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A stakeless yard long bean cultivar derived from an interspecific cross between cowpea *Vigna unguiculata* L. (Walp) and yard long bean *Vigna sesquipedalis* L. (Verdc.)

"Yard long bean" is an important vegetable in the Thai diet, particularly in Northeast Thailand. However, growing "yard long beans" requires stakes for supporting the twining stems and keeping the pod from touching the ground. Staking costs money, takes time and needs labour. An ideal cultivar would be a "yard long bean" with erect plant type and under 80 cm in height that produces typical long bean pods and allows convenient picking during the harvest time. An attempt to breed such a cultivar was made by crossing cowpea *Vigna unguiculata* L. (Walp.) with "yard long bean" *Vigna sesquipedalis* L. (Verdc.) in 1984. This resulted in a new cultivar "KKU 25". This cultivar, having erect plant type, requires no staking for supporting the stem and produces long fresh pods with acceptable taste which can be harvested within 43 days. The average pod length is 48 cm, and pod diameter 1.43 cm. In a preliminary yield trial, an average fresh pod yield of 16 t/ha was obtained.

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Studies on chemical and physical mutagens' induced polygenic variability in mungbean (*Vigna radiata* (L.) Wilczek)

Pulses used to be and still are cultivated on marginal lands under poor management conditions which result in low production. Genotypes which could respond to better management have been eliminated by past selection. It is, therefore, difficult and challenging to breed high yielding varieties in pulse crops with the limited genetic variability available. Induced mutations could supplement this variability. Extensive studies on genotype-mutagen interaction were undertaken with six varieties of mungbean having contrasting seed characteristics, morphological traits and genetic backgrounds. Each variety was treated with 300 Gy and 600 Gy of gamma rays, 0.1 and 0.5% of EMS, and 0.1 and 0.05 of SA. Dry seeds, water soaked and phosphate buffer soaked seeds served as controls. The following observations were made: differential response of varieties to mutagen treatments - irrespective of the variety or the characters; gamma-rays proved to be more effective than chemical mutagens; mutagenic treatments resulted in development of early maturing mutants that can fit well in multiple cropping systems particularly in raising a mung crop after the wheat harvest. The fact that some mutants were detected in M₄ with significant increase in yield and marginal improvement in protein content generation suggests the possibility of improving both characters provided a large population is screened.

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Soybean breeding with EMS mutagenesis

"Yudou No. 2" is a good soybean variety grown in the Honan Province. EMS was applied to seeds and valuable mutants were selected among the descendants. In a short period, several genetically stable strains were obtained. In the M₂ population, the early-maturing mutants were the most frequent, followed by short culm mutants. Other mutations altered leaf shape, grain size, habit of pod bearing, number of pods etc.. One of the best strains is "86-180". It is highly disease-resistant and ripens 19 days earlier than the original "Yudou No. 2". It bears more pods,



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although 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).

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Break-through in seed fertility of autotetraploid *Trigonella foenum graecum*

Fenugreek 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 corticosteroids 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 M₃, 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.

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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 (NaN₃) and EMS to create genetic variability. Phenotypically deviant types were selected in M₂. The mungbean mutants were synchronous, early, bushy, erect and disease tolerant. Maximum frequency of variants occurred in the treatment with 0.75 mM of NaN₃. The blackgram mutants were dwarf, bushy, trailing, synchronous and prolific podded. 1.0 mM NaN₃ 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 NaN₃ 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 NaN₃.

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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



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