Participant Information

OET 2006-9, TROPICAL PLANT SYSTEMATICS

14 June to 17 July 2006
(latest arrival 13 June, earliest departure 18 July)

Course coordinators

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WELCOME!

Welcome and congratulations on your admission to the Tropical Plant Systematics course! The course will give you a wonderful opportunity to learn about tropical plants and sharpen your analytical and practical skills as a systematist. You'll meet some top researchers in the field, develop ideas for future research, and form lasting relationships with colleagues. You'll also enjoy life at a variety of beautiful tropical sites.

Please read this information packet carefully and take it with you to Costa Rica. Make the preparations detailed within, and if you have any questions, please contact one of us.

COURSE ORGANIZATION AND ACTIVITIES

The course is designed to give you the skills for the identification, classification, inventory, and phylogenetic analysis of tropical vascular plants. To develop these skills you'll complete several projects and activities. One of your main projects, produced in collaboration with two or three students, will be a phylogenetic analysis of the

Costa Rican species of a small monophyletic group of your choice (usually 8-12 species). You'll also be required to collect, press, and label ten vascular plant species, and turn them in to us for comment (the specimens will be deposited in CR, INB, and UCR). We will also have exercises in writing keys and descriptions, and in compiling nomenclatural information.

We will spend about half our time on field walks and labs devoted to identifying vascular plant families and genera. A great way to do this is by doing transect surveys. This also teaches you a widely used sampling method and gives you experience with the distinctive structure and floristic composition of the major vegetation types we will visit. This will give you the skills to interpret forest composition and structure—something that systematists are often called upon to do—wherever you go in the Neotropics.

After taking the course, you should know how to:

- identify the main families and genera of tropical Angiosperms, ferns, and lycophytes
- explain the overall patterns of Angiosperm, fern, and lycophyte phylogeny
- explain the basics of phylogenetic theory
- run some commonly used computer programs for cladistic analyses
- interpret and describe vegetative, floral, inflorescence, and fruit structures
- construct dichotomous keys and identify plants with them
- write descriptions of plants
- collect and preserve various kinds of plants
- apply the principles of botanical nomenclature
- recognize the major tropical vegetation types found in Costa Rica and their characteristic plants
- use a common floristic inventory method (the 0.1 ha transect)

Travel. Our course runs during the wet season, and travel can be delayed by muddy roads or high rivers. Even with good driving conditions, bus rides can take most of the day because many roads are mountainous or unpaved. To stretch our legs and break the monotony and constant din of the bus's diesel engine, we might stop along the way to visit areas of biological, cultural, or historical interest.

Orientation. Part of the first day at each site will be spent in orientation; that is, showing you the trails, habitats, and common species in the area. Orientation walks will be done in small groups led by instructors, guest speakers, and local experts.

Transects. We will use tenth-hectare transects to sample forest stands at different sites. This will familiarize you with an inventory method commonly used to describe and quantify the woody species. It will be a challenge to identify families and genera--and maybe even species--from sterile material found in the transects. The data we gather will allow us to compare floristic similarity and relative diversity among the sites. They also ease the task of identification by teaching us what families and genera to expect in particular forest types. You will be amazed (and relieved) by the predictability of tropical forests!

Written Reports. With one or two other students, you will write a phylogenetic analysis of a small monophyletic group (8-12 species) in Costa Rica. You'll also write a second report on an independent project of your choice, such as a key, a pollination study, or an analysis of transect data. The reports must have a Spanish abstract (don't worry if you don't know Spanish—we can help). Time and access to computers will become limited toward the end of the course. *We strongly recommend that you bring a laptop if you have one.* You must be prompt and on time in writing your reports. Late reports will not be accepted—we mean it!

Written Exercises. These are short assignments that will not be included in the course book (unlike the written reports above). They include work on key writing, species-description writing, cladistic analysis, and nomenclature.

Course Book. Soon after the course, the written reports and an account of our activities will be compiled into a course book (that's one reason why you must turn in your work on time). Besides our botanical reports, the course book will contain 2006-9 memorabilia such as photos and quotations heard on the course. You'll be able to buy a bound copy of this book, and it will be mailed to you in December.

Computers. The course will have six IBM-compatible laptops available on a sign-up basis. If you own a laptop, we *strongly* urge you to bring it --there's a lot of competition for computers at the end of the course when everyone is rushing to finish reports. We will use Microsoft Word for text, Excel for spreadsheets and graphics, PowerPoint for presentations, Access for databases, JMP for statistics, and WINCLADA, PAUP, and MacClade for phylogenetic studies. We will travel with two inkjet printers, plus an additional dot matrix printer for rough copies and specimen labels. Photocopy machines will be available at La Selva, Palo Verde, and Las Cruces.

Digital Camera. The course has a Nikon Coolpix 4500 with a rechargeable battery and recharger. Use the camera to take images of your projects, study organisms, herbarium sheets--whatever you want. The images can be incorporated in PowerPoint presentations and your written reports.

Student Talks. During the first week of the course at Las Cruces, you must give a 10-minute talk about your research interests. You can talk about research that you've done or are considering doing for a dissertation, or you might have some special taxonomic or ecological knowledge that the rest of us would enjoy hearing about. If you want, you can summarize a topic you are familiar with because of the courses you've taken. Whatever you choose, the talk will provide us with an opportunity to learn something and to get to know you better. All presentations must be made in PowerPoint. Throughout the course, you will give additional short talks—either on you own or as part of a research team—summarizing the results of your independent projects and phylogenetic analyses.

