



Frosty Pod caused by *Moniliophthora roreri*

Dr. Lyndel Meinhardt

Research Leader, 301-504-1995,

Lyndel.Meinhardt@ars.usda.gov

Genetic analysis of fungal pathogens that cause diseases of *Theobroma cacao*. Research focus is to understand the function of diversity in these fungal pathogens so that better control methods can be developed.

Dr. Bryan Bailey

Plant Pathologist, 301-504-7985,

Bryan.Bailey@ars.usda.gov

Plant microbe interactions in cacao and biocontrol of cacao diseases. Molecular tools are used to characterize cacao plant defense responses and to optimize disease control methods including biocontrol.



Basidiocarp of *Crinipellis pernicioso*

Dr. V.C. Baligar

Soil Scientist, 301-504-6492,

VC.Baligar@ars.usda.gov

Response of cacao and tropical legume cover crops to abiotic stresses (soil acidity, elemental toxicity/deficiency, CO₂, light quality).



Nutrient amendment in Cacao

Research includes development of agroforestry-based best management practices in South America for sustainable cacao production.

Dr. Ronald Collins

Agronomist, 301-504-6135,

Ron.Collins@ars.usda.gov

Integrated pest management systems utilizing pesticides, biocontrol agents, cultural and management practices for agronomic and horticultural systems.



Witches broom caused by *Crinipellis pernicioso*

Dr. Prakash Hebbar

Visiting Scientist, 301-504-7007,

Prakash.Hebbar@ars.usda.gov

Senior Research Scientist with Mars Inc (under Cooperative agreement with USDA) responsible for research coordination, networking and technology transfer of IPM strategies of cacao pests and diseases to the origin countries. Emphasis on the use of environmentally friendly options such as biological control, rational use of chemicals and pheromones.

Dr. Robert Lumsden

Visiting Scientist, 301-504-5094,

Robert.Lumsden@ars.usda.gov

Scientific Advisor with WCF (World Cocoa Foundation) under a Specific Cooperative Agreement with USDA for cacao research. Liaison between industry and USDA cacao research activities.



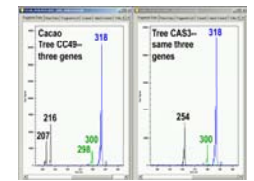
Pods of *Theobroma cacao*

Dr. Dapeng Zhang

Research Geneticist, 301-504-7477,

Dapeng.Zhang@ars.usda.gov

Application of interdisciplinary approaches to assist conservation and sustainable use of economically important perennial species used in tropical agriculture and agro-forestry.



Fingerprint of *Theobroma cacao*

Research interests range from genebank management, phylo-geography to germplasm enhancement.

The mission of the Sustainable Perennial Crops Laboratory is to carry out research on perennial crops of significance to national and global economies with the goals of improving and/or maintaining crop yields with reduced inputs, preserving and optimizing use of crop genetic diversity, reducing the negative environmental impacts resulting from crop production, and providing consumers and manufacturers with safe and stable commodity supplies.

Research emphasis:

A. Biological and Chemical Disease Control and Development of Agronomic Systems for Cacao and Alternative Crops

B. Environmental Quality Impacts from Pesticide Use on Perennial Crops

C. Molecular Characterization and Diversity Assessment of Cocoa Germplasm in the Americas



Black pod disease caused by *Phytophthora capsici*

SPCL is actively collaborating with government and non-governmental research initiatives, NGO's, universities and international research centers in Brazil, Peru, Cameroon, Costa Rica, Ecuador, Panama, Trinidad and the UK. Some of these organizations include:

US Institutes

Masterfoods/Mars, Inc:

WCF: World Cocoa Foundation, Vienna, VA.

Penn State: Pennsylvania State University

UF-IRREC: University of Florida, Indian River Research and Education Center, Ft. Pierce, FL.

UF-TREC: Tropical Research and Education Center, Homestead, FL

International Institutes

Almirante Cacao, Brazil

CABI: CAB International, United Kingdom

CATIE: Centro Agronomico Tropical de Investigacion y Ensenanza, Costa Rica

CEPLAC/CEPEC: Comissao Executiva do Plano da Lavoura Cacaueira/Centro de Pesquisas do Cacau, Brazil

CIRAD: Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement, France

CRU: Cocoa Research Unit, University of the West Indies, Trinidad and Tobago

EBCL: European Biological Control Lab, France

EMBRAPA/CNPAF: Empresa Brasileira de Pesquisa Agropecuaria/Centro Nacional de Pesquisa de Arroz e Feijao, Brazil

ICT: Instituto de Cultivos Tropicales, Peru

IESB: Instituto de Estudos Socia-Ambientais do Sul da Bahia, Brazil

IITA: International Institute of Tropical Agriculture, Nigeria

IPGRI: International Plant Genetic Resources Institute, Italy

IRAD: Institut de Recherche Agricole pour le Developpement, Cameroon

Imperial College, UK

INIAP: Instituto Nacional Autonomo de Investigaciones Agropecuarias, Ecuador

STRI: Smithsonian Tropical Research Institute, Panama

UESC: Universidade Estadual de Santa Cruz, Brazil

UENF: Universidade Estadual de Norte Fluminense, Brazil

UNALM: Universidad Nacional Agraria la Molina, Peru

University of Reading, UK



Field plot near El Chocloino, Peru



Cover crop (*Geophylla macrophoda*) under Cacao



U.S. Department of Agriculture

ARS, PSI, Sustainable Perennial Crops Lab
10300 Baltimore Ave, Bldg. 001, Rm 225
Beltsville, MD 20705-2350

Phone: 301-504-1995

Fax: 301-504-1998

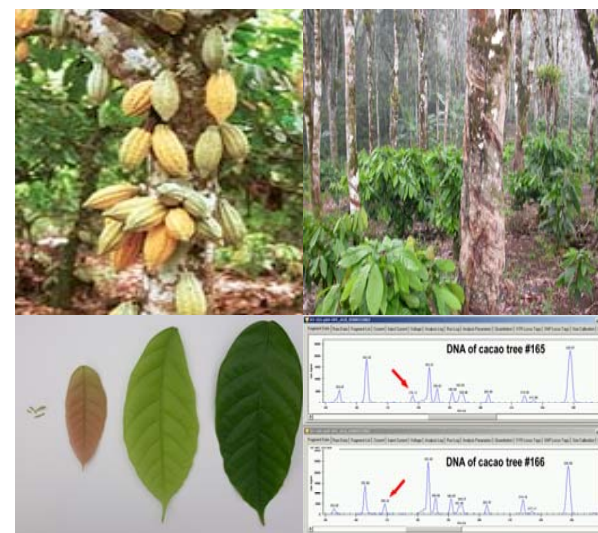
Website:

http://www.ars.usda.gov/main/site_main.htm?modecode=12-75-53-00



Agricultural Research Service
U.S. Dept. of Agriculture

**Sustainable
Perennial Crops
Laboratory**



Cacao-growing regions