

As recently announced on our website (http://www.sciencesnaturelles.be/active/sciencenews/antsecuador/index_html), Thibaut Delsinne and Wouter Dekoninck, entomologists at the IRSNB, organized in Loja (Ecuador) a ten-days training on ant taxonomy and ecology. This course was made possible thanks to a financial support from the Belgian National Focal Point to the Global Taxonomy Initiative (<http://www.taxonomy.be/>) and by a close cooperation with the Universidad Técnica Particular de Loja (<http://www.utpl.edu.ec/>).

The course was followed by 18 Ecuadorian biologists. Serious, and enthusiastic, they learned how to collect and identify ants. Here is a short illustrated report of the activities carried out.



Students and professors having taken part in the ant training. From top to bottom and from right to left (names of professors are written in **bold**): Carlos A. Narvaéz Romero, Diego A. Ochoa Jiménez, Cesar A. Cartuche Macas, Darwin Valle, Gabriel Brito, Lenin Jumbo, **Tania Milena Arias-Penna**, Stellamaris Sotomayor Burneo, Ximena S. Calderon Rueda, Diego F. Dominguez Gordillo, Patricio Solorzano Apolo, **Thibaut Delsinne**, Johana Romero A., **Wouter Dekoninck**, Ximena Crespo, Gabriela K. Ayala Camacho, Yesenia Vega Samaniego, Jhon B. Catillo J., Diego A. Ordoñez Hidalgo, **Diego Marín**. Two students and one professor (Daniel A. Sotomayor Bastidas, Angelo D. Armijos Carrión, **Fernando Fernández**), absent from the photograph were also involved in the course.

Students mainly lived at Loja, but some had made the journey from Quito or Guayaquil to be present! The average age was 24 years. Among these young myrmecologists, there were students starting the university but already eager to discover the biological richness of their country. Others were achieved scientists, biologists, or forest engineers, wishing to extend the field of their competences. Five professors shared with passion their knowledge: Fernando Fernández (Colombian myrmecologist), Diego Marín (Ecuadorian entomologist, working at the UTPL), Tania Arias-Penna (Colombian myrmecologist and scientific collaborator of the RBINS), Thibaut and Wouter.

Thursday September 15, 2011.

Beginning of the ant training! Thibaut explains the objectives and the organization of the course. Then, professors and students present themselves, explain their specialities and what they expect from the formation.



Then, journey to Macará, small town located along the Peruvian border, at 900 m above sea level. The trip lasts approximately five hours and temperature ups from a pleasant 20°C to a crushing 35°C! Today and tomorrow, students will discover a sclerophyllous forest and the ants which live there. After having made a heavy supply of water bottles (!), the entire troop arrives at Reserva Jorupe of Fundación de Conservación Jocotoco. This natural reserve protects 1500 ha of dry forest, one of the most fragile and threatened ecosystem of Ecuador. It is the first time that the ant fauna of this habitat is studied. Professors hope to discover beautiful surprises!



The ant sampling is carried out along a 200 m-long transect. Every ten meters, a pitfall trap is installed: a plastic glass is placed into the ground to collect foraging ants. The cup is half filled with soap and water and will be recovered the next morning. Students thus discover the simplest and most effective method to collect ants in dry forest. Simple, right! But Stellamaris (photo) and the other students confirm that it is nevertheless quite difficult to dig in a ground change into concrete by the chronic absence of rain!

Friday September 16, 2011.



In the small hours, we are returned to Reserva Jorupe. Students attentively listen to the explanations given by the professors, while remaining in the shade provided by the bus. It is hardly nine o'clock but the sun is already well there!



Objective of the day: to collect the ants in order to obtain the most exhaustive list of species from the reserve. For that, students use various sampling techniques. For instance, visual search and manual sampling: it is necessary to break deadwood, to reverse stones, to scan the vegetation... and of course to collect the ants we found! It is not as easy as that appears because ants run quickly and hide effectively!



Sugar and tuna baits were installed every ten meters. One hour after, students collect the attracted ants.



Samples of soil are thoroughly inspected to collect hypogean ants.



A technique classically used to collect ants living in the leaf litter is the Winkler method. First, one square meter has to be delimited on the ground. The leaf litter should not be disturbed to avoid ants running away. This task is not easy when the underwood is dense!



Then, the litter is sifted to collect its finest fraction and the small organisms inside it. This fraction will be brought back to Loja to be placed into a Winkler extractor (see below).



Winkler are carried out with the smile!



Lastly, pitfall traps are picked up.



Back to the UTPL at the end of the afternoon, students install the leaf litter samples in Winkler extractors, a kind of bag in which a net containing the litter is suspended. During three days, the ants will leave the litter little by little and will fall into a container filled with alcohol.

Saturday September 17, 2011.



The UTPL placed one of its buses at our disposal. We go to the Estación Científica San Francisco, nearly 30 km away from Loja.



Located at 1800 m on the Eastern cordillera of the Ecuadorian Andes, the ECSF is surrounded by green forests of exuberant vegetation... Nothing to see with the desiccated shrubs found at Reserva Jorupe!



