

CURRICULUM VITAE

George Simba Mahuku

Address: Plant Pathologist / Molecular biologist (Bean program)

CIAT - International Center for Tropical Agriculture

Apartado Aereo 6713, Cali, COLOMBIA, South America

Tel: (57-2) 445 0000; Fax: (57-2) 445 0073

E-mail: g.mahuku@cgiar.org

Website: <http://www.ciat.cgiar.org>

Mailing address in USA: CIAT, 7343 NW 79 Terrace, Medley, FL 33166, USA.

Specialization:	Research Scientist, Pathologist / Molecular Biologist
International Research:	Centro Internacional de Agricultura Tropical (CIAT)
Experience:	<p>CIAT, Cali, Colombia (1998 – present) Pathologist / Molecular Biologist – Bean Project. <i>Responsible for research on molecular basis of host /pathogen interaction of some bacteria and fungal diseases of beans, and developing integrated disease management strategies for small-scale farmers in Latin America and Africa.</i></p> <p>Prince Edward Island Potato Board, Canada (1997-1998) Senior Research Fellow, Potato Project. <i>Responsible for research on developing molecular diagnostic assays for soil borne pathogens of potato (<i>Verticillium wilt complex</i>), elucidating the population structure of this pathogen, and understanding host / host pathogen interaction.</i></p> <p>University of Guelph, Canada (1995-1997) Post-doctoral fellow, Department of Environmental Biology. <i>Responsible for developing IPM components for managing turfgrass diseases and elucidating the population structure of several turfgrass pathogens.</i></p> <p>University of Guelph, Canada (1992-1995) PhD studies <i>Responsible for developing molecular based assays for studying host-pathogen (the fungus <i>Leptosphaeria maculans</i> / oil seed rape) interactions.</i></p>

Department of Research and Specialist Services, Harare, Zimbabwe (1991-1992)

Research Officer, Plant Protection Research Institute
Responsible for research on cowpea and sorghum viruses

Texas A&M University, Texas, USA (1989-1991)

MSc Research

Responsible for developing an ELISA-based assay for identifying Maize Dwarf mosaic virus resistant sorghum genotypes

Department of Research and Specialist Services, Harare, Zimbabwe (1986-1989) Research Officer, Plant Protection Research Institute

Responsible for running and maintaining plant diagnostic laboratory, legume pathology and disseminating research results using participatory methods.

Teaching Experience:

Lecturer – Problem solving in Environmental Biology, Graduate School
Introduction to Plant Pathology and Mycology laboratories, Graduate School

Professional Membership:

American Phytopathological Society (USA)
Bean Improvement Cooperative (BIC)
International Society of Plant Molecular Biology (ISPMB)

Education:

Ph.D. Molecular Plant Pathology.
University of Guelph, Canada. 1995

Master of Science (Plant Pathology – Virology)
Texas A&M University, Texas, USA. 1991

B. Sc. Agriculture (Honours)
University of Zimbabwe, Zimbabwe. 1986

Grants and Awards:

CIAT - Outstanding Research Publication Award (2002)

New England BioLabs Molecular Biology Summer Workshop scholarship (1997)

Taffy Davison Memorial Research Travel Grant (1995)

Schooley Award for Innovative research (1994)

INTSORMIL/ CIDA post graduate scholarship (1992-1995)

INTSORMIL / ICRISAT post graduate scholarship (1989-1991)

Languages: English
Shona native
Spanish

Citizenship: Zimbabwean
Date of Birth: 25 August 1963
Country of residence: Colombia

Interest: Using a combination of classical and biotechnological tools to reduce or eliminate disease-associated crop losses and stabilize bean productivity. I am actively involved in tagging disease resistance genes and developing protocols for the use of molecular markers in marker assisted selection (MAS) in bean breeding programs. I am using classical (virulence or pathogenicity) and molecular tools to characterize and understand pathogen population structure and use this information to identify potential sources of disease resistance and to manage identified resistance genes in ways that prolong their utility. We have developed locus-specific microsatellite markers for two bean pathogens (*Phaeoisariopsis griseola* and *Colletotrichum lindemuthianum*) that we are using to monitor dissemination of new pathogen types and change in their population structure. In addition, we have developed green fluorescent protein expressing mutants of the ALS pathogen and we are using these as a tool to study the infection of resistant and susceptible bean genotypes so as to elucidate the mechanism of ALS resistance in dry bean. I am heavily involved in building biotechnology capacity, through both short and long-term training of scientists and students from Africa (Uganda, Rwanda, Kenya, Malawi, etc), and in Latin America and the Caribbean (Haiti, Nicaragua, Honduras etc).

Publications:

Kelemu, S., Calvert, L., Cardona, C., Correa, F., **Mahuku, G.**, Alvarez, E., Morales, F., Bellotti, A., Buruchara, A. and Minja, E. 2005. Advances in application of agricultural biotechnology to control diseases and pests of tropical crops. Paper presented at the 9th ICABR International Conference on Agricultural Biotechnology: 10 years later. Ravello (Italy), July 6-10, 2005.

