

SCREENING OF MUNGBEAN (*Vigna radiata* L.) GENOTYPES FOR DROUGHT TOLERANCE IN ARID CLIMATE OF SAUDIA ARABIA

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Preface

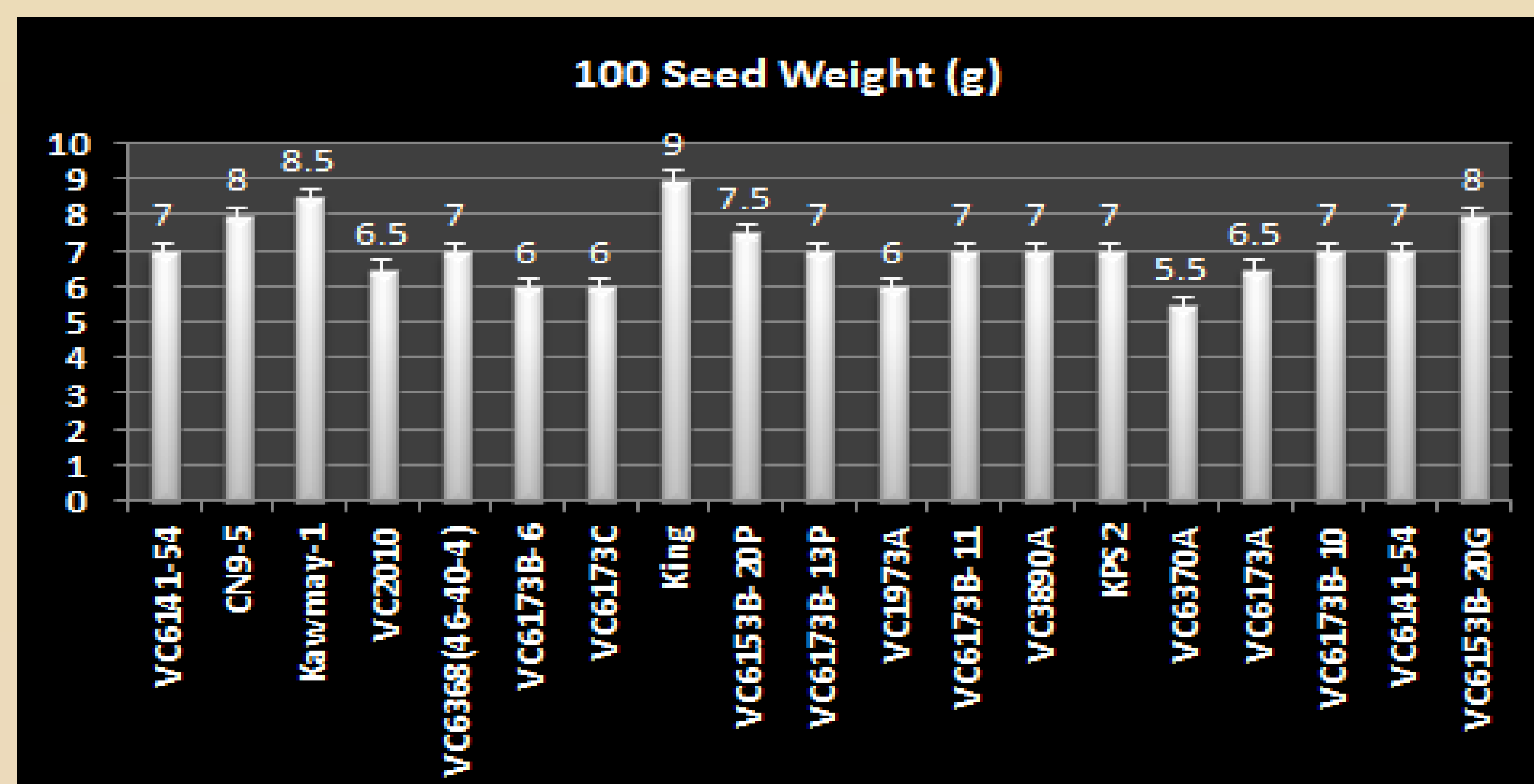
Mungbean is one of the most important pulse crops for protein supplement in subtropical zones of the world. It is widely grown in South East Asia as a short duration catch crop between two principal crops, can tolerate drought to a great extent, which means that it requires less water than many other summer crops. Mungbean contains 51% carbohydrate, 24–26% protein, 4% mineral, and 3% vitamins (Afzal et al., 2008). Besides providing protein in the diet, mungbean has the remarkable quality of helping the symbiotic root rhizobia to fix atmospheric nitrogen and hence to enrich soil fertility (Anjum et al., 2006). This crop can be used for both seed and forage production.

