BMAP
BLUE HOUSES AREA PROJECT

February 2021: Blue Mounds Area Project eBulletin
Conservation and Community, Together

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Outreach Ecologist's Updates

Brian Anderson

Hello BMAP,

Though our February has been particularly warm, I hope you've been able to take advantage of the warmth to get out and enjoy the winter. Not only that to the bare ones, flowing early in the dormant season can be a great way to minimize your ecological setting back the native species that are beginning to grow back because of the early warmth. Thank you Friends of Cherry Grove Prairie for your and Southern Driftless Conservation and Community Together for your interaction this in the landscape!

Rare Blowout Groundcedar (Diphasiastrum tetrastichum) - Credit: BMAP member Brenda Lewis

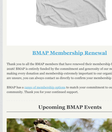
Rare Ground Juniper - Credit: BMAP member Brenda Lewis

As BMAP's Outreach Ecologist, my job is to support you all as we plan and implement land management on our area properties. Throughout the last year, I have been so impressed by communities like mine and over the phone if you want to discuss winter land management, please feel free to contact me. I'm glad to be a resource. I'm also interested in hearing about what's going on with your property. Fill out Brian's Help Visit Questionnaire for a crash site visit!

Stay indoors!
Outreach Ecologist
contact@bmaonline.org

BMAP Merchandise now available!

A portion of every purchase goes directly to supporting BMAP and our mission.



BMAP Membership Renewal

Thank you to all BMAP members that have renewed their membership for 2021! Your support is critical to our success. Your membership dollars are used to fund our land management, outreach, and education and membership extends beyond the year of your organization. If you are unsure, you can always contact us directly to confirm your membership status.

BMAP has a new membership option to match your commitment to our mission and community. Thank you for your continued support.

Upcoming BMAP Events

Common Milkweed (Asclepias syriaca) - Credit: BMAP member Brenda Lewis

BMAP Winter Conversations

BMAP's Winter Conversations series is under way!

45 minute longs at 7 on you, and are held at the Mt. Horeb Community Center, 107 N. Grove Street.

Wood's Prairie of Southern Wisconsin
Thursday, March 4
Tony Kuchnel

Hands-on prairie habitat, floral resources, biotic and exotic, and many other ecosystem services in Wisconsin. Hear about the diversity of woody shrubs in Wisconsin that you can readily incorporate into your gardens or acreage.

The Driftless Trail
Thursday, March 11
Kevin Lunde, Southern Driftless Conservancy
Red Cedar - Sumac Glade Restoration, Sand Sandstone, Sand Sandstone

Driftless Area Land Conservancy is making great progress on developing the one-mile Driftless Trail in Iowa County, creating a conservation corridor and exceptional hiking trail for small private lands. Hear about exciting project developments and upcoming trail openings, and get a timeline of a two-mile stretch of existing enhanced trail.

BMAP Summer Events

Take a look forward to the summer events we have planned for Summer 2021!

Walk With a Geologist - Pleasant Valley Conservancy
Saturday May 29
Tony Kuchnel
4915 Pleasant Valley Rd, Black Earth, WI 53515, USA
Lunden Area Hydro

Join BMAP member and local naturalist Ken Walz as he leads us through the geological and physical features of Lunden Area Pleasant Valley Conservancy, one of the most treasured and awesome in Dane County.

BMAP Property Tour - Ken Walz & Pat Trumbell
Saturday June 20
Tony Kuchnel
10747 Water Rd, Blue Mounds, WI 53517, USA

Join us in viewing the lands stewarded by Ken Walz and Pat Trumbell. Ongoing collaborations with the Prairie Enthusiasts, Dane County, and other local organizations are centered on restoring and protecting this diverse range of southern WI plant communities (not north of Blue Mounds State Park).

BMAP Property Tour - Kurt Dutsch & Elizabeth Hoyer-Peters
Saturday July 17
Tony Kuchnel
10000 Mill Rd
Murphy Desoto Park, Madison, WI 53704, USA

Join us for a tour of a spectacularly diverse Prairie and Dolomite Hoyer-Peters. Their restored prairie occupies a rarely forested pasture, while remnant oak savanna supported by USDA and local restoration contractors has focused on restoring old woodland and oak savanna.

BMAP Property Tour - Stephen & Peter Shanks
Saturday August 21
Tony Kuchnel
34386 Pine Rd, Black Earth, WI 53515, USA

Jackson and Peter Shanks balance their time restoring their remnant and woodland, promoting their restored tallgrass prairie, and nurturing young oaks within an old pine plantation. Join us for a tour of this beautiful property and hear about their experiences.

