

Are we eating our seed wheat?

by David Podoll

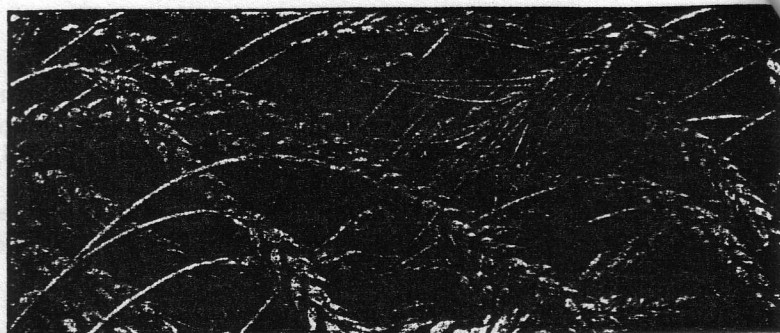
Recently, the Organic Research Review committee of the Midwest Organic Alliance commissioned a study concerning issues related to the types of seeds and varieties used by organic farmers. One statement in the review stood out: "The survey of organic producers revealed that they are satisfied with the varieties on the market and did not specifically express a need to direct research at variety development for organic production. They do, however, want to know how to avoid genetically engineered varieties in their systems as these varieties become more prevalent."

Does anyone else catch the incongruity here? Do farmers suppose that, as genetically engineered (GE) varieties increase in prominence, their choices for organic culture will not decrease?

I have been concerned for some time that as agriculture continues on its course of increasing industrialization, organic farmers may find themselves with only old, worn out varieties to grow. It is not too difficult to imagine the day when older, traditional varieties are simply not available. It may not happen that fast ... but then it could.

Think how quickly certain farming techniques were adopted locally. I remember the first farmer in our area to chisel plow in the fall. Neighbours watched for a couple of years. Then a few key farmers began doing it. Then BAM! Everyone was chisel plowing in the fall instead of moldboard plowing. A practice that was suspect at first became the norm in five years. Once farmers understand something will increase profits, it doesn't take long. If the new GE seed with disease, insect and herbicide resistance are everything the seed companies say they are, and farmers can make money with them, it may not be unreasonable for an organic farmer to find himself with empty bins and no seed to buy.

David Podoll began farming organically in 1975 and now farms with his brother's family on 480 acres. Besides producing their own vegetables and fruit, they raise small grains, vegetable seed, chickens, eggs, turkeys and philosophy. They farm near La Moure, North Dakota.



And, if he did have grain in his bin, would it be good for seed? And, if it is good for seed now, would it be good for seed after 20 more harvests?

As a farmer, what is my role concerning seeds? Is it out of my hands? Sure, I can plant some seed from my bin now and then, but it will eventually "run out" so I will need new seed stock. Besides, the university and private companies are constantly releasing new varieties. I have a virtual supermarket of genetic material to choose from. But it is not really so straightforward and simple as that. Who is protecting our genetic inheritance?

No farmer alive on this continent today can remember when it was absolutely the farmer's responsibility to be the keeper of the seeds. But that has been the traditional role of the farmer and gardener. Only in this century has the keeping and breeding of seeds been separated from the husbandman. Growing up in the time that I have, I cannot imagine a farmer replanting his own seed year after year for many years – let alone doing actual selection and breeding. Farmers don't have the expertise or resources to do that. Or do they? Maybe there is a need to change the present system.

My concern as a farmer about my responsibility in preserving genetic material has developed gradually over the last 30 years. As a high-school ag student in 1970, the southern corn leaf blight incident in which about half the U.S. corn crop was destroyed due to a common, single, susceptible gene, was a non-issue in this region. Corn was not a major crop in North Dakota at that time and besides, the formal wedding of agriculture and technology had just taken place after a long courtship. The honeymoon was on. Nothing could dampen the spirit and headiness of the marriage bed of a union that would surely dawn golden for agriculture, and especially for the world's poor and hungry.

