YIELDS OF VARIETIES OF WHEAT DERIVED
BY BACKCROSSING

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The backcross method of wheat improvement has introduced a number of innovations in plant breeding procedure. One of the most striking of these occurred when Baart 38 and White Federation 38 were increased and distributed in California without benefit of the extensive background of comparative yield trials which usually attends the introduction of an improved variety. This action was justified primarily by a theoretical consideration of the consequences of backcrossing \((r, 2)\), namely, that the yield, quality, and adaptation of the recurrent parents would be recovered. At the same time resistance to bunt, *Tilletia tritici*, and stem rust, *Puccinia graminis tritici*, could be added, which was the particular objective of this program. Pathological comparisons have adequately demonstrated the fulfillment of this last objective. Morphologic, ecologic, and a limited number of yield trials conducted during the progress of the breeding program indicated that the yielding ability of the commercial parents had been recovered, or that if differences still existed they were of such small magnitude as to be indeterminable in limited tests. It is now possible to supplement these preliminary tests with a considerable number of comparative yields from local, statewide, and regional sources.

VARIETIES AND TESTING METHODS

An understanding of the genetic relationship of the improved and commercial varieties under consideration is essential. White Federation 38 is a composite of 182 \(F_3\) lines showing resistance to stem rust and bunt. Their breeding is shown by the pedigree (Martin \(\times\) White Federation\(^a\)) \(\times\) (Hope \(\times\) White Federation\(^b\)). Baart 38 is a composite of 157 \(F_3\) lines showing resistance to bunt and stem rust and produced from crossing (Martin \(\times\) Baart\(^c\)) \(\times\) (Hope \(\times\) Baart\(^d\)). The numerical superscript denotes the number of times the commercial parent has been used in the crossing programs.

Only paired, contiguous field or nursery plots of the improved and commercial varieties are considered. These have been segregated from a somewhat larger

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3Numbers in parenthesis refer to "Literature Cited", p. 840.