Department of Horticultural Science
Spring/Summer 2018

Horticulture

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In this Issue

New Horizons

Students and faculty go above and beyond to further their research and professional aspirations

UNIVERSITY OF MINNESOTA
Driven to Discover℠

Pursuing their passion: CFANS alumni start probiotics company

By Rachel Parks

When CFANS alumnus Garrett McCormick (B.S. Food Systems, 2015) was just fourteen, he began taking probiotics and noticed a big change in how he felt: he had more energy and he was ill less frequently. Years later, after meeting Amanda Pederson (B.S. Nutrition, 2016) in a cooking class at the University of Minnesota, they turned this insight into their careers.

McCormick and Pederson started a probiotic company called thirty-two degrees, where they sell coconut water kefir. Kefir is a fermented beverage that typically contains milk products. Coconut water kefir, on the other hand, is "vegan, soy and gluten-free, and contains more probiotics in a few drops than can be counted on one-hundred million hands," according to the thirty-two degrees website.

The idea was sparked when the pair was making coconut water kefir in their home kitchen and realized there wasn't a readily available organic option. So, they developed their own coconut water kefir that uses organic coconuts, contains no added sugars, and is jam-packed with probiotics.

Pederson majored in nutrition at the U, while McCormick majored in food systems. Since probiotics is a newer field, neither of them received much exposure to the topic in their curriculum. However, their college experiences exposed them to a variety of interesting courses, helped them refine their interests, and get jobs after graduating. According to McCormick, the food systems major helped him realize his affinity for natural foods, a subject full of potential not only for personal health, but for business as well.

McCormick notes that during college, he noticed a common, negative worldview. "The overall narrative I experienced [was]... You go from high school, to college, to career, and then you spend the rest of your life miserable in your office chair."

Pederson also experienced this confining view during college. "I picked nutrition, and then [people were] like, well, what are you going to do with that? You can either be a dietician, or you can work in a hospital. Then I started realizing that there are other things you can do, too."

Before she realized this, Pederson was working in what she referred to as an unfulfilling corporate job after college, as was McCormick. As Pederson puts it, she had to find another way to be happy.

Launching the company was not without its difficulties. Some challenges the pair faced included time management while they both had other jobs, as well as learning the etiquette of professional communication with different groups of people.

"There has to be some means to get to where you want to be; [you can't] snap your fingers and have everything be perfect," McCormick says. "[But] I think if you put your head down and work, you will end up where you're supposed to be."

For more information about McCormick and Pederson's story and their company, thirty-two degrees, visit: www.thirtytwoprobiotics.com ♦

Call for nominations:

Distinguished Alumnus Award

The Distinguished Alumnus Award honors an alumnus/alumna who has attained professional distinction in horticultural science as evidenced by outstanding professional achievement on a state, national or international level. Nominees are chosen based on their demonstrated distinction in their professional lives, recognition as an authority within the field of horticultural science, and exceptional service to or volunteer activities in her/his field. The Distinguished Alumnus Award is presented to the winner in person at the Kermit Olson Lecture, part of our annual HortSci Grows event each spring.

To be eligible, candidates must have received at least one of the following degrees from the Department of Horticultural Science:

