

E D U N A B I O



Universität
Rostock



UNIVERSIDAD NACIONAL DE LA PLATA

Corpoica



UNIVERSIDAD NACIONAL AGRARIA
"Por un Desarrollo Agrario Integral y Sostenible"



Proceedings

International Workshop

Santa Clara and Bayamo,

March 2014, Cuba

E D U N A B I O

Schedule

- 23 March: Arrival in La Habana**
- 24 March: Travel to Santa Clara; Workshop I with colleagues from the Universidad Central, meeting with the Dean of the Faculty of Agriculture (Raciél Lima Orozco)**
- 25 March: Travel to Bayamo**
- 26 March: Workshop II, meeting with the President of the University of Granma, Narcys Bueno**
- 27 March: Field trip to Sierra Maestre**
- 28 March: Travel to Havana**
- 29 March: Informal meeting for foreign participants and farewell event**
- 30 March: Departure from La Habana**

Participants Workshops I and II

Tabel 1: Names of participants at the workshops I and II (complet list with adressen given in the annex)

Institution	Name/Position	Workshop 1	Workshop 2
Universidad de Granma	Narcys Bueno Rector		x
Universidad de Granma Faculty of Agriculture	Raúl López Project coordinator I Bayamo		x
Universidad de Granma Faculty of Agriculture	Yosvel Viera Tamayo Scientist		x
Universidad de Granma Faculty of Agriculture	Robison Hermosilla Espinosa Scientist		x
Universidad de Granma Faculty of Agriculture	Yoandro Rodriguez Ponce Scientist		x
Universidad de Granma Faculty of Agriculture	Ernesto Gómez Scientist, Agroecosystems		x
Universidad de Granma Faculty of Agriculture	Gisper Gongora Scientist		x
Universidad de Granma Dept. of Chemistry	Dilver Peña Fuentes Project coordinator II Bayamo		x
Universidad de Granma Dept. of Chemistry	Manuel Almeida Scientist, Chemistry		x
Universidad de Granma Dept. of Chemistry	Eugenio Torres Rodriguez Scientist, Chemistry		x
Universidad Central de las Villas Faculty of Agriculture	Raciel Lima Orozco Dean	x	
Universidad Central de las Villas Faculty of Agriculture	Marta Vega Hernandez Scientist, Animal Sciences	x	x
Universidad Central de las Villas Faculty of Agriculture	Cristobal Rios Scientist, Plant Sciences	x	x
Universidad Central de las Villas Faculty of Agriculture	Onelio Fundora Scientist, Soil Science	x	
Universidad Central de las Villas Faculty of Agriculture	Yamisey Year Year Scientist, Plant Sciences	x	
Universidad Central de las Villas Faculty of Chemistry	Pedro Jesus Iturra Quintero Scientist, Chemistry	x	x
Universidad Central de las Villas Faculty of Chemistry	Luisel Hernandez Junco Scientist, Chemistry	x	x

E D U N A B I O

Institution	Name/Position	Workshop 1	Workshop 2
Universidad Central de las Villas Faculty of Chemistry	Luís Bravo Sanchez Scientist, Chemistry	x	x
Universidad Central de las Villas Faculty of Chemistry	Jose Orestes Guerra Scientist, Pharmacy	x	x
Universidad Central de las Villas IBP	Idalmis Bermudez Coordinator of the master program of Biotechnology	x	x
Universidad Central de las Villas IBP	Lourdes García Rodríguez Coordinator of the PhD program of Biotechnology	x	x
Universidad Central de las Villas IBP	Daniel Agramonte Penalver Scientist, Biotechnology	x	x
IBP - Universidad Central Marta Abreu	Felipe Jimenez Terry Scientist, Biotechnology	x	x
CORPOICA Dept. Biotechnology	Martha Isabel Gomez Scientist Project coordinator for Corpoica	x	x
CORPOICA Dept. Biotechnology	Laura Fernanda Villamizar Scientist	x	x
CORPOICA Dept. Biotechnology	Mauricio Cruz Barrera Scientist	x	x
Universidad Nacional Agraria	Carolina Vega scientist, project coordinator for UNA	x	x
Universidad Nacional Agraria	Hugo Rodriguez Scientist	x	x
Universidad Nacional Agraria	Roxana Cruz Scientist	x	x
Universidad de Rostock	Bettina Eichler Lobermann Vice-Rector for Internationalisation Project coordinator	x	x
Universidad de Rostock Dept. of Hydrology	Konrad Miegel Professor	x	x

Main outcomes - summary

1. During the workshop the modules were selected which should be developed regarding aspects of biodiversity. Each partner nominated one or more persons responsible for the development and evaluation of the modules. Special emphasis was given on e-learning and distant-learning programs. Another Master course was included into the program: Sustainable agriculture (University of Santa Clara)
2. The partners discussed the organization of the academic exchange for 2014 as well as offered opportunities and topics for qualifications and practical terms.
3. Corpoica offered practical training programs for 1 month (160 hours) in aspects of "Microbial diversity and Biocontrol".
4. The partners agreed to include the field of animal sciences into the project.
5. The next workshop will be held in Colombia in February 2015. Corpoica will be responsible for the organization. The workshop will be combined with the field trip, which is also organized by Corpoica.

The following modules of the master study courses were selected (responsible persons in brackets)

S1 Manejo sostenible de los recursos naturales (Universidad Granma, Manuel Almeida and Dilver Peña)

S2 Ciencias Agropecuarias (Universidad Granma, Raúl López and Dilver Peña)

S3 Producción de medicamentos de origen natural (Universidad Central de las Villas, José Orestes, Pedro Iturra)

S4 Biotecnología de las Plantas (Universidad Central de las Villas, Lourdes García, Idalmis Bermudez)

S5 Protección Vegetal (Universidad La Plata)

S6 Agroecología (Universidad Agraria Managua, Carolina Vega)

S7 Agroforestería tropical (Corpoica in cooperation Universidad de Ciencias Aplicadas y Ambientales,

The workshop was split in two parts

Workshop I in Santa Clara

Workshop II (main workshop) in Bayamo

During the workshop I in Santa Clara Bettina Eichler explained the main objectives of the project and the issues needed to be discussed during the workshop in Bayamo. She met colleagues from the University in Santa Clara who could not participate at the

workshop in Bayamo. The main workshop was held in Bayamo, where all partners presented their institutions and discussed the issues given above.

