



## “To Finish is to Win:” The First Annual Louisiana State Arthropod Museum Mad Dog Marathon

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A common complaint in insect taxonomy classes is that the required insect collection is “too hard” in one aspect or another; i.e. too many families are required, it’s difficult or impossible to travel to a good collecting location, or it requires too much time to complete. Despite the warnings and help from instructors and teaching assistants (TAs), some students ultimately fail the course because of a dismal collection. The authors, both graduate students at Louisiana State Arthropod Museum (LSAM), tested the merit of these complaints in a fun, interesting, and engaging way. This endeavor was developed to assess how many families of insects could be collected and properly curated in 24 hours, while limiting our collecting range to the university campus. A desire to engage the faculty and students in the Department of Entomology, as well as other departments on campus and the public at large, led us to create the Mad Dog Marathon competition.

We sought to discover what quality of insect collection, based on diversity and specimen preparation, could be assembled in a single day at a single site. The data we gathered show that the requirements of a traditional insect taxonomy course are not, indeed, unreasonable!

### Background: “Insect Collection Theory”

One of the most important and fundamental skills all entomologists must possess is the ability to identify (to some meaningful level; the family rank is convenient) and preserve insect specimens. This is true whether

the researcher is a taxonomist describing new species, an ecologist conducting a community inventory, a specialist on pests of a particular crop, an extension agent, or even an exterminator. Misidentifications in any of these fields can have results that range from annoying to catastrophic. All researchers working with insects outside of a laboratory setting should voucher specimens from their work. This is an absolute requirement for responsible research. Specimens must be properly preserved and labeled before being sent to specialists for identification or confirmation (see Gotelli 2004).

Like most entomology departments, ours at Louisiana State University (LSU) requires graduate students to take a course in insect taxonomy, which has an insect collection component. Insect Taxonomy is taught in the spring of odd-numbered years and the insect collection accounts for half of the course grade. The insect collection grade is based on points for each correctly identified (and correctly spelled) family, diversity of species within families, proper preservation (pinning, alcohol, etc.), proper labeling, and overall presentation of the collection. The collection must also be turned in on time. The minimum taxonomic diversity requirement for most “A” collections is about 120 families.

The authors have experience as students in three taxonomy classes (MLF: fall of 2000 [Stephen W. Wilson, Central Missouri State University], fall of 2003 [Robert W. Sites, University of Missouri, Columbia]; MLG: Spring 2007 [Christopher E. Carlton, LSU]).

Additionally, the authors have worked with students of successive classes in a formal (MLG: TA spring 2009, LSU) and informal capacity. We have found that, despite all of the efforts, warnings, and help from instructors, TAs, and veterans of the class, a consistently high percentage of students submit terrible collections. Some even fail the course as a result of a low collection grade. A poorly made insect collection not only results in a low grade, but also represents a wasted effort on the part of the student, a lost opportunity to learn proper techniques, a poor use of resources such as pins and label paper, and useless specimens. The latter can be used neither for teaching nor placed in the permanent collection, and their only possible value is as an example of how *not* to prepare a specimen.

We have identified two general categories of student error: technical errors and time-budgeting errors. Technical errors encompass problems in specimen and label preparation and specimen arrangement. Specimen preparation mistakes involve preserving insects improperly (e.g. dry-mounting something that should be in alcohol), improper pinning (e.g. pinning a beetle through the pronotum), improper pointing (e.g. a specimen pointed on the left side), and poor arrangement of the specimen (e.g. not spreading a butterfly, or a beetle with legs cattywampus). Label preparation mistakes are perhaps the most frustrating, as they tend to be epidemic in a collection. These mistakes often include oversized fonts, wide borders, lacking locality informa-

tion, erroneous dates, false label information (sometimes through willful deceit, but more often a result of the student's poor record-keeping), and incorrect orientation.

Throughout the semester, countless examples of proper pinning, pointing, specimen arrangement, and labeling are shown to the students. Each student is put through practical exercises to communicate precisely what is expected for specimen and label preparation. At all times, proper collections are available to each student for comparison. How so many are able to make such a plethora of technical errors in their final collection is a deep and profound mystery to us. Upon review most students accept these mistakes as their own ("Yep, you're right, I pinned that beetle the wrong way...").

