

Botany & Conservation

A newsletter for alumni of Botany and Biological Aspects of Conservation • Fall/Winter 2013



102 years of female Botany faculty. Back row: professors past; front row: professors present. See back cover for names and tenures.

Climate and Connections

letter from the Chair

We hear much about climate: hot summers, droughts, floods, melting glaciers, and typhoons. The climate news is mainly bad: clearly humans are wreaking havoc with the earth's carbon cycle with potentially dire consequences for many species, including our own. However, one thing can be said for the climate crisis: it certainly drums home the importance of Botany. As the major living carbon sink, and as the ultimate source of all our food, progress in solving the problems afflicting humanity will surely have a botanical core. I, therefore, am proud to serve as chair of a department that conducts such important research and does such a good job of training students to be better able to develop and participate in effective responses to our climate-induced woes.

On a big, complicated campus like UW, however, the word "climate" has another meaning: how safe, accepted, and appreciated individuals from various backgrounds feel in their workplace. I also feel fortunate to lead a department where the working climate is so positive. As described in the centerfold feature, we should feel very proud about the great strides made by women botanists over the last 100 years. I appreciate my diverse colleagues (students, faculty, and staff) and our culture of mutual support, respect, and friendliness. I see this plainly at our social events and in daily interactions around the department. It was also clear in the spirited defense of the Friday Afternoon Club mounted by the graduate students and faculty earlier this Fall. Our positive climate reflects shared connections within the department, but it is also sustained and enriched by the great

moral and financial support provided our broad network of alumni and friends.

Talking of the botanical offshoots: it is my pleasure in this newsletter to greet a new constituency - all our **Biological Aspects of Conservation** (BAC) alumni. The BAC major has now been resorbed into the Botany department. In addition to administering this still vibrant program, we have happily taken up the challenge of connecting with all BAC alumni and integrating them into the Greater Botany community. Welcome! Send us your news and join our Facebook group. And to old friends and new: stay tuned, stay warm, and stay connected!

Don Waller, Chair

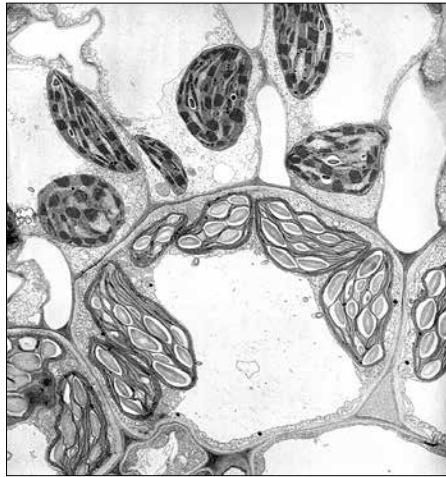


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Microscopy center renamed after Eldon Newcomb

A suite of rooms and microscopy equipment used by faculty and students in Birge Hall to study the inner secrets of living material has been named the Newcomb Imaging Center to honor Dr. Eldon Newcomb, Professor Emeritus of Botany. Eldon pioneered the application of electron microscopy to the study of structures and compartments in plant cells too small to be seen by a conventional light microscope, at a time when nobody knew what they should expect to see or how best to look. His fascination with the invisible workings of life began at the chemical level in a period when the processes of metabolism and respiration were giant topics in biology. As these mysteries received explanations and names such as oxidative phosphorylation, the Krebs Cycle, and the Calvin Cycle, Eldon found his interests shifting to the new frontier of cell structure. All



View of a cross section through a corn leaf showing mesophyll and bundle-sheath cells image: Eldon Newcomb

the chemistry of life, it was becoming known, did not run its course in a single sac of cell juice but within and between numerous and varied intracellular compartments that Eldon and his students were among the first to document and understand. Images collected during the 60s and 70s are, remarkably, still the examples shown in textbooks because their fineness has not been surpassed. Today's students wandering down the B2 corridor of Birge Hall would do well to look up at the 'Newcomb and company' prints: peroxisomes containing the catalase enzyme, chloroplasts loaded with starch, and many more. Research and education in the department not surprisingly still relies on visualizing cellular structures. That is why we strive to maintain state-of-the-art imaging technologies on the B1 floor of Birge Hall in a facility we have proudly named the Newcomb Imaging Center.

