Output 3: Strengthened capacity of NARS to design and execute IPM R&D, to apply molecular tools for pathogen and pest detection, diagnosis, diversity studies and to device novel disease and pest management strategies

Activity 3.1. Developing integrated pest management strategies for whiteflies

Contributors: J. M. Bueno, I. Rodríguez, X. Tapia, V. Lino and C. Cardona

Highlight:

- Continued and expanded diffusion of technology activities within the DFID-funded project on Sustainable Management of Whiteflies

Rationale

Whiteflies have become the target of excessive pesticide use by snap bean and dry bean farmers in the Andean zone. A management system for whiteflies that contribute to reduce pesticide use has been developed and tested with farmers in Colombia and Ecuador (see 2002-2004 Annual Reports). In 2006 we continued and expanded diffusion of technology activities at both sites in Colombia, Ecuador and Bolivia.

Materials and Methods

Following the renewal of the DFID project, diffusion activities were planned and contacts with collaborating partners were made. Preparation of technical and extension bulletins was continued. A large-scale demonstration trial was conducted in the Tenerife area of Colombia. Farmers Schools activities in the Chota region of Ecuador and Tenerife region of Colombia have continued to be developed. Two nurseries for the reconfirmation of the validation trials conducted in Bolivia were carried out. Treatments were disposed in a 3 x 3 Latin square. Whitefly populations were monitored and recorded every week. Yields and economic returns were analyzed**.**

Results and Discussion

Plots with areas ranging between 1500 and 2300 square meters, each one treated as described before in CIAT's 2004 Annual Report (CIAT's proposal and farmers' traditional method), have supplied us the necessary information in order to guarantee that the whitefly *Trialeurodes vaporariorum* can be managed with a significant reduction in the use of pesticides, in consequence validating with the obtained results, the technology that CIAT had previously developed years before.

As seen in previous trials and comparing the farmers' managing practices with the method proposed by CIAT (seed treatment and foliar applications based on the action

threshold) results in yields obtained with CIAT's proposal do not differ with those obtained by farmers with traditional calendar application practices (Table 3.1.1. Colombia: 3 trials; Table 3.1.2. Ecuador: 4 trials). We have been able to demonstrate that with the use of an efficient systemic insecticide as a treatment to the seed and foliar applications at the appropriate time (action threshold) in combination with proper cultural practices, farmers can obtain higher benefit/cost ratios with a reduction of up to a 75% in the amount of applications made per cropping cycle.

Table 3.1.1. Yields (Ton/ha) and economic returns obtained with two approaches for control of the greenhouse whitefly *Trialeurodes vaporariorum* in Tenerife, three of the reference trials in Colombia. Non-replicated demonstrative trial. No statistical analysis performed.

Treatment	No. of insecticide applications	Yield (Ton/ha)	Costs (US$/ha)		Benefits (US$/ha)		Benefit/cost ratio
			Variable	Total	Total	Net	
2005B							
Farmers practices[a]	7	7.9	383	1676	3333	1657	1.9
CIAT's proposal[b]	3	9.3	258	1552	3886	2335	2.5
2006A							
Farmers practices	7	15.5	148	1441	6773	5332	4.7
CIAT's proposal	2	16.3	258	1552	7316	5764	4.7
2006B							
Farmers practices	8	11.7	504	1797	3071	1275	1.7
CIAT's proposal	2	12.8	151	1444	3360	1916	2.3

[a] 7-8 foliar applications of conventional insecticides b Seed treatment with imidacloprid followed by two foliar applications of conventional insecticides at pre-established action thresholds.

Table 3.1.2. Yields (Ton/ha) and economic returns obtained with two approaches for control of the greenhouse whitefly *Trialeurodes vaporariorum* in San Rafael phase I and phase II, Yascón and Pimampiro, two of the reference sites in Ecuador. Non-replicated demonstrative trial. No statistical analysis performed.

Treatment	No. of insecticide applications	Yield (Ton/ha)	Costs (US$/ha)		Benefits (US$/ha)		Benefit/cost ratio
			Variable	Total	Total	Net	
San Rafael Fase I							
Farmers practices[a]	4	1.5	105.9	744.7	1660	915.2	2.2
CIAT's proposal[b]	3	2.0	71.9	710.7	2279	1568.2	3.2
Yascon							
Farmers practices	3	1.1	45.2	613.5	1012	398	1.6
CIAT's proposal	1	1.0	18.2	586.5	966	379	1.6
Pimampiro							
Farmers practices	5	1.3	133.4	749.3	1153.7	404.4	1.5
CIAT's proposal	3	1.4	77.06	693	1282.2	589.2	1.9
San Rafael Fase II							
Farmers practices	3	0.93	63.3	687.7	825	137.3	1.2
CIAT's proposal	2	0.97	48.9	673.2	862	188.7	1.3

[a] 3-7 foliar applications of conventional insecticides; [b] Seed treatment with imidacloprid followed by two foliar applications of conventional insecticides at pre-established action thresholds.

As in previous trials, and as compared with farmers' practices, alternative management strategies based on seed dressing and judicious timing of applications based on action thresholds resulted in yields that did not differ from those obtained by farmers with their traditional management approaches (Table 3.1.3). These initial trials clearly demonstrated that technology developed in Colombia and Ecuador also works in Bolivia.

Table 3.1.3. Yields (Kg/ha) and economic returns obtained with three approaches for control of the greenhouse whitefly *Trialeurodes vaporariorum* in tow sites of Comarapa (San Isidro Valley I and San Isidro Valley II), one of the reference sites in Bolivia.

Treatment	No. of insecticide applications	Yield (Kg/ha)	Costs (US$/ha)		Benefits (US$/ha)		Benefit/cost ratio
			Variable	Total	Total	Net	
San Isidro I							
CIAT's proposal 1[a]	2	13.1a	71.6	957.8	1965	1007	2.05
CIAT's proposal 2[b]	3	14.5a	175.0	1088.0	2160	1072	1.98
Farmers practices[c]	5	15.7a	219.9	1157.9	2355	1197	2.03
San Isidro II							
CIAT's proposal 1	1	13.1a	23.1	982.4	2489	1506	2.53
CIAT's proposal 2	1	10.7a	60.8	964.0	2033	1069	2.11
Farmers practices	6	13.8a	219.9	1228.4	2622	1393	2.13

[a] Seed treatment with imidacloprid followed by 1-2 foliar application of a conventional insecticide at pre-established action thresholds; [b] Drench application of imidacloprid followed by 1-3 foliar applications of conventional insecticides at pre-established action thresholds; [c] 5-6 foliar applications of conventional insecticides. Means within a column followed by the same letter are not significantly different at the 5% level by LSD. C.V. for yields = 16.5%.

Other activities were:

1. Quantification of the impact that both management strategies had on the parasitism of *T. vaporariorum* nymphs by *Amitus fuscipennis* (Figure 3.1.1).
2. Reinitiating of Farmers Schools activities in the Chota region of Ecuador and the Cundinamarca or Rio Negro regions of Colombia.
3. Initiation of Farmers schools activities in the San Isidro region of Bolivia
4. Initial impact evaluation in the target region.
5. Diffusion through electronic systems of technical and extension bulletins for Colombia, Ecuador and Bolivia (in Link to web page of CIAT, PDF version) Figure 3.1.2.