Books. The course has two boxes of books that will be with us at all sites. We will send you a list of these books, along with a list of course equipment (as an EXCEL file). The books mentioned below are in the course library, but you might want to read or buy them before the course.

We strongly recommended two books: Alwyn H. Gentry's *A Field Guide to the Families and Genera of Woody Plants of Northwest South America*, and the Judd et al. textbook *Plant Systematics: a Phylogenetic Approach* (Check the publisher's website at www.sinauer.com). These two books complement each other. Gentry's is a practical identification guide to woody plant families and genera. The Judd et al. book provides technical synopses of all higher taxa native to North America, including many primarily tropical families. It also includes sections on vegetative and reproductive morphology, the principles of plant classification, and the use of both morphological and molecular characters in phylogenetic analyses. It is particularly useful for its up-to-date summary of higher taxonomic relationships within the Angiosperms. Even if you do not buy this book for the course, we recommend you read most of it.

Another book, published 2003, is *Flowering Plants of the Neotropics* (eds. Smith et al.; Princeton Univ. Press; 616 pages, $75.00). It covers all of the 258 families of seed plants in the Neotropics and has 307 color and 258 line illustrations.

If you want to do some background reading about the Costa Rica, we recommend Daniel Janzen's *Costa Rican Natural History*. It's an excellent source of information on OTS sites and of many aspects of the Costa Rica biota. We also recommend John Kricher's *A Neotroptropical Companion, an Introduction to the Animals, Plants, and Ecosystems of the New World Tropics*. A less detailed but delightfully written introduction to tropical biology is *Tropical Nature*, by Adrian Forsyth and Ken Miyata.

If you want to brush-up on the basics of pteridophyte and angiosperm biology (a good idea), read Chapters 16, 18, and 19 in the textbook by Raven et al. *Biology of Plants*, and the relevant sections the Judd et al. text (mentioned above).

The ferns and lycophytes will be covered in a photocopied manual written by Robbin. It is written in Spanish and English and will be given to you at the beginning of the course. If you are *seriously* interested in pteridophytes,

consider buying David B. Lellinger's *The Ferns and Fern-allies of Costa Rica, Panama, and the Chocó (Part 1)* (about $32.00, available from the Missouri Botanical Garden Press), or Robbin Moran and Ramon Riba's volume 1 of *Flora Mesoamericana, Psilotaceae a Salviniaceae* (ISBN 968-36-4700-6; available online from the Missouri Botanical Garden Press). The latter is written in Spanish, lacks illustrations, and costs about $85.00.

Post-course Research. OTS has funds to support post-course research in Costa Rica. The funds can be used to pay living and travel expenses, usually at OTS field stations, from a few days to two weeks. The research could be a follow-up of a project done during the course or a pilot project for your thesis study. Consider arranging your schedule to stay after the course in Costa Rica to do research. It is also possible to receive post-course grant and return to Costa Rica at a later date to do the research. (Note that most airlines charge a fee of $75-100 to change the return date of your ticket.)

To get the grant, you have to submit a short proposal no later than the end of our stay at La Selva. We'll bring the necessary application materials and tell you how to apply. The proposals will be evaluated and decided upon within a few days, and the results of these decisions announced at our final site.

SITES WE WILL VISIT

San José. On our first day, after breakfast at the hotel (served at 7:00 a.m.), we will depart for the OTS office near the Univ. of Costa Rica campus. Be ready to leave by 8:00. For the rest of the morning, you will receive an introduction to the course, followed by an inventory of course equipment that is transported with us during the course in the infamous "blue boxes" with which you will soon be intimately familiar. At the OTS office you can, if you want to, leave your valuables (including passport and plane tickets) in a safe. *Please bring three copies of the photo and signature page your passport* (one copy is for you, two for OTS).

Students who need to time to negotiate visas while in Costa Rica (for example, foreign students studying in the United States who must apply for a re-entry visa in order to return to the U.S. following the course) should notify OTS (contact Ana Carter, anacarter@ots.ac.cr) and make arrangements to arrive one or two business days earlier (i.e., weekends don't count). You will not have time to do this once the course starts on June 14.

After eating lunch near the OTS office, we'll take a bus to the Instituto Nacional de Biodiversidad (InBio) and get a tour of their scientific collections. InBio has the most active herbarium in the country and is the headquarters for producing the *Manual of Costa Rican Vascular Plants*. Later in the course, you will work in this herbarium to complete your phylogenetic analysis and independent projects.

The next day (June 15) we leave San José and take an eight-hour bus ride to Las Cruces Biological Station near the Panamanian border. To break the monotony of the long bus ride, we'll stop at a *turbera*, a páramo bog, loaded fascinating plants such as a large, endemic *Puya* (Bromeliaceae) and an arborescent species of *Blechnum* (fern).

