# OFSP PROGENIES RESPONSES TO DIFFERENT ENVIRONMENTAL CONDITIONS IN BURKINA FASO

*Somé Koussao, Ouedraogo Jeremy, Belem Jerome, INERA, Burkina Faso, 01 BP 476 Ouagadougou, Burkina Faso; and Asante Isaac, Vernon Gracen and Danquah Eric, WACCI, University of Ghana, Legon, Accra, Ghana.
koussao@hotmail.com

## Introduction

Sweetpotao is grown in Burkina Faso in different types of environments ranging from lowlands to uplands with varying soil fertility. Despite its adaptability to different soils and climatic conditions sweetpotato performance also varies considerably with environment compared to other field crop species. Genotypes have been selected for their good performance in one environment or for their stable performance over a wide range of locations. Genotype by Environment (GxE) interaction analysis has helped to select varieties combining good yield, high beta-carotene content and acceptable dry matter content. However, in Burkina Faso, most of the OFSP varieties introduced failed to adapt. In a country where VAD among children under five and their mothers is recurrent locally adapted OFSP varieties could help to address the problem.

## Objectives

- To assess whether the 33 $F_1$ orange fleshed sweetpotato hybrids and their orange fleshed parental varieties respond differently to environmental changes;
- To identify varieties with stable performance or specific adaptation to be recommended to farmers in Burkina Faso.

## Materials and methods

Thirty three (33) F1 OFSP varieties obtained through controlled crosses and four (4) checks OFSP (1 local: BF14, and 3 introduced: Caromex, CIP-199062.1 and TIB-440060 were used in a Alpha-Lattice Design in 3 environments, in 2 replications in 2010 and 2011. Data were recorded on yield, Beta-carotene and dry matter. Multi Environment Trial analyses were computed using CloneSelector-3. ANOVA with genotypes fixed and environment random was also applied for each trait. Additive Main effects and Multiplicative Interaction was analyzed assuming a fixed effect model. Stability for the different genotypes was analyzed based on regression. AMMI genotype means biplot was displayed from these analyses.

## Results and discussion

Genotype effect accounted for 83.42% of the variation of beta-carotene content. However, GxE interaction effects accounted for the higher source of variation for yield, DM content and for the other traits. Genotypes with small GxE interaction effect were low yielding. The results revealed weak association between storage root yield, beta-carotene and dry matter content.

BF82xTainung-8 for yield and BF82xTIB-8 for beta-carotene showed 82.99% and 32.64% increase respectively over the performance of the best checks for storage root yield (CIP-199062-1) and for beta-carotene content (BF14). The best F1 genotype for DM content (BF82xTainung-11) had 4.29 % less than the best check for DM (Caromex).

Table 1: ANOVA for selected agronomic and quality components of 33 F1 OFSP and four checks

| | | Mean square for agronomic components | | | | | | Mean square for quality parameter | | Mean square for virus |
|---|---|---|---|---|---|---|---|---|---|---|
| Source of variation | df | Biomassyield | Rtnumpplt | Irtwgt | Rtyield | Survival | HI | DM | Betacar | Virsympt2 |
| Genotypes | 36 | 176.90*** | 5.744*** | 14487.*** | 129.18*** | 598.5** | 0.050*** | 81.250*** | 71.779*** | 11.963*** |
| Locations | 2 | 3625.33*** | 16.031**** | 6314. | 438.10*** | 553.2 | 1.754** | 2279.712*** | 0.830 | 37.135** |
| Rep/Locations | 3 | 40.22 | 5.153* | 23498.*** | 170.94** | 329.7 | 0.078*** | 0.106 | 6.606 | 0.698 |
| LocationsxGenotypes | 72 | 72.96** | 2.427* | 2409. | 46.22** | 380.9** | 0.0180*** | 32.977*** | 3.562 | 2.168** |
| Residuals | 105 | 95.14 | 1.649 | 3982. | 24.68 | 198.2 | 0.008 | 9.567 | 3.267 | 1.282 |

## Conclusion

- This MET analysis was effective to assess genotype responses to environmental variations.
- BF82xTainung-8 could be recommended for Kouare, BF92xCIP-6 for Kouare and Farakoba, while Loumbila was identified as the low performing environment.
- Despite these substantial results, further evaluations with farmers' participation is still needed for better varietal selection.


