Topic: The Transformation of Rapeseed Into Canola: A Cinderella Story
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1.0 Introduction

From an obscure inedible oilseed, to a multi-billion dollar crop, hailed as having the healthiest edible oil on the market today, the transformation of rapeseed into the genetically improved canola is truly a "cinderella" story. Some 30 years in the making, canola stands as a testament to the perseverance, ingenuity and cooperative spirit of several Saskatchewan scientists. They began with little more than a crop that grew well on the prairies and achieved an end product which stands as Canada's second most important revenue generator behind wheat. As stated by the National Research Council's publication *From Rapeseed to Canola: The Billion Dollar Success Story*, "Wheat may always be king, but canola wears a crown of considerable weight and undisputed beauty." (2).

2.0 Rapeseed vs. Canola

Rapeseed and canola are not terms to be used interchangeably. Canola was developed from rapeseed through the use of traditional plant breeding techniques. The crops differ with respect to their chemical composition and nutritional quality. Rapeseed oil contains a high proportion of erucic and eicosenoic acids which are not essential for human growth, and render the oil unfit for human consumption. In addition, the protein meal fraction left over after crushing, contains compounds called glucosinolates which inhibit growth in livestock. Conversely, canola oil contains low levels of erucic acid, and has the best nutritional profile of any vegetable oil on the market. Canola meal is also low in glucosinolates which enables it to be used as a nutritious protein source in livestock feed rations. According to the 1986 trademark, canola oil may not contain more than two percent erucic acid, and the solid fraction of the seed may not contain more than 30 micromoles per gram of glucosinolates (Canola Council of Canada <u>Canada's Canola</u>, 2-3).

3.0 Commercial Rapeseed Production in Canada

Rapeseed was used in Asia for thousands of years as a cooking and smokeless lamp oil. The plant was not used extensively in Europe and North America until the development of steam engines in the eighteenth century. Under the extreme heat and steam of an engine room, rapeseed oil was found to adhere to metal surfaces better than any other source of oil. Eastern Europe and Asia supplied North America's demand for rapeseed oil for use as a marine lubricant prior to the Second World War (Agriculture Canada <u>One Hundred Harvests</u>).

Rapeseed production in Canada occurred on a very small scale before the war, mainly confined to field plots at experimental farms and research stations (Canola Council of Canada <u>Canada's Canola</u>, 2). The first rapeseed grown in Canada was planted in 1936 by

Polish immigrant farmer Fred Solvoniuk at Shellbrook, Saskatchewan in his farm garden (Kneen, 27).[1] Although a lack of solid markets existed in Canada for rapeseed, the crop seemed well suited to growing conditions in Western Canada. According to Agriculture Canada's history (<u>One Hundred Harvests</u>), T.M. Stevenson, of the Canada Department of Agriculture, Forage Division in Saskatoon, found rapeseed to "…grow vigorously. It could be seeded late, and because of the many hours of daylight during Canadian summers, it matured before severe autumn frosts occurred."

When European and Asian supplies of rapeseed were cut off due to the Second World War, Canada's need for a domestic source became apparent. Canada needed to secure a supply of rapeseed oil to lubricate the steam engines which powered the country's war vessels. In 1942, T.M. Stevenson confidently assured the Wartime Agricultural Supply Board that rapeseed could be grown successfully in Western Canada.

T.M. Stevenson sent all of the available seed to Federal Experimental Research Stations to be increased, and acquired an additional 19 tonnes of *Brassica napus*[2] from the United States. The seed was distributed to roughly 15 registered seed growers in Saskatchewan in time for planting in 1943. Bolstered by guaranteed price supports of 6 cents per pound, the 1943 harvest of 2.2 million pounds of *B. napus* seed provided tidy profits for the producers selected to grow it. The acreage devoted to rapeseed increased in 1944 and 1945. Rapeseed's successful debut as a prairie crop led to the construction of Prairie Vegetable Oils, a crushing facility at Moose Jaw which opened in 1945. The president and general manager of the facility was J. Gordon Ross, one of the first farmers selected to grow rapeseed in 1943 (National Research Council, 8-9).