Las Cruces. (http://www.ots.duke.edu/en/lascruces/) For six days (June 15-21) we will be at the Las Cruces Biological Station, near San Vito, Costa Rica, about 15 km from the Panamanian border. It is a mid-elevation site (1100 m) with a 216-hectare rainforest and the Robert and Catherine Wilson Botanical Garden that houses a world-class collection of tropical plants. Here you'll be put through botanical boot camp, with basic training in topics such as vegetative and floral morphology, key writing, and cladistic analysis. Kevin Nixon will be on hand to drill you on angiosperm family characteristics and angiosperm phylogeny. Robbin will exercise your mind about ferns and lycopods. Brad Boyle will run you through the obstacle course of tricks for rapid identification of woody plants in vegetative condition. There's a large amount of time spent on the basic skills you need to complete the assignments during the rest of the course. During our stay at Las Cruces you will be required to give a 10-minute presentation in PowerPoint on your research interests.

Savegre Lodge. (http://www.savegre.co.cr/) We will travel here on June 22 and remain until June 27. This is a beautiful tourist lodge located at about 2200 m in the northern Talamanca mountains. It is surrounded by cloud forest dominated by massive oaks, and it is a famous place to see the Resplendent Quetzal. Here you can enjoy crystal-clear air, spectacular starry nights, abundant flowers, epiphyte gardens, and beautiful vistas. During our stay here, we will drive to the páramo on top of Cerro de la Muerte (3600 m) to study the plants there, then take a six-

hour hike down to the lodge. Temperatures can drop to near freezing at night, so bring warm clothing, including long underwear, gloves, and a warm hat. Good raingear is critical. We may see a lot of rain, and hypothermia can occur even at moderate temperatures. A good rule is to bring the same clothing you would have on a hike in northern mountains in the summer.

Palo Verde. (http://www.ots.duke.edu/en/paloverde/) We'll be here from June 28 to July 3. The biological station lies between an extensive marsh and a seasonally dry forest on rugged limestone outcrops. Mosquitoes abound here. You'll *really* need insect repellent. Chiggers are also a problem (we'll tell you how to take precautions). Air conditioning—thank goodness!—is now available in the classroom, herbarium, and reception office. The library and lab have internet connections.

Opportunities here for research are limitless. *Acacia* savannas, semi- and fully deciduous dry forest, riparian forest, successional forest, limestone bluffs, and a large marsh are within easy reach of the field station. This is one of the best sites to see wildlife. Most mornings from the breakfast table you'll see howler and white-faced monkeys. If time permits, we will take a one-day trip to a nearby mangrove swamp. There's also Robbin's famous optional half-day ~~swimming trip~~ field trip to see the rare and unusual aquatic angiosperm, *Podostemum* (Podostemaceae) growing at Lomas Barbudal.

La Selva Biological Station. (http://www.ots.duke.edu/en/laselva/) We travel here on July 4 and stay through July 9. The largest OTS field station, La Selva is near Puerto Viejo in the Atlantic lowlands at about 60 m. It encompasses over 1500 hectares of old- and secondary growth rainforest harboring over 2,000 species of vascular plants. There is also an arboretum, some planted tree crops, and experimental early succession plots. All these habitats are accessible by a well-maintained trail system. The station has everything: electricity, phones, new air-conditioned labs, microscopes, herbarium, library. Many researchers will be there, and several will share their knowledge and experience with us. Fabian Michelangeli will be with us at this site, telling us more about melastomes and phylogenetic analysis.

San José: Insituto de Biodiversidad (INBio) and Museo Nacional (CR). We'll spend two days (July 11 & 12) in San José for research at these herbaria. This is your chance to examine additional specimens for your monograph and independent projects. You'll be surprised at how fast this time goes! On July 13 we leave San José and return to La Selva.

La Selva Biological Station. Here you'll spend the last three days of the course, writing up your projects and making oral presentations. Time flies as everyone finishes up. Fabian Michelangeli will be on hand to help with your phylogenetic analysis. On the last day we will have a mini-symposium for oral presentations of any projects not yet given (usually these are the results of the group phylogenetic analyses). On July 17 we will return to San Jose (about two hours away by bus) and have a farewell dinner at one of Brad's and Robbin's favorite restaurants.

HIKES

For fieldwork during the Costa Rican wet season, we recommend rubber boots. You can buy good quality boots in Costa Rica for the equivalent of $12 to $15. They're called *botas de hule*. On the first day of the course, after our visit to InBio, you'll have a few hours in downtown San Jose to buy rubber boots. If you already have a comfortable pair, bring them. New boots can cause painful blisters. If you don't already have foot-high rubber boots that are worn-in, bring plenty of moleskin and carry it with you on hikes. Many people find that wearing two pairs of socks solves the blister problem. Bring your favorite trail shoes as well, and don't hesitate to bring your favorite leather hiking-boots if you prefer those. But remember: once wet, leather boots stay wet for a long time.

We will be on our feet for many hours during the orientation walks, field problems, collecting, and transects. Try to be in good physical condition when you arrive.