Figure 1. 84% of children under 6 and 61% of their mother suffer of malnutrition in rural area of Burkina Faso

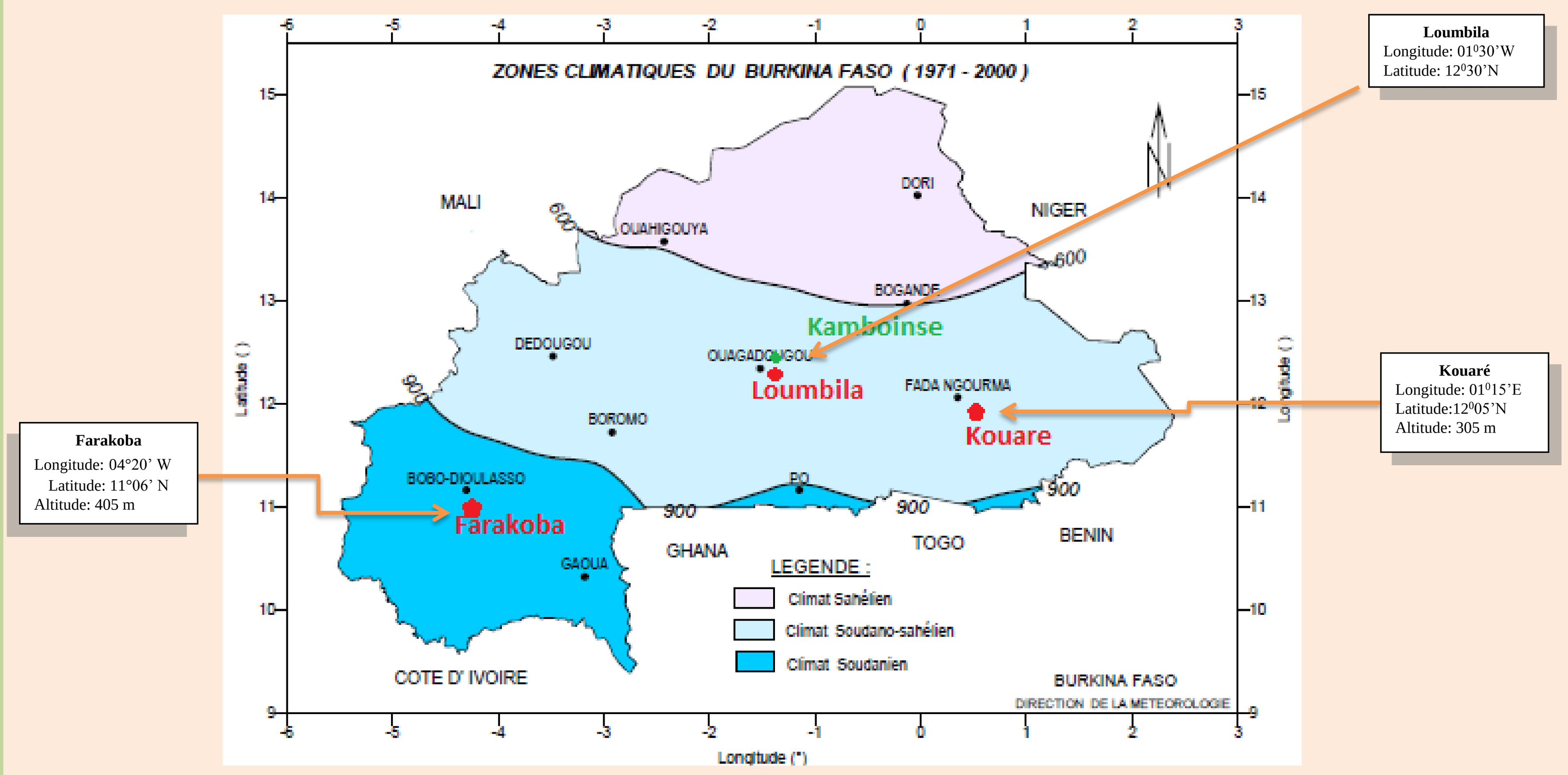