SER 25th Anniversary

The Society for Ecological Restoration (SER) was founded in Madison, so it was fitting that its 25th Anniversary and 5th World Conference were in Madison. The October 6-11 conference attracted 1,200 attendees from 53 countries—the biggest meeting ever.

The UW was well represented. Cara Nelson (MS Conservation Biology & Sustainable Development with Don Waller, 1994) was elected Chair of the SER board. Botany alumnus William R. Jordan III (PhD 1971) was honored for creating the first journal in this field in 1981 (now *Ecological Restoration*), the first book on Restoration Ecology, and for helping form SER in 1988. Another Botany alum, Roger Anderson (PhD 1968), chairs SER's Midwest/Great Lakes regional chapter. Botany participants included Joy Zedler, who discussed land ethics; Jim Doherty, who spoke on creating mounds to restore sedge meadows; and Don Waller, who presented on Wisconsin forests focused on drivers of species loss and effects of deer on understory vegetation. Botany alum Debbie Maurer (MS 2001) advised attendees on Oak Woodland restoration and Dr. Dan Larkin (PhD 2006) co-authored papers of phylogenetic diversity in tallgrass prairie restoration. Participation of other Botany alumni and students added to global recognition that our department is a hotspot for restoration ecology.

This newsletter is published by the Department of Botany at the University of Wisconsin-Madison for alumni, colleagues and friends. Editorial team: David Baum, Sarah Friedrich, Andrea Herr-Turoff, Cheryl Rezabeck, Kirsten Walters, Joy Zedler

Submissions are welcome. Please send comments, ideas and photos to:

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Galen Smith honored

Honorary Fellow Galen Smith was awarded the Wisconsin Wetlands Association Lifetime Achievement Award this November. Galen was celebrated for his work as a plant taxonomist with a specialization in wetland species and for his accomplishments as a conservationist who co-founded the Iowa Chapter of The Nature Conservancy; initiated the statewide Iowa natural areas system effort; and helped establish the Beulah Bog, Lulu Lake, and UW-Whitewater nature preserves.



BAC Alumna Interview: Cheryl Rezabek

Cheryl Rezabek returned to UW as our Departmental Administrator in August 2011. In a recent interview, she said her most memorable classes as a BAC undergraduate were field courses in Botany, Wildlife Ecology and Zoology. These helped her develop a critical eye for the natural world and led her to seek work related to natural resources. As an intern with DNR, she helped manage Sheboygan Marsh. Instead of renting an apartment, she camped out all summer at Kettle Moraine State Forest—an experience that sealed her interest in field work. Her first winter job was trapping and re-locating wild turkeys in Western Wisconsin. Some of this species' population expansion likely traces back to her long hours working in freezing conditions.

Cheryl has since played leadership roles linking science and public policy. For example, with a team of DNR researchers, engineers and policy makers she addressed impacts of acid rain, sulfur dioxide and ozone—research that helped the Public Service Commission and utilities craft legislation to limit power-plant emissions. “This was the first time that policy was driven by the science; we had the data. Ten years after implementation, we continued to monitor the environment and were able to demonstrate improvements in rain pH from reductions



Cheryl in the Galapagos

in SO₂ and NO_x. Wisconsin's acid rain law became a model for the federal government and other states.”

At Rush Lake, WI, Cheryl helped DNR adopt the new model of ecosystem management in the late 1990's. As DNR's Land Team Leader for the Upper Fox Basin (5 counties) she was challenged to “make something happen” to restore the largest prairie pothole east of the Mississippi River (33 ac) for waterfowl, endangered species and hard stem bulrushes. Rush Lake had deteriorated and public opinion for a restoration plan was splintered and contentious. “So I took an ‘ecosystem approach’ and expanded the stakeholder group to include those within the entire watershed, not just those direct users of the lake.” While working

for the state, Cheryl continued to take advanced courses at UW, collaborated on projects with various universities, and participated in The Wildlife Society, the Society of American Foresters, and other organizations.

