

# FIELD NOTES

SPRING 2008



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# FIELD NOTES

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FRIENDS OF THE UNIVERSITY OF OKLAHOMA BIOLOGICAL STATION

## Director's Message

It has been quite the year here at The University of Oklahoma Biological Station (UOBS), and 2007 will be best remembered for the "great flood" that inundated Lake Texoma during the summer. Water was lapping within inches of building C. The high water covered the main road up to seven feet in spots, knocked out our internet and land-line phones for nearly 5 weeks, compromised our septic system, and finally forced us to cancel the 2007 August Summer Session. This was the first Summer Session cancellation since the flood of 1990! However, the fantastic job that Richard Page and Donna Cobb and their crew did to manage the operation of the station during this tumultuous time is to be commended. (See page five of this issue of Field Notes for some flood photographs taken by Donna.) We are hoping for a more "normal" year for 2008 and are looking forward to it.

This year also marked the 4<sup>th</sup> biennial Friends of UOBS (FUOBS) Celebration, which was held the weekend of October 19-21, 2007. The station welcomed over 70 friends and alums to the weekend festivities, which were highlighted by our very special guest, world-renowned author, illustrator and ornithologist-naturalist, David Allen Sibley. David presented a talk about "Birds and Bird Guides" on Saturday afternoon and he also led two early morning bird tours on Saturday and Sunday morning, with proceeds from both the talk and tours benefiting the FUOBS Endowed Scholarship Fund. The FUOBS Celebration was capped off by our reserve fund auction to benefit the Scholarship Fund. We had a record auction which raised over \$7,000 towards this fund.

As for other station news...Tammie Cluck, a long time member of the UOBS facilities staff, left us in the spring to pursue other professional and family matters (i.e. grandkids). In addition, Dr. James Larson and his wife Amy, who arrived in November 2006 to take up the UOBS postdoctoral fellow position, departed UOBS in July for their native Kansas. James accepted a permanent position with the Kansas Department of Wildlife and Parks as an aquatic biologist. They also

welcomed their first child (Alton James) in late August. We wish James, Amy, and Alton well in their new life together. A national/international search is currently underway for James's successor. The Station also welcomed in April Dr. Dagmar Frisch (Donana Biological Station, Spain) as a European Union (EU) Marie Curie Postdoctoral Fellow. Dagmar (accompanied by her husband, Heinrich), will spend two years in my lab at UOBS, as we work together studying the ecology and genetics of the exotic sub-tropical invasive zooplankter, *Daphnia humholtzi*.

Other news includes Dr. Dave Hambright receiving additional funding (approx. \$1.8 million) for the next 5 years from the Oklahoma Department of Wildlife Conservation (ODWC) to continue his lab's work on the invasive golden algae, *Prymnesium parvum*, in Lake Texoma. This award represents the single largest research award ever based at UOBS. Further, Dr. Gary Wellborn received a \$300,000 (3-year) award from the National Science Foundation (NSF) to continue funding his research group in their study of the mechanisms involved in ecological speciation, using his model system the amphipod *Hyalolella azteca* complex. Congratulations to both Dave and Gary for this tremendous funding success!

Further, we had a very active group of graduate and undergraduate research students at the station this year. We welcomed Carrie Miller, a new Ph.D. student in Dave Hambright's lab. Also, we had two Summer Graduate Research Fellows, John White and Jeff Wesner, who were funded through the generous support of the Loren G. Hill Fund and the Kim and Nancy Hauger Graduate Fellowship Fund. Finally, I want to thank the dedicated UOBS staff for their hard work in helping us "survive" 2007! We're looking forward to 2008!

Best wishes to all!

**Larry Weider**—Director  
*The University of Oklahoma Biological Station (UOBS)*



Greetings, once again, from your Executive Committee and Board of Directors of FUOBS! The recent Station Celebration was a resounding success thanks to the hospitality shown to us by Dr. Weider and his staff. October was a great time to hold the Celebration and the Station has recovered nicely from the July flooding. David Sibley, renowned ornithologist, gave our feature presentation and led Saturday and Sunday morning birding expeditions with many of our numbers in tow. We really had a great time and I thank you that were able to attend this event.