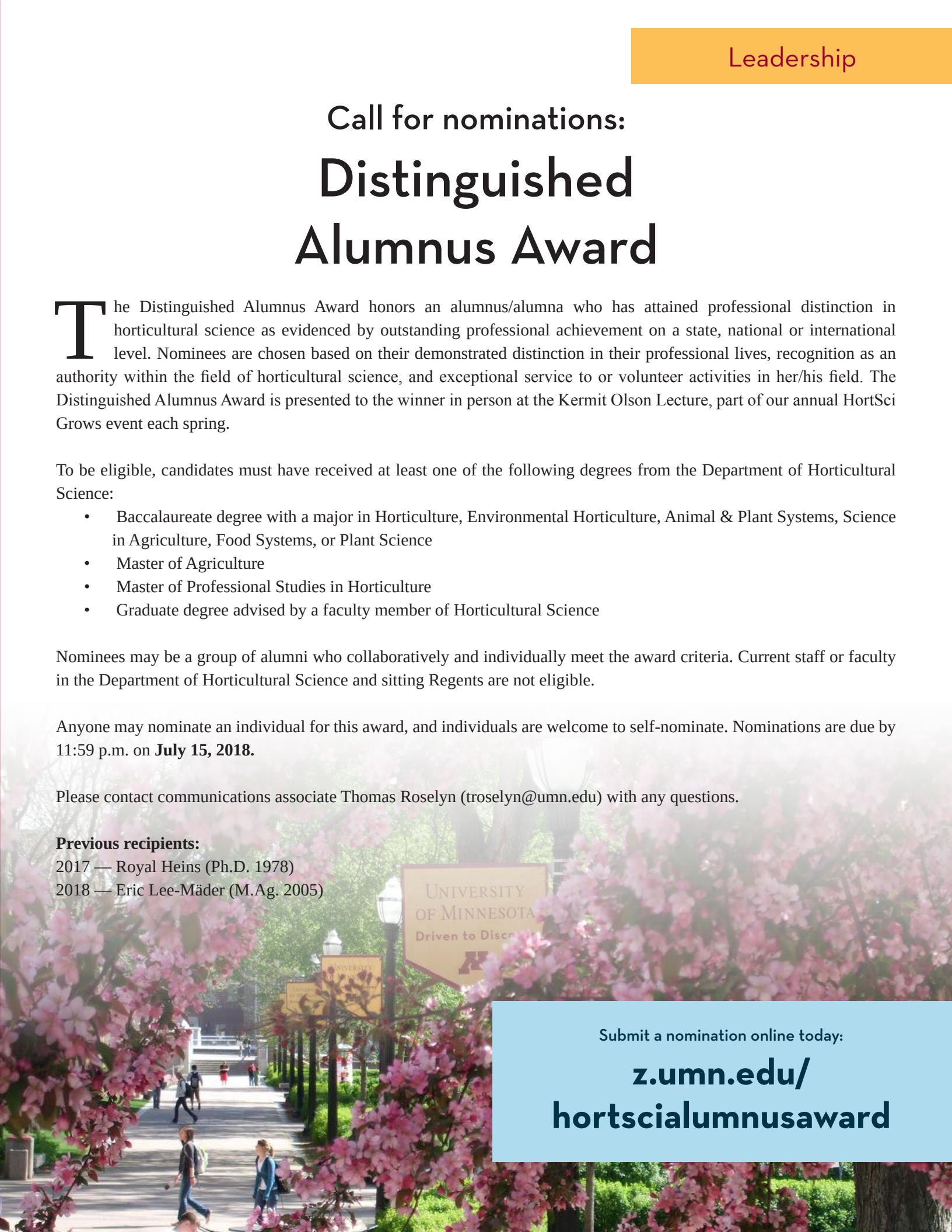
- Baccalaureate degree with a major in Horticulture, Environmental Horticulture, Animal & Plant Systems, Science in Agriculture, Food Systems, or Plant Science
- Master of Agriculture
- Master of Professional Studies in Horticulture
- Graduate degree advised by a faculty member of Horticultural Science

Nominees may be a group of alumni who collaboratively and individually meet the award criteria. Current staff or faculty in the Department of Horticultural Science and sitting Regents are not eligible.

Anyone may nominate an individual for this award, and individuals are welcome to self-nominate. Nominations are due by 11:59 p.m. on **July 15, 2018.**

Please contact communications associate Thomas Roselyn (troselyn@umn.edu) with any questions.