Drought stress conditions had significant effects on most growth parameters viz., plant height (Ashraf and Iram 2005; Sadeghipour 2009; Ranawake et al., 2011; Abbas and Mohamed 2011), leaves number (Ranawake et al., 2011; Abdel et al., 2011), pods number per plant (Moradi et al., 2008; Ranawake et al., 2011), total dry weight (Ashraf and Iram 2005; Farq and Bano 2006; Abbas and Mohamed 2011), number of leaves (Abbas and Mohamed 2011) and plant dry weight (Ashraf and Iram 2005; Farooq and Bano 2006; Ranawake et al., 2011; Abbas and Mohamed 2011), leaf area and dry matter (Khalil et al., 2001; Van-Delden et al., 2001 and Chiu et al., 2002 and Ahmad and Shad, 2010). Several studies also revealed that genotypes are differed in their responses to water stress conditions, grain yield was affected under drought stress condition by varietal differences and it was reduced about 22.69% compared to non-stress condition (Abayomi et al., 2012; Mahdi et al., 2012). Therefore the present study was carried out to evaluate the nineteen mungbean genotypes from the aspects of growth, seed yield and yield component characters as well as seed quality under Saudi Arabian arid climate.

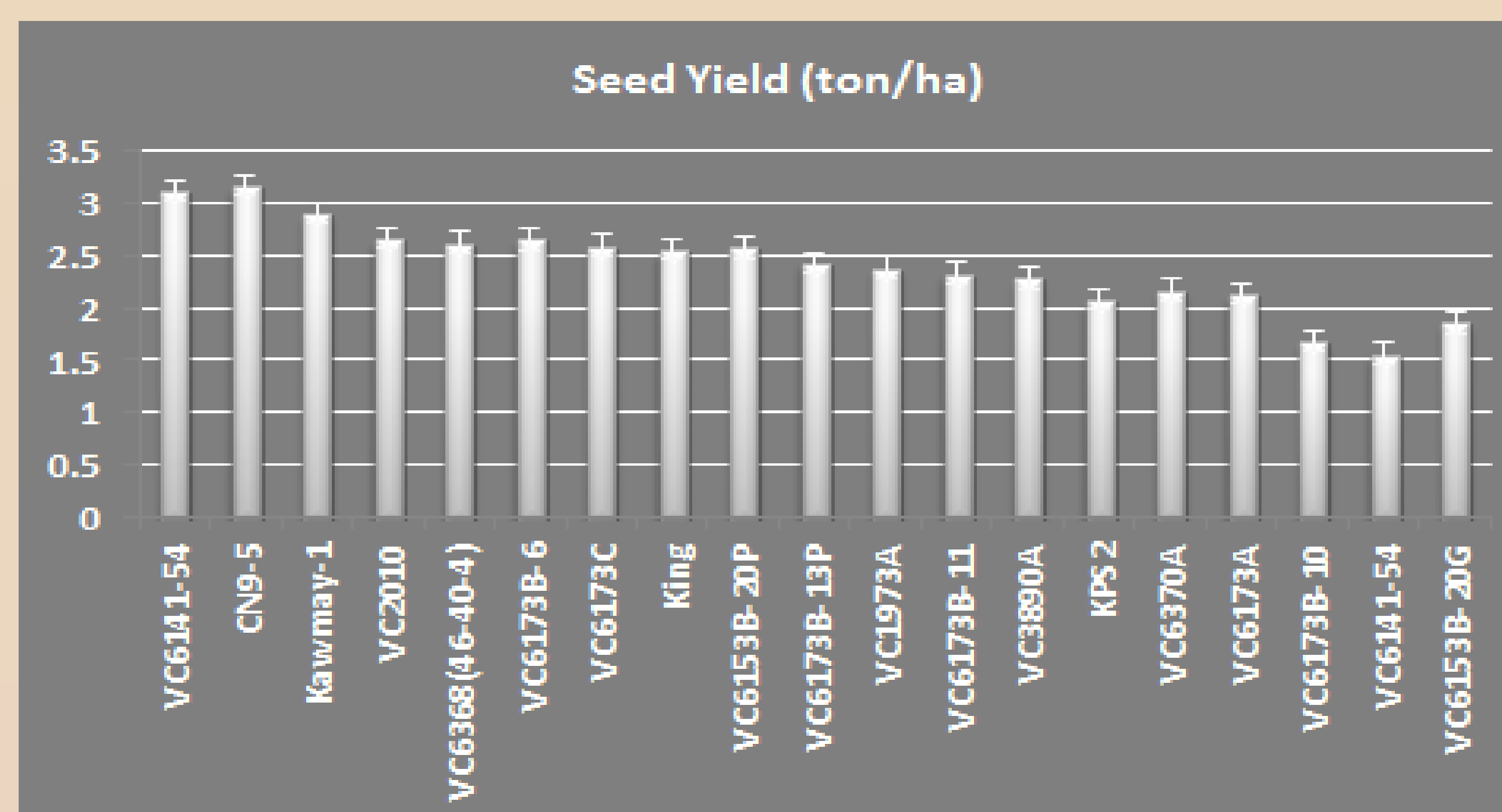
Processes

Two field trials in (CRD), nineteen mungbean genotypes were conducted at Agricultural Research Station, College of Food and Agriculture Sciences, Derab, near Riyadh, King Saud University, Saudi Arabia (24.42° N latitude and 46.44° E Longitudes, Altitude 600 m), during summer seasons of 2010 and 2011. The main objective of this study was to evaluate the growth, yield and yield components as well as seed quality. At harvest Samples from each plot were randomly hand pulled and air dried, then seed yield and yield component characters were determined. Seed quality traits in particular protein and carbohydrate contents were analyzed for each individual experimental unit.

