dwarf prolific corn. See the December 6, 1957 issue of Seed World, pp. 16-17, for a more complete discussion of the project.

2. Twin-shoot.

In 1956, we made a number of complementary crosses between twin-shoot and Inbred Hy, a single eared strain. We used single plants in each case for closer control. We needed to know whether any cyto-plasmic inheritance was involved. However, the F_1 plants were all single-eared, regardless of the way the cross was made. F_1 ears were selfed to check F_2 ratios.

We had five ear rows of twin-shoot, numbering 194 plants, that were entirely homozygous for the character.

3. Siberian corn.

The strain of Siberian corn we mentioned in our last report seems to be quite dominant for earliness. The strain itself was producing silks and tassels this year 43 days after the seed was planted. The crosses we had made between Siberian corn and some of our regular early lines like M14 and Oh51A were from a week to 10 days earlier than the lines themselves. The Siberian corn is quite susceptible to bacterial wilt, and we have had a considerable amount of it in our breeding field the past two years. Lack of time kept us from following up on some indication of self-sterility in this corn. The pollinations we made to continue the strain were all sib-pollinations.

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1. Genetics of resistance to Puccinia polysora Underw.

F_1 families from crossing lines homozygous for Rpp_1 and Rpp_2 reacted uniformly against infection by P. polysora.

(a) Against Race EA.1 - typical hypersensitive lesions (class "01") characteristic of Rpp_1. No effect of Rpp_2 was detectable.

(b) Against Race EA.2 (against which Rpp_1 confers no resistance) - typical necrotic lesions (class "1") characteristic of Rpp_2 alone.

From studies of derivatives from this cross, the conclusion was reached that Rpp_1 and Rpp_2 are linked. Three separate estimates of

crossover probability were 0.09, 0.12 and 0.16. From the F_3 generation from selfing crosses of ($\underline{Rpp}_1$ X $\underline{Rpp}_2$) X susceptibles, lines were selected that were pure for both genes together.

2. Field breeding for resistance to P. polysora.

Colleagues on field stations in East Africa, using our pure resistant lines crossed and back-crossed to adapted local maizes, have developed, and brought into production, lines homozygous for either $\underline{Rpp}_1$ or $\underline{Rpp}_2$. In general these new lines are as productive as the old in the absence of P. polysora and greatly superior in its presence.

No evidence has as yet been obtained that any race of P. polysora other than EA.1 is prevalent in the field; consequently genes $\underline{Rpp}_1$ and $\underline{Rpp}_2$ are proving equally effective (although $\underline{Rpp}_1$ would become ineffective if EA.2 appeared).

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1. Preliminary observations of three types of leaf necrosis which appear to be simply inherited.

a. The field corn inbred line Q83 consistently exhibits a characteristic interveinal leaf necrosis. This condition has been observed on all plants of the line at many locations in the Northeast and in southern Florida for many years. F_1 progeny of Q83 x + do not show the condition.

b. The sweet corn inbred Iowa 5125B consistently exhibits a characteristic large circular necrotic area on the leaves, several times the size of typical H. turcicum lesions. All plants of the line are affected; the condition has been observed for a number of years in many locations across the northern United States.

During the course of routine selfing of Iowa 5125B two sister lines, differing by only two generations, were evolved. One of these, R43-9-1-2-1-2-1-1 has proved free of the leaf necrosis, while the other R43-9-1-2-1-2-2-2 remains typical of the original line. F_1 progeny of Iowa 5125B x + do not show the condition. The cross between the sister lines was made last year.