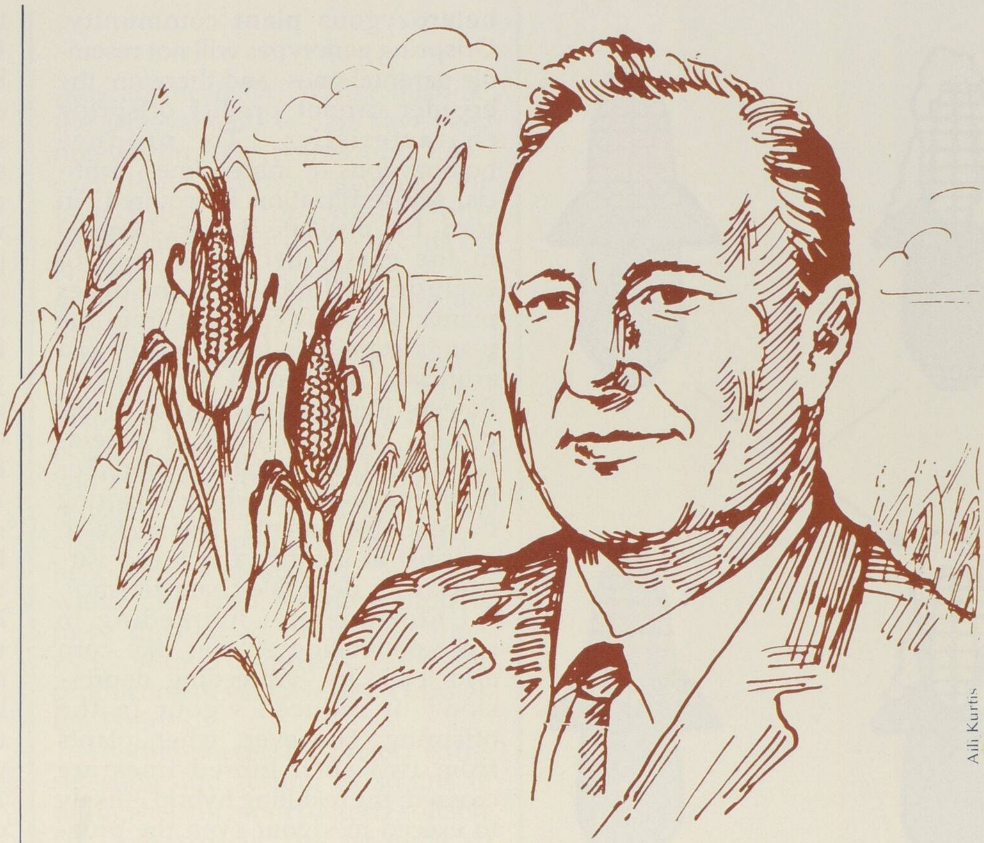
The Corn Project

Like his colleagues Drs. Bushuk and Evans, Dr. Ed Larter, head of the program's corn breeding project, comes from a prairie agricultural background on a southern Alberta farm. As a plant breeder, Dr. Larter is famous for the key role he has played in the improvement of triticale, a new wheat and rye hybrid which has been heralded as possibly the most significant new crop since the Neolithic revolution. Triticale's disease-resistance, yield, and nutritional value are equivalent to the best wheats, and it can be grown under marginal soil and climate conditions.

Larter's work for the cold crop program, however, centres on corn (or more properly maize), the world's third most important cereal crop after wheat and rice with about 350 million tonnes produced annually worldwide. Because of severe climate, very little corn is grown on the Canadian Prairies; where it is planted, chiefly in Southern Manitoba, it is confined to the extreme south. Here, only about 101 000 ha (250 000 acres) of the high-quality grain corn is planted. The best yields are about 1030 dm^3/ha (70 bushels an acre) which is well below yields of 1763 dm^3/ha (120 bushels an acre) produced under the more favourable climate conditions of the United States corn belt.

As with the wheat project, Ed Larter's research goal is the breeding of cold tolerant, high-yielding varieties of grain corn suitable for widespread production on the Canadian Prairies. While Larter admits that corn would be a less profitable crop than wheat for prairie farmers, he expects that its principal attraction would be as a cash crop. Unlike wheat which is stored, grain corn can be sold immediately as feed to livestock producers.

Larter has found that the crucial factor limiting corn production on the Prairies is cold soil temperatures during the early spring. Differences of only 1°C can be highly significant. Most corns will germinate and grow well in soil of 12°C or above. Below 11°C, however, most varieties either fail to germinate or only grow very slowly. With a maximum crop growing season of 120 days under Prairie conditions, this slow early growth results in sharply reduced yields.



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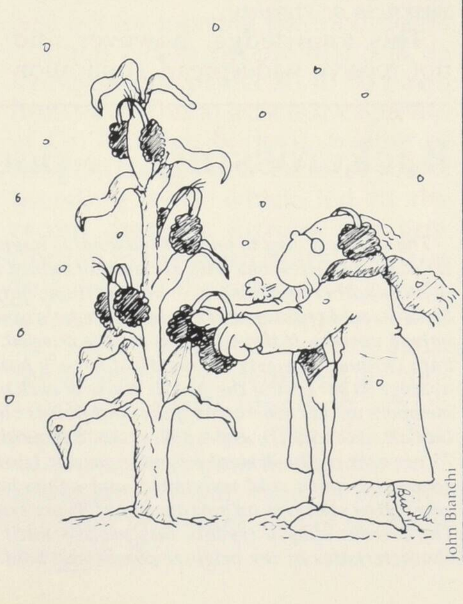
Dr. Ed Larter.

Larter's breeding project, then, is aimed at developing corn varieties which will grow vigorously in cold Prairie spring soils and then mature relatively quickly. The project will, he says, "push the frontiers of corn production further northward and westward."

The chief problem facing corn breeders is that unlike wheat, which is a self-pollinating species, corn is a cross-pollinating species. Like most animals, plants are defined by two sets of genetic information, one from each parent; under normal circumstances, these two sets differ widely in their information content — which provides a species with essential variety. Such a configuration is termed 'heterozygous' (*hetero* meaning different). In self-pollinating species, however, the information in these two 'parental' sets eventually converges (they become highly 'inbred'), leading to what is called a 'homozygous' condition (*homo* meaning alike). As a result, offspring closely resemble parents, and producing and selecting the best homozygous genotypes is a relatively simple matter. Later, crosses between these homozygous genotypes can be made to combine desirable genes in a single cultivar. This is essentially the procedure Dr. Evans is following in the winter wheat project.



John Bianchi

Breeding with cross-pollinating species like corn, however, is far more complicated. Genes are constantly reshuffled from generation to generation leading to a highly