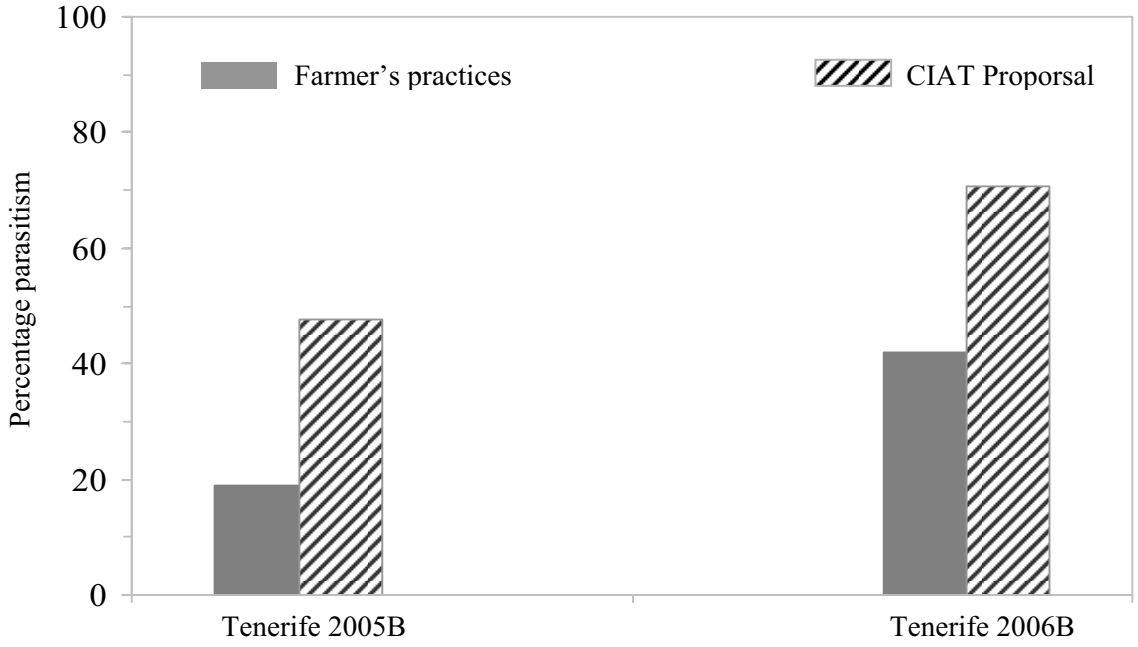

Figure 3.1.1. Impact in two reference sites in Colombia of two whitefly management strategies on parasitism of *Trialeurodes vaporariorum* nymphs by *Amitus fuscipennis*.

New Publications

Managing the Whitefly *Trialeurodes vaporariorum* in String and Field Beans

The biology and management of the whitefly *Trialeurodes vaporariorum* in string and field beans: a technical manual is now available for agronomists and technicians in Latin America. Likewise, three primers on this worldwide, persistent pest, written for farmers in Bolivia, Ecuador, and Colombia, have also just been published.

The publications are part of a strategy to disseminate research results from the project on the Sustainable integrated management of whiteflies as pests and vectors of plant viruses in the tropics, financed by the British Department for International Development (DFID). Coordinated by CIAT, the project is executed by CIAT's Bean Entomology (Colombia), the Corporación Grupo Randi Randi (Ecuador), and the PROINPA Foundation (Bolivia).

For queries on electronic copies of the publications, contact Isaura Rodriguez at irodriguez@cgiar.org

Figure 3.1.2. Printing of CIAT WEB page http://www.ciat.cgiar.org/beans/index.htm

Activity 3.2. Socializing research results on managing bacterial wilt of plantain

Contributors: E. Álvarez, L. A. Mesa, V. Treviño, and J. Loke

Rationale

Bacterial wilt has spread widely because of poor practices in prevention and management such as using infected suckers and contaminated tools and clothes, and lack of early detection and eradication.

This activity aims to diffuse information on the integrated management of bacterial wilt to farm owners and workers, technicians, and agronomists in the Municipality of Armenia, Department of Quindío, Colombia.

Materials and Methods

To emphasize the importance of this disease, explain its management, and describe research advances, we programmed two meetings directed by CIAT functionaries and students from the Universidad de Quindío.

Results and Discussion

The first meeting was held on 26 June 2006 at the Santa Elena Farm, Armenia (Quindío), to which 42 persons attended, including farm owners and workers, technicians, and agronomists. At this meeting, the importance of bacterial wilt was discussed, together with possible causes of its dissemination. Management of this problem was explained, and research advances described.

The second socialization was conducted on 31 August 2006 at the La Yalta Farm, which had successfully adopted and adjusted management practices for bacterial wilt. At this meeting, 20 people actively participated, clearing their doubts and discussing recommendations on managing the disease.

Activity 3.3. Capacity Building

Table 3.3.1. List of students supervised in 2006.

Ph D. Thesis

Name	Supervisor	University	Title
Claire Mukankusi (Sep 2003 – Aug 2007)	Robin Buruchara	University of Kwazulu-Natal, South Africa	Breeding beans (*phaseolus vulgaris* L.) for resistance to Fusarium root rot (*Fusarium solani* f. sp. *Phaseoli*) and large seed size in Uganda
Virginia Gichuru (Sept 2005 – Aug. 2006)	Robin Buruchara	Makerere University, Uganda	Symptomatology and characterization of *Phythium* spp. of major crops in a bean based cropping system in sout-western Uganda
Lucia Afanador Kafuri (July 2006 – July 2009)	Elizabeth Alvarez	Universidad Nacional Medellin - Colombia	Anthracnosis of Castilla's blackberry – variability in the species, races of the casual agent and identification of resistance sources.

MSc Thesis

Name	Supervisor	University	Title
Juan Fernando Mejia (Oct. 2005 – Oct. 2007)	Elizabeth Alvarez	Universidad Nacional, Palmira - Colombia	Evaluation of DArT technology as a selection marker in genotypes resistant to frogskin in cassava varieties
Alberto Rojas (Feb 2006- April 2007)	Elizabeth Alvarez	Universidad de Caldas - Colombia	Identification of anthracnose management strategies in soursop (*Annona muricata*) with emphasis in resistance and biofungicide use in the departments of Valle del Cauca and Huila
Jose Moderafa Magia (Jan 2005 – Jan 2007)	Fernando Correa	Universidad Nacional, Palmira - Colombia	Inheritance of resistance to *Pyricularia grisea* in different rice cultivars

Table 3.3.1. List of students supervised in 2006 (continued)

