

# CURRICULUM VITAE



## **Dr. Cecilia Mbithe Mweu**

Research Fellow

Institute for Biotechnology Research

Jomo Kenyatta University of Agriculture and Technology

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## **Academic background**

2008-2012: PhD. (Biotechnology), JKUAT, Kenya.

2002- 2004: M.Sc. (Natural Products and Biotechnology), MAICH, Greece.

2001-2002: Post graduate Diploma (Natural Products and Biotechnology), MAICH, Greece.

1996-2000: B.Sc. (Botany and Zoology), Nairobi University.

1991-1994: KCSE, Precious blood secondary school, Kilungu.

1983-1990: KCPE, Tala S.A Primary school, Tala.

**Profession:** Biotechnologist with interest in tissue culture, microbiology, molecular genetics, genetic engineering and conservation.

## **CAREER OBJECTIVE**

To fully utilize, my potential in training and research in order to improve teaching quality and crops with an aim of increased yield, quality, food and improved species. Also to take plant biotechnology research to higher and current advances using high technologies.

**SKILLS SUMMARY** Plant Tissue Culture, Bioprospecting, Molecular Biology, genetic engineering, Microbiology, Crop Production, Plant Propagation, Data Collection and Analysis, Proposal writing, Scientific Research Writing and Presentation.

## **Working Experience**

**2013 to date:** Research Fellow, Institute for Biotechnology Research, Jomo Kenyatta University of Agriculture and Technology, Kenya.

**2007 to 2012:** Assistant Research Fellow, Institute for Biotechnology Research, Jomo Kenyatta University of Agriculture and Technology, Kenya.

**2004 - 2007:** Research Scientist - Department of Molecular genetics, National Museums of Kenya, Kenya.

### **Research Interest**

1. Genetics and tissue culture of Coconut, Jatropha, sweet potato, Roses, Mpelepele to improve planting materials and yields
2. Conservation of biodiversity (tropical crops and forests) and sustainable management of ecosystems

### **Publications**

Mayoli R. N., Isutsa D. K., Nyende A.B. and **Mweu C.M.** Effective regeneration of high value coffee plantlets through direct somatic embryogenesis using synthetic equivalents of characterised endogenous biochemical. *Global journal of bioscience and biotechnology*. Vol. 7 (3) 2018: 425- 434.

Asunta Mukami, Alex Ngetich , **Cecilia Mweu**, Mutemi Muthangya, Richard Oduor, Mathew Ngugi and Wilton Mbinda. Rapid and efficient plant regeneration from shoot apical meristems of finger millet [*Eleusine coracana* (L.) Gaertn.] via direct organogenesis. *African journal of Biotechnology*. Vol. 17(29), pp. 898-905, 18 July, 2018.

Alex Ngetich, **Cecilia Mweu**, Mathew Ngugi, Asunta Mukami, Henry Ojulong and Wilton Mbinda. Efficient plant regeneration protocol for finger millet (*Eleusine coracana* (L.) Gaertn) via somatic embryogenesis. Vol. 17(21), pp. 660-667, 23 May, 2018

Mayoli R. N., Isutsa D. K., Nyende A.B. and **Mweu C.M.** Evaluation of Endogenous Sugars, Chlorogenic Acid and Caffeine Associated with Direct *Somatic Embryogenesis* of Coffee (*Coffea arabica* L.). *Journal of Advances in Agriculture*. Vol.8 2018 ISSN 2349-0837.

Mayoli R. N., Isutsa D. K., Nyende A.B. and **Mweu C.M.** Evaluation of Endogenous Phytocomponents and Amino Acids Associated with Direct *Somatic Embryogenesis* of Coffee (*Coffea arabica* L.). *Journal of Advances in Agriculture*. Vol.8 2018 ISSN 2349-0837.

Mayoli R. N., Isutsa D. K., Nyende A.B. and **Mweu C.M.** Relationships of Selected Endogenous Factors Associated with Direct *Somatic Embryogenesis* of Coffee (*Coffea arabica*). *Journal of Advances in Agriculture*. Vol.8 2018 ISSN 2349-0837.

Joshua Kiilu Muli, Nancy Budambula, **Cecilia Mweu** and Sylvester Elikana Anami. Drought Response in Selected Tropical Inbred Maize Lines and Relative Expression of *PARP2* Gene under Limited Water Conditions. *Plant Science publishing*. Vol. 6, No. 1, 2018, pp. 8-15.

