



Zimbabwe Plant Breeders Association

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ZPBA NEWSLETTER Issue 1 of 2021

Zimbabwe Plant Breeders Association
Innovative - Creative - Classic

Date: 05 MAY 2021
(9:00-12:00hr)

VENUE: ZOOM
(Meeting ID: 984 5160 8301
Passcode: 574197)

Hosted by

THEME: ENHANCING GENETIC GAINS TO BOOST CROP PRODUCTIVITY & QUALITY IN THE FACE OF CLIMATE CHANGE & DISCERNING MARKETS

Time: 5 May, 2021 09:00 Harare, Pretoria

Join Zoom Meeting

<https://zoom.us/j/98451608301?pwd=cUxnMklicVpYdkVGVDI5MFBmbzdpZz09>

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1. FOCUS ON YOUNG AND UPCOMING PROFESSIONALS

a. ENHANCING DROUGHT TOLERANCE AND CARBON SEQUESTRATION IN WHEAT BY IMPROVING THE ROOT SYSTEM

by



Isack Mathew
African Centre for Crop Improvement
University of KwaZulu-Natal
PBag X01 Scottsville 3209
Pietermaritzburg
Contact: isackmathew@gmail.com; +27 60 350 9533

I am an alumnus of the University of Zimbabwe having graduated with a BSc. Honours in Agriculture from the department of Crop Science. I did my MSc studies at the University of KwaZulu-Natal (UKZN) of South Africa. I went on to enroll for PhD studies at the African Centre for Crop Improvement (ACCI) of the UKZN in collaboration with the Institute of Research and Development in Paris, France (IRD) with funding from the Water Research Commission of South Africa (WRC) and National Research Foundation of South Africa (NRF). My interests are in rooting systems of crops for drought tolerance and carbon sequestration hence for my PhD studies investigated the possibilities and benefits of optimizing biomass allocation and improving the root system of wheat.

In almost all the cases, the ultimate objective of plant breeding is to increase yield productivity. However, that end goal is achieved using different strategies and approaches. Traditionally, yield gains have been achieved by improving secondary traits related to grain yield. Unfortunately, much focus has been to above ground traits such as plant height, tillering capacity, and high-density tolerance among others to the detriment of below ground traits including root biomass and architecture. Over the years, breeders have paid less attention to roots partly because of the difficulties associated with root phenotyping and less regard for indirect benefits derived from improved root systems compared to the direct benefits from traits such as high harvest indices.

The benefits of improved root systems are numerous and include ecosystem services such nutrient and water recycling in the soil, support for microbial activity for symbiosis and improved tolerance to edaphic constraints. Old and obsolete varieties have prolific root

systems that rendered more drought tolerant but gradually they have been replaced by modern cultivars that have high harvest indices but are highly susceptible to abiotic stresses especially drought and nutrient deficiency stress. Over the years, there has been extensive selection within a narrow genetic base in many national programs especially for elite crops such as wheat and maize that enjoy huge amounts of attention from the research community. Consequently, their genetic diversity for root traits has diminished considerably to levels of concern in the face of climate change. It is against this backdrop that a project focusing on assessing genetic diversity for rooting ability was initiated to respond to the needs for improved cultivars.

It was envisaged that improving the root system in wheat would provide a double-pronged solution to poor soil health and drought stress challenges. The improved root system will increase exploration for soil moisture especially in sub-Saharan where wheat is established with residual moisture from preceding summer season and has to contend with terminal drought stress later in the winter season. On the other hand, the deeper and denser root systems have higher ability to sequester carbon into the soil. This is a rather off-spin benefit that farmers rarely think about. Farmers are rather more concerned with high yield varieties but such varieties often fail to reach their potential because of poor soils and lack of water availability. It is also relatively harder to convince farmers to change their agronomic practices and adopt new technologies that promote zero tillage, cover cropping, mulching or afforestation to sustain the environment than it is to promote new and improved cultivars. So, if the new cultivars are “climate-smart” and possess inherent ability to improve the soil, reduce carbon emission from agricultural lands and contribute to removing atmospheric carbon dioxide, it would improve sustainability. In the long term, less fertilizer and irrigation application will ensue following improved soil health and better water retention due to larger and denser root systems. In line with modern breeding techniques, molecular characterization of a large panel of genotypes was undertaken to identify quantitative trait loci and devise marker assisted breeding for future programs. The project laid the groundwork for breeding and I spent time evaluating available genetic diversity for the end goal. This work is on-going and has been continued by other researchers and is part of a project funded by the WRC.

