Table 6. Morphological description of ADT 41 (JJ 92)

Character	Description
Plant height (cm)	95-105
Leaf sheath	Green
Auricle	Pale green
Ligule	White, Cleft
Leaf blade	Green
Flag leaf	Erect to horizontal
Apiculus	Green
Awn	Mostly awned
Exsertion	Just exserted
Rough rice L x B x T (mm)	12.02 x 2.30 x 1.88
Brown rice L x B x T (mm)	8.32 x 1.92 x 1.62
L/B ratio	4.3
Rice grade	Extra long slender
Rice colour	White
Abdominal white	Occasionally present
1000 grain weight (g)	24.2
Hulling percentage	73.5
Milling percentage	67.2

an elongation ratio of 1.44. It is rich in protein (9.81%). The cooked rice has volume expansion ratio of 4.6 (Table 5).

This variety is moderately resistant to blast but susceptible to stem borers, leaf- and planthoppers, leaf folders, bacterial leaf blight, brown spot, tungro, and sheath rot which can be controlled by suitable plant protection measures. The morphological features of this variety are given in Table 6. It is semi dwarf in stature, non lodging with moderate tillering. The grains are occasionally awned.

Based on the above desirable features, a Basmati variety of rice ADT 41 (JJ 92) was released for cultivation during *sornavari/kar/ kuruvai* season in Tamil Nadu.

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ANALYSIS OF STABILITY PARAMETERS FOR SEED YIELD OF BLACK GRAM IN SODIC SOIL

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ABSTRACT

The performance of six diverse black gram genotypes was evaluated in summer and *rabi* seasons during 1992 and 1993 under sodic soil. Pooled analysis of variance indicated significant differences among the genotypes and the environments. The genotype x environment interaction was highly significant indicating differential performance of genotypes under varied environmental conditions. The genotypes SSRC 1 and CO.5 showed higher yields, low stability of yield and adapted better to saline soil conditions. CoBG 282 recorded comparable yield to Co.5 and was better adapted to poor environment with yield stability.

KEY WORDS : Black Gram, Sodic Soil, GXE Interaction, Adaptation, Linear Component.

In Tamil Nadu, saline / sodic soil occupies about 0.30 million ha. In salt affected soils, the crop growth either completely fails or produces very little yield. Studies were undertaken at the Soil Salinity Research Centre. Tamil Nadu Agricultural University, Tiruchy to identify suitable crop to this soil. Black gram (*Vigna mungo* (L) Hepper) is one of the important grain legumes grown in Tamil Nadu. Though several improved varieties have been developed, most of them show inconsistent performance under varied environmental conditions. Eberhart and Russell (1966) suggested use of linear regression (bi) for measuring response and non-linear (s^2_d) components of GXE interaction for judging phenotypic stability of genotypes. The method suggested by Bilbro and Ray (1976) makes use of bi as a measure of adaptation, co- efficient of determination (r^2) as the stability parameter.

In the present investigation, an attempt has been made to identify genotypes with higher yield and stability of yield performance.

Table 1. Estimates of stability parameters for seed yield (kg/ha) in black gram

Genotype	Summer 1992	*Rabi* 1992 second fortnight of October	Summer 1993	Mean	bi	s^2d	r^2
SSRC.1	971	1042	923	979	0.2246	5442.3296	23.2
T9	301	731	384	472	1.6059	21423.5447	79.4
CoBG282	678	797	802	759	0.5068	1666.3572	82.7
VB.2	325	647	820	597	1.4634	57739.1977	54.2
VB.4	153	640	778	524	2.1374	69115.5167	67.9
CO.5	912	987	557	819	0.0575	105001.8167	00.1
Mean	557	807	711	711	0.9992		
SEm +	43	70	31	28	0.9245		
CD 5%	129	210	93	80			
Environmental Index	-134.9	115.7	19.2	-	-		

MATERIALS AND METHODS

The material for the investigation comprised-improved varieties of black gram developed at various research centres in the country. These genotypes were grown in fields with soil pH ranging from 8.6 to 8.9 in a randomised block design with four replications at the Soil Salinity Research Centre, Tiruchy. The experiment was repeated during summer seasons of 1992 and 1993 (January-April) and *rabi* of 1992 (October-January). The seed yield data of all the three experiments were taken for G-E interaction study. The linear (bi) and non-linear (S^2d) components of G-E interaction were calculated as suggested by Eberhart and Russell (1966).