Contribution of the partners during the workshop in Bayamo

University of Rostock (Germany)

At the beginning of the workshop Bettina Eichler (project leader) presented the University of Rostock and gave a summary of the main objectives and the milestones of the project.

Following main objectives of the project were confirmed by the participants:

- Foster aspects of biodiversity in higher education
- Improve the quality of education
- Strengthen the cooperation and academic exchange between institutions in Latin America and Germany
- Provide a basis for further joint projects

Main project issues were discussed as well with Narcys Bueno (President of the University of Granma) during the stay in Bayamo.

Konrad Miegel presented new aspects regarding the effect of hydrological parameters on soil quality and biodiversity.

Aspects of biodiversity should be also more considered in the following modules of the Master course “Plant production and Environment” of the University of Rostock: I) Renewable primary products and Bioenergy II) Agronomy and Plant nutrition, III) Soil Use Systems in the Tropics and Subtropics.

Bettina presented the chair of Agronomy of the University of Rostock and explained options for scientific collaborations.

List of presentation given¹:

Summary of the project EDUNABIO (Projects_overview_eichler)

Short presentation of the University of Rostock (Rostock_presentation_university)

Presentation of the research and education activities of the chair of Agronomy and nomination of modules to be developed within the project (Rostock_chair_agronomy)

Lecture of drought stress and impacts on agriculture (Rostock_Hydrology)

¹ All presentations of the workshop can be download: Link.....

Crop Science

Gene expression profiling
 (transcriptome analysis)
 Allelic diversity of genes
 Genome-wide association studies
 QTL based modelling
 (e.g. prediction of flowering time)

Plant responses on biotic/abiotic stress
 Mixed cropping

Agronomy

P fertilizer practice
 Biofertilizers and PGPR
 Crop production effects on soil
 fertility
 Recycling of wastes and residues

Interdisciplinary Faculty – Maritime Systems
 Leibniz P Campus

Figure 1: Research activities of the chair of Agronomy of the University of Rostock – presented by Bettina Eichler

Universidad Nacional Agraria (Nicaragua)

Carolina Vega presented the University and gave details about master study courses, PhD programs and she presented modules to be developed within the project. Furthermore, she gave important information regarding the status of biodiversity and valuable regions in Nicaragua. Carolina focused on the improvement of the education and research (see figure 2) and the option to modify contents of courses during the project time.

The following modules of the MSc study course “Agro-ecology and rural development” were selected for further revision within the project: I) Analyses and management of sustainable agro-ecosystems, II) Ethno-ecology, III) Planning of fincas.

List of presentation given:

Quality in research and education (Nicaragua_quality_education_research)

Selected modules for the project (Nicaragua_selected_modules)

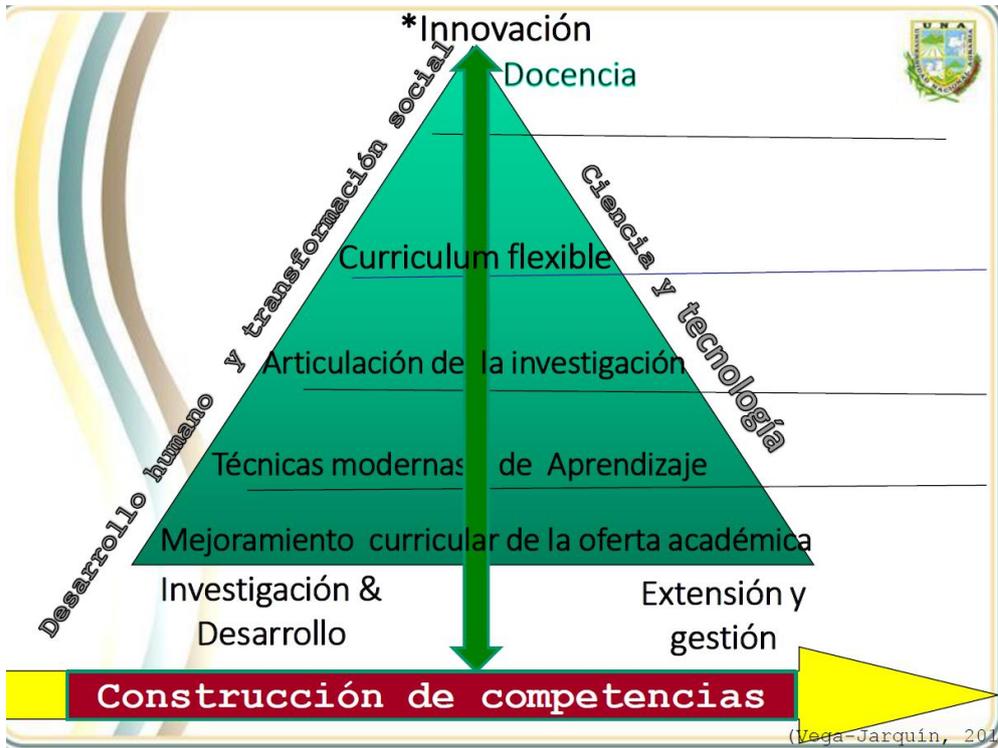


Figure 2: Approach to improve the quality of education and research – presented by Carolina Vega

Corpoica (Colombia)

Martha Gómez presented the main data of Corpoica including branches of investigation, laboratories, research focusses and current projects. Furthermore, the study course Agroforestry was presented.

Laura Villamizar showed a selection of practical courses offered by Corpoica for students of the partner universities in the field of “Microbial diversity and biological pest control”. During these courses students and PhD students have the opportunity to get knowledge in experimental designs and laboratory work, field experiments, data analyses and scientific writing (see figure 3). Corpoica offered the following topics for practical courses: I) Microbial diversity, II) Basics of biological pest control, III) Biological control of phytopathogens, IV) Biological control of fungi and insects V) Formulation of biological pest products VI) Quality control VII) Different case studies.

