ADAPTABILITY OF COFFEE VARIETIES ACROSS TWO COFFEE AGRO ECOLOGICAL ZONES IN KENYA

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Introduction

Coffee is an important global commodity that is traded secondly after oil and supports over 120 million livelihoods all over the world (Pham et al., 2019). The adaptability of coffee is dependent on the existing environmental conditions which determines its production and quality (Taraves, 2018). Studying the adaptation of coffee in different environments is critical in breeding, since the varieties that perform well in specific environments are selected and utilized in crop improvement thus the aim of the study

Materials/Methods

Ten (10) coffee varieties from four countries were evaluated for their yield performance in Kenya across two coffee agro ecological zones (Koru and Ruiru). Ruiru and Koru are located at altitudes of 1620m and 1554m with bimodal annual rainfall of 1063mm and 1740mm respectively. There was no disease control in the experiment. The trial was established in the year 2015 using the Randomized Complete Block design with three replications. The cherry yield was recorded in the year 2018 and 2019 and analyzed for the two environments.

Data analysis

The data was subjected to Analysis of Variance (ANOVA) using R statistical software and Analysis of effects declared at 5% significant level using the Linear Mixed-Effects models. The GGE biplot was also generated to determine the performance across the two different sites and years.

Figure 1 :Performance of individual coffee genotypes over the two years' period (2018 and 2019).
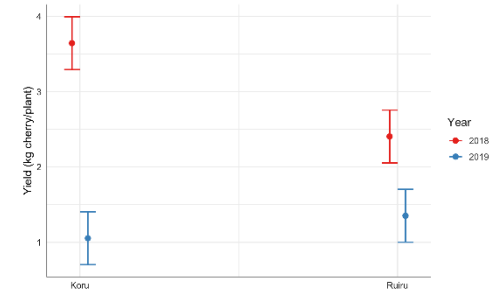
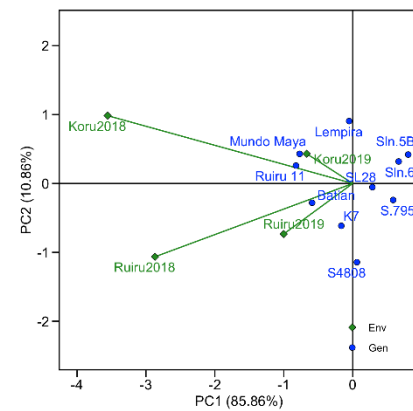Figure 2:Mean yield performance of coffee genotypes across the two locations in 2018 and 2019

Figure 3: GGE biplot showing the performance of the coffee varieties across the two environments and years

Results/Discussion

There was significant difference on the yield performance among the varieties, over the two years across the two environments. Ruiru 11 recorded significantly (P≤ 0.05) higher yields followed closely by Mundo Maya, Batian and K7(Figure 1). The varieties Sln. 5b and Sln.6 recorded significantly low yield across the two environments over the two seasons. The decline of yield in 2019 was due to prolonged drought and also the effects of biannual bearing (Figure3). There was a positive interaction between the two environments, indicating that the two environments are significantly different from each other with Koru recording a higher mean average on yield (Figure3)
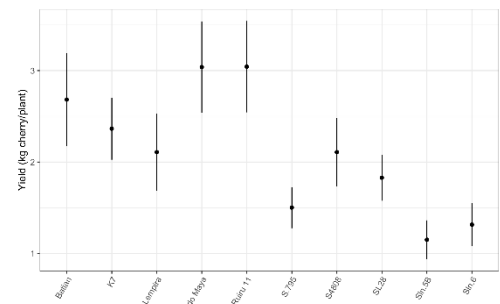
Conclusion/Perspectives

The results from the study revealed varieties that are more adapted to the two environments . The Kenyan varieties were among the top five highly performing genotypes. Cup quality is an important attribute in breeding Arabica coffee. It will be important to conduct sensory evaluation of the genotypes in order to asses their cup quality performance in relation to yield for selection..

References:

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 Pham Y,Reardon-Smith K, Mushtaq S, Cockfield G, (2019) The impact of climate change and variability on coffee production: a systematic review,Climatic Change, Springer, vol. 156(4):609-630.