



NEWSLETTER

Southwestern Research Station

Portal, Arizona

Center for
**Biodiversity
Conservation** and
AMERICAN MUSEUM OF NATURAL HISTORY 

Number 22

Year 2007

FROM THE DIRECTOR

Unlike the previous winter of 2006, the Chiricahua Mountains this past winter were blanketed in snow. As a result spring brought creeks surging with cold snow melt and mountains blossoming with a wealth of wildflowers. Our wet spring was followed by the summer monsoon season, and SWRS scientists and course participants were blessed with an abundance of flora and fauna for their research and classroom projects.

In spring 2008 we will break ground for the new Education Building. Because of the unique biological attributes and high levels of biodiversity found in the Chiricahuas, the station has experienced growth in its use by classes and workshops and a need for more classroom space has risen. The Education Building will provide instructors with ample space for classes and workshops in a spacious and environmentally friendly atmosphere. Thanks to a very generous challenge grant from Emily and John Alexander, and a grant from the National Science Foundation, our wish to create a new Education Building will become a reality.

Each year more and more naturalists pass through the station as they travel throughout the Chiricahuas enjoying the scenic beauty and wildlife here. An interpretive kiosk connected to the Education Building will educate visitors on our conservation efforts and direct them to areas they can visit on the station grounds, such as our hummingbird area. And, a new nature shop will have books on the area as well as indigenous crafts and artwork. All of us at the station and the Center for Biodiversity and Conservation are very excited about this important project.

Last spring the SWRS submitted a proposal to the National Science Foundation requesting funds to remodel the Osborn Memorial Laboratories (built in the 1950s). We are happy to announce that the grant was awarded this fall 2007! The labs are an essential part of

the station's research facilities, providing space for senior scientists and students and serving as a place for scientists to come together and share ideas. The remodel will include an upgrade of the electrical system, new energy efficient lights, new plumbing, new interior walls, and lab-quality benches; all using sustainable and non-toxic materials.

Through these green building initiatives, we are well on our way to accomplishing the objectives set forth in the SWRS Master Plan. Although we have a ways to go before the SWRS meets its ultimate goal of all structures being sustainable and energy efficient, we are proud of the accomplishments we have made so far. I want to extend my thanks to the SWRS staff for their support of station goals through their optimism and hard work.

SWRS staff bottom from left: Ben Knapp, Jodi Kessler,



Jonathon Bush. Top from left: Robert Lane, P.D. Hulce, Dawn Wilson, Geoff Bender (Not pictured Juvy McEwan).

May 2008 be a pleasant year for all of you,

Dawn S. Wilson

Southwestern Research Station

The SWRS Annual Newsletter is published each winter. The research station is a non-profit organization under the direction of the Center for Biodiversity and Conservation at the American Museum of Natural History (AMNH) in New York.

The SWRS enhances the existing diversity and strengths of the AMNH by providing scientists and educators from the Museum and other institutions across the country and around the world the opportunity to participate in research, workshops, and classes in one of the most biologically rich environments in the United States.

Staff:

Dawn S. Wilson, Ph.D, Director
P.D. Hulce, Office Manager/Volunteer Coordinator
Jonathon Bush, Bookkeeper
Ben Knapp, Chief Maintenance
Geoff Bender, Maintenance
Jodi Kessler, Kitchen Manager/Cook
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EDUCATION

MAMMALOLOGY IN THE CHIRICAHUA MOUNTAINS

For over 40 years, the University of Arizona in Tucson has offered an annual course in mammalogy that includes weekend field trips to the Chiricahua Mountains and to the Southwestern Research Station. Dr. Michael Nachman has been teaching this course since 1996.

The course covers the biology of mammals of the world. It combines experience from laboratories, lectures, field work, and independent research. The laboratory portion of the course relies heavily on the mammal collections of the Department of Ecology and Evolutionary Biology at the University of Arizona. One major goal is to have students become familiar with the evolutionary diversification of mammals of the world and also with the ecology and evolution of the local

mammalian fauna. The class is popular and usually has 40 to 60 undergraduate students.



Dr. Michael Nachman and mammalogy students.

Field trips form an integral part of the class and allow students to become familiar with the natural history of mammals in Arizona. SWRS sits at probably the single best site in North America for a course in mammalogy. Southern Arizona is one of the most diverse regions in North America for mammals, and students routinely see dozens of species in a single weekend. The Chiricahua Mountains offer a rare diversity of mammals in part because of the different life zones that range over a gradient of elevations. SWRS is home to over a dozen species of bats, including nectar-feeding bats, and nearby low-elevation sites contain dozens of species of desert-adapted rodents. Many students get their first taste of field biology in this class, and quite a few students have gone on to careers in biology as a result of their experience in this and similar courses.