MÓDULO : «Biodiversidad Microbiana y Control Biológico»

- Duración del módulo: 1 mes – 160 horas
- Cupo: 3 estudiantes

OBJETIVO GENERAL

Entrenar estudiantes en aspectos teóricos y prácticos relacionados con caracterización uso y aprovechamiento de mo para el control biológico de plagas y enfermedades

OBJETIVO ESPECÍFICOS

Se espera que al finalizar el módulo el estudiante tenga las bases teóricas y prácticas para:

- *Aislamiento, caracterización y conservación de mo biocontroladores
- *Diseño y montaje de bioensayos para la evaluación de mo antagonistas
- *Diseño y montaje de bioensayos para la evaluación de mo entomopatógenos
 - *Montaje y mantenimiento de colonias de insectos plaga
 - *Producción masiva y formulación de mo
 - *Control de calidad de bioproductos



METODOLOGÍA

Conferencias magistrales

Prácticas de Laboratorio

Montaje de bioensayos en laboratorio e invernadero

Visitas a ensayos en condiciones de campo

Sesiones de análisis de datos

Sesiones de discusión de artículos

Visitas a otros laboratorio

Figure 3: Training program offered by Corpoica in the field of microbial diversity.

List of presentation given:

Description of the Master Course Agroforestry (corpoica_description_agroforestry)
General information of Corpoica (corpoica_general)

EDUNABIO

Description of the practical courses offered by Corpoica to other partners (Corpoica_practical_courses)

Universidad de las Villas, Santa Clara (Cuba)

The Faculty of Agriculture, the Faculty of Chemistry and the Institute of Biotechnology of Plants were presented by Cristóbal Ríos, Pedro Iturria, and Idalmis Bermúdez, respectively. Idalmis highlighted that the Master course in Biotechnology belongs to courses with the label of Excellency. Special attention was given to the module Production and conservation of genetic resources (see figure 4). Marta Vega introduced the department of animal sciences. This had special importance since the area of animal sciences was not included in the project yet. Issues of breeding and potato production were discussed with Daniel Agramonte and Felipe Jiménez.

Pedro Iturria presented a virtual laboratory which was developed in the department of Chemistry. He also offered the possibility to host the official website of the project and will be responsible for the work package "Evaluation".

Contenidos del Programa (adaptado a Proyecto EDUNABIO)

- Origen e importancia de los recursos genéticos; Concepto de agrobiodiversidad, germoplasma, recursos genéticos y biodiversidad; importancia de los recursos genéticos; su clasificación; origen de la biodiversidad genética vegetal y animal; centros de origen de la diversidad genética; conceptos, causas e importancia de la erosión genética. Especies de plantas y animales domesticados, hongos y otros microorganismos (especies nativas e introducidas) Prospección e introducción de recursos genéticos; principios y métodos de prospección de germoplasma vegetal; bancos de germoplasma o banco de genes de animales y vegetales; principios de la introducción de germoplasma vegetal; cuarentena vegetal. Conservación de recursos genéticos; importancia de la conservación de los recursos genéticos; conservación in situ; Conservación en fincas, milpas, conucos, paisajes agrarios, reservas comunitarias. Conservación *ex situ*; bancos de germoplasma, jardines botánicos. Conservación *in vitro*; importancia del mantenimiento de la pureza genética. Características y evaluación de los recursos genéticos; descriptor de clasificación; metodología de evaluación; documentación y bases de datos. Utilización de recursos genéticos. Métodos tradicionales de fitomejoramiento; mejoramiento participativo. Métodos biotecnológicos empleados en la fitomejora; métodos de multiplicación acelerada.

Figure 4: Suggestions for modification of the module Production and conservation of genetic resources within the Edunabio-Project presented by the University las Villas.

List of presentation given:

Description of the Master Course Sustainable Agriculture

(Santa_clara_course_sustainable_agriculture)

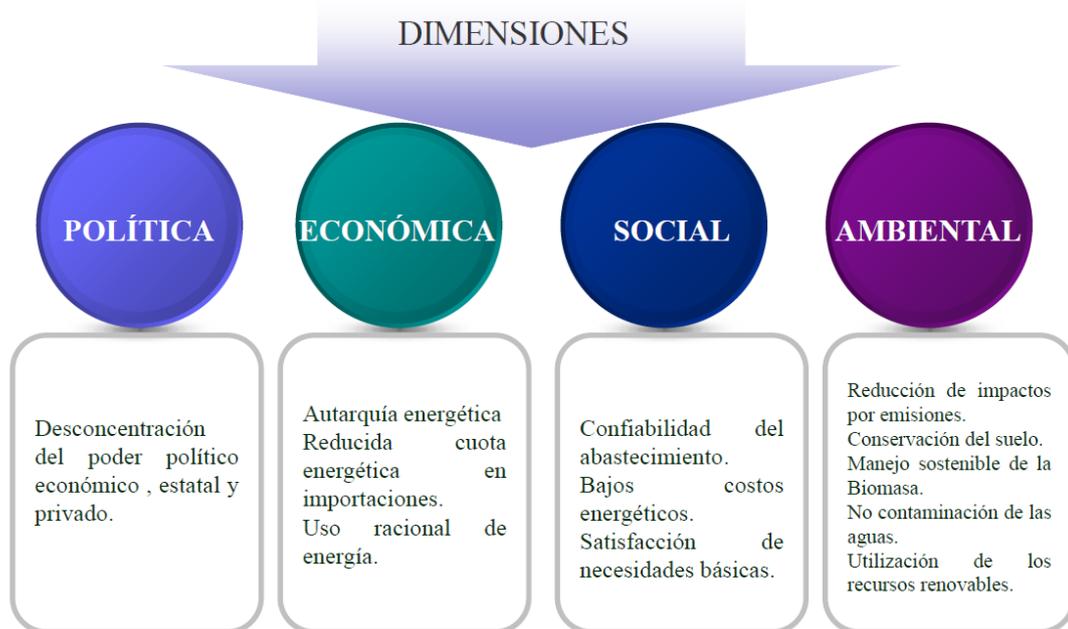
Description of the Master Course Medical Plants (Santa_clara_medical_plants)

Selected modules IBP (santa_clara_selected_modules_IBP)

Universidad de Granma, Bayamo (Cuba)

Dilver Peña presented the University including current projects and other scientific activities. Manuel Almeida explained the contents of the Master course: Sustainable management of Natural Resources which was developed within the last DAAD project between the Universities in Rostock, Managua, Santa Clara and Bayamo. For the project the module Renewable energies and recycling materials was selected and presented by Yoandro Ponce. He highlighted the role of renewable energy regarding social, political, economic and environmental aspects. Raúl López summarized the contribution of the University of Bayamo within the project.