Bashiloni Naaty, **Cecilia Mweu Mbithe**, Aggery Bernard Nyende, Peter Njenga, Joshua Kiilu Muli. *In Vitro* Regeneration via Somatic Embryogenesis of *Schizogygia Coffeoides* Baill (Mpelepele). *American Journal of Plant Biology*. Vol. 2, No. 2, 2017, pp. 66-72.

Joshua Kiilu Muli, **Cecilia Mweu**, Nancy L. M. Budambula, and Sylvester E. Anami. Yeast Extract Peptone Based Co-cultivation Media Promotes Transient GUS Expression

in Tropical Maize Genotypes. Asian Journal of crop Science. Vol. 9 (3): 71-81, 2017.

**Cecilia M. Mweu**, Aggrey Nyende and Justus Onguso. "Efficient *Somatic embryogenesis* of *Jatropha curcas* L. from petiole and leaf discs." International Journal of Biotechnology and Molecular Biology Research 7.3 (2016): 29-35.

Mary C. Imbo, Nancy L. M. Budambula, **Cecilia Mweu**, Joshua Kiilu Muli and Sylvester E. Anami. Genetic Transformation of Sweet Potato for Improved Tolerance to Stress: A Review Advances in Life Science and Technology Vol.49, 2016 ISSN 2224-7181.

Joshua Kiilu Muli, Nancy L. M. Budambula, **Cecilia Mweu**, Mary C. Imbo and Sylvester E. Anami. Genetic Improvement of African Maize towards Drought Tolerance: A Review Advances in Life Science and Technology Vol.48, 2016 ISSN 2224-7181.

**Cecilia Mbithe Mweu**. Somatic embryogenesis, molecular characterization and genetic transformability of the Kenyan *Jatropha* (*Jatropha curcas* L.). Doctoral thesis 2012.

Johnstone Omukhulu Neondo, **Cecilia Mweu Mbithe**, Peter Kariuki Njenga and Catherine Wangari Muthuri. Phytochemical characterization, antibacterial screening and toxicity evaluation of *Dichrostachys cinerea*. International journal of medicinal plant research 2012, Vol. 1 (4), pp. 032-037.

Muiruri N. Stella, **Mweu M. Cecilia** and A. B. Nyende. Micropropagation protocols using nodal explants of selected Rose (*Rosa hybrida*) cultivars. African journal of horticultural Science Vol 4 2011 ISSN 1998-9326.

Belhocine, S., **Mbithe, C.**, Dimitrova, I., Kampranis, S.C. and Makris A. M. 2004. Yeast mutants resistant to Bax lethality reveal distinct vacuolar and mitochondrial alterations. Cell Death Differ. 2004 Aug; 11(8): 946-8.

**Cecilia Mbithe Mweu**. Isolation of yeast genes restoring sensitivity to Bax tolerant mutant. Bax lethality in yeast affects the vacuoles in addition to mitochondria in a distinct manner” MSc. Thesis, 2003.

#### **Booklet**

Patrick M., Alice W., Peris K., Paul K., Humprey G., **Cecilia M.**, Mathias M. 2010. Selected useful plant species of Tharaka, Kenya. A guide to seed collection, propagation and use. Vol. 1.

#### **Patent**

**Mweu, C. M.**, Onguso, J. M., Rugetho, J.N. and Nyende A. B. 2008. Application No. KE/P/2008/000783(1). Regeneration protocol of Aloe species.

#### **Innovations**

Developed an *In vitro* regeneration protocol for coconut (*cocos nucifera*) and released the plantlets to the field (*KALRO Mtwapa and Matuga*) in 17<sup>th</sup> August 2016.

### **Plant tissue culture Protocols developed**

In vitro regeneration of Rose cultivar – 2013.

In vitro regeneration of Passion fruit varieties -2013.

### **Conference proceedings**

1. **Mweu, C.**, Wangai L. and Wacheke G. 2012. Characterization, Regeneration and *Agrobacterium tumefaciens*-mediated transformation of *Jatropha Curcas*, NCST workshop 8th August, Nairobi.
2. Muiruri N. Stella, **Mweu M.** Cecelia and A. B. Nyende 2010. ROSE (*Rosa hybrida*) Micropropagation from nodal explants of cultivars HAK, JKUAT.
3. **Mweu, C.M.**, Onguso, J. M., Rugetho, J.N. and Nyende A. B. 2008. Regeneration protocol of Aloe species. 1<sup>st</sup> all Africa Congress on Biotechnology, 22<sup>nd</sup> -26<sup>th</sup> September, Nairobi. Pg 260-265
4. **Mweu, C.M.**, Onguso, J. M., Rugetho, J.N. and Nyende A. B. 2008. Mass micropropagation of *aloe vera* L. through leaf derived callus. JKUAT Conference

### **Trainings**

11-th – 13<sup>th</sup> July 2018

Partnerships for enhanced engagement (PEER) & COACH Women in Science Mentoring Program, Kigali Rwanda.

