Zimbabwe Plant Breeders Association

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NEWSLETTER

ZPBA Newsletter Issue 2 of 2018

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1. WHO IS ZPBA- Zimbabwe Plant Breeders Association

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.

ZPBA hopes to contribute towards agricultural and industrial development in Zimbabwe through creating a platform for information exchange and sharing amongst plant breeders and related professionals, contributing towards policy dialogue, building capacity in both the public and private sector through relevant training.

ZPBA is governed by **an elected Executive Committee**, which **derives its powers** from the **membership** and functions through an **appointed Secretariat**.

Read more http://zimbabweplantbreedersassociation.org.zw/about-us/

2. IN THE NEWS

CELEBRATING ZPBA HISTORY MAKERS:

A CONTRIBUTION FROM THE FIRST PAID-UP GRADUATE STUDENT MEMBER – Fortunate Makore

2.1 The likely Impact of breeding for climate change effects on maize plant architecture and variety turnover

Fortunate MAKORE, a PhD Student at the University of Zimbabwe

Contact: 263 773708712; chiedza34@gmail.com

Climate change has resulted in increased daily temperatures, heat waves, shifting of seasons, shrinking of seasons, severe and frequent droughts in Eastern and Southern Africa. Maize productivity is expected to be greatly reduced by these environmental challenges. This is likely to influence maize plant architecture in tropical environments as observed in the USA corn-belt, where maize architecture shifted from drooping leaf architecture to more erect leaf to increase productivity through high population density. Therefore, regional plant breeders should focus on developing new and improved varieties that are adaptable to the expected climatic conditions.

Heat stress hastens plant growth and development as heat units are attained faster negatively impacting on yield due to reduced leaf area duration. Higher temperatures shorten crop duration resulting in less time to accumulate grain yield. Early maturing varieties tend to give relatively lesser yield and to overcome this it is paramount to breed plants with an architecture that tolerate high plant density to achieve higher yields. Grain yield can be increased by breeding for high plant density from the current 44000 plants per hectare towards the USA corn-belt levels of 100000 plants per hectare. This would inevitably result in changes in plant architecture, such as selection for short statured plants, strong stalks and roots that can withstand lodging under high population density. In addition, plants with erectophile leaves and small tassels would be selected for to reduce shading effects that compromise yield. Concomitant selection for drought stress tolerance would result in varieties with strong deep roots that are capable of extracting water and fewer leaves above the ear to reduce biomass. Maize plants with smaller tassels and fewer tassel branches are more tolerant to drought stress because they consume less energy, thus breeders should consider apical dominance of the tassel when selecting.

An example of a US corn maize field illustrating ideal crop architecture adapted to high population

In order to cope with climate change effects varietal turnover should be improved such that breeders would churn out new more adaptable varieties every five years. Such an approach would allow farmers to benefit quicker from the genetic progress. This would only be possible when breeders shift from traditional breeding methods that develop varieties in 10 to 30 years to new technologies such as doubled haploid technology and genomic selection that develop varieties in shorter cycles.

2.2 Morphological Diversity and Adaptability of Introduced Grain Amaranth Genotypes in Zimbabwe

GASURA Edmore (Dr) Senior Lecturer/ Plant breeder, Dept. of Crop Science University of Zimbabwe.

Contact details: gasurae@yahoo.com; +263 775862222

A. hypochondriacus (left) and *A.cruentus* (right)

A.cruentus (left) and *A.caudatus* (right)

Amaranth breeding programmes require well adapted and diverse grain amaranth genotypes. This project was conducted to characterize and to determine the adaptability of 18 grain amaranth varieties. The species *Amaranthus cruentus, Amaranthus hypochondriacus, Amaranthus hybridus and Amaranthus caudatus* were used in this study to assess their morphological diversity and adaptability. The study was carried out

in three locations in Zimbabwe in the 2013/2014 rainy season. The locations were grouped according to their agro-ecological regions, that is, region II, III and IV. A 6x3 alpha lattice design with three replications was used.

Quantitative traits of the grain amaranth were subjected to analysis of variance and there were highly significant differences ($p < 0.001$) on grain yield, plant height at flowering, number of panicles, inflorescence length, plant height at maturity, number of days to flowering, number of days to maturity and number of branches for the genotype by environment interaction. There were significant differences ($p < 0.05$) amoung environments on the measured quantitative traits except number of branches and plant height at maturity. There were significant differences ($p < 0.05$) amoung genotypes in number of panicles and number of branches.

Qualitative traits that were collected in the study include leaf colour of immature and mature plants and two dominant colours were observed (green and red). There was no variation in stem colour, all genotypes had green stems. There were four seed colours observed in the amaranth species and these colours were black, pink, dull white and shiny white.

