helpful criticisms and suggestions. Thanks are also due to the authorities of R.M.S.P. Hospital for permission to collect the data.

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## COLCHICINE-INDUCED TRUE BREEDING MINIATURE MUTANT IN GROUNDNUT

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CONSEQUENT on treatment with mutagens, recessive mutations are realized usually in $M_2$ and subsequent generations. Certain chemicals like colchicine and hydrazine, however, are reported to be capable of giving rise to recessive homozygous mutation right in $M_1$ generation, as observed in sorghum[1,2], flax[3] and tomato[4]. Since such recovery of mutations results in saving time, land and labour, it was thought imperative to study the effect of colchicine in groundnut.

Seeds of two homozygous true breeding varieties *viz* JL 24 and Chico were pre-soaked for 2 hr in distilled water. Three concentrations of aqueous solution of colchicine *viz* 0.025%, 0.05% and 0.1% were used. Two hundred pre-soaked seeds in each treatment combination were treated with aqueous colchicine for 4 hr at 30 + 1°C followed by post-washing with distilled water for 2 hr. Controls using distilled water were also run for the same durations. Treated seeds along with controls were planted in the field.

In $M_1$ generation, no visible abnormality was observed in case of controls and treated Chico. In the case of JL 24 treated with 0.1% colchicine, one albino and two miniature phenotypes were isolated in $M_1$ which amounted to a frequency of 1.5%. The albino mutant died subsequently. The two miniature mutants were identical. Their growth habit was of Spanish bunch type *i.e.* similar to the untreated JL 24. The plant height, size of the leaflets (figure 1) and number and size of pods and seeds were, however, much reduced in the mutants as compared to the parent (table 1). Meiotic analysis showed presence of diploid *i.e.* $2n = 40$ chromosomes with normal meiosis. The mutants showed very high pollen stainability and