GENERAL COMMENTS

Our schedule will be demanding, and orientation days can be exhausting. There may or may not be a free hour or two in the afternoon, but we generally will be engaged from 8:00 a.m. until 9:00 p.m. (incidentally, throughout the year in Costa Rica, there are only 11 to 12 hours of sunlight per day). This may well be the most intense immersion in field botany that you've experienced, and you'll probably find it exhilarating, but you must be prepared for some discomfort. Each of us at some point will probably feel exhausted from heat, hiking, insects, lack of sleep (sleeping quarters are not luxurious). Or we might just feel incapable of absorbing any more. If this happens, you may take off an afternoon or evening so that you can return refreshed the next day. We don't subscribe to the philosophy that a field biologist has to be capable of forced marches under grueling conditions—a biologist learns more from strolls that allow for observation. But one good thing: we'll have an abundance of tasty, well-balanced meals. As for living conditions, there will be little privacy. There will be little opportunity for private conversation in the sleeping quarters. We all need to cooperate in being quiet at night and in allowing people a little privacy.

An OTS course is an intense experience academically and socially. We will be living together closely for six weeks, and this means that we must try to be as open, honest, and cooperative as possible. We must be willing to accept and express differences of opinion, to exchange and modify our ideas (academic and otherwise), to appreciate and tolerate other people's social values, philosophical beliefs, and behavioral idiosyncrasies. We must also be willing to interact, accept criticism, help someone having a hard time, and share ideas, knowledge, and excitement.

COURSE COORDINATORS

Brad Boyle is coordinator and will be with the course for its duration. He is a Research Associate at the University of Arizona, and his research focuses on the evolution of plant form and function,and the historical and environmental determinants of plant community structure and diversity. Brad is also co-developer of The SALVIAS Project (http://www.salvias.net/pages/index.html), an informatics project which brings together plants specimen and inventory databases as tools for testing theoretical hypotheses, modelling species ranges, mapping vegetation, and predicting responses to climate change. Brad was a student of the late Al Gentry, from whom he learned many of the novel plant identification techniques we will be using during the course. Brad has taught *Tropical Plant Systematics* since 1998, and has also co-coordinated OTS Tropical Biology.

Robbin Moran is co-coordinator and will be with the course for its duration. He is a Curator at the New York Botanical Garden, and his main interests are the evolution, geography, and ecology of ferns and lycophytes. He has published four books and over 80 papers on ferns. Robbin was the main writer, editor, and organizer for the pteridophyte volume of *Flora Mesoamericana*, a work that treats the ferns and lycophytes (nearly 1400 species) occurring from southern Mexico to Panama. It is the largest fern flora ever written. He has also taught and done research at the Missouri Botanical Garden, Aarhus University (Denmark), and the University of Arkansas at Little Rock With Brad he has co-organized five of the last OTS *Tropical Plant Systematics* courses. You can view Robbin's web site at http://sciweb.nybg.org/science2/Profile_12.asp

ASSISTANT PROFESSOR

Mauricio Bonifacino, from Uruguay, will be assistant professor for the course. He teaches botany at the school of Agronomy in Montevideo and works at the school's herbarium. He completed his Ph.D. on systematics of Asteraceae at La Plata University, where he was a student of Jorge Crisci. His main interests are taxonomy, evolution, biogeography, and conservation of Asteraceae in southern South America. Mauricio has been the TA on two previous courses and now is coordinator (with Fabian Michelangeli) for the Spanish-language version of this course.

INVITED FACULTY

Kevin Nixon will join the course toward the end of the course at Las Cruces and Savegre Lodge. He is a Professor and Curator at Cornell University and has several research interests: taxonomy and systematics of *Quercus* and the

family Fagaceae, higher level phylogeny of the seed plants and angiosperms, identification and phylogenetic significance of Cretaceous angiosperm fossils, and theoretical issues in systematics. He has also written computer programs for the analysis of phylogenetic data. Kevin will give us three talks on his favorite topics in systematics, and will be on-hand to help with your phylogenetic analysis. Learn more about Kevin's research interests at http://www.plantbio.cornell.edu/Graduate_Field/nixon.htm

Fabián A. Michelangeli is an Assistant Curator at the New York Botanical Garden. His research focuses on plant systematics and evolutionary interactions between ants and plants. Most of his research has been done on the myrmecophytic genus *Tococa* (Melastomataceae) using molecular and morphological methods. In addition, he is interested in floristics and speciation events that have resulted in high endemism in the tepuis region of southern Venezuela. He will be with us at La Selva and during our herbaria work in San José. You can read more about Fabian at: http://sciweb.nybg.org/science2/Profile_63.asp

Mark Olson received his PhD in Evolutionary and Population Biology from Washington University in St Louis in 2001. His main interests are the evolution of plant form and function, especially in the dry tropics, and biodiversity exploration. Most of Mark's work focuses on evolution in anatomical characters of plant stems, including functional studies of mechanical support, conduction, and storage. He is an assistant professor at the Institute of Biology of the Universidad Nacional Autónoma de México, and has conducted field work in the Horn of Africa, Namibia, Madagascar, Oman, and India. He is a member of the founding class of National Geographic Emerging Explorers. For more information on Mark's research, see http://www.explorelifeonearth.org/ .