RESULTS AND DISCUSSION

The summer 1992 as evidenced by negative environmental index value was considered to be a poor environment (Table 1). The differential effects of environments of genotypes were found to be significant as indicated by high significant environment (linear) mean sum of squares. Genotype mean squares when tested against pooled deviation were found to be significant indicating independent nature of genetic systems in controlling stability parameters. The linear component of G x E interaction was significant, so prediction about performance of most of the genotype appeared feasible. The significant M.S. due to pooled deviation indicated that the genotype differed considerably with respect to their stability of yield performance.

Pooled analysis of variance(Table 2) reveale significant difference among the genotypes studie and the average yield of the varieties varied fron 472 to 979 kg/ha. Singh *et al.* (1975), Mishra (1983) and Misra (1990) have reported similar significant differences in yield of black gram genotypes.

Eberhart and Russell (1966) have suggested that an ideal genotype for cultivation should have high mean yield, linear regression and least deviation from regression (S^2d) indicating stability of yield. Bilbro and Ray (1976) have pointed out that the value of regression coefficient (bi) indicates the adaptation of the genotype of environment, while high coefficient of determination (r^2) indicates stability. Thus to judge the stability of genotype both S^2d and r^2 were taken into consideration.

Considering the average yield of the genotypes, SSRC-1 gave the maximum yield of 979 kg/ha followed by CO.5 which yielded 819

Table 2. Analysis of variance for genotype x environment interactions for seed yield in black gram

Source	df	MS
Genotypes	5	113030.11**
Env. + (Geno x EV)	12	47286.84**
Env. (Linear)	1	191668.72**
Genotype x Environment (linear)	5	23020.55**
Pooled deviation	12	21722.55++
Pooled error	54	187.99

** P = 0.01 against pooled deviation;
++ P = 0.01 against pooled error.

kg/ha, bi values of these two genotypes 0.2246 and 0.0575 respectively indicate that these are well adapted to poorer environments. Stability of yield was low for these two genotypes. Significantly low yield to SSRC-1 but on par to CO.5 was recorded by Co BG.282. Stability of yield of this genotype was high and bi value of 0.5068 indicated that this variety is well adapted to poor environments.

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EFFECTIVENESS AND EFFICIENCY OF GAMMA RAYS IN BLACK GRAM

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ABSTRACT

The effectiveness and efficiency of gamma rays in relation to induction of chlorophyll mutation in M_2 generation was made in different genotypes of black gram. The chlorophyll mutation frequency increased upto 50 krad of gamma rays and the maximum increase was recorded in hybrid COBG 301 x PDU1 followed by COBG 301 and PDU 1. The type *viridis* was found to be the maximum. The efficiency of chlorophyll mutation was high in PDU 1 on lethality basis and COBG 301 on injury basis. The efficient dose for parents was 30 krad and for hybrid 50 krad.

KEY WORDS : Gamma Rays, Effectiveness, Efficiency, Mutation, Frequency, Viridis, Chlorophyll Mutation.

Black gram (*Vigna mungo*(L.) Hepper) is one of the important pulse crops of India and it is grown mainly in dry lands. Bringing together of the gene complexes of parents in the hybrids, and subjecting the heterozygous material to irraditation produced considerable variability in black gram (Ahmed John, 1991). In recent years, physical mutagen is available for induction of mutation in cultivated plants towards improving their characters. The potential physical mutagen is known to cause severe breakdown of genetic system and induce variations in crop plants. Accordingly, the present investigation was taken up to study the gamma irradiation in parents, COBG 301 and PDU 1 and their hybrid COBG 301 x PDU 1 of black gram.

MATERIALS AND METHODS

Crossing was effected using COBG 301 as ovule parent and PDU 1 as pollen parent. Conventional crossing method as well as rapid method of hand pollination technique were adopted for producing the hybrid seeds (Rachie *et al.*, 1975). Two different crossing blocks were raised at an interval of 15 days. The dry seeds of COBG 301, PDU 1 and their F_1 COBG 301 x PDU 1 were subjected to 30 to 50 krad gamma irradiation at the School of Genetics, Tamil Nadu Agricultural University, Coimbatore, by exposting to a cobalt 60 gamma source. The emission of gamma rays from the cell at the time of treatment was at the rate of 0.286229 Million Reongent units per h. Five samples of 250 seeds for each treatment along with control were taken. The irradiated seeds were then sown in the field along with the controls. Data were gathered from five replication laid out in factorial randomised block design. In the M_1 generation, the plants were bagged to ensure self fertilisation. The M_2 generation was raised in the field on individual M_1 plant progeny basis in the randomised block design with four replications. The chlorophyll muta tions were scored from 3 to 15 day old M_2 seed lings. Mutagenic effectiveness and efficiency were calculated following the methods of Konzak *et al.* (1965).