Genotype plus genotype by environment interaction biplots showed that genotype 16 and 13 were the most stable and produced high grain yield across environments. Harare was also identified as the most ideal testing site for grain amaranth in Zimbabwe. Molecular work is recommended to complement phenotypic studies of grain amaranth in future studies.

Figure 2.2 Possible height of *A. hybridus* (2.3m)

2.3 ZPBA Organised Plant Breeders course- Preparing and presenting variety release & supporting documents in Zimbabwe on 28 June 2018

The 28 June, 2018 Plant Breeders Training Course participants

A big thank you to the presenters

Dr. Dumisani Kutywayo (Director Crops Research Division, DR & SS, Chairperson Variety Release Committee) - **Official Opening and Welcome**
Dr. Claid Mujaju (Head of Seed Services, Secretariat for Variety Release Committee) - **Variety Registration**
Mrs. Tambudzai Chikutuma (Plant Breeders Rights Officer, Seed Services) - **Variety Protection**
Mrs. Patience Nyakanda (ZPBA Coordinator) - **Ethical issues around variety release**
Mr. Walter Chivasa (Business Development Manager for Southern Africa- Seed Co) - **Variety Release Proposal Structure**
Dr. Lewis Machida (Plant Breeding Consultant) - **Practical on Variety Release Proposal Preparation**
Dr Joe Mushonga (ZPBA ExCom) - **Objectives of the "Preparing and presenting variety release and supporting documents in Zimbabwe Breeders Course"**

2.4 CROP BREEDING INSTITUTE of DR&SS RELEASES TWO NEW "SUPER" DEMAND-DRIVEN BEAN CULTIVARS

Protea for canning purposes

NUA674 for nutrition

Read more: http://zimbabweplantbreedersassociation.org.zw/varieties/
And another bean related article: https://seedsystem.org/wp-content/uploads/2018/08/Reaching-the-Last-Mile-PABRA-experience-Buruchara-et-al.pdf

3. UPCOMING EVENTS

3.1 Seminar-**20 September, 2018 14:00hrs- 15:00hrs at UZ Dept. of Crop Science 'Molecular Breeding of Soybean' by Kristin Bilyeu** USDA/ARS Plant Genetics Research Unit, University of Missouri, Columbia, 'Soybean is an important crop worldwide, valued for the vegetable oil and high protein meal processed from the seeds, and also has been used directly as food. Soybean research has led to both increased yields and seed quality through traditional plant breeding and applied genetics, molecular biology, and genomics. My research efforts have been directed at increasing the functionality of the oil and meal components of soybean, and more recently to explore the expansion of soybean adaptation for high yield in more environments. Examples of such efforts are the discovery of the high oleic acid soybean oil trait, the high energy meal trait, and the combination of those traits into soybeans adapted to all major US soybean production environments …..' *Come and hear more*

3.2 Seminar- **4 October, 2018 at UZ Dept. of Crop Science "In Search of Excellence in Agriculture Research Management in Africa" by Prof Paramu Mafongoya.**

3.3 Training- **22-26 October, 2018. Statistics and Data Analysis Training Course** to be facilitated by CIMMYT Scientists.. *details will be posted closer to the date*

3.4 Fundraising- **End of November, 2018 ZPBA Fundraising Golf Tournament.** The objective is to raise funds towards ZPBA training initiatives. These training programs will capacitate breeders and expose them to the latest technological advances so that they address emerging issues like climate change, fall armyworm, tomato leaf miner etc. more precisely and efficiently as well as initiate local breeding programs for new or under-researched crops such as horticultural crops. Inviting participation through sponsorship, advertising on tees and greens, prize donations, items to raffle & auction etc. Contact C. Mumbire (0778 306 628) or L. Karadzandima (0774 721639)

4. ZPBA MEMBERSHIP

4.1 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

4.2 Membership Fees

The 2018 subscriptions are now due and these have been maintained at the previous levels.

The **categories and annual membership fees** are listed below:

i.	Ordinary membership	**$100.00**
ii.	Student membership	**$10.00**
iii.	Retired membership	**$50.00**
iv.	Corporate membership	**$250.00**

The fees can be paid quarterly or half-yearly but this will attract an extra $5.00 charge.

Banking details are as below

Account Name: Zimbabwe Plant Breeders Association

Account No.: 1096005470194

Bank Name: FBC Bank Limited; Branch: Borrowdale, Harare

Branch Sort Code: 8127; Swift Code: FBCPZWHA

NEW!!! Now you can also pay by Ecocash

Ecocash Merchant Code: 188268

Read more *http://zimbabweplantbreedersassociation.org.zw/membership/*

5. ZPBA CONTACT DETAILS

ZPBA mobile phone: + 263 (0)784 618719; (send your name if you want to be on the ZPBA WhatsApp group)
ZPBA email: zimplantbreedersassociation@gmail.com
ZPBA website: http://zimbabweplantbreedersassociation.org.zw/