Check out our web site for information on courses and workshops offered at the SWRS!!
<http://research.amnh.org/swrs>

CURRENT RESEARCH ACTIVITIES

Many senior scientists return to the SWRS year after year to work on long-term research projects that focus on native plants and animals in the surrounding mountains and desert valleys. These long-term projects add much to our knowledge and prove useful in guiding land management decisions for the surrounding national forests. We greatly appreciate our senior scientists'

dedication to helping us preserve this hotspot of biodiversity.

Another notable group of scientists that come to the station are the undergraduate and graduate students. They work at the station collecting data for senior thesis, Masters and Ph.D. degrees. Many make long-lasting contacts which later benefit them in their professional careers. In this year's newsletter, I would like to highlight their work. The following is a list of projects conducted by students during the 2007 research season.

CHRISTOPHER AGARD – Effects of Tail Loss on Lizards: *Sceloporus jarrovii* and Other Sympatric Lizards. Howard Univ., Washington, DC. Awarded SWRS Student Support Fund Grant.

ARIAN AVALOS – Antipredatory Behavior in *Sceloporus jarrovii*. Indiana Univ./Purdue Univ., Ft. Wayne. Awarded SWRS Student Support Fund Grant.



Bat photo by Merlin Tuttle;
Moth photo by Kelly Lasater

JESSE BARBER – Sound Strategies in the Bat-Moth Arms Race: The Predator Spectrum. Wake Forest Univ., Winston-Salem, NC.

Awarded AMNH Theodore Roosevelt Grant.

BRIANNA BEAN – Effect of Female Patch Size on Male Response in the Striped Plateau Lizard. Univ. of Puget Sound, WA.

TIMOTHY BONEBRAKE – A Macrophysiological Approach to Understanding Climate Change Effects on Butterflies. Stanford Univ., CA.

AMANDA CHUNCO – Causes and Consequences of Hybridization in Spadefoot Toads. Univ. of NC, Chapel Hill.

ROBERT COVERT – Correlated Evolution of Embryonic Physiology and Eggshell Morphology in Gekkonid Lizards. Virginia Tech, Blacksburg, VA.

BRIAN DIAS, SONIA CHIN, AND VICTORIA HUANG – Evolution of Brain-Behavior Controlling Mechanisms. Univ. of Texas at Austin.

MARSHALL KNODERBANE – Evolution in Flash Flooding Streams. Oregon State Univ.

KELLY LASATER AND EWA SERGIEJ – The Role of Mating Signals in Breeding Success: Does the Intensity of Nest Building Behavior in Painted Redstarts (*Myioborus pictus*) Function as a Signal of Female Quality to Her Mate? Univ. of Wroclaw, Poland.

RYAN MARTIN – A Test of the Ecological Conditions Necessary for the Evolution and Expression of Resource Polymorphism. Univ. of NC, Chapel Hill.

GALEN PRIEST – Pollinator/Plant Interactions between a Desert Shrub, *Erythrina flabelliformis* and Its Hummingbird Pollinators. College of Wooster, Ohio.

AMBER RICE – Has Prezygotic Isolation Evolved between Populations of *Spea multiplicata* That Are Sympatric and Allopatric with the Competitor *S. Bombifrons*? Univ. of NC, Chapel Hill.

JODI-ANN SAMPSON – Nectar Production of *Erythrina flabelliformis* and Its Effect on Pollination by Hummingbirds. College of Wooster, Ohio. Awarded SWRS Student Support Fund Grant.

BRIAN STORZ – Environmental Regulation of Spadefoot Skeletal Muscle Development. Florida State Univ., Tallahassee. Awarded AMNH Theodore Roosevelt Grant.

