HYBRID CORN STABILIZES CORN YIELDS

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A study has been made to determine whether hybrid corn stabilizes corn yields, and what might possibly be expected in the future by the use of adapted hybrids.

In order to ascertain whether or not hybrid corn has stabilized corn yields, a study was made of data from the 1934 to 1938 Illinois corn performance test bulletins. The annual yields for hybrids and for open-pollinated varieties were taken, and the average yields calculated. The percentage by which the annual yield of each hybrid fell below or exceeded the average yield of that hybrid over a period of years was taken to be yield variability. These annual percentage fluctuations were averaged to represent the variation for a period of years.

The results of the three- and four-year averages (Fig. 1) show that the lowest fluctuation of yields was in the northeastern section of the state, and that the fluctuation increased progressively for the northern and north-central, reaching a peak in the central section. The south-central and southeastern sections had a slightly smaller variability than the central section. Six hybrids in northeastern Illinois fluctuated only 5.5 per cent from the three-year average, while five hybrids in the central section had a very wide variation of 30.7 per cent. Hybrids in the south-central section fluctuated 29.9 per cent, but in this case there were only three hybrids considered.

The percentage variation of the open-pollinated varieties, though higher showed the same tendency to increase from the northeastern section to the central section, as did the hybrids. The lowest per cent fluctuation, 13.3 per cent, occurred in northeastern Illinois, and the highest variation was 35.0 per cent which

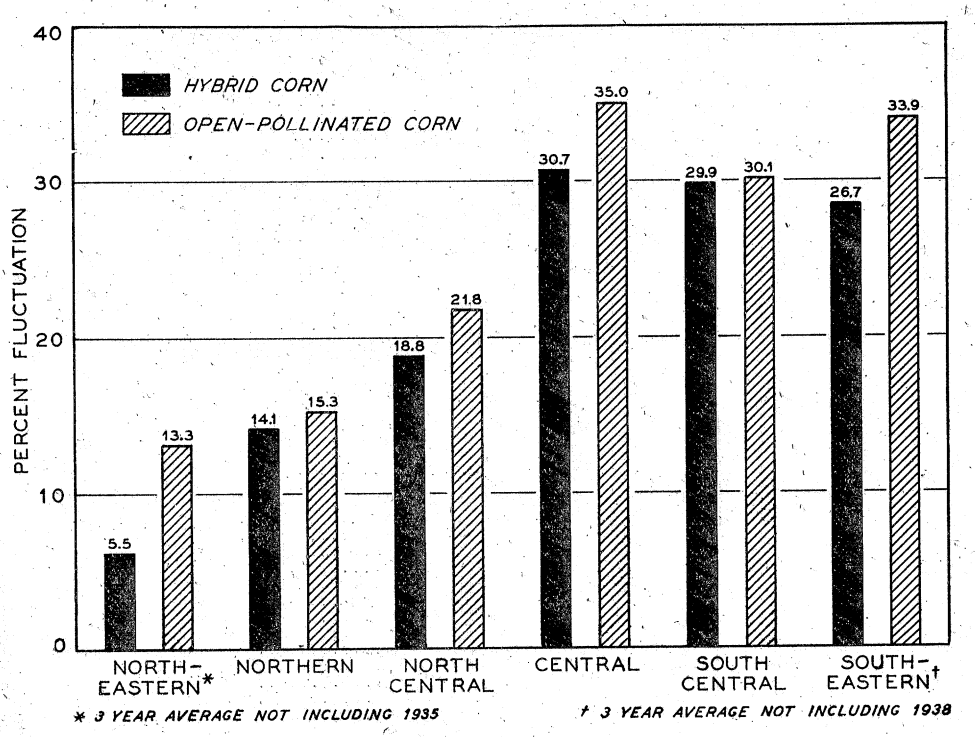
HYBRID CORN
OPEN-POLLINATED CORN
PERCENT FLUCTUATION
40
30
20
10
0
5.5
13.3
14.1
15.3
18.8
21.8
30.7
35.0
29.9
30.1
26.7
33.9
NORTH-EASTERN*
NORTHERN
NORTH CENTRAL
CENTRAL
SOUTH CENTRAL
SOUTH-EASTERN†
* 3 YEAR AVERAGE NOT INCLUDING 1935
† 3 YEAR AVERAGE NOT INCLUDING 1938

