

CURRICULUM VITAE - LEENA TRIPATHI

Principal Scientist and Deputy Director for Eastern Africa Hub
International Institute of Tropical Agriculture (IITA), Kenya

OVERVIEW

I am highly motivated **Plant Biotechnologist** with over 20 years' experience in genetic improvement of important staple crops for smallholder farmers such as banana, cassava, enset (Ethiopian banana), legumes and yam for disease and pest resistance to enhance production, which in turn will contribute to improved food security, income and wellbeing of resource-poor farmers in sub-Saharan Africa and Asia.

I have risen through the ranks at the International Institute of Tropical Agriculture (IITA), where I have been working for the last 17 years, to current position as the Deputy Director of Eastern Africa Hub and Country Representative of IITA-Kenya. I am supporting the Regional Director to supervise and provide leadership to over 300 multi-disciplinary and multi-cultural researchers in Eastern Africa Hub for IITA. Under my leadership IITA-Kenya has grown fivefold. Prior to this, I was Country Representative of IITA-Uganda. I am also providing science leadership as Faculty members of various institutions and Support Leader for CGIAR Research Program for Root, Tubers and Banana.

As Principal Scientist, I have been successfully leading plant transgenic research at IITA including establishing robust '**Genetic Transformation Platform**' which is instrumental for developing genetically modified products and transfer technologies to national agricultural research systems (NARS) in sub-Saharan Africa. I have pioneered genetic engineering of banana to confer resistant to the deadly bacterial **Xanthomonas wilt disease**, which is threatening banana production and the livelihoods of smallholder growers in East Africa. The disease has caused estimated economic losses of about \$2–8 billion over the last decade in East Africa. The improved transgenic bananas are under confined field trials cross-countries and are close to being released to farmers. My team is now expanding this transgenic technology to enset, which is staple crop in Ethiopia. My lab is also developing virus resistant banana and cassava using RNAi technology. I am also trying to develop new crop improvement technologies like **genome editing** for staple food crops.

I have established strong global collaboration including advanced labs in USA, UK, Australia and National partners in Kenya, Uganda, Ethiopia, Malawi and regional partners.

I have mobilized more than 17 Million USD for cutting edge research in my lab in Africa in addition to financial support from CGIAR Research Program for Root, Tubers and Banana.

My research outputs have been published in 70 articles in refereed Journals with high impact factor like Nature Biotechnology or in book chapters and have been featured in more than 170 national and international news articles and documentary films.

I have created an excellent team by building critical mass of scientists and technical staffs, building capacity and mobilizing resources for cutting edge research. I have been supervising M.Sc. & Ph.D. students, and mentoring postdocs and young scientists.

ACADEMIC QUALIFICATION

- 1993-1999 **Ph.D., Plant Molecular Biology**
National Botanical Research Institute & University of Lucknow, India
Thesis: *In Vitro* Regeneration and Genetic Transformation Studies in Grain Legume *Cicer arietinum* (Chickpea).
- 1991-1993 **M.Sc., Molecular Biology & Biotechnology**
G. B. Pant University of Agriculture & Technology, India
Thesis: Studies of Molecular Genetics of Atrazine Resistance in *Gloeocapsa rupestris*.
- 1987-1991 **B.Sc. Botany, Chemistry & Zoology**
Christ Church College, Kanpur University, India

MANAGEMENT AND LEADERSHIP TRAINING

- 2014 Leadership and Management Training for Scientists (Hfp consulting)
- 2012 Women's Leadership and Management Development Course (Gender & Diversity, CGIAR)
- 2010 Project Management Programme (MTD Training)
- 2009 Communication and Partnership Building Training
- 2008 Training Course for Leading Excellent Project Teams

EMPLOYMENT HISTORY

- 2016- To date Deputy Director, Eastern Africa Hub, IITA, Kenya
- 2016- To date Principal Scientist- Plant Biotechnologist, IITA, Kenya
- 2011- To date Country Representative of IITA, Kenya
- 2011-2016 Senior Scientist- Plant Biotechnologist, IITA, Kenya
- 2010-2011 Country Representative of IITA, Uganda
- 2004-2011 Scientist- Plant Biotechnologist at IITA, Uganda
- 2003-2004 Scientist- Plant Biotechnologist at IITA, Nigeria
- 2000-2003 Post Doc- Plant Biotechnologist at IITA, Nigeria
- 1999-2000 Research Scientist at University of North Carolina at Greensboro, USA

1999-1999	Research Associate at National Botanical Research Institute, Lucknow, India
1996-1998	Senior Research Fellow at National Botanical Research Institute, Lucknow, India
1993-1996	Junior Research Fellow at National Botanical Research Institute, Lucknow, India
1991-1991	Intern- Summer Program Visiting Student at Tata Institute of Fundamental Research, Mumbai, India

OTHER POSITIONS

2016- To date	Editorial Board Member of Frontiers
2016- To date	Support Leader for CGIAR Research Program for Root, Tubers and Banana
2015- To date	Editorial Board Member for Scientific Reports, Nature Publishing Group
2015- To date	Chair of International Society for Plant Pathology (ISPP) for Plant Pathogenic Bacteria Committee
2014- To date	Editor of Plant Cell Reports, Springer
2014- To date	Independent Expert for GMO Answers
2011- To date	Faculty member of Biosciences east and central Africa (BecA) hub
2009- To date	Member of Africa College, University of Leeds, UK
2008- 2011	Visiting Faculty of University of Leeds, UK
2007	Guest Faculty of United Nations Industrial Development Organization (UNIDO)

AWARDS AND HONORS

2015	IITA Board of Trustees Annual Excellence Award (2014) for " Outstanding Publication "
2014	Jury award for best poster presented at CGIAR Research Program-Root Tubers and Bananas (CRP-RTB) Annual Meeting.
2014	IITA Board of Trustees Annual Excellence Award (2013) for " Outstanding Scientist "
2011	IITA Board of Trustees Annual Excellence Award (2010) for " Outstanding Publication "
2010	Awarded for 10 years of dedicated service at IITA

2005	Awarded as Top Scientist of IITA
1996	Award of Council of Scientific and Industrial Research (CSIR) Senior Research Fellowship
1994	Award of CSIR-UGC-Junior Research Fellowship and eligibility of Lectureship
1993	Award of Graduate Test of Aptitude in Engineering (GATE-Life Science)- Research Fellowship
1991	Recipient of Department of Biotechnology (DBT) sponsored scholarship
1988	Recipient of Christ Church College Merit Scholarship

CAPACITY BUILDING IN PLANT BIOTECHNOLOGY IN AFRICA

- Trained more than 25 staffs from EIAR for genetic engineering and biosafety compliance.
- Trained more than 200 NARS in the field of genetic transformation, tissue culture, molecular diagnostics and GMO detection
- Supervised more than 30 students for M.Sc. and Ph.D. degree
- Mentoring postdoc and young scientists
- Mentoring Norman Borlaug Fellow
- Trained Industrial Attachment students and technical staffs
- Capacity built at National Agricultural Research Laboratories (NARL)/ National Agriculture Research Organization (NARO), Uganda for banana transformation and molecular biology
- Capacity built at National Crops Resources Research Institute (NaCRRI)/ National Agriculture Research Organization (NARO), Uganda for cassava transformation
- Building human capacity at Kenyan Agricultural and Livestock Research Organization (KALRO), Kenya for cassava transformation
- Building infrastructure and human capacity at Ethiopian Institute of Agricultural Research (EIAR) for conducting enset transformation
- Instructor for Biosafety Course organized by UNIDO
- Course offered- “Plant Molecular Biology” for M.Sc. program at University of Ibadan, Nigeria

MEMBERSHIP OF SCIENTIFIC SOCIETIES

- Member of American Association of Advancements of Science (AAAS)
- Member of American Chemical Society (ACS)
- Honorary Life membership for Asian PGPR Society of Sustainable Agriculture
- Member of Society for *In Vitro* Biology
- Member of American Phytopathological Society
- Life Member of Society of Indian Agriculture Biochemistry
- Member of Society of Biological Chemist
- International forum of Plant Tissue Culture
- Food Safety Network, Agnet
- CropBiotech Net
- ProMusa Group

- Genomic India International Forum

MEMBER OF COMMITTEES

- 2016- 2018 Chair of International Conference of Plant Pathogenic Bacteria (ICPPB)
- 2015-2016 Scientific Committee member for International Bacterial Wilt Symposium 2016 in France
- 2013-2014 Scientific Committee member for Symposium IHC2014: "Unraveling the banana's genomic potential" in Brisbane, Australia.
- 2011-todate International Livestock Research Institute (ILRI) Biosafety Committee Member
- 2005-todate National Coordination Committee for BXW control in Uganda
- 2005-todate Steering committee member of NARO/Bioversity Biotechnology project
- 2010-todate Steering committee member of ABSPII project
- 2005-todate Management committee of NARO Biotechnology Centre
- 2005-todate Search Committee for recruitment of scientists

REVIEWER FOR INTERNATIONAL JOURNALS AND PROJECT PROPOSALS

- Scientific Reports
- Journal of Plant Biotechnology
- Plant Cell Reports
- Biologia Plantarum
- BMC-Plant Biology
- Plant Cell, Tissue and Organ Culture
- Australian Journal of Botany
- Euphytica
- European Journal of Plant Pathology
- Current Plant Biology
- Frontiers of Plant Science
- In vitro Cellular and Develop. Biology-Plant
- Transgenic Research
- Biotechnology and Molecular Biology Reviews
- Molecular Breeding
- South African Journal of Botany
- Journal of Agricultural Science and Technology
- Journal of Crop Improvement
- Journal of Crop Protection
- Electronic Journal of Biotechnology

- International Journal of Plant Developmental Biology
- Acta Horticulturae
- Interciencia
- African Journal of Biotechnology
- Journal of Integrative Agriculture
- Reviewed several project proposals for different Funding agencies

SUMMARY OF MANAGEMENT EXPERIENCE

I have more than 17 years of team leadership, management and research experience in Africa. During this period, I have empowered team members by enhancing their capacity for research, effectiveness to integrate and make them work together within a team.