Name	Supervisor	University	Title
Francisco Lopez Machado (Aug.2005 - Dec 2006)	Cesar Cardona	Universidad del Valle, Cali-Colombia	Characterization of tolerance to damage caused by the adults of *Aeneolamia varia* (F.) as a component of resistance in the genotypes of *Brachiaria* spp.
Maria Elena Cuellar Jimenez (Feb 2004 - March 2006)	Francisco Morales	Universidad del Valle, Cali - Colombia	Bean leaf crumple virus: Transmisión by whiteflies (Gennadius) (Homoptera: Aleyrodidae), search for sources of resistance in *Phaselous vulgaris* L. and epidemiology.
Natalia Villareal (March 2006-June 2007)	Lee Calvert Juan Antonio Garcia	Centro Nacional de Biotecnología Madrid, Spain	Protein expression of the Cassava Frog skin virus (FSV) in bacterial systems (E. coli)
Ulises Castro	Cesar Cardona	Universidad de Chapingo, Mexico	Mechanisms of resistance to *Aeneolamia Albofasciata* and *Prosapia simulans* in *Brachiaria* spp.
Natalia Labrin (June 2005 – Jan 2007)	Lee Calvert	CATIE, Costa Rica	Ecological Agriculture in the area of genetics to resistance in Venezuelan rice varieties (*Orytza Sativa*) to the white leaf virus
Alejandro Pabon (Jul 2004 – March 2006)	Cesar Cardona	Universidad de Viçosa, Brazil	Mechanisms of resistance to *Deois incompleta*, *D. Schah* and *Notozulia entreriana* in *Brachiaria* spp.
Paola Sotelo (Jan 2005 – Dec 2006)	Cesar Cardona	Universidad Nacional, Palmira - Colombia	Inheritance study of a new begomovirus in snap beans (*Phaseolus vulgaris*) in the Cauca Valley
Ana Karine Martinez (Junio 2005 – Junio 2007)	Francisco Morales	Universidad Nacional, Palmira – Colombia	Characterization of *begomovirus* and evaluation of tomato lines for resistance to *begomovirus* in the Cauca Valley

Table 3.3.1. List of students supervised in 2006 (continued)

Name	Supervisor	University	Title
Maritza Cuervo (Jan 2005 – Sept 2006)	Lee Calvert	Universidad Nacional, Palmira – Colombia	Molecular characterization of isolates of the virus associated with cassava frogskin disease collected from production zones in Colombia
Adriana Maria Sanabria Moreno (Dec 2006 – Dec 2007)	Segenet Kelemu	Universidad Nacional , Bogota – Colombia	Genetic diversity among isolates of the anthracnose pathogen infecting tropical fruits
Linda Jeimmy Rincon Rivera	George Mahuku	Universidad Nacional, Bogota - Colombia	Virulence and Molecular characterization of *Colletotrichum lindemuthianum* isolates from different bean production zones of Colombia

BSc Thesis

Name	Supervisor	University	Title
Luz Adriana Meza Becerra (Feb 2005 – Dec. 2006)	Elizabeth Alvarez	Universidad del Valle, Cali - Colombia	Microbiological, chemical and Physical evaluation of sources of lixiviate residues of plantain and its effects in the management of bacterial wilt (Finca La Florida)
Eliana del Pilar Macea (Aug 2005 – Aug 2006)	Anthony Bellotti	Universidad del Valle, Cali - Colombia	Identification of molecular markers associated with resistance to green mites in cassava
Gabriel A Torres Londoño (Oct 2005 – Oct 2006)	Anthony Bellotti	Universidad de Caldas, Colombia	Evaluation of *sogatella kolophon* (kirkaldy) and Empohasca bispinata (Davidson & Delong) as possible vectors of cassava frogskin disease.
Victor Hugo Treviño Henao (Oct 2005 – Oct 2006)	Elizabeth Alvarez	Universidad del Quindio, Colombia	Microbiological, chemical and Physical evaluation of sources of lixiviate residues of plantain and its effects in the management of bacterial wilt (Finca la Manigua)

Table 3.3.1. List of students supervised in 2006 (continued)

Name	Supervisor	University	Title
Marcelo Vargas (Feb 2005 – Feb 2006)	Elizabeth Alvarez	Universidad de Caldas, Colombia	Evaluation of ecological practices of soil management and its effect on moko disease of plantain caused by *Ralstonia solanacearum* (Finca La Guaira, Dep. Quindio)
Omar Zuluaga (Feb 2005 – Feb 2006)	Elizabeth Alvarez	Universidad de Caldas, Colombia	Evaluation of ecological practices of soil management and its effect on moko disease of plantain caused by *Ralstonia solanacearum* (Finca La Cataluña, Dep. Quindio)
Sandra Jimena Valencia (March 2005 -March 2006)	Cesar Cardona	Universidad Nacional, Palmira – Colombia	Sub – lethal effects of antibiosis on the demography of *Zabrotes subfasciatus* and *Acanthoscelides obtectus,* storage pests of beans.
Anyimilehidi Mazo Vargas	Anthony Bellotti	Universidad del Valle, Cali - Colombia	Effect of cotton Bollgard® (Bt) on the diversity and abundance of soil arthropods in Cauca Valley.
Laureano Alberto Hernandez Goroy (Aug 2006- Aug. 2007)	George Mahuku	Universidad Nacional, Bogota – Colombia	Biological control of bean diseases: Investigating the potential biocontrol / plant growth promoting aspect of bacteria isolated from *Morinda citrifolia*.
Angela Iglesias Garcia (Aug. 2006 – Sept. 2007)	George Mahuku	Universidad del Valle, Cali - Colombia	Identifying and developing molecular markers linked to ALS resistance genes in the Andean genotype, G 5686
Andres Jenver Matta (Aug. 2006 – Sept. 2007)	George Mahuku	Universidad del Valle, Cali - Colombia	Identification and development of molecular markers linked to *Pythium* root rot resistance in common bean genotypes MLB 49-89A and AND 1062
Carlos Fernando Castillo Londoño (Aug. 2006 – Aug. 2007)	Elizabeth Alvarez	Universidad de Caldas – Manizales	Improvement of nutritional management for the preventive control of rose mildew.

Table 3.3.1. List of students supervised in 2006 (continued)

Name	Supervisor	University	Title
Adriana Arenas (June 2006 – June 2007)	Elizabeth Alvarez	Universidad del Valle, Cali - Colombia	Search of resistance sources to blackberry anthracnose in accessions of the Cauca Valley through molecular characterization of isolates of *Colletotrichum* spp. and its host *Rubus glaucus*
Monica Fernandez de Soto (Dec 2006- Dec 2007)	Lee Calvert	Universidad del Valle, Cali - Colombia	Molecular characterization of resistant and susceptible varieties to the white leaf virus through the use of micro satellite molecular markers.
Alba Rocio Corrales (Jan 2006- Feb 2007)	Francisco Morales	Universidad del Tolima	Characterization of begomovirus transmitted through whitefly (*belmicia tabaci*) in tomato crops (*lycupersicum esculento*) in the Andean zone departments of Cundinamarca and Tolima