Mahuku, G., Montoya, C., Henríquez, M.A., Jara, C., Teran, H., and Beebe, S. 2004. Inheritance and Characterization of the Angular Leaf Spot Resistance Gene in the Common Bean Accession, G 10474 and Identification of an AFLP Marker Linked to the Resistance Gene. *Crop Science* 44: 1817-1824.

Mahuku, G. S. 2004. A simple extraction method suitable for PCR-based analysis of plant, fungal, and bacterial DNA. *Plant Molecular Biology Reporter* 22: 71-81.

Mahuku, G.S. and Riascos, J. J. 2004. Virulence and molecular diversity within *Colletotrichum lindemuthianum* isolates from Andean and Mesoamerican bean varieties and regions. *European Journal of Plant Pathology* 110: 253-263.

Kelemu, S., **Mahuku, G.**, Fregene, M., Pachico, D., Johnson, N., Calvert, L., Rao, I., Buruchara, R., Amede, T., Kimani, P., Kirkby, R., Kaaria, S., and Ampofo, K. 2003. Harmonizing the agricultural biotechnology debate for the benefit of African farmers. *African Journal of Biotechnology* 2: 394-416.

Kelemu, S., and **Mahuku, G.** 2003. Harnessing Biotechnology to Improve Food and Forage Legumes: The Case of Plant Disease Resistance. Paper for the Second National Workshop on Food and Forage Legumes, 22-27 September 2003, Addis Ababa, Ethiopia

- Mahuku**, G.S., Jara, C., Cajiao, C., and Beebe, S. 2003. Sources of resistance to angular leaf spot (*Phaeoisariopsis griseola*) in common bean core collection, wild *Phaseolus vulgaris* and secondary gene pool. *Euphytica* 130: 303-313
- Mahuku**, G.S., Jara, C.E., Cajiao, C. and Beebe, S. 2002. Sources of Resistance to *Colletotrichum lindemuthianum* in the Secondary Gene Pool of *Phaseolus vulgaris* and in Lines Derived from Crossing Primary and Secondary Gene Pools. *Plant Disease* 86:1383-1387.
- Mahuku**, G.S., Jara, C., Cuasquer, J.B., and Castellanos, G. 2002. Genetic variability within *Phaeoisariopsis griseola* from Central America and its implications for resistance breeding of common bean. *Plant Pathology* 51: 594-604.
- Mahuku**, G.S. and H.W. Platt (2002). Quantifying *Verticillium dahliae* propagules in soils collected from potato fields using a competitive PCR assay. *American Journal of Potato Research* 79 (2): 107-117.
- Mahuku**, G. S., M. A. Henríquez, J. Munõz, and R. A. Buruchara. 2002. Molecular Markers Dispute the Existence of the Afro-Andean Group of the Bean Angular Leaf Spot Pathogen, *Phaeoisariopsis griseola*. *Phytopathology* 92: 580-589.
- Mahuku**, G.S. and H.W. Platt (2002). Molecular evidence that *Verticillium albo-atrum* Grp 2 isolates are distinct from *V. albo-atrum* Grp 1 and *V. tricorpus*. *Molecular Plant Pathology* 3: 71-80.
- Jara, C., Castellano, G., y **Mahuku**, G. (2001). Estado actual y proyección de la investigación relacionada con la mancha angular del frijol (*Phaeoisariopsis griseola*). *Fitopatología Colombiana* 25 :1-6
- Daayf F, Platt HW, **Mahuku** G, and Peters RD 2001. Relationships between RAPDs, Gpi-allozyme patterns, mating types, and resistance to metalaxyl of *Phytophthora infestans* in Canada in 1997. *American Journal of Potato Research* 78:129-139.
- Jara, C., y **Mahuku**, G., 2001. Estado Actual y proyección de la investigación relacionada con la mancha angular (*Phaeoisariopsis griseola*) del frijol. *Fitopatología Colombiana*. 25(1): 1-6.
- Mahuku**, G., R.D. Peters, H.W. Platt and F. Daayf, 2000. Random amplified polymorphic DNA (RAPD) analysis of *Phytophthora infestans* isolates collected in Canada during 1994-1996. *Plant Pathology* 49:252-260.
- Mahuku**, G.S. and Henriquez, M.A. 2000. Molecular markers dispute the existence of the “Afro-Andean” subgroup of the bean angular leaf spot pathogen, *Phaeoisariopsis griseola*. *Phytopathology* 90: S49 (abstract)
- Platt, H.W. (Bud) and **G. Mahuku**, 2000. Detection methods for *Verticillium* species in naturally infested and inoculated soils. *American Journal of Potato Research* 77: 271-274.
- Jara, C., **Mahuku**, G., Teran, H., and Singh, S.P. 1999. Reaction of common bean lines Vax 4, Vax5, and Vax6, derived from interspecific hybridization and gene pyramiding, to 20 *Xanthomonas campestris* pv. *phaseoli* isolates of different geographical origins. *BIC* 42: 1-2.
- Mahuku**, G.S., Jara, C., Cuasquer, J.B. and Castellanos, G. 1999. Molecular and virulence diversity within *Phaeoisariopsis griseola* isolates from Central America and implication to resistance breeding in beans. *Phytopathology* 89:S47.