The second category, and the one we wish to focus on for the remainder, is one of time-budgeting errors, which are a result of either not understanding or ignoring the proper time investment for each of the tasks required in constructing a collection. Time-budgeting errors inevitably result in not having collected enough families, not having identified specimens already collected, not having properly arranged specimens, and/or ultimately not submitting the collection on time. Late collections typically occur because the student is scrambling at the last minute to label, identify, or arrange the specimens. Interestingly, in our experience, this is an area in which students rarely take all the blame. The most popular excuses for poor collections stem from time-budgeting errors: "It's impossible to get 120 families," "I don't have a car so I couldn't drive to a good collecting area," "I didn't have enough time to identify my specimens," "I didn't think it would take so long to label and arrange my collection," and so on.

Serendipitously, we were shown what a dedicated student can do in a short amount of time. In the spring of 2005, one student of Insect Taxonomy, Dmitry "Mad Dog" Chouljenko, performed an extraordinary feat. The day the collection was due, the properly field-labeled specimens he had collected throughout the semester were still in the freezer or in alcohol. That afternoon, he arrived at the museum and began pinning, pointing, and spreading his specimens. Working through the night, he made proper locality and identification labels and taxonomically arranged the specimens in his collection. By the next morning, he presented the instructor with an exemplary A+ collection spanning two drawers (though he was

docked 10% for being a day late). The title of our event, described herein, commemorates his heroic efforts.

### The Event!

The authors decided to stage a BioBlitz-style competition at LSU as a practical example of what kind of insect collection can be assembled with limited time and resources. This had the dual purpose of generating some empirical data on the time involved in assembling a proper collection, plus promoting the art of insect collecting to the department and others on campus. The rules were simple:

- 1) Everything, from collection to completion, must take place in a 24-hour time period.
- 2) Specimens must only be collected on LSU's main campus in Baton Rouge (no car required). (Fig. 1)
- 3) Only adult hexapods are eligible for submission.
- 4) No specimens will be accepted without label data.
- 5) All family names must be spelled correctly for credit.
- 6) Specimens must be arranged neatly in proper insect drawers for maximum credit.

Rules 3–6 parallel those of ENTM 4005. Rules 1 and 2 were self-imposed "experi-

mental manipulations" to illustrate the type of collection that could be produced given limited time and a limited geographic area.

The entire competition was organized in less than one week by the authors (both graduate students). Competitors provided their own collecting equipment, or borrowed equipment from LSAM. Label paper, pins, ethyl acetate, and alcohol were donated by LSAM (< \$100 in supplies). The participants were six students (and student equivalents) with a keen interest in insect collecting and entomology: the two authors, Stephanie Gil, Leigh-Anne Lawton, Jong-Seok Park, and Erich Schoeller.

Points were awarded in the following way:

- 10 points for each correctly identified order
- 5 points for each correctly identified family
- 2 points for each series (5 or more individuals of the same species/morphospecies)
- 1 point for each additional morphospecies within a family (at the discretion of the judges)
- 50 points available for overall quality of presentation

The person who earned the most points was to be declared the Grand Prize winner, but acknowledgments were given for



Fig. 1. Map of the boundaries set for the Mad Dog Marathon competition.

collecting the most families of Hemiptera, Coleoptera, Diptera, Hymenoptera, and Lepidoptera (properly spread); the most series; and the most morphospecies. The following members of the LSU entomology department acted as judges for the event: Dr. Chris Carlton (Chief Judge and event emcee), Ms. Victoria Bayless, and Dr. Dorothy Prowell.

To make the event even more interesting, the organizers suggested soliciting personal sponsorship by faculty members (monetary pledges for each family collected by a participant), with the idea that all proceeds would benefit the LSAM foundation and the Entomology Club at LSU. The pledges began with a generous donation of \$150 by Dr. Gregg Henderson to MLG in exchange for his completed collection, which Dr. Henderson will use for educational purposes in his class. The most socially inclined participant of the bunch, Leigh-Anne Lawton, convinced multiple colleagues to sponsor her efforts, and succeeded in precipitating a landslide of support for all candidates, including particularly generous donations from Dr. Seth Johnson, Dr. Dorothy Prowell, Dmitry "Mad Dog" Chouljenko, Victoria Bayless, and Dr. Wayne Kramer. Interesting pledges included \$5 per family of Psocoptera (by Dr. Chris Carlton) and \$10 per family of Phthiraptera (by Dr. Igor Sokolov).