To reach the forest, it is necessary to cross the Río San Francisco using a small funicular...



A new method is discovered by the students: the Malaise trap. It is a tent allowing the collection of flying insects like winged ants (the reproductive males and females).



However the objective of the day is to collect ants with the techniques learned during the stay in dry forest: Winkler, baits, visual search, soil samples... As a result, it will be possible to compare the effectiveness of these techniques according to the ecosystem under study...



A colony of *Linepithema* is discovered under a large stone... Rooms filled of larvae of various ages are observed.

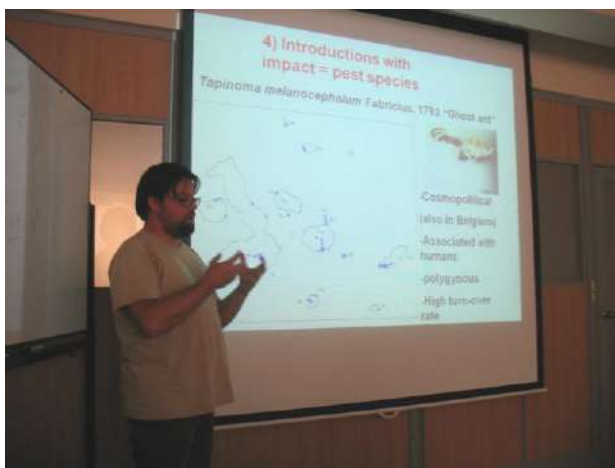


We were lucky to find a raid of *Nomamyrmex*. These ants do not have fixed nest. Colonies are so populous that they must constantly move to find food in sufficiency. *Nomamyrmex* belongs to the ants known as wandering ants or nomad ants, also called army ants or legionary ants because when they move they form columns recalling small armies in action. They are specialists: they only hunt other ants. Here, we observed a battle between *Nomamyrmex* (large wine-colour ants with the orange abdomen) and *Pheidole* (small orange ants), which try to defend their nest. A rare and interesting observation!

Sunday September 18, 2011.

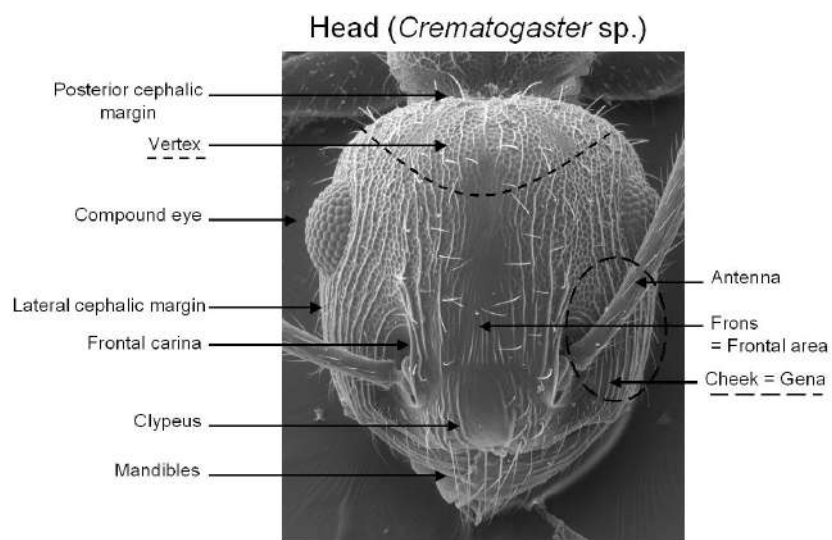


Theoretical day! Fernando presents the ant biology, ecology and evolution. Thibaut explains the usefulness of ants in conservation biology.

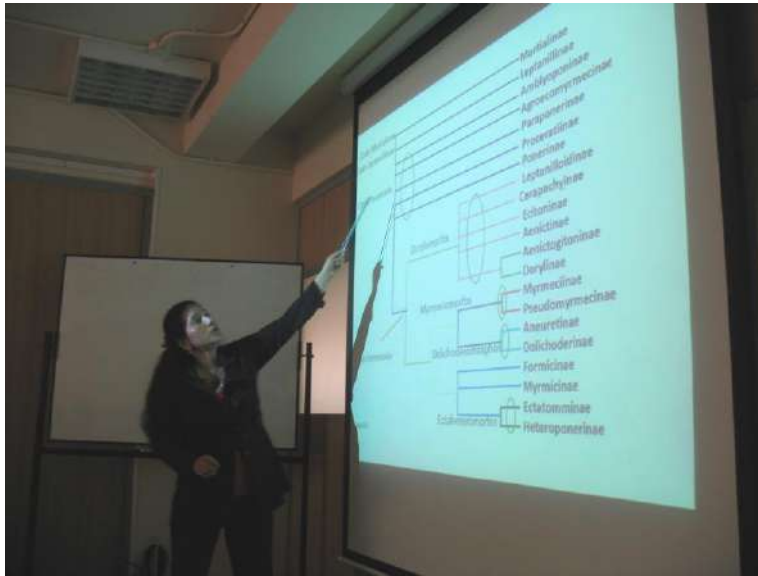


Then Wouter presents the problems caused by the introduction of some ant species on the Galápagos Islands. Afterwards, he discusses the relationships between ant genotypes and phenotypes.

