ABSTRACT

Drought is the major constraint causing considerable yield reduction in chickpea. Roots play a critical role in enhancing drought tolerance. The main objective of the study was to introgress drought tolerant root traits into Kenyan chickpea varieties through marker assisted breeding (MABC). Eight simple sequence repeat (SSR) markers, linked to quantitative trait loci (QTL) for root and yield traits, were used to screen the parents at ICRISAT, India. In addition, 1144 single nucleotide polymorphic markers (SNPs) were also used in genotyping these parents at Legume Genomics Center, United Kingdom. Crosses were made between two selected varieties, ICCV 92944 (Chania Desi II) and ICCV 00108 (LDT 068) and 'QTL-hotspot' donor parent ICC 4958 that has extensive rooting system. Polymor phic SSR and SNP markers were used to select progenies with root QTL at F1, BC1F1 and BC2F1 that were later advanced to BC2F3. The BC2F3 populations were evaluated for root traits at Egerton University in randomized complete block design with two replications in pot experiment. The BC2F3 families were significantly different for root dry weight (RDW), shoot dry weight (SDW), total plant dry weight (PDW) and root to shoot dry weight (R/S) ratio (R/S) for Chania Desi II x ICC 4958 and R/S for LDT 068 x ICC 4958. These lineshad significantly improved root traits compared the recurrent parents. MABC is aneffective and efficient method of introgressing complex drought tolerant traits which leads to improvement in yield especially under drought conditions.