You couldn't help but notice that our Friends group has really made a difference for the Station. David Sibley stayed in one of our guest researcher apartments that were made possible, in part, from fund raising and donations from the Friends. Several of the OU Zoology graduate students helped with the weekend activities and shared their research projects with us through display posters. Our push for 2006 and 2007 was to raise scholarship funds for our students, and I thank those of you that contributed so generously to the cause. You should be proud about the work and research that our students and faculty are conducting at the Biological Station. We plan to solicit funds and grow the scholarship fund some more over the next two years.

On a personal note, I would like to thank you for the opportunity to serve as your Chair for the past two years and I am gracious for your support. Get behind our new chairperson, Jane Barrett, and the new Executive Committee and make a difference for our organization. Let's continue our support for the Station we all love.

Kim R. Hauger  
*Outgoing Chairman-FUOBS*

## A BIG THANK YOU TO DONORS TO FUOBS!

Many individuals made generous donations to the Friends over the last year. Following are the names of individuals who made cash donations (not previously published in Field Notes) during the period August 30, 2006 through October 20, 2007, along with the names of individuals they wish to honor. In 2006 the total donations were \$5,463.10 and our OU Foundation account earned \$92.72 in interest. From January 1–October 20, 2007 the donations totaled approximately \$3,685.

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| » William D. Shephard... in honor of Harley Brown  | » Ronny C. Woodruff                                      |
| » Patricia Bynum Riggs                             | » Virginia Self Brashear... in memory of J. Teague Self  |
| » Bedford M. & Carolyn H. Vestal... in memory of   | » Hubert Frings... in memory of Mabel Frings             |
| Howard McCarley                                    | » Sharon T. Vaughn... in memory of J. Teague Self,       |
| » George & Joan Hauger                             | Elroy Rice and Prof. Rohrbaugh                           |
| » Christie & George Carstens                       | » Patricia Bynum Riggs... in memory of Carl D. Riggs and |
| » Penny and John Barrett                           | Norman and Mildred Brillhart                             |
| » Ron and Libby Woodruff                           | » Joseph D. and Suzy Maness                              |
| » Anonymous Donor... in memory of Howard McCarley  | » Bruce Stewart and Georgia Stewart... in memory of      |
| » Patricia Bynum Riggs... in honor of Mary Lee &   | Gerald Don Stewart                                       |
| Terry Foor   | » Bruce and Sharon Smith... in honor of the Oklahoma     |
| » Dr. & Mrs. Tom White                             | Junior Academy of Science                                |
| » Marie Babb                                       | » Ellen Rowe Phillips... in memory of Marge Smith        |
| » Sally Brooks Smith... in memory of Horace Bailey | » Julia Yoshida and Claudio Topolcic                     |
| » Barbara Shirley... in memory of Carl Riggs       | » Dr. Bill Johnson                                       |
| » James N. Thompson, Jr.                           | » Jane and David Barrett                                 |

At each celebration, Julia Yoshida gathers and, with husband Claudio Topolcic, organizes and ships from Concord, Massachusetts a variety of interesting items for our Celebration fund raising sale and auction. Other members also contributed many items to the sale this year. Jane Barrett arranged for Ms. Ann Kidd to donate an original George M. Sutton watercolor painting that was the high item in our Celebration fund. We owe many thanks to the members who contributed and carried out the sale, which brought in approximately \$7228 for the Friends Scholarship Fund (we are finalizing the figures at this time). Dr. Yoshida wishes us to particularly recognize James Baird of Princeton, MA and Pat and Herb Pratt of Cambridge, MA who have made especially generous donations for the auction.

We urge you to consider contributions to the Friends this year. The Executive Committee is planning to continue increasing the Friends Scholarship Fund and other money for scholarships as much as possible. The Friends fund is an endowed fund from which only the earnings will be spent. As the costs of higher education continue to increase, we feel it is important to help students have the opportunity to experience the field environment through courses at the Station.

