

Abstract

Developing maize with durable resistance to maize stem borers could be enhanced by identifying genotypes with different mechanisms of resistance and pyramiding the resistances into high yielding genotypes. This study was carried out on 120 CIMMYT tropical maize inbred lines to identify the most important mechanisms of resistance that could be used to discriminate the germplasm into resistant or susceptible categories. The experiment was laid in an α -lattice design, and replicated three times during the 2011/12 seasons. Traits measured were leaf toughness, stem penetrometer resistance, trichome density, stem sugar content, leaf damage, number of stem exit holes and stem cumulative tunnel length. A selection index was computed and categorized the 120 inbred lines into 33 resistant, 29 moderately resistant, 31 moderately susceptible and 27 susceptible. The most resistant lines were those derived from the CIMMYT multiple borer-resistant populations with CKSBL10039 being most resistant and CML395 most susceptible with indices of 0.49 and 1.84, respectively. Trichome density, leaf toughness and stem sugar content in that order were the most important traits in discriminating the lines into resistance and susceptible categories. More research is needed to classify the specific types of trichomes and sugars present in both resistant and susceptible inbred lines.