Ceiba Foundation for Tropical Conservation
Educational Programs

Research Project Proposal Guidelines

General Notes

The scope of your project is limited by the short time we have available for field studies. Think carefully about the connection of your small study to broader disciplines of ecology, basic biology, conservation or others. The best kinds of studies attack a compact question that will contribute to an important, large area of scientific interest. If done well, your focused study will illuminate the broader area of interest, making a contribution whose importance is greater than the size of the study would otherwise suggest.

Projects may be manipulative or observational. May include conservation, culture, ethnobotany or other interests beyond typical biology and ecology. We have limited field equipment -- think hardware store, not university lab -- but much can be done with little.

Title

All proposals should begin with a title. The title should be brief and clearly state what the paper is about. Avoid "cute" or funny titles. Include all group members.

Background

Provide biological or ecological background on your species, ecological process, or system of interest. Cite the work of previous authors wherever possible. This section should start with general information, then begin to focus on your area of interest, leading up to the explicit rationale for your proposed study.

Rationale

All research must be set in a broader context; in this section explain the rationale, or justification, for your particular study. "This organism is extremely interesting to us" is <u>not</u> sufficient. Ask yourself why the study is important, what does it contribute to broader understanding the species' biology, or how does it shed light on key ecological concepts? This section is very important, and will be the hardest to write. The best projects seek to unlock important larger mysteries by studying one small component, but always with a clearly elaborated linkage.

Questions and Hypotheses

State your research questions and hypotheses very clearly. The exact phrasing will constrain the manner in which you collect, and analyze, all your data. Be careful to separate hypotheses into distinct sentences.

Methods

This section should be the longest and most detailed. Your professors can give you the most useful advice on methods: how to make them match your hypotheses, ensure that sample sizes are sufficient, avoid bias, improve data collection techniques, and distribute effort between treatments and replicates. Be very clear about the methods you will employ to address each hypothesis. Be sure to include the number of treatments and replicates used to test each hypothesis. Indicate where your study sites are located, and provide a rough outline of your data-collection schedule, so that you can be sure your replicates can be collected in the time allotted. Describe clearly the statistical tests you will employ, even if these are only averages, variances, and ratios. Be careful that a chosen test matches the data you will collect, e.g., chi-square can only be used on frequency data. For non-parametric tests, check the tables of critical values to make sure your number of replicates will be sufficient (e.g., Wilcoxon needs n=6 to be able to reject H_0 at $p<0.05$)

Expected Results & Discussion

Indicate the results you expect to find, if your hypotheses are to be supported. Imagine your major results as graphs, which will suggest the appropriate statistical tests. Explain how the results will relate back to the broader rationale & justification you set out in the Introduction and Rationale sections. This is where you spell out how your findings will illuminate the broader areas of interest to which you established linkages. Avoid, however, making generalizations that are too sweeping for the work you will have done.

Literature Cited

Drawing from your literature review, or resources at the station, include at least three citations. Include author(s), year, article title or book title, name of journal, volume (and issue) number, and page numbers. Avoid citing lectures (i.e., "Meisel, pers. comm., 2010"), substitute textbook or article sources instead.

Length & Style

Most proposals can be 1 to 2 pages in length. Perfect grammar and complete sentences are not necessary (until the final paper!), but you must clearly explain your hypotheses, logic, and methods.