# The ecological genetics of the water flea *Daphnia lumholtzi*, an invasive zooplankton species in Lake Texoma

Contributed by Dagmar Frisch, European Union Marie Curie Postdoctoral Fellow

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In April 2007, I became a resident researcher at the University of Oklahoma Biological Station to start my postdoctoral fellowship with Dr. Lawrence J. Weider. I was awarded a 3-year fellowship by the European Union (Marie Curie Outgoing International Fellowship) which allows me to carry out my research project on the evolutionary genetics of exotic, invasive zooplankton species until April 2009 at the UOBS, and thereafter for another year at the Biological Station of Doñana in Seville, Spain. I received my PhD in Berlin, Germany in 2000, and have since worked at the University of Mississippi in Oxford, MS and the Doñana Biological Station in Sevilla, Spain.

My current research topic is the evolutionary genetics of invasive species. In this collaboration with Dr. Larry Weider we are using a zooplankton species as a model organism that has invaded freshwater habitats outside its original geographical and environmental ranges. Biological invasions of exotic species have become an increasing concern for native ecosystems of which aquatic habitats are considered to be most affected. In economic terms, damages caused by invasive species have been estimated at over \$138 billion per year in the USA alone. One of the major concerns of biological invasions is that exotic species have the potential to displace similar native species and thereby might generally change the structure of the food web. In order to predict future invasions and to develop successful conservation and management strategies, it is crucial to learn more about the biological mechanisms that enable species to invade new habitat ranges.

Invasive success of species has traditionally been associated with various organismal properties, e.g. fast reproduction, good competitive ability and predation resistance. Another important property commonly encountered in invasive species is their ability to cope with environmental properties profoundly different from those of the habitat of origin. This is frequently explained by broad physiological tolerance within individual animals, but recent studies suggest that microevolutionary processes, e.g. fast adaptation to new environmental conditions at the population level, might be important in facilitating invasive success.

The aim of our study is to explore the microevolutionary mechanisms involved in facilitating rapid spread of invasive species into new habitats using the water flea *Daphnia lumholtzi* as a model. Water fleas are planktonic crustaceans of small size (mostly between 1 and 4 mm) that form a crucial link in the food web between the microalgae and secondary consumers, such as fish and larger invertebrates like insect larvae. The water flea *Daphnia lumholtzi* has a native range that includes portions of subtropical Africa, S.E. Asia and Australia, from which it dispersed to the United States. Since its introduction in a Texas reservoir in the late 1980s, most likely by stocking fish from African lakes, it has invaded more than 120 reservoirs in the mid-west and arid western states. It is now frequently found in aquatic habitats of the southwestern USA and is currently moving both further north and south with recent invasions to the Laurentian Great Lakes of North America and into Brazil. A high temperature optimum (20–25°C) was thought to preclude this species from invading cooler lakes in the northern USA. However, its persistence throughout the winter in some Missouri populations, suggests its

adaptation to cooler temperatures. *Daphnia lumholtzi* has been present in Lake Texoma, Oklahoma since 1991. This mesotrophic reservoir located on the border of Oklahoma and Texas impounds the Red and the Washita Rivers. The Red River is approximately twice as saline as the Washita River, creating a strong horizontal salinity gradient in the lake, in addition to a salinity increase and temperature decrease in the deeper layers during summer stratification. Due to these environmental properties Lake Texoma provides an ideal system for the study of the ecological genetics of this species in relation to physico-chemical factors.

For our studies we use a combined approach that includes data collected in the field and experimental studies performed under controlled conditions in the laboratory. The population of *Daphnia lumholtzi* in Lake Texoma has been sampled since 2005 at five locations which include shallow and deep sites. During the sampling trips we collect live animals to set up cultures of single clones for experimental work. Clones, i.e. genetically identical individuals, are relatively easy to obtain in water fleas. The main reproductive mode of these animals is parthenogenetic, which means they can produce offspring from unfertilized eggs and thus produce individuals that are genetically identical to their mothers.

Other sampled individuals are used to analyze the genetic structure of the population throughout the lake. The distribution of genotypes in the lake appears to be related to temperature with certain genotypes being more prevalent during the summer months at high temperatures, whereas other genotypes show an inverse relationship to temperature. To compliment the field data, survival experiments at different temperatures (22°C, 32°C) and salinities were performed.