After my PhD studies, I took up a postdoctoral research post within the ACCI where I have been responsible for assisting students with research methods and design, data analyses and thesis write-up among other responsibilities. There have been both challenges and growth opportunities. The main challenges include interpersonal management, dealing with huge workloads and meeting deadlines for projects. Being young and relatively inexperienced, postdoctoral research is a training ground to manage and mentor a team. Despite the challenges, it has helped improve my people management skills in mentoring, planning and implementation of projects. I am grateful for the opportunities and funding that I received along my academic journey. I would encourage young researchers to take up opportunities with research organizations in other countries. This provides an important multidimensional perspective on how others operate, gives insight into work that has been carried out by others and also provides opportunities for future collaborations, especially for those who wish to pursue careers in academia. Such skills, in one way or another, would help the plant breeding and seed sector in Zimbabwe

b. IT TAKES THE CONTINENT TO TRAIN WELL EQUIPED BREEDERS TO MEET CHALLENGES- A Zimbabwean student advocating for mainstreaming African Crops in mitigating climate change and enhancing dietary diversification

by

Josephine Pasipanodya (Contact: jospasy@gmail.com)

Josephine Pasipanodya is a Zimbabwean national, and a recipient of the European Union Intra Africa Mobility Scholarship scheme for the genetic improvement of African Orphan Crops – MoBreed. Under the project she is hosted by the University of Namibia, which is part of a consortium with partner Universities namely: University of KwaZulu-Natal – Republic of South Africa, Ebonyi State University - Nigeria, Jimma University – Ethiopia and University of Abomey Calavi – Benin Republic. Faced with climate change and rapid population growth, most parts of Africa are food insecure and malnutrition is rampant. In a quest to develop climate ready varieties and to promote diversification of cropping systems, the human skill in plant breeding and seed systems is inadequate. MoBreed seeks to train high profile plant breeders capable to develop cultivars of African crops and stimulate seed systems that meet stakeholders' needs in the face of climate change.

Josephine's crop of focus is bambara groundnut (*Vigna subterranea* (L.) Verdc), a crop better suited for marginalized environments, densely packed with nutrients, and fitting diverse cropping systems. Her research seeks to improve food, nutritional, and climate change resiliency in semi-arid environments, typical of Northern Namibia, through exotic germplasm introduction and unlocking adaptive features for drought tolerance. To date, she has identified farmer preferred varietal preferences and production bottlenecks in bambara groundnut production regions, characterized local and exotic accessions using phenotypic and SNP markers, and ongoing evaluation of candidate lines to serve as donor parents for drought adaptation breeding programs.

Through her academic pursuit and work-based learning, Josephine identifies her role and expertise being in pre-breeding and trait discovery and welcomes collaboration and opportunities in genetic conservation and utilization. Her first encounter with plant breeding was at her BSc (Hons) degree in Horticulture at the Women's University in Africa partially funded by Joshua Nkomo Scholarship (Higher life Foundation). During her studies she had further exposure when she had with an internship placement at the Department of Research and Specialist Services Crop Breeding Institute. She enrolled for a Masters in Plant Breeding degree at the University of Kwa-Zulu Natal, funded by the Bill and Melinda Gates Foundation through the AGRA Improved Masters in Cultivar Development for Africa (IMCDA) scholarship, and this further shaped her skills and generated a pronounced appreciation of plant breeding in agriculture. For her Masters studies she focused on the evaluation of CIAT regional common bean Angular leaf spot collection in KwaZulu-Natal and the establishment of the mode of inheritance of Angular leaf spot disease on parental lines often used by South African breeders. Josephine takes on a multi-disciplinary approach utilizing molecular tools, quantitative genetics, farmer' inclusion in varietal development, robust phenotyping, and ICT (crop imagery classification and machine learning) in generating novel information.

As a postgraduate international student, she is grateful for the funding opportunities and bilateral arrangements within African member states which facilitate conducive study environments and knowledge sharing amongst experts. “Environments are dynamic and present various challenges to crop production, working in different landscapes and ecologies has equipped me with a diverse set of skills and breeding for various abiotic and biotic stresses”, say Josephine. She believes in hard work, pays attention to detail, and networking.

