

Research Traineeship

Thanks for your interest in conducting a research traineeship at the Un poco del Chocó-Nature Reserve and Biological Station.

During a research traineeship you will mainly work on your own internship project, but you will also get an insight into on-going research projects and assist with the respective data collection. Your internship project will be supervised by Nicole. She is an experienced field ecologist and ornithologist and assists you to plan, carry out and analyze your own investigation. At the beginning of your traineeship you will have to hand in a proposal and at the end of the internship project you will have to write a report about your work and the results (in publication style).

The internship is especially recommended for graduate students, although advanced undergraduates with a special interest in conducting their own project are also welcome. With this info sheet we would like to give you a bit more detailed idea of what our traineeship looks like.

Your Internship Project

Project Planning and Proposal

Before you go

The first step to conduct your own research project in the reserve is to find a suitable research topic for your project. You can either study a topic related to our own **biological field work** in the reserve or come up with your own research ideas (find the reports on former **research projects** here). In your application, you can let us know about your interests and ideas. If you already have a precise idea of which research you would like to conduct, you can add a short proposal to your application. Nicole will then discuss the feasibility of your project with you (usually via Skype) or can help you with ideas for a feasible project considering your fields of interest. Depending on the time you have before starting your traineeship at the reserve, you can already search for literature, read related research and start working on a basic outline of your research proposal at home.

Proposal

At the beginning of your traineeship you will be required to plan your field work and write a proposal. Besides discussing the outline of your proposal and field work ideas with Nicole, you can use your first few days at the reserve to explore, to get familiar with your research topic/organisms and the field conditions. For those completely new to the ecosystem rainforest, we also offer a tropical ecology course and recommend to participate in the course before starting the internship.

Every research intern must write a proposal. Developing a research proposal is part of the scientific method and is great practice for future academic research. You will learn how to approach a research question and to plan field work and data collection accordingly. The extent of this proposal can vary, depending on the requirements of your home university, the time you have for your research and/or if it is necessary to apply for a research permit. In general, your proposal should contain a description of your research topic and research question(s), the aim of your study and existing research (literature). Then you should explain your approach for the field work, which materials you will need and the methods you will apply.

Field Work

During your field work you will gather data for your research project. Typically interns spend most of their time in the reserve with this practical part of the internship project. The field work should normally last at least 6 weeks (especially for studies with an experimental research design or component) to guarantee a sufficiently large sample size or data set and to allow for flexibility in the time schedule.

Analysis and Research Report

At the end of the internship, you will analyze the data gathered during your field work, draw conclusions and finally write your research report about your findings. The research report is an important part of the internship and should contain the typical elements of a scientific article, such as abstract, introduction, materials and methods, results and discussion.

Nicole can evaluate and grade your report at the end of the traineeship, if necessary.

Assistance in Biological Field Work

As a research trainee you will also have the chance to participate in on-going research projects in the reserve. You can assist in the data collection of the following projects:

Longterm Bird Monitoring Project

Constant effort mist netting and bird banding

Background

The biological station Un poco del Chocó has started a long-term bird monitoring program in August 2014. The purpose of this research is to study the understory bird populations in the reserve, to assess survival and recruitment rates and to relate this data to the environment. Mainly passerines are captured with mist nets. Birds are banded with metal bands and in specific cases as well with color bands. Furthermore,

they are weighed, measured, sexed and aged (if possible) and examined for their general fitness (molt, parasites, etc.).

The obtained capture-mark-recapture data allows us to study demographical and ecological parameters. Furthermore, the ecology of many tropical bird species is still poorly known (e.g. molt patterns and strategies). Therefore, this study also aims to fill gaps in our knowledge on tropical bird ecology. The individual marking with color bands is used to realize various behavioral studies on specific bird species.

Methodology

On the banding days, we will open mist nets from approx. 6-11 am. This means that we will have to be at the banding location 15 minutes earlier to open nets. Once the nets are open they will be checked every 30 minutes. We will go on net rounds to check for birds, extract them and bring them back to the banding station. Here birds will be banded, measured, and we will assess ecological data (sex, age, parasites, fat, molt). Nets will be closed after five hours. After completing two banding days in one location nets will be taken down and will be installed at the next location.

Bird census

Background

As only a restricted group of birds can be studied using mist nets (understory, passerines), the mist netting effort is also combined with a regular bird census. Both the number of different bird species found are counted, as well as the number of individuals.

Point-stop-counts

The birds in the reserve will be counted once during each banding session applying the technique of intensive point-stop-counts. From 6-10 am 12 different monitoring points will be assessed for 10 minutes each, counting all individuals of birds heard or seen at each point.

Transect counts

To study the bird populations around the nature reserve, transect counts are realized on different parts of the road to Las Tolas. Between 6 and 10 am a 4km long transect of road will be walked counting the number of bird species and individuals.

The obtained data shall give more information about migratory behavior of certain bird species in between different altitudes, as well as alterations in the ecosystem, e.g. changes in population size, habitat use and diversity.