Fig. 1

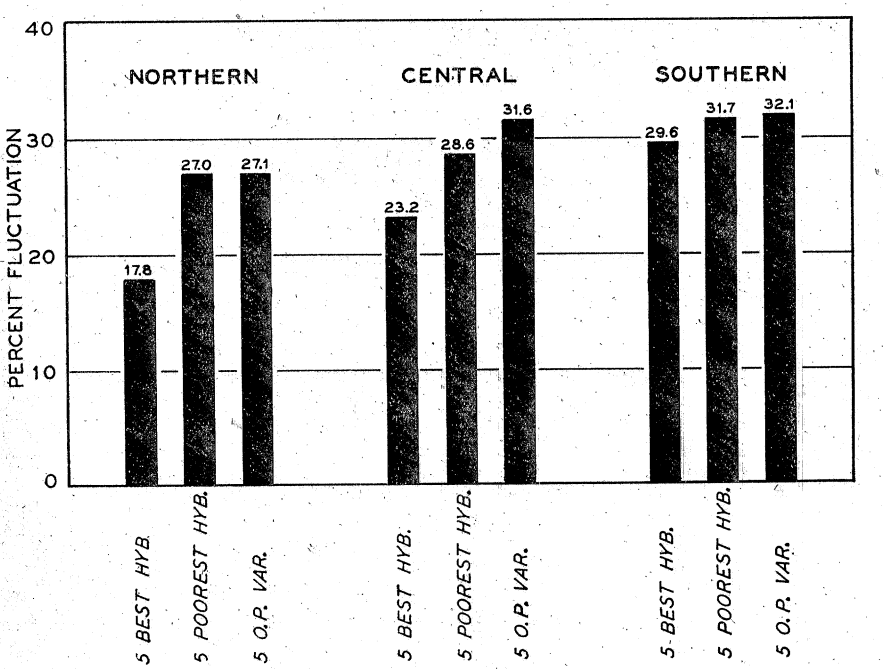
PERCENT FLUCTUATION
40
30
20
10
0
NORTHERN
CENTRAL
SOUTHERN
17.8
27.0
27.1
23.2
28.6
31.6
29.6
31.7
32.1
5 BEST HYB.
5 POOREST HYB.
5 O.P. VAR.
5 BEST HYB.
5 POOREST HYB.
5 O.P. VAR.
5 BEST HYB.
5 POOREST HYB.
5 O.P. VAR.

Fig. 2

occurred in central Illinois. It should be pointed out, however, that there were only two open-pollinated varieties included except in the northern, and south-central sections where there were three.

The difference in per cent fluctuation between the hybrids and the open-pollinated varieties indicates whether hybrids do or do not tend to stabilize yields. In all of the sections, except the south-central and possibly the northern, there is a distinct advantage in favor of the hybrids stabilizing yields. Northeastern Illinois, the section with the lowest variability, had the highest difference between the hybrids and the open-pollinated varieties. South-central Illinois gave only a 0.2 per cent variation in favor of the hybrids stabilizing yields. In contrast to northeastern Illinois, northern Illinois hybrids had an advantage of only 1.2 per cent.

Individual sectional results indicate there is a wide variation among the hybrids. For example, in northeastern Illinois one hybrid had an average annual fluctuation as low as 3.2 per cent, and the one with the most average annual fluctuation had a variation of 9.2 per cent. One hybrid exceeded the average fluctuation of the open-pollinated varieties in the northern, north-central, east north-central, central, west-central, and south-central sections.

A comparison (Fig. 2) was made of the average of the five best hybrids, the average of the five open-pollinated varieties, and the average of the five poorest hybrids for the past five years in three sections of Illinois. In northern Illinois the five best hybrids had nearly a 10 per cent advantage over the open-pollinated varieties and five poorest hybrids in the stabilization of yields. In two of the five years the five best hybrids had a fluctuation of more than 20 per cent. The five poorest hybrids and the five open-pollinated varieties fluctuated more than 20 per cent three and four years, respectively. In central Illinois the five poorest hybrids did not fluctuate as much as the open-pollinated varieties by 3 per cent. The five best hybrids fluctuated 8.4 per cent less than the open-pollinated varieties. The best hybrids fluctuated more than 20 per cent in only one year. Both the open-pollinated varieties and the poorest hybrids varied more than 20 per cent in four of the five years. The five best hybrids for the southern section fluctuated 3.0 percentage points less than the five open-pollinated varieties, and only 1.1 percentage points less than the five poorest hybrids. The five best hybrids and the five poorest hybrids fluctuated more than 20 per cent in three of the five years, and the open-pollinated varieties exceeded this variability in only two of the five years.

All this would indicate a slight tendency for hybrids to stabilize yields in southern Illinois, while in northern and central Illinois adapted hybrids have already definitely stabilized the corn yields.

Explanation of Figures

Fig. 1.—Average annual fluctuations from the average yield for hybrid corn and open-pollinated corn grown in the four years 1935-38, in six sections of Illinois.

Fig. 2.—Average annual fluctuations from the average yield of the five best hybrids, the five poorest hybrids, and the five open-pollinated varieties for the five-year period, 1934-38, in three sections of Illinois.