

Scientists identify markers associated with resistance to the banana weevil borer

Scientists at [IITA](https://www.iita.org) and their collaborative partners have identified molecular markers associated with resistance to banana weevil—one of the most destructive pests of the crop that can lead up to 100% yield loss.

Identifying the markers on a crop's genome in a population derived from a cross from two banana accessions, "Monyet" and "Kokopo", will aid the development of resistant varieties—the most effective way to control the pest for resource-poor smallholder farmers. [to page 3](#)



The destructive banana weevil can cause up to 100% yield loss.

Researchers organize PVS workshop to improve African Yam Bean availability and enhance food security

To ensure food security and improve the nutrition of Africans, the Genetic Resource Center (GRC) organized a workshop on "Participatory variety selection of African Yam Bean (AYB)" on 20–21 December. The workshop aimed to provide enough seeds of AYB to farmers for increased income and food security. However, this has been hitherto impossible because there are no registered or officially released improved varieties of AYB in Nigeria, a prerequisite for commercial seed production within the formal seed system.



Morufat Balogun highlighting the workshop's objectives.

IITA West Africa Hub Director [Michael Abberton](#) appreciated the organizers for the excellent effort put into the workshop. He stated that the workshop would serve as a platform for interaction to improve the potentials of AYB.

IITA Seed Bank Manager Olaniyi Oyatomi mentioned some of the workshop's objectives and the workshop's outputs to significantly improve farmers' interest in traits and nutrients that are beneficial to the consumers. "We hope that AYB will be extended to the world and enhance nutritional security," he stated.

YIFSWA II Project Tissue Culture Specialist [Morufat Balogun](#), who managed the recently concluded "Beanpreneurs" project, noted that GRC collections of AYB were evaluated for their potential to mitigate the challenges associated with AYB. These challenges include long gestation, long cooking time, and short shelf-life of the tubers produced by some of the collections. On-station and on-farm trials are required before registration of varieties in Nigeria, so the workshop was to co-identify preferred accessions based on farmer and researcher perception using the current on-

station experiment. Furthermore, she explained that AYB could be intercropped with some staple crops such as yam, cassava, and maize to improve the soil fertility due to AYB's nodule-forming properties.

Wumi Jegede, a PhD student at the University of Ibadan and Research Fellow with the GRC, explained that the experiment's main objective was to understand how Genotype and Environment ($G \times E$) affects dry matter partitioning into seed and tuber in AYB. She highlighted that the experiment was carried out in Ibadan and Ikenne, using forty accessions collected all over Nigeria and randomized in three replicates. Furthermore, she mentioned that criteria for the selection included short gestation period, disease incidence, and seed and tuber yield in choosing the best variety for AYB.

Dr Ibidun Adetiloye, a Plant Breeder representing the National Center for Genetic Resources and Biotechnology having the mandate to register and release improved varieties in Nigeria, suggested that more farmers should be involved in on-farm trials. The Institute of Agricultural Research and Training, Moor Plantation, Ibadan, was also represented at the workshop.

Dr Muhammed Sanusi, an Extension Specialist from the University of Ibadan, explained the procedures for selection to the participants using a Focus Group Discussion.

At least five best-performing accessions are expected to be selected and pushed for on-farm trials.



Workshop attendees participating in on-field selection of the accessions.

Take responsibility! Stop the spread of COVID-19!

Always clean your hands; practice physical and social distancing; wear face masks properly; avoid crowds and public places; keep a 2-meter distance from the next person; and practice general sanitation and hygiene.

Got a story to share?

Please send your story with photos and captions every Tuesday to iita-news@cgiar.org or Katherine Lopez (k.lopez@cgiar.org) and Uzoma Agha (u.gha@cgiar.org) for headquarters and Western Africa, Catherine Njuguna (c.njuguna@cgiar.org) for Eastern and Southern Africa, and David Ngome (d.ngome@cgiar.org) for Central Africa.



The banana weevil borer, *Cosmopolites sordidus* (Germar), is one of the major banana pests that constrains banana and plantain production, both important staple foods and sources of income for millions of people globally and in sub-Saharan Africa in particular. The larvae of the banana weevil feed on the underground banana stem, called a corm, impeding nutrient and water uptake and causing plants to topple.

Yield losses from this pest worsen with every subsequent ratoon (growth of a new plant from the suckers after harvesting the parent crop) due to the build-up of the infestation. Yield losses of up to 100% can be realized because of the complete disappearance of the banana mat.

While cultural methods can reduce the pressure of weevils in a banana field, growing resistant varieties is the only sustainable way of combatting this pest. Unfortunately, most cultivated banana varieties, including the East African highland cooking bananas (Matooke) and plantain, are susceptible to this pest.

While banana improvement through crossbreeding has registered success as hybrids have been [released in East Africa](#) and the rest of the banana-growing world, the process is slow, tedious, and expensive, taking up to

two decades. The use of molecular markers promises to speed up the selection process by selecting the good, resistant material in the nursery, reducing the long selection cycles in the field that take many years.