Reflecting on BAC as her major, Cheryl said, “I thought I would have my best shot at getting a job if I had a broad base of experience and education... The BAC degree gave me that option... Our big environmental problems are not going to be solved by a single expertise. They will be solved by groups of experts working together and led by someone who can understand all the pieces, fit them together, and work toward the solution. That someone could have a degree in BAC.

“The University gave me inspiration for my career and now I'm back and it's inspiring me on to new endeavors. I enjoy learning about the research interests of the faculty and students, and appreciate the excellent staff in the department...I have started what I hope to be a long-term phenology project out at Abraham's Woods, a place I first visited in my undergrad field course.” Cheryl is currently enrolled in a botanical watercolor painting class, and she says, “I also like the view from my office.”

Make a Gift

For a full listing of giving opportunities and online donations, please see: <http://www.botany.wisc.edu/giftgiving/>

To mail a donation, please make checks out to the University of Wisconsin Foundation and include the fund number on the check. Please send to:

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Questions? Contact: Ann Dingman
ann.dingman@supportuw.org
608-265-9954

John Curtis remembered on his birthday



At the Arboretum, we have a prairie named for him; in the classroom, we have a vegetation book authored by him; and as part of our department and beyond, we have his legacy of research and conservation. All were solid reasons for the Botany Department and Arboretum to celebrate the 100th anniversary of Curtis's birth this September. The event at the Arboretum was headlined by Don Waller, who presented highlights of Curtis's career. For more information on Curtis see: <http://www.botany.wisc.edu/cmsdocuments/curtis2013.pdf>

The past forty years have seen a sea change in the role of women in science (see graphic lower right). Here we highlight news of our female botanists.

Tryon bequest supports female graduate students

The Botany department's efforts to support young female scientists took a big leap forward thanks to a generous bequest from the estate of Alice Faber Tryon (1920-2009) and Rolla M. Tryon (1916-2001). The Tryons were both UW alumni and eminent fern biologists. By providing a significant injection of funds into the Judith Croxdale fund for Women in Science, we are now able to provide fellowships to greatly help female students as they complete graduate degrees in Botany.

As outlined in the articles on this page, the climate for women in science is one that has improved immeasurably since Alice completed her master's at UW in 1948. And through the Croxdale fund we are able to support inspiring young scientists as they conduct diverse kinds of worthwhile research.



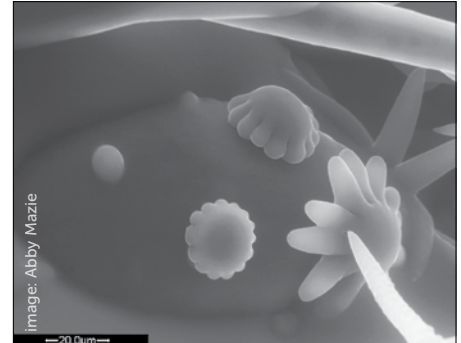
Alice and Rolla Tryon at the Missouri Botanical Gardens (c. 1950s)

Abby Mazie



If you try to give Abigail "Abby" Mazie a compliment, her ever-present smile will broaden as she brushes it off with a modest laugh. But

when you get to know her, it's hard not to applaud her numerous contributions to our department. Abby, a two-time recipient of a Judith Croxdale award, is conducting her Ph.D. research on the evolution of trichome form in Brassicaceae. These trichomes are single cells that may take on remarkable shapes (see photo). Abby is using molecular techniques to move genes among species that differ in trichome shape in the hope of identifying genes that can control evolutionary changes in cell shape. But her contributions to the department go far beyond her research. She is active in educational science outreach. For example, just a few



Brassicaceae trichomes

weeks ago she taught a gaggle of middle school girls about the science behind autumn leaf color. An experienced teacher, Abby stepped up to assume the role of lecturer for Plant Anatomy this semester while professor Marisa Otegui is on sabbatical. When she's not busy transforming plants, teaching a course, or editing writing, Abby can be found reading comics or playing board games with her two kids, baking brownies from scratch, or watching her favorite television show (*Homicide: Life on the Street*.)