Activity 3.4. Training and Consultancy services offered during 2006

Contributors: Members of PE-1

Event	Date	Organizer/ Place	Participants	Received by
Field Day –Biology and management of *Trialeurodes vaporariorum* in beans and snap beans	May 5	CIAT-Bean entomology / Pradera, Valle	76	Farmers and technicians South Valle
Field Day –Biology and management of *Trialeurodes vaporariorum* in beans and snap beans	March 22	CIAT-Bean entomology /Tenerife (Cerrito, Valle	54	Farmers and technicians –South Valle
Field Day –Biology and management of *Trialeurodes vaporariorum* in beans and snap beans	July 22	CIAT-Bean entomology /Tenerife (Cerrito, Valle)	92	Farmers in South Valle and North Cauca
Pest identification techniques	Oct	CIAT- cassava Entomology –	1	Staff -Chiclayo SENASA Peru.
Foro Internacional sobre innovación y alianzas para el desarrollo del cultivo de plátano	Dec 6	CIAT- Palmira Agronatura- Cassava pathology	32	Professors, students, technicians, farmers
Curso sistemas modernos de producción procesamiento y utilización de la yuca		CIAT-MAGFOR	4	MAGFOR staff offcials Ricardo Valerio, Marlin Torres Picado, Fanor Guerrero Nuñez, Manuel Davila Villegas.
Sampling insects, biology of whiteflies	March 17	CIAT – Bean Entomology	15	Students Universidad del Valle Cali, Colombia
Management of Whiteflies	June 16	CIAT – Bean Entomology	100	Farmers in Cáqueza and Fómeque (Cundinamarca)

Activity 3.4. Training and consultancy services offered 2006 (continued)

Event	Date	Organizer/ Place	Participants	Received by
Management of whiteflies	July 28	CIAT – Bean Entomology	50	Professionals, professors, students, technicians and farmers in XXXII Congress SOCOLEN Manizales
Management of pest in beans	Aug 27	CIAT – Bean Entomology	43	Farmers associated to FENALCE in Tolima
Management of whiteflies	Aug 28	CIAT – Bean Entomology	53	Flower's technicians in Antioquia
Whiteflies identification	Sept 6	CIAT – Bean Entomology	2	Tito Anzoategui, Angel Fernando Copa Universidad Autonoma Gabriel Rene Moreno - Bolivia
Management of pest in beans	Nov 15	CIAT – Bean Entomology	31	Professors, and students Nariño University
Management of pest in beans	Nov 27	CIAT – Bean Entomology	5	CGIAR Directing Board
Management of whiteflies	Nov 20	CIAT – Bean Entomology	101	Students, technicians and farmers in Seminar Potato good management practices in East Antioquia.
Management of whiteflies	Feb-March	CIAT – Bean Entomology	1	Patricio Gallegos INIAP Ecuador
Reconocimiento de enfermedades de yuca	March	CIAT –Palmira cassava pathology	1	Elias Espindola Distraves - Barrancabermeja

Activity 3.4. Training and consultancy services offered 2006 (continued)

Event	Date	Organizer/ Place	Participants	Received by
Reconocimiento y manejo de enfermedades de yuca	April	CIAT –Palmira cassava pathology	1	Antonio Uset, Instituto Nacional de Tecnología agropecuaria (INTA) Argentina
Capacitación en diagnostico de enfermedades y evaluación de resistencia enfermedades en yuca	July-Oct	CIAT – Palmira cassava pathology	1	Godwin Ameorphe Internacional Atomic Energy Agency, IAEA Ghana
Field Day: Manejo de Moko en plátano	June 23	CIAT – Palmira cassava pathology	50	Farmers and technicians Finca Santa Elena, Armenia
Field Day: Manejo de Moko en plátano	Ago 31	CIAT – Palmira cassava pathology	15	Farmers and technicians finca La Yalta, Armenia
Field Day: Manejo de moko en plátano	Dec 15	CIAT – Palmira cassava pathology		Farmers and Technicians, Tulúa.

Activity 3.5. Conferences, workshops, meetings attended by one or more staff of PE-1 project

Staff Member	Date	Place	Event
Segenet Kelemu	4-8 Sept	Nairobi, Kenya	CIAT- African Meeting
	23 March	Bogotá, Colombia	Three party meeting with CORPOICA – CIAT-CEISA
	29 July – 2 Aug	Quebec City, Canada	American Phytopathological Society meeting
	23 Sept – 3 Oct	Beijing, China	CATAS – Keynote Lecture Friendship Award ceremony offered by the State Administration of Foreign Experts Affairs -CHINA
	11-15 Sept	Cartagena, Colombia	XLVI APS – Caribbean Chapter - XXVII ASCOLFI - III UMNG International Phytopathology Workshop
	14-16 Nov	Palmira, Colombia	2nd International course on Phytosanitary risks for Colombian Agriculture
Marcela Cadavid	Oct - Nov	Montevideo, Uruguay	EMBO course -
Elizabeth Alvarez	17 Feb	Armenia Colombia	I National course on integrated management of plantain crops
	18-19 May	CIAT – Palmira Colombia	International workshop: Strategic alliances of the palm sector
	24-25 May	Bogotá, Colombia	Innovation Forum: Technologies for efficiency, ASOCOLFLORES- Ceniflores
	31 May-2 June	CIAT – Palmira Colombia	IV International congress of Biological Control
	19-23 June	Bali, Indonesia	International Oil Palm Conference
	28 Aug. – 2 Sept.	Manizales, Colombia	II International seminar on production, commercialization and industrialization of plantain
	12-16 Sept	Cartagena Colombia	XLVI APS – Caribbean Chapter - XXVII ASCOLFI - III UMNG International Phytopathology Workshop
	14 – 16 Nov	CIAT – Palmira, Colombia	2nd International course on Phytosanitary risks for Colombian Agriculture
	6 Dec	CIAT - Palmira, Colombia	International forum: Innovations and alliances for the development of plantain crops.
German Llano	11 Nov- 12 Dec	Haikou City, Hainan Province, CHINA	Chinese Academy of Tropical Agricultural Sciences (CATAS) Training course on new technology for Tropical Agriculture for Developing Countries.
	28 Aug. – 2 Sept.	Manizales, Colombia	II International seminar on production, commercialization and industrialization of plantain

Activity 3.5. Conferences, workshops (continued)

Staff Member	Date	Place	Event
John Loke	6 Dec	CIAT – Palmira, Colombia	International forum about innovations and alliances for the development of plantain crops
	17 Feb	Armenia Colombia	I National course on integrated management of plantain crops
	28 Aug. – 2 Sept.	Manizales, Colombia	II International seminar on production, commercialization and industrialization of plantain
George Mahuku	29 July – 4 Aug.	Quebec City	American Phytopathological Society meeting
	Sept 12-15	Cartagena, Colombia	XLVI APS – Caribbean Chapter - XXVII ASCOLFI - III UMNG International Phytopathology Workshop.
	Oct 14-22	Kumming, China	Yunnan Academy of Agricultural Sciences in the Yunnan province of the People's Republic of China
Francisco Morales	4 - Feb	New Delhi, Bangalore, Hyderabad	Visit to whitefly project site in Bangalore Visit and invited lecturer to Virology lectures at ICRISAT in Hyderabad Visit with officials of the Ministry of Agriculture of India
Fernando Correa	29-30 Aug.	Los Baños, Philippines.	Rice Blast Workshop IRRI-JIRCAS. IRRI,
	29-30 June	San José, Costa Rica.	Segundo Congreso Arrocero.
	26 – 28 April	Brasilia, Brazil	VIII Reunión Nacional de Pesquisa de Arroz.
	10-14 April	Nanjing, China	Second Research Coordination Meeting.
	26 Feb – 1 March	The Woodlands, Texas, U.S.A.	31st Rice Technical Working Group Meeting.
Lee Calvert	29 July – 4 Aug.	Quebec City	American Phytopathological Society meeting
	Sept 12-15	Cartagena, Colombia	XLVI APS – Caribbean Chapter - XXVII ASCOLFI - III UMNG International Phytopathology Workshop.
Juan Miguel Bueno	November	Chota , Ecuador	Visit whitefly management field site
	November	Cochabamba, Bolivia	Visit whitefly management field site

Activity 3.6. List of visitors to the various research activities of PE-1 project.

