

## **Activity 14. Integrated control of subterranean pests in South America.**

### **Introduction**

This project started on April 1. Due to the short period this annual report informs mostly about the recent activities that were conducted to install the project.

### **Preliminary Activities**

The project was originally designed for the Department Cauca, however, security problems made it necessary to identify alternative survey zones. Previously existing relations with SENA Armenia and the University of Caldas, Manizales, suggested conducting surveys in the coffee zone (Quindío, Risaralda, Caldas) where guerrilla activities are not frequent and where cassava has become one of the most important crops. Unfortunately, SENA Armenia was not a reliable partner so that we had to identify and interview farmers by ourselves. We also intensified contacts with University of Caldas, Universidad del Valle, CORPOICA (Rionegro) and the University of Bogotá.

The difficult financial situation made it necessary to apply for more funding. In May and June we submitted three proposals to SENA, Colciencias and the German Eiselen Foundation.

Preliminary field surveys in Quindío, where large-scale farmers dominate, revealed that white grubs and burrower bugs were almost not present. However, farmer interviews indicated that these pests appear every year, but they are well controlled through the application of insecticides. One farmer applied successfully entomopathogenic fungi against soil pests. Small-scale farmers in Risaralda recognize white grubs and *C. bergi* are recognized as important pests. A great abundance of soil pests were found in cassava (Pereira) and onion (Florida) fields. Due to the dry season soil pests were rare in Caldas (Granja Montelindo). However, eight undescribed species were collected. Due to the necessity to collect insects for rearing and carry out of bioassays. Routine pest surveys and their natural control agents were established in Pereira (cassava and pasture) and in Florida (onion and grassland). It is planned to include some farms in Quindío next year if additional funding makes the extension of field surveys possible.

The increasing traveling costs made it necessary to include less remote sites such as the North of Cauca. Security in that part of Cauca seems to permit field surveys. These are conducted in cassava and pasture at CIAT's experimental station in Santander de Quilichao, Caldono and Pescador. Since July routine surveys are being conducted in North of Cauca and in two zones close to Pereira.

### **Establishment of Activities**

On August 26/27 (2002) we organized a meeting with all project partners: The University del Valle (James Montoya), University of Bogotá (Miguel Serrano), University of Caldas (Fernando Vallejo) and the Investigation Centre in Rionegro (Martha Londoño). The objective was to coordinate and synchronize project objectives and activities. There was an agreement on following issues:

- Study of actual pest complexes and associated natural enemies.
- The selected crops are: Pasture kikuyo (*Pennisetum clandestinum*) and potato (*Solanum tuberosum*) in the North and East of Antioquia, the same crops in Cundinamarca; cassava, pasture and onion (*Allium fistulosum*) in Risaralda, and cassava and pasture in the North of Cauca.
- An preliminary field survey will provide information on the ideal experiment size
- The pests will be collected in a sample area of one square meter. This methodology is considered as more reliable for diversity studies than monoliths (30x30 cm)
- Synchronization of white grub sampling techniques
- Synchronization of collection of natural control agents
- Carry out experiments on economic damage under controlled conditions.

### Completed Activities

- Accommodation of a lab for white grubs colonies at Quindío, CIAT. At this moment (10/09/02) there are about 850 white grubs present after a peak of more than 1200 four weeks previous. This rate of decrease is within the normal range due to diseases and handling.
- Collection of white grubs in Caldoño for identification in cassava fields and in forest ecosystems. Forests were included to compare cultivated fields with a less disturbed environment. 600 specimen were collected in the forest: Dominant species: *Phyllophaga menetriesi*, *Cyclocephala* spp., *Anomala* spp. Also 600 specimen were collected in cassava: Dominant genera: *Phyllophaga*, *Plectris*.
- About 600 specimens collected in cassava fields in Pereira: *P. menetriesi*, *Cyclocephala*.
- Shipment from Panama (ca. 50 specimen): Dominance of *Phyllophaga* and *Leucothyreus* sp., some *Anomalini*.
- Farmer interviews in Quindío, Risaralda, Cauca. Up to now we have interviewed more than 80 farmers. The aim is to interview about 60 farmers in each region, i.e. about 200 interviews.
- Isolation of 15 entomopathogenic fungi and 5 bacteria strains. No native nematodes have yet been isolated from the samples in Pereira and Cauca.

### Goals to achieve by the end of 2002

- Interviews with farmers to document traditional knowledge, pesticide use, cultural practices and crop species affected.
- Pests' species and biological control agents identified.
- Use of light and pheromone traps.
- Maintain white grub and *C. bergi* colonies.
- Routine of screening of entomopathogens established.

### Theses Underway

- Maria Paulina Quintero (Univalle): Studies of pathogenicity of nematodes on *Phyllophaga menetriesi*.
- Lina María Serna: (Universidad de Caldas): Basic knowledge of white grubs, *C. bergi* and their natural enemies (Florida).

- Nelly Villegas (Universidad de Caldas): Basic knowledge of white grubs, *C. bergi* and their natural enemies (Pereira).
- César Zuluaga (Universidad de Bogotá): Basic knowledge of white grubs, *C. bergi* and their natural enemies (Cundinamarca).

### **Planned Theses**

- Lisa Struck (U de Hanover): Influence of *Crotalaria* on the behavior of *C. bergi* (initiates in November 2002).
- Juliana Jaramillo (M.Sc., Hanover): Pathogenicity of entomopathogenic fungi against *C. bergi* and white grubs in semi-controlled experiments (initiates on September 23, 2002).
- Ana Milena Caicedo (M.Sc., Hanover): Pathogenicity of entomopathogenic nematodes against *C. bergi* and white grubs in semi-controlled experiments (initiates in April 2003).

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