Previous recipients:
2017 — Royal Heins (Ph.D. 1978)
2018 — Eric Lee-Mäder (M.Ag. 2005)



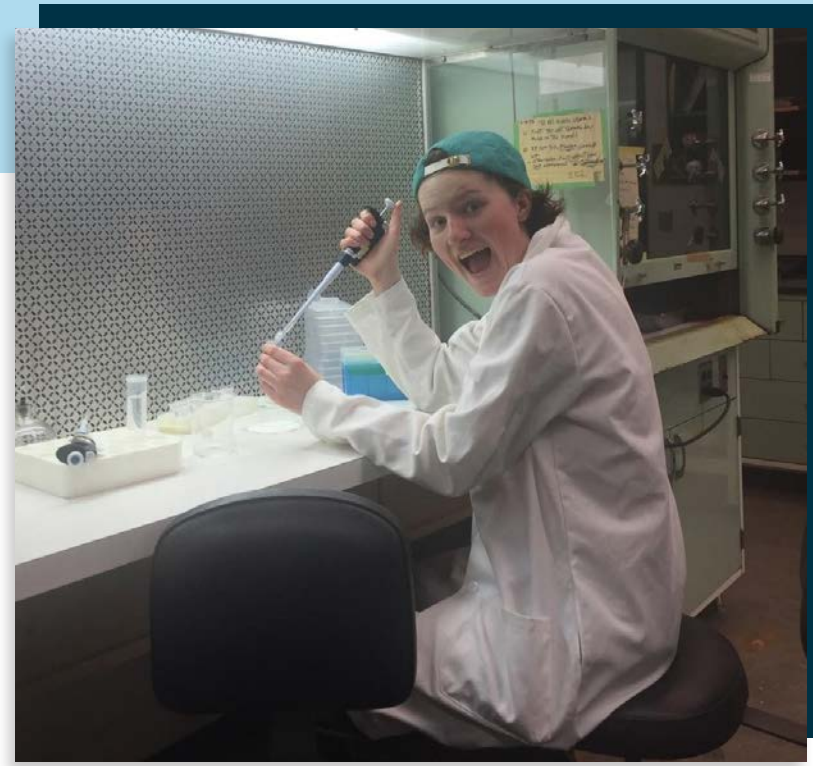
Submit a nomination online today:

z.umn.edu/hortscialumnusaward

Student Spotlight

Abigail Diering's journey from cooking veggies to mapping grape genes

By Janelle Hueners



"In other labs you stay inside all day, but in my lab we go to the greenhouse and look at things that are alive."

Abigail Diering, a Plant Science and Chemistry major from Denver, Colorado, speaks enthusiastically about her experience working in two Horticultural Science research laboratories. Her interest in plant research can be traced back to one of her first classes at the University of Minnesota: Plant Propagation, Horticultural Science's introductory course covering the fundamentals of plant biology and a wide variety of growing techniques. This class sparked her interest in the biochemistry of plants and led her to apply for a job in Professor Adrian Hegeman's laboratory.

Up until that point, Diering's primary interaction with plants was as a food source. She was in culinary school and decided she needed a change. "I wanted to see what was happening with the plants I was putting in my food."

With that in mind, Diering began her journey into the world of horticultural science. The chemistry she learned in her first plant propagation class spawned a particular fascination for viticulture, the study of grapes. Working with Assistant Professor Matthew Clark, Horticultural Science's resident grape expert, was a natural next step. Diering's role: to further develop research on a grape population that has been specifically bred to map a number of important genetic traits, ranging from disease resistance to color variation. Clark and Diering are hopeful that research on this population may lead to a new variety of wine grape that combines the beloved flavor of a European variety and the hardiness of a North American grape.

"Keep your eyes peeled. One of these grapes is going to be famous someday" she added.

Diering looks forward to furthering her research on the genetic traits of grapes this summer. She will also be working with Professor Jim Luby on the development and breeding of kiwi berries, which taste like kiwis but are roughly the size of table grapes and can easily be eaten whole.

