

ABSTRACT

Four varieties of soybean were selected for improvement through mutation breeding. The varieties were used as starting material for this study in which increased yield, seed protein content and decreased sensitivity to the day length were of greatest interest.

Changes were studied in three generations of plants, grown from seeds which had been treated for two hours in distilled water, and six hours in 0.05M EMS in tris buffer, with plants derived from seeds treated for two hours in distilled water and six hours in 0.05M tris buffer as control. Some selected plants were studied for four and five generations. Damage to embryo cells was manifested in the first generations by an average reduction of 37% in survival and 45% in growth rate, as well as by leaf spotting and malformed leaves and stems.

Stem fasciation and forking occurred with relatively high frequencies, averaging 15% in the first but with much lower frequencies in the second and disappeared in the third generations.

Mutation rates were calculated on the percentage of chlorophyll mutants appearing in the second generation and showed frequencies between 0 and 15% for the varieties.

Selection, which began in the third generation, yielded putative mutants for high yield, early flowering, and up to 5% increase in seed protein content.

Further studies of some early flowering mutants are expected to yield biotypes more day neutral than the parental strains. Other selections included mutants which showed improvement in standing ability, increase in the number of leaflets per leaf and a change in seed coat colour.

Indications are that EMS is capable of increasing genetic variability in soyabeans. The varieties showed different degrees of mutability.

Variety 7, yielded the largest number of chlorophyll mutants as well as putative mutants for other characters.