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.

Season	U.S. Mainland	Molokai	Class
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).

Band 2 was present in pollen of inbred AA1, but absent in inbred AA7, while the reverse was true of band 4. In an F_2 population of 61 plants, band 2 was present in 49 plants (presence: absence ratio of 4.08 to 1). Band 4 was present in 50 of the 61 F_2 plants (ratio 4.54 to 1).

The F_2 distribution of bands 2 and 4 is presented in Table 1. The 9:3:3:1 ratio expected on the basis of non-linked loci was approximated satisfactorily by the observed data (X^2=4.26, P=0.27). The null type was not observed.

Table 1
Distribution of esterase bands 2 and 4 in pollen of an F_2 population of 61 plants

	(bands 2 and 4)	(band 2)	(band 4)	(null)
Observed frequency	38	11	12	0
Expected frequency (based on 9:3:3:1 ratio)	34.29	11.43	11.43	3.81

Bands 2 and 4 could be classified in segregating populations into 2 classes, on the basis of the intensity of the esterase stain reaction. These were referred to as 'strong' and 'weak' reactions, or 2^S and 4^S versus 2^W and 4^W respectively. Classification of the F_2 population on this basis is presented in Table 2. The data were best interpreted by the assumption that the strong bands represented homozygotes, while the weak bands represented heterozygotes, a conclusion warranted by observation of the inbred and F_1 lines. Following this assumption the expected F_2 phenotypic ratios were computed (Table 2) and they compared favorably with the observed ratio (X^2=6.29, P=0.29).

Table 2
Distribution of esterase bands 2^S, 2^W, 4^S and 4^W in pollen of an F_2 population of 61 plants

	(2^S4^S&2^W4^W)	(2^S4^W)	(2^W4^S)	(2^S&2^W)	(4^S&4^W)	null
Observed frequency	24	9	5	11	12	0
Expected frequency (based on 5:2:2:3:3:1 ratio)	19.05	7.62	7.62	11.43	11.43	3.81

It has not been possible to determine whether the pollen esterase isozymes are synthesized under gametophytic or under sporophytic control. Using the gametophytic model, expected F_2 phenotypes of pollen are presented in Table 3. The table assumes that in heterozygotes the different types of pollen are produced in equal numbers; e.g., pollen of the heterozygote

AaBb consists of ¼ having both bands 2 and 4, ¼ having only band 2, ¼ having only band 4 and ¼ having neither band. Theoretically, this results in 9 phenotypes (2^S4^S, 2^W4^W, 2^S4^W, 2^W4^S, 2^S, 2^W, 4^S, 4^W and a null type). Of these 9 phenotypes, only 6 would be apparent in the gel (since it is most difficult to differentiate between 2^S4^S and 2^W4^W, between 2^S and 2^W, and between 4^S and 4^W, owing to the effect of minor differences in concentration of extracts applied to the gel).

Table 3

Expected F_2 ratios and phenotypes for esterase bands 2 and 4. (A, band 2; B, band 4; a and b, null alleles)

F_2 genotype	per cent of pollen producing bands: (2 & 4)	(2)	(4)	null	F_2 phenotype
AABB	100	0	0	0	2^S4^S*
AABb	50	50	0	0	2^S4^W
AaBB	50	0	50	0	2^W4^S
AaBb	25	25	25	25	2^W4^W
AAbB	50	50	0	0	2^S4^W
AAbb	0	100	0	0	2^S -
AabB	25	25	25	25	2^W4^W
Aabb	0	50	0	50	2^W -
aABB	50	0	50	0	2^W4^S
aABb	25	25	25	25	2^W4^W
aaBB	0	0	100	0	- 4^S
aaBb	0	0	50	50	- 4^W
aAbB	25	25	25	25	2^W4^W
aAbb	0	50	0	50	2^W -
aabB	0	0	50	50	- 4^W
aabb	0	0	0	100	- -

* s, strong; w, weak

At the present time there appears to be no immediate method to distinguish whether pollen esterase isozymes 2 and 4 are synthesized under gametophytic or sporophytic control.

Timothy Macdonald

3. Peroxidase isozymes in maize.

Electrophoretic separation of maize extracts on starch gel reveals several distinct zones or bands with peroxidatic activity. Different strains of maize are being used in genetic studies of these peroxidase polymorphisms. Maize tissues studied intensively have been the seedling root and shoot, and 14-day old endosperm. Seedlings are germinated in petri dishes, and saline extracts used for electrophoresis. Starch gels are stained with o-dianisidine, a stain superior to benzidine for permanent gels.