The acreage peaked in 1948 with 80,000 acres sown to rapeseed in the prairie provinces (White and Bolton, 3). From an industry which had shown great promise, the production of rapeseed plunged to a meager 400 acres by 1950 (National Research Council, 10). The end of the Second World War resulted in a reduced demand for marine lubricants, and moreover, the move to diesel engines from steam power had begun. Demand for Canadian produced rapeseed declined after the war, and the price supports, designed to encourage farmers to plant the crop, were discontinued in 1949 (Busch et al., 608-609). Figure 1 from Busch et al. (609) illustrates the rapid rise in rapeseed production, and the pronounced decline post-1948.

4.0 Rapeseed Research Undertaken at Saskatoon

4.1 Rapeseed – A Viable Option

Trade disruptions during the Second World War made Canada examine its domestic edible oil resources, This examination brought to light Canada's inadequate production of edible oil, which was far below that required to meet the country's needs. So why was

[1] Solvoniuk cultivated the *Brassica campestris* (now *B. rapa*) species. Due to the Polish origin of both Solvoniuk and the seed, the species became known as Polish rapeseed.

[2] The *B. napus* species became known as Argentine rapeseed, as the seed was originally shipped from Argentina.

rapeseed chosen as a viable answer to Canada's edible oil woes over other proven alternatives like sunflower or soybean? After all, rapeseed produced a dark, strong smelling oil that was used to lubricate steam engines, there were concerns over its toxicity when consumed by humans in large amounts, and the meal was unsuitable for animal consumption. The answers lie in rapeseed's proven track record as a crop particularly well suited to prairie conditions, unlike crops like sunflower and soybean. Agriculture on the prairies was also in dire need of an alternative crop to help offset the wheat dependent economy of the time which was prone to large gluts (National Research Council, 17). Farmers would also be more receptive to growing a crop like rapeseed which would not require a large investment in new equipment, or a significant change in current farming practices (National Research Council, 11).

4.2 Rapeseed Research Begins

Saskatoon is the acknowledged birthplace of rapeseed research; a nucleus of investigation from which other research programs were inspired. There has been a continuous rapeseed research program in Saskatoon since the 1940s, when Dr. William J. White, a plant breeder employed by Saskatoon's Dominion Forage Laboratory, started a rapeseed breeding program (Phillips and Khachatourians, 41). White and Henry (Hank) Sallans, head of the National Research Council(NRC) Oilseeds Laboratory in Saskatoon, were of the minority of scientists interested in rapeseed research in the early 1940s. The researchers began their involvement with rapeseed research during the time when the demands for industrial lubricant during the Second World War necessitated the cultivation of the crop in Canada. White studied the agronomics, while Sallans investigated the chemistry of rapeseed. From the beginning, rapeseed research and breeding programs in Saskatoon relied on the cooperation between breeders and chemists, and the research organizations they worked for (Busch et al., 609). White assisted Sallans by analyzing the iodine value of rapeseed oil which could be correlated to its drying quality (National Research Council, 4-5). In turn, White was assisted by Sallans and Burton M. Craig of the NRC when he began his breeding program in 1944. White selected for oil content, yield, early maturity and iodine value, ultimately leading to the registration of Canada's first rapeseed variety Golden in 1954 (National Research Council, 9). Golden's superior characteristics included uniform and earlier maturity, higher seed yield and oil content of the seed (Agriculture Canada, <u>One Hundred Harvests</u>).