In addition to the above people, several Costa Rican botanists and ecologists will join us. Here are some who you will meet:

Francisco Morales (INBio; Savegre)
Nelson Zamora (INBio and OTS; Inbio)
Ulíses Chavarría (INBio and Servicio de Parques Nacionales; Palo Verde)
Eugenio González (OTS; Palo Verde)
Orlando Vargas (Reserva Biológica Bijagual; La Selva)

INTERNATIONAL COURTESY

We are guests in Costa Rica, and this means being sensitive to Costa Rican's standards of appearance and behavior. You will want to bring some good clothes to wear in town, but nothing fancy. Nice jeans or other pants and a sweater (evenings in San José are cool) would be appropriate. We'll be living as a group in close quarters, and no matter what your feelings are about nudity and sex, those traveling with us and living around us may be much more conservative. States of undress that are acceptable and inevitable in field-station dormitories can be offensive in public.

Do not bring marijuana or any other illegal drug into Costa Rica and do not plan to buy any of these things there—don't even think of it! The anti-drug laws are severe, and your arrest would be a disaster for you and OTS. In Costa Rica, accused drug offenders are held in jail, without bail, until their trial date.

COLLECTING

Unlike other OTS courses, we will make permanent collections of plants. You will need to collect, press, dry, and label many specimens, making duplicates of each collection so that these can be deposited in Costa Rican (CR, INB, and USJ) and other herbaria. These collections will be made under a special permit issued by the Costa Rican government and can be made only in the name of the permit holder (in this case, Robbin) and with the permit holder's collection numbers. Collections you make will bear your name as an additional collector. For those of you wanting to work with these specimens after the course, you can arrange to have duplicates shipped to you at your home institution. We will provide more information on how to do this during the course.

We are authorized to collect dried herbarium specimens only; we are not authorized to collect pickled material or specimens preserved in silica gel, or other organisms such as insects. It you wish to collect such specimens, particularly if you plan to use the material for DNA analysis, you must get your own permits. You will need both a collecting and an export permit, and cannot apply for an export permit without first having a collecting permit. OTS will assist you in obtaining these permits, but considerable effort on your part will still be needed, and you will have to cover the approximately $150 cost. If you think you will need your own permit, you should begin applying for one immediately. To do this, write to Francisco Campos (fcampos@ots.ac.cr) who works at the OTS office in San José. He will help you obtain a permit. Much of the information he needs can be sent by e-mail.

Our course permit applies only to particular activities at particular sites. It does not give us *carte blanche* to collect anywhere or any time. Additional restrictions apply to groups such as cacti, orchids, and bromeliads. Throughout the course, collecting should be cleared with the coordinators to ensure compliance with our permits. Failure to comply might have serious consequences for you, the coordinators, and OTS.

PREPARING FOR THE COURSE

1. Make sure you have a valid passport with at least six months before the expiration date of the passport on your travel day. You might need a visa to enter Costa Rica. If you're unsure about what you need, contact a travel agent or Ana Carter at CRO (Costa Rican office) for information (anacarter@ots.ac.cr).
2. Prepare a 10-minute talk in PowerPoint about your research interests, to be given at Las Cruces.
3. Think about a possible small, monophyletic group (6-10 species) for your monograph project.
4. Do some pre-course reading (see recommended books, above).
5. Bring a hand lens, hand clippers (Felco brand is best; we recommend buying a leather holster as well), and, if you want to take images or files home with you, a memory stick. The first two items you'll use frequently throughout the course. If you constantly need to borrow these items, you'll be a pain-in-the-butt to everyone.

5. **Health**

a. **Health Insurance. You must have health insurance to participate in the program.** If you do not already have health insurance, you need to arrange immediately for coverage during the course.

b. **Diseases and Immunizations**. For professional advice, check with your local health department or physician. The Centers for Disease Control and Prevention website may be useful as well (http://www.cdc.gov/travel/camerica.htm#region). We are not medical professionals and the following is preliminary information only, regarding diseases and immunizations that you might want to consider:

Cholera. Several autochthonous cases of cholera have been confirmed in Costa Rica in recent years. We understand that the immunization is not very effective, but consult your physician/travel health consultant. Be careful of what and where you eat while in Costa Rica, specifically avoid buying juices and un-peelable fruits from street vendors.

Dengue. This unpleasant, flu-like disease (known in some parts of the world as bone break fever) has recently increased substantially in Costa Rica. Mosquitoes carry the dengue virus, and no vaccine for the disease exists. Treatment consists of resting, drinking fluids, and taking acetaminophen (not aspirin). Dengue is usually not very serious in otherwise strong, healthy people, but a rare hemorrhagic form does require medical attention. Consult your doctor for more information. Fortunately, dengue is usually a disease of crowded tropical cities and towns; to our knowledge no cases have been reported for the remote areas we will visit.

Diphtheria. A booster should be taken every ten years; it is typically administered together with tetanus (called the TD vaccine).

Hepatitis A. Immune serum globulin taken just before leaving may afford protection. Consult your

physician on the use of globulin. Note that there is a two-shot vaccine available in some areas that confers permanent immunity.

Malaria. The chance of getting malaria in Costa Rica is low, but malaria does exist in Costa Rica, especially along the Atlantic Coast. In the past, most course participants have chosen not to take malaria prophylactic medication, but each participant must decide for him/herself in consultation with your physician. If you opt for prophylaxis, this needs to be started in advance of your trip to Costa Rica.

Polio. Be sure your inoculation is current.

Rabies. If you plan on handling bats, this vaccination series is *mandatory.* This is usually a three step shot process so give yourself plenty of time. This is also an expensive vaccine, so you might want to shop around.

