Breeding Hard Red Winter Wheats for the Northern Great Plains Area

E. R. Ausem and R. H. Bamberg

The development of more hardy adapted varieties of hard red wheats has resulted in a northward expansion of the area devoted to the culture of winter wheats. Low temperatures, combined with other environmental factors to which these wheats often succumb, have limited their wider use. Winter wheat usually matures earlier than spring wheat thus often allowing it to escape hot dry winds and the rusts that frequently injure spring wheats. When winterkilling is not too serious a factor, winter wheat outyields spring wheat. It also has the advantage of giving a better distribution of labor. Winter wheat should, therefore, be grown instead of spring wheat in localities where this is possible.

The states included in the northern section of the hard red winter wheat area are Minnesota, South Dakota, Wyoming, and Montana. The first three of these states each grow between 100 and 200 thousand acres of winter wheat while Montana grows over a million acres annually. The development of more hardy varieties has made possible the successful growing of these wheats in areas where they were frequently injured by winterkilling. Some of these varieties are MinTurki, Minhardi, Marmin, and Yogo.

Most of the relatively hardy winter wheat varieties which have been developed for the northern section have been as desirable in quality as the better spring wheats. Greater disease resistance, such as resistance to leaf and stem rusts and ordinary and dwarf smut, is also needed. There is a demand, therefore, for winter wheats with greater winter-hardiness, more disease resistance, and better milling and baking quality than those now available for growing in this area. This paper discusses the breeding work now being done for the improvement of winter wheat varieties adapted to the northern region.

WINTERHARDINESS

One of the major problems in the improvement of wheats for the northern region is the development of more winterhardy varieties. Winterkilling may be due to any or all of four causes, viz., (a) heaving, (b) smothering, (c) physiologic drought, and (d) direct effect of low temperatures on the plant tissues. Winter wheats vary greatly in their

---

1Contribution from the Minnesota and Montana Agricultural Experiment Stations and the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Dept. of Agriculture. Authorized by the Director of the Minnesota Agricultural Experiment Station for publications as scientific journal series Article No. 2308, and by the Director of the Montana Agricultural Experiment Station for publication as Paper No. 185 journal series. Also presented at the annual meeting of the Society in Columbus, Ohio, February 28, 1946. Received for publication October 10, 1946.

2Agronomist and Associate Pathologist, respectively, Division of Cereal Crops and Diseases, cooperating with the Minnesota and Montana Agricultural Experiment Stations, respectively.