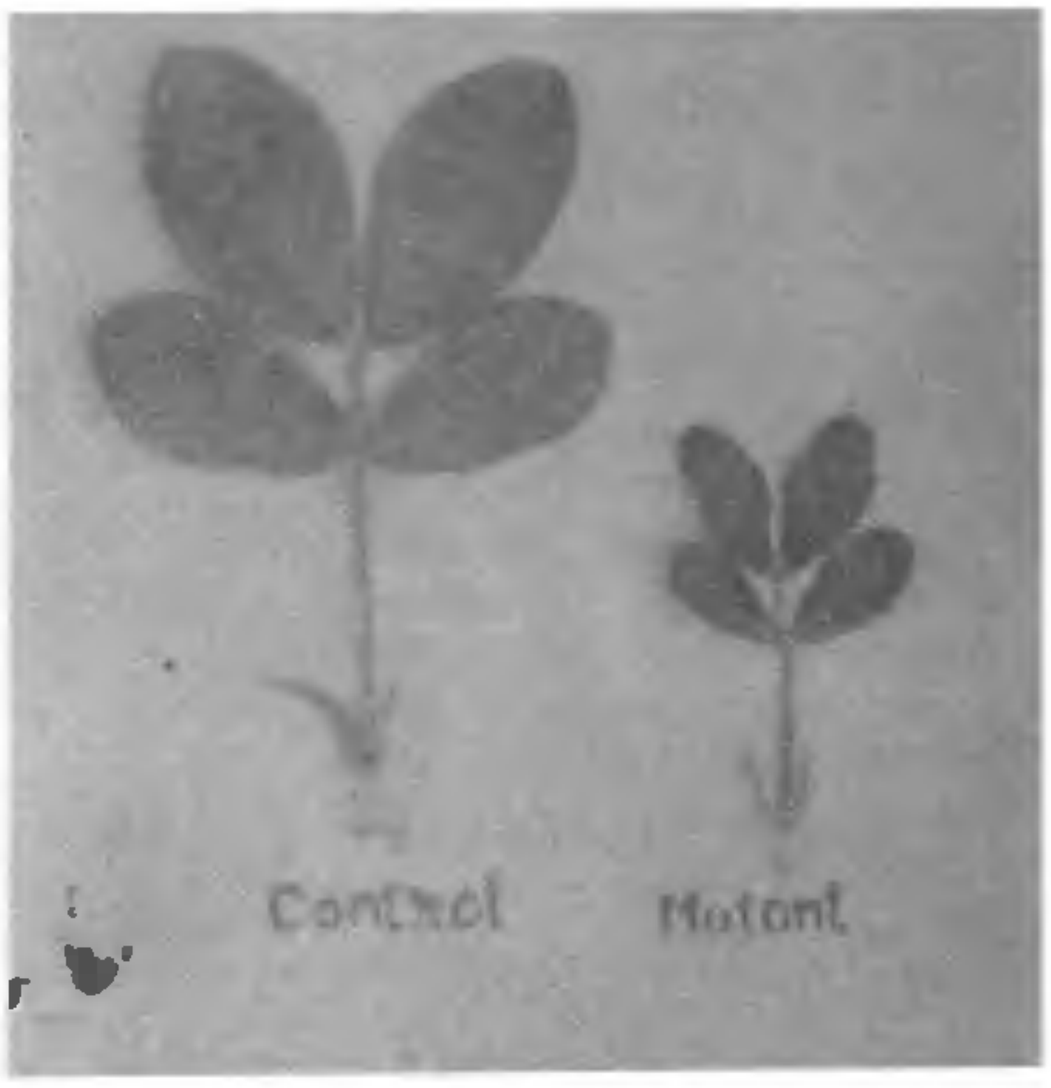


**Figure 1.** Leaf characteristics in the parent and the mutant.

**Table 1** *Mean values for different characteristics of minature mutant and its parent JL-24*

| Characteristics | JL-24 (Parent) | Miniature Mutant |
|---|---|---|
| Height of main axis (cm) | 22.7 | 8.7 |
| Plant length (cm) | 25.1 | 9.7 |
| Petiole length (cm) | 5.3 | 2.9 |
| *Leaflet size (cm)* | | |
| (i) Length | 6.1 | 2.2 |
| (ii) Width | 3.0 | 1.1 |
| Days to maturity | 90 | 85 |
| No. of pods/plant | 11.8 | 5.1 |
| *Pods size (cm)* | | |
| (i) Length | 2.6 | 1.3 |
| (ii) Width | 1.1 | 0.7 |
| Weight of pods/plants (g) | 9.1 | 1 3 |
| No. of seed/plant | 18.4 | 6.8 |
| 100 seed weight (g) | 35.0 | 11.7 |
| Shelling (%) | 69.7 | 63.6 |

normal flowering and pod formation. Smoothness of pods, testa colour and shape of the seeds were similar in mutants and the parent.

The miniature mutants bred true and no variation was observed in $M_2$. These were hybridized with the parent JL 24 to ascertain the genetic nature of the mutation. $F_1$ was similar to JL 24. In $F_2$, 149 normal and 40 miniature plants were obtained conforming to a ratio of 3:1 respectively ($X^2 = 1.48$ with $P$ value between 0.2 and 0.3). It indicated that this character is controlled by a single recessive gene. The miniature phenotype and small leaf character in groundnut were reported to be recessive and controlled monogenically[5,6]. Cytological and genetical analyses thus ruled out the possibility of dominant mutation and chromosomal aberration; the occurrence of point mutation of recessive nature was established.

Since colchicine acts both as a mutagen and as a chromosome doubling agent, the occurrence of this true breeding mutation in $M_1$ can be explained owing to somatic reduction of the chromosomes after or perhaps concurrent with mutagenic effects and subsequent restoration of the diploid chromosome number. Similar explanation has been advanced in case of sorghum[1,2] and flax[3]. Occurrence of this phenomenon indicates the possible use of colchicine for early realisation of recessive mutations in groundnut.

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## A NOTE ON EUTROPHIC CHARACTERISTICS OF TWO FRESHWATER BODIES OF KURUKSHETRA, INDIA.

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THE term eutrophication denotes nutrient enrichment of water which may be caused owing to any kind of pollution particularly the release of agricultural and sewage effluents into a water body. A detailed physico-chemical examination of water could demonstrate such a condition; however, in a situation lacking these facilities, the importance of biological species as indicator of eutrophication has also been realised[1-3]. The present note is a study of trophic status in two freshwater bodies, *viz.*, Jyotisar and Nabhkamal, of Kurukshetra.

A regular and periodical sampling of water was taken up during March 1977–June 1979 so as to collect information on population ecology of dominant zooplankton species in relation to conductivity, temperature, alkalinity, pH and dissolved oxygen[4]. Conductivity, which is a measure of the total amount of dissolved electrolytes in the water, was found to vary between 270 and 540 $\mu$mhos/cm in Jyotisar and between 451 and 1560 $\mu$mhos/cm in Nabhkamal during the course of the present investigation. Dunn[5], while differentiating the trophic levels of Danish lakes classified the lakes having conductivity greater than 200 $\mu$mhos/cm as clearly eutrophic and those with values less than 200 $\mu$mhos/cm as oligotrophic. If Dunn's criterion is applied to Nabhkamal and Jyotisar, the former falls in the category of high eutrophy while the latter remains comparatively at the lower stage of eutrophy. Methyl orange alkalinity of water exhibited wide range in Nabhkamal (173 to 470 ppm) than in Jyotisar (84 to 116 ppm) confirming the advance stage of eutrophy in the former tank as per observations of Tucker[6] who postulated that greater fluctuations in alkalinity are expected in water only with high organic nutrients. The range of temperature and pH fluctuations was almost identical in the two freshwater bodies (11.5°C ± 1 – 32.5°C, 7.4–9.1).

Rotifers were the most and least abundant component of zooplankton in Nabhkamal and Jyotisar, respectively. In the two successive years of study, rotifers contributed 58.22% and 46.88%, cladocerans 22.24% and 25.94% and copepods 19.54% and