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The Relation of Winter Apples to Hardiness of Tree*

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THE search for a hardy, productive winter apple of good color and the best dessert quality is becoming an old story in the north-western states, in the north-central and eastern portions of the province of Ontario, throughout the province of Quebec, and over a large part of the province of New Brunswick. Over this immense territory the cry for many years has been for a long-keeping apple which will compare favorably, in all particulars, with the best long-keeping apples grown in the more favored parts of the American continent. Why does this search still go on? And will the desired apple ever be found? These two questions I shall attempt to answer in this short paper.

From the writer's experience with over 3,000 species and varieties of trees and shrubs, exclusive of cultivated fruits, from many countries and climates, that are under his care and observation at the Central Experimental Farm, Ottawa, I have drawn the following conclusions regarding hardiness of trees: A tree or shrub which will withstand a test winter at Ottawa must be one which ripens its wood early.

Trees or shrubs which are native to places having a longer or much longer growing season than at Ottawa, grow longer than the native species, or those from a somewhat similar climate to the native species. When a test winter comes, their wood is not sufficiently ripened, or winter-resistant, and they are more or less injured or perish.

After 17 years' observation of this large collection, which has increased to over 3,000 species and varieties, it may be said that with scarcely an exception, and these doubtful ones, no apparent increase in hardiness has taken place in individual specimens. Plants which killed to the ground 17 years ago, kill to the ground still. Those which killed to the snow line, kill to the snow line still. Those which are killed back one-half or merely a few inches at the tip do so still. Sometimes a tree will remain hardy for several years and then kill back to near the ground. It is possible that they are getting hardier very gradually, but if so this increasing hardiness is imperceptible so far. Another observation regarding tender trees has been that after a season when the growth has been strong more injury is likely to occur than in a season when the growth is short.

Individual specimens of certain species have been found hardier than others. This has been particularly noticeable in the case of *Catalpa bignonioides* which, as a rule, kills back badly at Ottawa, but some individual trees have proven much hardier and bloom freely at Ottawa. The raising of seedlings from these tender species has not been carried on long enough to state positively, from our own experience, that hardier types will be produced in this way, but the history of such work makes us hopeful. Some favorable results have, however, already been obtained.

Let us now turn to the hardiness of apple trees, and we might include all other large fruits that have been tested at Ottawa. About 700 named varieties of apples have been tested. It has been found that a far larger proportion of those which originated in the eastern and south-western states are tenderer than those which originated in the north-eastern and north-western states and in Canada. The same may be said of Europe. The hardy varieties from Great Britain, France, and Germany are few compared with those from the colder parts of Russia. The exact figures have not yet been worked out, but may be before this paper is published. It may be stated safely that the hardiest apples are those which have originated in Russia. They are the hardiest survivors of the hundreds and thousands of varieties which have originated in Russia during the past centuries, and have shown their ability to withstand the winters there as far north as latitude 55°, or further in a continental climate. In America, and especially in the colder parts of the country, the origination of varieties has been more recent, and we believe that it will be some time before such hardy kinds as Hibernal, Charlamoff, and Duchess will be obtained on this continent, although some quite hardy varieties have already been originated.

By again analyzing the list of varieties tested, we find that the season of all the hardiest varieties is summer or autumn. The winter of 1903–4 was a very severe one in Ontario, and in the orchards at the Central Experimental Farm, and 164 varieties of apples were winter-killed. An analysis of these varieties, a list of which was published in the annual report for 1904, shows that 130 of these were early winter and winter varieties, and 34 summer and autumn. This is sufficient evidence to prove that summer and autumn varieties are hardier than later keeping sorts.

Let us now consider the difference between a summer and a winter apple.

A summer apple is one that is ready for use in the summer; a winter apple is one that is not ready for use until winter. The season of the first is much shorter than the second, mainly because it reaches maturity in a hotter time of the year than the others. Duchess and Wealthy apples will keep much longer on Prince Edward Island, where the climate is cooler and development slower than they will at Ottawa. Winter apples will also keep better there than they will in those parts of Ontario where they succeed.

It has been observed frequently that apples which mature early and are in condition for eating in summer and autumn are grown on trees that ripen their wood early, and on the other hand, an apple which is not ready for use until winter is usually grown on a tree that does not ripen its wood early. This is a fact which many have observed and that is perfectly natural. The fruit of most varieties of winter apples has to be kept on the trees at Ottawa until there is

*Read before the last convention of the Quebec Pomological Society.