Still, I remember being a little concerned, but probably more indignant at the collective stupidity of those responsible for the keeping of seeds. We were lucky a complete disaster did not happen – not *all* the corn was wiped out – but we picked up the pieces and learned from our mistakes. Didn't we?

Today, as an organic farmer, my concern over seeds and their keeping is much heightened. Several years back when it began to rain, we found ourselves in a long wet cycle that presented a very difficult challenge to farming in our area. The grains bred for our semi-arid climate could not handle the disease pressure caused by the dampness.

Such was the case for our previously reliable Coteau variety of wheat. It is the last of the really good bread wheats released

by North Dakota State University in 1978 and is a good wheat for organic culture. Tall, vigorous and weed competitive, it has a deeper and more searching root system than the new dwarf wheats. And it produces quality. The lowest protein score I've had is 14.4 percent. In the wet, however, the yield declined dramatically – the consequence of leaf disease killing the leaves before they could fully feed the seeds. Other factors, such as late springs, also entered into the equation of decline. But one thing seemed inevitable: Coteau's 15 year reign on our farm was nearing an end.

Okay, let's get out the supermarket list of wheats and see what is available to replace Coteau. I need a tall wheat for biomass production and weed competition, strong straw, excellent baking qualities and disease resistance. The field narrows fast, too fast, for both US and Canadian varieties. I am left with Coteau and a couple of cousins with significant Coteau parentage. Everything else is of lower overall quality and grows shorter, or doesn't fit key criteria. I am stunned. What kind of choice is that for organic culture? But, hey, can I expect to find a wheat bred to fit the requirements of an organic production system?

I recalled an article in *The Land Report* in which Walter Pickett described the hard red winter wheat brought to the Kansas plains by the first settlers. It was what their families grew on the Ukrainian plains for who-knows-how-long, and continued to grow in Kansas until replaced by newer, higher yielding varieties. We generally expect our varieties to last for a decade at most before declining. So what about this "turkey red wheat" variety that apparently held its own in yield and quality for many decades?

Pickett found that turkey red wheat was not what we would call a "variety" today, but really about eight or ten distinct types making up the larger population known as turkey red. The population had a broad genetic base. If a race of rust or leaf disease swept through such a population, it would likely affect only one or two of those distinct types. The result would be only a small drop in yield. There would likely always be some disease but, with a broad genetic base, a relatively stable, moderate yielding "variety" could be relied upon to produce a crop almost, if not, indefinitely. Sustainability.

That got me thinking. Could I reproduce a spring wheat population like turkey red but of higher yielding types? I could try mixing some selected varieties for a small garden planting and see what it looked like. I told John Gardner, director of our region's land grant research farm, about my idea. Being open-minded and always helpful, he said he would send me whatever information he could find on the wheat strains being evaluated at the time, along with their evaluation criteria and scores.

After poring over the information I received, it didn't look too promising. Of all the varieties and numbered

strains, it was clear that there was as much, or as little, variation within a given strain (depending on year, location and weather) as there was between varieties. That told me the gene pool was very narrow. There was no way I could put together a population with a broad genetic base. Let's see, did I just say something about learning from our mistakes? It is not surprising that wheat growers in our region have been faced with a serious plague of late.

I still wanted to put together a spring wheat population with a broad genetic base but I had a more immediate situation to confront. My Coteau was failing with no wholly adequate replacement.

Coteau is like an old friend. I found it difficult to discard. It had developed a spiritual value for me. (Hey, farmers get attached to their tractors and cows. Why not plants?) Furthermore, Coteau still has potential. It seems more resistant to scab than any other wheat. Its quality is still good and it probably has more genetic diversity than anything since released. There is genetic material worth saving here, yet its vigour is reduced. Coteau doesn't seem as competitive as it used to be and the heads are smaller, reducing yield. But it is still a good wheat for organic culture.