Deputy Director for IITA Eastern Africa hub: I am providing leadership to more than 300 multi-disciplinary and multi-cultural researchers in East Africa Hub for IITA. I have been representing IITA to external organization and promoting its research.

Country Representative for IITA-Kenya: Under my management, since 2011, the station has grown about five times. I have been successfully managing the station through providing oversight and mentorship to researchers and administrative staffs. I have also been facilitating collaboration/partnership between IITA and local national agricultural research systems (NARS), universities, national development agencies, private sector, non-government organizations (NGOs) and community based organizations. Under my leadership, IITA has signed several Memorandum of Understanding (MoU) like with Kenya Agricultural and Livestock Research Organization (KALRO), Ministry of Agriculture, Livestock and Fisheries (MoALF) in Kenya, Ethiopian Institute for Agricultural Research (EIAR). Currently, the agreement with Government of Kenya for hosting IITA and the MoU with Queensland University of Technology (QUT), Australia are under process.

Country Representative for IITA-Uganda: From 2010-2011, I led the multidisciplinary team at IITA-Uganda.

Principal Scientist: I am leading the transgenic research at IITA across all its stations/hubs and managing several research projects in different African countries such as Kenya, Uganda, Ethiopia and Nigeria. I have built an excellent well-motivated team by building critical mass of scientists and technical staffs, building capacity and mobilizing resources for cutting edge research. I have been mentoring postdocs and young scientists. I have established strong global partnerships in transgenic program.

During my leadership, the transgenic research at IITA has made impact and earned good reputation and high level of funding. We have developed several technologies, which are under product development and closer to dissemination to farmers. Our research outputs have been highlighted on global arena.

I am also leading the Quality Management at IITA and trying to establish Quality Management System in place.

Scientist at IITA-Uganda (2004-2011): I led the transgenic research on production of transgenic bananas resistant to Xanthomonas wilt disease and nematode resistance plantains.

Scientist (2003-2004) / Post doc (2000-2003) at IITA-Nigeria: I led and managed project on production of virus resistant transgenic plants of banana at IITA-Nigeria. During this period, I managed technical staffs, graduate students and Industrial Attachment trainees.

Research Scientist: In 1999, I joined University of North Carolina at Greensboro and led research on production of herbicide- tolerant soybean through EMS mutagenesis. I was supervising research assistant working on this project. I was involved in research on production of transgenic soybean with insect-pest resistance.

SUMMARY OF RESEARCH ACCOMPLISHMENTS

1. Establishment of “Genetic Transformation Platform” for banana and cassava in Africa

Despite technical difficulties of transforming a monocot species, we have developed efficient transformation system for several banana and plantain cultivars using embryogenic cell suspensions. Availability of efficient transformation systems has paved the way for genetic manipulation of banana and plantain by incorporating agronomically important traits such as those conferring diseases or pests resistance, as well as tolerance to abiotic stress factors. Introduction of desirable character traits in this crop is no longer restricted to those occurring in close relatives.

My lab has also successfully developed a robust transformation platform for farmer-preferred varieties of cassava that can be used to develop improved varieties with desired traits. We were the first one to report successful *Agrobacterium*-mediated transformation of African farmer-preferred cassava varieties in a laboratory based in sub-Saharan Africa.

Currently, most of the African laboratories lack the capacity and the expertise to carry out genetic transformation of the staple crops, which has therefore been limited to, advanced laboratories. The “Genetic Transformation Platform” established by me is very instrumental in order to build the capacity of researchers in Africa to carry out genetic modification of crops like banana and cassava, where these crops have important socioeconomic niche.

2. Control of Xanthomonas wilt disease of banana and enset

I have pioneered a new approach, which uses genetic engineering to produce banana varieties resistant to banana Xanthomonas wilt (BXW) disease caused by *Xanthomonas campestris* pv. *musacearum*. This disease is threatening banana production and the livelihoods of smallholder growers in East and Central Africa, and solutions should be found fast before it could destabilize food security in the region. The disease has caused estimated economic losses of about \$2–8 billion over the last decade in Africa in the absence of effective natural host plant resistance. My research team along with our partner (National Agriculture Research Laboratories [NARL], Uganda) developed transgenic bananas by inserting Hypersensitive Response-Assisting Protein gene (*Hrap*) and Plant Ferredoxin-Like Protein gene (*Pflp*) from sweet pepper. Several of these transgenic lines had been shown to be 100% resistance to BXW through three successive crop cycles under field conditions. Aside from full resistance to BXW, the transgenic lines also showed flowering and yield (bunch weight and fruit size) characteristics comparable to non-transgenic varieties. We have published these results in the world-leading scientific journal *Nature Biotechnology*, and our approach could have great value to protect other crops in other countries against bacterial diseases.

To avoid breakdown in resistance, we have also developed transgenic bananas by stacking these two genes together in the same line to enhance and durable resistance. The promising transgenic lines are

under field trials in Kenya and Uganda. Currently, we are on product development pathway and planning to release the BXW resistant banana to farmers in 2021 in Kenya and Uganda.

Our research provides proof of concept for control of BXW through *Hrap* and *Pflp*-mediated resistance and the first field based evidence for transgenic control of a bacterial disease in banana and progress towards development and release of transgenic bananas resistant to BXW feasible. Such resistant varieties would boost the available arsenal to fight this disease epidemic and save livelihoods in Africa. Banana is important food and cash crop in the Great Lakes region of East Africa. Food security studies revealed that in Uganda, Rwanda, and Burundi, bananas constitutes more than 30% of the daily per capita caloric intake, rising to 60% in some regions. Ex ante impact analysis conducted by IITA has clearly shown the potential economic impacts of GM banana cultivars resistant to BXW disease in the Great Lakes region of Africa. If this new technology successfully adopted in the region, both consumers and producers would benefit. Largest benefits would accrue to consumers and farmers in countries that have experienced large production losses due to BXW.

I have negotiated the royalty free license through African Agricultural Technology Foundation (AATF) for the wilt-resistance genes – *Pflp* and *Hrap* – from the patent holder Academia Sinica in Taiwan. I along with partner from University of Nebraska have confirmed that the HRAP and PFLP proteins expressed in the transgenic banana pose no potential risks of allergy or toxicity to humans. Even so, the transgenic lines are currently under testing for food and environmental safety in compliance with biosafety regulations. Most of the edible bananas are sterile and the clonal mode of propagation makes the risk of gene flow from banana to another crop species insignificant.

Based on success with transgenic bananas, we are trying to transfer transgenic technology from banana to enset in partnership with Ethiopian Institute of Agricultural Research (EIAR). Enset, closely related to banana, is a staple food source for over 15 million people in Ethiopia. Its production has also been severely threatened by *Xanthomonas* wilt disease in all the enset growing areas of Ethiopia.

3. Genetically modified plantain for resistance to nematodes

Plant parasitic nematodes impose losses of up to 70% on plantains and cooking bananas in Africa. Application of nematicides is inappropriate and resistant cultivars are unavailable. My lab in partnership with University of Leeds, UK developed transgenic plantains using an anti-feedant cysteine proteinase inhibitor (cystatin) from maize and an anti-root invasion, non-lethal synthetic peptide either singly or by stacking these genes. The glasshouse study showed that both the genes are capable of providing resistance in plantain to concomitant infection with different nematode species. Confined field testing of 12 promising lines demonstrated that transgenic expression of maize cystatin and synthetic peptide confers resistance against key nematode pests *Radopholus similis* and *Helicotylenchus multicinctus*. The best peptide transgenic line improved agronomic performance relative to non-transgenic controls and provided about 99% nematode resistance at harvest of the mother crop. Its yield was 186% of the nematode challenged controls based on larger bunches and diminished plant toppling in storms, due to less root damage. These results are published in *Scientific Reports* (Nature Publishing Group).