“This is exciting news for the banana breeding community. Previous studies on weevil resistance had only identified banana accessions resistant to weevils. This is the first time that resistance to weevils has been localized at the genomic level”, says [Brigitte Uwimana](#), IITA banana molecular breeder who led this study.

Because bananas are polyploid (that means they have more than two copies of each of their 11 chromosomes), the scientists had to use a non-conventional way of identifying the region associated with resistance, a method called “Continuous mapping”. The identified markers associated with resistance to weevil damage will be used to develop molecular tools for marker-assisted breeding in bananas.

The work was conducted by the scientists from the IITA (CGIAR) Banana Breeding Programme and [Gnomix BVBA, Belgium](#), as part of the [Breeding Better Banana project](#) funded by the Bill & Melinda Gates Foundation. It is part of the [CGIAR Research Program on Roots and Tubers \(RTB\)](#).



The identified weevil-resistance markers will be used to develop molecular tools for marker-assisted breeding in banana.

The findings were published in a paper: *Continuous mapping identifies loci associated with weevil resistance [Cosmopolites sordidus (Germar)] in a triploid banana population* in the *Frontiers in Plant Science*, 2021. 12(2520); <https://doi.org/10.3389/fpls.2021.753241>

STIHL Company trains farmers to use improved agricultural machines

As part of activities to ensure the accessibility, acceptability, sustainability, and technical know-how of STIHL machines, C. Woermann, Nigeria and STIHL Company, Germany organized a three-day training from 30 November to 2 December at the Sahel room, [IITA](#) Ibadan. Focusing on enlightening, and evaluating the performance of the machines, the training exposed participants to the engineering modules of the selected machines to ensure farmers can use them to achieve high productivity.



A participant using the tiller during the field demonstration.

One of the facilitators, IITA Post-Harvest Engineer Thierno Diallo, said agriculture is essential to humanity as they need continuous cultivation of crops for survival. He encouraged participants to embrace mechanization to ensure increased production, higher yields, and food security.

According to STIHL representative Victor Aliyu, participants were selected from seven different units of IITA, including the youth agripreneurs. He also added that participants were taught machine maintenance tips, which will help with the easy adoption of mechanization.

One of the participants, Charles Olabanji, Production Officer, IITA Youth Agripreneurs (IYA), commended the training organizers. He stated that the training was a good development

related to his work, especially the tilling machine, brush-cutter, saw machine, and farm cutter. He also extolled the durability of some of the machines during the field demonstration while suggesting “IITA should patronize STIHL as the machines used for demonstration are durable.”

Cliff Mfam, Cassava Breeder, acknowledged the usefulness of the machines, especially the farm cutter, and he advised farmers to adopt it. According to him, it will reduce the drudgery of labor and the work hours on the field. He further suggested that STIHL can improve the tiller, and IITA can modernize the tiller.

At the end of the 3-day training, participants received certificates of participation.



STIHL representative Victor Aliyu presenting a workshop certificate to a participant.

Gender book launch: A significant shift in the drive towards gender equality

The past decade has seen a renewed and more comprehensive interest in gender equality and women’s empowerment in agricultural development. This drive has created a unique opportunity to advance gender equality and institutionalize gender research within agricultural research for development (AR4D) organizations. A new book, [“Advancing Gender Equality through Agricultural and Environmental Research: Past, Present, and Future.”](#) has been released as part of this overall drive and the growing body of evidence and ideas generated.



Speakers at the virtual book launch.

The book highlights the over 30 years of history and wealth of gender knowledge by over 55 gender researchers from [CGIAR](#) and partners, including [IITA](#). The book will help discover how agricultural and environmental research and development contribute to gender equality and women's empowerment. For CGIAR, this is an opportune moment to take stock of progress and articulate a forward-looking agenda for future gender research with gender equality and women's empowerment at the center.

The book was launched in a virtual meeting organized by [IFPRI](#) and the CGIAR Research Program on Policies, Institutions, and Markets (PIM). During the launch, the moderator, Frank Place, Director of CGIAR Research Program on PIM at IFPRI, stated that the book is timely as its insights are indispensable for the One CGIAR's aim to contribute to the ambitious gender equality targets. He added that the book indicates a shift away from a typical instrumentalist outlook focused on how gender analysis can contribute to research objectives, such as improved productivity.

Co-editors and authors, CGIAR Senior Expert and Advisor Rhiannon Pyburn and Senior Associate Anouka Van Eerdewijk, both from KIT Royal Tropical Institute, gave an overview of the book. Pyburn mentioned that the book began with an idea from the second scientific conference in 2018. She further shared details of the book's three sets of thematic chapters: technical research topics that have integrated gender; research themes where gender integration is pivotal like nutrition, climate change, and agriculture; and gender-specific themes such as women empowerment.