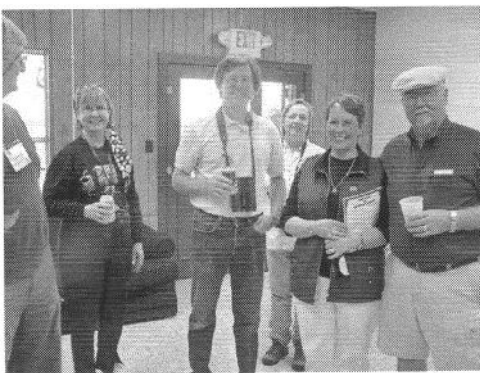
Juvenile individuals of the two main genotypes were subjected to the respective conditions for 24 hours after which the number of live animals was recorded. The lab experiments support our field observations of differential success of genotypes under different temperatures.

We interpret our data to mean that temperature plays a significant role in influencing genetic variation in *D. lumholtzi*, which may contribute to the species' successful invasion in the U.S. Additional (untested) factors could also play a role in influencing genetic variability in this species, (e.g. turbidity, predator defenses). The *D. lumholtzi* invasion has the potential to disrupt native planktonic community structure, which could largely affect the entire food web of the lake. Our future studies are aimed at revealing more details of the ecological genetics of *D. lumholtzi* in both Lake Texoma and other lakes in the US.

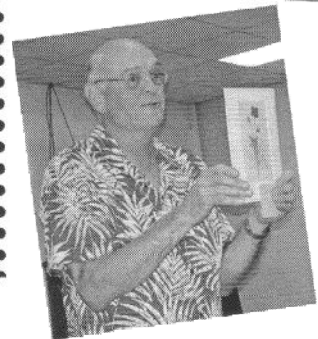


# Station Celebration, 19-21 October 2007

The Station Celebration held on 19-21 October 2007 was a fine event enjoyed thoroughly by the 70+ friends and alums who attended. The birding with David Sibley and his excellent Saturday presentation were described as superb. Old friendships were solidified and new ones formed. Among the images on this page you may note one with three generations of Carpenters! Friends from many different decades of UOBS history were represented. Business was conducted and a new Executive Committee approved. Of course, one of the primary purposes of the event was to provide support for present and future students of the Biological Station through fundraising (the auction was a great success) and other FUOBS activities. This was admirably accomplished. Hopefully, even more can experience the next Station Celebration!

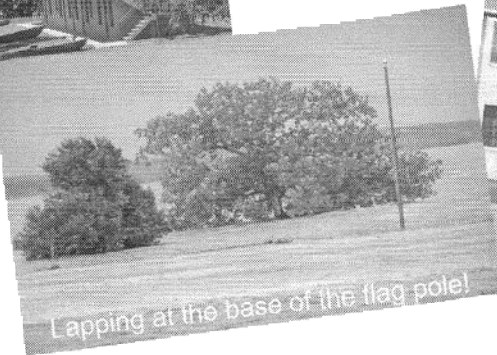
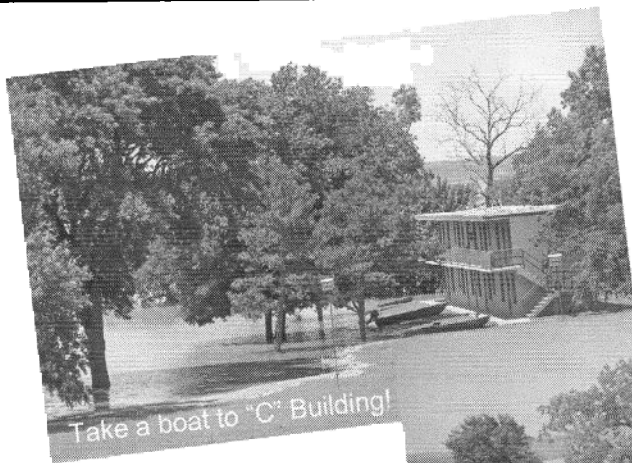


**Next Friends of UOBS Event!  
Oklahoma Museum of  
Natural History Fall 2008  
Details to be Announced**



# Six Feet High and Rising! Summer Floods 2007

Dr. Larry Weider noted in his Director's Message the flooding due to rising lake levels during the summer of 2007. Here are some photographs taken during that time by Donna Cobb. She showed many others at the Station Celebration.



