

LILIAN WANJIRU MBUTHIA

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EDUCATION BACKGROUND

PhD, Plants Soils and Insects,

Aug 2014

Concentration: Environmental Soil Science

University of Tennessee, Knoxville

Dissertation topic: Long term impacts of tillage, cover crops, and nitrogen rates on soil quality and microbial community dynamics under continuous cotton production in West Tennessee.

Advisor: *Dr. Neal S. Eash*

MSc. International Horticulture,

Sep 2009

Major: Phytopathology and Entomology

Leibniz Universität Hannover, Germany

(Magna cum laude)

Thesis Topic: Interactive effects of arbuscular mycorrhiza fungi (AMF) with biocontrol organisms on soil-borne diseases of tomato caused by *Fusarium oxysporum*. Advisor: *Dr. Henning von Alten*

BSc. Horticulture,

Apr 2005

Jomo Kenyatta University of Agriculture

& Technology (JKUAT), Kenya

(2nd Upper Class Honors)

Research topic: The use of banana bunching covers to reduce pests and disease incidents and improve post-harvest quality of bananas. Advisor: *Prof. Esther Kahangi*

PROFFESIONAL INTERESTS

Special interest in Agricultural Management Practices that enhance Soil Fertility, Sustainable Crop Production and Environmental Quality. My specific professional interests include:

- ❖ Research on the impact of different agricultural practices on soil physicochemical and biological properties, their interactions and resulting influence on soil microbial diversity and biogeochemical nutrient cycling.
- ❖ Advocating sustainable agricultural management systems in Africa including but not limited to nutrient management, crop density and intensification, cropping system management, and incorporating conservation agriculture management principles.
- ❖ Promoting relevant agricultural education and training in both formal and informal settings especially including the development of curriculum and training materials at grass root levels and at tertiary education systems

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EXPERIENCE

Sanergy Ltd

Jan 2015-Present

Soil Science Specialist

- ❖ Research and product development on re-use of treated bio-solids for agricultural production
- ❖ Research, monitor, and improve the quality of Sanergy's agricultural products in order to deliver optimum value to the customer
- ❖ Infuse customer development efforts with agronomic expertise in order to help to fuel sales growth
- ❖ Ensure agricultural products are compliant with international and local standards
- ❖ Certification of agricultural products with relevant regulatory bodies like KEPHIS and KEBS
- ❖ Organize farmer field day trainings and product promotional activities

The University of Tennessee,

Jan 2012- Dec 2014

Department of Biosystems Engineering and Soil Sciences

Graduate Research and Teaching Assistant (GRA/TA)

- ❖ Research focus on soil quality and characterization of microbial community structure, activity and function under conventional tillage and conservation agriculture management practices
- ❖ Graduate Teaching Assistant (GTA) for three courses:
Introduction to Soil Science (ESS 210): Instructing one lab section of 25-30 students, and grading of lab reports and exams of 95 students.
Soils and Civilization (ESS 120): Lectured and assisted with class organization for a class of 235 students
Soil Nutrient Management and Fertilizers (ESS 330): Assisting with class organization and lab activities

The University of Tennessee

Aug 2010-Dec 2011

Department of Entomology and Plant Pathology

Graduate Research Assistant (GRA)

- ❖ Research on breeding and development of dogwood ornamental tree resistance to *Powdery mildew*. Methods applied include: Development of Short Sequence Repeats (SSR) genomic libraries for the selection of resistance genes.

Osho Chemical Industries Ltd, Nairobi-Kenya

June 2005-Oct 2007

Technical Customer Service Manager

- ❖ Trained technical field staff on the application and use of the companies agrichemical products and services
- ❖ Coordinated production, marketing & sales, and efficient delivery of products and services
- ❖ Planned and coordinated promotional activities and trainings
- ❖ Developed simple training materials (guides) on production and management of vegetables, fruits and cereals.
- ❖ Responded to questions arising from Radio promotional programs focused on informing farmers on crop management practices and use of agrochemical products.

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ADDITIONAL RESEARCH ENHANCEMENT TRAININGS AND EXPERIENCE

- ❖ Certified Soil Scientist in Fundamentals of Soil Science by the Soil Science Society of America (SSSA). **June 2014**
- ❖ Laboratory skill training at the **USDA ARS, Lubbock, TX station Soil Microbiology and Biochemistry Lab**: Attained expertise on biochemical techniques used in assessment of soil microbial communities as well as methods and procedures to assay the activities of enzymes that play a role in carbon, nitrogen and phosphorous cycling through organic matter decomposition and organic compound mineralization in soils. **Aug-Sept, 2013**
- ❖ Certificate of training on **Good Teaching Practices** from University of Tennessee, Knoxville, Tennessee. **January to April 2012.**
- ❖ Certificate of laboratory training on **Molecular Biology Techniques** from Leibniz Universität Hannover, Germany. **April, 2010**
- ❖ Certificate of training on **Quality and Post-Harvest Management in International Horticultural Production Chains of Fresh Plant Produce**. European-Intensive training program Hannover, Germany. **May, 2008.**
- ❖ Certificate of training on **Safe Use of Pesticides and Spraying Techniques** from the Agrochemical Association of Kenya. **June 2006**
- ❖ Student internship at **KleinWanzlebener Saatzucht (KWS SAAT AG)** a German based research institution that focuses on breeding and development of superior maize and wheat hybrid seed. Skills attained include: Techniques on development and selection of double haploid lines in maize and wheat. Phytopathological analysis techniques for selection of disease resistance plants. **March-April 2008**
- ❖ Student Internship at **Agricultural Extension Services, Ministry of Agriculture (Uasin Gishu District), Kenya**. Gained experience on participatory rural appraisal of projects; Taught and trained farmers on good agricultural practices and offered technical expertise on crop production and management techniques. Gained practical experience on production and management of large scale flower and fresh produce production.