4. Cassava brown streak disease (CBSD) resistant cassava

CBSD, caused by two viral species *Cassava brown streak virus* (CBSV) and *Ugandan Cassava brown streak virus* (UCBSV), is developing as a pandemic throughout the East African region with sporadic reports also in Central Africa. The biggest concern is that CBSD could spread to West Africa, particularly Nigeria, which is the world's largest producer of cassava. It is the most destructive viral disease of cassava causing up to 90% reduction in tuber yield, and more importantly causes necrosis of affected tubers, making them unfit for consumption. Of the available biotechnological approaches to control plant viral diseases, RNA interference (RNAi) is a very promising strategy that has been successfully employed to control numerous viral diseases caused by both DNA and RNA viruses. Therefore, we are developing CBSD-resistant transgenic cassava using RNAi technology.

5. **Virus resistant banana**

Bunchy top disease caused by banana bunchy top virus (BBTV) is the most devastating virus disease of bananas. The disease moves through plantations quickly rendering them unproductive. The virus is transmitted through infected planting material as well as by the banana aphid, *Pentalonia nigronervosa*. Banana bunchy top disease is extremely difficult to control and is continuing to spread in continents where bananas are primarily produced by smallholder farmers. My lab in collaboration with Queensland University of Technology (QUT), Australia is developing resistance to BBTV in farmers preferred banana/plantain cultivars using RNAi targeting the major components of the BBTV “life cycle”, virus replication and cell to cell movement, the infected cell and the insect vector. We are also developing resistance to the aphid vector using RNAi. Once we will have proof of concept for these separate strategies, they will be stacked in order to achieve robust and sustainable plant resistance.

6. **Genetic improvement of yam (*Dioscorea rotundata*)**

Yam is an important crop in the tropics and subtropics providing food security and income to over 300 million people. However, yam production remains constrained by increasing levels of field and storage pests and diseases. A major constraint to the development of biotechnological approaches for yam improvement has been the lack of an efficient and robust transformation and regeneration system. Although genetic transformation of clonally propagated crops has been widely studied as a tool for crop improvement and as a vital part of the development of functional genomics resources, there has been no report of any existing *Agrobacterium*-mediated transformation of yam (*Dioscorea* spp.). Recently, my lab has also developed an efficient, fast and reproducible protocol for *Agrobacterium*-mediated transformation of *D. rotundata* using axillary buds as explants, which provides a useful platform for future genetic engineering studies in this economically important crop. This is the first report of *Agrobacterium*-mediated transformation of yam with experimental evidence of stable integration of T-DNA in *D. rotundata* genotypes. This protocol opens up an avenue for future genetic improvement of *D. rotundata* with candidate genes of proven agronomic importance to attain sustainable production.

7. **Genome editing**

Editing of genome is a new era of crop improvement through targeted mutations and gene editing. Crops improved through genome editing might not have to pass through the regulatory approvals, which is the main hurdle for the commercialization of transgenic crops. Genome edited crops will be more acceptable to the public than transgenic crops. My team is trying to apply this tool for banana and yam, which have complex genomes and are not easy to bred through conventional methods. We are focusing on developing genome-editing tools for yams, which can be utilized for control of viral diseases and improvement of nutrients. Also, my laboratory has generated mutants for banana using CRISPR and currently analyzing them for resistant to viruses.

8. **Stewardship and quality management system (QMS)**

Stewardship and QMS including regulatory compliance are very important for any plant biotechnology laboratory involved in product development. Therefore, I am developing stewardship and quality management plans for biotechnology-derived plant products at IITA. Under my leadership, IITA Plant Transformation Laboratory started the process of implementing QMS. It has established document control system and information management system to create traceability of laboratory and product information. Through my efforts, IITA has recently joined Excellence Through Stewardship (ETS), which is a QMS program addressing several critical elements and critical control points. ETS guides and provides technical resources to understand and implement stewardship and QMS for the full life cycle of agricultural technology products. This membership marks our commitment to the best quality management and product stewardship practices. I am also assisting our partner ‘Ethiopian

Institute of Agricultural Research (EIAR)' to establish stewardship and QMS for the biotech products under development in Ethiopia.

BUILDING SUCCESSFUL PARTNERSHIPS

Strong and effective partnerships are very important to have impact on community from outcome of any research. For effective transgenic research, different actors like multidisciplinary scientists, Advance Research Institutes (ARIs), National Agricultural Research Systems (NARS), Non-Government Organizations (NGOs), policy makers, private sector etc. are required.

Advance Research Institutes (ARIs): I have established strong partnership with several ARIs to develop innovative technologies for providing solutions to farmers in Africa. The best structure for this type of partnership is to have joint research projects and joint publications. Our partnership with University of Leeds has allowed us to develop nematode resistant plantains, which are under field trials. This partnership has also been extended for developing nematode resistant yams for West Africa. Similarly, we are developing transgenic cassava for CBSD resistance in partnership with Donald Danforth Plant Science Centre. Our effective collaboration with Swiss Federal Institute of Technology in Zurich has allowed us to establish cassava transformation platform at IITA using African farmer preferred cultivars. I have also established collaboration with University of California at Davis. I am collaborating with University of Nebraska for assessing food safety of protein coded by genes used in developing transgenic bananas. I have also established partnership with Queensland University of Technology, Australia for developing banana bunchy top virus resistant bananas for Africa. The new partnerships also include Iowa State University, USA and Queen's University Belfast, UK.

National Agricultural Research Systems (NARS): I have established partnership with various NARS like Ethiopian Institute of Agricultural Research (EIAR), Kenya Agricultural and Livestock Research Organization (KALRO), National Agriculture Research Laboratories (NARL), Uganda and National Crop Resources Research Institute (NaCRRI), Uganda. We jointly identify the problem and develop collaborative research project with various stakeholders that will lead to research outcomes that meet the needs of NARS partners. In the project, we identify the gaps in the NARS and try to fill them by building capacity through upgrading the infrastructure and training their staffs and students. In return NARS are more involved in the capacity building of extension agents and public sector. They participate in field testing and releasing of transgenic varieties in their respective countries. They are the direct link to deal issues with regulatory authorities. I am also collaborating with various Universities such as Makerere University, Kenyatta University, University of Nairobi, University of Pretoria, and Norwegian University of Life Sciences and involved in training postgraduate students.

Non-Government Organizations (NGOs): I have established partnership with African Agricultural Technology Foundation (AATF). Some of my innovations are developed using the knowledge or technologies generated from previous innovations. AATF has been instrumental in facilitating technology transfer negotiations whereby proprietary biotechnologies have been made available to Africa.

Policy Makers and Regulators: They play very important role in transgenic research. I work with them hands in hand as they have to provide approval at different stages of research. I seek approval and advices from them but also provide training and information to them as and when required.

Private Sector: Tissue culture and seed companies play important role in dissemination of improved varieties. I have established partnership with various tissue culture companies in the East and Central

Africa. Currently, we are training in order to prepare them to accept, multiply, and disseminate transgenic varieties to farmers when ready.

Communication experts: I also work closely with communication experts at IITA, AATF, International Service for the Acquisition of Agri-biotech Applications, Cornell University and local media for public awareness and information campaigns through local radio, local TV program and other media that target smallholder farmers. We also use open forum to disseminate information.

Farmers: They are our main beneficiaries. On the project, we also consult them through surveys in order to select varieties for improvement. Recently, we conducted ex ante impact analysis to evaluate the potential economic impacts of GM banana cultivars resistant to BXW disease in the Great Lakes region of Africa. Farmer representatives were involved in the surveys.

Multidisciplinary Team of Scientist: I collaborate with scientists from different area of expertise within IITA. I consult breeders for selection of varieties to be used for genetic transformation. Pathologist, virologist and nematologists are involved during glasshouse and field evaluation of transgenic varieties for disease and pest resistance. I also work closely with Agronomist during field trials. Socio-economists are involved during impact analysis.

