Generation and Characterization of Striga-Resistant Maize and Sorghum Varieties Using Azide-Based Mutagenesis

Kiruki, S. and Othira, J. O.
Department of Biochemistry and Molecular Biology, Egerton University, P. O. Box 536, Egerton
E-mail: othirajack@hotmail.com

Abstract

Production of cereal crops is threatened by *Striga hermonthica* (Del. Benth) weed known to infest an estimated 46000 hectares of land in the traditional food producing areas in Western and Coastal Kenya. The grain yields of maize and sorghum, the major calorie-providing food crops grown largely by the small scale farmers, are reduced by 30-60% due to *Striga* infestation. *Striga* is a parasitic weed that attaches to the roots of maize, sorghum and other cereals robbing them of water and nutrients. The research involved generating maize and sorghum mutants by Azide-based mutagenesis, screening for *Striga* resistance by seed germination bioassay and assessing for DNA polymorphism using Randomly Amplified Polymorphic DNA technique. Present investigation has demonstrated the high degree of *Striga* resistance of a few maize and sorghum genotypes [maize: K9911, K0611 and sorghum: J0621] developed through Azide-induced mutagenesis. These mutants were non-stimulating due to absence of chemical stimulants or their occurrence at very low concentrations. Some resistant varieties stimulated *Striga* germination to a very low degree, indicating that host resistance could result from other physiological factors. DNA polymorphism was manifested by the presence of distinct bands which varied depending on whether the variety or the mutant was resistant or susceptible. The *Striga* susceptible maize varieties produced unique bands at 5.0kb using primer OPU-18 and, 6.0kb and 8.0kb using primer OPW-04, which were missing in resistant varieties. Similarly, *Striga* susceptible sorghum varieties produced unique band at 6.0kb using primer AB4-13 which was missing in resistant varieties. But using primer OPE-01, the resistant sorghum variety had an extra band at 7.0kb. The extra bands observed could be conferring genes for *Striga* stimulant production. Since these bands were absent in the resistant varieties, it might have been altered or silenced during mutation hence their inability to produce *Striga* germination stimulants. Finally, *Striga* resistant varieties developed can be used as resistant gene sources in maize and sorghum improvement. Their agronomic qualities should also be tested before propagation by national breeding programmes for use in *Striga*-infested fields.

Key words: *Striga hermonthica*, Resistant mutants, DNA polymorphism, RAPD-PCR.