Soo Hyun Kim

Soo Hyun Kim wants to reconstruct the history of Asian dust accumulation on Hawaiian montane rainforests over the last million or more years. That's a tall order, even for a student with a B.S. and M.S. in Biology from Sungkyunkwan University in Korea and an M.A. in Museum Studies and Paleontology from the University of Kansas. Currently a third-year PhD student in the Hotchkiss Lab, Soo is interested in the mineral aerosols that have blown from Chinese and Mongolian deserts to Hawaii—in fact, approximately 80% of the total annual aerosols on Hawaii are transported from Asian deserts. Not that Hawaii is covered in dust; on the contrary, it is located in the least dusty area in the Northern Hemisphere. In part for that reason, Hawaiian rainforest soils, especially on the older and more eroded islands, appear to benefit substantially from long-term dusting of phosphorus imported



from Asia. Soo's dissertation work, supported in part by a Judith Croxdale award, aims to reveal just how significant these Asian phosphorous imports are. Soo is also serving the department as an accomplished teaching assistant in General Botany (Botany 130).

Getting to know new faculty: Kate McCulloh article by Tom Ziemer, L&S News

Dry weather isn't ideal growing conditions for most plants, a reality most Wisconsin farmers know all too well after the past two summers. But dryness does provide fertile ground for Kate McCulloh's research.

The newly-hired assistant professor of botany studies how plants deal with drought stress, with a particular focus on "trees and shrubs and the mechanisms they use to resist various degrees of water stress—from the everyday stress of losing water to the atmosphere that all plants experience, to the severe droughts that plants are dealing with more and more."

McCulloh is eager to study species in this part of the country, after working at Oregon State University. We quizzed the native Kansan about herself and her studies.

Q: Do you have a favorite plant?

A: All the plants I've worked with have a special place in my heart, but there are a few that really fascinate me. For example, *Welwitschia mirabilis* is this really weird gymnosperm that grows in the Namib Desert in Africa. It only makes two leaves



that grow from the base and it lives for a really long time, so the leaves get all frayed and destroyed on the edges. They're fascinating for many reasons, and I'd love to get over there and work on those.

Q: What can students expect in the classroom?

A: I try to bring a lot of energy to lectures. People often think that plants are boring, but they're actually amazing! They turn air and sunlight into

sugar—how could that possibly be boring! I also try to get the students involved as much as possible, because engaged students are learning students.

Q: If you weren't in your field or academia, what would you be doing?

A: The first job I ever wanted as a kid was to be a garbage collector, because I thought they only worked one day a week (the day they collected my trash). Obviously, that dream was shattered. In high school, I was a life guard, and I totally loved it. I've always thought that if I grew up somewhere it didn't freeze, I'd probably be doing that full time.

Q: What do you like to do outside of work?

A: I have two little boys, so they consume a huge amount of time. We like to hike, camp and ski, and I also swim and play some soccer.

Q: What's your favorite food?

A: Pretty much anything with cheese is guaranteed to please when I'm around.