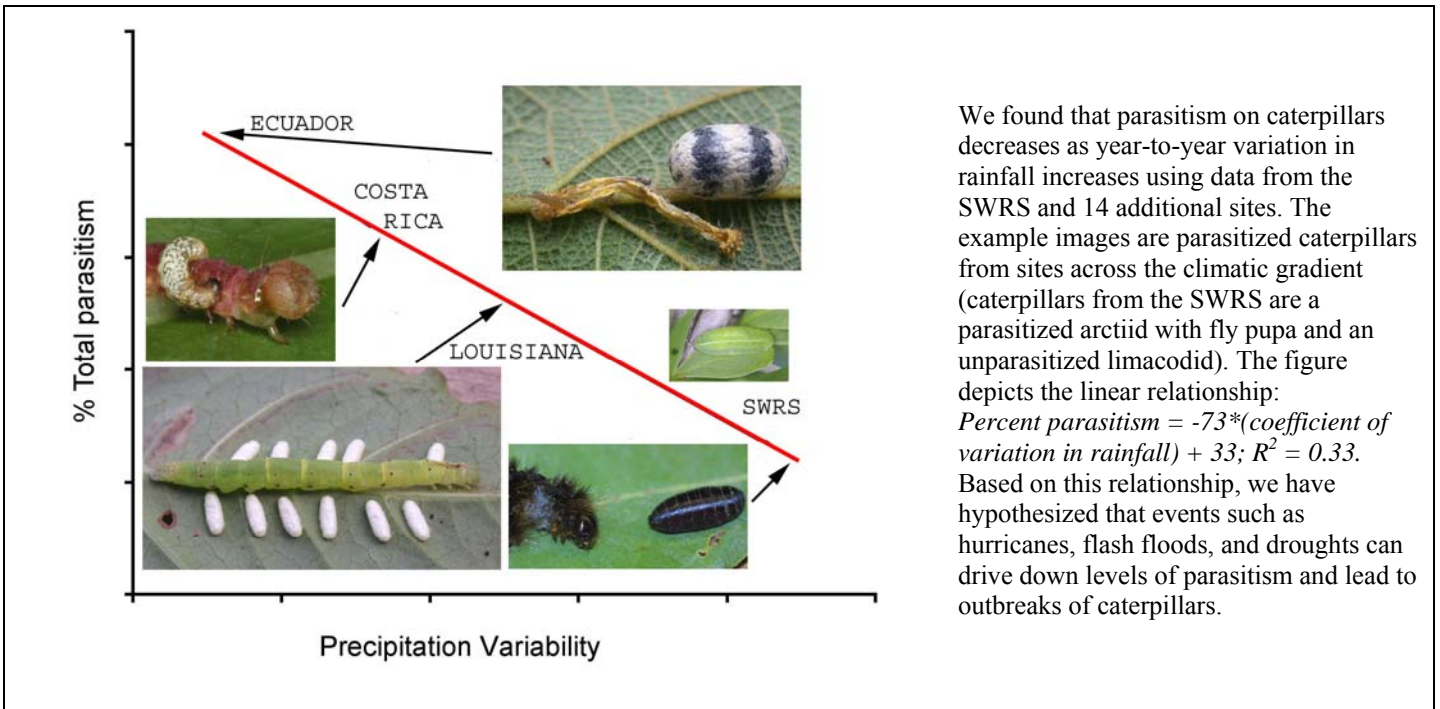
SHELBY STURGIS – The Role of Midden in *Pogonomyrmex barbatus* Colonies. Stanford Univ., CA. Awarded SWRS Student Support Fund Grant.

SEVAN SUNI – Long-term Population Dynamics in Dependent-lineage Populations of the Harvester Ant *Pogonomyrmex barbatus*. Stanford Univ., CA. Awarded SWRS Student Support Fund Grant.

ROBERT UNCKLESS – *Drosophila innubila* and a Male-killing Strain of *Wolbachia* with which It is Infected. Univ. of Rochester, NY.

FEATURED RESEARCHER FOR 2007 - LEE DYER, TULANE UNIVERSITY
TRITROPHIC INTERACTIONS AT SWRS

When Hurricane Katrina flash flooded my home in New Orleans in 2005, I snuck off to SWRS to check on the hundreds of caterpillars and pupae that I had collected with Earthwatch volunteers and students in my laboratory earlier that summer. It was somewhat ironic to escape from one flooded site to another area that regularly experiences flash floods, and it helped me focus my ideas about how climatic variability affects plant-caterpillar-enemy interactions. We published a paper later that year on extreme weather events and tritrophic interactions across the Americas (Stireman et al. 2005, Proc. of the National Academy of Sciences of the U.S of America 102:17384-17387).



