Controlling

SWEET CORN SMUT

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Several cultivars were found to have significantly less head smut than the commercial standards, Jubilee and Bonanza. Among the most highly resistant were Goldenrod, NCX 235, Silver Queen, 70-2367, 67-2750, E 1502 and 70-2021. NCX 243 would probably have greater commercial acceptance than the above cultivars but it was somewhat higher in susceptibility to head smut.

HEAD SMUT OF SWEET CORN, caused by the fungus *Sphacelotheca reiliana*, became an economic problem in 1971 in Orange and Los Angeles counties in California. A high incidence of the disease was found in five fields. Infection by the pathogen occurs shortly after planting from inoculum in soil or possibly from contaminated seed. The fungus becomes systemic in the corn plant and replaces the tassel and ear with a black fungal mass.

Studies were initiated in 1971 to evaluate varieties for tolerance to head smut and to test a systemic fungicide, Vitavax, as a seed treatment. The Jubilee variety was planted at the University of California South Coast Field Station on August 19, 1971. Jubilee seed was treated before planting with 8 or 16 oz 75W Vitavax per 100 lb of corn seed. Plots were replicated five times and thirty seeds were planted per plot. Number of smutted plants was determined on December 13. The seed treatment slightly depressed the number of smutted plants per plot (7.75 smutted plants in the 16-oz and 8-oz treatment, and 10.50 smutted heads in the check plot), but the cost of treatment plus lack of effective commercial control precludes its use by growers.

Seed of eleven varieties of sweet corn was obtained from commercial companies to test for possible tolerance to head smut. Seed was planted on August 16 at University of California South Coast Field Station near Santa Ana, in soil known to be infested with the head smut organisms. Local recommendations were followed for fertilizer, irrigation, and insect control during the experiment. Per cent head smut of tassel and ear was evaluated on November 17, 1942. The trial showed that Bonanza was very susceptible to corn head smut (58.2% infected ears) and could be used as a check in future evaluations. Jubilee showed higher tolerance than Bonzana (12.2% infected ears), but growers prefer a variety with less than 5% head smut. Goldenrod, Triumphant II, NCX 235, Silver Queen, and Rogers 67-2750 all met this criterion. However, Triumphant II and NCX 235 had undesirable light-green husk color and were not judged high in flavor. Silver Queen was outstanding in flavor, but was late maturing with white kernels.

Additional varieties and hybrids were evaluated for tolerance to head smut in 1973. Seed was planted at South Coast Field Station on April 3 in the infested soil used for previous plots. Plots were 100 ft long and replicated five times. Smutted plants per plot were counted on July 18. Hybrid 70-2367, Longchief 65, E 1502 and 70-2021 provided excellent tolerance to head smut (5% and under of infected ears). However, 70-2367 produced short ears, while Longchief 65 has poor husk color and lacked flavor. E 1502 also produced small ears, although it had excellent flavor. Hybrid 70-2021 had poor fill at the tip of the ear. Jubilee and Bonanza again had unacceptable levels of head smut, at 26.7 and 48.4%, respectively.

Two new hybrids and one new variety were compared with Jubilee and Bonanza in a planting made July 2 at South Coast Field Station. The plot was replicated five times and notes on amount of head smut per plot were taken on September 18. Jubilee was highly tolerant (0.7% infected ears) in this trial, but for unknown reasons. In addition, only Jubilee produced acceptable husk appearance, kernel flavor, and marketable ear size, even though the 34,800 plants per acre exceeded the 26,000 plant spacing used by commercial growers. While Jubilee has shown high yield (350 crates—five dozen crates per acre), it is not especially well adapted to areas having severe sugar cane mosaic virus. Jubilee would also be less desirable than in the past seasons if head smut becomes a predictable, recurring problem. Bonanza, as in previous trials, produced a high incidence of head smut (26.2%). Fanfare was tolerant of head smut (0.7%) and had good flavor, but produced short, stubby ears. Poor flavor and ears not as large as Jubilee were noted in Hybrid 66-2327 (6% infection). Hybrid 70-2367, with 0.3% infection, had good flavor, tender, but small ears.

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TABLE 1. INCIDENCE OF CORN HEAD SMUT IN SELECTED SWEET CORN VARIETIES, GROWN IN INFESTED SOIL, SANTA ANA, NOVEMBER, 1972

Variety	% Head smut
Goldenrod	0.4
Triumphant II	0.7
NCX 235	1.6
Silver Queen	2.4
67-2750 Rogers	4.8
Valley Market	5.6
Longchief 65	5.7
Capitan	5.9
NCX 230	8.8
Jubilee	12.2
Bonanza	58.2

TABLE 2. INCIDENCE OF SWEET CORN HEAD SMUT ON SEVERAL HYBRIDS AND VARIETIES, GROWN IN INFESTED SOIL, SANTA ANA, JULY, 1973

Variety	% Head smut
Hybrid 70-2367	3.7
Longchief 65	4.2
E 1502	5.0
Hybrid 70-2021	5.1
Hybrid 70-2129	6.8
Hybrid 69-1689	8.3
Hybrid 68-2657	8.8
NCX 243	8.9
Triumphant II	9.7
Goldie	11.1
Style Pak	13.1
NCX 2004	14.4
Jubilee	26.7
NCX 245	26.7
Hybrid 70-2428	28.5
Bonanza	48.4