RYE is highly self-sterile and depends very largely upon the wind for pollination. Only 60 to 80% of the total number of flowers in the head set seed in the field. Both seasonal variations and heritable differences play a part in the low percentage of seed produced. From the agronomic standpoint a knowledge of the variation within lines in their ability to set seed when self-pollinated is important.

The senior author (4) became interested in this problem on finding that during a 3-year study, 33.2% of 29,760 flowers observed did not set seed under field conditions. Undoubtedly the same situation occurs in commercial rye fields and some decrease in yield due to this cause is to be expected. If there are varying degrees of incompatibility in rye, selection and hybridization of the more compatible individuals might reduce the amount of sterility. Reduction of vigor from inbreeding increases the difficulties of the problem.

Close breeding has yielded results of practical value. A selection program of open-pollinated lines was begun in 1922. Starting with selected plump white kernels from a field of Schlansted rye (Wis. Ped. No. 2) selection was continued over a period of five years in open-pollinated head rows for large heads having high fertility and large, plump white kernels. At the end of the five-year period, several head rows were found in which the kernels were large, free from green color, but approximately 2 to 3% were grayish. The plants were vigorous and the heads were medium large and well filled. Seven of the better lines were composited, given the number Wisconsin Pedigree 6, and named Imperial. This variety has been distributed for commercial production. Subsequent tests in yield plats have shown Imperial rye to be as vigorous, as winterhardy, and higher in yield than Schlansted from which it originated.

As close breeding sufficiently intensive to eliminate green kernels apparently did not result in decrease of vigor or lowering of yield, a more intensive inbreeding and hybridizing program of rye was undertaken in which yield was the main objective and high fertility was one of the means to attain it. This paper reports progress over 11 years of selection for high fertility in inbreds and also of hybrids from inbreds. The scope of this experiment does not permit a detailed and complete study of incompatibility. All low fertility lines were of necessity discarded in the progress of this experiment, therefore no data on low fertility selections are available. These results are submitted therefore to show the progress made during 11 years of inbreeding, hybridizing, and inbreeding of hybrids and selection of the more vigorous and highly fertile lines.

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3Figures in parenthesis refer to “Literature Cited”, p. 418.