This study was one of the results of my laboratory's ongoing studies of tritrophic interactions across sites in the Americas, funded by Earthwatch Institute, National Science Foundation, US Department of Agriculture, National Geographic, and personal funds. The focal taxa for our tritrophic interactions are caterpillars, their host plants, and the parasitic wasps and flies (parasitoids) that control caterpillar populations. The overall goal of the research is to quantify diversity of plant-caterpillar-parasitoid interactions at all of our sites, document the natural history of these interactions, and test specific ecological and evolutionary hypotheses. Quantifying "diversity of interactions" is much like studying species diversity, except trophic chains of varying links are used as the base unit as opposed to an individual species (i.e. "richness" would be the total number of plant-caterpillar-parasitoid species chains in a community). Examples of both basic applied questions that we have addressed include:

- Are tropical caterpillars more specialized than temperate caterpillars?
- What affects diversity and abundance of caterpillars and parasitoids in natural forests and adjacent agriculture (e.g., alfalfa fields near SWRS)?
- How does diversity of tritrophic interactions vary across latitudinal, altitudinal, and climatic gradients?
- How do variation in precipitation and temperature affect levels of parasitism (and subsequently affect caterpillar densities)?

These are ambitious questions, and even just describing the immatures of the thousands of species of moths that occur in Arizona is a lifetime endeavor, so I plan to continue this work at the SWRS for another 50 years. Hopefully you will be seeing Earthwatch volunteers, bags of caterpillars, and my son Camden hanging around the station for many more decades.

HUMMINGBIRD RESEARCH AND EDUCATION BY SUSAN WETHINGTON

For the past two years, the Hummingbird Monitoring Network (HMN) has been collaborating with the SWRS on hummingbird conservation projects. The HMN is a science-based, nonprofit organization dedicated to the conservation of hummingbird diversity and abundance throughout the Americas. It began in 2002 as a grassroots organization but now has the challenge of becoming a sustainable multi-national conservation organization whose work improves hummingbirds' ability to survive, reproduce successfully, and maintain viable populations.

In 2007, 544 birds and 7 species were captured at the SWRS: Black-chinned with 315 captures is the



Blue-throated Hummingbird
Photo by Jay Harm

most common species, followed by Blue-throated with 106 captures, Magnificent with 61, Broad-tailed with 32, Rufous with 22, Anna's and Calliope with 7 captures each. Black-chinned, Blue-throated, and Magnificent breed at SWRS and show high site fidelity there. From April through June, roughly 50% of the birds

captured were already banded. These high recapture rates are critical for estimating survivorship and population trends and suggest that SWRS will be a good long-term monitoring site. Additionally, the SWRS is the only monitoring site in the Network that has strong numbers of Blue-throated Hummingbirds, a relatively rare species in the U.S.

The SWRS' increased focus on long-term studies provides the HMN with an opportunity to establish a matrix interaction site here. At these sites, we are identifying the keystone nectar resources for hummingbirds and will be tracking changes in phenology and abundance of these resources through the years. We also are actively researching factors that improve hummingbird nest success rates.

SWRS SCIENTIFIC ADVISORY COUNCIL

The SWRS hosted the Scientific Advisory Council (SAC) on 18 July. Members present included Jay Cole, Carol Simon, Sara Helms Cahan, Ray

Mendez, Karin Pfennig, and Dawn Wilson. One member, Dave Lyte, was unable to attend. Listed below are major topics of discussion at this meeting.

- ◆ Over the past few years, the SWRS has added some new courses to its education program. Dr. Howard Topoff's Animal Behavior course has been very popular. Dr. Topoff had a great idea that we advertise the course to high school teachers and offer teacher certification credits!
- ◆ The committee recommended that a new position, science coordinator, be added to the SWRS staff. This person would not only coordinate research activities for all interns but would develop additional enrichment activities and research projects to get the interns more involved in research while at the station.
- ◆ Jay Cole sent out a survey last year to all scientists that have worked at the SWRS and 15 responses came back. A few trends were detected and we opened these to discussion.
 1. Scientists suggested more seminars be offered at the station. The only place to host a seminar is the conference room in the Main House. This problem will be solved this year with the addition of the new Education Building. The SWRS will now be able to hold seminars simultaneously with classes and workshops.
 2. We discussed the condition of some of the research facilities like the Animal Behavior Observatory (ABO) and the labs. We are looking for funding to refurbish the ABO. The SWRS received an NSF grant to remodel all labs. This project is in progress and should be completed in March 2008.
 3. Another point that was brought up in the survey pertained to use of the station by daily, walk-in visitors. These include birders, hikers, and other naturalists that come to the area to enjoy the diversity of the area. Many SWRS scientists have ongoing experiments that could be inadvertently damaged by uninformed visitors. We are in the process of building an interpretive kiosk that will illustrate use and non-use areas for visitors.

