

Heterosis:	L	LM	M	MH	H
L	10.3%	10.2%	11.5%	5.5%	-3.7%
LM	10.2%	10.1%	11.3%	1.3%	-0.6%
M	11.5%	11.3%	16.2%	6.6%	4.8%
MH	5.5%	1.3%	6.6%	1.2%	1.6%
H	-3.7%	-0.6%	4.8%	1.6%	-1.4%
Averages:	6.76%	6.46%	10.08%	3.24%	0.14%

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1. Winter breeding nurseries on the island of Molokai, Hawaii.

Commercial winter corn breeding nurseries were instituted in 1966 on the island of Molokai, Hawaii, in an area chosen for its uniquely dry temperate climate. Corn Belt and tropical maize varieties produced excellent seed yields in these nurseries and future development of the area by the seed industry appears certain. Some characteristics of this area and of corn grown there will be cited; detailed performance data can be obtained upon request.

The area chosen for nursery development is in the vicinity of Kaunakakai (sea level), on the southern, leeward coast of Molokai, 25 mi. by air from Honolulu (4 flights/day). The area is sunny, dry, and cooled by tradewinds that often blanket the island's mile-high hills with clouds. (Details on the 260 sq. mi. of Molokai may be found in "Molokai; Present and Potential Land Use" by Harold Baker, U. Hawaii Land Study Bur. Bull. 1, 1960).

Rainfall near Kaunakakai averaged 13.5"/yr. over a 25 yr. period (range, 2.8" to 29.2"), with monthly medians as follows:

Month:	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Rainfall:	0.2	0.6	1.1	2.2	0.8	1.0	0.1	0.2	0.0	0.0	0.0	0.0

Temperatures at Kaunakakai exceed by about 2° the following 10-yr. averages computed at the Molokai airport (elev. 443'):

Month:	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Mean Temp:	76°	74°	71°	70°	70°	71°	72°	74°	75°	76°	77°	76°

Max-Min temperatures in the winter of 1966-67 (Oct. to Feb.) were 86 and 65, resp., at the Molokai airport; it is doubtful whether temperatures below 55 or above 95 have ever occurred in this area.

Winter daylengths in Hawaii (19° N) minimize at 10 hr. 50 min., and the Kaunakakai area is rarely overcast. Winds are mild on the Kaunakakai

plain, compared with the airport at which a 15 mph tradewind (ENE) is commonplace; while sporadic winds exceed 45 mph at the airport, hurricane velocities do not occur.

Preliminary winter nursery studies have been conducted since 1961 at the University of Hawaii's 13 experiment stations, and were continued in 1965-66 under a cooperative project with Cornnuts, Inc., including lines from Illinois Foundations Seeds, Inc. Results of the 1965-66 tests led to the search for a dry leeward location for these nurseries, and the firm of Cornnuts, Inc., negotiated with the Molokai Ranch of Kaunakakai for the first commercial nursery in 1966.

The area chosen is evidently too dry for Helminthosporium turcicum blight, which fares best only in Hawaii's cool, wet highlands. The sweet corn mosaic-stunt (transmitted by a leafhopper, Peregrinus maidis) was virtually absent from 1966-67 nurseries, and future build-up should be checked easily with insecticide. Earworms and aphids were sporadic, while leaf-feeding insects were of no consequence. Other major pests of corn (e.g., cutworms, borers, rusts, mildews, smuts) are rare or absent in Hawaii.

Most Corn Belt inbreds set silk in 60-65 days at Kaunakakai (planted Nov. 21). Days to silking of temperate corns are reduced about 15% in Hawaii as indicated by the following days to silk on Molokai for the major seasonal types of sweet corn hybrids.

<u>Season</u>	<u>U.S. Mainland</u>	<u>Molokai</u>	<u>Class</u>
Very early	45 days	44 days	Spancross
Early	55 days	48 days	Carmelcross
Mid-season	65 days	52 days	Golden Cross
Late	75 days	57 days	Country Gentleman

Plant heights and ear lengths are affected proportionately by this telescoping. Seed production in 1966-67 trials was excellent, with ear lengths and seed sets estimated to exceed 80% of corn belt averages. Most major corn belt inbreds were included in these trials; performance data on these and other lines will be provided upon request.

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## 2. Pollen esterase isozymes.

Starch gel electrophoresis of pollen extracts from two sweet corn inbreds from Hawaiian Sugar demonstrated 7 anode-wandering esterase isozymes. The bands, labeled 1-7, had Rf values at pH 8.6 of 86, 80, 77, 74, 42, 37 and 31 respectively. Genetic studies reported here involve bands 2 (Rf 80) and 4 (Rf 74).