PUBLICATIONS

Articles in refereed Journals

1. Onyilo F., Tusiime G., Chen L.H., Falk B., Stergiopoulos I., Tripathi J.N., Tushemereirwe W., Kubiriba J., Changa C., **Tripathi L.** (2017) *Agrobacterium tumefaciens*-mediated transformation of *Pseudocercospora fijiensis* to determine the role of *PfHog1* in osmotic stress regulation and virulence modulation. *Frontiers in Microbiology* 8:830. doi: 10.3389/fmicb.2017.00830
2. Muiruri K.S., Britt A.B., Amugune N.O, Nguu E.K., Chan S., **Tripathi L.** (2017) Expressed centromere specific histone 3 (CENH3) variants in cultivated triploid and wild diploid bananas (*Musa* spp.). *Frontiers in Plant Science* (in Press).
3. **Tripathi L.**, Atkinson H., Roderick H., Kubiriba J., Tripathi J.N. (2017) Genetically engineered bananas resistant to *Xanthomonas* wilt disease and nematodes. *Food and Energy Security*. doi: 10.1002/fes3.101
4. **Tripathi L.**, Amit I., Baker D., Barker R., Berger B., Bertozzi C., Bhatia S., Biffi A., Demichelis F., Doudna J., Dowdy S.F., Endy D., Helmstaedter M., Junca H., June C., Kamb S., Khvorova A., Kim D.H., Kim J.S., Krishnan Y., Lakadamyali M., Lappalainen T., Lewin S., Liao J., Loman N., Lundberg E., Lynd L., Martin C., Mellman I., Miyawaki A., Mummery C., Nelson K., Paz J., Peralta-Yahya P., Picotti P., Polyak K., Prather K., Qin J., Quake S., Regev A., Rogers J. A., Shetty R., Sommer M., Stevens M., Stolovitzky G., Takahashi M., Tang F., Teichmann S., Torres-Padilla M.E., Vemula P., Verdine G., Vollmer F., Wang J., Ying J.Y., Zhang F., Zhang T. (2016) Voices of Biotech. *Nature Biotechnology* 34:270-275. doi: 10.1038/nbt.3502
5. Manoharan R., Tripathi J.N., **Tripathi L.** (2016) Plant regeneration from axillary bud derived callus in white yam (*Dioscorea rotundata*). *Plant Cell Tissue and Organ Culture* 126:481–497. doi: 10.1007/s11240-016-1017-2
6. Mburu K., Oduor R., Mgtutu A., **Tripathi L.** (2016) Silicon application enhances resistance to

xanthomonas wilt disease in banana. *Plant Pathology* 65, 807–818. doi: 10.1111/ppa.12468

7. Muwonge A., Tripathi J.N., Kunert K., **Tripathi L.** (2016) Expressing stacked *Hrap* and *Pflp* genes in transgenic banana has no synergistic effect on resistance to Xanthomonas wilt disease. *South African Journal of Botany* 104:125-133. doi: 10.1016/j.sajb.2015.09.017
8. Anderson J.A., Gipmans M., Hurst S., Layton R., Nehra N., Pickett J., Shah D.M., Souza T.L.P.O., **Tripathi L.** (2016) Emerging agricultural biotechnologies for sustainable agriculture and food security. *Journal of Agricultural and Food Chemistry* 64:383-393. doi: 10.1021/acs.jafc.5b04543
9. Onyango S.O., Roderick H., Tripathi J.N., Collins R., Atkinson H.J., Oduor R. O., **Tripathi L.** (2016) The ZmRCP-1 promoter of maize provides root tip specific expression of transgenes in plantain. *Journal of Biological Research-Thessaloniki* 23:4. doi 10.1186/s40709-016-0041-z
10. Tripathi J.N., Oduor R.O., **Tripathi L.** (2015) A high-throughput regeneration and transformation platform for production of genetically modified banana. *Frontiers in Plant Science* 6:1025. doi: 10.3389/fpls.2015.01025
11. Ainembabazi J.H., **Tripathi L.**, Rusike J., Abdoulaye T., Manyong, V. (2015) Ex-Ante Economic Impact Assessment of Genetically Modified Banana Resistant to Xanthomonas Wilt in the Great Lakes Region of Africa. *Plos One* 10(9): e0138998. doi: 10.1371/journal.pone.0138998
12. Atkinson H.J., Roderick H., **Tripathi L.** (2015) Africa needs streamlined regulation to support the deployment of GM crops. *Trends in Biotechnology* 33:433-435. doi: 10.1016/j.tibtech.2015.06.005
13. Dwivedi S.L., Britt A.B., **Tripathi L.**, Sharma S., Upadhyaya H.D., Ortiz R. (2015). Haploids: Constraints and opportunities in plant breeding. *Biotechnology Advances* 33:812-829. doi: 10.1016/j.biotechadv.2015.07.001
14. **Tripathi L.**, Babirye A., Roderick H., Tripathi J.N., Changa C., Urwin P.E., Tushemereirwe W.K., Coyne D., Atkinson H.J. (2015) Field resistance of transgenic plantain to nematodes has potential for future African food security. *Scientific Reports* 5:8127. doi: 10.1038/srep08127
15. Legg J.P., Kumar P.L., Makesh Kumar T., **Tripathi L.**, Ferguson M., Kanju E., Ntawuruhunga P., Cuellar W. (2015) Cassava Virus Diseases: Biology, Epidemiology, and Management. *Advances in Virus Research* 91:85-142. doi: 10.1016/bs.aivir.2014.10.001
16. Nyaboga E., Njiru J., **Tripathi L.** (2015) Factors influencing somatic embryogenesis, regeneration and Agrobacterium-mediated transformation of cassava (*Manihot esculenta* Crantz) cultivar TME14. *Frontiers in Plant Science* 6:411. doi: 10.3389/fpls.2015.00411.
17. **Tripathi L.**, Tripathi J.N., Kiggundu A., Kori, S., Shotkoski F., Tushemereirwe W.K. (2014) Field trial of Xanthomonas wilt disease-resistant bananas in East Africa. *Nature Biotechnology* 32:868–870. doi: 10.1038/nbt.3007
18. Tripathi J.N., Lorenzen J., Bahar O., Ronald P., **Tripathi L.** (2014). Transgenic expression of the rice *Xa21* pattern recognition receptor in banana (*Musa* sp.) confers resistance to *Xanthomonas campestris* pv. *musacearum*. *Plant Biotechnology Journal* 12:663-673. doi: 10.1111/pbi.12170

19. Nyaboga E., Tripathi J.N., Manoharan R., **Tripathi L.** (2014) *Agrobacterium*-mediated transformation and regeneration of yam (*Dioscorea rotundata*). **Frontiers in Plant Science** 5:463. doi: 10.3389/fpls.2014.00463
20. Blomme G., Jacobsen K., Ocimati W., Beed F., Ntamwira J., Sivirihauma C., Ssekiwoko F., Nakato V., Kubiriba J., **Tripathi L.**, Tinzaara W., Mbolela F., Lutete L., Karamura E. (2014) Fine-tuning banana *Xanthomonas* wilt control options over the past decade in East and Central Africa. **European Journal of Plant Pathology** 139:271-287. doi: 10.1007/s10658-014-0402-0
21. Nyaboga E., Njiru J., Nguu E., Gruissem W., Vanderschuren H., **Tripathi L.** (2013) Unlocking the potential of tropical root crop biotechnology in East Africa by establishing a genetic transformation platform for local farmer-preferred cassava cultivars. **Frontiers in Plant Science** 4:526. doi: 10.3389/fpls.2013.00526
22. Adikini S., Beed F., Tusiime G., **Tripathi L.**, Kyamanywa S., Lewis Ivey M.L., Miller S.A. (2013) Spread of *Xanthomonas campestris* pv. *musacearum* in banana plants: implications for management of banana *Xanthomonas* wilt disease. **Canadian Journal of Plant Pathology** 35:458-468. doi: 10.1080/07060661.2013.845856
23. Atim M., Beed F., Tusiime G., **Tripathi L.**, van Asten P. (2013) Increased potassium, calcium and nitrogen nutrition reduce Banana *Xanthomonas* Wilt caused by *Xanthomonas campestris* pv. *musacearum*. *Plant Disease* 97:123-130. doi: 10.1094/PDIS-07-12-0646-RE
24. **Tripathi L.**, Singh A.K., Singh S., Singh R., Chaudhary S., Sanyal I., Amla D.V. (2013) Optimization of regeneration and *Agrobacterium*-mediated transformation of immature cotyledons of chickpea (*Cicer arietinum* L.). **Plant Cell Tissue and Organ Culture** 113:513-527. doi: 10.1007/s11240-013-0293-3
25. **Tripathi L.**, Tripathi J.N., Tushemereirwe W.K., Arinaitwe G., Kiggundu A. (2013) Transgenic bananas with enhanced resistance against *Xanthomonas* wilt disease. **Acta Horticulturae** 974:81-90.
26. **Tripathi L.**, Tripathi J.N., Roderick H., Atkinson H.J. (2013) Engineering Nematode Resistant Plantains for Sub-Saharan Africa. **Acta Horticulturae** 974: 99-108.
27. Namukwaya B., **Tripathi L.**, Tripathi J.N., Arinaitwe G., Mukasa S.B., Tushemereirwe W.K. (2012) Transgenic banana expressing *Pflp* gene confers enhanced resistance to *Xanthomonas* Wilt Disease. **Transgenic Research** 12:855-865. doi: 10.1007/s11248-011-9574-y
28. Tripathi J.N., Muwonge A., **Tripathi L.** (2012) Efficient regeneration and transformation protocol for plantain cv. 'Gonja Manjaya' (*Musa* spp. AAB) using embryogenic cell suspension. **In vitro Cellular and Developmental Biology- Plant** 48:216–224. doi: 10.1007/s11627-011-9422-z
29. Roderick H., **Tripathi L.**, Babirye A., Wang D., Tripathi J.N., Urwin P.E., Atkinson H.J. (2012) Generation of Transgenic Plantain (*Musa* spp.) with Resistance to Plant Pathogenic Nematodes. **Molecular Plant Pathology** 13:842-851. doi: 10.1111/j.1364-3703.2012.00792.x
30. Roderick H., Mbiru E., Coyne D., **Tripathi L.**, Atkinson H.J. (2012) Crop biotic stress assessment using quantitative digital imaging: plant parasitic nematode damage to banana. **Plos One** 7(12):e5355. doi: 10.1371/journal.pone.0053355