CONTRIBUCIÓN ENERGÉTICA A LA SUSTENTABILIDAD DEL DESARROLLO



El aporte de la política energética en favor de la sustentabilidad resulta altamente significativo

Figure 4: Role of renewable energies. Presentation given by the University of Granma.

Summary and General Discussion of the Workshop II

After the presentations the selection of the modules of the master courses were discussed. Finally, the discussion resulted in a selection of at least two modules per master study course. The participants suggested academic exchanges for 2014, giving special attention to young scientist. The participants, mainly from Cuba, appreciated the project also in order to motivate young people to study agricultural or environmental subjects.

Bettina gave special thanks to all participants for their contributions to this successful workshop.



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	Instituto de Biotecnología de las Plantas. Universidad Central Marta Abreu. Universidad Central de las Villas	Felipe Jimenez Terry	Investigador Especialista propagación de plantas producción de sustratos orgánicos y casa de cultivo	felipe@ibp.co.cu
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	Universidad Nacional Agraria	Roxana Yadira Cruz Cardona	Investigación y producción de cultivos tejido vegetales	rcardona@una.edu.ni

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Proceedings

**Workshop Bogotá-Villavicencio, Colombia
February 22-28, 2015 Organizers: Corpoica/UDCA**

&

Meeting in Santa Clara

Workshop Bogotá
23/02/2015

10:00 Opening

10:10 „The EDUNABIO-Project – First results and further perspectives“

Bettina Eichler-Löbermann, University of Rostock, Project Leader

Session: Aspects of agro-biodiversity in education (Moderation Laura Villamizar)

10:40 Higher education in Agronomy and Organic Chemistry

Selected modules and contents, responsible persons

Raúl López, Dilver Pena, University of Granma

11:10 Higher education in Animal Science and Soil Science, Selected modules and contents, responsible persons,

Pedro de la Fé, Onelio Fundora, University of Santa Clara

12:00 Higher education in Cropping Systems, Modules and contents, responsible persons, Carolina Vega, University UNA, Managua

12:20 Higher education in Chemistry, Modules and contents, responsible persons, Jorge Jios, University La Plata, Argentina

12:40 Higher education in Environmental Sciences, Edgar Martinez, UDCA

+++ Lunch +++

Session: Knowledge transfer, training, evaluation (Moderation Pedro de Fé)

14.00 Knowledge transfer – Experiences from La Plata

Santiago Sarandon, University La Plata

14:20 Practical training and courses

Martha Gómez and Laura Villamizar, Corpoica Bogotá

14:40 Instruments of evaluation in education - short presentations of all partners

15:20 Biodiversity and Environmental protection on highways

Alemayehu Gebissa, University of Rostock

15:45 Activities in 2015 (Chair: Bettina Eichler-Löbermann, University of Rostock)

Summary and Closure, Welcome dinner

Contents of presentation– short version:

Laura (Corpoica): gave the welcome and opening words of the Workshop, and every delegate introduced themselves.

Bettina (Uni Rostock): delivered a presentation regarding the project EDUNABIO, deeply explained the project report 2014 and the aims of the Workshop 2015. Specifically, Bettina interacted about the list of master programs involved in the project and the decision to insert the programs of Sustainable Agriculture and Advance Animal Health from the University Santa Clara in the project. The integration of the Master on Animal Science supported the project considerably as animal health is commonly integrated to agricultural systems in the American region, and is a key point for agrobiodiversity. Bettina emphasized that all information regarding the evaluation tools of the modules need to be sent to Alfred Flint (Uni Rostock), and advised all members to work close together in this field. Bettina suggested to elaborate a table with all modules involved and to give

the responsible persons. She advised Hugo to copy all presentations as they should be later presented on the projects homepage.

Raul/Dilver (UDG) gave an overview of the activities from UDG followed by the presentations of **Pedro/Onelio/Ray** from UCLV. Additionally, Pedro informed about the conference on Sustainable Agriculture to be held in 2016 in Santa Clara, Cuba, and about the Journal Centro Agrícola from as a medium to publish papers related to Agrobiodiversity.

Edgar Martínez, the Dean of the Environmental Engineering Faculty of UDCA, Colombia, presented the content of the master program on socio-environmental administration.

Jorge (La Plata) delivered his presentation, the results of cooperation with students from UDG, Cuba, and gave the possibility to offer trainings in spectroscopy in his institution.

Visit of the library of CORPOICA "Tibaitatá" and presentation of the Journal CORPOICA, as well as the collection of old/classic books.

Santiago and Claudia (La Plata) introduced the education on agrobiodiversity for different groups: technicians, professionals, producers and students. Specifically, they emphasized the need to introduce education on biodiversity on study programs of related disciplines.

Carolina (UNA) informed about the Agro-ecology Law of Nicaragua and the support from the universities. Hugo and Carolina introduced very impressively their experience in e-learning in cooperation with UDG in Cuba.

Alemanyehu (Uni Rostock) informed about highway construction and biodiversity and emphasized the important role of interdisciplinary approaches.

Participants

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COLOMBIA	CORPOICA	Martha Gómez Álvarez	mgomeza@corpoica.org.co
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Field Trip

Participants: All participants from the workshop (excluding Edgar)

24/02/2015

- Starting of the field trip to Villavicencio.
- Mauricio and Camilo (Corpoica) presented their reports about activities in the frame of EDUNABIO in UDG/Cuba, UNA/Nicaragua and CORPOICA/Colombia. Also about the visit of Carolina to CORPOICA.

