

ABSTRACT

Spores of Ustilago scitaminea, collected from smut infected plants of three varieties of sugarcane, differing in susceptibility, showed no differences in germination nor hyphal development. Spores in contact with excised buds of varieties differing in susceptibility, showed significant differences in germination and fungal growth. Spores in contact with the young buds of the highly susceptible, HJ 5741, germinated faster and exhibited more rapid rates of hyphal extension, than spores in contact with old buds of the same variety. Correlation between smut susceptibility and selected bud and germination characteristics was insignificant.

Resistant varieties had an overall slower rate of shoot elongation than susceptible varieties. The mean rate of shoot elongation for the resistant varieties, in both trials, was 2.0 cm/wk., compared to 2.5 cm/wk. for the susceptible and moderately resistant varieties.

Susceptible varieties, usually require, after smut inoculation, a shorter time than resistant varieties to produce their first smut whips. In the 1979 trial, the time taken for the susceptible varieties to produce their first smut whips was 60.5 days, compared to 80.7 days and 166.7 days for the moderately resistant and resistant varieties respectively.

Removal of the two outer bud scales, prior to smut inoculation, in both trials, caused a mean increase in smut infection of 64.1% over that of inoculation with the scales intact. In the 1979 trial, the level of smut infection obtained for the ratoon was 39.7% higher than that of the plant cane. This difference was significant.

Smut infection resulted in severe reduction in cane yield. Removing the two outer bud scales, prior to smut inoculation, in the 1979 trial, caused a mean yield reduction of 93.6% for the susceptible varieties, 71.5% for the moderately resistant and 23.0% for the resistant varieties. Smut infection also resulted in decreases in sugar content and juice % and increases in fibre % and moisture % of the susceptible and moderately resistant varieties and also, two of the resistant varieties, which produced little or no smut. Smut infection resulted in a higher Tc/Ts ratio, that is, more infected canes were needed to produce a unit of sugar, than healthy canes.

The outer bud scales were shown to affect the resistance of the susceptible, moderately resistant and two of the resistant varieties. Evidence was obtained that there are physiological factors involved in smut resistance.