew 2 acres. Stu knows that the way heritage wheats are going to survive is if people want to buy the flour and eat the bread made with these wheats.

Until the market is developed, he knows that the small-scale bakers and millers throughout the Maritimes are the key to success. Without this small scale element, and community support, the heritage wheat will not survive. He hopes that over time the demand for heritage wheats will thrive, Acadia will become a household name, and farmers will get a decent price for the wheat they grow.

I had my first slice of Acadia wheat bread the other day. The taste was great, the bread nourishing, and I silently thanked the truly dedicated farmers, millers, and bakers involved in plucking this seed from a museum shelf and bringing it back to life, as well as those who never stopped growing and saving it – passing the seed from one generation to the next.