4. Attempts to modify cell organelles of Tcms by irradiation.

The pathotoxin response of male-sterile cytoplasms susceptible to race T of Helminthosporium maydis, the causal organism of southern corn leaf blight, as well as cytoplasms resistant to race T has been investigated and reported by Krueger, Josephson and Hilty (Phytopathology, in press). Mitochondria were isolated by standard procedures and respiration determined polarographically with a Clark oxygen electrode.

Mitochondria from cytoplasms susceptible to H. maydis were susceptible to respiratory control ratio (RCR) decline in the presence of the pathotoxin produced by the fungus while those from resistant cytoplasms were resistant. This indicates that the mitochondria susceptible to the pathotoxin will be susceptible to H. maydis and vice versa.

These studies would indicate that it may be possible to modify the cell organelles of Tcms through irradiation and make it possible to continue using Tcms in production of seed. Plants of Tcms T220 were irradiated with 750R and 1500 R at megasporogenesis and the mature egg cell stages, as well as combinations of both, in 1972. Plants grown from this seed were artifically inoculated in 1973 with H. maydis. No plants showed complete resistance but there were some indications of restricted secondary spread of blight. Seed from these plants will be tested for reaction to blight in 1974. Additional irradiation of plants of Tcms T220 was continued in 1973. Plants were irradiated in the zygote stage as well as at megasporogenesis and the mature egg cell stages. Plants grown from this seed will be tested for reaction to leaf blight in 1974.

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