## YOUNG SCIENTIST... CONGRATULATIONS!

Courtney Bass from Edmond Memorial HS was the 2007 winner of the \$100 FUOBS award at the Oklahoma Junior Academy of Science banquet this past spring. The title of her paper was, "Preliminary investigation of invertebrates of water-filled bracts in *Helioconia caribaea* from Saba. Her paper was published as a JOAS electronic publication which can be located at [www.oas.ucok.edu/ojas/index.html](http://www.oas.ucok.edu/ojas/index.html).

**STATION MEMORIES** from Bruce Stewart who was first at the Station in the summer of 1973, and again during the summers of 1983 through about 1992. He experienced the Station as an undergraduate, graduate student, and professor. Professor Stewart currently teaches at Murray State College in Tishomingo, OK where he has been for the past 25 years.

- The Biological Station was a thrilling adventure for a young undergraduate from East Central State College in 1973. I was in awe of the professors, the graduate students, and the atmosphere in general. I remember one night we were studying for one of Dr. Howard McCarley's notorious natural history practical exams. It was on mammals. Quietly, Dr. Charles Carpenter appeared from his classroom next door. He overheard us moaning about how hard it was to identify all the mammals by skulls only. Dr. Carpenter told us to place skulls in his hands behind his back. He identified every single skull we handed him! Today, when my human anatomy students complain about the difficulty of identifying individual human bones, I turn my back to them and say, "Hand me any bone behind my back." One after the other, I name those bones! Thanks, Dr. Carpenter, for this bit of teaching wisdom!
- The 4th of July was a great time of fun and celebration at the Station through the summers of the 1980's. There were turtle races, kids' games, and adult games. There were great volleyball tournaments with Oklahoma (led by Captain Carpenter) against Texas (led by Captain Clark Hubbs). One year we had a sanctioned chicken flying contest! Each professor launched a chicken, and the kids were the "chicken collectors." All the classes were "required" by Dr. Loren Hill to develop a biology theme skit that was presented in the cafeteria for everyone, including many visitors, to see. There were pollinating bees, marching entomologists, spawning fishes, singing and courting birds, and all manner of educational stories about them! No Oscars, but delightful and educating entertainment! Then it was back to hard work since each class required individual research projects, and time was running out..
- The great memories are countless, and I have a treasure trove of photographs to remind me. In 1973, I met a high school botany teacher, Freeman Thomas, from Arkansas. Freeman sang and played beautiful folk music and took Dr. McCarley and me to visit Jimmy and Clela Driftwood in Timbo, Arkansas one weekend. Mr. Driftwood was the author of such songs as The Battle of New Orleans. I remember the infamous "Red Truck" used to cart wind-blown students on field trips. Some field trips changed my life... Dr. McCarley's nocturnal trip to the swamps of the Little River Bottom, for example. I later took UOBS field zoology students to the same exact place and heard them whispering, "I think he wants us to follow him!" We found and heard nine species of chorusing anurans that night (along with a number of western cottonmouths!). And there was humor, such as the time Dr. Bill Matthews had to take us to the carwash to clean the fish ecology class after an incredibly muddy seining experience! The Station was inhabited by a diversity of people from so many places, cultures, backgrounds and research interests. I remember students working incredibly hard for extremely demanding courses. However, learning did not just occur in the classroom. It was an a 24-hour a day learning environment. I remain a better teacher and person today because of the influences of so many at the Station through the years. It had a family atmosphere, through good times and sometimes difficult times. I so desire that the programs at UOBS continue to provide such experiences to our present and future students. The world is better off for it!

The Friends of the University of Oklahoma Biological Station (FUOBS) was established under the umbrella of the University of Oklahoma Alumni Association. The purpose of this organization is to promote and support the Biological Station and to promote connection with its friends and alumni. Any person who is a current or former student, faculty, staff member or friend of the Biological Station may become a member by request.