Field Trip 25/02/2015

- Visit to CORPOICA "La Libertad", Villavicencio.
- Presentation of the EDUNABIO delegates and the staff members of the departments Animal Reproduction, Animal Husbandry, Tropical grass, Genetic Resources, and Quality.
- Ruben Valencia, who is the director of CORPOICA "La Libertad", gave a detailed presentation about the research centre.
- Visit to the Laboratory of animal reproduction (artificial insemination and embryo transfer) dedicated to improve and preserve their bovine local genetic resources. The delegates received information on these topics and the recuperation of the San Martinero breed, a local genetic resource. The delegate Pedro interacted about the research on the molecular basis of the interaction ovule – spermatozoa and the use of classical and even local plant lectins on the study of the glycosylation of these cells.
- Explanation of programs on animal health for the local bovine bred San Martinero, and Cebu Brahman. The responsible person referred to the infestation of *Dermatobia hominis* and ticks in bovines, and explained the eco-friendly alternatives for their control. Pedro introduced the problem of overuse of the endectocide Ivermectin in Latinamerica, and their influence

on dung beetles population and other arthropoda, as well as on the recycling of feces, he also advised about the integral management of ticks.

- Visit to rubber (caucho) plantations, and excellent explanation about their management and profits for producers and community.
- Visit of an area involved in identification, recuperation and propagation of wild fruits. Here it was showed showed how to preserve biodiversity and guarantee income for the farmers at the same time. Among other, tree grapes, tree peanuts, cacao varieties, plants for the production of natural colorants and medicine were presented.
- Visit of an experimental station dealing with the production of several varieties of grass better adapted to local climatic conditions.
- Visit of an organic fruit plantation: oranges, mandarin, yellow mamee (mamey amarillo), wild cherries, medlar (níspero).

26/02/2015

Visit to the field station CORPOICA "Taluma"

- Visit of field experiments with rotations of rice plantations and bovine production in order to improve soil quality. Samuel Caicedo Guerrero (director) explained the rotation. Santiago referred to the erosion both systems can cause. Bettina referred to the control of the amount of cattles per hectare in order to protect environment from CH₄, N₂O and N₂ emissions.
- Discussion about integral management soil-grass-animal.
- Visit of an orange plantations.
- Visit of a cashew (marañón) plantations and technologies for their recuperation.
- Visit of an area divided and managed in several parcels including parcels with wild flora, which contribute to keep biodiversity despite of intensive agriculture.

At night:

- Short meeting of the project and discussion of activities in 2015. Argentina's members will have priority in mobility activities. Pre-planning of the workshop in Nicaragua 2016. Discussion about the balance of integrated disciplines in the mobility activities.

27/02/2015

Trip to Bogotá

Goodbye/closing dinner. Short statements of Bettina and other delegates.

28/02/2015

Departure of the delegates.

Bettina, Alemanyehu and the colleagues from Cuba went to Cuba

Project meeting in Santa Clara (Cuba)

02/03/2015

Participants: Andres Castro Alegria (Rector of the UCLV), Alfredo Marin Cardenas (Dean of the Agricultural Faculty), Bettina, Alemanyehu, Pedro, Onelio, Ray, Idalmys, Javier Aguiar, Marta Vega, Mario Reinoso, Yamisey Yera and Leonel Lazo.

Activities:

- Presentation of the dean of the Faculty of Plant and Animal Sciences at UCLV. He mentioned the role of the training program for farmers and transfer of technologies.
- Presentation of the project EDUNABIO
- Definition of modules of master programs related with agriculture to be included in the project: Sustainable Agriculture, Plant Biotechnology and Advance Animal Health.

- The Rector appreciated the participation of UCLV at the projects. Discussion about the relation Cuba-EU-USA, and an upcoming visit of the German ambassador in Habana to UCLV. He emphasized the historical relations (more than 50 years) of UCLV and the University of Rostock.
- Bettina gave a talk about researches in bio-fertilizers.
- Pedro informed about future perspectives in topics of animal feeding and energy production with Prof. Kanswohl from the University of Rostock.
- Side meeting of Prof. Alemanyehu with the dean of the faculty of Civil Engineering and Architecture, and the head of the centre for Materials Research at UCLV.
- Visit of the classrooms and laboratories of the Faculty of Plant and Animal Sciences at UCLV.

Lunch time

- Visit of the Institute of Plant Biotechnology (IBP) and their installations. The IBP wants to intensify the cooperation with CORPOICA.

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Proceedings

Workshop Managua, Nicaragua 2016

**Part 1:
February 25 to March 02**

**Part 2:
May 03 to May 06**

Organizer: Universidad Nacional Agraria, Faculty of Agronomy

Schedule Part 1

25.02. Arrival of participants

26.02. Workshop on Distance Learning

27.02. + 28.02. Excursion to Camoapa and Masaya (Finca El Plantel)

29.02. Workshop of the main outcomes of the Edunabio project

01.03. Meeting with the representatives of UNA, selected presentations on Agrobiodiversity

02.03. Leaving of the participants

Schedule Part 2

02.05. Arrival of participants

03.05. Workshop on the main outcomes of the Edunabio project

04.05. Workshop on Distance Learning

05.05. Workshop on Agrobiodiversity

06.05. Meeting with the representatives of UNA

07.05. Leaving of the participants

Due to new visa regulations, which require a visa for Cubans citizens, the Cubans must cancel their flights for February and had to postpone their visit at UNA to May2016.

The Ministry of Higher Education in Cuba was not informed about these new regulations regarding the visa before. The Cubans participants were informed about this regulation two days before departure by the embassy of Nicaragua in Havana.

Part 1) Workshops and field trips

Friday, 26.02. Special course on Distance Learning.

This course was given by Guillermo Antunez (Cuba) via a video conference. Comprehensive learning material was provided prior to the course to the participants.