4.3 An Uphill Climb

Nearly 25 years before canola would become a reality, a determined assemblage of scientists began the monumental task of converting rapeseed oil into an edible form, and rendering the meal fit for animal consumption. Burton Craig, one of the scientists involved in the early research, summed up their task: "The only trouble with the crop was that the oil was no good, and the meal was no good!" The scientists faced an equally arduous task of convincing a skeptical public who knew rapeseed oil to be toxic, and farmers who likened the crop to the dreaded wild mustard (National Research Council, 1-2). However, armed with the knowledge that an alternative crop was needed in Western Canada, and that rapeseed grew very well under prairie conditions, the scientists were convinced of rapeseed's potential. "…We'd also known the times when there were surpluses of wheat; nobody wanted it because there was too much of it on the world market. And so we all very quickly appreciated the fact that if you could get a crop that could grow well in western Canada, this would be a good thing for the agricultural economy." explained researcher Les Wetter, of the scientists' drive to develop rapeseed (National Research Council, 20).

The early years of toil, which took place in the laboratories of the National Research Council's Prairie Regional Laboratory and the University of Saskatchewan, are often not reported in the numerous accounts of the history of canola development. During these early years, a dedicated group consisting of Dr. Henry "Hank Sallans", Dr. Burton Craig, Dr. Clare Youngs, Dr. Les Wetter and Dr. Milton Bell, supported by a contingent of technicians, undertook important rapeseed research . Sallans and Youngs investigated methods of separating the oil into edible and industrial components. Craig and Youngs explored methods of analysis to determine the fatty acid composition of rapeseed oil, recognizing that a refined method of analysis would have to be found before a rapeseed breeding program could be successful (National Research Council, 21-22). The scientists also attempted to find alternative industrial uses for rapeseed oil to boost the sagging market demand (National Research Council, 27).

5.0 Breeding For a Better Quality Oil

5.1 Key Players

The two scientists at the forefront of the breeding efforts were Keith Downey of the Canada Agriculture Research Station in Saskatoon, and Baldur Stefansson of the University of Manitoba. In 1957, Keith Downey assumed responsibility for the rapeseed breeding program begun in 1944 by W.J. White who was moving on to head up the Crop Science Department at the U of S. As explained in the NRC's publication *From Rapeseed to Canola: The Billion Dollar Success Story*, "Neither Baldur Stefansson nor Keith Downey realized it at the time, but both were embarking on projects that would soon earn them national and international acclaim" (40). Downey and Stefansson's contributions to the development of canola would eventually earn them the title of the "fathers of canola" and a rightful place in the Canadian Agricultural Hall of Fame (Canola Council of Canada <u>Canola "fathers" honoured</u>).

5.2 Gas Liquid Chromatography

A key chapter in the canola success story was the application of gas-liquid chromatography (GLC) to analyze the erucic acid content of the seeds. The efforts of Downey and Stefansson benefitted from this new technology, which was refined and adapted for the analysis of fatty acids, like erucic acid, by the PRL's Burton Craig and Martin Mallard. Prior to the adoption of GLC methods, the erucic acid content was analyzed using distillation techniques which required several litres of oil derived from a given variety of rapeseed, and was very labor intensive (Busch et al., 610). GLC was the long sought after method of analysis that gave plant breeders the necessary tools they were looking for (National Research Council, 39-40).

Craig purchased the PRL's first GLC unit in 1957. He soon discovered that adaptations would be required to accomplish their goal of finding an effective and rapid method of fatty acid analysis. As purchased, the solids of the chromatograph column were coated with silicon, requiring additional steps for saturated fats analysis. Undeterred by this obstacle, Craig set off to the library to investigate a promising new type of compound he had heard of called polyesters. Through trial and error, and following a recipe from a library book, Craig synthesized what became known as "Craig's Polyester". Meanwhile, Mallard made improvements to the GLC unit, some of which were incorporated by the manufacturers. By incorporating Craig's polyester and Mallard's fine tuning, the PRL could put the unit to work. "It was only a matter of a couple of years and we were down to where we could analyze the oil in a single seed," said Craig. Approximately 50 different analyses could now be accomplished in the time it had taken to do one trial (National Research Council, 37-38).

