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Introduction

Significant evidences report current coffee varieties will not tolerate the environmental threats of the 21st century, changing climate, disease and insects. This creates a disastrous decline in supply in the future. The best hope for sustaining the supply of high-quality coffee in the years to come is to focus on making the coffee plant more resilient. The creation of new varieties, supported by a vibrant seed sector, will result in major global productivity and quality gains.

Materials/Methods

National performance trials involving 40 f1 hybrids were evaluated. The hybrids were developed by World Coffee Research (WCR) and Rwanda Agriculture Board (RAB). Materials were evaluated for growth and quality characteristics in three different locations. Statistical analysis consisted of AMMI, AMMI stability value (ASV) path analysis, and combining abilities (GCA and SCA).

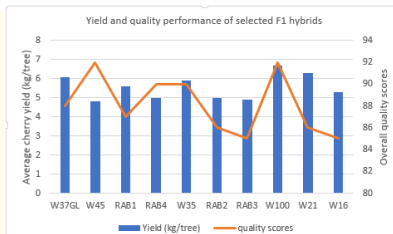


Figure 1: Yield and quality of F1 hybrids



Figure 2: SCA for F1 hybrids



Figure 3: One of Breeding trials

Results/Discussion

From the AMMI analysis and ASV 10 best performers recorded a cherry yield per tree higher than 5 kg/tree and the overall quality scores above 85% (figure 1 for fixed varieties and figure 2 for hybrids). 24 months old varieties and hybrids already recorded cherry yield per tree higher than the national average (Ngango et al. 2019).

The GCA effects of parents and SCA effects of crosses were significant ($P < 0.01$) for stem diameter, number of nodes per branch, number of cherries per tree, bean size, the weight of 100 beans, cherry yield per tree, quality scores, rust, and coffee berry disease scores. Improvement programs should be focus on selection of superior parents (Fasahat et al.2016). Crosses exhibiting high SCA effects would produce desirable transgressive segregants in advanced generations (Reyes 2019)

Conclusion/Perspectives

Performance trials exhibited good candidates for direct release for F1 hybrids. However, it will be necessary to put in place a sustainable strategy for mass multiplication of planting materials either through clonal propagation or exploitation of male sterility. Hybrids with positive SCA are valuable genetic resources for further breeding investigations.

References:

- Fasahat et al. (2019). Plant Science. doi.org/https://doi.org/10.1016/j.plantsci.2019.110213
 Ngango et al. 2019. Agriculture 2019. doi.org/10.3390/agriculture9070161