31. Adikini S., **Tripathi L.**, Beed F., Tusiime G., Magembe E.M., Kim D.J. (2011) Development of specific molecular tool for detecting *Xanthomonas campestris* pv. *musacearum*. ***Plant Pathology*** 60:443-452. doi: 10.1111/j.1365-3059.2010.02419.x
32. Esuola C.O., **Tripathi L.**, Fawole I. (2011) Effects of various virulent strains of *Agrobacterium tumefaciens* on genetic transformation of banana (*Musa* sp.) cultivar Williams. ***African Journal of Horticulture Science*** 5:84-91.
33. **Tripathi L.**, Mwaka H., Tripathi J.N., Tushemereirwe W.K. (2010) Expression of sweet pepper *hrp* gene in banana enhances resistance to *Xanthomonas campestris* pv. *musacearum*. ***Molecular Plant Pathology*** 11: 721-731. doi: 10.1111/j.1364-3703.2010.00639.x
34. **Tripathi L.**, Tripathi J.N., Tushemereirwe W.K. (2010) Control of banana *Xanthomonas* wilt disease using genetic engineering. ***Acta Horticulturae*** 879:649-657. doi: 10.17660/ActaHortic.2010.879.71
35. Shotkoski F.A., **Tripathi L.**, Kiggundu A., Arinaitwe G., Tushemereirwe W. (2010) Role of biotechnology and transgenics in bananas (*Musa* spp.) in Africa. ***Acta Horticulturae*** 879:275-279. doi: 10.17660/ActaHortic.2010.879.27
36. Lorenzen J., Tenkouano A., Bandyopadhyay R., Vroh B., Coyne D., **Tripathi L.** (2010) Overview of banana and plantain (*Musa* spp.) improvement in Africa: Past and future. ***Acta Horticulturae*** 879:595-603. doi: 10.17660/ActaHortic.2010.879.66
37. **Tripathi L.**, Mwangi M., Abele S., Aritua V., Tushemereirwe W.K., Bandyopadhyay, R. (2009) *Xanthomonas* Wilt: A Threat to Banana Production in East and Central Africa. ***Plant Disease*** 93:440-451. doi: 10.1094/PDIS-93-5-0440
38. **Tripathi L.**, Tripathi J.N. (2009) Relative susceptibility of banana cultivars to *Xanthomonas campestris* pv. *musacearum*. ***African Journal of Biotechnology*** 8:5343-5350. doi: 10.4314/ajb.v8i20.65972
39. Odipio J., Tusiime G., **Tripathi L.**, Aritua V. (2009) Genetic homogeneity among Ugandan isolates of *Xanthomonas campestris* pv. *musacearum* revealed by Randomly Amplified Polymorphic DNA Analysis. ***African Journal of Biotechnology*** 8: 5652-5660. doi: 10.5897/AJB09.1063
40. **Tripathi L.**, Odipio J., Tripathi J.N., Tusiime G. (2008) A rapid technique for screening banana cultivars for resistance to *Xanthomonas* wilt. ***European Journal Plant Pathology*** 121:9-19. doi: 10.1007/s10658-007-9235-4
41. **Tripathi L.**, Tripathi, J.N. (2008) High Frequency Shoot Regeneration of Various Cultivars of Banana (*Musa* sp.). ***Journal of Crop Improvement*** 22:171-180. doi: 10.1080/15427520802123679
42. **Tripathi L.**, Tripathi J.N., Tushemereirwe W.K. (2008) Rapid and efficient production of transgenic East African Highland Banana (*Musa* spp.) using intercalary meristematic tissues. ***African Journal of Biotechnology*** 7:1438-1445.
43. **Tripathi L.**, Tripathi J.N., Tushemereirwe W.K., Bandyopadhyay R. (2007) Development of a semi-selective medium for isolation of *Xanthomonas campestris* pv. *musacearum* from banana plants. ***European Journal Plant Pathology*** 117:177-186. doi: 10.1007/s10658-006-9083-7

44. Biruma M., Pillay M., **Tripathi L.**, Blomme G., Abele S., Mwangi M., Bandyopadhyay R., Muchunguzi P., Kassim S., Nyine M., Turyagyenda L., Eden-Green S. (2007) Banana *Xanthomonas* wilt: a review of the disease, management strategies and future research directions. *African Journal of Biotechnology* 6:953-962. doi: 10.4314/ajb.v6i8.56989
45. **Tripathi L.**, Tripathi J.N., Vroh-Bi I. (2007) Bananas and Plantains (*Musa* spp.): Transgenics and Biotechnology. *Transgenic Plant Journal* 1:185-201.
46. Kuta D.D., **Tripathi L.** (2005) *Agrobacterium*-induced hypersensitive necrotic reaction in plant cells: a resistance response against *Agrobacterium*-mediated DNA transfer. *African Journal of Biotechnology* 4:752-757.
47. **Tripathi L.**, Tripathi J.N., Hughes Jd'A. (2005) *Agrobacterium* -mediated Transformation of Plantain cultivar Agbagba (*Musa* spp.). *African Journal of Biotechnology* 4:1378-1383. doi: 10.4314/ajb.v4i12.71498
48. **Tripathi L.** (2005) Techniques for detecting Genetically Modified Crops and Products. *African Journal of Biotechnology* 4:1472-1479. doi: 10.4314/ajfand.v4i13.71830
49. **Tripathi L.**, Tripathi J.N., Tushemereirwe W.K. (2004) Strategies to resistance to bacterial wilt disease of banana through Genetic Engineering. *African Journal of Biotechnology* 3:688-692. doi: 10.4314/ajb.v3i12.15039
50. **Tripathi L.** (2003) Genetic Engineering for improvement of *Musa* production in Africa. *African Journal of Biotechnology* 2:503-508. doi: 10.5897/AJB2003.000-1100
51. **Tripathi L.**, Tripathi J.N., Oso R.T., Hughes J.d'A., Keese P. (2003). Regeneration and transient gene expression of African *Musa* species with diverse genomic constitution and ploidy levels. *Tropical Agriculture* 80:182-187.
52. **Tripathi L.**, Tripathi J.N. (2003) Role of Biotechnology in Medicinal Plants. *Tropical Journal Pharmaceutical Res.* 2:243-253. doi: 10.4314/tjpr.v2i2.14607
53. **Tripathi L.** (2000). *In vitro* regeneration of large seeded grain legumes. *Indian Journal of Agriculture Biochemistry* 13.
54. **Sharma L.**, Amla D.V. (1997). *In vitro* regeneration of chickpea (*Cicer arietinum* L.) via direct organogenesis. *Indian Journal of Experimental Biology* 36:605-609.

Books/ Book chapters

1. Roderick H., **Tripathi L.**, Poovarasan S. (2016) Transgenic Approaches to Improve Resistance to Nematodes and Weevils. *In: Banana: Genomics and Transgenic Approaches for Genetic Improvement*, Mohandas Sukhada and Ravishankar V. Kundapura (eds) Springer, pp. 247-260, ISBN 978-981-10-1583-0. doi 10.1007/978-981-10-1585-4.
2. **Tripathi L.**, Tripathi J.N., Kubiriba J. (2016) Transgenic Technologies for Bacterial Wilt Resistance. *In: Banana: Genomics and Transgenic Approaches for Genetic Improvement*, Mohandas Sukhada and Ravishankar V. Kundapura (eds) Springer, pp. 197-209, ISBN 978-981-10-1583-0. doi 10.1007/978-981-10-1585-4.