Back-to-back awards

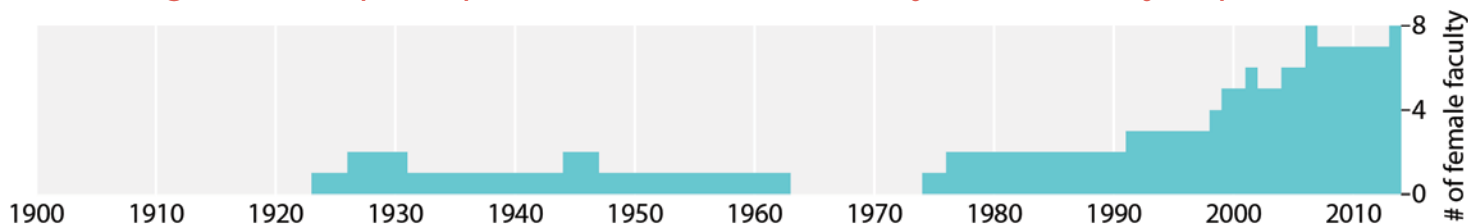
The Society of Wetland Scientists (SWS) elected Joy Zedler to Fellow status following review of her career-long contributions to wetland science, conservation, education, and the SWS journal, *Wetlands*. As a special treat, Zedler was presented with the award and a sculpture by her former student, Dr. Greg Noe, Research Ecologist at USGS headquarters.

Then the Ecological Society of America (ESA—"the world's largest community of professional ecologists") honored Joy as a Fellow at their annual conference, recognizing her contributions to advancing and applying ecology in academia, government, conservation organizations and the public. She joined 16 other Elected Fellows at the August 2013 Awards Reception in this first

year of nominations from ESA's 10,000 members.

Said Joy: "It's wonderful to have one's work recognized by professional peers and rewarding to help societies bring science to bear on national decision-making."

The long road to equal representation: female faculty in the Botany Department



ALUMNI NEWS

Thank you to all the alumni who took the time to send us their updates. Please keep the news coming! Expanded information can be found on the Botany website

George Kuhlman (BS 1956) retired 20 years ago from the research branch of the US Forest Service. He currently volunteers with Learning Ally, AARP Tax Aide, and his church in Georgia when he's not tending to his garden.

Ralph Gumpf (MS 1962) *"You cannot imagine my surprise and delight when turning to p. 6 of the Summer 2013 Botany Alumni Newsletter, and seeing the picture of Elsa Stiles' lithograph! I was a member of that class. We were doing quadrat work in the forest--April 1960. Ms. Stiles did her pencil sketch that day, and at the end of the semester, gave a print to each member of the*

class as a gift. I have matted and framed my print, as it was very memorable for me!

In the print, the leftmost person in the foreground (with pipe in mouth) is me. To the left of me, with hat on and back turned, is Dr. Grant Cottam, who was the instructor.



What a special treat to see this in the newsletter! Thanks!"

Jonathan Gressel (PhD 1963) co-founded an Israeli biotech start-up (TransAlgae Ltd.) dedicated to domesticating algae using genetic engineering and served as CSO for the first three years. Due to his efforts, he was awarded Israel's highest civilian award, the Israel Prize. Jonathan still lectures in addition to working as a review editor for several different journals and consulting in biotech – and brewing beer for weekly departmental meetings.

Bob Ream (PhD 1963) In 1997 Bob retired as Professor Emeritus of Wildlife

Biology from the University of Montana (28 years) and from the Montana House of Representatives (15 years). He was chair of Montana Democratic Party for the next 8 years. From 2009 through April 2013 Bob was appointed chair of Montana Fish, Wildlife and Parks Commission. In October 2013 he presented a paper and organized a panel on state wolf management at the International Wolf Symposium in Duluth. In his free time Bob keeps busy hiking (including the Peruvian Andes, summer 2012), skiing, hunting, and sailing.

Mary Beth Kirkham (MS 1969), Professor in the Department of Agronomy at Kansas State University, was presented with the Irvin Youngberg Award in Applied Sciences for her research achievement (Mary Beth at right in photo below).



Beth Middleton (BS 1978) is a research ecologist at the National Wetlands Research Center in Lafayette, Louisiana. She works on geographic gradients in function in cypress swamps and peatlands.

Robert Price (MS 1979) is a senior seed botanist, analyst, and taxonomist at the California Department of Food and Agriculture in Sacramento. He also serves as the scientific editor for the Conifers Around the World project, which won a book of the year award from the Council on Botanical and Horticultural Libraries (2013).