Results and Discussion



Genotypic variations among the nineteen genotypes used in the present study were highly significant in grain yield per hectare.



Thus such results clearly appeared that mungbeans have a major adaptive mechanism for unfavorable conditions. Furthermore, seed quality determined as Protein and carbohydrate content were also showed significant differences among genotypes under drought condition of the present studies.

Table 1: Range, mean and coefficient of variability for the mungbean genotypes evaluated during two summer seasons under arid climate of Saudi Arabia

Character	Maxi.	Mini.	Mean	σn^{-1}
100 Seed Weight (g)	8.5	5.5	6.97	6.97 ± 0.88
No. of Plants (plant/m ²)	36	20	25.32	25.32 ± 3.80
No. of Pod/plant	40.8	22.0	30.29	0.29 ± 7.27
No. of Seeds / pod	12.8	6.0	8.90	8.90 ± 2.23
Grain yield (tons/ha)	3.16	1.56	2.43	2.43 ± 0.428
Total Carbohydrates (%)	54.06	48.09	52.09	52.09 ± 2.46
Protein (%)	29.16	23.44	25.48	25.48 ± 1.50

Table 2: Analysis of variance for grain yield per hectare in the mungbean genotypes.

S.O.V.	d.f.	S.S.	M.S.	F. Value
Replication	2	14.66	7.33	14.34**
Genotype	18	794.61	44.15	86.39**
Error	56	28.82	0.511	

Conclusion

Owing to the present results obtained it is concluded that differences among genotypes X Environment Interaction were sufficient to select the promising tolerant mungbean genotypes against drought condition.

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