

Preference Differences of Egg Laying European Corn Borer Adults among Maize Genotypes¹

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Additional index words. *Zea mays*, *Ostrinia nubilalis*, oviposit, pubescence, insect resistance

Abstract. Six homozygous lines each of sweet- and pop-corn (*Zea mays* L) were covered with cages when in the whorl stage of development and exposed to egg-laying European corn borer (*Ostrinia nubilalis* Hbn) adults. Differences among lines in regard to egg masses per plant were highly significant, with sweet, nonpubescent, and early lines showing fewer egg masses per plant.

European corn borer is the most serious insect pest on sweet corn grown for processing in the North Central U.S. Partial or complete host resistance would be an effective means of biological control and reduce use of insecticides. There are several modes of plant resistance to insects (6). Researchers (1, 2, 3, 4, 5, 7) have suggested that certain corn plant characteristics may influence egg laying activity of the corn borer adult.

We measured possible preference for oviposition among host genotypes by European corn borer moths. Emphasis was given to effect of host height, pubescence, and maturity as well as genotype.

Sweet and pop corn lines with a 17 day spread in anthesis date were over planted in alternate row combinations at Arlington, Wisconsin on Parr silt-loam soil in 1974 and 1975, and later thinned to 2 plants per hill to give 39,000 plants/ha (16,000 plants/acre). Popcorn was included because many lines are rather heavily pubescent.

European corn borer pupae, previously obtained from the USDA Corn Borer Research Unit at Ankeny, Iowa, were placed in small propagation cages to obtain moths for infestation. When the corn plants reached the whorl stage of growth, screened cages 60 x 120 x 152 cm were each placed over 3 hills in each of 3 replicates of different sweet-pop combinations in a randomized complete block design. Corn borer moths were collected by hand from the propagation cages, and 30 moths in a 1:1 sex ratio placed in each laying

cage. (Male corn borers are brown with a variegated wing pattern; females are larger and cream colored.) After 1 week the cages were removed, the egg masses on the corn plants counted and plant height from ground level to tip of the top leaf, relative pubescence, and silking date recorded.

Determination was made of extended leaf height, leaf pubescence, days from planting until 90% silk, and egg masses per plant (Table 1). Line differences for no. of egg masses per plant were highly significant. While differences between years for egg masses were significant, the year by line interaction was not. The sweet lines were somewhat lower than the pop lines for egg masses per plant and showed the greatest range for individual lines, from a low of 1.0 to a high of 13.6.

Single degree of freedom comparisons (8) were used to determine differences for no. of egg masses per plant between all pop and all sweet corn lines, between all pubescent and all

Table 1. Relative maturity, height, leaf pubescence, and corn borer egg masses per plant for sweet and pop corn lines, Arlington, Wisconsin.

Entry	Inbred	Relative maturity (days)	Plant ht ^z (cm)	No. egg masses per plant ^z
1	pY3989 ^x	76 ^w	161 ^v	9.2
2	S 1528	74	150	9.5
3	P 3991 ^x	71	141	2.2
4	P 3994 ^x	78	150	7.1
5	S 1530	69	118	2.8
6	S 1541	70	117	3.8
7	S 1544	74	140	1.8
8	S 1550	74	129	13.6
9	P 4014	74	120	5.5
10	P 4021	71	126	5.0
11	P 4009 ^x	85	145	9.5
12	S 1529	68	140	1.0
Mean			136.5	5.9
LSD 5%			10.8	4.1

^zAvg of 2 replicates over 2 years.

^yP and S stand for pop and sweet corn, respectively.

^xLeaves show heavy pubescence.

^wFrom planting until 50% silk.

^vFrom ground level to tip of the top leaf.

Table 2. Independent single degree of freedom comparisons of various line combinations for egg masses per plant.

Comparison	Mean square
Popcorn vs. sweet corn lines	3.74
Pubescent vs. sweet corn lines	7.37*
Pubescent vs. non-pubescent pop corn lines	4.85*
Pubescent vs. all non-pubescent lines	8.85*
Early vs. late lines	37.85*

*Significant at 5% level

non-pubescent lines, between pubescent and non-pubescent pop corn lines, and between pubescent pop and all sweet corn lines and between early and late lines (Table 2). The late lines averaged significantly more egg masses than early lines, reflecting stage of development at time of infestation. Although the pop lines as a group were not significantly different from the sweet lines, the pubescent pop lines were significantly different from sweet lines, non-pubescent pop lines and all non-pubescent lines. The pubescent lines averaged 7.0 egg masses per plant and the non-pubescent lines, 5.4. While no. of egg mass were not significantly correlated with plant height, they were positively correlated with maturity. The phenotypic correlation for egg mass no. per line in the 2 years was 0.50*.

For these genotypes, sweet, non-pubescent and early lines showed fewer egg masses per plant. Other factors such as leaf angle, leaf texture, cutin, chemical secretions, and aroma may be involved. These and other attributes in turn may be related to maturity. These lines had a 17 day spread in anthesis date, although at the time of exposure to egg laying corn borer adults all lines were in various stages of whorl development and none had flowered.

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¹Received for publication October 28, 1975. Research supported by the College of Agricultural and Life Sciences, University of Wisconsin-Madison, the Wisconsin Alumni Research Foundation; and the Wisconsin Cannery and Freezers Association.

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