Bruce McCune (PhD 1982) A professor in the Department of Botany and Plant Biology at Oregon State University, Bruce received the OSU Alumni

Association Distinguished Professor Award for outstanding professional achievement through teaching, scholarship and service.

Robert Morrow (PhD 1987) works at Orbital Technologies Corporation (ORBITEC) on the west side of Madison as Bioproducts and Bioproduction Systems Lead. They are currently developing LED lighting systems for horticultural applications and working on plant growth systems to be used for research on the International Space Station.

David Foster (PhD 1998) is a professor of Biology and Environmental Sciences at Messiah College, where he opened and directed the Oakes Museum of Natural History, chairs the Sustainability Studies Major Committee, and serves on various local and regional boards related to sustainability and land use. He also serves as Vice-Chair of the Executive Board for AuSable Institute of Environmental Studies.

Jeffery Morawetz (BS 2000) studies systemics and anatomy of the parasitic plant family Orobanchaceae at the Rancho Santa Ana Botanic Garden. A brief interview on his travels in the Democratic Republic of the Congo aired on *National Geographic Weekend Radio* in November.

Gregory Bean (MS 2002) works with Monsanto in Chesterfield, Missouri, as a protein purification research scientist. He and fellow alum **Huyen Nguyen (BS 2001)** currently live in St. Louis, where they love to visit the Missouri Botanical Garden.

Stacey Smith (PhD 2006) is currently an assistant professor in the department of ecology and evolutionary biology at the University of Colorado-Boulder. Her lab group studies the evolutionary history of the tomato family and is enjoying working with their plants in the department's rooftop greenhouses.

Nathan Schaefer (BS 2009) is currently a PhD candidate in the computational

biology program at the University of California-Santa Cruz.

Brianna Laube Duran (BS 2010) just completed her master's degree in Environment and Resources with the Nelson Institute for Environmental Studies. She is now the Conservation Education Coordinator for the Madison Audubon Society, where she develops environmental education curricula and works with area schools to connect children with nature and instill an appreciation for bird habitat conservation.

Rollin Reinart (BS 2010) spent some time in food manufacturing before moving to the University of California-Davis where he is currently working on his master's in International Agricultural Development, focusing on interactions between climate change and agricultural systems, in preparation for Peace Corps work in 2014.

Josh Sulman (MS 2010) started working this year as an environmental scientist with Stantec in Cottage Grove, Wisconsin. He recently co-authored a paper on *Sparganium* phylogenetics with the botany department's own **Bryan Drew (PhD 2011)**, Chloe Drummond, and Professor Ken Sytsma.

Sarah Johnson (PhD 2011) is an assistant professor of natural resources and biology at Northland College in Ashland, Wisconsin. Her lab focuses on long-term dynamics and patterns of diversity and composition in plant communities.

Beth Lawrence (PhD 2011) is a tenure-track professor in DePaul University's department of environmental science. She enjoys teaching conservation biology and environmental data analysis as well as conducting community and ecosystem-level wetland ecology research with undergraduates.

Sam Albiero (BS 2012) is the only botany major studying at the Marquette University School of Dentistry. Upon graduating in 2016, he'll be serving as a dental officer in the US Armed Forces.

