THE MASS-PEDIGREE METHOD IN THE HYBRIDIZATION IMPROVEMENT OF CEREALS1

J. B. HARRINGTON2

During the past 12 years several methods of handling hybrid populations have been used under the dry open plains conditions at Saskatoon in western Canada. The straight pedigree method, while desirable in several respects, proved expensive and distinctly limited the amount of material carried. The straight mass method allowed the carrying of a large volume of material, but was very slow. Modification of the mass method, by selecting whenever feasible during the years of segregation and running individual plant progeny tests where desirable, is believed to be a suitable combination plan. It is this combination which is referred to as the mass-pedigree method.

In order to state clearly the case for the combination method, it is necessary first to consider the generally accepted use of the two methods which it combines. The pedigree method has been used very extensively in the hybridization improvement of self-fertilized crops in Canada, the United States, Great Britain, and Australia, as well as in other countries. It has been described by Love (9), Hayes and Garber (5), and others. Essentially it consists of selecting promising plants in several segregating generations commencing with P2, and each year after F2 growing an individual progeny of each selected plant. A progeny is bulked and considered to be a pure breeding line as soon as all of the plants appear to be uniform for easily observable morphological characters. A uniform appearing progeny may sometimes be bulked as early as F3, as mentioned by Love (9), or F4, as stated by Biffin and Engledow (1). Hayes and Garber (5) prefer on the whole not to consider any progenies as lines before F5. On account of the large amount of selecting and progeny testing associated with the pedigree method, many breeders have recently commenced using the mass method as an economical substitute.

The mass method is now used considerably in various countries. It has been employed in Germany and Sweden for many years. Until comparatively recently it was not used much in Canada and the United States, although it was described by Newman (10) in 1912. During the past 10 years an increasing number of breeders in these countries have commenced to use the method in one form or another. In the United States the mass method has been described by Love (9), Hayes and Garber (5), and others. Its usefulness has been pointed out by Florell (3) and, in a specialized form, by Harlan and Martini (4). Recently, Hiorth (6) detailed the manner in which Baur uses the mass method and Bohorodski (2) recommended it as being far superior to the pedigree method.

1Contribution from the Department of Field Husbandry, University of Saskatchewan, Saskatoon, Sask., Canada. Also presented at the annual meeting of the Society held in Washington, D. C., on November 18, 1936. Received for publication February 19, 1937.
2Professor of Field Husbandry.
3Figures in parenthesis refer to "Literature Cited", p. 384.