The hybrids developed by topcrossing were grown in yield trials in 1971. Plot size was 5.8 M^2 and plant density was 51,666 plants per hectare. Preliminary yield results are presented in Table 1.

Hybrids involving lines from selected populations show a definite superiority over those from the parent population whether you look at the mean of all lines, the highest yielding line or some subset of the highest yielding lines. Although lines from the three selected populations performed somewhat the same, the C12 lines appear to have a slight advantage over I13 lines. We can also conclude that 7 generations of mass selection for prolificacy was about as effective as 12 or 13 generations of mass selection for high grain yield. Hybrids involving lines from improved populations compared very favorably in yield with the best Nebraska Experiment Station hybrids included as checks. One hybrid check, a cross between two related lines (N7A x N7B) was a relatively low yielder as shown in Table 1.

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1. Effects of genetic and environmental factors on production of phytoalexin from Helminthosporium turcicum of Zea mays.

Genotypes used were Ht Ht Bx Bx, Ht ht Bx Bx, Ht Ht bx bx, ht ht Bx Bx, and ht ht bx bx (see MGCNL 45).

Production of inhibitory substances (presumably phytoalexin) decreased in the following order, as determined by a bioassay test with leaf diffusates on spore germination: Ht Ht Bx Bx, Ht Ht bx bx, Ht ht Bx Bx, ht ht Bx Bx, ht ht bx bx, and control (sprayed with water only). Differences between genotypes were all highly significant. Ht ht Bx Bx was much less inhibitory than Ht Ht Bx Bx.

Environmental factors studied were: attached or detached leaf, inoculum concentration, predisposing temperature, seedling age, and days from inoculation until collection of diffusate. These all significantly affected production of phytoalexin.

Much more phytoalexin was produced by the attached than by the detached leaf. A high spore concentration increased both the rate and amount of phytoalexin over a low concentration. A predisposing temperature of 70° F produced more inhibitory substances than did 80-90° F. Diffusates from seedlings inoculated at the fifth and sixth leaf stage inhibited spore germination more than seedlings inoculated at later stages. Production of phytoalexin increased up to the third, fourth or occasionally the fifth day after inoculation. After this time, the inhibitory effect gradually disappeared.

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1. A new anthocyanidin in maize: luteolinidin.

The gene sm (salmon silk) in the presence of red pericarp (P^{rr}, etc.) results in silks which are salmon in color. The P locus determines pericarp and cob color. Of particular interest is the P^{rr} allele which gives red pericarp and cob color (Emerson et al., 1935). This study was directed to the identification of pigments which cause salmon silk and red pericarp color in the genotype P^{rr} sm/P^{rr} sm.

A genetic marker stock, P^{rr} Y Pl sm py/P^{rr} Y Pl sm +, which has salmon silks, red pericarp, and red cob was used for this study. Silks from this stock about 5 days after emergence were removed from the ear and ground in acidified 80% methanol. Pericarp from mature kernels of the same stock was obtained by soaking kernels for 4 hours and hand-peeling the pericarp. Similarly, pericarp was ground in acidified 80% methanol. The pericarp and silk samples were allowed to stand for 24 hours, filtered, and reduced at 40° C with a rotary evaporator. Separation and identification of anthocyanins was accomplished by the usual techniques, paper chromatography, acid hydrolysis, and light and UV