25<sup>th</sup> – 26<sup>th</sup> January 2018

Women for biosciences science communication training program, Nairobi, Kenya.

16<sup>th</sup> June 2017

Validation workshop for revised National Biotechnology Development policy document, Nairobi, Kenya.

20<sup>th</sup> April 2017

Inaugural forum on *Women in Bioscience*, Nairobi, Kenya.

7<sup>th</sup> -10<sup>th</sup> June 2016

Advanced Bioinformatics Training, Nairobi, Kenya.

24<sup>th</sup> October to 14<sup>th</sup> November 2014

Regional training on Plant Genetics Resources and seeds, India.

6<sup>th</sup> - 8<sup>th</sup> August 2014

International workshop on open data for science and sustainability in developing countries, Nairobi, Kenya.

19<sup>th</sup> - 20<sup>th</sup> December 2013

Regulations on Handling, Storage, Packaging and Transportation of Genetically Modified Organisms, Nairobi Kenya.

2<sup>nd</sup> December to 6<sup>th</sup> December 2013

Ruforum training on Food systems: from agronomy to human health at Entebbe, Uganda.

29<sup>th</sup> July to 2<sup>nd</sup> August 2013

IAEA/AFRA Regional Training on *Molecular Marker and Biochemical Characterization* at the University of Eldoret.

14<sup>th</sup> June 2013

Stakeholders' workshop on handling, packaging and transportation of GMOs.

May 2013

Pedagogy training at JKUAT in Nairobi, Kenya.

6<sup>th</sup> August to 9<sup>th</sup> August 2012

Strengthening National Capacity for Biosafety Management by National Biosafety authority (NBA) at Nairobi Kenya.

6<sup>th</sup> August to 9<sup>th</sup> August 2012

Executive workshop on Agricultural Biotechnology in Kenya at AICAD JKUAT , Juja.

8<sup>th</sup> June 2012

Insider guide to getting published by emerald publishing group at JKUAT in Nairobi, Kenya.

20<sup>th</sup> March 2012

Tools and process of mentoring by gender and mentoring center JKUAT in Nairobi, Kenya.

8<sup>th</sup> November to 9<sup>th</sup> November 2011

The use of social media for teaching and research by INASP and JKUAT library at in Nairobi, Kenya.

17<sup>th</sup> May to 28<sup>th</sup> May 2010

Attended an international course on Agriculture in transition at the international Agricultural centre at the Wageningen University in the Netherlands.

24<sup>th</sup> to 26<sup>th</sup> February 2010

Second National conservation assessment and management workshop for prioritization of medicinal plants of Kenya AICAD, JUJA.

29<sup>th</sup> September to 3<sup>rd</sup> October 2008

Agro forestry and tree genetics: making molecular markers meaningful at Nairobi, Kenya.

April 2006 to September 2006

Production and development of virus resistant plants using modern Plant Biotechnology techniques at RLP Agrosience GmbH, Germany.

6<sup>th</sup> March – 31<sup>st</sup> March 2006

Research and Implementation of Biotechnology, Biosafety and International Regulations, Genius GmbH, Germany.

6<sup>th</sup> Febraury- 3<sup>rd</sup> March 2006

*Theoretical and practical basic course* (Development Oriented Biotechnology / Plant Genetic Resources) at Martin Luther University Halle, Germany.

**Teaching**

University teaching since 2012 of the following units to postgraduate students

IBR 3106: Plant Micro propagation

IBR 3104: Biosafety, bio policy and bioethics

IBR 3119: Seminars and Report writing

Short course on Plant tissue culture and molecular techniques

**Postgraduate Theses Supervised**

<b>Student</b>	<b>Level</b>	<b>Title</b>	<b>Status</b>
1. Kibet Ngetich Alex	PhD.	Enhancement of drought tolerance in finger millet by expressing isopentenyl transferase gene. <b>JKUAT.</b>	On going
2. Rose Nduku Mayoli	PhD.	Determination of selected endogenous factors associated with somatic embryogenesis of coffee ( <i>coffea arabica</i> l.) cultivar Ruiru 11. <b>Chuka University.</b>	Defended
3. Margaret A. Odeph	PhD.	Distribution, molecular characterization and screening for <i>magnaporthe oryzae</i> (blast) tolerance genes in Kenyan finger millet. <b>JKUAT.</b>	On going
4. Akello Sundy	PhD.	Identification of secondary metabolites conferring resistance to pests and diseases in Kenyan coconut germplasm and mass production of elite varieties. <b>JKUAT.</b>	On going