Saturday, 27.02. to Sunday 28.02. Field trip to Camoapa and the Cooperative farm "El Plantel"

The following issues were carried out during the field trip: I) Visit of various field experiments, II) Explanations of methods of mixed cropping in this region of Nicaragua, III) Discussion with farmers about sustainable crop production and animal husbandry, IV) presentations of students of the branch of UNA in Camoapa, V) meeting with representatives of the branch of UNA in Camoapa, VI) meeting with docents regarding contents of master modules

Monday, 29.02. Workshop of the Edunabio project

Welcome addresses **Carolina Vega** (Managua) and introduction of the all participants.

Bettina Eichler (Rostock) presented the work of the project Edunabio with special focus on the last year. She specially drew attention on the importance of e-learning. Related to this topic a special training course (half a day) was included in the present workshop in Nicaragua. A homepage of Edunabio is online and all presentations of the present workshop can be downloaded from there.

Alfred Flint (Rostock) presented the main outcomes of the work package "Evaluation". He developed a system for the evaluation of courses. This work was supported by the project "Kosmos" of the University of Rostock. He presented in detail the concept and items of the evaluation sheet which should be filled in by students involved in the training courses modified during the project. Questions are related to time, skills, quality, literature etc. One main issue of the discussion was the question whether or not the students should give their personal data, such as name and address.

Jael Cruz (Managua), master student of Carolina Vega, presented her work related to microbiological studies, and the effects of microbial communities on cacao cultivation. In future molecular genetic analysis will be carried out. This work is of special interest as part of the training and education work package within the Edunabio project.

Franciska Mejia (Managua), master student of Carolina Vega, presented her work related to fungi as native antagonists to avoid the extensive use of insecticides in crop production. This work is of special interest as part of the training and education work package within the Edunabio project.

Laura Villamizar (Bogotá) reported about new techniques in the field of pharmaceutical technology (formulation of biomedicaments) with a special emphasis on the analysis by SEM and TEM technology for the evaluation and quality control of biological insecticides and on the production of recombinant enzymes. The results of this work were used in various teaching programs.

Hugo Jiménez (Bogotá) reported about his results on fermentation tests which he did during a stay in Rostock. Here he used crops from mixed cropping experiments. In addition, he reported about the degradation of feedstuff for animals. The results of this work should be also used in teaching programs.

Jorge Jios (La Plata) spoke about new trends of teaching in chemistry. Special chemistry lectures were also given for students of biology, engineering and agriculture with special focus on current problems related to contamination and environment. He highlighted the relevance of chemical subjects in master courses on agrobiodiversity.

Claudia Flores (La Plata) spoke about current trends in the field of agroecology which special emphasis on sustainable development in the context of economy, sociocultural aspects and ecology.

Carolina Vega (Managua) summarized the most important findings with special focus on future problems to be solved within the Edunabio network.

The participants gave special thanks to Dr. Carolina Vega for the organization of the workshop.

Tuesday, 01.03. Meetings and presentations

Meeting with representatives of the university UNA.

Peter Langer (Rostock) gave a lecture about indigo and indirubin as plant ingredients for the development of drugs based. The lecture put a special focus on teaching aspects related to chemical and biological diversity relevant to agriculture and drug development which are key features of the Edunabio project.

Gladys Romero (Bogotá) gave a lecture on genetic aspects of cultivation with a focus on teaching within the Edunabio network.

Part 2) Workshops and meetings

May 02-07, 2016 in Managua, Nicaragua

Various activities were developed within the frame of the second part of the Workshop.

It became necessary to divide the workshop into two parts, as the Cuban participants could not take part at the workshop in February due to new visa regulations between Cuba and Nicaragua.

I) Meeting with the Dean of FACA (Faculty of Animal Sciences, UNA) Prof. Carlos Jose Ruiz Fonseca, with the dean of FAGRO (Faculty of Agronomy, UNA) Prof Gregorio Varela, and the vice-rector of UNA Prof. Alberto Sediles Jaén.

UNA is planning to establish Veterinary Medicine and Animal Husbandry as a joint career; currently UNA offers Veterinary Medicine and Animal Husbandry separately. It was agreed that Cubans professors will be involved in the development of the methodological design. Additionally, the Cuban professors will elaborate material for students on practical experiences at farm level, as well as lab protocols on food analysis, parasitology, microbiology and clinics.

II) Visit to FACA installations.

The Dean of FACA guided a tour through the installations and animal facilities of the faculty, e.g., the teaching farms of poultry, swine, bovine, sheep, rabbits, *Ctenosaura similis* (garrobo), and forage banks. At every station ideas were interchanged with students.

III) Carlos Saenz (professor of FACA, UNA) presented a PhD project on Sustainable Agriculture - Monitoring the effects of pesticides on animal health. Several students participated and had to develop own presentations on this topic under supervision of the Cubans scientists. Carlos Saenz was invited for a two-week stay at Universidad Central "Marta Abreu" de Las Villas (Department of Veterinary Medicine and the Center of Bioactive Chemicals).

IV) Visit to the Universidad de Ingeniería (UNI)

Although, the UNI is not directly involved into the Edunabio project there is a long tradition of collaboration between this university and the partners of the Edunabio project. During the meeting further academic activities were discussed. The partners agreed to carry out joint conferences and teaching activities in the field of Environmental Sciences and Resource Management.

V) Visit to the Laboratory of Soil Analysis and a meeting on soil protection

Several UNA specialists took part at these activities (some of them were educated in Cuba). It was discussed how the outcomes of recent studies in soil science could be implemented in teaching activities.

VI) Debate with professors of FAGRO about education in master study courses. It was discussed how new modules can be created and how the workload of each module should be calculated.

VII) Meeting with the Rector of UNA, Prof. Telemaco Talavera.

Raul Lopez introduced the idea of an integral project on Agriculture in Dry Areas. The idea was accepted by all participants.

VIII) Meeting at the Department of Irrigation. Here the new post graduate program in Irrigation Systems was presented.

The participants gave special thanks to Dr. Carolina Vega for the organization of the second part of the workshop.

