

restoration of fertility in double cross hybrids on sterile basis with two sterile lines may be predicted with a relative accuracy.

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6. An attempt for induction of mutation of normal cytoplasm into sterile cytoplasm by treatment with streptomycin.

According to Sager (Scient. Amer. 1965, 212, 1), Petrov et al. (Refer. jurnal, Rasteniev. 1969, 10, 55, 10), Yehuda and Dlana (Planta 1970, 91, 195) streptomycin appears to be a specific mutagen for cytoplasmic factors. The mutation of normal cytoplasm into a sterile one is of importance to the creation of new sources of sterile cytoplasm and for shortening of the period of development of sterile analogues.

We repeated the experiment of Petrov. 100 germinating seeds were taken from each line containing the genotypes Wf9-Nrf₁rf₁rf₂rf₂rf₃rf₃, VIR-75-Nrf₁rf₁rf₂rf₂Rf₃Rf₃, A-344-NRf₁Rf₁Rf₂Rf₂rf₃rf₃ and O570a-NRf₁Rf₁Rf₂Rf₂Rf₃Rf₃. The following concentrations of streptomycin in distilled water were used: 0.001γ/ml, 0.01γ/ml, 1γ/ml, 10γ/ml, 100γ/ml, 1 mg/ml and 10 mg/ml. The germinating seeds were soaked in this solution for 24 hours at temperature 22-24° C. Dry and soaked seeds served as controls in each experiment. Two progenies were observed after the treatment.

Male sterility was not found in any of the variants.

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1. Physiological investigations of the stature mutant nana-1.

Coleoptile elongation, seedling elongation, isoenzymes of peroxidase and peroxidase activity, respiration of coleoptiles and mesocotyls, protein synthesis, and changes in ribonucleic acid in seeds and seedlings of the stature mutant nana-1 were investigated.

Seedlings were treated with indoleacetic acid in various concentrations. Measurement showed a significant increase in growth by the treated

plants when compared to untreated control groups. Coleoptile sections were treated with IAA and showed a significant increase in growth over intact controls.

Coleoptile sections were treated with various concentrations of tryptophan and tryptamine. Those treated with tryptophan exhibited no significant difference between treated and untreated groups. The length of coleoptiles treated with tryptamine increased a significant amount over the intact control groups.

Peroxidase isoenzymes were studied by means of electrophoretic and colorimetric techniques. Mesocotyls of dwarf and normal seedlings were examined for differences in electrophoretic banding patterns of peroxidases. No differences were determined by this method. There were also no differences in the peroxidase activity between the dwarf and its normal sib.

The respiratory activity of the dwarf and normal coleoptiles appeared to be both aerobic and anaerobic. Aerobic activity of nana-1 and normal was equal. Anaerobic activity of nana-1 and normal was also equal. The respiratory activity of the dwarf and normal mesocotyls was different with the normal exhibiting greater respiratory activity than the dwarf.

The uptake of ^3H -leucine and its utilization in protein synthesis was different in the dwarf and normal mesocotyls. Both dwarf and normal mesocotyls took up ^3H -leucine at approximately the same rate, but pooling effect was noted in that the dwarf was not as efficient as the normal in extracting leucine from the amino acid pool and utilizing it in protein synthesis. A similar effect, though not as severe, was found in the coleoptiles.

Whole seedlings were treated with IAA and the total RNA was determined. Over the five day treatment period, a general increase was exhibited until the fifth day when a decrease was noted. Treatment with IAA generally increased the amount of RNA synthesis in the dwarf and decreased RNA synthesis in the normal.

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