Flower and Pollination Ecology

Background

In tropical ecosystems, the interactions between flowering plants and their pollinators are very important. On the one hand pollinators often use flowers as their sole energy resource and on the other hand the reproductive success of flowering plants depends

on the visitation of pollinators. Therefore, an emphasis of the biological work at *Un poco del Chocó* lies on flower ecology research.

One very important pollinator group in the neotropics are hummingbirds. They often visit a wide array of different food plants and create a complicated network of hummingbird-plant-interactions. Since the beginning of 2017 we are collaborating in a broader study which investigates the ecology of those networks on different altitudinal levels in the Northwest of Ecuador. Therefore, we are researching the amount of food sources available for hummingbirds over the year and the array of flowers they use.

Methodology

Transect counts

Once a month we walk a 1,5 km transect in the reserve and note all available hummingbird-pollinated flowers as well as any hummingbird plant interaction. At the end of each count we place several time-lapse cameras in front of flowers and film interactions for three days. After three days, we place them in front of other flowers and film for another three days. Afterwards the video data will be transferred to a computer and analyzed with a specific software to detect interactions.

Nectar measurements

To determine the daily nectar production of flowers, the day before the measurements they will be bagged in mosquito netting to avoid pollinators to visit. The following afternoon nectar will be extracted. The nectar volume will be measured with microliter syringes and the sugar concentration will be measured using a refractometer. Then the daily energy production of a plant can be calculated from nectar data and the number of open flowers.

Flower morphology

As the morphology of flowers determines which pollinator can visit a flower, hummingbird -pollinated flowers will be collected and measured. A caliper rule is used to measure the lengths of corolla, stigma and anthers.

Biodiversity

Camera Trap Project

Several different camera traps are monitoring the bird and mammal activity in the reserve. Once a week we need to check the traps, replace batteries and read out the memory cards. Then the data has to be analyzed. We try to identify the different species and transfer the data to an excel sheet.

Lepidopteran Project

As changes to lepidopteran diversity are good indicators to study habitat changes and environmental impact, we are monitoring the lepidopteran diversity in three different habitats in the reserve. We use bait traps and butterfly nets to catch and identify lepidopterans in primary forest, secondary forest and edge habitat. On two mornings (per month), four bait traps are placed in each habitat and prepared

with banana bait. In the afternoon, the traps will be emptied and butterflies will be identified.

To facilitate the identification of certain species, we are compiling a species list and we are working on a field guide to the different stages of lepidopteran species. As well as many other insects, most lepidopterans can only be identified in their adult stages. Therefore, lepidopteran larvae and pupas are collected and observed at the field station. Their different stages of development are documented (incl. food plants and behavior) and finally adults can be identified. The caterpillar cages will be revised regularly and any changes need to be documented and photographed.

Miscellaneous

Blog writing

In times of social media we are also trying not to stay behind and regularly report about news from our reserve on our blog and Facebook page. Therefore our interns can also write short articles in English about their experiences, certain events, or findings for our blog.

Work Schedule

Your daily work schedule depends very much on your research topic and you can plan your time independently according to the needs of your project. At the biological station we work from Tuesday to Saturday; Sunday and Monday are off. But, of course, you can work on your project anytime. Nicole is available for advice, questions and help with your project on work days (preferably in the mornings).

Credit for Internships

It might be possible for students to receive academic credit for the internships (and the tropical ecology course) from their home university. You should check on the conditions for accreditation with your university in advance. We do not have the ability to independently provide academic credit, but we are happy to work with your university to ensure all requirements are met by our program. Often, a major requirement is a written report and a certification. Nicole has already guided students from a lot of different universities as an external supervisor and she is happy to provide an evaluation of performance, grade your report and complete any paperwork required by the university.

Investigation Authorization

If you want to conduct your own research project at the reserve, you might need an investigation authorization issued by the Ecuadorian Ministry of the Environment. In general, any research that involves the manipulation of organisms requires a research permit. Should it be necessary to export collected organisms or other samples to complete your investigation abroad, you need to apply for an export authorization additionally.

If you conduct your research as a side project to one of our ongoing research projects in the reserve (e.g. bird monitoring and banding, lepidopteran research or pollination network research), your research might already be covered by our permits. Should you plan to work on an independent research topic and you need to manipulate or export organisms you will need to get research permit. In any case, please enquire with Nicole about research permits and the process of getting them.

Rates and Dates 2018

The rates for a research traineeship at the Un poco del Chocó - Nature Reserve and Biological Station depend on the duration of your stay. Our rates cover food and lodging at the station's house, use of the station's facilities and the lab, basic equipment, professional supervision and taxes.

Duration of stay	Rate per week	Rate per month
first 8 weeks	224,- US\$	896,- \$
following weeks	199,- US\$	796,- \$

You can complete a research traineeship all year round (only in June/July supervision might be limited). The minimum stay for a traineeship is 8 weeks. Please note that we prefer to receive new arrivals on Wednesdays.

Furthermore, we recommend to combine the internship with the participation in the tropical ecology & conservation course.

Dates for the tropical ecology course

January 16 - 27

April 17 - 28

August 28 - September 8