



Zimbabwe Plant Breeders Association

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ZPBA NEWSLETTER Issue 3 of 2023

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APBA 2023 Conference in Morocco in pictures



1. Zimbabwean Agricultural Scientists Shine at the APBA Conference in Benguerir, Morocco

Compiled by



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Figure 1: Zimbabwean participants): **Kneeling (left to right)** Dr. Oswell Ndoro, Dr. Sydney Mavengahama, Dr. Frank Magama. **Standing (left to right)** Prof. John Derera, Ms. Ronica Mukaro, Dr. Lenin Musundire, Mr. Dean Muungani, Dr. Godfrey Chigeza, Dr. Rufaro Madakadze, Prof. Pangarayi Benard Tongoona, Prof. Julia Sibiya, Prof. Kingstone Mashingaidze and Dr. Claid Mujaju **Not in the picture** Prof. Ngonidzashe Chirinda, Dr. Vimbai Chimonyo, Dr. Godwill Makunde, Dr. Catherine Ziyomo, Ms. Olga Mavankeni, Mr. Tinotenda Gonhi

INTRODUCTION

Plant breeding associations such as the Zimbabwe Plant Breeders Association (ZPBA) and the African Plant Breeders Association (APBA) are committed to practical solutions, capacity building, and problem-solving, leading to long-term strategic development in the plant improvement field. By leveraging the expertise and dedication of scientists, students, and professionals, Africa is on its way to revolutionizing crop improvement and enhancing the seed sector, ultimately contributing to sustainable agricultural production, food and nutrition security, and improved livelihoods across the continent.

The APBA organises biennial conferences, with the most recent held from 23 to 25 October 2023 in Marrakech, Morocco which built on the success of previous APBA conferences in Accra, Ghana (2019), Kigali and Rwanda (2021). These inclusive gatherings provide a unique platform for plant breeders, researchers, students, private companies, and policymakers to network, exchange knowledge, discuss research findings, and showcase achievements.

ZIMBABWE WINS THE BID TO HOST APBACON'25

The ZPBA secured the bid to host the next APBA conference in 2025, beating the bid the Nigerian Plant Breeders Association as was announced during the just ended APBA 2023 conference in Morocco. In an acceptance speech, Dr. Frank Magama, CEO of Kutsaga and President of ZPBA, indicated that, "*Zimbabwe is excited and ready to host the event in the magnificent Victoria Falls. We received significant support from the Government of Zimbabwe, specifically the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development, and the Zimbabwe Tourism Authority.*" Efforts are currently underway to attract potential donors for the 2025 conference.

ZIMBABWEAN SCIENTISTS CONTRIBUTIONS AT THE 2023 APBA CONFERENCE IN MOROCCO

The exceptional contributions of Zimbabwean agricultural scientists who participated in the recent APBA conference in Morocco, deserve special recognition. Esteemed individuals demonstrated exemplary leadership, expertise, and unwavering dedication to advancing crop improvement and the seed sector in Africa. Their participation reaffirmed Zimbabwe's strong commitment to agricultural research, capacity building, and the cultivation of partnerships to address the continent's challenges. Zimbabwean agricultural scientists took centre stage with at least six participants giving oral or poster presentations, several participating in high level panel discussions and chairing, as well as delivering keynote addresses. Dr. Claid Mujaju gave a keynote address on Seed systems and Germplasm conservation. Dr. Vimbai Chimonyo, Ms. Ronica Mukaro, Dr. Godwill Makunde, Dr. Lenin Musundire, Dr. Godfrey Chigeza also gave well received presentations. Prof. John Derera, Prof. Pangirai Tongoona, Dr. Oswell Ndoro, Dr. Rufaro Madakadze, Dr. Mujaju and Prof. Julia Sibiya participated in a panel discussion. Zimbabwean participants were a good mix of age and gender with both private sector, public sector and international organisations well represented.

ZIMBABWEANS ELECTED AND HONOURED AT APBACON'23

Our own-Prof Julia Sibiya, was elected as the new President of APBA, demonstrating her leadership and recognition within the plant breeding continental community. Additionally, Mr. Dean Muungani, assumed the role of the new general secretary. The conference also recognized the remarkable achievements of two renowned Zimbabwean scientists. Prof Pangirayi Tongoona received an award for his outstanding contributions to training plant breeders in Africa, leadership, and research. Dr. Rufaro Madakadze was honored for her significant role in establishing APBA and her unwavering support for plant breeding training in Africa. These accolades underscore the profound impact Zimbabwean scientists have made in advancing agricultural research and development in the continent.

In the following sections, we will delve into the individual biographies and notable achievements of the four Zimbabwean scientists who were elected or received awards at the conference.

