Abstract

The root hemiparasite Striga hermonthica causes enormous yield loss in its dryland staple cereal host Sorghum bicolor. Striga-resistant sorghum cultivars could be an important part of integrated S. hermonthica control. For efficient resistance breeding, knowledge about the pathogenic diversity of S. hermonthica is essential. The aims of this study were therefore to (i) determine the genetic diversity within and between seven S. hermonthica populations from East and West Africa using 15 microsatellite markers and (ii) to assess pathogenic main effects and host-parasite interactions of these S. hermonthica populations grown on 16 diverse sorghum genotypes in a greenhouse pot trial.

Most of the observed genetic variance (91 %) assessed with microsatellite markers occurred within S. hermonthica populations. Only a small portion (8 %) was accounted to differences between regions of origin of the S. hermonthica populations. A positive correlation ($R^2=0.14$) between pairwise geographic and genetic distances reflected the slightly increasing differentiation of S. hermonthica populations with increasing geographic distance. East African S. hermonthica populations, especially those from Sudan, had significantly greater average infestation success across all sorghum genotypes than West African populations. Some specific host-parasite interaction effects were observed.

The applied markers detected only neutral genetic diversity. To identify any association between striga virulence and molecular markers, a high-density marker system covering the whole striga genome would be required and a very precise and representative phenotyping system.

The high genetic variation among individuals of each S. hermonthica population underlines the high potential adaptability to different hosts and changing environments, and points to the need to manage sorghum resistance alleles in space and time so as to hinder the parasite to overcome resistance.

Combining resistant varieties with an integrated management approach will be essential for effective S. hermonthica control.

Keywords: Greenhouse pot trial, microsatellite markers, striga aggressiveness, striga genetic variability, striga resistance in sorghum, striga-sorghum interaction, witchweed