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## Genotypic Response, Yield Stability, and Association Between Characters among some of Sudanese Faba Bean (*Vicia faba* L.) Genotypes under Heat Stress

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### Abstract

Heat stress is one of the abiotic stresses that affect and reduce yield productivity of faba bean. This study aimed to evaluate the performance and stability of twenty two faba bean (*Vicia faba* L.) genotypes under terminal heat stress. The genotypes were field tested for two consecutive years (2001/02–2002/03) during winter in Sudan, at Shambat (the Experimental Farm of Faculty of Agriculture, University of Khartoum). To induce heat stress, three sowing dates were used, namely: S1 (optimum), S2 (14 days later than optimum), and S3 (28 days later than optimum). The genetic variability, yield stability and correlation between yield, yield components and other vegetative traits were determined. The results showed that the induced terminal heat stress was severe enough to cause significant reduction in yield and most of the studied characters. Significant differences between genotypes for most of the studied characters were found. Some genotypes tolerate slight heat stress (S2), but become susceptible under severe heat stress (S3) and vice versa. Under slight heat stress, genotype C.52/1/1/1 was highly stable, gave the highest yield and was moderately tolerant to heat stress, whereas under severe heat stress, genotypes C.52/1/1/1 and C.42 showed the highest yield, were highly stable and moderately tolerant terminal heat stress. Significant positive phenotypic correlations for seed yield/plant with its components; number of podded nodes/main stem, and number of pods/plant were obtained. These two components were positively and significantly correlated with each other, but negatively and highly significant associated with 100-seed weight. Seed yield/plant was positively correlated with dry matter/plant, harvest index and plant height in both years. Positive and significant correlation of seed yield/plant with 100-seed weight and seed yield (kg/ha) was observed. It could be concluded that the high yielding genotypes under terminal heat could be used to improve heat tolerance in faba beans and making possibilities of extending production of faba bean in the non-traditional areas. Moreover, the traits that exhibited strong and positive association with yield could be used as selection criteria for improving faba bean under heat stress conditions.

**Keywords:** Correlation, faba bean, genotypic, heat stress, stability, Sudan, variability