1. Prof. Julia Sibiya: A Leading Plant Breeding Expert

Prof. Julia Sibiya is an Associate Professor of Plant Breeding and the current Dean and Head of School (Acting) of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal (UKZN), South Africa. With over 30 years of experience in academia, she has made substantial contributions to the field of plant breeding. She has mentored over 70 graduate students and co-authored more than 120 research articles in international peer-reviewed journals. She has played a pivotal role in coordinating various plant breeding projects, including the Improved MSc in Cultivar Development for Africa (IMCDA), funded by the Alliance for a Green Revolution in Africa (AGRA). Prof. Sibiya is actively involved in mobility programs, e.g. the EU-funded Mobreed, which focuses on enhancing training and research mobility for underutilized crops breeding in Africa. She is an alumnus of the African Centre for Crop Improvement (ACCI) in South Africa and UC Davis African Plant Breeding Academy and serves on the Board of Directors for Div Seek International Network Inc. Her academic background includes a BSc. Honours in Crop Science from the University of Zimbabwe, an M.S in Plant Pathology-Virology from The Ohio State University, and a Ph.D. in Plant Breeding from the UKZN.



"I am truly grateful to the APBA members for placing their trust and confidence in me to serve as the next President for the 2023-2025 term. I do not take the responsibility lightly and I promise to work with the Plant Breeders from various countries, institutions, private and public sector and CGIAR in finding solutions to the global challenges we are facing in the agricultural sector and contribute to solving the food security issues. I'm looking forward to working with the ZPBA in organising the 4th APBA Conference in Victoria Falls, Zimbabwe."

2. Mr. Dean Muungani: Bridging the Gap between Research and Seed Systems

Mr. Dean Muungani, who is currently serving as a Product Manager for Grain Crops at the International Institute of Tropical Agriculture (IITA), is an expert in plant breeding and seed systems. He holds a Master's degree in Business Administration and Plant Breeding and Seed Systems, along with a BSc Honors degree in Agriculture (Crop Science). Mr. Muungani has a rich background in maize breeding, having worked as a Maize Breeder and Research Officer at the Crop Breeding Institute before joining private seed companies. His roles include being a Research Manager and Maize Breeder at Agriseeds (Pvt) Ltd., Senior Maize Breeder and Head of Product Development at Seed Co Limited. Mr. Muungani's expertise lies in establishing research departments and driving product development to address the needs of farmers, consumers and seed companies. He was instrumental in the formation of the ZPBA in 2016 serving as its President from 2018 to 2019, and the formation of the APBA in 2019 and has been serving as an Executive Committee member. He was recently elected to the position of General Secretary for the APBA at the recently concluded biennial congress in Marrakech, Morocco.



"I am deeply grateful to the APBA for granting me this remarkable opportunity. I am equally thrilled by the news that the ZPBA will be hosting the esteemed APBA conference in Zimbabwe. This highly anticipated event provides our scientists with an invaluable opportunity to gain insights from cutting-edge global research in plant breeding and related fields, while also fostering connections with renowned scientists from around the world. Moreover, it offers international scientists a chance to explore Zimbabwe's scientific advancements and tourism attractions."

3. Prof. Pangirayi Benard Tongoona: A Distinguished Plant Breeding Scholar

Prof. Pangirayi Tongoona is a highly accomplished and influential figure in plant breeding and genetics. He earned his PhD in Plant Breeding and Genetics from the University of Zimbabwe (UZ) in 1987 and currently holds prestigious positions including Professor of Plant Breeding and Genetics, Plant Breeding Consultant, and Associate Director (Breeding Programmes) at the West Africa Centre for Crop Improvement (WACCI) at the University of Ghana (UG). He is also an Honorary Professor at the University of KwaZulu-Natal (UKZN). Prof. Tongoona has mentored and graduated 110 PhD and 50 MPhil/MSc students from various African countries specializing in Plant Breeding, Genetics, and Seed Science and Technology. His research, comprising numerous peer-reviewed articles and conference presentations, has been recognized and supported by substantial funding exceeding \$8 million. Notably, he played a key role in the release of three maize hybrids in 2017 while leading the plant breeding team at WACCI, UG. Prof. Tongoona has been invited as a visiting researcher to renowned institutions such as Michigan State University, Cornell University, Purdue University, Texas A&M University, and the University of Botswana. He has also served as an External Examiner for Crop Science programs and held editorial roles for esteemed journals. Prof. Tongoona's exceptional contributions have earned him life membership of the ZPBA in 2018 and the prestigious Meritorious Award from the APBA in October 2023. His expertise is sought after by organizations like the AGRA and CIMMYT, solidifying his influence in the agricultural sector.