CIAT – Palmira, Colombia

Name	Institution	Date
Dr Jaime Cárdenas	Coordinador de Riesgos Fitosanitarios - ICA	April 6/Mayo 15
Dr. Alfredo Quintero	Funcionario del Grupo de Analisis de Riesgos del ICA	May 11
Dr. Jairo Osorio	Coordinador MIP -CORPOICA	March 15/July 14
Dr. Enrique Torres	CCER Panelist- U. Nacional de Colombia	May 6-18
Dr. Achim Doberman	CCER Panelist - University of Kansas	May 6-18
Dr. Diane Rocheleau	CCER Panelist- Clark University	May 6-18
Dr. Ricardo E. Quiroga	CCER Panelist – Senior Economist IADB	May 6-18
Dr. Jan Leach	APS President	Sept 11
Dr. Hari C Sharma	ICRISAT – Entomologist	Sept -25-28
Dr. Juan Manuel Alvarez	Assistant professor University of Idaho	Oct 10-12
Dr. Miguel Serrano	Supervisor TD& S Monsanto	Oct 17-19
Mr.Pedro Zapata	Comité Cafeteros Valle, Colombia	Nov. – Dec
Mr. Matthew Levin	Ambassador, Embassy of Canada, Colombia	Nov. 3
Mrs. Rosalba Levin	Embassy of Canada, Colombia	Nov. 3
Mr. Stewart Wheeler	Political Counselor, Embassy of Canada, Colombia	Nov. 3
Ms. Diana Muñoz	Candian International Development Agency, CIDA	Nov.3
Mr. Brian Armstrong	Canadian International Development Agency, CIDA	Nov. 3
Dr. Louise Fortman	CIAT Board of Trustees	Nov.9
Dr. Ken Giller	CIAT Board of Trustees	Nov.9
Dr. Claudio Wernli	CIAT Board of Trustees	Nov.9

Activity 3.6. List of visitors (Continued)

Name	Institution	Date
Dr. Andrés Valencia Pinzón	Gerente General ICA, Colombia	Nov. 14
Dr. Javier Diaz Molina	President, ANALDEX, Colombia	Nov. 14
Dr. Tod Drenan	USDA	Nov. 14
Dr. Ramiro Tafur	President, SAG	Nov.14
Mr. Carlos Escobar	Productora de Jugos S.A., Colombia	Nov. – Dec.
Ms. Catherine Mgendi	CGIAR Media Specialist based in ILRI Nairobi	Nov. 29
Mr. Silverio González	FEDEPLATANO, Colombia	Dec. 6
Mr. Over Naranjo	Finca La Guaira, Colombia	Dec. 6
Mr. Marino Montoya	Finca Las Américas, Colombia	Dec. 6
Dr. Thierry Lescot	CIRAD, Francia	Dec. 6
Mr. Jon Jairo Mira	AUGURA, Colombia	Dec. 6
Mr.Greicy Sarria	ICA – Palmira, Colombia	Dec. 6
Mr.Carlos Ospina	Alcaldía de Buenavista, Colombia	Dec. 6
Dr. Jairo Castaño	Universidad de Caldas, Colombia	Dec. 6
Mr. Alberto Diaz	Universidad del Valle, Colombia	Dec. 6
Dr. Lorenzo Peláez	Corpoica – Nataima, Colombia	Dec. 6
Mr. Titus Galema	Univ. Larestain, The Netherlands	Dec. 6
Dr. Ana Armijos Salazar	CIBE-ESPOL, Ecuador	Dec. 6

Activity 3.7. List of awards to staff in the project PE – 1

- L.E. Romero, I. Lozano Potes and N. Villareal (third place) Semilleros DNA Agro-Bio 2006. Identification of microsatellite molecular markers in rice for resistance to *Tagosodes orizicolus"*. Bogotá, November 2006.

- F.J Correa Victoria, F. Escobar, G. Prado, G. Aricapa, M.C. Duque, and J.L. Fuentes. National Prize of Phytopathology "Rafael Obregón" "Identification of microsatellite markers linked to *Pyricularia grisea* resistance genes in rice". XXVI Congress of the Colombian Society of Phytopathology and related sciences (ASCOLFI), Cartagena, 12-16 September 2006.

- Segenet Kelemu. Friendship Award 2006 by the State Administration of Foreign Experts Affairs, authorized by the State Council of the People's Republic of China. Beijing, China, September 27, 2006. Most outstanding award for contribution to the economic and social development of the people's Republic of China.

- Award of Recognition for scientific contribution in rice, Consejo Municipal de General Saavedra, Bolivia 2006.

Activity 3.8. List of ongoing special projects 2006

Project Title	Donor	Participating Institutions	Amount available in 2006 US$		Total project budget US$
			CIAT (lead scientist)	Participating Institution (lead scientist)	
Precision agriculture and construction of models for tropical fruit crops (2005 – 2007)	COLCIENCIAS Agencia Colombiana de Cooperación Internacional (ACCI) MADR Colombia	Corporación BIOTEC	(Elizabeth Alvarez)	406,248 (Myriam Sánchez)	425,564.00
Dynamics of sources of inoculum and analysis of the anthracnose pathogen population infecting tropical fruits (2005 – 2007)	COLCIENCIAS, Colombia	CORPOICA	(Segenet Kelemu) 46,459	(Jairo Osorio)	219,046.00
Evaluation of cross protection as a strategy for the control of tristeza virus in citrus (2005 – 2007)	COLCIENCIAS, Colombia	CORPOICA	(Lee Calvert)	(Jorge Gómez)	35,500.00
Development and implementation of phytosanitary certification program for citrus. (2006 – 2008)	Ministry of Agriculture and Rural Development (MADR), Colombia	CORPOICA, ICA , Profrutales Ltda.	(Lee Calvert)	Corpoica; ICA (Jorge Gómez, Jorge E. Angel)	118,820 (approved) 261,114.00 (total project cost)

Activity 3.8. List of ongoing special projects in 2006 (continued)