3. **Tripathi L.**, Kumar P.L., Patil B.L., Fatokun C. (2015) Pathogen-Resistant Genetically Engineered Crops in Africa, *In: **Genetically Engineered Crops in Developing Countries***, Reddy, D.V.R., Kumar, P.A., Kumar, P.L., Loebenstein, G., Rao, C.K. (eds), Studium Press LLC, USA, pp. 217-240.
4. Gedil M., **Tripathi L.**, Ghislain M., Ferguson M., Ndjiondjop M., Kumar P.L., Raatz B., Lopez-Lavalle L.A., Bhattacharjee R., Semagn K., Ribaut J. (2014) Biotechnology success stories by the Consultative Group on International Agriculture Research (CGIAR) system, *In: **Biotechnology in Africa***, Wambagu. F., Kamanga D. (eds), Springer, chapter 6, pp 95 – 114. doi: 10.1007/978-3-319-04001-1_6
5. **Tripathi L.** (2011) Biotechnology in *Musa* Improvement. *In: **Banana Breeding: Progress and Challenges***, Pillay M. and Tenkouano A. (eds) Chapter 11, Blackwell publication, pp. 217-234. doi: 10.1201/b10514-12
6. Pillay M., Cullis C.A., Talengera D., **Tripathi L.** (2011) Propagation Methods in *Musa* *In: **Banana Breeding: Progress and Challenges***, Pillay M. and Tenkouano A. (eds) Chapter 15, Blackwell publication, pp. 283-303. doi: 10.1201/b10514-16
7. **Tripathi L.** (2008) Current status and future prospects of genetic improvement in bananas. *In: **Crop Improvement and Biotechnology***, Thangadurai D., Tripathi L., Vasanthaiah H.K.N., Cantu D.J. (eds), Bioscience Publication, India, pp. 1-21.
8. **Tripathi L.**, Tripathi J.N., Tenkouano A., Bramel P. (2008) Banana & Plantain *In: **Compendium of Transgenic Crop Plants: Transgenic Tropical and Subtropical Fruits and Nuts***, Volume 5, Kole, C., Hall, T.C. (eds), Blackwell Publishing, Oxford, UK, pp. 77-108.
9. Thangadurai D., **Tripathi L.**, Vasanthaiah H.K.N., Cantu D.J. (2008) ***Crop Improvement and Biotechnology***, Bioscience Publication, India.
10. **Tripathi L.** (2007) Genetic Modification of Plants to Enhance Fungal Resistance *In: **Recent Advances in Alternative Postharvest Technologies to Control Fungal Diseases in Fruits & Vegetables***, Troncoso-Rojas R., Tiznado-Hernández M.E., González-León A. (eds), Research Signpost, India, pp. 157-179.
11. Pillay M., **Tripathi L.** (2007) Banana Breeding *In: **Breeding Major Food Staples***, Kang M.S., Priyadarshan P.M. (eds) Blackwell Publishing, pp. 393-429. doi: 10.1002/9780470376447.ch13
12. Pillay M., **Tripathi L.** (2006) Banana *In: **Genome Mapping & Molecular Breeding: Fruits and Nuts***, Kole C. (ed), Vol 4, Springer, Heidelberg, Berlin, pp 281-303. doi: 10.1007/978-3-540-34533-6_15
13. **Tripathi L.** (2005) Transgenic technologies for developing bacterial disease resistance in plants. *In: **Genetic Resources and Biotechnology***, Thangadurai D., Pullaiah T., Tripathi L.(eds), Vol 3, Regency Publications, New Delhi, pp. 200-220.
14. Thangadurai D., Pullaiah T., **Tripathi L.** (2005) Genetic Resources and Biotechnology, Vol 3, Regency Publications, New Delhi.
15. **Tripathi L.**, Tripathi J.N. (2004) Application for Biotechnology for conservation and Genetic Enhancement of *Musa* Germplasm. *In: **Genetic resources and Biotechnology***, Thangadurai D., Pullaiah Y. (eds), Regency Publications, New Delhi, India.

16. **Tripathi L.**, Amla D.V. (2002) Development of efficient in vitro regeneration system in chickpea amenable to direct genetic transformation. *In: Advances in Legume Research in India*, Rao R.R. (ed), Dehradun, BSMP, ISBN 81-211-0273-1, India.

Articles in Magazines

1. Tripathi L. (2012) Transgenics in crop improvement research at IITA. R4D Review 8:58-60.
2. Tripathi L. (2011) Transgenic banana for Africa. IITA R4D Rev. 6:70 – 72.
3. Tripathi L. (2009) Biotechnology and nematodes. IITA R4D Rev. 2:47-48.
4. Fatokun, C., Tripathi, L., Herron, C. (2009) Ensuring Biosafety. IITA R4D Rev. 2:19-20.
5. Tripathi L. (2008) Looking after the welfare of smallholder banana growers. IITA R4D Rev. 1: 38-39.
6. Tripathi L. (2008). The Future of African Bananas. IITA R4D Rev. 1:46-48.
7. Tripathi L. (2007) Demystifying biotechnology. Business Friends Africa J 1:38-46.

RESEARCH APPEARED IN NATIONAL/INTERNATIONAL NEWS

My research outputs have been highlighted in documentary films like “*Food Evolution*” and CNN-*Earth’s Frontiers*.

It has also been featured in more than 170 national and international news including Nature News, Discovery News, Nature Biotechnology, The Guardian, The Standard, SciDev Net, Crop Biotech update, Science Times Magazine, Science News, American Scientist, USAID Blog, National Radio, National TV, Msafiri (Kenyan Airways magazine), Africa Geographic (Popular Magazine of South Africa), Daily Monitor, New Vision, New Agriculturist etc. (see Annex).

INVITED SPEAKER AT CONFERENCES (SELECTED LIST)

- | | |
|------|--|
| 2017 | International Consortium on Applied Bioeconomy Research (ICABR) in Berkeley, USA |
| 2016 | Plenary session “Science to Practice” of American Phytopathological Society (APS) Annual Meeting in Florida, USA |
| 2016 | 6th International Bacterial Wilt Symposium, Toulouse, France |
| 2016 | World Congress on Root and Tuber Crops in Nanning, China |
| 2016 | IPS 6 th International Conference, New Delhi, India |
| 2016 | Emerging Technologies for Global Food Security Conference, Saskatoon, Canada |
| 2016 | 4th Annual National Biosafety conference, Nairobi, Kenya |

- 2015 4th Annual National Biosafety conference, Nairobi, Kenya
- 2015 2nd International Workshop of the Learning Alliance on Banana Bunchy Top Disease Control in Africa, Ibadan, Nigeria
- 2014 13th IUPAC International Congress of Pesticide Chemistry, organized by the American Chemical Society (ACS) in San Francisco, USA
- 2014 18th International Consortium on Applied Bioeconomy Research (ICABR) in Kenya
- 2014 Africa Food Security Conference (AFSC) in Nairobi, Kenya
- 2013 The American Association for the Advancement of Science (AAAS) Annual Meeting in Boston, USA
- 2013 National Bi-ennial Conference on Biosafety in Kampala, Uganda
- 2013 2nd National Biosafety Conference in Nairobi, Kenya
- 2013 International Congress on Plant Pathology (ICPP) in Beijing, China
- 2013 Biotechnology for development in Africa: 9th annual meeting of the African Science Academies (AMASA) in Ethiopia
- 2011 Genetically Modified Organisms in Horticulture Symposium in South Africa
- 2010 12th International Conference on Plant Pathogenic Bacteria (ICPPB) in La Reunion
- 2010 AGBIOSAFESEED in Kampala, Uganda
- 2009 International workshop on banana bunchy top disease and banana Xanthomonas wilt in Arusha, Tanzania

INVITED LECTURES (SELECTED LIST)

- 2017 University of California in Berkeley, CA, USA
- 2016 Program for Biosafety Systems (PBS)/ International Food Policy Research Institute (IFPRI), Washington DC, USA
- 2016 Queensland University of Technology, Brisbane, Australia
- 2015 Genetic Engineering for Crop Improvement: Case Studies from African Crops at Purdue University, Indiana, USA
- 2015 West Africa Yam Nematode Convening organized by BMGF in Kenya
- 2015 CMD2 Cassava Workshop at Gates Foundation, Seattle, USA
- 2014 Open Forum for Agriculture Biotechnology (OFAB), Ethiopia

2014	World Vision, Kenya
2014	University of California in Davis, USA
2014	Ethiopian Institute of Agricultural Research, Ethiopia
2013	Open Forum for Agriculture Biotechnology (OFAB), Kenya
2011	Chinese Academy of Tropical Agriculture Sciences, China
2010	Biosciences eastern and central Africa hub, Nairobi, Kenya
2009	CGIAR Science Forum in Netherlands
2008	University of Leeds, UK
2008	African Agricultural Technology Foundation, Kenya

PERSONAL DETAILS

Date of birth 9 June 1970
Nationality Indian
Sex Female
Address International Institute of Tropical Agriculture (IITA)
 C/o ILRI, P O BOX 30709
 Nairobi 00100, Kenya
 Tel: +254 20 4223472; Mob: +254 731089399
 E-mail: L.Tripathi@cgiar.org; Skype: leena.tripathi

REFERENCES

Dr. Nteranya Sanginga
 Director General
 International Institute of Tropical Agriculture (IITA)
 Oyo Road; P.M.B. 5320
 Ibadan, Oyo State, Nigeria
 Email: N.SANGINGA@CGIAR.ORG

Dr. Bruce Coulman
 Plant Sciences Department
 University of Saskatchewan
 51 Campus Drive; Saskatoon, Saskatchewan;
 CANADA S7N 5A8
 Email: bruce.coulman@usask.ca

Prof. Trine Hvoslef-Eide
 Professor
 Plantevitenskap (IPV), NMBU
 Norwegian University, Norway
 Email: trine.hvoslef-eide@nmbu.no

Dr. Larry Beach
 Independent Consultant
 Ex-USAID
 Washington DC, USA
 Email: biot1larry@gmail.com

ANNEX

RESEARCH APPEARED IN DOCUMENTARY FILM

1. Food Evolution: Documentary Film directed by Scott Hamilton Kennedy, 12 Nov 2016.
2. CNN Earth's Frontiers: Genetically modified bananas in Uganda, 23 March 2011.