The competition began at 10 a.m. on 10 June 2009 and lasted until 10 a.m. on 11 June 2009. It began with a rousing pep talk by chief judge Chris Carlton (source of the title quotation). He concluded with six pearls of wisdom, which varied wildly in relevance and lucidity:

- 1) Hurry, but don't rush.
- 2) Respect your colleagues; they are out to defeat you!
- 3) Don't use plastic bags.
- 4) Keep the community garden organic.
- 5) Spread Leps early and often.
- 6) Beat with authority.

All participants took oaths with their right hand placed on *Borror and DeLong's Introduction to the Study of Insects* (Triplehorn and Johnson 2004), to the effect that they would not cheat by utilizing previously collected insects, and that they would stay within the specified geographic boundaries. At the stroke of 10:00, the participants were off! The collecting was intense for the first few hours, but this mostly sunny and hotter-than-average June day (with a high

temperature of 94°F) took its toll on the participants. Most participants worked in the entomology teaching laboratory, where a few notable visitors dropped by during the day: Dr. Meredith Blackwell (a mycologist from the Biological Sciences Department), who was very interested in seeing any Laboulbeniales-harboring insects; the entomology department head, Dr. Timothy Schowalter; and "Mad Dog" himself, Dmitry Chouljenko.

Each participant had a different suite of strategies for amassing the most insects in a short amount of time. Lawton put out chicken-bait traps; Schoeller did intensive, targeted hand collecting; Gil used fruit-bait traps; and Gimmel sifted old grass clippings. All participants (with the exception of Gil, who reportedly took a one-hour nap) stayed awake through the night, processing their catch and periodically checking their blacklights and the building walls for night-flying insects. The participants quickly discovered that sample processing would occupy most of the time of the event, and that the amount of material collected greatly exceeded the amount of material they would be able to prepare for the collection. Since time was very short, large, soft insects and spread Lepidoptera gave the participants much grief, for these often require more than 24 hours to properly set.

During the wee hours of the morning, long periods of silence blanketed the room as the participants diligently and wearily sorted, pinned, pointed, labeled, and identified their catch. As dawn broke, some participants had serious doubts as to whether their collections would be prepared before 10:00 a.m. New life was breathed into the competitors when Dr. Gregg Henderson stopped in during the morning bearing snacks and refreshments, including home-grown tomatoes from his garden. As the deadline approached, the participants feverishly arranged their specimens in their respective Cornell drawers. Interested members of Entomology and other departments began arriving for the grand finale as 10:00 drew near. All collections were submitted with time to spare, and were admired and gawked at by those in attendance (Figs. 2 and 3). Interesting insects taken included *Zenoa picea* (Coleoptera: Callirhipidae), *Tenomerga cinerea* (Coleoptera: Cupedidae), a specimen of the rare waterscorpion *Curicta howardi* (Hemiptera: Nepidae), and a two-striped walkingstick, *Anisomorpha buprestoides* (Phasmatodea: Pseudophasmatidae).

The following morning, after much-needed recuperation and convalescence, a reception was held in honor of the partici-