Tetanus. Good for ten years, but consider getting a booster shot if your last one was more than five years ago.

Typhoid. This is a one-dose vaccine if you have had prior series; two doses four weeks apart or three doses one week apart if you have never had typhoid shots. Do this well before leaving for Costa Rica; some people feel ill for a day after receiving the vaccine. The oral vaccine generally seems to have fewer side effects.

Yellow Fever. None currently reported for Costa Rica, but check with your local health department.

We will be living and eating under sanitary conditions, and it's unlikely that any of us will get the above diseases. In Costa Rica, nearly all tap water is safe to drink, including that of all the stations we will be visiting and in San José. When eating, however, remember to use common sense, particularly when eating street food. Also, remember to stay hydrated if you are sweating a lot (likely) or suffering from diarrhea (also likely at some point during the six weeks). The biggest health problem on most OTS courses is the common cold.

If you are allergic to bee stings, carry an Anakit or Epipen and inform one of us about your allergy upon arrival. Also let us know if you are allergic to Penicillin or other drugs or have any food allergies.

Check with the travel health-consultants at your university for current recommendations. Bring adequate supplies of any prescription drugs that you need. If you are currently taking any medication, and will need take it during the course, be sure to bring a complete extra supply of this medication with you to Costa Rica, and to let us know. Antifungal or athlete's-foot creme and hydrocortisone creme (for itchy bug bites) are also recommended. Although most drugs are easily available in Costa Rica, we will not always be near a pharmacy, and if we are, don't count on finding your favorite brand name.

6. Airline Reservations. Plan to arrive in San José on or before the evening of June 13 (Tuesday). OTS starts paying bills at that time. The last day of the course is July 17 (Monday). You may leave the following day. Student flights are often available from your university travel service--check it out. Also try the International Council Travel ([1] 800-877-2433), a travel agency that books international student airfares and offers substantial discounts.

7. Money. Plan to have enough money for personal expenses. You will have to pay the airport exit tax ($26.00), taxi fare from the airport and back again ($14-16 each way), laundry at several sites, snacks and a few lunches, drinks, any personal items, and (if necessary) any medical expenses. Film and batteries are expensive in Costa Rica; bring them with you. The students usually contribute towards the purchase of a course tape player and/or guitar. On April 26, 2006, the exchange rate was 505 colones (singular: colon) to the dollar. Unless you plan to travel after the course or buy a lot of souvenirs, US $300 should be adequate.

Our hotel in San José is the Hotel La Amistad (calle 15 and avenida 11; telephone: 258-0021). You can exchange money there, but they might not have enough for all of you on the same day. Upon arriving in San José, you might want to change some money at the airport or at a bank in town. ATM machines are available in San José. Travelers' checks are a safe way to carry money (best are American Express or other widely recognized name brands), but you can often change them only in banks after lengthy waits, and cash gets a better exchange rate. Thus, it's best to have some cash (US$75) for immediate exchange upon arrival. Airport taxis and hotels usually accept dollars (not travelers' checks) instead of colones. (Remember: you must pay a $26 tax at the airport when you leave Costa Rica.)

8. Telephones and Mail. International calling is easy if you buy a phone card in Costa Rica. Calls can be made from all the sites we will visit. Also, you'll have free access to the internet at Las Cruces, Palo Verde, and La Selva. For snail mail, you can send and receive mail at irregular intervals during the course. Tell people *not* to send packages because you will have to deal with *Aduana* (Customs), and you won't have time to do that during the course (you'll also have to pay high fees to retrieve the package from them). All mail should be sent AIRMAIL.

Your mailing address in Costa Rica will be:

Your Name, OTS 2006-9
Organización para Estudios Tropicales
Apartado 676, 2050 San Pedro
COSTA RICA

Please note that this address is the PO Box for the OTS Costa Rican office, not its street address. The CRO is located in the Ciudad de Investigación (Research Campus) of the University of Costa Rica.

Remember: at Las Cruces, Palo Verde, and La Selva, you'll have access to the internet and can check your e-mail.

In case of an emergency, your friends and relatives can reach you through the OTS Costa Rican Office (CRO), telephone 011-506-524-0607. Keep in mind that you will usually be hard to reach. If a call to CRO does not work, try calling the North American Office (NAO) at 919-684-5774. They, in turn, can send an e-mail message to CRO.

WHAT TO BRING

a. VALID PASSPORT and three copies of the photo and signature page (see above).
b. CASH AND TRAVELERS' CHECKS (see above).
c. CLOTHNG AND PERSONAL ITEMS: Travel as light as possible. Take two pieces of luggage: one duffel bag or suitcase (e.g., for storing cold-weather clothing when we are in the lowlands), and a good, comfortable knapsack. Avoid bringing large, hard suitcases. An empty, medium-sized duffel bag is useful for overflow and storage. Expect your field bag to get dirty and wet. All its contents should be packed in plastic bags. You will need cool, lightweight clothes with long sleeves and pants for warm-weather sites, and warm, heavier clothes for Savegre. Label all your clothes with your name using waterproof markers or sewn-in labels. We have a communal laundry, and socks and underwear tend to look alike. Except for your town clothes, most of your clothing will get muddy and receive rough treatment. Plan to have one set of clean clothes to relax in at the end of the day. Do *not* bring expensive watches or jewelry. You can store things at our hotel in a communal locker that we can rent.