RESEARCH APPEARED IN NATIONAL/INTERNATIONAL NEWS

1. Nigerian Tribune: 2 million households targeted for improved food security in 2017, 14 April 2017.
2. Cornell Alliance for Science: GMO banana offers hope for disease and pest resistance, 5 April 2017.
3. GMO Answer: Genetic Engineering: One Tool Saving East Africa's Bananas, 18 May 2017.
4. Genetic Literacy Project: Talking about bananas as a food crop, challenges: Leena Tripathi offers GE answers to threats to bananas, 28 March 2016.
5. Talking Biotech Podcast: 029 Banana Disease and GE Solutions, 26 March 2016.
6. Biosciences for farming in Africa News: B4FA week in review – 6 April 2016.
7. IPS News: Africa Closer to a Cure for Banana Disease, 14 Dec 2015.
8. IOL News: Show African farmers how to profit, 29 May 2015.
9. iTunes: Talking Biotech Podcast, 26 March 2016.
10. The Independent, UK: ActionAid: The charity spreading 'groundless' fears over GM, 22 March 2015.
11. The Independent, UK: The GM crops debate moves to Africa– and it's just as noisy, 22 March 2015.
12. The Washington Post: The last thing Africa needs to be debating is GMOs, 25 May 2015.
13. Genetic Literacy Project: Documentarian Scott Hamilton Kennedy explores why activists block GMO solution to African banana wilt crisis, 5 May 2015.
14. New Vision: Banana bacterial wilt being managed but at what cost? 17 Dec 2014.
15. New Vision, Uganda: Can modern technology save Uganda's banana crop? 9 Dec 2014.
16. NTV, Kenya: Food Friday: Understanding genetically modified crops, 10 Oct 2014.
17. SciDev Net: Project releases disease-resistant cassava plantlets, 15 April 2014.
18. Monitor, Uganda: Uganda in regional effort to tackle cassava viruses, 25 March 2014.
19. IITA News: Saving Enset–Ethiopia's ancient false banana from deadly bacterial wilt disease, 7 Jan 2014.
20. SciDev Net: Scientists to create disease-resistant Ethiopian enset, 21 Jan 2014.
21. Humanitarian News: Saving Enset-Ethiopia's ancient false banana from deadly bacterial wilt disease, 7 Jan 2014.
22. Africa Science News: Ethiopia, IITA partner up to save ancient false banana, 17 Dec 2013.
23. Environment Guru: Field trials of a new banana variety resistant to bacterial wilt disease to start in Kenya, 18 Sept 2013.
24. Standard Digital News, Kenya: Scientific banana trial in the works to fight wilt in Kenya, 20 Aug 2013.
25. USAID Feed The Future News: How Science and Technology Can Help Us Feed the Future, 20 June 2013.
26. The EastAfrican, Kenya: Bacterial wilt-resistant banana variety in the offing, 15 June 2013.
27. Global times, China: GMO banana trials to begin Kenya in 2014, 31 May 2013.
28. Fresh Plaza, Kenya: Bacterial wilt resistant banana variety, 31 May 2013.
29. New Vision: Kawanda develops wilt resistant banana varieties, 30 October 2013.
30. Standard Digital News: Bacterial wilt resistant banana variety to save farmers from losses, 29 May 2013.
31. Meridian: African GM Banana Trial Set to Combat Root-Eating Worm, 29 Feb 2012.

32. News from Africa: Plantain Gains Defence against Devastating Microscopic Worms, 7 April 2012.
33. Hortinews: Maize defends banana against nematodes, 10 April 2012.
34. ProMusa: Battling an invisible enemy, 28 March 2012.
35. Africa Science News: Scientists put defenses in Plantain against devastating microscopic worms, 6 April 2012.
36. CCAfrica: Plantain Gains Defence against Devastating Microscopic Worms, 10 April 2012.
37. Newstime Africa: Plantain gains defense against devastating microscopic worms, 5 April 2012.
38. Africa Newswire: Plantain gains defense against devastating microscopic worms, 7 April 2012.
39. Daily Trust, Nigeria: Researchers tackle devastating microscopic worms, 10 April 2012.
40. African Agriculture: Uganda-Trials of nematode-resistant GM banana to begin in 2012, 19 March 2012.
41. Alphagalileo: Researchers achieve breakthrough in reinforcing plantain against devastating microscopic worms, 05 April 2012.
42. Uganda Radio Network: Scientists discover defense against devastating Banana worms, 8 April 2012.
43. NewsRx: Transgenic Research- Study Findings on Transgenic Research Are Outlined in Reports from International Institute of Tropical Agriculture, 7 Aug 2012.
44. CNN: Genetic modification used to fight Uganda's banana blight, 23 March 2011.
45. Nature Biotech: GM bananas, 7 June 2011.
46. The Guardian, UK: Genetically modified bananas are neither black nor white, 22 March 2011.
47. The Guardian,UK: Ugandan scientists grow GM banana as disease threatens country's staple food, 9 March 2011.
48. American Scientist: Ugandan Scientists Grow GM Banana, 9 March 2011.
49. Beijing Today: Ugandan scientists grow GM banana as disease threatens country's staple food, 9 March 2011.
50. Global Food Security: Defeating nematode worms with GM bananas, Oct 2011.
51. Eureka Alert: Plant breeding revolution for cassava, banana, 14 Sep 2011.
52. UC Davis: Plant breeding revolution for cassava, banana, 13 Sept, 2011.
53. Check Biotech: Plant breeding revolution for cassava, banana September 14, 2011.
54. Council for Biotechnology Information: Ugandan scientists testing GM bananas with potential to resist crop disease, 11 March 2011.
55. ISAAA: Defeating Nematode Worms with GM Bananas 7 Oct 2011.
56. Check Biotech: Defeating nematode worms with GM bananas, 12 Oct, 2011.
57. Silobreaker: Defeating nematode worms with GM bananas - Global Food Security 5 Oct 2011.
58. Horti News: Genes from sweet pepper to fortify African banana against wilt, 2011.
59. World Press: Bananas Get Pepper Power, 16 Oct 2011.
60. CTA: Sweet genes arm banana crops, 3 Nov 2011.
61. Meridean Institutes: GM bananas, 10 June 2011.
62. Biotech Uganda: Field tests on GM bananas takeoff, 9 March 2011.
63. Nigerian News Direct: Genetic Modifications: IITA, others make breakthrough on bananas, 1 March 2011.
64. The Hindu, India: GM bid to fight banana disease, 9 March 2011.
65. ISAAA: Uganda Implements Field Trials of GM Bananas, 10 June 2011.
66. BIOTechNOW: Uganda Sets Aside GM Ban to Save Banana Crops, 10 March 2011.
67. Sudan Vision: Ugandan Scientists Grow GM Banana as Disease Threatens Country's Staple Food 12 March 2011.
68. ABC Information: The Benefits of Genetically Modified Crops to Small Scale Farmers, Aug 2011.
69. UTV News: Ugandan scientists grow GM banana as disease threatens country's staple food, March 9 2011.
70. Daily Monitor, Uganda: Wilt-resistant banana plant now available, says Museveni, 5 Dec, 2011.
71. Nature News: Uganda prepares to plant transgenic bananas, 1 Oct 2010.