Project Title	Donor	Participating Institutions	Amount available in 2006 US$		Total project budget US$
			CIAT (lead scientist)	**Participating Institution** (lead scientist)	
Utilization of resistant varieties for the control of cassava frogskin disease in the Atlantic coast and Cauca zones (2005-2008)	Ministry of Agriculture and Rural Development (MADR)-IICA	Corporación para Estudios Interdisciplinarios y Accesoria Técnica (CETEC), Asociación Nacional de Productores y Procesadores de Yuca (ANPPY)	7,241 (Lee Calvert)	11,340 [Roger de Jesús Ramos (ANPPY), Alberto Rodríguez (CETEC)]	53,000.00
Increasing Cassava Productivity through Integrated Pest Management (2005 – 2007)	Inter-American Institute for Cooperation on Agriculture (IICA), Colombia	Live Systems Technology (LST), S.A., Bogotá , Colombia	42,213 (Andreas Gaigl)	(Esperanza Morales)	83, 246.00
Lulo with aggregated value: New alternatives for the small holder (2006 – 2008).	Ministry of Agriculture and Rural Development (MADR), Colombia	CORPOICA La Selva, Universidad de Antioquia	148,689 (all two years) (Alonso Gonzalez, Zaida Lentini, Elizabeth Alvarez)	53,433 (Mario Lobo)	202,122

Activity 3.8. List of ongoing special projects in 2006 (continued)

Project Title	Donor	Participating Institutions	Amount available in 2006 US$		Total project budget US$
			CIAT (lead scientist)	**Participating Institution** (lead scientist)	
Pest and Disease Resistance, Drought Tolerance and Increased Shelf Life Genes from Wild Relatives of Cassava and the Development of Low-cost Technologies to Pyramid them into Elite Progenitors (2005 – 2007)	The Generation Challenge Programme, CGIAR	EMBRAPA-CNPMF, Brazil Namulonge Agricultural and Animal Production Research Institute (NAARI) Crop Research Institute (CRI) National Root Crop Research Institute (NRCRI)	(Elizabeth Alvarez, Anthony Bellotti , Hernan Ceballos, Martin Fregene)	(Alfredo Alves, Anton Bua, Titus Alicia, Elizabeth Okai, Chiedozie Egesi)	894,906.00
Integrated disease management in cassava. (2005 – 2007)	Ministerio de Agricultura y Desarrollo Rural de Colombia (MADR) and Inter-American Institute for Cooperation on Agriculture (IICA), Colombia	Live Systems Technology (LST) S.A., Colombia	41,935 (Elizabeth Alvarez)	(Esperanza Morales, Jaime Jaramillo)	89,180.00

Activity 3.8. List of ongoing special projects in 2006 (continued)

Project Title	Donor	Participating Institutions	Amount available in 2006 US$		Total project budget US$
			CIAT (lead scientist)	**Participating Institution** (lead scientist)	
Evaluation of the Effectiveness of Biorationals Used in the Management of Bruchid Pests on Beans (Phaseolus vulgaris) by Small-Scale Farmers in the Lake Victoria Basin (2004 – 2007)	SIDA SAREC, Sweden	NARS Universities and research programs in Kenya and Tanzania	(Eliaineny Minja)	(Mabel Imbuga, Paul Tarus, Absolom Munyasi, John Ogecha, Phanice Namungu, Hashim Barongo, Goodluck Kimaro)	30,000.00
Integrated management of whiteflies in the tropics – Phase III (2005 – 2008)	Department for International Development (DFID), UK	IITA AVRDC CIP CABI NRI	301,557 (Francisco Morales, Cesar Cardona, Anthony Bellotti, Glenn Hyman)	449,076 (James Legg, Peter Hanson, Isabel Carballal)	2,613,071.00
Improvement of nutrient management for the control of mildew disease in roses, caused by the fungal pathogen *Peronospora sparsa* (2006 – 2007)	COLCIENCIAS, Colombia	CENIFLORES ASOCOLFLORES	19,011 (Elizabeth Alvarez) 60,702 (total)	7,387 (Rebeca Lee)	75,969.00

Activity 3.8. List of ongoing special projects in 2006 (continued)

Project Title	Donor	Participating Institutions	Amount available in 2006 US$		Total project budget US$
			CIAT (lead scientist)	**Participating Institution** (lead scientist)	
Promotion of Integrated Pest Management Strategies for Major Insect Pests of *Phaseolus* Beans in Hillsides Systems in Eastern and Southern Africa (2005 – 2006)	DFID, United Kingdom	NARS in Uganda, Kenya, Tanzania and Malawi	(Eliaineny Minja, Robin Buruchara, Kwasi Ampofo)	(Michael Ugen, Fina Opio, John Ogecha, Felister Makini, Catherine Madata, David Kabungo, Patrick Mviha, B. Chibambo)	113,118.00
Pesticide use reduction and development of resistance to pesticides in rice and beans in Colombia, Venezuela and Ecuador (2005 – 2008)	FONTAGRO	INIA, Venezuela FEDEARROZ, Colombia INIAP, Ecuador	41,000 (Fernando Correa, César Cardona)	34,000 (Reinaldo Cardona, Miguel Diago, Sandra Garcés)	224,000.00
Studies in epidemiology and control of the anthracnose disease of mango (2006-2008)	COLCIENCIAS	CORPOICA	(Segenet Kelemu) 35,000 payment still pending	(Jairo Osorio)	70,250.00

Activity 3.8. List of ongoing special projects in 2006 (continued)

Project Title	Donor	Participating Institutions	Amount available in 2006 US$		Total project budget US$
			CIAT (lead scientist)	**Participating Institution** (lead scientist)	
Combating the Hidden Hunger in Latin America: Biofortified crops with improved vitamin A, essential minerals and quality project (2005 - 2010)	CIDA	MADR, Universidad de Caldas Petrotesting FIDAR	(Elizabeth Alvarez) (Joe Tohme, Anthony Bellotti, Bernardo Ospina)	Jairo Castaño Jaime Jaramillo José Restrepo	
Collection, characterization, and clonal multiplication of avocado with emphasis on identification of lines tolerant to *Phytophthora* spp. (2006-2008)	Ministry of Agriculture and Rural Development (MADR), Colombia	CORPOICA, PROFRUTALES	(Elizabeth Alvarez) (Alvaro Mejia, Alonso Gonzalez, Joe Tohme)	(Juan Jaramillo, Danilo Rios)	194,705.00
Understanding the Mechanism of Plant Resistance to Whiteflies (2004 – 2008)	United States Department of Agriculture (USDA)	USDA	(Anthony Bellotti)	(Stephen Lapointe)	61,146.00 (103,146 total budget)

Activity 3.8. List of ongoing special projects in 2006 (continued)

Project Title	Donor	Participating Institutions	Amount available in 2006 US$		Total project budget US$
			CIAT (lead scientist)	**Participating Institution** (lead scientist)	
Implementación de modernas tecnicas de diagnostico molecular de virus, viroides y fitoplasmas en frutales y hortalizas de costa, sierra y selva del Perú (2006-2008)	Centro Internacional de la Papa - CIAT		(Lee Calvert) (Elizabeth Alvarez)		20,000

Activity 3.9. List of project proposals and concept notes developed with partners