Ms. Pasipanodya acknowledges her mentors- Professor Rob Melis, Dr. Deidre Fourie, and her academic supervisors- Dr. Lydia Horn, Professors Julia Sibiya, and Enoch Achigan-Dako, as well as various research centers, notably the Agriculture Research Council - South Africa, Pro-Seed (Pvt) Ltd – South Africa, Mashare Agriculture Development Institute – Namibia, International Institute of Tropical Agriculture (IITA), GRC - Ibadan, University of Namibia, BECA-ILRI hub in Kenya and several SADC national genebanks.



Featured Ms. Josephine Pasipanodya at one of the trial sites at Mashare Agriculture Development Institute - Kavango Namibia.

c. A JOURNEY TOWARDS PLANT BREEDING

by

Rachel Magaya (Contact: rachelmagaya84@gmail.com ; +263 77 321 5608)



i) Rachel work settings during the week



ii) Rachel student settings during weekends

The sky is indeed not the limit for Rachel, a student member of the Zimbabwe Plant Breeders Association and an Msc Crop Science (Plant Breeding) student at Marondera University of Agricultural Science and Technology (MUASt). Here she shares her experiences of studying locally as a mature student during the weekend whilst going to work.

Not all things come by chance, hard work, dilligence and discipline are the core pillars of most successful people. To most formally employed individuals, Friday evenings hold a special place in their families' lives as they look forward to a restful weekend. But not so for Rachel who defied the odds sacrificing family time and rest in pursuit of her dreams and goals, burning the midnight oil studying stretched and consumed her weekend time. Weekend degree studies had been growing in popularity, because they have allowed people to hold on to their jobs as they pursue further studies to attain extra vital qualifications to boost their CVs. Rachel joined this growing trend and her training at the Women's University was the starting point of enduring weekend classes in which she soldiered on to accomplish what most people deemed difficult. Rachel obtained a first class for a BSc Honours in Agriculture degree with Women's University in Africa (WUA) in 2018. Without wasting any precious time, she immediaditely enrolled at Marondera University of Agricultural Science and Technology in 2019 to pursue her Masters studies in Plant Breeding where she currently in her final year.

Catching on to the trend, Marondera University had just launched a new suite of weekend courses and classes in 2018 leading to a range of undergraduate and post-graduate degrees. These classes were being conducted during Saturdays and Sundays giving students the opportunity to carry out employment duties or other livelihood activities as well as enough time to do assignments and research projects during the weekdays. The time-tables were set in advance allowing for distance-learning support in-between and field trips with a dissertation in the final year. Such an approach suited well a mature student like Rachel because she would then better plan her activities. Rachel looked forward to and enjoyed the field trips component of her studies. The trips to the National Bio-Technology Authority of Zimbabwe, The Department of Research and Specialist Services (DR&SS) stood out because she got the practical experience in molecular techniques and plant breeding principles.

In her final year, she got an attachment opportunity with the DR&SS under the Crop Breeding Institute(CBI) maize section and this exposure further stired her interest in plant breeding. Under the mentorship of Dr Simango (MUASt) and Mr Matova (CBI), Rachel carried out her research study on the adaptability and stability of CBI new elite maize (*Zea mays* L.) hybrids in diverse environments around Zimbabwe. The CBI produces several maize hybrids yearly and these need to be evaluated for adaptability and stability before release. In her study, 20 newly developed maize hybrids were evaluated across six sites in Zimbabwe for grain yield and other related traits. Apart from contributing to the data for variety release, the study will also help farmers in choosing varieties which are best suited for their environment.

The journey as a mature student studying locally has not been easy considering that she still had a full time job and a mother to two, the youngest was 5 months old when she started her studies. Furthermore, with no scholarship opportunity, they had to work hard as a family to ensure that her tuition fees were paid on time. Rachel had to forgo most of the social activities such as family events, church gatherings as she focused on her studies. She has been fortunate to have the support of her family as well as from work.

With the inspiration from Dr Shava (SADC Plant Genetic Resources Center), Dr Simango (MUASt), Dr Tibugari (Lupane University) and Mr Matova (Mukushi Seeds) she has managed to perserver and the end is just around the corner. After completion of her Master's degree, Rachel is aiming to get an opportunity to practice as a plant breeder, which will be a total change in career as well as to go for PhD studies.

'My word of advice to women and young breeders is that nothing comes without hard work and you need to be persistent. Age is just a number when it comes to adult learning, it is never too late to learn new things. Personally I will be shifting from the health sector to agriculture' said Rachel in closing.