72. Discovery news: Bananas gets pepper power, 23 Aug, 2010.
73. Crop Biotech Update: Sweet pepper genes inserted to banana to fight pest, 18 June 2010.
74. Afrol News: Ugandan scientists develop resistant banana, 15 June 2010.
75. AgBioWorld: Uganda: Sweet Genes Arm Banana Crops, 15 June 2010.
76. Fresh Plaza: Uganda: Sweet genes arm banana crops, 15 June 2010.
77. SciDev Net: Sweet genes arm banana crops, 14 June 2010.
78. Science Alert: New bananas resist disease, 16 June 2010.
79. Truthabouttrade: Uganda: Sweet genes arm banana crops, 15 June 2010
80. Africa Science News Services: Green pepper to the rescue of African bananas, 5 Aug 2010.
81. Alpha Galileo: Genes from Sweet Pepper Arm Banana Against Deadly Wilt Disease, 4 Aug 2010.
82. Bio-Medicine: Genes from sweet pepper to fortify African banana against devastating wilt disease, 6 Aug 2010.
83. BrightSurf.com: Genes from sweet pepper to fortify African banana against devastating wilt disease, 9 Aug 2010.
84. Crop Biotech Update: Green pepper to the rescue of African bananas, 6 Aug 2010.
85. CTA - Brussels Office Weblog - Sweet genes arm banana crops, 12 Aug 2010.
86. eScience News: Genes from sweet pepper to fortify African banana against devastating wilt disease, 6 Aug 2010. .
87. EurekAlert: Genes from sweet pepper to fortify African banana against devastating wilt disease, 6 Aug 2010.
88. Food Ingredients first: Genes from sweet pepper to fortify African banana against devastating wilt disease, 9 Aug 2010.
89. Food Security and Ag-Biotech News: Green pepper to the rescue of African bananas, 12 Aug 2010.
90. Fresh Plaza: Green pepper to the rescue of African bananas, 10 Aug 2010.
91. Fresh Plaza: Kenya: Banana disease cure renews hope of lifting export ban, 11 Aug 2010.
92. GENET News: Green pepper gene to the rescue of African bananas 10 Aug 2010.
93. IITA website: Green pepper to the rescue of African bananas, 5 Aug 2010.
94. Kennislink.nl: Banana with new genes in Africa (in Dutch), 11 Aug 2010.
95. Leadership: Green pepper to the rescue of African bananas, 7 Aug 2010.
96. Life Sciences World: Genes from sweet pepper to fortify African banana against devastating wilt disease, 6 Aug 2010.
97. Lockergnome: Genes from sweet pepper to fortify African banana against devastating wilt disease, 8 Aug 2010.
98. Missouri Native Plant Society: Genes from Sweet Pepper Arm Banana Against Deadly Wilt Disease, 4 Aug 2010.
99. Modern Ghana: Green pepper to the rescue of African bananas, 5 Aug 2010.
100. Next: Nigerian scientists find cure for banana disease, 5 Aug 2010.
101. PHYSORG: Genes from sweet pepper to fortify African banana against devastating wilt disease, 6 Aug 2010.
102. Russian news-making company INFOX: Genetics do bananas vaccinated of sweet pepper (in Russian) 11 Aug 2010.
103. Science Codex: Genes from sweet pepper to fortify African banana against devastating wilt disease, 6 Aug 2010.
104. Science Daily: Genes from sweet pepper arm banana against deadly wilt disease, 4 Aug 2010.
105. Science News Today: Genes from sweet pepper to fortify African banana against devastating wilt disease, 9 Aug 2010.
106. Science Technology Blog: Genes from sweet pepper to fortify African banana against devastating wilt disease, 6 Aug 2010.
107. The New Vision, Uganda: Green Pepper Genes to Fight Banana Wilt, 9 Aug 2010.
108. The Punch: Green pepper saves African bananas from pests, 11 Aug 2010.

109. News Guide.US: Genes from sweet pepper to fortify African banana against devastating wilt disease, 7 Aug 2010.
110. Web Newswire: Genes from sweet pepper to fortify African banana against devastating wilt disease, 8 Aug 2010.
111. Sunrise: Major breakthrough on banana's most devastating wilt. Aug 7, 2010.
112. Rural 21: The International Journal for Rural Development.: Green pepper to protect bananas from Xanthomonas Wilt, Vol. 44 Nr. 5/2010.
113. Food Ingredients: Green Pepper Genes to Fight Banana Wilt, 9 Aug 2010.
114. Food Security Blog: Green pepper to rescue the African bananas, 10 Aug 2010.
115. Business daily Africa: Researchers engineer resistance of African banana to fight diseases, 16 Aug 2010.
116. Fresh plaza: Researchers engineer resistance of African banana to fight diseases, 16 Aug 2010.
117. The East African: Sprucing up bananas with green pepper to fight wilt, 23 Aug, 2010.
118. The Africa report: The scientists bring hope for better bountiful crops, 8 Sept, 2010.
119. Agriculture policy in Africa: Modified banana could cure deadly disease, 19 Sept, 2010.
120. Fresh Plaza: Sweet pepper gene confers resistance to bacterial wilt. Uganda prepares to plant transgenic bananas, Oct 4, 2010.
121. The Standard, Kenya: Remedy to fight banana disease, 8 Nov 2010.
122. The Punch: Green pepper saves African bananas from pests, 8 Nov 2010.
123. News Direct: Genetic Modifications: IITA, others make breakthrough on banana, 3 Jan 2011.
124. Cell Daily News Aggregator: Banana gets pepper power, 23 Aug 2010.
125. Crop Biotech Update: Sweet pepper *Hrap* gene improves resistance to banana Xanthomonas wilt, 8 OCT 2010.
126. GMO Journal: Uganda Testing Genetically Modified Bananas, 15 Dec 2010.
127. New Agriculturist: Green pepper genes help bananas fight disease, Aug 10, 2010.
128. Daily Monitor, Uganda: Banana bacterial disease remedy found, 18 Aug 2010.
129. The Guardian, UK: Deadly disease stalks banana production in eastern Africa, 28 April, 2009.
130. Capital FM Kenya: Banana farming under threat from BXW, 27 April 2009.
131. Daily Monitor, Uganda: Uganda loses trillions to banana wilt- study, 1 May 2009.
132. The Standard, Kenya: Disease a threat to bananas, 30 April 2009.
133. Daily Nation, Kenya: Disease could wipe out bananas, 11 May 2009.
134. The Monitor, Uganda: Scientists develop easy ways to spot banana disease, 7 June 2009.
135. Molecular Plant Breeding: Banana farming under threat from Banana Xanthomonas Wilt (BXW) disease, 28 April 2009.
136. Africa News: Uganda loses \$8bn to banana disease, 28 April 2009.
137. Africa Science News Services (ASNS): Deadly disease stalks African banana production, 27 April 2009.
138. HANA News Online: Deadly disease stalks banana production in eastern Africa, 27 April, 2009.
139. Uganda Pulse: Uganda Business News: Uganda loses billions due to banana disease, 29 April 2009.
140. Fresh Plaza, Kenya: Banana farming under threat from BXW, 28 April 2009.
141. 21food.com: Kenya: Banana farming under threat from BXW, 29th April 2009.
142. Crop Biotech Update: Banana Disease Threatens Farmers' Livelihood in Sub-Saharan Africa, 30 April 2009.
143. Sunrise: Deadly wilt to halve Banana production in next 10 yrs, May 1 2009.
144. Radio Sapientia, Uganda: Banana farmers advised, May 4 2009.
145. African Agriculture: Uganda suffers big losses from banana wilt, May 1 2009.
146. Fructidor : Banana farming in central and east Africa under threat from wilt disease, May 6 2009.
147. SciDev Net: Scientists develop easy ways to spot banana disease, 4 June 2009.
148. Biotechnology News: Scientists develop easy ways to spot banana disease, 4 June 2009.
149. Bussiness Times: Scientists develop easy ways to spot banana disease, 18 June 2009.
150. AGFAX Radio : Winning the war on banana wilt? June 2009.

151. IRIN: EAST AFRICA: Banana blight puts livelihoods at risk, 17 June 2009.
152. Fresh Plaza: East Africa: Banana blight puts livelihoods at risk, 19 June 2009.
153. African Press Int.: Banana blight puts livelihoods at risk – Bananas and plantains are the world's fourth most important food crop after rice, wheat, and maize, 18 June 2009.
154. Reuters AlertNet: East Africa:Banana blight puts livelihoods at risk, 18 June 2009.
155. ReliefWeb: East Africa:Banana blight puts livelihoods at risk, 17 June 2009.
156. AllAfrica.com: East Africa:Banana blight puts livelihoods at risk, 17 June 2009.
157. Science Times Magazine: Banana Bacterial Wilt: Biotechnology Research Against BBW In Progress: Is Hope On The Way? vol 2, issue 4, 2009.
158. Inter Press Service News: A Better Banana For Africa, 14 Oct. 2008.
159. CGIAR: Story of the Month: Making the Most of Banana, Sept 2008.
160. Geographical: Battling the Banana Plague, magazine article by Charlie Furniss,, Vol. 79, February 2007.
161. Msafiri (Kenyan Airways magazine): Save our Bananas. Nov 2006.
162. IITA News: Fighting the East African *Xanthomonas* wilt pandemic, 2006.
163. SciDev Net: GM bananas to fight wilt in Africa, 28 Nov 2006.
164. Monsanto-UK News: GM Bananas to Fight Wilt in Africa, 9 Dec 2006.
165. African Crops News: GM bananas to fight wilt in Africa, Dec 2006.
166. GENET News: GM bananas to fight wilt in Africa, Dec 2006.
167. AgBioView Newsletter on Agricultural Biotechnology: GM bananas to fight wilt in Africa, 5 Dec 2006.
168. CropBiotech Update: Engineering wilt-resistant bananas for Africa, 15 Dec 2006.
169. AGNET: Engineering wilt-resistant bananas for Africa, 15 Dec 2006.
170. IITA News: GM bananas to fight wilt in Africa, 9 Dec 2006.
171. New Vision, Uganda: Banana wilt cure expected in 10 years, 21 Sept 2005.
172. Africa Geographic (Popular Magazine of South Africa): Banana – pick of bunch of GM? Sept 2005.