Participants of the Edunabio activities in Nicaragua 2016

Family name	First name	Institution
Villamizar Rivero	Laura	Corpoica (Colombia)
Jiménez Sabogal	Hugo	Corpoica (Colombia)
Romero Guerrero	Gladys	UDCA (Colombia)
Flores	Claudia	University La Plata (Argentina)
Jíos	Jorge	University La Plata (Argentina)
Méndez	José Mamerto	UNI Managua (Nicaragua)
Páramo	Leandro	UNI Managua (Nicaragua)
Chamorro	Efraín	UNI Managua (Nicaragua)
Talavera	Telemaco	UNA Managua (Nicaragua)
Saenz	Carlos	UNA Managua (Nicaragua)
Ruiz	Carlos Jose	UNA Managua (Nicaragua)
Jaén	Alberto Sediles	UNA Managua (Nicaragua)
Beck	Inge	UNA Managua (Nicaragua)
Salazar	Dennis	UNA Managua (Nicaragua)
García	Leonardo	UNA Managua (Nicaragua)
Ordoñez	Mercedes	UNA Managua (Nicaragua)
Videa	Roger	TICs-UNA (Nicaragua)
Munguía	Rodolfo	UNA Managua (Nicaragua)
Gutiérrez	Martha	UNA Managua (Nicaragua)
Arguello	Harold	UNA Managua (Nicaragua)
Ríos	Miguel	UNA Managua (Nicaragua)
Vega	Carolina	UNA Managua (Nicaragua)
Cruz	Jael	UNA Managua (Nicaragua)-UNA
Mejía	Francisca	UNA Managua (Nicaragua)
Alvarado	Rommel	UNA Managua (Nicaragua)
Chavarria	Isabel	UNA Managua (Nicaragua)
Gutiérrez	Jeanette	UNA Managua (Nicaragua)
Eichler	Bettina	University of Rostock
Flint	Alfred	University of Rostock
Langer	Peter	University of Rostock
Lopez	Raul	Universidad de Granma (Cuba)
Torres	Eugenio	Universidad de Granma (Cuba)
Antunez	Guillermo	Universidad de Granma (Cuba)
De la Fe	Pedro	Universidad de Santa Clara (Cuba)

Family name	First name	Institution
Espinosa	Ray	Universidad de Santa Clara (Cuba)
Fundora	Onelio	Universidad de Santa Clara (Cuba)
Lazo	Leonel	Universidad de Santa Clara (Cuba)

Apart from these participants listed several students and farmers were involved in the activities of the workshops and meetings

E D U N A B I O



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UNIVERSIDAD NACIONAL AGRARIA
"Por un Desarrollo Agrario Integral y Sostenible"



Proceedings

International Workshop

La Plata, Argentina

March 6 to 10 2017

**Organizer: Universidad Nacional de La Plata
Faculty of Agriculture and Forestry**

E D U N A B I O

Schedule

05.03. Arrival of participants

06.03. Workshop: Presentation of research lines related to agrobiodiversity in the Faculty of Agriculture and Forestry (UNLP).

07.03 Workshop: Presentations related to the main outcomes of the Edunabio project

08.03 Excursion to Benito Juárez (Buenos Aires Province) ("La Aurora" farm)

09.03 Excursion to Peri-urban Region of La Plata. (Agostinelli farm and "La nueva esperanza" farm).

10.03. Workshop: Role of agrobiodiversity in agroecosystems

11.03. Leaving of the participants

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Participants of the Edunabio activities in Argentina 2017

Family name	First name	Institution
Vasquez Carreño	Diana	Corpoica (Colombia)
Jiménez Sabogal	Hugo	Corpoica (Colombia)
Cruz	Iván	UDCA (Colombia)
Flores	Claudia	University La Plata (Argentina)
Jíos	Jorge	University La Plata (Argentina)
Sarandón	Santiago	University La Plata (Argentina)
Baldini	Carolina	University La Plata (Argentina)
Blandi	María Luz	University La Plata (Argentina)
Bonicatto	María Margarita	University La Plata (Argentina)
Gargoloff	Natalia Agustina	University La Plata (Argentina)
May	María Paula	University La Plata (Argentina)
Paleologos	María Fernanda	University La Plata (Argentina)
Stupino	Susana	University La Plata (Argentina)
Cruz	Jael	UNA Managua (Nicaragua)
Mejía	Francisca	UNA Managua (Nicaragua)
Antúnez Sánchez	Guillermo	University Granma (Cuba)
López Sánchez	Raúl	University Granma (Cuba)
Bermúdez Carabaloso	Idalmis	University de Las Villas (Cuba)
Lazo Pérez	Leonel	University de Las Villas (Cuba)
De la Fe Rodríguez	Pedro	University de Las Villas (Cuba)
Espinosa	Ray	University de Las Villas (Cuba)
Barranco Olivera	Luis Antonio	University de Las Villas (Cuba)
Eichler	Bettina	University Rostock
Flint	Alfred	University de Rostock

Workshops and field trips

Monday, 06.03.

Welcome and opening words of the Workshop by the Dean of the Faculty Agriculture and Forestry, Sandra Sharry, and by Prof. Claudia Flores. The Dean explained how important agrobiodiversity is as part of the strategic plan of the Faculty.

Ing. Agr. Santiago Sarandón (Universidad Nacional de La Plata, Argentina) spoke about the agrobiodiversity role in agroecosystems and he presented a research project of the Agroecology course.

Lic. Carolina Baldini (Universidad Nacional de La Plata, Argentina) presented her research project "Territory in motion: the territorial transformations of the CHP in the last 30 years. A look at the effects of territorial dynamics on regional biodiversity".

Dra. Fernanda Paleologos (Universidad Nacional de La Plata, Argentina) explained the role of carabids (Coleoptera, Carabidae) as components of agrobiodiversity and their importance for the sustainability of agroecosystems.

Ing. Agr. Agustina Gargoloff (Universidad Nacional de La Plata, Argentina) presented her research project about the management and knowledge of agrobiodiversity on family farms in La Plata region and its impact on sustainable management of agroecosystems.

Lic. María Margarita Bonicatto (Universidad Nacional de La Plata, Argentina) talked about the nexus between sustainability and agrobiodiversity with special emphasis on the analysis of seed conservation and associated knowledge in familiar agroecosystems of La Plata Horticultural Region.

