Hybridisation used A. manihot ssp. manihot and ssp. tetraphyllus. New varieties showed 87-146% yield increases over older virus susceptible varieties. The number of fruits increased by 13-30%, virus incidence decreased by 84-99%. An EMS induced mutant "EMS8" showed a yield increase of 107%, a fruit number increase of 16% and a disease decrease of 99%. The mutant also carries a good amount of resistance to the fruit borer: infestation decreased by 46%. The mutant is the best among the tested varieties for canning, is suitable for dehydration, and can be stored prepacked at room temperature for 6 days.

(B.R. Sharma, S.K. Arora, Department of Vegetable Crops, Landscaping and Floriculture, Punjab Agricultural University, Ludhiana-141 004, India)

Obtaining a new variety of rape by biotechnology

High-frequency induction of pollen embryoids and plantlets of rape was obtained by stepped float anther culture. In addition, somatic embryoids and plantlets were induced with a high frequency from several species by cell suspension culture. The erucic acid (EA) content of embryoids was analysed by a micro-analysis technique and a semi-micro-analysis of glucosinolates (GS) content in culture was used. A new variety "H86-166" with low EA and low GS content was selected by these techniques. It gave a yield of 3169 kg/ha and has been released for commercial production on about 1000 ha in Yunnan Province.

(Z.H. Chen, S.X. Cun, Z.Z. Zhang, W.F. Wang, T.H. Zhang, W.B. Li, L.H. Zhang, Institute of Genetics, Chinese Academy of Sciences, Beijing, 100012, China, and Laboratory of Genetic Engineering, Yunnan Academy of Agricultural Sciences, Kunming, 650223, China)

Breeding cultivars of barley and mustard containing biochemical mutants

The inactivation of dominant and co-dominant alleles is becomming increasingly important in changing the composition of seed carbohydrates, protein, oil, fibre and secondary products to suit modern food and feed technologies. In barley, breeding lines adapted to south-eastern Australian conditions have been developed containing a waxy endosperm from the Japanese variety "Sumire Mochi", the high lysine gene lys from cv. "Hiproly" of Ethiopia, and the induced high lysine mutant gene lys 3a from "Risö 1508". The improved mutant lines yield 12-34% less than the highest yielding feed barley. The lys and lys 3a alleles suppress the formation of prolamins, the waxy allele inhibits the formation of amylose. It seems difficult to modify the background genotype to fully compensate for the reduction of major storage carbohydrate or protein compounds. However, waxy barleys have uses in some human foods and a premium can be paid to producers. The grain of the provisionally-patented waxy cultivar "Wasiro" is suitable for pearling. It contains 5% β-glucan (soluble fibre) and therefore should be as effective as oat bran for reducing blood cholesterol.

In Indian mustard (Brassica juncea), three cultivars differing in date of maturity, each containing the spontaneous mutant alleles for low erucic acid levels in the seed oil, have been developed to produce a high quality, mildly flavoured cooking/salad oil. The concentration of glucosinolates in the seed meal must be reduced to make it palatable and non-toxic to pigs and poultry. Three B. juncea lines were treated in up to four successive generations with gamma rays or EMS. 60,000 seed samples were analysed in subsequent generations. Two induced mutants with reduced glucosinolate concentrations are now available besides 4 naturally-occurring sources with only little reduced yields.

Recombination may give a high-yielding low erucic acid and low glucosinolate variety of B. juncea.

(R.N. Oram, Division of Plant Industry, CSIRO, Canberra, 2601 Australia)

Mutation breeding research of wheat (T. aestivum) in China

78 cultivars and various valuable strains have been obtained through induced genic mutation and chromosome translocation. Irradiation of hybrid seeds, gametes, zygotes and in vitro cultured cells, gave increased mutation frequency and expanded spectrum. Various physical agents were examined either singly or in combination with chemical agents. Combined use of γ-irradiation by low dose and in vitro culture proved effective in raising the percentage of seed-set in wide-crosses.

(L. Wang, B. Zhang, J. Shi, S. Tao, Q. Fan, Department of Mutation Breeding and Genetics of Plants, Institute for Application of Atomic Energy, CAAS, Beijing, China)

Induced resistance to septorial leaf blotch disease in wheat cv. "SaberBeg" and its hybrids by fast neutrons

Seeds of "SaberBeg" and its hybrids in F_2 generation were irradiated with different doses of fast neutrons. 1324 variants selected from M_2 and F_4M_2 were evaluated for resistance to septorial leaf blotch (Septoria tritici Rob ex Desm) with artificial inoculation under field conditions, through 3 successive generations. Results revealed 55 variants moderately resistant, along with better agronomic traits such as stiff stem, earliness in maturity and good adaption to semiarid zone conditions. The highest number of such variants was obtained from irradiated "SaberBeg" x "Mexipak" and "SaberBeg" x ("Mexipak" x "AbuGhraib 4"), while the lowest number was found from "SaberBeg" x "Araz".

(I. Ibrahim, E. Al-Marooff, A. Al-Janabi, A. Mahmood, Al-Aubaidi, Faculty of Agriculture and Biology, P.O. Box 765, Baghdad, Iraq)

Selection of salt-tolerant variant of wheat in vitro

Growing-tip explants of four winter wheat varieties were cultured on basal medium supplemented with 2,4-D 2mg/l and various NaCl concentrations. The calli derived from "Nongda 139" growing-tips were subcultured on the medium salinized with 0.4% NaCl for one year. Then they were cultured on a medium serially salinised with NaCl, increasing by 0.4% steps until 2%. Finally, surviving calli were transferred to a medium containing 0.4% NaCl for regeneration. 21 plants were obtained among which 3 were sterile. Dwarf, late ripening, shrunken grains and spike shape variations were observed, but they were non-heritable except dwarf and spike shape. Some potential NaCl-tolerant variants were identified.

(Q. Zheng, Y. Zhu, W. Chen, X. Tang, Institute for Application of Atomic Energy, CAAS, Beijing, China)

Isozyme differences in barley mutants

Thirty mutants (M_{11}) of barley (Hordeum vulgare L.) induced by physical and chemical mutagens were analysed for isozyme composition using polyacrylamide gel electrophoresis. Results show that these mutants were different in the isozymes leucine aminopeptidase, esterase and peroxidase. The differences included the number of forms of each enzyme,