How Long Will Present Spring Oat Varieties Last in the Central Corn Belt

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Approximately ten million acres of spring oats are grown annually in the states of Iowa, Illinois, and Indiana. This is more than one-fourth of the entire oat acreage of the United States. During the last 20 years the relative importance of the different oat varieties in this area has fluctuated rather rapidly. This quick turnover in oat varieties is due to a number of interacting factors, not all of which are understood.

Many varieties of oats have been introduced into the central Corn Belt. Some have been widely accepted by the farmers while others have proved less popular and have been grown on a small portion of the land devoted to oats. Without exception the acreage devoted to a particular variety of oats has increased for a period, then decreased. A very few varieties, such as Columbia, have remained in production over a relatively long period. However, the acreage devoted to these varieties has steadily decreased. The situation is dramatized in a sentence published in the "Iowa Farm Science", December, 1948, by H. C. Murphy, Senior Pathologist of the USDA located at Ames, Iowa, "Iowa farmers have changed their oat varieties twice since 1941". If the factors which lead to the decline and replacement of oat varieties could be adequately appraised, it might be possible to predict with useful accuracy their approximate period of popularity. This in turn would give a rough indication as to when a replacement variety would be needed and would thus have some practical importance. It would also be a notable addition to crop ecology. The present paper attempts first of all to summarize our present knowledge on these points. Among these factors are an active oat breeding project closely coordinated throughout the area; alert extension services in close touch with industry and with the breeding program; the lack of any economic method of controlling oat diseases that cannot be reached by seed treatments; and the presence in the area of potentially serious pathogens. So far as can be determined excessive losses from disease have been the most common cause of a given variety being abandoned. This is, of course, no more than should be expected when large areas of varieties of similar parentage are grown in the presence of various pathogenic races which have known capacities for variation.

Indeed, it is hard to conceive of conditions more favorable to the rapid increase of an aggressive genic race or species than that furnished by methods of oat culture. Oats are self-pollinated and care is taken to insure the purity of varieties they are released. An acre of oats contains a million and a half plants. Thus a 40-acre field, the standard unit in the central Corn Belt, could contain a pure stand of some 60 million practically identical plants. Many of the pathogens consist of a number of physiologic races, the relative abundance of which is markedly influenced by the repeated planting of areas of a single variety or a number of varieties of similar parentage.

The major proportion of the central Corn Belt is planted with varieties of similar parentage. In 1948 Clinton on 71.3% of the acreage and Benton and Mindo on 4.2% of the acreage. Clinton and Benton are different selections from the same cross, D69 × Bond. While Mindo is closely related to Clinton as is Benton, it is not closely related to Clinton as is Bond. While Bond as a parent and is similar to Clinton in being resistant or susceptible to the crown rust (Puccinia coronata avenue). The D69 x Bond as a parent and is similar to Clinton in being resistant or susceptible to the crown rust (Puccinia coronata avenue). The single fact is more widely recognized in plant pathology than the screening effect which results from planting large areas of one crop variety. The situation in the spring oat area has been often summarized by Stakman and his associates. The same relation exists with oats in the central Corn Belt. For example, H. C. Murphy in a letter to the authors, “During the period 1941 races 2 and 5 made up approximately 80% of the United States. Races 8 and 10, on the other hand, were during this period absent. By 1948, however, races 8 and 10 were the common races of stem rust. This increase in 8 and 10 with corresponding decline in the highly pathogenic races 2 and 5 is almost certainly due to the effect of the vast acreage of Richland and Victoria. Richland derivatives susceptible to rust but resistant to 2 and 5.” The Victoria derivatives were eventually abandoned.