SKILLS AND EXPERTISE

- ❖ Research skills in methods applied to soil quality assessment by microbiological, molecular and genomic techniques
- ❖ Skills in bio statistical analysis of biological data and multivariate data analysis applications of SAS and R-statistical packages
- ❖ Bioinformatics statistical analysis of metagenomic sequence data using open source biostatistics programs like MOTHUR, and Qiime
- ❖ Language skills: Spoken and written English, Swahili, and Kikuyu. Can converse and read some German.

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AWARDS AND PROFESSIONAL SOCIETY MEMBERSHIP

- ❖ Member of the American Society of Agronomy/Soil Science Society of America (SSSA)
- ❖ Member of the American Phytopathological Society
- ❖ Member of the Gamma Sigma Delta Agricultural Honor Society
- ❖ Member of Horticultural Association of Kenya (HAK)
- ❖ Recipient of the Elsie L Crenshaw Student Award, **Jan 2012**

OUTREACH ACTIVITIES AND INTERESTS

- ❖ Participated in a forum focused on generating ideas of **reforming the agricultural education system of Kenya** organized by JKUAT, a leading agricultural university in Kenya held in 2006.
- ❖ Actively involved in dissemination and training of local farmers in Kenya on **the use of banana bunching covers, an innovative technique** aimed at reducing pest and disease incidences as well as improve quality production of bananas. This was based on the research topic I did for my undergraduate Bachelor's degree training. **2005-2006**
- ❖ Developed curricula and other innovative educational materials in agriculture and soil science for middle school and high school teachers after successfully applying the class and materials with several groups of students at the University of Tennessee, Knoxville. This has been a great opportunity for raising awareness of agricultural sciences in the primary and secondary school systems and encouraging students to pursue these important areas of studies

PUBLICATIONS/SCIENTIFIC CONFERENCE PRESENTATIONS

Publications:

O'Dell, D., **Mbuthia, L.W.**, Lambert, D.M., and Eash, N.S. (2013). *Soils and Civilizations: Using a General Education Course to Teach Agricultural Relevance.*

Mbuthia, L.W., Molefi Mpheshea, Acosta-Martinez, V., DeBruyn, J., Schaeffer, S., Tyler, D., Walker, F. R., and Eash, N. S. (2014?) Tillage, Cover Crops, and Nitrogen Fertilization Effect Soil Quality, Microbial Community Structure and Function in a Long-Term (31yrs) Continuous Cotton System. **Under review for submission to Soil Biology and Biochemistry**

Mbuthia, L.W., Layton Alice, Acosta-Martinez, V., DeBruyn, J., Schaeffer, S., Tyler, D., Walker, F. R., and Eash, N. S. (2014?) Nitrogen Fertilizer, Cover Crops and Tillage Effects on Soil Bacteria Taxonomic Composition in a Long-Term (31 Years) Continuous Cotton Study In West Tennessee. **Under development for publication in Applied Soil Ecology Journal**

Scientific Forums Presentations and Abstracts:

Mbuthia L. W., von Alten, H., Grunewaldt-Stöcker, G. (2009). The Interactions of *Arbuscular Mycorrhiza Fungi* (AMF) with other Bio-control Agents in the Control of *Fusarium oxysporum f. sp. lycopersici*. **Tropentag, Hamburg, Germany**

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Mbuthia, L.W., Acosta-Martinez, V., DeBruyn, J., Schaeffer, S., Tyler, D., Walker, F. R., and Eash, N. S. (2013). Characterization of the Microbial Community Structure after Long Term Conservation Agriculture Practices under Continuous Cotton Production in West Tennessee. **ASA, CSSA, and SSSA International Annual Meetings, Tampa Florida**

Mbuthia, L.W., Molefi Mpheshea, Acosta-Martinez, V., DeBruyn, J., Schaeffer, S., Tyler, D., Walker, F. R., and Eash, N. S. (2014). Microbial structure and soil quality under different cover crops, nitrogen rates and tillage options in a long Term (31 years) continuous cotton production in West Tennessee. SANREM-CRSP USAID Annual Meeting. Washington DC

REFERENCES

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Dr. Verónica Acosta-Martínez, Ph.D.
USDA-ARS, Lubbock, TX
Soil Microbiologist and Biochemist
Lead Scientist, Sustainable Agro-Ecosystems that Control Soil Erosion and Enhance the Environment
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<http://www.ars.usda.gov/pandp/people/people.htm?personid=21820>