Donor/Title	Lead Researcher/ Principal Contact	Total Budget US$
FONTAGRO – Bioplaguicidas como alternativas verdes de control de plagas y enfermedades para aumentar la competitividad de pequeños agricultores Andinos. Sent 03/22/06	S. Kelemu/ C.Cardona/ G. Mahuku	490,000
FONTAGRO - Caracterización y manejo de la antracnosis (*Colletotricum spp*) del mango, aguacate y guanábana en Colombia, Ecuador y Perú. Sent 04/03/06	F. Correa	298,000
FONTAGRO - Fortalecimiento de cadenas de valor de plátano: innovaciones tecnológicas para reducir agroquímicos	E. Alvarez Approved sept 2006	250,000
FONTAGRO - Productores de lulo y mora competitivos mediante selección participativa de clones élite, manejo integrado del cultivo y fortalecimiento de cadenas de valor.	A.Gonzalez/ E. Alvarez/ A. Gaigl/ Z.Lentini/M. Gottret Approved Sept 2006	486,000
Rural Sector Support Programme – World Bank funded Bilateral programme – Empowering farmers and strengthening research through capacity building to improve banana productivity in Rwanda: Linking scientist training with farmer participatory research	R. Kirkby/ Clifford S. Gold, Visitng Scientist	299,610
CIP – Implementación de modernas tecnicas de diagnostico molecular de virus, viroides y fitoplasmas en frutales y hortalizas de costa, sierra y selva del Perú	L.Calvert/ E. Alvarez Approved	20,000
SENA –BPA Producir plátano con estándares internacionales de calidad, en fresco y procesadoa través de la implementación de buenas practicas agrícolas BPA, en cinco municipios del departamento del Quindío.	E. Alvarez/John Loke	89,376
Fondo Nacional Hortifruticula – ASOHFRUCOL Producir plátano con estándares internacionales de calidad, en fresco y procesado a través de la implementación de buenas practicas agrícolas BPA, en seis (6) municipios del departamento del Quindío.	Elizabeth Alvarez/ John Loke/German Llano	89,955

Activity 3.9. List of project proposals (continued)

Donor/Title	Lead Researcher/ Principal Contact	Total Budget US$
Grupo Agroindustrial La Fabril – Identificación del agente causal y el manejo de una enfermedad destructiva de Palma de Aceite en Ecuador	John Loke	95,865
Fondo latinoamericano de innovación en palma africana (FLIPA) – identificación del agente causal y el manejo de una enfermedad destructiva de palma africana en Colombia y Ecuador	Elizabeth Alvarez /John Loke	603,456
MADR - Fortalecimiento de la cadena productiva de mora, mediante manejo integrado de enfermedades y selección de clones élite.	E.Alvarez	337,952
MADR - Ajuste y validación de innovaciones tecnológicas para reducir agroquímicos en plátano	E. Alvarez	260,870
Sub-Saharan Africa Challenge Program – Increasing the productivity, stability, sustainability and profitability of smallholder agriculture in vulnerable production systems through more effcient use of water and nutrients.	G. Mahuku Approved	1,000,000
SPII, Karaj, Iran – Improvement of Chitti bean in Iran;	G. Mahuku Approved	224,000
Rockefeller Foundation – Enhancing Crop Productivity: Exploiting the molecular basis of host-pathogen interaction to develop durable disease resistance in African crops, using Angular Leaf Spot disease of bean as a model	G. Mahuku	322,230
FONTAGRO - Habichuelas (vainitas) *verdaderamente* verdes: Una alternativa limpia para generar empleo e ingreso para pequeños agricultores.	G. Mahuku	490,000
Sub- Saharan Africa Challenge Program – Improving potato-bean-sweet-potato (PBS) based rural livelihood systems through integrated soil ecosystem management (ISEM), market development and nutritional innovation in the highlands of Lake Kivu area.	G Mahuku	2,000,000
Federal Ministry of Finance (BMF), Austria – Improving fruit and vegetable product quality from smallholder systems: Optimizing soil-crop-pest management for economically viable, socially acceptable and ecologically sustainable production.	G. Mahuku	709,000€
Bilateral Project for Belgium – Improving rural livelihoods in Rwanda: Promoting integrated crop, diseases, and pest management 9ICDPM) strategies for intensification and diversification of agricultural systems	G Mahuku	3,000,000€

Activity 3.10. List of Publications

Refereed journal articles

Abello, J. F., Kelemu, S. 2006. Hongos endofitos: Ventajas adaptativas que habitan al interior de las plantas. Revista Corpoica Ciencia y Tecnología Agropecuaria (in press).

Alvarez, E., Mejia, J.F. 2006. DNA Sequence Analysis of the 16SrRNA region of Phytoplasma associated with lethal wilt in oil palm. Fitopatología Colombiana 29(1):39-44

Alvarez, E., Mejia, J.F., Loke, J., Llano, G. 2006. Detection and characterization of a phytoplasma associated with cassava frogskin disease Fitopatología Colombiana 29(2):69-76

Blair, M. W., Muñoz, C., Garza, R., Cardona, C**.** 2006. Molecular mapping for resistance to the bean pod weevil (*Apion godmani* Wagner) in common bean. Theoretical and Applied Genetics 112(5): 913-923.

Blair, M.W., Rodriguez, L.M., Pedraza, F., Morales, F.J., Beebe, S. 2007. Genetic mapping of the bean golden yellow mosaic geminivirus resistance gene bgm-1 and linkage with potyvirus resistance in common bean (Phaseolus vulgaris L.).Theoretical Applied Genetics 114: 261-271.

Fuentes, J.L., Correa-Victoria, F.J., Escobar, F., Prado, G., Aricapa, G., Duque, M.C., Tohme, J. 2006. Microsatellite markers linked to the blast resistance gene *Pi-1* in rice for use in marker assisted selection. Euphytica (accepted)

Jia, Y., Correa-Victoria, F.J., McClung, A., Zhu, L., Wamishe, Y., Xie, J., Marchetti, M., Pinson, S., Rutger, N., Correll. J. 2006. Rapid determination of rice cultivar responses to the sheath blight pathogen *Rhizoctonia solani* using a micro-chamber screening method. Plant Disease (accepted)

Holguin, C.M., A. Carabali, A.C. Bellotti. 2006. Tasa intrínseca de crecimiento de la población de *Aleurotrachelus socialis* Bondar en Yuca Manihot esculenta Crantz. Revista Colombiana de Entomolgia (32)2: 140-144.

Lopez-Gerena, J., Correa-Victoria, F.J., Prado, G., Tohme, J., Zeigler, R., Hulbert, S. 2006. Mapping QTL affecting partial resistance and identification of new blast resistance genes in rice (*Oryza sativa*). Theor. Appli. Genet. (submitted)

Morales, F.J. 2006. History and current distribution of begomoviruses in Latin America. Advances in Virus Research 67: 127-162.

Morales, F.J. 2007. Tropical Whitefly IPM Project. Advances in Virus Research 69: 249-311.

Velten, G., Rott, A., Cardona, C., Dorn, S. 2006**.** Effects of the plant resistance factor arcelin on parasitism f the common bean bruchid *Acanthoscelides obtectus* (Coleoptera: Bruchidae) by its natural enemy *Dinarmus basalis* (*Hymenoptera: Pteromalidae*). Biological Control (Submitted).