“I am thrilled that the ZPBA has emerged victorious in its bid to host the esteemed APBA conference in 2025, set against the stunning backdrop of Victoria Falls. This triumph opens the door to a momentous occasion where researchers from across Africa and beyond will convene to exchange their extensive knowledge and experiences in genetics and crop improvement. Moreover, the conference promises to be a catalyst for bolstering tourism in Zimbabwe, showcasing its rich offerings to an international audience.”

4. Dr Rufaro Madakadze: Driving Education and Training for Crop Improvement

Dr Rufaro Madakadze serves as a Lead Capacity Building and Technical Support in the Seed Systems Program at AGRA. She is a horticultural scientist specializing in seed science with a strong background in crop sciences, acquired through her studies at Michigan State University and the University of Guelph, Ontario. Dr Madakadze's career includes teaching crop sciences at the University of Zululand, South Africa, and the University of Zimbabwe, where she also served as the Chairperson of the Department of Crop Science. She has mentored numerous postgraduate students and contributed to research projects supported by organizations like DFID, EU, UNU/INRA, and the Rockefeller Forum Foundation. She has managed capacity building and extension programs at AGRA in 15 countries that have resulted in the

training of more than 800 scientists, 150 research technicians, more than 1000 seed enterprises personnel, more than 20,000 village-based advisors who have reached more than 5 million smallholder farmers. Dr Madakadze's expertise has led her to serve on advisory committees and evaluation panels for research funding institutions.



“I was thrilled to receive the award, as it recognized the work I love: building capacity to empower African institutions and people, ultimately enhancing smallholder farmer food security and incomes. I am grateful to have had the opportunity to contribute to this cause, both in Zimbabwe, South Africa, and across the continent, through my work at AGRA.”

2. CONTROL PLOTS - A SEED QUALITY ASSURANCE TOOL AS IMPLEMENTED IN ZIMBABWE

By

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INTRODUCTION

Pre and Post Controls are one of the cornerstones of Organization for Economic and Cooperation Development (OECD) varietal seed certification. Growing of control plots is a quality assurance tool for assessing varietal identity and genetic purity of seed-lots.

Control plots are used to monitor the identity and purity of a variety, at various stages in the seed multiplication programme, thereby assuring National Designated Authority (Seed Services) that the quality of seed produced by seed companies in the OECD Schemes is of a satisfactory level.

The control plot tests are designed to answer two questions:

- (a) Does the sample generally conform to the description of the variety, thereby confirming its identity?
- (b) Does the sample conform to the published standards for varietal purity, which is the genetic purity?

The first question can be answered by making a visual comparison between the control plot, sown using a sample of seed representative of the seed lot, and a plot grown from a reference sample, referred to as the “Standard Sample”, usually submitted during official release of the variety or requested from breeders.

The second question requires the identification of off-type plants within the control plot so that their numbers can be related to the standards published in the OECD Seed Schemes. This test measures the uniformity of the seed lot and determines whether or not the characteristics of the variety have remained unchanged during seed multiplication. It will also indicate the effectiveness of limiting the number of crop generations.

PRE CONTROL TESTS

Pre-control plot is variety verification of early generations: Pre-basic + Basic seed [and Certified Seed Generation 1 (C1) where it is used as parental seed]. They provide information on varietal identity and varietal purity that is essential for the next generation that grows from it. They also support the field inspection of the following generation, as well as identify varietal identity and varietal purity problems at an early stage (before they become a major problem).

A Pre-control test, is grown simultaneously with the seed crop of the following generation. Rouging is not allowed in control plots, off-type plants are labelled to avoid re-counting. There should be conformity between the pre-control plot results and those from the field inspection, but if the results do not conform, a pre-control result overrides inspection results.



Fig 1. Examples of labeled off-type plants in pre-control plot

POST CONTROL TESTS

Post control is a term applied to variety verification of Certified Seed which is not for further multiplication. In the year that plots are being grown, the Certified Seed has been sold and test results will come too late for remedial action (unless the seed lot or part of it has not been marketed). Post control tests monitor the efficiency of the seed production process in maintaining varietal identity and purity.

By comparing the control plot and the plot sown with the Standard Sample, the National Seed Authority Monitors the quality of the seed, Checks whether minimum standards are being met, and Identifies ways on how the system can be improved.



Fig. 2 Examples of the traits that are checked in maize

ESTABLISHING CONTROL PLOTS

When establishing control plots consider the cropping history of the land and ensure there is:

- No risk of contamination from volunteer plants of the same or closely related species,
- A good crop rotation plan must be put in place.