___ Shirts. Bring one for the town and three for the field. Long-sleeved are best for protection against bugs and the sun. Lightweight cotton work shirts are ideal. Quick-dry synthetics are also good. Bring several T-shirts.
___ Pants. One pair presentable for town, and two or three pairs for field. Light khaki or canvas pants are best. Synthetic or cotton-synthetic blends may look and feel ugly, but they dry quite quickly, and tend to be more durable than cotton. Blue jeans are fine for casual wear, but they make poor field pants because denim is hot, heavy, and slow drying.

___ shorts for relaxing
___ swimsuit (for Robbin's *Podostemon* trip!)
___ underwear; lots!
___ socks; at least 7 pairs, including a pair of warm ones for highlands and cotton for lowlands.
___ sweater or wool shirt or light "fleece" jacket for San José and highlands. If you get cold easily, bring two or more to layer.
___ laundry bag, e.g., pillowcase
___ soft, foldable hat with a broad brim for sun and rain
___ gloves, one pair for Savegre (light wool works well)
___ bandannas
___ rainwear; bring a poncho or a light rain jacket; rain pants are useful for highland sites
___ collapsible umbrella. Useful (if not essential) at all elevations. Excellent and rather inexpensive ones are available in San José
___ boots. Get rubber boots, not fancy leather or Goretex ones. Good rubber boots are available in Costa Rica for about $15 up to about men's size 10. If you have bigger feet, bring rubber boots from North America.
___ sneakers or tennis shoes
___ sandals to wear at field stations (rubber sandals work best)
___ towels; 2 thin ones are better and dry faster than the thick luxury types
___ personal toiletries. Most items are available in Costa Rica, but women should bring an adequate supply of tampons; they are sometimes hard to find and expensive.
___ personal medical supplies. The course has excellent first-aid kits, but you should bring a small supply of aspirin, antiseptic, hydrocortisone cream, moleskin, Band-Aids, and foot anti-fungal powder or cream. Definitely bring a two-month supply of any prescription medication you use. Women who are subject to yeast or urinary-tract infections should bring proper medication. Also, every participant must have their own EXTRACTOR kit (made by Sawyer), used to extract venom from a snake bite. This is essential safety equipment that should be carried with you at all times during the course. A venomous snakebite has never occurred on an OTS course, but there have been close calls. Quick use of the Extractor after a bite can dramatically decrease the amount of venom circulating in your body, significantly decrease tissue damage, and maybe save your life.
___ extra eyeglasses or contact lenses and prescription, in case yours get broken or lost, extra lens solutions (expensive and many brands are unavailable in CR)
___ sunglasses
___ high rated (15+) sunscreen
___ sewing needles, strong thread, extra buttons, safety pins, extra shoe laces
___ clothespins (a few)
___ insect sting kit. If you have a severe reaction to insect stings, bring an emergency adrenaline kit such as "Epipen" or "Anakit," available by prescription, and keep it with you. Inform the coordinators of your sensitivity to insect stings.
___ additional warm clothes for Savegre: a wool hat, long underwear, wool sweater or fleece jacket, water- and windproof rainjacket. Without these you will be absolutely miserable at this site.

d. ESSENTIAL FIELD EQUIPMENT

___ a good light is an absolute *must!* Bring a headlamp or flashlight with enough batteries for several changes. A headlamp is better because your hands will be free. If you use rechargeable batteries bring several sets, and your charger. Remember, not all sites have electricity. Best to bring one good headlamp for night work and one small light ("mini-mag lite" or equivalent) to carry in your daypack for emergencies.
___ extra batteries. Pack batteries in watertight containers. The course does not supply batteries.
___ a day pack for daily field use
___ pocket knife, preferably Swiss Army type with numerous functions
___ wrist watch, inexpensive and water-resistant
___ insect repellent
___ lecture notebook
___ waterproof field notebooks, pocket size. "Rite-in-the-Rain" is a common U.S. brand. Very useful if you can get them! The small ones are easy to fill up so bring several.

___ pencils and small sharpener, or mechanical pencils and spare leads
___ felt-tip pens, permanent and waterproof, preferably black (e.g., "Sharpies"; bring at least 5 medium point and two fine point. These are extremely useful and difficult to buy in Costa Rica.
___ 10× hand lens. Tie it on a string and wear it around your neck.
___ plastic bags (including some heavy-duty zipper-closure bags; Ziploc brand freezer bags are excellent).
___ large envelope or plastic folder for the handouts and other papers you will accumulate
___ water bottle or canteen, one-liter size. If you drink a lot of water, two will be useful for long hikes.
___ earplugs. Foam-rubber type is the best and cheapest ($1 or $2). Can be bought at airports.
___ a good quality hand pruner for collecting woody plants (e.g., Felco brand, preferably with leather holster). You'll use this a lot.

e. ALMOST ESSENTIAL FIELD EQUIPMENT. This list will help you be well equipped, but not overly so. Students from previous courses have often found themselves not having enough waterproof notebooks, batteries, high-speed film, rain pants, moleskin, bandanas, aspirin, vitamins, rechargeable batteries, extra watch, alarm clock, and warm clothes for Cuericí (think in terms of layers).