5.3 The Half-Seed Technique

The precise analysis afforded by the GLC enabled breeders to take advantage of a significant discovery made by Downey and his graduate student Bryan Harvey. The pair determined that the erucic acid in rapeseed was controlled by the genotype of the developing embryo in the seed, rather than by the maternal plant. Therefore, seeds from the same plant differed with respect to erucic acid content (Busch et al., 609-610). Downey and Harvey worked out a "half-seed" method by which the oil of a seed could be analyzed, while at the same time preserving the seed for planting if it showed promise with low erucic acid content. Harvey experimented with an eye surgeon's scalpel to carefully separate the seed into two halves, making sure to preserve the root and growing tip as part of one of the halves so that it could be planted. The half seeds which were planted produced rather scraggly rapeseed plants; however, they were productive. Further modification of the GLC method by Craig enabled the oil from half of a seed to be analyzed (National Research Council, 47). Through the cooperation of these staff from the PRL and Agriculture Canada, the half-seed technique became tremendously successful, accelerating the development of low erucic acid varieties of rapeseed (Agriculture Canada <u>One Hundred Harvests</u>).

5.4 Low Erucic Acid Rapeseed

Armed with the necessary tools of analysis, Downey and Stefansson began to survey the world's rapeseed germplasm. The first big breakthrough came in 1960, when Stefansson came upon a seed from the European forage rape Liho with only about 10% erucic acid. In the cooperative spirit of plant breeders at the time, Stefansson shared some of the seed with Downey. It was Downey who was first able to successfully transfer the low erucic acid characteristic to the *B. napus* variety (Kneen, 41). ORO, the first low erucic acid rapeseed (LEAR) was put into commercial production in 1968. The first LEAR variety was a significant scientific achievement, but was not very successful commercially. ORO was agronomically inferior to some of the high erucic acid varieties currently on the market, and an abundance of cheap sunflower oil from Russia softened the demand for the higher priced LEAR oil (National Research Council, 50-51).

Once the low erucic acid characteristic had been passed on to the *B. napus* variety, Downey focused his attention on developing a similar *B. campestris* variety, which accounted for most of the rapeseed produced on the prairies. Downey began his search by surveying *B. campestris* germplasm from around the world. Among the countless samples of seed which showed little promise, Downey came across a sample of Polish origin with very low erucic acid levels. One of the seeds was found to contain no erucic acid, and the half-seed technique was employed to grow a plant - albeit a weak and sickly specimen. Five invaluable seeds were produced, compared to the usual 2000, which formed the basis for the *B. campestris* breeding program. Span, the first low erucic acid *B. campestris* variety, was released in 1971 (National Research Council, 48).

The International Conference on the Science, Technology and Marketing of Rapeseed and Rapeseed Products, held in September 1970 in Sainte-Adele, Quebec, brought to light recent research which suggested a link between the feeding of high erucic acid rapeseed and fat accumulations around the hearts of lab animals. Health Canada promptly called for a switch to LEAR varieties in Canada as soon as possible, which was a boon to the research programs of Downey and Stefansson. The Agriculture Canada Research Branch in Saskatoon was up to the challenge of supplying the large quantity of seed required to facilitate the changeover from high erucic acid rapeseed to LEAR varieties. Half of the 2300 kg of Span seed produced from Downey's breeding program was contracted out to growers in the Imperial Valley in California to be increased. D.A. Cooke, a plant scientist from the Melfort Research Branch, moved down to California to supervise. Despite severe frosts, one million kg of seed was produced in time for planting in June 1971. A complete changeover to LEAR was achieved within two years (Agriculture Canada One Hundred Harvests).

5.5 Double Low

Scientific studies confirmed that rapeseed meal was goitrogenic when fed to farm animals due to the presence of glucosinolates. In order for rapeseed to be competitive with other oilseeds like soybean, a method to decrease the toxicity of the glucosinolates would have to be found, or bred out of the rapeseed altogether. Until this could be achieved, rapeseed growers would find themselves at a considerable disadvantage (Busch et al., 610). Les Wetter and Clare Youngs of the PRL, and Milton Bell of the University's Department of

Animal Husbandry were key figures in early research on rapeseed meal. Wetter and Bell studied glucosinolates and their effects on animals, and Youngs and Wetter were involved in developing different crushing methods to restrict the destruction of the amino acid lysine and the release of the enzyme myrosinase at high temperatures, both of which were linked to the toxicity of glucosinolates in rapeseed meal (National Research Council 58-63). The research conducted by Youngs and Wetter into crushing methods to minimize the release of the enzyme myrosinase has been incorporated by processors worldwide (Hickling, 6).