Figure 2. The three sites of evaluation

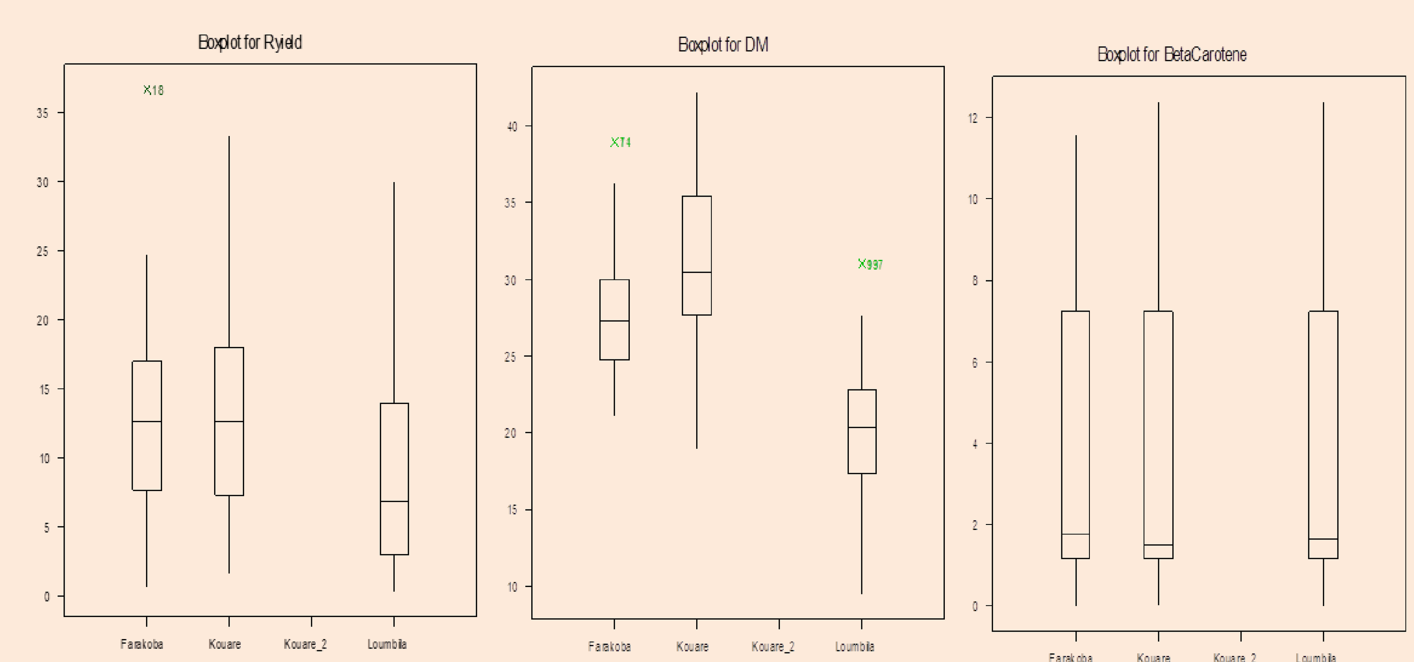

Figure 3: Average performance in storage root yield, dry matter and beta-carotene content in 2010and 2011

