THE development of double-cross corn hybrids in the past 25 years through crossing selfed lines selected from open-pollinated varieties led to rather spectacular improvements in yield and performance. The superiority of such F₁ hybrids was evidenced in a practical way by their rapid acceptance by farmers and the consequent rapid decline in use of open-pollinated varieties as hybrid seed became commercially available in the corn belt. Following the development of suitable double-cross hybrids, corn breeders have devoted much of their efforts toward further improvement of hybrid performance through the search for new superior inbred lines as well as through improvement of lines already in existence. The methods of line improvement have been largely those of pedigree selection in selfed progenies from crosses among available lines, gamete selection and backcrossing of various types including double backcrossing, or convergent improvement as suggested originally by Richey (4). There can be no doubt that rather marked improvement has occurred in the foundation lines used and consequently in the hybrids made from them. The greatest improvement realized, however, has been in important agronomic characteristics other than yield. To the extent that these agronomic characteristics influence yield indirectly, improvement in productivity has occurred. Much of the improvement in agronomic characteristics has been effective in lending stability to grain production through reduction of the influence of many common crop hazards.

The original suggestion of convergent improvement by Richey in 1927 (4) was for the purpose of improving the general vigor and productiveness of two inbred lines used in a single cross without interfering with their behavior in hybrid combination as well as providing information on the type of gene action for yield in corn. The application of convergent improvement to practical breeding programs has been shown to be effective in improving the

MATERIALS AND METHODS

The single cross, W9 × 38-11, is used as a double-cross hybrid seed production in the central portions of the corn belt. One of the parent inbreds has been difficult to propagate in many areas because of its poor pollen shedding ability. The popularity of this seed parent made it seem a desirable choice for convergent improvement program in an attempt to increase the shedding ability of W9 without appreciably reducing the yield potential of the F₁ as a parent in hybrids with which it is used.

The F₁ single cross was backcrossed twice to different lines. Selfing and selection were subsequently practiced on portions of the backcross progenies. After two generations of backcrossing was begun of the selected segregates to recurrent (R) and nonrecurrent (NR) parent lines. A comparison of the selected recovered line combinations together with the original F₁ single cross, as well as some eliminations of selected recovered lines from the testing period due to failure to obtain testcross seed, were reported in this paper were obtained from the first cycle of convergent improvement with a common parent single cross.

Increased efficiency was obtained by adjacent plot testing of such combinations from the North Central Corn Technical Committee. The results reported in this paper were obtained from the first cycle of convergent improvement with a common parent single cross.