Despite the advances made by these men, it was apparent that the meal would not be accepted by crushers for use in animal feeds until glucosinolates could be eliminated through plant breeding - a task that would not be accomplished until the 1970s (National Research Council, 64). The lack of a refined method of analysis was also an impediment to any breeding effort to reduce glucosinolates, just as it was for erucic acid in the oil. Youngs and Wetter of the PRL went to work, and by 1967 had come up with a rapid GLC method which could be used to analyze glucosinolate levels in small samples of rapeseed meal. Downey took advantage of the new method developed by the PRL, and began to analyze all of the samples in his possession, looking for a variety with low glucosinolate levels (National Research Council, 64).

The breakthrough they had been searching for came when Jan Krzymanski, a visiting scientist from Poland, came to the Saskatoon Research Branch in 1967, bringing some samples of rapeseed form Poland. Among these samples was Bronowski, a *B. napus* variety with very low levels of glucosinolates. The discovery of Bronowski was an important breakthrough, and in the cooperative spirit of breeders working in the public service, Downey sent seed samples to Stefansson in Manitoba. By 1973 both breeders had developed a *B. napus* variety which was low in both glucosinolates and erucic acid. It is likely that a bit of professional competition was involved when the two breeder's varieties went head to head against each other for registration. Stefansson's Tower variety proved to be better agronomically, and in 1974 Agriculture Canada registered Tower as the world's first zero-erucic acid, low-glucosinolate *B. napus*. However, a "double-low" variety of *B. campestris,* which dominated production across the prairies, was yet to be developed. Downey responded to this challenge, and working with breeder Sid Pawlowski from the Saskatoon Research Station, developed the world's first zero-erucic, low glucosinolate *B. campestris* variety Candle, which was released in 1977 (National Research Council, 65-72). As a *B. campestris* variety, Candle filled the niche of the northern growing areas, where Tower's later maturity was problematic (Agriculture Canada <u>The Saskatoon Research Station</u>).

5.6 Beyond the Laboratory

The efforts of the scientists involved in developing the new double-low varieties went far beyond their laboratories. In the *Western Producer's* 2003 80th Anniversary Section (16), Keith Downey summarized the work involved in gaining acceptance for the new crop:

> **You have to be able to talk to the importers of your products and gain their confidence and tell them face to face what we could do to make this crop better, both from a processing and nutritional point of view. It became clear it was**

important to condition our markets for changes in the quality and product we were able to breed into rapeseed and canola.

6.0 Canola Production and Products

6.1 "Canola" is Coined

Canadian rapeseed breeding was by far and away years ahead of the rest of the world. Distinct products could be derived from the new "double-low" varieties, and it was decided that a new name was necessary to distinguish the Canadian product from the rest of the rapeseed on the world market. The Western Canadian Oilseed Crushers' Association trademarked the term 'canola' in 1978 to distinguish the superior edible products derived from double-low varieties of *B. napus* and *B. campestris*. The trademark was transferred to the Canola Council of Canada in 1980 (National Research Council, 75-76). Canola is a combination of the words Canadian and oil, but the term is not restricted to use in Canada, and has evolved into a generic term used worldwide (Canola Council of Canada Canada's Canola, 3).

6.2 Canola Production

From a modest first planting of rapeseed in the farm garden of Mr. Fred Solvoniuk of Shellbrook, Saskatchewan in 1936, canola has taken its place as Saskatchewan's second most important crop, after wheat. Saskatchewan production accounts for approximately 40% of the canola produced in Canada. Canola ranks third, behind wheat and barley, in Canadian exports, and fifth in world trade, behind rice, wheat, maize and cotton (University of Saskatchewan). Canadian canola exports are valued at over two billion dollars (Canola Council of Canada Overview).

