THE JOHN INNES HORTICULTURAL INSTITUTION
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The races of maize found in the West Indies have been described and discussed by W. L. Brown (Trop. Agric. 1953). It has been known since the pioneer work of Alfred Russell Wallace that island life presents special evolutionary features. Hence the maize races of the West Indian islands afford the geneticist interested in the scientific basis of the evolution and selection in cultivated plants, an opportunity of testing a number of hypotheses.

For instance, in the West Indies it is possible that gradual in-breeding has been accompanied by selection for general plant vigour: although the races are comparatively more inbred than usual for open-pollinated maize varieties found elsewhere, their vitality complex, so named by Harland, is undiminished. If the foundation of a race has depended on a limited number of parents then the amount of variation later released will be limited.

A preliminary examination of the genetics of these populations indicates that they may have been derived by methods involving closer inbreeding than is normally the case in open pollinated species.

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1. <u>A population study in the northwestern corner of Minnesota.</u>

Four recommended hybrids with relative maturities of 80 days or less were tested in the A.E.S. 100 area of Minnesota at population rates ranging from fourteen thousand to twenty-four thousand plant per acre.

	I	II	III	IV	V	VI
Approximate Population	14,000	16,000	18,000	20,000	22,000	24,000
Rate in 36" Rows	2/25"	2/21½"	3/29"	2/17½"	3/24"	2/14½"
Avg. yield Bu./Acre	82	88	87	95	94	102
Moisture % at Harvest	17.7	17.9	18.6	17.6	18.4	18.0

The largest population continued to show a substantial increase in yield but the populations associated with three plants per hill yielded lower than expected from those populations involving two plants per hill. The moisture percentage at harvest was quite variable.

R. H. Peterson

2. The inheritance and linkage relationships of factors controlling a long mesocotyl type.

A study is under way to determine the mode of inheritance and linkage relationships of factors controlling the long mesocotyl type common to Indian corns from the Southwest. A stock averaging 24 mm (from germ face to first node) was crossed to nine inbreds (direct extractions from a number of open-pollinated varieties) and a set of chromosomal interchanges. The agronomic possibilities of this trait are being considered.

A. Forrest Troyer

3. Location of fertility restorer genes A and B in inbreds A293 and K55 using translocation stocks with Wf9^t as a tester.

This study was initiated to determine the number of and locations of the fertility restorer genes in inbreds A293 and K55. Fertile segregates of Wf9^t x (B164^t x A293) A286$_2$ - 2 and Wf9^t x (Tx61^t x K55) A286$_2$ - 4 were crossed with 28 different translocations involving all arms of the chromosomes. The fertile plants with translocations from these crosses were crossed onto Wf9^t. A linkage study will be made in 1957.

Based on work of other investigators, it was hypothesized that the fertility restoration in these inbreds was the function of 2 complementary genes. The expected phenotypic ratios for the hypothesis are as follows:

$[(\text{Wf9}^t \text{ x A293}) \text{ A286}_2\text{-2}]$ AaBb x aaBB (TRANSLOCATION STOCKS)

$\downarrow$

AaBb + AaBB	+	aaBB + aaBb
Fertile-use		sterile-discard

(Wf9^t) aabb x AaBb $\longrightarrow$

1 AaBb	+	1 Aabb + 1 aaBb + 1 aabb*
Fertile		Sterile

(Wf9^t) aabb x AaBB $\longrightarrow$

2 AaBb	+	2 aaBb
Fertile		Sterile

* Data to be used for recombination test for B.