

4. The effect of X-rays and fast neutrons on maize pollen.

An experiment was conducted in the last two years to compare the effects of X-rays and fast neutrons on maize pollen. Pollen from Plants 65-27 and 65-26 was irradiated with X-rays and fast neutrons of the same dose (1500 rads), and was used in self-pollinations. Five plants for each of these two types of radiation were employed. At harvesting, it was found that about 70 per cent of the ovules pollinated with X-rayed pollen set well-filled kernels, while about 95 per cent of the ovules pollinated with fast neutron treated pollen set well-filled kernels. Last summer, 345 bulked kernels from neutron treatment and 330 bulked kernels from X-ray treatment were planted in the field. Only four per cent of the former emerged while over 90 per cent of the latter gave viable seedlings.

It is postulated that acute irradiation with fast neutrons at a dose of 1500 rads on the pollen is adequate in inducing dominant embryo lethal mutation in maize of the immediate generation while X-rays of the same dose are less effective. However, at the same dose rate, X-rays are more effective than fast neutrons in reducing the percentage of seedset.

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1. Chemical mutagens on maize: Ethyl methanesulfonate.

Many geneticists have been interested in the production of mutations, to be used mostly in fundamental studies. The chemical mutagen ethyl methanesulfonate (EMS) has been shown to produce a high frequency of mutations accompanied by a relatively low frequency of chromosomal aberrations in plants.

The following studies have been conducted to study the feasibility of modifying the effects of EMS on maize. If the effect of this chemical mutagen can be modified it may also be possible to alter its effectiveness and efficiency. These terms have been defined by Nilan et al (1965). They state that effectiveness of a mutagenic agent usually means the rate of "point" mutations as related to dose. Efficiency usually refers to the "point" mutation rate in relation to other biological effects induced, usually a measure of damage. Biological effectiveness is used in this paper as the amount of damage as related to dose.

Post-treatments being investigated to influence the effectiveness and efficiency of the mutagen treatment are soaking of the seeds in water and drying them. Other modifying factors being investigated are temperature and duration of treatment and concentration of mutagen. If seeds

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