4. Agnes Omire	PhD.	Diversity and transcriptomics of doum palm. <b>JKUAT.</b>	On going
5. Joshua Muli	MSc.	Characterization of transgenic maize lines over- expressing parp hairpin construct for drought stress tolerance. <b>JKUAT.</b>	Graduated
6. Mary Imbo	MSc.	Competence to agrobacterium -mediated transformation and expression analysis of nudx gene in selected farmer-preferred sweet potato. <b>JKUAT.</b>	Graduated
7. Bashiloni Naaty	MSc.	Somatic embryogenesis and anti-microbial activity assay of Mpelepele ( <i>schizozygia coffaeoides</i> ). <b>JKUAT.</b>	Graduated
8. Kamau Jacob Ngugi	MSc.	Characterization of the CRT Y gene in paracoccus SP.BG 37 for the potential commercial application in the production of carotenoids. <b>JKUAT.</b>	On going
9. Chepkemoi Caren	MSc.	Micropropagation of <i>cocos nucifera</i> L through somatic embryogenesis and callus induction from leaf and embryo explants for mass propagation. <b>JKUAT.</b>	On going
10. Eunice M. Kithaku	MSc.	Isolation and Molecular Characterization of Fungal contaminants from banana tissue culture laboratory, Kenya. <b>JKUAT.</b>	On going
11. Kepue S. Mercy	MSc.	Genetic diversity of Taro ( <i>Colocasia esculenta</i> L.) and regeneration of different genotypes through organogenesis in Kenya. <b>JKUAT.</b>	On going
12. Kimani Ngata	MSc.	In vitro regeneration, morphological and	On going

molecular characterization of *Osyris lanceolata*. **JKUAT.**

### **Post Graduate Theses Examined**

**Richard K. Wekesa (2016)**, Effect of 2, 4-D and NAA concentration on callogenesis, somaclonal variation and sugarcane mosaic virus elimination in selected sugarcane varieties. **PhD, JKUAT.**

**Robert Gitahi Kamau (2016)**. Morphological and genetic diversity of Mango accessions in the eastern region of Kenya using SSR markers. **MSc. JKUAT.**

**John Mwangi Ithiru (2016)**, Determination of genetic diversity and resistance to *Pseudomonas syringae* pv. *Garcae* in selected coffee genotypes in Kenya. **MSc. JKUAT.**

**Ndungu Kimani Cyrus (2015)**. Screening of Kenyan commercial wheat varieties for resistance to stem rust fungus. **MSc. JKUAT.**

**Lubabali Hudson (2015)**. *In vitro* regeneration of selected commercial Coffee (*Coffea Arabica* L.) varieties in Kenya. **MSc. JKUAT.**

**Okoyo J. Masanga (2015)** Evaluation of transgenic Maize and groundnuts (*Arachis hypogaea* L) transformed with antiAflatoxin RNA Interference genes constructs. **MSc. JKUAT.**

### **Resource Mobilization and Fund Raising**

	<b>Title</b>	<b>Role</b>	<b>Funding /year</b>
1.	Pathogen diversity, host-plant resistance and disease management strategies of finger millet <i>Magnaporthe oryzae</i> blast in Kenya	Collaborator	National Research Fund, <b>Kshs. 17.5 Million.- 2018</b>
2.	Collection, conservation and characterization of economically important doum palm: towards increased food security in Kenya	Principal - investigator	National Research Fund , <b>Kshs. 20 Million - 2017</b>