___ camera with extra battery. An extra lens cap and a haze filter to protect the lens are wise investments.
___ silica gel (if you need it)
___ watertight plastic bag or storage container for camera, flash, and calculator. Include an old sock full of silica gel to prevent fungal attack and corrosion.
___ clipboard, can be bought for a dollar or two at any office supply store
___ vials and caps (The course will have some, but if you need them, bring a lot.)
___ reprints or identification manuals on special topics of interest (The course library is spotty.)
___ memory stick
___ tape cassettes or CDs of music for long bus rides and parties. The course bus has a tape player, and participants on past courses have pooled funds to buy a course boom box and/or guitar.
___ laptop computer (see discussion above)
___ any special stains (e.g., those used by pollination biologists)
In addition, bring any special equipment you need for own research projects.

f. EQUIPMENT FOR AFTER THE COURSE. If you enjoy hiking and plan to stay in Costa Rica after the course, consider bringing camping gear such as a tent, sleeping pad, stove, and cooking utensils. In the experience of one of us (Brad), Costa Rica's very best beaches and forests are accessible only on foot. Don't worry about having to lug this equipment around on the course—you can store it at our hotel in San José.

ARRIVING IN COSTA RICA

Try to meet fellow participants (who may be on the same plane) before your arrival. Upon deplaning you will first go through *Migración*, where your passport will be stamped. You then retrieve your baggage and go through customs, or *Aduana*, where they may or may not check the contents of your bags. Passing customs in San José is usually fast and efficient.

Once out of the airport, take a collective (shared) or regular taxi to the Hotel La Amistad, located at calle 15 and avenida 11 (telephone: 258-0021). Taxi drivers will approach you as you leave the airport terminal entrance. Establish the fare with them in advance. Most drivers happily take dollars. Remember, at about 510 colones to the U.S. dollar, the fare will sound like a lot, but it shouldn't be more than about 7000-8000 colones (U.S. $14-16). Besides telling the taxi driver the street address of the hotel, you can say that the hotel is located two blocks west of the *Hospital Calderón Guardia*. Any taxi driver knows where that hospital is.

There will probably be other OTS people at the hotel, and they can help orient you. At the hotel office, be sure to change some small amount of money (ca. US $100). We do not recommend walking around San José by yourself,

especially at night. Although a modern city, one safer than most in the U.S., San José has its share of muggers and pickpockets. *Never* leave your backpack unattended in any public place. More than one student or researcher has been wiped out of valuables and data. Carry your wallet in a front pocket, and if you have a handbag keep it under your arm. Never put valuables in the outer pocket of a backpack. Consider buying a money belt or chest pouch. Also, do not go out alone at night, and do not walk alone through any of the small city parks.

San José is a city of perpetual spring. The climate is comfortably warm by day and cool (sweater weather) at night. This time of year, rain is possible anytime.

If you arrive a few days before the course, there are inexpensive, clean (but not necessarily quiet) hotels for U.S. $30-$35 per day in San José. Consult a recent edition of a Costa Rican travel guide for more information.

SEXUAL HARASSMENT

OTS policy prohibits sexual harassment. You can get a copy of this policy from CRO upon request. The policy defines sexual harassment and lays out procedures and remedies that apply if harassment is alleged. Any interested person, whether concerned about an offense, an allegation of offense, or just interested, is encouraged to review the policy.

FINAL THOUGHTS

The key words for our course are cooperation, flexibility, and curiosity. It is important to approach the course in a spirit of cooperation and open-mindedness: sharing ideas, helping to pack and carry baggage, lending a hand others if they aren't feeling well. It's also important to be flexible. The course personnel have tried to take care of all logistical details and provide for the intellectual content of the course. Inevitably, there will be things that just don't work as planned—automotive breakdowns, delays in mail or food delivery, bad weather. There will be times that try our souls, but a sense of humor and a good imagination when it comes to improvisation will get us through.

Another key word is dedication. An OTS course is nonstop immersion in biology, 15 hours a day, every day, with a few rare breaks (Robbin's showing of the botanical comedy movie, *A New Leaf*, starring Elaine May and Walter Matthau, is one such break). When you have thousands of species within walking distance in beautiful places, it is hard to be bored! This course will be an adventure in learning and a rewarding intellectual, aesthetic, social, and cultural experience.

We look forward to meeting you in June!

Brad, Robbin, and Mauricio

ITINERARY, TROPICAL PLANT SYSTEMATICS, OTS 2006-9

June 13	Students arrive in San Jose-La Amistad Hotel
June 14	in San José (morning in OTS office; afternoon InBio tour)
June 15	Travel to Las Cruces, arriving in afternoon.
June 16-21	in Las Cruces
June 22	Travel to Dota-Savegre Lodge, arriving for lunch
June 23-27	in Savegre
June 28	Travel to Palo Verde, arriving in afternoon.
June 29-July 3	in Palo Verde
July 4	Travel to La Selva I, arriving in afternoon.
July 5-9	in La Selva
July 10	Travel to San José
July 11-12	in San José (herbaria)
July 13	Travel to La Selva II, arriving for lunch.
July 14-16	in La Selva
July 17	Travel to San José after lunch. Farewell dinner; end of course
July 18	Students depart