#### FUOBS BOARD OF DIRECTORS

##### EXECUTIVE COMMITTEE:

**Chair:** Mrs. Jane Barrett  
**Vice Chair/Chair-Elect:**  
 Dr. Edie Marsh-Matthews  
**Secretary:** Dr. Barbara Shirley  
**Treasurer:** Dr. Pamela Genova

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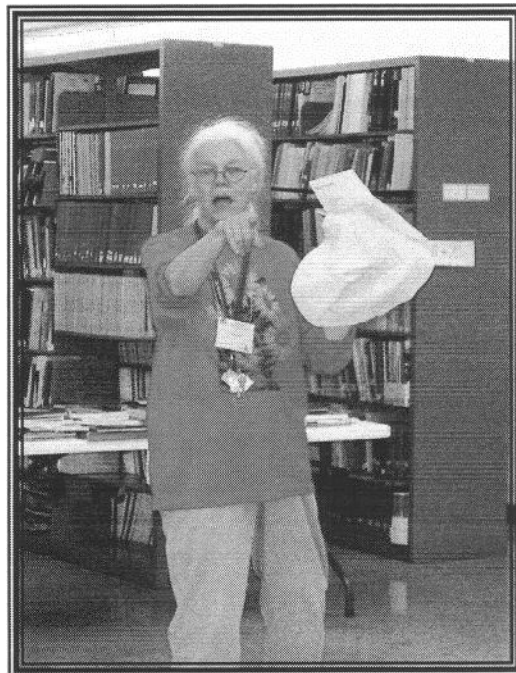
•Mrs. Ellen Rowe Phillips

##### EX-OFFICIO MEMBER:

•Dr. Larry Weider, Director of UOBS

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 •Dr. Jody Maness  
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 •Professor Bruce G. Stewart  
 •Dr. Bedford M. Vestal  
 •Dr. Julia Yoshida



**JANE BARRETT**  
**INCOMING CHAIRPERSON OF FOUBS**  
**HAVING FUN AT THE STATION**  
**CELEBRATION 2007**

## UOBS 2008 SUMMER SESSION SCHEDULE

### SESSION I— 18-31 May 2008

#### Field Studies of Non-Flowering Plants

(BOT 4990/5990 Sec. 050, 3 credit hours)

*Adam Ryburn, State Univ. of NY at Oneonta*

#### Bird Ecology

(ZOO 4970/5970 Sec. 050, 3 credit hours)

*Terry Maxwell, Angelo State Univ.*

#### Wetlands Ecology

(ZOO 4970/5970 Sec. 051, 3 credit hours)

#### Wetlands Science and Management

(ES 5273, Sec. 050, 3 credit hours)

*Robert Nairn, The Univ. of Oklahoma*

#### Molecular Techniques for Field Biology

(ZOO 4353/5353 Sec. 100, 3 credit hours)

*James Thompson, The Univ. of Oklahoma*

*Ron Woodruff, Bowling Green State Univ.*

#### Senior Capstone - Evolutionary Medicine

(ZOO 4983 Sec. 100, 3 credit hours)

*Ingo Schlupp, The Univ. of Oklahoma*

### SESSION I— 27 July—8 August 2008

#### Field Botany

(BOT 4990/5990 Sec. 051, 3 credit hours)

*Bruce Smith, The Univ. of Oklahoma*

*Adam Ryburn, State Univ. of NY at Oneonta.*

#### Field Herpetology

(ZOO 4970/ZOO 5970 Sec. 052, 3 credit hours)

*Geoff Carpenter, The Univ. of Oklahoma*

#### Field Mammalogy

(ZOO 4970/5970 Sec. 053, 3 credit hours)

*Michael Kennedy, The Univ. of Memphis*

#### Introduction to Stream Ecology

(ZOO 4970/5970 Sec. 054, 3 credit hours)

*William Stark, Fort Hays State Univ.*

#### Senior Capstone—Multi-scale Perspectives on Global Environmental Change

(ZOO 4983 Sec. 200, 3 credit hours)

*Lawrence Weider, The Univ. of Oklahoma*