6.3 What is canola used for?

Of the approximately seven million tonnes of canola seed produced in Canada each year, about half of the seed is exported, while the other half is crushed domestically (Hickling, 3). Canola seed is crushed and solvents are used to separate the oil from the meal at crushing facilities across the country. In Saskatchewan, canola crushing plants are located in Nipawin and Clavet. In Canada, canola oil is used in the production of 90% of the domestically produced salad and cooking oils, 50% of shortening and shortening oils and 45% of margarines and margarine oils (Statistics Canada as cited in Malcolmson and Vaisey-Genser). Canola oil is lauded as having the best mix of saturated, monounsaturated and polyunstaurated fatty acids of any edible oil on the market. Specifically, canola oil is the lowest in saturated fat, and has high levels of monounsaturated fat which have been linked to a reduction in blood cholesterol levels (Canola Council of Canada The Facts). Canola meal - the solid product leftover after crushing, is used as a high protein, high-energy livestock and poultry feed supplement. Due to the wide availability of canola meal, it is also routinely used in aquaculture and in sheep, horse, rabbit and other specialty animal diets (Hickling, 34). A wide range of inedible uses for canola oil from printing inks to biodiesel have also been developed. The following list from the Canola Council of Canada's publication *Canada's Canola* outlines the numerous edible and inedible uses for

canola oil and meal (15).

7.0 Research Initiatives in Saskatchewan

7.1 Biotechnology

Saskatoon, Saskatchewan continues to be a center of canola research today. Saskatoon's Agriculture and Agri-Food Canada Research Station[3], the National Research Council's Plant Biotechnology Institute[4], the University of Saskatchewan and numerous private research companies constitute "one of the world's largest initiatives in canola breeding and research genetics," according to Ag-West Biotech Inc., a provincial authority on biotechnology. Much of the current focus of canola research is centered around biotechnology, largely due to the fact that the crop lends itself very well to genetic transformation. Current research includes increasing resistance to pests and disease, herbicide tolerance, enhanced meal quality, and expanded industrial and inedible uses (Ag-West Biotech Inc. <u>Canola- Biotechnology's Powerhouse Crop).</u>

Scientists working at PBI were involved in the development of the world's first transgenic GM (genetically modified) canola. Released under the name Innovator in 1995, the canola "was resistant to herbicides known as Liberty, Ignite, Basta (and others) containing the active ingredient phophinothricin." AgrEvo was the company responsible for the commercialization of the first transgenic GM canola (Dr. Wilf Keller, personal communication).

7.2 Brassica juncea

Agriculture and Agri-Food Canada and the Saskatchewan Wheat Pool partnered to develop the world's first canola quality *Brassica juncea*[5] varieties, Arid and Amulet. Available to growers for the first time in 2002, this edible oilseed crop extends the area suitable for canola production into the hotter, drier brown soil zone of the Palliser Triangle. The development of canola-quality *Brassica juncea* required a reduction in erucic acid and glucosinolates, and the development of a fatty acid profile to match that of current canola varieties (Saskatchewan Wheat Pool). Agriculture and Agri-Food Canada estimates an additional 2-4 million acres could be added to production with *Brassica juncea* (Agriculture and Agri-Food Canada <u>Breeding Improved Oilseeds</u>). The Saskatchewan Wheat Pool's Chief Executive Officer, Mayo Schmidt foresees a bright future for the new crop:

> ***Brassica juncea* will take its place alongside Argentine and Polish canola as a**

[3] In 1998, Agriculture and Agri-Food Canada's Saskatoon Research Station was named the "Center of Excellence in Canola" by the Government of Canada.

[4] The NRC's Plant Biotechnology Institute was formerly known as the Prairie Regional Laboratory.