Velten, G., Rott, A., Cardona, C., Dorn, S**.** 2006. The inhibitory effect of arcelin on the development of *Acanthoscelides obtectus*. Journal of Stored Products Research (Accepted January 19 - 2007).

Velten, G., Rott, A., Conde Petit, B., Cardona, C., Dorn, S**.** 2006**.** Influence of dry beans seed traits on tritrophic interactions. Biological Control (Submitted).

Non-refereed Journals:

Blair, M. W., Cardona, C., Garza, R., Weeden, N., Singh, S.P. 2006. Development of a SCAR marker for common bean resistance to the bean pod weevil (*Apion godmani* Wagner). Annual Report of the Bean Improvement Cooperative 49: 181-182.

Books and Book Chapters

Calvert, L.A. 2007. Tenuiviruses affecting wheat. "Compendium of Wheat Diseases and Insects (Third Edition)" Editor Bill Bockus. (In press)

Calvert, L.A., Lentini, Z. 2007. Rice hoja blanca virus. "Characterization, Diagnosis & Management of Plant Viruses Vol. 4" Eds. Rao, G.P., Bragard, C. and Lebas, B.S.M. (In press) pp. 85-98.

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Melo, E.L., Ortega, C.A., Gaigl, A., Ehlers, R., Bellotti, A.C. 2006. Parasitismo de dos cepas de entomonematodos, una nativa (*Steinernema feltiae*, cepa Colombia) y otra introducida (*Heterorhabditis bacteriophora* cepa E-Nema®), sobre los seis estados de desarrollo de Cyrtomenus bergi Froeschner (*Heteroptera: Cydnidae*) en condiciones de laboratorio. In: Nematodos entomoparásitos: Experiencia y perspectivas. Eds. J.C. Parada, J.E. Luquez Z, W de J. Piedrahita C. Universidad Nacional de Colombia. Conciencias, Colombia. pp. 175-183.

Melo, E.L., Ortega, C.A., Gaigl, A., Bellotti, A.C. 2006. Evaluación de concentraciones de *Heterorhabditis bacteriophora* (Italia) sobre larvas de segundo instar de *Phyllophaga menetriese* (*Coleoptera: Melolonthidae*). In: Nematodos entomoparásitos: Experiencia y perspectivas. Eds. J.C. Parada, J.E. Luquez Z, W de J. Piedrahita C. Universidad Nacional de Colombia. Conciencias, Colombia. pp. 184-191.

Rejane Nunez Farias, A., Bellotti, A.C. 2006. Pragas e Sece controle. In: Aspectos socioeconômicos e agronômicos da mandioca. Eds. L.S. Souza, A. Rejane N. F., P.L.P. de Mattos, W.M. G. Fukuda. EMBRAPA, Mandioca e Fruticultura Tropical. Cruz das Almas, BA, Brazil, 2006. pp. 591-671.

Conference/Workshop Presentations

Alvarez, E. 2006. DNA sequence analysis of the 16s rRNA region of phytoplasma associated with lethal wilt in oil palm. International Oil Palm Conference. Nusa Dua- Bali, Indonesia. June 19 -23, 2006.

Alvarez, E. 2006. Pudriciones radiculares en cultivos tropicales: Pudrición de raíz en yuca (*Manihot esculenta Krantz*) causada por *Phytopthora spp*. In : Memorias II Curso Internacional de Riesgos fitosanitarios para la agricultura colombiana. Palmira ,Colombia, Nov. 14-16, 2006. pp. 159 -167.

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Alvarez, E., Llano, G., Loke, J.B. 2006. Efecto de dos especies de *Trichoderm* sobre el rendimiento y control de pudrición de raíces de yuca. XLVI Annual Meeting American Phytopathology society (APS) Caribbean Division - XXVII Congreso ASCOLFI , Cartagena, Colombia, Sept., 12-16, 2006.

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Caicedo, A.M., Valencia, A., Montoya-Lerma, J., Bellotti, A.C. 2006. Respuesta inmune de *Cyrtomenus bergi Froeschner* (*Hemiptera: Cydnidade*) en presencia de *Trypanosomatidae* en órganos y hemocelo. Resúmenes XXXIII Congreso Sociedad Colombiana de Entomología, SOCOLEN. Manizales, Colombia. July 26-28, 2006. p. 37.

Correa-Victoria, F.J. 2006. Improving Blast Resistance for Upland Rice in Colombia: a Challenging Task. 31st Rice Technical Working Group Meeting. The Woodlands, Texas, USA. Feb. 26 - March 1, 2006.

Correa-Victoria, F.J. 2006. Identification of molecular markers for pyramiding rice blast resistance genes. Second Research Coordination Meeting. Nanjing, China. April 10-14, 2006.

Correa-Victoria, F.J. 2006. Avances en la investigación en enfermedades del arroz: *Pyricularia grisea.* II Congreso Brasilero de la Cadena Productiva del Arroz. VIII Reunión Nacional de Pesquisa de Arroz. EMBRAPA, Brasilia, Brasil. April 26-28, 2006.

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Carabali, A., Bellotti, A.C., Montoya-Lerma, J. 2006. Potencial demográfico del biotipo B de Hemisia Tabaco (*Homoptera: Aleyrodidae*) sobre genotipos Africanos de *Manihot Esculenta Crantz*. Resúmenes XXXIII Congreso Sociedad Colombiana de Entomología, (SOCOLEN0. Manizales, Colombia. Julio 26-28, p.32.

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Voice of America two hour interview with Segenet Kelemu – Amharic program –October 2006.

Activity 3.11. List of Partners/ collaborators

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Cooperative Research Center for Tropical Plant Protection
University of Queensland

Brazil
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Instituto Agronómico de Campinas (IAC)

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Canada
Andre Levesque, Agiculture and Agri-Food, Ottawa

Colombia

Adriana Arenas, Universidad del Valle
Agrobiológicos SAFE , Laboratory "Natural Control", Medellín
Alberto Soto, Universidad de Caldas
Ana Luisa Díaz, ICA
Aníbal Tapiero, CORPOICA
BIOCARIBE S.A., Medellín
Bolívar Muñoz, CORFOCIAL
Carlos Aníbal Montoya, ICA
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Tanzania
ADRA- Adventist Development and Relief Agency
AHI- African Highlands Ecoregional Programme
Anglican Church of Tanzania, Mara Diocese
Catherine Madata, Agricultural Research Institute
ELCT- Evangelical Lutheran Church of Tanzania
Farm Africa
FIPS Farm Inputs Promotion Africa
HEM- Himo Environmental Management
Local government and religious leaders
Ministry of Agric.-Armyworm project
Minjingu Mines & Fertilizer Ltd.
SARI Bean research programme
World Vision

Uganda
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AAMP- Area-Based Agricultural Modernisaion programme
Africare
AHI – African Highlands Ecoregional Programme
Antón Bua, Namulonge Agricultural and Animal Production Research Institute, NAARI
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NAADS- Uganda National Agricultural Advisory services
NEMA – National Environment Management Authority
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PMA- Plan for the Modernisation of Agriculture
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