2. UPCOMING EVENTS

i. ZPBA Annual Event 2021



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TOBACCO RESEARCH BOARD

ZPBA ANNUAL EVENT 2021

THEME: ENHANCING GENETIC GAINS TO BOOST CROP PRODUCTIVITY & QUALITY IN THE FACE OF CLIMATE CHANGE & DISCERNING MARKETS

TOPIC	PRESENTER
TRB virtual tour	TRB
Theme 1 - FOCUS ON CONCEPTS	Thematic Convener – Dr. Pepukai Manjeru, MSU
Plant breeding goes microbial	Dr. Frank MAGAMA, TRB
Towards accelerating genetic gains, optimisation and delivery	Dr. Hapson MUSHORIWA, ICRISAT-ZW
Value of Plant Quarantine in the protection of crop genetic gains from exotic pests: Implication on trade and cross border movement of germplasm	Mr. Nhamo MUDADA, PQSI
HEALTH BREAK	
Theme 2 CROP SPECIFIC	Thematic Convener – Dr. Benhildah MASUKA, SeedCo
Status of research in the Zimbabwe Sugarcane Industry	Dr. Leo MPOFU, ZSAES
“Novel hybrid product system that results in improved seed purity and increase yield”	Dr. Jill CAIRNS, CIMMYT
Towards improved varieties of African Indigenous Vegetable in Zimbabwe	Dr. Kennedy SIMANGO, MUAAT
Tobacco Wood Energy Program (TWEP): an initiative promoting indigenous tree conservation	Mr. Pomerayi MUTETE, Forestry Commission

ii. **APBA 2021 Conference**

- Theme '*Accelerating genetic gains in plant breeding for resilience and transformative food systems and economic growth in Africa.*' It will be an online event. Registration is now open. Call for abstracts closes on June 15 2021. Visit APBA Website: <https://africanplantbreeders.ug.edu.gh> for more details
- The ZPBA wishes to support participation of one postgraduate student at the conference. To this end we are running a competition to select a student who comes up with the best abstract/presentation. This is open to currently registered postgraduate students who are either Zimbabwean citizens OR registered at a Zimbabwean university studying a relevant degree program. To enter submit an abstract by 15 May, 2021. Those selected will then be asked to prepare and submit a presentation. For more details contact Mr. Tatenda Mayaya (tatendamayze@gmail.com) or Dr. Casper Kamutando (kamutandocn@gmail.com)

iii. **CALL to celebrate FAO International Year of Fruit and Vegetables**



For more information visit [The best thing about fruits and vegetables? Their diversity! | FAO Stories | Food and Agriculture Organization of the United Nations](#)

And view <https://youtu.be/6CZ9mF8EaLl>

Share your thoughts on how we can mark this FAO International Year of Fruit and Vegetables as ZPBA email zimplantbreedersassociation@gmail.com; call or WhatsApp +263 (0)784 618719



Contact Us

Telephone: +263 (0)784 618719 (send your name if you want to be on the ZPBA WhatsApp group)

Email: zimplantbreedersassociation@gmail.com

Website: <http://zgba.org.zw/>

You are receiving this e-mail because you are active or interested in plant breeding or plant breeding related fields. If not and would not like to continue receiving communication from ZPBA, then email 'unsubscribe' to zimplantbreedersassociation@gmail.com

WHO IS ZPBA

ZPBA is a **membership-based, not-for-profit, non-political, professional association** of Zimbabweans based locally or abroad active or interested in plant breeding and/or plant breeding-related fields (e.g. seed agronomist, seed inspectors, seed technologists, geneticists, germplasm conservation specialists, biotechnologists, molecular biologists, etc.) launched on the **26th of January, 2016** at Holiday Inn, Harare with financial assistance from FAO.

ZPBA is legally registered as a **Trust** in Zimbabwe: registration number 1791/2018. The **ZPBA Board of Trustees** consists of the elected **Executive committee of the ZPBA** who are bound by the Trust Deed and the ZPBA Constitution.

Membership benefits include

Professional and personal development;
Shared costs on human resource development; Networking; **Timely Communication (especially for events, internships, job vacancies, scholarships);**
Voting rights; **Discounted rates for events;**
Sense of pride in the profession and industry

WANT TO BE A SUBSCRIBED MEMBER?

What are you waiting for, visit [Apply for Membership – Zimbabwe Plant Breeders Association \(zgba.org.zw\)](http://zgba.org.zw/). Pay your subs and receive your unique membership ID.

THANK YOU SUBSCRIBED MEMBER

Thank you to members who continue to pay their subscriptions as well as those who support fundraising initiatives. Your contributions make it possible for your association to keep going.