Her advice to other students? Be bold. "Just do it. Go ask questions. Apply for UROP [Undergraduate Research Opportunities Program], and talk to graduate students. Everybody's a person. They're not as scary as they seem. Also, try the Honeycrisp apple."

Diering has found a home in the Department of Horticultural Science at the University of Minnesota. She has identified a passionate group of people, all willing to help and support one another. And, she has put herself at the forefront of some groundbreaking research in a field that is ripe for new discoveries.

"There's no saying you can't do something here," she adds.

Find out about the amazing research and career opportunities for Horticultural Science students by visiting our website: horticulture.umn.edu ♦

Bees, berries, and borrage: Recruiting wild pollinators in a strawberry agroecosystem

By Nathan Hecht

Bees need flowers and flowers need bees. This is one of the simplest lessons of the natural world, but as a graduate student in the Department of Horticultural Science, Nathan Hecht wants to know more about what this means specifically for Minnesota food production. How can our understanding of ecology inform the way we design our agricultural systems? That is, how can we create agricultural landscapes that are both more productive and sustainable?

Hecht's research examines the question of whether wild pollinators can be recruited to pollinate a strawberry crop by planting insect-attractive flowers nearby. This is an "if you plant it, they will come," sort of strategy. While providing resources and habitat for wild pollinating insects isn't a new strategy, the practice has been gaining popularity as evidence of its benefits for food crops has risen in the scientific community. Given the decline in observed honey bee colonies, "pollinator farmscaping" has received increased consideration as a way to ensure the continued presence of pollinators for pollination-dependent crops.

Hecht's field research takes place at the West Central Research and Outreach Center (WCROC) in Morris, Minnesota, where he works with lead horticultural scientist Steve Poppe to manage a two-year pollinator farmscaping experiment.

In the 2017 growing season, the team planted a patch of borage (borago officinalis), a blue, star-shaped, edible herb on one end of three plots of day-neutral strawberries, a variety of annual strawberry plants that can be grown from June to October. One of Hecht's roles is to collect data on strawberry fruit production and insect presence and examine how these variables change with distance from the flower patch. The hypothesis? Strawberry flowers closer to the borage flower patch will receive more insect visits, be more fully pollinated, and produce bigger, higher quality strawberries.

Each borage patch hosts a wide variety of insects, including bumble bees, honey bees, native bees, flies, and other nectar-loving insects. Most of the insects found on strawberry flowers in Hecht's experiment are either small native sweat bees or hover flies, a family of flies that often mimic bee behavior.

While the team only has data from the first year of the experiment, the results are promising and may lead to more wide-scale economic and ecological benefits to pollinator farmscaping. When planted within 50 feet of a borage flower patch, individual berry weights tended to be higher than berries harvested at the far end of the row, and heavier berries may mean heavier profits for growers.

Time will tell if the pattern continues, but providing a nearby habitat for bees and other pollinators could help strawberry growers increase their bottom line and, at the same time, help support and conserve wild pollinator populations.

There are many ways to incorporate pollinator farmscaping practices into your own home garden or a large-scale farm. This can begin with simply mowing less often, to allow early season flowers like clover and dandelions to thrive when other floral resources are low. Planting annual flowering species can be one way to experiment with flower plantings at low cost and with little risk. Some flower strips could even serve as secondary crops, as many species are edible, have medicinal properties, or can be sold as cut-flowers. More long-term efforts could include perennial flower plantings or even restored prairie landscapes. The Xerces Society (xerces.org) has many resources available to help design and integrate these sorts of practices on farms. ♦

Nathan Hecht is a Master's student in the Rogers & Hoover Organic and Sustainable Horticulture Lab at the University of Minnesota. He was the first-place winner of the Organic Research Forum Poster Competition during the MOSES 2018 Conference and the first-place winner of the HortSci Grows 2018 Poster Competition.

