athough the seeds are a little bit smaller and is highly productive (4110kg/ha). Another good strain is "86-223". It is also disease-resistant and highly productive (3390kg/ha).

(Gu Aiqiu, Geng Yuxuan, Zhu Baogo, Institute of Genetics, Academia Sinica, Beijing 100012, China)

Break-through in seed fertility of autotetraploid Trigonella foenum graecum

Penugreek is an important legume crop in tropical and subtropical zones of India, used as green vegetable, cattle fodder, food flavourant and for pharmaceutical purposes. The seeds are a source of diosgenin, a steroid sapogenin used for synthesis of steroidal drugs like corticosteroide sex hormone and oral contraceptives. Seeds valuing 15-20 million rupees are exported annually. Polyploids are vegetatively superior but have poorer seed fertility. Cross breeding among locally collected germ plasm and autopolyploidisation did not give satisfactory results. Mutation induction using gamma rays or EMS alone and in combination was undertaken to broaden the variability for increased grain yield. In M_3, mutants were selected with up to 143 pods per plant, compared to 80 in the diploid progenitors and up to 123 in advanced hybrids. 11 promising high yielding lines will be further evaluated.

(S.S. Raghuvanshi, Poonam Agrawal, Jaya Singh, Anil K. Singh, Plant Genetics Unit, Botany Department, Lucknow University, Lucknow, 226007, India)

Mutation induction in mungbean, blackgram, chickpea and lentil using chemical mutagens

Grain legumes cultivated in Bangladesh have narrow genetic bases. Seeds of four species were treated with sodium azide (NaN_3) and EMS to create genetic variability. Phenotypically deviant types were selected in M_2. The mungbean mutants were synchronous, early, bushy, erect and disease tolerant. Maximum frequency of variants occurred in the treatment with 0.75 mM of NaN_3. The blackgram mutants were dwarf, bushy, trailing, synchronous and prolific podded. 1.0 mM NaN_3 and 2% EMS concentrations produced the highest frequency of mutants. The chickpea mutants included broad-leaved, white flowered, erect, dwarf, bushy, early and chlorophyll-deficient types. White-flower mutants were reasonably free from wilt disease. The 0.4 mM concentration of NaN_3 produced the highest frequency of mutants. In lentil, late flowering mutants were predominant. Some plants with increased number of pods were selected. Maximum frequency of mutants were obtained from 0.50 mM concentration of NaN_3.

(M.A.Q. Shaikh, Bangladesh Institute of Nuclear Agriculture, Mymensingh, Bangladesh)

Induced mutations in citrus

Parthenocarpic tendency is an important prerequisite for successful induction of seedlessness in breeding and especially in mutation breeding. A gene for asynapsis and accompanying seedless fruit has been found by us in inbred progeny of cv. "Wilking". Using budwood irradiation by gamma rays, seedless mutants of "Eureka" and "Villafranca" lemon (original clone of the latter has 25 seeds) and "Minneola" tangelo have been obtained. Ovule sterility of the three mutants is nearly complete, with some pollen fertility still remaining. A semi-compact mutant of

Shamouti orange has been obtained by irradiation. A programme for inducing seedlessness in easy peeling citrus varieties and selections has been initiated.

(P. Spiegel-Roy, Aliza Vardi, Department of Fruit Breeding and Genetics, The Volcani Centre, A.R.O., Bet Dagan, 50 250 Israel)

Mutation breeding in guava (Psidium guajava)

Guava is an important tropical fruit crop, rich in Vitamin C. The pulp of the fruit is very soft and is ideal for canning. However, the presence of a large number of hard seeds is a major disadvantage. Mutation studies have been initiated with a view to induce seed sterility. Large quantities of guava seeds were subjected to treatments with gamma radiation ranging from 10 krad to 25 krad. The lethal dose for 50% reduction in the growth parameters was around 25 krad. Among the irradiated progenies distinct variations with reference to growth habits, leaf size and branching pattern have been observed.

(D.M. Mahishi, B.G.S. Reddy, G. Shivashankar, Department of Genetics and Plant Breeding, University of Agricultural Sciences, G.K.V.K., Bangalore-560 065, India)

Irradiation damage and recovery in shoot apices of sweet cherry (Prunus avium L.)

Dormant scions of "Bing" were exposed to fractionated 6kR gamma rays and then grafted. Irradiated and unirradiated main buds were sampled at 3 day intervals for one month. Buds were fixed in FAA, longitudinally sectioned, and stained with hematoxylin. Both random and localised cell damage was observed in irradiated apices. There was evidence of radiosensitivity gradient in the shoot apex. Recovery from irradiation damage was via flank meristem, central meristem, or leaf primordia and axillary meristems.

(S. Saamin, M.M. Thompson, Cocoa & Coconut Research Division, MARDI, 36307 Sg. Sumun, Perak, Malaysia, and Department of Horticulture, Oregon State University, Corvallis, Oregon 97330, USA)

Mutation breeding in ornamental plants

Mutation induction produced a large number of new promising varieties in ornamental species. 37 new mutants of Chrysanthemum and 14 of rose have been developed by mutations and released for commercialisation. The mutations in flower colour/shape were detected as chimeras in M_1V_1, M_1V_2, M_1V_3 generations. The mutation frequency varied with the cultivar and exposure to gamma rays. Comparative analysis of original cultivars and their respective induced mutants on cytomorphological, anatomical and biochemical characters are being carried out for better understanding of the mechanism involved in the origin and evolution of somatic flower colour/shape mutations. Cytological analysis with reference to chromosomal aberrations, chromosome number, ICV, INV and DNA content gave no differences between the original and mutant cultivars. Analysis of florets/petal pigments by TLC and spectrophotometric methods indicated both qualitative and quantitative changes.

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