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Full Length Research Paper

Combining ability of maize (Zea mays) inbred lines resistant to *Striga* hermonthica (Del.) Benth evaluated under artificial *Striga* infestation

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The parasitic weed *Striga* affects maize on an estimated 20 million ha in Africa, making it a major cause of maize yield reduction from near world average of 4.2 t/ha few decades ago to the present 1.5 t/ha. The objectives of this study were to examine the combining ability of 20 inbred lines and identify single crosses which can be used to develop other hybrids resistant to *Striga* hermonthica (Del.) Benth. Fourteen female lines were mated using North Carolina Design II with all six males. The resulting 84 F_1s along with six commercial checks were evaluated in four separate trials for two rainy seasons during 2010. The trials were conducted on station under both artificial *Striga* infestation and *Striga* free environments using standard procedures at the Kibos and Alupe sites, both in the Kenya's Lake Victoria Basin. Data were recorded on *Striga* counts, *Striga* damage rating (SDR), grain yield and other agronomic traits. General combining ability (GCA) and specific combining ability (SCA) effects were computed using SAS. The new F1 hybrids outperformed the commercial checks in grain yield and reaction to Striga. Single crosses JI-30-3/TESTR 151, JI-30-18/TESTR 151, CML206//56/44-6-3-7-1/TESTR 149 and JI-30-18/TESTR 156 gave the highest yield while single cross JI10-28-#/TESTR 136 gave the lowest yield. The ratio of GCA: SCA mean squares exhibited a predominance of additive gene effects in the inheritance of *Striga* resistance traits as opposed to dominance gene effects. Inbred lines with good GCA for yield and *Striga* resistance traits were identified as TESTR 151, TESTR 156 and OSU231//56/44-6-4-17-3. The high GCA inbred lines and the superior single crosses will provide a basis for future use perse and also development of three-way and double cross hybrids to be grown in *Striga* prone areas of the Lake Victoria Basin in eastern Africa.

Key words: Maize, *Striga* hermonthica, general combining ability (GCA), specific combining ability (SCA), host plant resistance, sub-Saharan Africa.