Metabolic and physiological traits associated with Bambara groundnut (*Vigna subterranea* (L.) Verdc) adaptation in contrasting environmental conditions (Code: Bam1-003)

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Introduction

Bambara groundnut is an underutilised crop grown under rainfed conditions in Africa where drought is a major limiting factor for crop production. Many reports have described Bambara groundnut as a drought resistant crop, however limited evidence exists on the particular extent of resistance and the specific traits and physiological processes that enable it be resist drought relative to other important leguminous crops. Three important areas that have received relatively little research attention include root responses to drought, biochemical processes and the water use characters amongst bambara groundnut landraces. In order to improve the yield and fully exploit the potential of bambara groundnut, a more thorough understanding of the underlying mechanisms in response to drought is needed.

Objectives

The aim of this work is to investigate metabolic and physiological traits associated with Bambara groundnut adaptation in different environmental conditions. The work will aim to investigate the behaviour of roots of bambara groundnut landraces in response to drought conditions, explore biochemistry, such through plant hormones such abscisic acid (ABA), in drought conditions and to properly determine and quantify water use of landraces.

Methodology

Landraces from Africa and South East Asia will be grown in different water regimes at growing facilities at the University of Nottingham Malaysia campus. Four landraces have so far been selected based on germination rates (IITA 686, Ankpa 4, Nav 4 and Burkina) whilst more will be considered in the future. A variety of physiological measurements will be taken, including stomatal conductance, chlorophyll content and photosystem II activity, as well as taking samples for ABA analysis and water use measurements (water use and transpiration efficiency). In order for proper root investigation plants will be grown in columns.

Outcomes

The study aims to improve understanding of the variety of drought-induced physiological responses that exist amongst landraces, as well as further insights as to how bambara groundnut differs from other legumes. Doing so will add weight to advocacy efforts to promote bambara groundnut as a potential food security crop for drought prone countries, especially in Africa, as well as contribute valuable knowledge needed for selecting superior genotypes that can be used in breeding programmes.