2020 Technical Report

Ground Penetrating Radar Project - GPR

Project activities for 2020

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Summary

IITA and IDS GeoRadar are partnering to develop a grand penetrating radar tool that will be useful for non-destructive estimation of cassava root yield as a high throughput phenotyping tool in Nigeria. The project is funded by the Bill and Melina Gates Foundation. The goal is to develop a commercial prototype phenotyping tool by the end of 2022.

2020 Project Activities

The GPR project activities for 2020 began at IITA in Nigeria with a visit of USA partner on GPR project from IDS GeoRadar company, Colorado, North America. The two-man team arrived IITA Ibadan February 24 and departed March 10, 2020.

The USA team led by Alfredo Delgado had Carl Macintyre as his colleague on the trip to Nigeria. They met IITA cassava breeding team for work plan discussion that was centered on GPR data acquisition for year 2020. IDS GeoRadar partner made a presentation to IITA team on the new data acquisition device, calibration, and acquisition methodology. Then, the IITA team provided field trials for data acquisition operations.

Root scanning operations were held in two locations, Ibadan and Ikenne. Scanned cassava roots in trials such as Advance Yield Trials, Uniform Yield Trials, Genetic stock, Seedling Nursery and Demand creation Trials. Prior to scanning operations, we collected pre scanning data such as plot row length measurement and cassava plants stand reference point. After scanning operations, we conducted individual plan harvests and collected harvest data.

After departure of USA GeoRadar GPR project partners, the IITA team commenced preparation for the setting up of 2021 trials purposely for GPR scanning operations.

We designed trials using and Advance Yield Trial (AYT) format. The trials include 5 clones and a blank plot as check. In Ibadan, we established the trial in two contrasting soil types – Clayey and Sandy soils. A third trial was established in Ikenne.

The planting was done with 3 planting dates spaced 2-month intervals beginning from April 2021. This would help us capture roots at different ages.

Capacity Development Activities

In the year, IITA GPR team had 2 sets of online virtual training sessions:

1. Organized to acquaint and guide IITA team into procedure for GPR-slice data analysis for root imagery and pixel counts.

    - This was a general training by Dean Goodman on basic principle and procedure used by geophysics to detect underground objects such as metals, underground water pipes et cetera. The meeting was conducted for IITA and CIAT teams held on 15 July 2020
    - Agricultural application with GPR-slice training was anchored by Alfredo Delgado. The meeting was on 3 September 2020.

2. The second sets of online meetings focused on user inputs interface software development for data acquisition software.

    - Six weekly meetings between October 5 to November 18, 2020
    - The meeting was to allow the user make input into building a new device with ease of operation and incorporating important / relevant software.

The GPR team made a presentation to the IITA cassava research team on GPR activities for the year 2020 and proposed operations to be carried out for 2021.