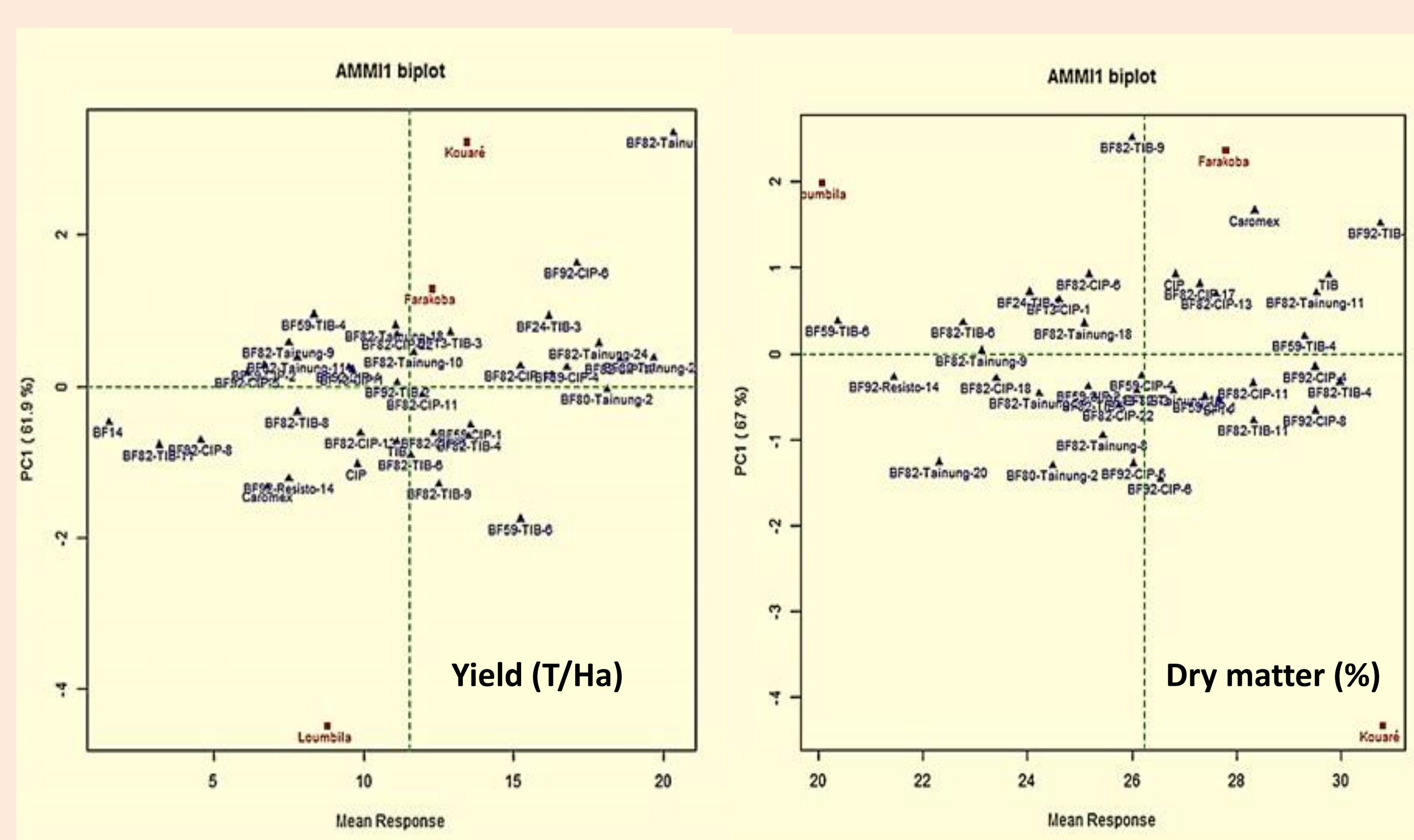


Figure 4: AMMI1 biplot of the interactions of genotypes by locations for storage root yield and dry matter

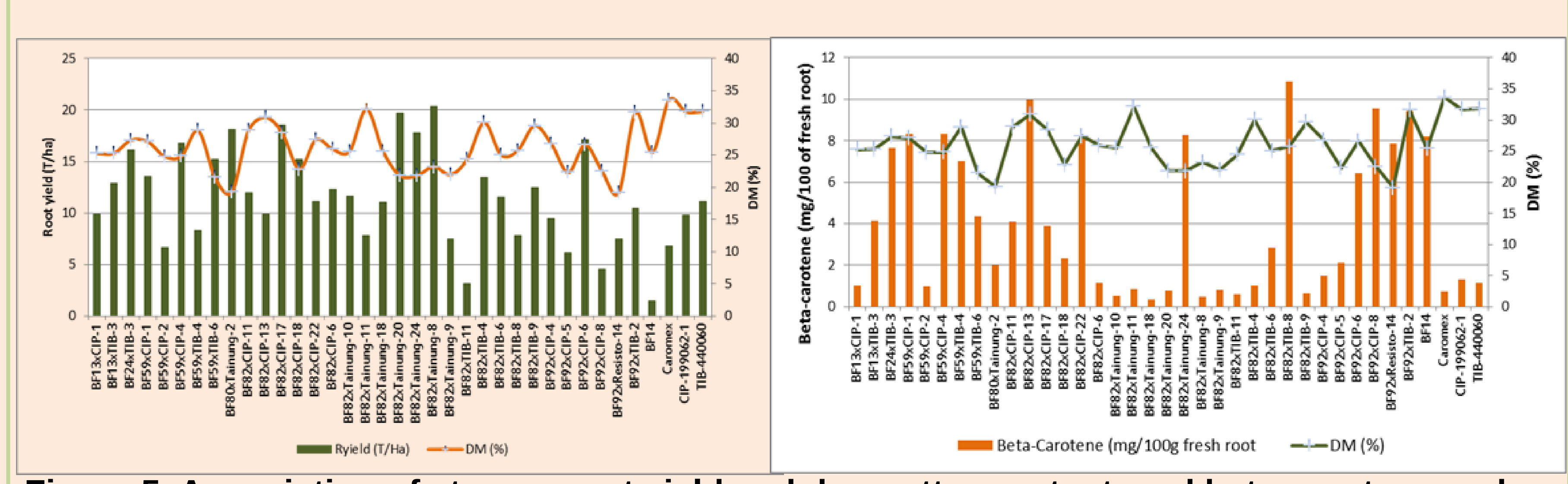

Figure 5. Association of storage root yield and dry matter content, and beta-carotene and dry matter content of the 33 F1 genotypes and 4 checks evaluated

## Acknowledgements

Thanks to Alliance for a Green Revolution in Africa (AGRA) for the sponsorship.