STATION NEWS/UPDATES

NEW BUTTERFLY COURSE AT THE SWRS!

The SWRS is pleased to announce a new Butterfly Course that will be held 17-23 August 2008. The course hopes to bridge the gap between amateur

observation and scientific inquiry. Daily field trips to several different life zones will be complimented by lectures, slide presentations, and lab/seminar work and discussions. Butterflies are not only beautiful, but have been shown to be good indicators of climate change by using shifts in their emergence periods and latitudinal changes in their home ranges. In addition to observing and identifying various species of butterflies, this course hopes to also explore some of the changes in butterfly populations and their dynamics. There also will be one or two nights of black-lighting to learn more about the nocturnal Lepidoptera. The course is limited to 16 slots, so be sure to register early.

FOR THE NATURALISTS

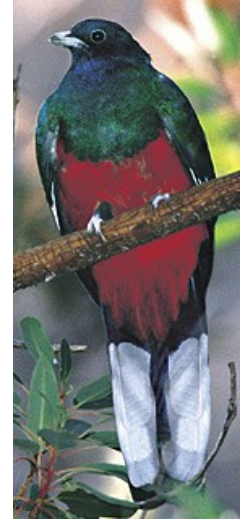
THE CHIRICAHUA NATURALIST BY P.D. HULCE



January and February brought snow, and lots of it, to the Chiricahuas. The research station had over 10 inches by the end of January. A Winter Wren took up residence in the lumber rack in our work shop, and a Hammond's Flycatcher was seen daily by the pool. On 12 January, a Madrean Alligator Lizard was found inside the nature shop. Slightly warmer days in February had Orange Sulphurs and Southern Dogface butterflies flying at the station. The first Turkey Vultures of the season arrived 9 March. Other March sightings included Texan Crescents, Short-tailed Skippers, Sara Orangetips, Lucy's Warblers, Yucca Giant-Skippers, and an early Swainson's Hawk.

After such a wet winter, spring was beautiful with wildflowers, birds, and butterflies. The first week of April brought Olive Hairstreaks, Orange Skipperlings, White-barred Skippers, Mylitta Crescents, Elegant Trogon and Buff-breasted Flycatchers. At least two nestings of Buff-breasted Flycatcher occurred on the station grounds this year. Other interesting sightings at the research station included an out of place Marsh Wren, Great-tailed Grackle, Short-tailed Hawk, and a very cooperative Worm-eating Warbler that stayed for almost two weeks. Lewis' Woodpecker was in residence at the George Walker House in Paradise, a Yellow-throated Warbler was a one-day wonder in Portal, and Long-eared Owls were again nesting near Rodeo, NM. Perhaps the most interesting avian

occurrence of the year began on 4 April, when a single Red Crossbill was seen at the research station. Within a week, up to 15 individuals were seen, and sightings continued throughout the summer and fall. The last sighting at the station for the crossbills occurred on 30 September. Groups of over 30 were seen at Rustler Park on our May birding tours, and this species was recorded on the Portal Christmas Bird Count in December.



Eared Quetzal
photo by Dave Utterback

Late spring through fall produced more sightings of Short-tailed Hawk and Twin-spot Rattlesnakes at Barfoot, Indigo Bunting in Portal, Northern Parula at the station, and an attempted nesting of Berylline Hummingbirds near South Fork. Pine Siskin was a bit unusual at George Walker House in July, and a Cabbage White was unexpected at the station. The station's first Natural History Tour in September recorded 110 species of birds, 16 species of mammals, 16 species of herps, 43 species of butterflies, 30+ species of insects, 80+ species of plants, including such speciality species as Chiricahua White, Red-bordered Satyr, Satyr Comma, Black Checkerspot, Elegant Trogons, Green Rat Snake, and Black Bear.

October brought a single Grasshopper Sparrow to the station, and two Canyon Wrens took up residence in and around our maintenance shop. An Arizona Powdered Skipper was rather late on 26 October. Williamson's Sapsucker, Hammond's Flycatcher, and Cassin's Finches were all seen at the station in November and December. Odonates were well represented by Desert Firetail, Emerald and Great Spreadwing, and Canyon Rubyspot.

To wrap up the year, the Portal Christmas Bird Count recorded 130 species of birds, including an Eared Quetzal in South Fork and a Streaked-backed Oriole at a private residence near Portal.