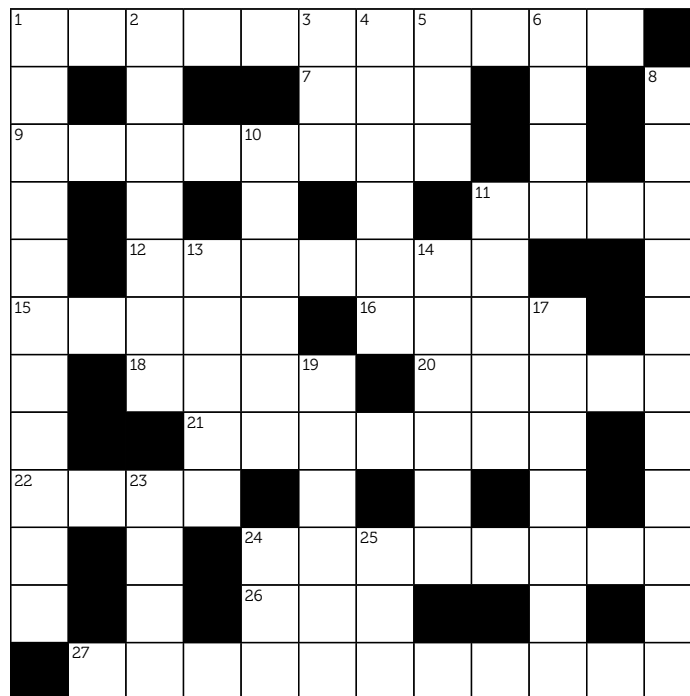
Deidre Conocchioli (BS 2012) is currently working at the Rancho Santa Ana Botanic Garden in Claremont, California, and also serves as a conservation botanist working on the national "Seeds of Success" program with the Bureau of Land Management.

Emily Sessa (PhD 2012) recently accepted a tenure-track assistant professor position at the University of Florida teaching plant systematics with the

biology department after working as a post-doc at the University of Arizona.

Jackson Hetue (BS 2013) is working with Wisconsin Fast Plants, the education and outreach program for UW's Plant Pathology department. He also serves as the curator for the Rapid-Cycling Brassica Collection. He loves his job, and is happy to be staying in Madison and connected with the UW campus.

BOTANY CROSSWORD contributed by David Baum (answers on back cover)



Across

1. Fleshy enlargement of the stem in many orchids
7. Family of *Agrobacterium* oncogenes noted for their ability to induce the hairy root syndrome
9. A stalklike outgrowth of a lichen thallus bearing an apothecium
11. *Humulus* kiln
12. Percussion

- instruments, often made from *Lagenaria* fruit
15. What an Italian Botanist might say on departing
16. Slippery trees?
18. Meadow ____; Less common common name for *Dionaea*.
20. Spruce
21. Vertebrate analog of a pitcherplant's pitcher
22. Last words

- on a famous Botanist?
 24. *Telopea* plants
 26. ____ Lynn Ashman, Pitt Botanist
 27. Process used for recycling cell membranes
- ### Down
1. Papery
 2. Native
 3. Site of the initiation of DNA replication (abbr.)

4. Based on a common name, what soapwort is supposed to give Bet
5. Prefix for 16
6. The part of a tree that lies immediately under the bark
8. Field botanists, for example
10. The opening of a tubular corolla or calyx where the tube joins the limb
11. Osmic
13. Birthplace of Belgian bryologist Theo Arts
14. Muncher of Andean plants
17. Liquor often flavored with one of several Rosaceous fruit (alt. spelling)
19. Tobacco ____ Virus
23. Essential nutrient for plant growth
24. Body resolving international agricultural disputes (abbr.)
25. Floret type



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Key to cover image:

1. Emma Louella Fisk 1923 - 1963
2. Ruth Irene Walker 1926 - 1931
3. Lillian S. Cooper 1944 - 1947
4. Merry Lepper 1974 - 1978
5. Linda Graham 1976 - present
6. Judith Croxdale 1979 - 2002
7. Donna Fernandez 1991 - present
8. Joy Zedler 1998 - present
9. Andrea Gargas 1999 - 2007
10. Sara Hotchkiss 2001 - present
11. Marisa Otegui 2004 - present
12. Eve Emshwiller 2006 - present
13. Cécile Ané 2006 - present
14. Kate McCulloh 2013 - present



The Graham Lab studies the microbiomes of algae in order to better understand how plants were able to colonize land in the Ordovician. This image shows the algae *Cladophora glomerata* with a commonly associated diatom, *Cocconeis* (in orange).
Image: Michael Piotrowski.