

Abstract

The aims of this work were 1) to assess whether sorghum (*Sorghum bicolor* (L.) Moench) genotypes originating from the India can be grown and analyzed in the climatic conditions of central Europe and 2) to find out the utilization potential of selected non-destructive and destructive methods based mostly on the chlorophyll *a* fluorescence measurements and the determination of photosynthetic pigments' content for the differentiation of sorghum genotypes based on their presumed drought tolerance. Field experiments made during 2 years compared 15 genotypes of this species (2 *stay-green* parental lines, 2 senescent parental lines and 11 introgression lines with *stay-green* loci), 2 of these genotypes were further analyzed in greenhouse conditions where the water deficit was induced by a cessation of watering for 12 days. The field-grown plants showed some differences between individual genotypes in all measured parameters; however, for the majority of the genotypes these differences were not statistically significant. The *stay-green* parental genotype B35 differed the most from the other ones in both field seasons, but the other *stay-green* genotypes usually did not differ from the senescent genotypes. No significant differences between both greenhouse-tested genotypes (presumably contrasting in their drought tolerance) were found. The possible utilization of the methods analyzed in this study for the determination of sorghum drought tolerance is thus questionable.

Key Words

Carotenoids; chlorophyll fluorescence; chlorophylls; drought; drought tolerance; OJIP curve, photosynthesis; proline; *Sorghum bicolor*; spectral reflectance indices; *stay-green*; stress