

**Table 7. Frequency of mutations for several characteristics in the M2 generation following treatment with various concentrations of Ethyl methanesulphonate (EMS) and N-methyl-N'-nitro-N-nitrosoguanidine (NTG).**

Characteristic	Frequency (%)
Small, yellow and/or deformed lethal plants	0.67
Reduced plant height, 55 day old plants	0.90
Earlier bloom date	0.59
Improved resistance to race 1 <i>Puccinia helianthi</i>	0.20
Decreased resistance to race 1 <i>Puccinia helianthi</i>	1.38
Ageotropism of upper stems	0.59
Decreased oil content of achenes	1.04

Calculated frequencies for seven characteristics; i.e., earlier bloom date and improved resistance to race 1 of *Puccinia helianthi*; would be desirable and the frequency of these was among the lowest observed. Progeny of earlier blooming and rust resistant plants performed similarly in the M3 generation. No evaluation of hybrid performance of these lines had been made at the time of this writing.

## DISCUSSION

The results indicated that infiltration was a rapid method of treating sunflower achenes to induce mutations. The amount of air space can be reduced to nearly zero by infiltration in 60 minutes (Urs, unpublished data) and replaced by chemical solution to subject the kernel to the action of the mutagen.

Lethal doses of both EMS and NTG were revealed at 2500 and 5000  $\mu\text{g/ml}$ . At 2500  $\mu\text{g/ml}$  the dosage was potent enough to reduce survival of seedlings drastically even at a treatment time of 10 minutes. Greenhouse conditions were more favorable for the survival of treated seedlings because of controlled temperature and moisture conditions.

Mutations were observed for several characteristics, most of which were undesirable. The earlier blooming selections were of particular interest, since they would provide parental stock for earlier hybrids for double cropping, later seeding following disaster conditions, or allow the growing of sunflower in a shorter season. Undoubtedly many other mutations occurred which were phenotypically undetected, especially albino and male or female steriles. The frequency of mutation, in this study, although higher than those reported for other species, was still quite low. Phenotypically, except for the small yellow and/or deformed lethal plants, all mutant forms resembled the source material, H6B.

## LITERATURE CITED

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## GENETIC ADVANCES BY MASS SELECTION IN THE OIL PERCENTAGE OF SUNFLOWER (*HELIANTHUS ANNUUS* L.).

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## ABSTRACT

In order to increase the oil content in the sunflower crop, in 1976 have been initiated a breeding programme by mass selection. It was used to open-pollinate variety Guayacan INTA, which has good performance in seed yield, but low oil content.

Three cycles of selection have been realized in 1977, 1979 and 1980. In 1978 it was impossible to obtain another cycle because of unfavorable environmental conditions. The plants were selected in the isolate plot and were analyzed individually for oil content by MNR method. The selection index was near 20%.

In the analysis of the results was observed a continuous genetics advance by selection. The regression coefficient for oil content was  $b = 13.18\%$  of average improvement per cycle compared to the original population. Besides the coefficient of genetics variation were similar, what it would permit to continue the selection programme.

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