SWRS BIRD AND NATURE TOURS

The Chiricahua Mountains of S. E. Arizona afford some of the best birding in the United States. Our six-day/5-night Bird and Nature Tours include: Airport pickup in Tucson, double-occupancy cabin housing, three meals/day, hearty and sumptuous sack lunches, and more. Our experienced guide is a local of the area



Baby Great-Horned Owl
Photo by Kevin Frey

and will take you on daily field trips and optional owl walks at night. To give each participant the full birding experience, each tour is limited to 10 persons or five couples. Check out our web site for more information and dates of our 2008 tours

<http://research.amnh.org/swrs/> .

STUDENT INTERN AND VOLUNTEER POSITIONS

Approximately 30 positions are available for the 2008 season. Two types of programs are available at the SWRS:

1. RESEARCH SEASON – Students interested in conducting research:

The student intern program offers students in biological sciences outstanding opportunities to observe and become involved with scientists conducting field research. Food and lodging are provided in exchange for 24 hours per week of routine chores, with the remaining time available for research activities. This program is open from March through October to both undergraduate and graduate students.

2. NATURALIST SEASON -- Individuals interested in birding, hiking, and other nature adventures:

The volunteer program offers individuals the opportunity to enjoy all the wonders of the Chiricahua Mountains. Just a few minutes walk from the station are hiking trails, creeks, and birding areas. Food and lodging are provided in exchange for 24 hours per week of routine chores, with the remaining time available for personal activities. This program is open from September through May each year.

For applications, please visit our web site and click on Volunteers on the left side of the home page or contact: P.D. Hulce, SWRS, P.O. Box 16553, Portal, AZ 85632 USA; 520-558-2396; dhulce@amnh.org

2007 INTERNS AND VOLUNTEERS!

The SWRS would like to thank the following individuals for participating in our intern and volunteer

programs. We miss all of you and wish you well in your future endeavors.

Colombia: Martha Borrás; **Denmark:** Payana Hendriksen, Nynne Nielsen; **Italy:** Novella Garavini; **Korea:** Hong-Sup Shin; **Poland:** Marta Borowiec, Ewa Sergiej; **United Kingdom:** Stephanie Brown; **United States:** Carla Abrams, Barbara Allen, Amy Arends, Arian Avalos, Bonnie Bedillion, Freya Berntson, Karin Burghardt, Liana Burghardt, Alexander Dennis, Sean Fitzgerald, Christine Hamilton, Amanda Henning, Eric Hough, Frank Insana, Kelly Lasater, Erin McCreless, Julie Miller, Galen Priest, Hannah Robbins, Joel Smoot, Ron Thompson, Angela Van Camp, Corey Wilson.

A SINCERE THANKS TO ALL OF OUR FRIENDS OF THE SWRS

Donations to the SWRS help support students in their research and provide funding for special projects. We would like to extend our heartfelt thanks to the following people for their donations: Emily and John Alexander, Andy and Peg Anderson, Wyatt and Margaret Anderson, Robin Andrews, AST Foundation, Marika Austin, Joe and Valer Austin, Mr. and Mrs. Joseph Bagnara, Bat Conservation International, Karen Becker, Rene and Delane Blondeau, Bonnie Bowen, Frank Boyle, Bayard and Martha Brattstrom, Bartley and Charlotte Cardon, Jack and Martha Carter, Gloria and James Childress, Jay Cole, Rock Comstock, Bill Cooper, Michael Cyr, Maryann Danielson, Carolyn and Robert Dearing, Heidi Dobson-Whitman College, Jim and Linda Dodge, Barton Faber, Stuart Fullerton, Fred and Nancy Gelbach, Sheryl Gillespie, Bruce and Vivianne Gold, Randall Gray, Billie and David Hardy, Lynn Havsall, Rudolf Jander, Michael Judd, Schuyler Hilt, Joanna and Don Hollister, Rudolf Jander, Frederic and Galye Jandrey, Patricia Kabitzke, Rolf Koford, Nancy Lauver, John and Nancy LeGates, Kurt Leuschner, Louis Lopilato, Lyn Loveless, Jack and Katherine Marietta, Hal and Pat Michael, Barbara Miller, Guy Miller, Pam Myers, Diane and Bill Obluck, Scott and Adrienne Orcutt, Barbara and Ronald Quinn, Jerome Rozen, Jr., Tom Schneller, Wendy Shadwell, Ruth and Marvin Shilling, Noel and Helen Snyder, Stanley Spector, Suzanne Stalls, Kurt and Carolyn Stenzel, Paul Stone, Carol Townsend, Robbie and Maury Ward, Thomas Wootten Trust, James and Andrea Wygle, Eugene and Ruth Varney.