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|-----|--|--------------------------|---|
| 3.  | Micropropagation of <i>cocos nucifera</i> L through somatic embryogenesis and callus induction from leaf and embryo explants for mass propagation. | Principal - investigator | National Research Fund , <b>Kshs. 450,000 - 2017</b>                                |
| 4.  | Isolation and Molecular Characterization of Fungal contaminants from banana tissue culture laboratory, Kenya.                                      | Principal - investigator | National Research Fund , <b>Kshs. 285,000 - 2017</b>                                |
| 5.  | Enhancement of drought tolerance in finger millet by expressing isopentenyl transferase gene.  | Principal - investigator | RUFORUM, <b>Kshs. 1.5 Million – 2016.</b>   |
| 6.  | Regeneration of Kenyan coconut through <i>Somatic embryogenesis</i> .  | Lead researcher          | KCDA 2012 to date, <b>3 Million</b>   |
| 7.  | Regeneration of Passion fruits hybrids ( <i>Passiflora edulis</i> ) hybrid varieties – KPF 4, KPF 11 and KPF 12 through organogenesis.             | Principal - investigator | Jomo Kenyatta University of Agriculture and Technology Enterprises (JKUATES) – 2011 |
| 8.  | Characterization, Regeneration and <i>Agrobacterium tumefaciens</i> -mediated transformation of <i>Jatropha Curcas</i>                             | Principal investigator   | National Council of Science and Technology, Kenya – <b>Kshs.1.6 Million</b> 2009    |
| 9.  | Conservation of useful plants in Tharaka District – Kenya ( <i>In vitro</i> propagation of <i>Melia Volkensii</i> and <i>Osyris lanceolata</i> ).  | Co - investigator        | Royal Botanical Gardens, Kew, UK – 2008   |
| 10. | Regeneration of four Roses ( <i>Rosa hybrida</i> ) hybrid varieties – Golden, Bonaire, Versilia and Holiday through organogenesis.                 | Principal - investigator | JKUATES – 2008  |
| 11. | Regeneration of aloe species through organogenesis   | Principal investigator   | JKUATES – 2007  |

### **Administrative responsibilities**

**2008 to date:** Research in charge of regulation and monitoring of IBR Laboratories, developed the IBR Labs code of conduct.

**2014 to date:** Member of Performance and Appraisal committees.

**2014 to date:** Banana Project technical committees.

**2008 to date:** Started, chaired and committee member of IBR Welfare Association

**2013 to 2015:** IBR teaching time tabler.

**2012 to 2014:** IBR Gender and mentoring representative

**2008 to 2010:** IBR attachment student coordinator.

**2008 to 2010:** IBR teaching time tabler.

### **Membership of Professional and other Societies**

1. African Women in Bioscience
2. InWent –Alumni.
3. African Biotechnology Stakeholders Forum (ABSF).
4. The Netherlands Alumni Association of Kenya (NAAK)
5. Member of Institute for Biotechnology Welfare Association.

### **Awards**

InWent, Germany award for technology transfer after successful course completion on Development Oriented Biotechnology / Plant Genetic Resources, 2006.

### **Board of Management**

**2015:** Appointed by Ministry of Education, Science and Technology as member of the Board of Management for Fr. Heeran Girls High School. Member of the executive committee and chairperson academic committee.

**2011:** Appointed by Ministry of Education as member of the Board of Management for Fr. Heeran High School. Member of the executive committee and chairperson academic committee.

**2008:** Appointed by Ministry of Education as member of the Board of Management for Fr. Heeran High School. Member of the executive committee

### **Giving Back to Community**

2012 to date: Giving volunteer weekly services and running a tree planting programme at the Vincentian Retreat center Thika.

2008 to date: Mentoring Fr Heeran girls High School.

2008 -2014: Secretary of the Wikwatyo welfare Association, JKUAT.

2012 -2015: Secretary of the Twitethye welfare group committee.

**2012 – 2015:** Secretary St. Rita Small Christian Community, St Augustine, Juja.

Supported needy students at JKUAT and Fr. Heeran Girls High school.

### **Consultancies and Collaborations**

Stakeholders Workshop Program and Draft Reviewed National Biotechnology Development Policy June, 2017.

Validation of the revised national biotechnology development policy 2017, at royal orchid Azure hotel, Westland's, Nairobi June 16<sup>th</sup> 2017.

Development of Fr. Heeran Girl's strategic plan 2017- 2022

*In vitro* propagation of the Kenyan coconut (*Coco nucifera*). Joint research project between JKUAT and the former KCDA (Currently the Nuts and Oil crops Directorate) 2013 to date.

Revision of draft Biosafety (Handling, Packaging, Storage and Transportation) Regulations - 2013, at Kenya School of Monetary Studies (KSMS) from 19 - 20 Dec 2013.

Development of Fr. Heeran Girl's strategic plan 2012- 2016

Strategic planning workshop at Kolping conference center, Machakos 2012, Development of strategic plan for secondary schools in Machakos County.

### **Keynote speaker**

Fr Heeran girls High School, Chairperson BOM speech, Annual General Meeting 2017.

### **REFEREES**

#### **Prof. Aggrey B. Nyende**

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Research  
Jomo Kenyatta University of Agriculture  
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