Other SW Wisconsin Events & Resources

Know of a local resource/event worth/not worth/worth but needs a little tweaking? Let us know at contact@bmaonline.org

UW Arboretum - Restoration Crew Leader Training

Are you interested in growing your ecological expertise and contributing to local conservation efforts? Become an Arboretum restoration team leader! Team leaders have trained volunteers who direct drop-in volunteers at Arboretum restoration work parties, and help lead volunteers in the Arboretum's native habitat restoration crew.

Activity: **Wednesday, March 24, 2021 (Opt-Out)**
Contact: Hannah Wiegand-Krez, wiegandkrez@wisc.edu, (608) 262-0347

Ice Age Trail Alliance Events & Workdays

If you are interested in helping with trail maintenance and/or hiking, and/or trying to hold skills in land management, the IATA has a variety skills and activities on the Blue Mounds area throughout April and May.

Dane County Parks Events

Dane county parks have a whole host of educational events and outreaches workdays for kids interested in enjoying and restoring grasslands and woodlands.

The Prairie Enthusiast Workdays

TPE regularly hosts work days throughout Southern, but the Sauk Dejaire chapter meets regularly in our local area. Join the group in maintaining this resilient rotational flora support TPE properties.

Naturalist's Notebook
The Physiology and Ecology of C3 and C4 Grasses

C4 grass Bluejoint (Verna (Bamboo) nutriplanda) Photo Credit: BMAP member Brenda Lewis

When talking about prairies, meadows, and savannas, grass inevitably becomes part of the conversation. Grasses are important components of all three of these ecosystems (and beyond) and facilitate numerous key functions. Grasses can also be non-native or invasive in grasslands, becoming a major impediment to restoration and management.

In these conversations, you'll often have people talking about C3 and C4 grasses and C3 invasive/aggressive grasses. The distinction between these two groups is important, but the differences between these groups are not necessarily what people think, and understanding the differences can direct grassland restoration and land management.

As a disclaimer, there are both native and non-native C3 and C4 grasses (Nassuna). This isn't splitting one grass into "non-native" and "native" categories. Grasses, like any non-native grasses found in prairie restorations, are C3, and many of the common native grasses that people think of as "prairie" are C4. Grasses are a diverse group of plants and have evolved to occupy a variety of niches and have adapted to a variety of climatic grasses. These categories are also not exclusive. Some plants can have intermediate physiology, capable of both C3 and C4 photosynthesis.

Read Brenda's complete draft of the Grasses Notebook Presentation Handouts

Figure: Left: Native C3 grass Sporobolus heterolepis (photo credit: Wisconsin Prairie Herbarium, photographer Paul Dorfman). Right: Native C4 grass Elymus hystrix (photo credit: Wisconsin State Herbarium, photographer Aaron Carlson)

C3 Grasses

C3 photosynthesis is the dominant form of photosynthesis throughout the world, and by most measures, it is the "standard" form of photosynthesis. The name comes from the fact that the first photosynthetic enzyme to manifest in the leaf tissue called the mesophyll. In the mesophyll, this enzyme primarily responsible for photosynthesis (RuBisCO) that really seems to fix and water, as long as the ambient temperature allows for the cell to open stomata (Figure 1, left).

Figure 1: A diagram of how C3 and C4 potentially carry in leaf anatomy. C3 plants (right) have the RuBisCO located in bundle sheath cells, whereas C4 plants (left) contain photosynthesis in the mesophyll. Image from Wikimedia Commons (https://commons.wikimedia.org/wiki/File:C3-vs-C4.svg).

Examples of C3 grasses in Wisconsin:
Bluebeard Grass (Elymus hystrix) - native
Bottlebrush Grass (Hystrix patula) - native
Pennsylvania Sedge (carex pensylvanica) - native
Porcelain Grass (Phalaroides arundinacea) - native
Reed Canary Grass (Phalaroides arundinacea) - native
Sweetgrass (Hierochloe odorata) - native
Orchard Grass (Dactylis glomerata) - non-native
Tall Fescue (Lolium arundinaceum) - non-native
Red Fescue (Festuca) - numerous species
Sedge (Alvinkaia (subgenus) - crop
Oat (Avena sativa) - crop
Wheat (Triticum aestivum) - crop

C4 Grasses

C4 grasses also photosynthesize using the enzyme RuBisCO, but there are a few extra steps involved in the process. In C4 plants, the first enzyme to fix carbon is a different enzyme called CPEn through this enzyme, but this is quickly converted to a carbon molecule with a carbon chain of four. This is a molecule it does take to a specialized structure in the leaf called the Bundle Sheath Cells (Figure 1, right). Inside these cells, the RuBisCO enzyme is in charge and carbon.

