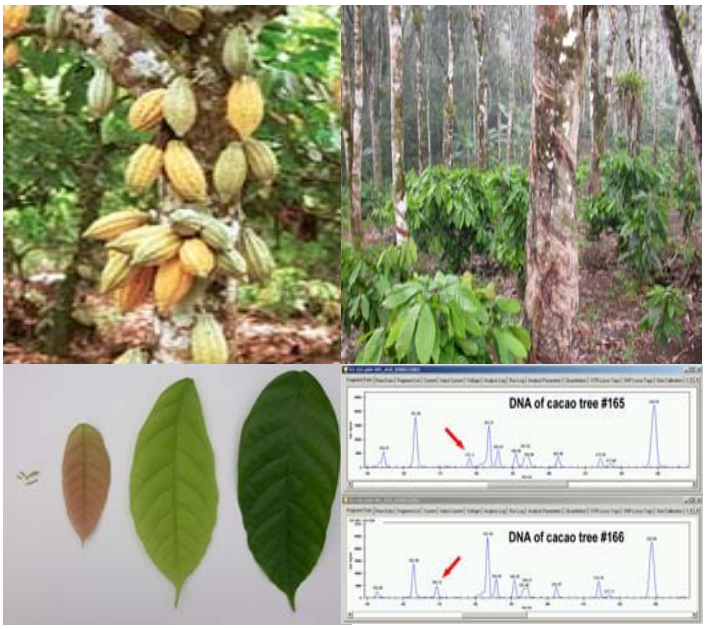
Field plot near El Choclino, Peru

Agricultural Research Service
U.S. Dept. of Agriculture

Sustainable Perennial Crops Laboratory



U.S. Department of Agriculture
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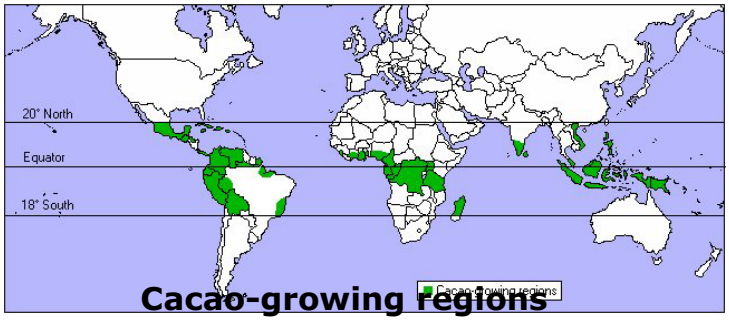
http://www.ars.usda.gov/main/site_main.htm?modecode=12-75-53-00



Cacao-growing regions

Frosty Pod caused by *Moniliophthora roreri*

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*

Dr. Lyndel Meinhardt, Research Leader
301-504-1995, meinharl@ba.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, baileyb@ba.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 perniciosa*

Dr. V.C. Baligar, Soil Scientist
301-504-6492, vbaligar@asrr.arsusda.gov
Response of cacao and tropical legume cover crops to abiotic stresses (soil acidity, elemental toxicity/ deficiency, CO_2, 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, collinsr@ba.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 perniciosa*

Dr. Prakash Hebbar, Visiting Scientist
301-504-7007, hebbarp@ba.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.

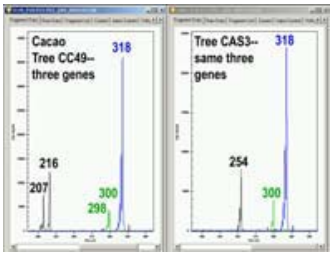
Dr. Charles Helling, Soil Scientist
301-504-6645, hellingc@ba.ars.usda.gov
Environmental risk assessment of pesticides used or proposed for sustaining production of cacao, banana, and other tropical crops as alternatives to illicit drug crops in South America.

Flume for stream water monitoring of pesticides.

Dr. Robert Lumsden, Visiting Scientist
301-504-5094, lumsdenr@ba.ars.usda.gov
Scientific Advisor with WCF (World Cocoa Foundation) under a Specific Cooperative Agreement with USDA for cacao research. Liason between industry and USDA cacao research activities.

Pods of *Theobroma cacao*

Dr. Dapeng Zhang, Research Geneticist
(301) 504-7477, dzhang@ba.ars.usda.gov
Application of inter-disciplinary approaches to assist conservation and sustainable use of economically important perennial species used in tropical agriculture and agro-forestry. Research interests range from genebank management, phylo-geography to germplasm enhancement.



Fingerprint of *Theobroma cacao*

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

Master*foods*/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-Ambientals 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 Développement, 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