

Abstract

Tea is grown in areas which differ widely in elevation, climatic and edaphic factors. These differences have profound effect on growth, productivity and quality of tea. A collaborative study between the Tea Research Foundation of Kenya (TRFK) and Tea Research Institute of Tanzania (TRIT) was initiated in 2005 to evaluate the performance and genetic stability of thirty improved tea cultivars across eight tea growing sites in the two sister states. Yield data was collected between 2007 and 2009. Tea quality data entailing extraction and quantification of total polyphenols was generated for 45 clones being evaluated in three Kenyan sites only. Significant differences ($P < 0.0001$) between clones, sites and years and their interactions were revealed. Clone TRFK 371/8 was the best clone in Timbilil and Kangaita, while TRFK 301/5 was best in Ngwazi, Ilinge-R and MTRS. Clone TRFK 31/8 was the best in Sotik. Considering yield means across all sites, clone TRFK 371/8 was, overall, the most outstanding and stable across sites and years. Yield variations attributable to sites showed that Ngwazi, Ilinge-R and Sotik were the most suitable tea growing sites in that order, while Nandi appeared to be the poorest. The %TP was also significantly different ($P < 0.0001$) among clones, sites and their interactions, implying genes, environment and their interactions have considerable impact on tea quality. As clones TRFK 301/4, TRFK 301/5, TRFK 301/6, TRFK 303/178, TRFK 303/259, TRFK 371/3, TRFK 371/8 had above-average genetic stability for yield, they are suited to good tea growing sites, while those clones with average to below average stability could be exploited in moderate to marginal sites. Clones TRFK 303/259, TRFK 371/3 and TRFK 371/8 had above-average genetic stability for yield and %TP meaning that these clones could be cultivated widely in high yielding environments without compromising yield and quality of black tea.