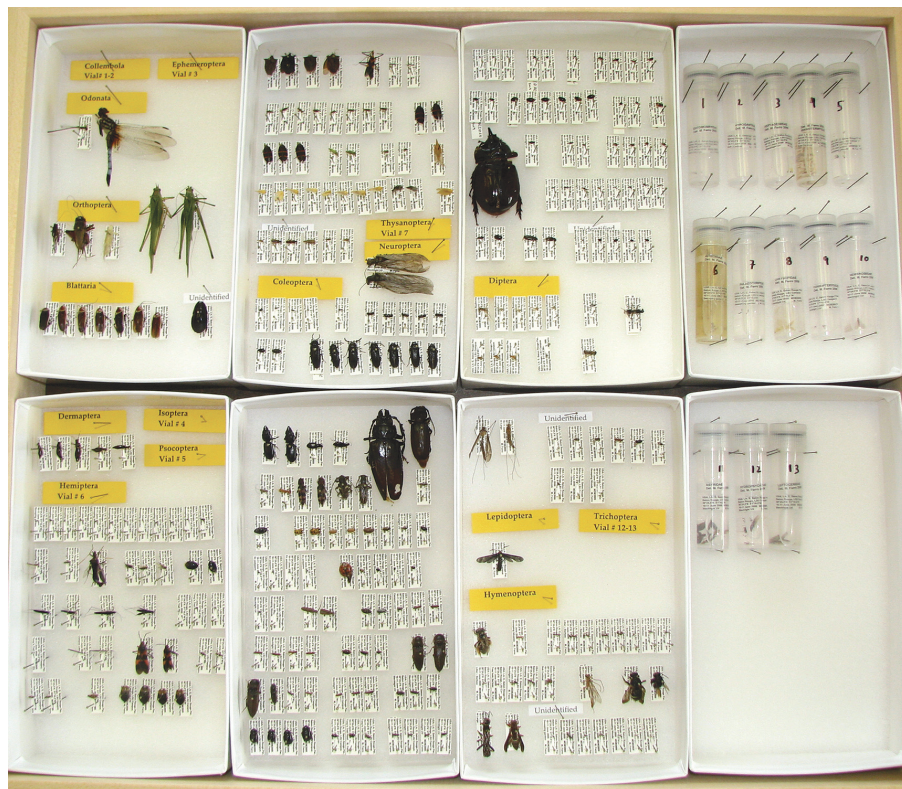


Fig. 2. A collection resulting from the Mad Dog Marathon competition (assembled by MLF).



Fig. 3. Interested attendees admiring the cornucopia of entomological delights collected during the Mad Dog Marathon.

pants and donors, and the score sheets were displayed. The winners in each category were as follows:

Most Hemiptera families: Gimmel (23)  
 Most Coleoptera families: Ferro (35)  
 Most Diptera families: Gimmel (14)  
 Most Hymenoptera families: Gimmel (10)  
 Most Lepidoptera families: Schoeller (4)  
 Most series: Park (15)  
 Most extra morphospecies: Gimmel (54)  
**Grand Prize: Gimmel (779 points)**

The point totals ranged from 413 to 779. All collections were excellent and did not differ appreciably in the quality of specimen or label preparation, but only in the number of identified families. All participants turned in at least 48 families. The grand prize was won by MLG, who collected, processed, and identified 101 families. When all collections were combined and the overlaps were accounted for, a total of 17 orders and 157 families had been collected, processed, and

identified. Many additional families went unidentified because of time constraints. It is interesting to note that the specimens from this combined collection of 157 families would amount to at least two "A" collections in ENTM 4005, all from relatively few (about 40) man-hours spent collecting *without leaving campus*.


### Conclusion

We have shown that ample insect diversity exists on campus for an insect collection that will receive the maximum points available. Since each of the six participants spent about 20 of the 24 hours productively, we estimate that it should take between 100 and 120 dedicated hours to properly prepare an "A" collection for submission in ENTM 4005. Stated another way, the student should expect to spend at least one hour on a collection for each family required. Considering that the students are given an entire semester to complete their collections, this is a reasonable requirement, especially given the importance of this course as the bedrock of the entomology curriculum. These numbers should serve as valuable time-budgeting lessons for students who are charged with making a collection.

MLF kept close track of his time spent on each activity. Of the 24-hour time period, 6.5 hours were spent collecting, 7 hours were spent pinning, 1.5 hours were spent making labels, 2 hours were spent labeling specimens, 4.25 hours were spent arranging pinned and labeled specimens in the drawer, and 2.75 hours were spent idle. All specimens were sight-identified (80 families), so this time budget does not take into account any additional time needed by students to identify their specimens. For each hour spent collecting, approximately two and a half hours of work were needed for turning the material into properly arranged specimens.

The inaugural year for this event was an outstanding success, both in terms of

learning what is possible with limited time and mobility, and as a surprisingly lucrative fundraiser that garnered nearly \$1000. Additionally, we succeeded in demonstrating, to both our department and others, the amount of skill and dedication possessed by people in our field of insect taxonomy. For the 2010 Mad Dog Marathon, we plan to include select participants from other schools and departments.

We hope our conclusions are useful as fuel for instructors trying to drive home the importance of proper time management to their students, and as an example of the high-quality results possible for students with a limited home range. 

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