Seed companies plant Control plots under the supervision and guidance of Seed Services. Seed Services shall provide planting instructions for control plot growing. The target should be 100% of parental seed lots used in seed production fields should have control plots (pre-control) and at least 5% of certified seed lots (post control).

CONTROL PLOT LAYOUT

As for the layout, the control plot tests should be designed in such a way that observations **can be easily made**. A simple layout with all samples of the same variety grouped together provide the best basis for comparison with the Standard Sample. A variety or a parental line in question must be planted next to next by standard (**reference sample**). **It is also an advantage to put similar varieties in close proximity to highlight differences that exist between them.**

Within a particular variety, recording is easily facilitated if related seed lots, which share the same antecedent, are sown in neighboring plots. In this way contaminants seen in one plot can be readily examined for their presence in adjoining plots.

The plots may be duplicated in another part of the field so that additional data can be obtained.



Fig 3. Example of control plot layout of different crops



Fig 4. Example of control plot layout with uniform crop

INTERPRETATION OF RESULTS

Interpretation of varietal purity results depend on the sample size and the reject table below shows the number of off-types (reject numbers) for a given sample size as they relate to varietal purity. A sample is rejected when the number of off-type plants is equal or greater than the reject number for a given population/sample size.

Table 1: Reject numbers for various sample sizes and varietal purity standards

Sample Size (plants)	Varietal Purity Standard				
	99.9%	99.7%	99.5%	99.0%	98.0%
	Reject numbers (plants)				
200	-	-	4	6	9
300	-	-	5	7	11
400	-	4	6	9	14
1000	4	7	10	16	29
1400	5	9	13	21	38
2000	6	11	16	29	52
4000	9	19	28	52	96

- The (-) indicates that the sample size is too small for a valid test.
- The reject numbers in white background are less reliable because the sample size is not large enough.
- The reject numbers in green background are reliable because the sample size is large enough.

DOCUMENTS

Traceability of seed documents (sampling and inspection reports) is important for it will allow for trackability and traceability of seed lots. Tracking allows for identity preservation and quality assurance while traceability allows for problem solving, both are essential for seed quality assurance as provided for by control plots.

IMPORTANCE OF OECD SEED SCHEMES

- OECD provide international framework for the production of high quality seed to facilitate seed trade and encourage use of high quality seed in participating countries/member states.
- Participating countries agree on harmonized procedures for production, processing and trade including procedures for control plots.
- OECD also enhances cooperation and understanding between parties e.g. importing and exporting countries, public and private sectors, and other international organizations.
- This international harmonized system increases market confidence and hence enables our local seed companies to access commercial world seed markets.

Zimbabwe has been a member of the OECD Seed Schemes since 1992 and therefore subscribes to the OECD context of certified seed. Seed Services Institute is the National Designated Authority for the OECD Seed Schemes hence their role in control plots.

3. UPCOMING EVENTS

1. ZPBA Annual Event 2024

- Traditionally this has been held within the first quarter (ideally in January) annually and the 2024 event will include elections for ZPBA leadership and a ZPBA Honorary Membership Award.
- The theme for the ZPBA 2024 annual event is '***Harnessing the genetic potential of crop species for enhanced food production and nutritional security under climate change in Zimbabwe***'
- The program will include presentations from seasoned scientists and also from students. There will be awards for best student presentation. For presentations contact Dr. C. Kamutando (+263 71 323 2033; kamutandocn@gmail.com) or contact him using ZPBA contact details.
- Various institutions including local seed companies, ARC, CIMMYT, CTDO, MSU SEQART, TRB, UZ contributed financially and in kind to hosting the event in the past. For all (individuals & institutions) who wish to partner and/or sponsor the event to contact Dr Thoko Ndhlela (+263 78 200 5471; T.NDHLELA@cqjar.org) or contact her via ZPBA contact details

2. APBA 2025 Conference in Zimbabwe

- Calling on volunteers to be part of the organizing committee – ZPBA needs you
- It is also time to work on your presentations, seek sponsorship to participate-don't leave it till the last minute.
- **You are encouraged to participate in one way or another**

3. Call to be a subscribed (paying) member of ZPBA

- ❖ This is a call to be a subscribed member and pay your annual subscriptions (10USD for students, 40USD for ordinary members, 250USD for corporates) – ZPBA needs the funds to keep the basic infrastructure running, particularly as it prepares to host APBA'25.
- ❖ For more details on membership and benefits visit [Memberships – Zimbabwe Plant Breeders Association \(zpba.org.zw\)](https://www.zpba.org.zw)



Contact Us

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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 \(zpba.org.zw\)](#). 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.