Mahuku, G.S., Platt, H.W. (Bud) and Maxwell, P. 1999. Comparison of polymerase chain reaction based methods with plating on media to detect and identify *Verticillium* wilt pathogens of potato. *Can. J. of Plant Pathol.* 21:125-131.

Goodwin, P.H., **Mahuku, G.S.**, Liu, H., and Xue, B.G. (1999) Monitoring phytoplasma in populations of aster leafhoppers from lettuce fields using the polymerase chain reaction. *Crop Protection* 18:91-99.

Hsiang, T. and **Mahuku, G.S.** (1999) Genetic variation within and between southern Ontario populations of *Sclerotinia homoeocarpa*. *Plant Pathology* 48:83-94.

Daayf, F., Platt, H.W. (Bud) and **Mahuku, G.** (1999) Investigating *Phytophthora infestans* diversity in Canada on the basis of RAPD-PCR markers, races, GPI allozyme patterns and mating types. *Canadian Journal of Plant Pathology* 21: 200 (Abstract).

Mahuku, G.S. and P.H. Goodwin, (1998). Influence of sucrose, mucin and xanthan gum on spore germination of ten different fungi. *European Journal of Plant Pathology* 104:849-852

Mahuku, G.S., Hsiang, T., and Yang, L. (1998) Genetic variation in *Microdochium nivale* isolates from turfgrass. *Mycological Research* 102:559-567.

Mahuku, G.S. and Goodwin, P.H. (1998) Presence of *Xanthomonas fragariae* in symptomless strawberry crowns in Ontario detected using a nested polymerase chain reaction (PCR). *Canadian Journal of Plant Pathology* 19:366-370

Mahuku, G.S., Goodwin, P.H., Hall, R., and Hsiang, T. (1997) High variability among isolates of *Leptosphaeria maculans* from individual oilseed rape fields as determined by pathogenicity and random amplified polymorphic DNA analysis. *Canadian Journal of Botany* 75:1485-1492.

Mahuku, G.S., Hall, R. and Goodwin, P.H. (1996) Distribution of *Leptosphaeria maculans* types in two fields in southern Ontario as determined by the polymerase chain reaction. *European Journal of Plant Pathology* 102:569-576.

Mahuku, G.S., Hall, R. and Goodwin, P.H. (1996) Coinfection and induction of systemic acquired resistance by weakly and highly virulent isolates of *Leptosphaeria maculans* in oilseed rape. *Physiological and Molecular Plant Pathology* 49:61-72.

Mahuku, G.S., Goodwin, P.H. and Hall, R. (1995) A competitive polymerase chain reaction to quantify DNA of *Leptosphaeria maculans* during blackleg development in oilseed. *Molecular Plant-Microbe Interactions* 8: 761-767.

Mahuku, G.S., Hall, R. and Goodwin, P.H. (1995) Coinfection and induction of systemic resistance by weakly and highly virulent isolates of *Leptosphaeria maculans*. Abstract, *Canadian Journal of Plant Pathology* 18:95.

Mahuku G.S., Goodwin, P.H. and Hall, R. (1995) Use of a competitive polymerase chain reaction to quantify DNA of *Leptosphaeria maculans* during blackleg development in oilseed rape. Abstract. *Phytopathology* 85:1176.

Mahuku, G.S. (1995) Application of the polymerase chain reaction to study the interaction of *Leptosphaeria maculans* with oilseed rape. Ph.D. Thesis. University of Guelph, Guelph, On 298pp.

Mahuku G.S., Goodwin, P.H. and Hall, R. (1994) Distribution and occurrence of *Leptosphaeria maculans* virulence types in canola. Abstract. *Phytopathology* 84:1125

Mahuku, G.S.(1991) Effect of the air-gun technique for selecting for levels of resistance to maize dwarf mosaic virus strain A in sorghum. M.Sc. Thesis, Texas A&M University, College Station, Texas.

Mahuku, G.S. and Toler, R.W. (1990) Varietal disease response of sorghum lines inoculated with maize dwarf mosaic virus strain-A. Abstract. *Phytopathology* 80:436

Levy, C., **Mahuku, G.S.,** Tattersfield, J.R., and Cole, D.L. (1990). Methods of assessment of red leaf blotch of soybean used to evaluate cultivar susceptibility and chemical control. *Crop Protection* 9:148-154.

Mahuku, G.S. (1986) Evaluation of fungicides for efficacy to, and cultivars for resistance to *Pyrenochaeta glycines*, causal agent of red leaf blotch of soybean. BSc Thesis, University of Zimbabwe, Harare, Zimbabwe.