Dra. María Luz Blandi (Universidad Nacional de La Plata, Argentina) spoke about practices, knowledge and perceptions that affect agrobiodiversity conservation in La Plata horticultural region.

Lic. Susana Stupino (Universidad Nacional de La Plata, Argentina) presented her project "Spontaneous plant diversity in horticultural agroecosystems of La Plata and its relation to different styles of agriculture".

Ing. Agr. Paula May (Universidad Nacional de La Plata, Argentina) presented the project of her doctoral thesis "Do local seeds contribute to more sustainable agriculture? Study of horticultural varieties in family farms in La Plata Region".

Tuesday 07.03

Workshop of the Edunabio project

Prof. Bettina Eichler-Löbermann (University of Rostock, Germany) presented the tasks of the project Edunabio with special focus on the last year's achievements. She also emphasized the milestones of the project and explained the deadlines and responsible persons for each objective. Special attention was drawn to the possibilities of continuing the work of the Edunabio-team after the project end.

Francisca Mejía y Jael Cruz (Universidad Nacional Agraria, Nicaragua) presented a summary of results of their work in the frame of the EDUNABIO-UNA project. Later Francisca Mejía (Managua), master student of Carolina Vega, presented her work related to fungi as native antagonists to avoid the extensive use of insecticides in crop

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production. This research is of special interest as part of the training and education work package within the Edunabio project.

Dr. Idalmis Bermúdez Caraballoso (Universidad Central "Marta Abreu" de Las Villas, Cuba), coordinator of the Master Programme of Plant Biotechnology, presented the incorporation of different aspects of agrobiodiversity into this program.

Dr. Pedro Yoelvys De La Fe Rodríguez, Dr. Leonel Lazo and Dr. Ray Espinosa (Universidad Central "Marta Abreu" de Las Villas, Cuba) presented a methodological work to deepen knowledge in Agrobiodiversity in the Master Programs: Sustainable Agriculture and Advanced Animal Health at UCLV. Additionally, Ray presented the web page of EDUNABIO which should be established at UCLV. Also, the vice-rector of UCLV Dr. Luis A. Barranco Olivera introduced the UCLV, showed the institutional video and invited all members to the International Convention UCLV-2017.

Dr. Raúl López Sánchez (Universidad de Granma, Cuba) explained the action carried out under the EDUNABIO program with a particular emphasis on the teaching of Agrobiodiversity in the master's programs of the University of Granma.

Dr. Alfred Flint (University of Rostock, Germany) presented the main outcomes of the work package "Evaluation". He presented an example of the evaluation of courses. This work was supported by the project "Kosmos" of the University of Rostock. He presented in detail the concept and items of the evaluation sheet which should be filled in by the students. Questions are related to time, skills, quality, literature etc. He also explained the importance of going forward on this step as a key result of the project EDUNABIO

Dr Jorge Jíos (Univesidad Nacional de La Plata. Argentina) spoke about the activities carried out in the framework of the EDUNABIO project. He highlighted the relevance of chemical subjects in master courses on agrobiodiversity. After that, Jorge Jios students presented their research:

Lic. en Química María Gabriela Echeverría gave a lecture about metals determined by ICP in samples of Cuban plant species: outlook and perspectives

Srta. María Ximena Ferro presented her final career work of the bachelor in Chemistry and environmental technology: Biogas and bio fertilizers by anaerobia biomass digestion.

Dr. Hugo Rodolfo Jiménez Sabogal and Er. MSc. Diana Rocío Vásquez Carreño from Corporación Colombiana de Investigación Agropecuaria (CORPOICA), Colombia informed about Corpoica's contirbution to EDUNABIO.

Ivan Cruz from Universidad de Ciencias Aplicadas y Ambientales (UDCA), Colombia presented the results of the research project "Vulnerability of coffee plantation in agroforestry due to climate change".

Wednesday 08.03

Field trip to Benito Juarez city (SE of Buenos Aires Province) and visit of "La Aurora" farm. This farm was declared by FAO as one out of 50 successful farms with respect to Agro-ecological applications in the world.

The following issues were carried out during the field trip:

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I) Ing. Agr. Eduardo Cerdá (La Aurora technical advisor) explained the particularities of this farm and the agroecological transition process. He pointed out the ecological, social and economic benefits of the agroecological production and explained the agroecological practices they have applied and clearly showed its benefits compared with non-agroecological farms.

II) Discussion between the farmer (Mr. Juan Kiehr), the technical advisor (Ing. Agr. Eduardo Cerdá) and the attending participants (about 60 including students from La Plata University).

III). Guided tour by Juan Kiehr and Eduardo Cerdá through the whole farm (aprox. 650 ha). They demonstrated in the field several successful agroecological practices like crop rotations, mixed cropping of wheat and clover and the use of the latter for bovines feeding after wheat is harvested, the inspection of the soil macrofauna, the inclusion of bovines in the system. The agroecological practices are applied even in animal productions, e.g. bovines are not dewormed with Ivermectin as its faecal excretion is harmful for the dung beetles, key insects for the dung recycling and soil natural fertilization.

In these activities (I, II and III) participated numerous students, technicians and farmers.

Thursday, 09.03.

Excursion to Peri-urban Region of La Plata. (Agostinelli farm and “La nueva esperanza” farm) known as La Plata horticultural “belt” (the most important horticultural sector of Buenos Aires province).

Before the excursion started Ing. Agr. (Msc) Claudia Flores, informed the participants about the reality of the La Plata Horticultural Region highlighting their historical shape and the different types of farmers and production styles that exist in the Region.

For the excursion two different farms as examples of different styles of production (conventional and organic) were chosen. First the “Agostinelli” farm, an intensive production farm for tomatoes under greenhouses with a modern irrigation system for water, fertilizers and pesticides was visited. Afterwards an agroecological farm, “La nueva esperanza”, with a high variety of crops and fruits was visited. Here the owner explained the agro-ecological practices which are applied in order to avoid the use of pesticides.

The participants gave special thanks to Msc Claudia Flores for the organization of the workshop.

Friday, 09.03.

The last workshop was used to discuss the role of biodiversity in small groups and to develop joint activities in research and education in the future.