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MUTATION-INDUCED VARIABILITY FOR IMPROVED YIELD IN SPRING WHEAT UNDER HOT IRRIGATED ENVIRONMENTS

Wheat production under dry and hot environments is challenged by heat stresses. Wheat improvement approaches for such stressful environments are constrained by the availability of genetic variability. Gamma-ray is used to induce variability in two Sudanese local wheat varieties (Tagana and Khalifa) to improve grain yield under the hot (30-38℃ during the grain filling period) irrigated environments of Sudan. Dry seeds (10-15% moisture content) were exposed to six treatments of irradiation (0, 100, 200, 250, 300, 400 GY). The LD50-60 was 150 and 200 Gy for Khalifa and Tagana, respectively, indicating that Khalifa was more sensitive to irradiation than Tagana. Two mutant populations, each with about 20,000 lines, were advanced to M4 with preliminary visual scoring for agronomic performance. Based on grain yield, 500 M5 lines from the two populations were selected for tolerance to heat stress at the GRS. The mutant populations were advanced to M6 with preliminary evaluation of grain yield. Based on M6 grain yield results, 50 advance lines from the two populations (10 from Tagana and 40 from Khalifa) were selected and tested in addition to the parents (Tagana and Khalifa) and two high yield national checks for grain yield under heat stress condition in 2015/16 and 2016/17. Grain yield was significantly different (P 0.01-0.06) among mutant lines and parents. Three and four lines had significantly higher grain yield than Tagana and Khalifa, respectively. Some of these lines combined early maturity and high grain yield. These top mutant lines will be advanced to multi-location trails to verify their performance before submission for official release as new mutant varieties for hot irrigated environments of Sudan.

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