Since I am not a big grower of wheat I thought I might as well try to "save" my Coteau, try to resurrect it to its former productive state. Two things gave me hope. One was our experience with Crown millet. My dad brought some seed of this proso millet when he came to the farm in 1953 and we have planted back this seed each year since. It was a Canadian release of the late 1930s, and now, almost 60 years old, it has not lost any yield potential. Indeed, this year we harvested almost 2,400

pounds of 59 pound millet seed. High yield, high quality, sustainability. If this millet is capable, then maybe, with proper care, Coteau can be kept for a long time too.

I found the second reason for hope in *Return to Resistance* by Raoul Robinson, available from Ag Access. In it Robinson describes how farmers can breed crops for long-term disease resistance and maintain them. I should not shy from this work because it is farmers who have been doing the work of crop selection all along. Only recently has that job been relegated to others.

So, I started cleaning my seed well, saving the largest and heaviest kernels. There was still enough there. I had to clean out more than half, but the lesson was that some plants were still producing good, plump kernels and we needed to save these seeds.

After only two years we have much of the old vigour back. Behind all this was the feeling that it was my responsibility to acknowledge and try to maintain the genetic material we call Coteau. I should not thoughtlessly discard a variety and move on to another.

My journeys with our Coteau wheat and Crown millet and other grains, along with breeding and saving seed

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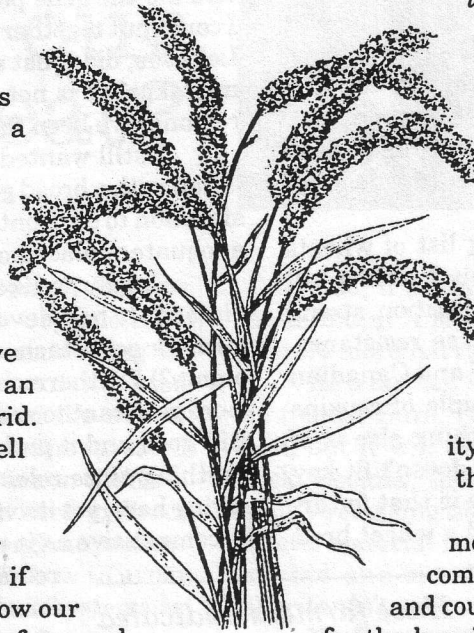
of vegetable crops and flowers, have taught me some important things about seeds:

- To be maintained, genetic material must live, grow and reproduce each season. It cannot be saved in a vault.

- Individual hybrids are short term. It is very difficult, if not impossible, to maintain the inbred parent lines from which a hybrid is created beyond a certain number of generations. At some point, new inbred lines must be developed to create a replacement hybrid.

Many times hybrids will yield more than open-pollinated varieties ... but not always. The yield increase is most dramatic with corn. Even then I have been told it is fully possible to create an open-pollinated corn equal to any hybrid. Some hybrids are unbeatable, but it is well to remember they are short-term.

- Seeds adapt to soil, climate and culture. Crops bred and grown under chemical-intensive systems do less well if placed under organic management. I know our wheat and millet are well adapted to this farm and become more so with each season. They would not do as



well under conventional management. Next to our responsibility to be keepers of genetic material, organic farmers should think seriously about adapting and maintaining genetic resources for their farms. Each should read *Return to Resistance*. It may well be an

important management tool and can also be an opportunity for value-added enterprise.

- The process of selecting wheat varieties that will be released by seed companies to farmers for growing, emphasizes suitability for the industrial process – how well the wheat fits the milling and baking machines. Agronomic considerations are secondary and few. Nutrition is not considered.

Are we eating our seed wheat? Have farmers abdicated the responsibility for the keeping of genetic material to those whose view is short-term profit?

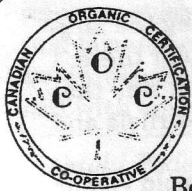
The keeping of seeds is a trust. A common trust. Genetic material must be for the commonweal. To patent genes is an affront and counter to the care and sensibility required for the keeping of seeds. Seeds must be planted and saved by folks who truly care. ❖

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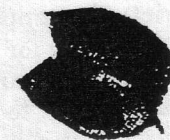
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