Eerdewijk added that one central point made in the book is the importance of being explicit and comprehensive in conceptualizing gender equality and women's empowerment.

In her presentation, RTB [CIP](#) Gender Research Coordinator Vivian Polar shared insights from Chapter 2, "Examining choice to advance gender equality in breeding research," which she co-authored. She said the chapter focused on how breeding research can promote gender equality. "Technological options available to women are usually not in line with their needs and priorities. Hence, for empowerment to happen,

people must have the option to choose," she said.

Iliana Monterroso Ibarra, Co-Coordinator of Gender and Social Inclusion Research, [CIFOR](#), shared from Chapter 6, "A gender-natural resources tango: Water, land and forest research." She mentioned that the chapter analyzes the theoretical work that led to major shifts in policy discourse- such as shifts from management to governance, recognizing plurality and diversity, and focusing on intersectional inequalities, which is strongly influenced by political ecology scholarship. "The chapter highlights how it is no longer possible to conceive Natural Resources Management (NRM) initiatives without taking equality or inclusion into account," she said.

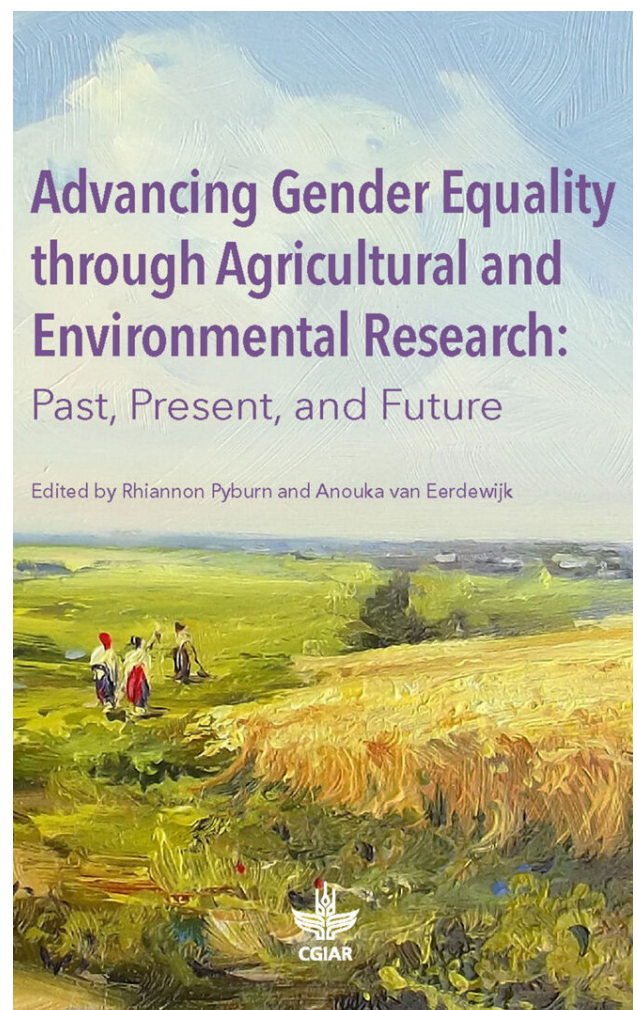
Cynthia McDougall, Senior Research Fellow- Gender, Environment and Development, Stockholm Environment Institute (SEI), spoke about chapter 10, "Toward structural change: gender transformative approaches (GTA)." She mentioned that the chapter shows the need for a change in approach as gender approaches in agriculture, NRM, and other areas, leading to gender equality, is not doing well enough. "Not a single country is set to achieve gender equality by 2030; hence there is a need for change in approach," she said.

Susan Kaaria, Senior Gender Officer, Inclusive Rural Transformation and Gender Equality Division at [FAO](#), also shared her thoughts on the book. Kaaria stated that the book offers an opportunity to change and reframe the global debate on gender equality. She highlighted two things that should be put in place for the book to influence the future agenda for gender: First, the need to widely disseminate the book so that it influences practice; second, ensuring that this innovative thinking influences global and national policy debate.

Jemimah Njuki, Director for Africa at IFPRI, another discussant, said a major contribution of the book is that it defines the partnership that people have to build in achieving gender equality and women's empowerment as a goal. She added that another interesting thing is the evolution of the scope of research, moving from the thought of what women's roles are to transformative change. "This is a fundamental shift in CGIAR gender research," she said.

Concluding the event, the moderator mentioned that CGIAR is already recognized as a powerhouse in gender research. He added that CGIAR is working as a system and with other partners engaged in gender research in various capacities. "We are positioning ourselves to become a stronger voice on gender in the future," Place said.

IITA gender scientists contributed to four chapters of this book. [Béla Teeken](#) co-authored chapter 2, Sounkoura Adetonah contributed to Chapter 4, [Steven Michael Cole](#) contributed to chapter 9, and [Gundula Fischer](#) co-authored chapter 10.



Front cover of the book.