Monday September 19, 2011.



The day starts with an explanation (given by Wouter) of the terms used to describe the ant morphology.



Then Tania and Fernando show the characteristics of all the subfamilies and of the principal ant genera living in Ecuador.



A coffee break is well deserved...



... before putting knowledge into practice. Identified ants (but whose name is hidden) must be recognized by the students...



Students discover the ants more closely!

Tuesday September 20, 2011.



After having learned (by Diego) how to develop an entomological reference collection, students spend most of the day sorting the ants collected at the Reserva Jorupe and at the ECSF.



Then Fernando explains in a very didactic way how to pin the ants with the aim of identifying and keeping them in collection.





Students are highly concentrated to successfully carry out this meticulous task...

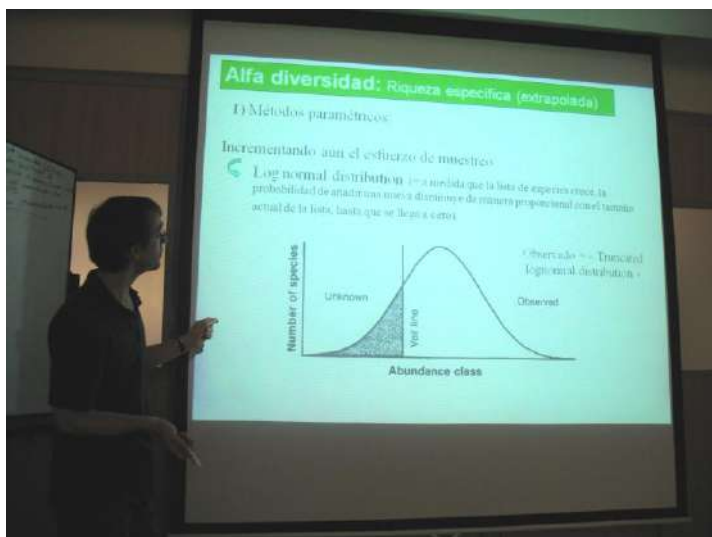
Wednesday September 21, 2011.





The day is devoted to the identification of ant specimens collected in dry and wet forests. Professors check the identifications, help the students to observe the most diagnostic criteria and give some advice...

Thursday September 22, 2011.



Morning: Thibaut explains the analyses related to the studies of biodiversity.



Afternoon: students learn how to use the main software allowing the analyses of biodiversity. As a result, they discover that all the analyses are possible using freeware available on the Internet!

Friday September 23, 2011.



Morning: real data are handled in order to better understand how freewares work.



Afternoon: By groups of two, the students present to each other a scientific paper (which had been given to them at the beginning of the ant training). It is indeed essential for the future researchers to be able to read scientific texts (written in English), to have a critical mind and to communicate results orally.

Saturday September 24, 2011.



Last day of the ant training, devoted to cleaning the laboratory... Indeed! This task also forms part of the myrmecologist job!



The formation ends in good mood by tasting Ecuadorian food!

What about the next step?

A questionnaire was filled out by the students in order to evaluate how they had lived the course. They had the choice to remain anonymous or not. The negative points noted by the students were related to the low quality of some stereomicroscopes, the duration of the ant training (estimated too short by some of them) and the occasional use of the English language during the class.

However, all the students with no exception found the adventure highly positive. They all appreciated the friendly atmosphere found among students and professors. The quality of the courses was underlined, as well as the availability, the patience and the teaching quality of the professors. Some even wrote: "I think that this training was one of my best experiments"; "this training was of vital importance (sic) for my career and represents a guide for better knowing my future job".

The course encouraged the UTPL to integrate the ants in its research programs. Jhon, one of the students, is from now on charged to collect and identify the ants of three dry forests.

A poster presenting the training was exposed at the annual conference of the ECSF at Loja on October 6-7.

Twelve ant genera were collected in dry forest and 17 in wet forest. Only 6 genera were found in both ecosystems. These results should be soon the subject of a scientific publication.

Thibaut and Wouter thank Prof Jörg Bendix, Research unit 816 of "Deutsche Forschungsgemeinschaft" (DFG), Naturaleza & Cultura Internacional, Felix Matt, Jörg Zeilinger, the team of the ECSF and Fundación de Conservación Jocotoco to have authorized the access and work within their reserves. Carlos Iván Espinosa is also thanked for his help at the Instituto de Ecología (UTPL).

The electronic microscopy photograph of the ant comes from the website "RBINS Ante Museum - Paraguay Collection" (<http://projects.biodiversity.be/ants/>). All the other photographs were taken by Thibaut and Tania.