Figure 2: A global map from Lin et al. (2015) showing the global distribution of C4 dominated grasslands, primarily in hot, dry areas.

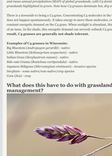


Figure 3: A plot of MAP vs. MAT showing the mean annual temperature (MAT) and mean annual precipitation (MAP) of global grasslands, with C4-dominated grasslands highlighted in green. Data from C4 grasses dominate hot, dry environments.

There is a downside to being a C4 grass. Concentrating CO_2 molecules in the bundle sheath cells requires energy, and C4 plants need to be in a hot, dry environment for this to be a net-positive (overall energy channel) on the C4 grass. When sunlight is abundant, this is not much of an issue. In the shade, this energetic demand can severely cripple C4 grasses. **As a result, C4 grasses are generally not shade-tolerant.**

Examples of C4 grasses in Wisconsin:
Big Bluestem (Andropogon gerardii) - native
Little Bluestem (Schizachyrium scoparium) - native
Indian Grass (Sorghastrum nutans) - native
Switchgrass (Panicum virgatum) - native
Sugarcane Millipede (Miscanthus sinensis) - invasive
Sorghum - some native/non-native/crop species
Corn (Zea) - crop

What does this have to do with grassland management?

Big Bluestem Grass (Andropogon gerardii) Photo Credit: BMAP member Brenda Lewis

Since C4 grasses generally have an advantage in hot and sunny conditions, they can and will, be, they are a natural and integral part of our prairie systems. Particularly, C4 grasses can be invasive in our prairies, and management considerations need to be made. Since C4 grasses are generally not shade-tolerant, they can be easily overcome by shade and outshine the tall, unbranched and wide-leafed, C3 grasses. Because of this, C4 grasses are often the first to go in prescribed burns, and C3 grasses are generally the last to go.

However, many landowners work with more moderate rich soils, wetter substrates, shaded conditions, and/or cool-season C3 grasses. Many of the C3 grasses in Wisconsin are not native to our geographic location. In fact, many of the non-native C3 grasses in Wisconsin were originally introduced because of their high growth rates and ease of establishment, and many of these grasses are still used in agriculture today. Many of these non-native C3 grasses (Orchard Grass, Tall Fescue, Red Fescue, Sweet Vernal Grass, Kentucky Bluegrass) are also invasive in prairies and woodlands, so consider introducing native C3 grasses that thrive in these environments.

Like cool things or nerdy stuff? Here are exceptions to general trends for C3 and C4 grasses: Some C4 grasses like the recently identified, invasive Japanese Millipede (Miscanthus sinensis) can be shade-tolerant. Some C3 grasses like Tall Fescue can tolerate greater Mid-Summer Stress (Photosynthesis quenched or Stomata closed to conserve moisture) and thrive in sunny, dry, disturbed conditions.

Next time you are out in the prairie or visiting a restored prairie, consider the physiology and ecology of the grasses you see. Know what grass physiology has wrought and feeling implications for grassland management and restoration.

BMAP on Facebook

The Blue Mounds Area Project Facebook page seems to be a good place to find information about upcoming events, but it's a one way flow of information. Did you know we also have a Facebook Group? The BMAP Facebook Group is a great way to connect with other BMAP members. Unlike the page, it's interactive, we'll post high yielding regular conversation starters.

In any time you can also post:

- Restoration-related questions
- Requests for help with burns
- Extra seeds or plants to share
- Photos of what's growing in your prairie or woodland
- Anything else that relates to ecological restoration in WI

To join the group, click this group and click Join Group. The group is open to all landowners and allies in the Driftless Area of WI or surrounding areas who are working to restore native biodiversity and ecosystem health.

Write a Review!

The Blue Mounds Area Project is a community-based organization with a focus on prairies, oak savanna and woodlands. We are a 501(c)3 organization and all donations are tax deductible. Contact us at contact@bmaonline.org for more information.

Thanks to all our members for your support!

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Blue Mounds Area Project
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Mt. Horeb, WI 53572

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