[5] *Brassica juncea* is a mustard, from which oriental and brown mustard varieties are produced.

profitable oilseed crop for western Canadian farmers. *Brassica juncea* adapts well to the southern Prairie climate providing better heat and drought tolerance and higher yields than traditional canolas. We are extremely proud of our research team, which has maximized its strategic partnership with AAFC and its research scientists. It is these kinds of partnerships that Canada needs to keep our farmers competitive in a tough international marketplace. (Saskatchewan Wheat Pool).

7.3 Canola Biodiesel

The efficiency and economics of the use of canola biodiesel on a commercial scale is currently being tested in Saskatoon. The City of Saskatoon has embarked on a two-year BioBus pilot project to evaluate the use of a five percent canola biodiesel blend in two of its transit busses. If this project proves successful, it could mean a win-win opportunity for producers and consumers. In addition to providing an additional market for canola producers, preliminary research by Saskatoon's AAFC Research Station and the University of Saskatchewan showed a remarkable cost savings for the environment and the consumer. An astonishing one ton of renewable canola biodiesel saves five times its weight in diesel fuel, and engine wear rates were up to 50% lower in engines fueled by biodiesel (City of Saskatoon).

7.4 MCN Bioproducts Inc.

MCN Bioproducts Inc. is another successful University spin-off company. In a University press release dated May 12, 2004, the company was described as follows: "MCN Bioproducts Inc. was created in 2000 to commercialize a process to fractionate canola meal, one of the highest quality plant-based protein sources in the world. Canola meal is currently produced as a byproduct when canola seed is crushed to extract the oil." College of Agriculture researchers developed the technology, which was honoured with the University's Innovation Place-Industry Liaison Office Award of Innovation at a ceremony held in May of 2004. According to Doug Gill of the University's Industry Liaison Office, MCN's technology "...turns an undervalued commodity into quality products that will open up new markets." This technology has the potential to be very important for canola producers (University of Saskatchewan <u>MCN Bioproducts</u>).

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Appendix A:
Quotes Relating to Canola Development

"From humble beginnings, Canada's one-time "Cinderella crop" has become a high quality crop, second only in importance to wheat."

Agriculture Canada, <u>Saskatoon Research Station 1917-1985</u> online publication http://collections.ic.gc.ca/agrican/pubweb/hs200020.asp , March, 2003.

"Farmers, grain handling companies, processors, and researchers joined forces to support canola research, and promote production and use, in a co-operative and collaborative effort of outstanding teamwork. Seldom, if ever, in the agricultural history of Canada has there been such rapid and spectacular progress in the advancement of production and utilization of a particular crop."

Canola Council of Canada, <u>Canada's Canola</u>, page 6.

"Drs. Stefansson and Downey helped introduce a crop that has tremendous health benefits for consumers. Canola has one of the lowest saturated fat levels of any oil and a high omega-3 content, both of which help prevent heart disease. Canola has become a household name in Canada and around the globe thanks in part to their efforts."

Phil Thomas, Consulting Agrologist in Canola Council of Canada, "Canola "fathers" honoured," <u>Canola Connection</u> online publication. <u><http://www.canola-council.org/events/pr_25oct02.html></u>, December, 2002.

"The only trouble with the crop was that the oil was no good, and the meal was no good!"

Burton Craig in National Research Council, <u>From Rapeseed to Canola: The Billion Dollar Success Story</u> (Ottawa: National Research Council Publications, 1992), page 1.

"Wheat may always be king, but canola wears a crown of considerable weight and undisputed beauty."

National Research Council, <u>From Rapeseed to Canola: The Billion Dollar Success Story</u> (Ottawa: National Research Council Publications, 1992), page 2.

Story Re: research staff involved in rapeseed research:

Researcher Les Wetter shared this story in the NRC's publication, From Rapeseed to Canola: The Billion Dollar Success Story, page 34.

"I heard this indirectly, that Dr. Sallans had told Dr. Ledingham: 'You know, we're lucky we've hired these farm people. People who've come from the farm in western Canada turn out to be very innovative people. If they can't solve a problem one way because they've failed they won't back off, and won't attack it. They'll go at it another way. They're very innovative people, and that's what you need in research – innovative people.' "