

Abstract

Common bean (*Phaseolus vulgaris* L.) is sensitive to water stress. Objective of the study was to select genotypes resistant to drought and determine traits associated with drought resistance. One hundred and eight bean genotypes from University of Nairobi Bean Research Program, the International Center for Tropical Agriculture (CIAT), The Gene Bank of Kenya (GBK) and local varieties were screened in a drought nursery from 2008 to 2010 at Kabete Field Station. The experimental design was a split plot with three replicates. The two irrigation treatments, irrigated (non stress, NS) and rainfed (drought stressed, DS) were main plots, and genotypes the sub-plots. The whole experiment received sprinkler irrigation up to flowering stage to ensure good establishment and stand uniformity. Irrigated plots (NS) received supplemental irrigation as required while the rainfed (DS) plots did not receive further irrigation until the crop was harvested. Data was collected on days to flowering, maturity, shoot biomass traits and grain yield. Yield data under stress and no stress conditions was used to calculate drought intensity index (DII). A combined analysis of variance showed that season, irrigation and genotypic effects were highly significant ($P > 0.01$). Severe drought (DII=0.72) reduced grain yield by 63%, while moderate drought (DII=0.3) in 2010 reduced grain yield by 40%. Thirteen genotypes from three grain types were drought resistant. Grain yield under drought stress was positively correlated with days to flowering ($r=0.55^{**}$), days to maturity ($r=0.64^{**}$), pod harvest index ($r=0.57^{**}$), and negatively correlated with pod wall biomass proportion ($r=-0.63^{**}$). Selection of common bean genotypes for drought stress may consider use of seed biomass, pod harvest index and reduced pod wall biomass proportion by breeders.