

Use of Marker-Assisted Breeding to Combine Tolerance to Water Deficit Stress with Disease Resistance and Edible Seed Quality.

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A population was developed to combine tolerance to water deficit with resistance to root-knot nematodes and high oleic fatty acid content. Selection and testing were performed in the F₂ generation. Accessions were advanced and breeding lines were grown as replicated trials from 2015 to 2019. Progeny of accessions selected in the F₂ generation based on the best 3 SSR markers from GWAS outyielded the other accessions by 20%. Several accessions yielded well repeatedly under water deficit compared to commercial varieties. Large differences in rankings based on yield between irrigated and water deficit conditions suggest that certain accessions possess tolerance to water deficit, as opposed to high yield potential in general. However, low shellout among accessions is thought to be a result of the use of the unadapted minicore material as parent. Backcrossing will be needed to improve shellout.