Flowers from the last frontier:

Professor Neil Anderson's quest for the arctic daisy

Alaska: A home not only to enormous glaciers and wild salmon, but to a wide and unique variety of plant life. This was the destination for Horticultural Science professor Neil O. Anderson in fall of 2017 and again this spring, with the goal of expanding the germplasm collection for his chrysanthemum breeding program. Anderson's focus species was Chrysanthemum arcticum and its two subspecies, commonly known as the arctic daisy, all of which grow primarily in coastal areas within the "last frontier" of the United States.

Above: *Dr. Neil Anderson and Stacy Studebaker plant collecting in the alpine region of Kodiak Island, Kodiak, AK. Stacy is the expert on flora growing in the Kodiak Archipelago.* ***Right:*** *An example herbarium specimen from the University of Minnesota Bell Museum Herbarium showing a plant sample collected in 1955 along the Sterling Highway of the Kenai Peninsula in Alaska.*

The arctic daisy is the only chrysanthemum species native to North America, with Alaska as its center of origin and diversity, according to Anderson. However, it has never been thoroughly researched or used in genetic studies—one of many reasons Anderson is interested in it. From both an evolutionary and genetic perspective, the arctic daisy appears to be an exceptional species that could be useful for new cultivar development. Its more unusual traits, like high tolerance for salty soils, could be combined with desirable traits from other species through selective breeding.

The trip to Alaska required months of careful planning. Anderson contacted local plant experts, botanists, and taxonomists for more information about where he might find the species, as well as where it no longer grows. He also had to obtain permission to collect on federal, state, and tribal lands before travel plans could be finalized.

It wasn't long after Anderson and his team arrived and set their sights on collecting live specimens that they encountered a series of challenges. A trip to the Aleutian Islands had to be cancelled because of dangerous sea conditions. The team also had to wear special protection gear when working in the Kodiak Archipelago to protect themselves against the Kodiak brown bear. And, while Anderson spent two months searching for plant populations in areas where the arctic daisy was historically

By Rachel Parks

Left: *Arctic daisy population found growing high up in the sphagnum-moss mountainsides. Their small shoots and leaves were visible thanks to the timing of Anderson's second trip.*

Below: *Anderson celebrating after successfully collecting extant specimens of Chrysanthemum arcticum, commonly known as the arctic daisy.*

documented, he came back empty handed. Not to be discouraged by a lack of live plants, Anderson collected dried samples of leaves from hundreds specimens held in research facilities throughout the United States to extract DNA for genetic analysis.

With a renewed focus, Anderson returned to Alaska in late spring of 2018 to explore sites he couldn't visit the first time, including Attu Island—the westernmost of the Aleutian Islands. Attu is an uninhabited World War II battle site that Anderson was able to reach thanks to the only charter boat (the Pŭk-ŭk) to take birding and research groups the 800 miles round trip from Adak Island across the formidable Bering Sea each year.

Visiting earlier in the year, when the arctic daisy was more likely to be growing and setting flower buds, promised Anderson a chance to spot the plants more easily, albeit at the cost of missing the seed collection season.

To his delight, Anderson was successful in locating 21 populations of the arctic daisy growing along the coastline. The plants were found growing on steep rocky cliffs overlooking the ocean and high up in sphagnum moss covered mountainsides. Their small shoots and leaves were just barely visible, peeking out from thick, normally underground stems (called rhizomes). Over the course of the 17 day trip, Anderson collected more than 300 plant samples, which are now either growing in the University's greenhouses or frozen for DNA extraction in future genetic studies.

"It was a remarkably successful trip," noted Anderson. "Fun and sometimes dangerous, but a worthwhile adventure that will yield benefits for a long time to come." ♦

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Cover Photo
Dave Hansen. “Summertime” ™ amur maackia, introduced by former faculty member Harold M. Pellett and the University of Minnesota Agricultural Experiment Station in 2001.

Questions? Comments?
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