

Early Detection and Rapid Response

Can a highly coordinated team of experts and weed managers stop a new invasive species?

The wording of this article has been adjusted to a 7-8th grade reading level. Andrea Barbknecht of the Wyoming Wildlife Federation made the revisions as part of the organization's curricula to engage kids in exploring their Wyoming landscape.

The original article, written by Emilene Ostlind for Western Confluence magazine, can be found [here](#).

By Emilene Ostlind (May 2020)

For many westerners, cheatgrass (*Bromus tectorum*) is the classic example of an invasive weed. It is well known for thriving in sagebrush landscapes. There, it crowds out **native** plants, fuels fires, and threatens wildlife and livestock grazing. Over the past decades, researchers, weed specialists, and **rangeland** managers have learned a lot about cheatgrass. They know what patterns of mowing or grazing, kinds of herbicides, and range conditions can slow it down. We still haven't figured out how to really stop cheatgrass's spread. We also can't clear it out of the vast acreages it has invaded. One of the main lessons has been that keeping cheatgrass out in the first place is more effective and cheaper than trying to fight it once it takes over.

Another invasive annual grass popped up in Wyoming a few years ago. It has the potential to be even worse than cheatgrass. Managers knew they had a small window of

time to get control of this new invader. They leapt into action. Based on cheatgrass, managers assumed that invasive annual grasses cannot be controlled once they take hold. One team of researchers is armed with lessons learned from decades battling **annual** grasses, the best new herbicides, and carefully developed plans of attack. They are out to prove that they can remove an invasive species.

In the summer of 2016, a University of Wyoming professor named Brian Mealor took a group of students to the National Guard Training Area in Sheridan, Wyoming. Sheridan is a community of 18,000 nestled against the eastern slope of the Bighorn Mountains. Their goal was to collect data for a graduate project. As they set up transects and identified plants, a weird grass kept showing up. Mealor took some photos of it and started emailing his

colleagues around the state. This set off a firestorm of worry and action.



Brian Mealor, a University of Wyoming professor and extension agent specializing in rangeland weeds, has been spearheading the effort to hold two new invasive grasses at bay in northeast Wyoming. (UW photo.)

The grass was ventenata (*Venenata dubia*), also known as North African wiregrass. It has been creeping out from Washington and Idaho since it arrived there in the 1950s. It spreads by as much as 3 million acres per year. In western North America, annual grasses like cheatgrass and ventenata are the worst of the worst invasive plants.

These exotic plants have found an unused niche in the ecosystem. They germinate in the fall and sprout in the early spring. They steal soil moisture from long-rooted native perennials before they get a chance at it. That gives invasives a jump start on their growing and helps them outcompete native plants. They produce many seeds which spread by wind or by snagging on shoelaces and animal fur. The seeds are shaped to drill into the soil where they can stay dormant for many years.

If rangeland managers thought cheatgrass was bad, venenata is worse. Its tough stems

tangle mower blades and are inedible to grazers. Cows and deer can eat cheatgrass when it is very young in the spring, but not ventenata. In the fall, ventenata forms a thick layer of wiry stems over the ground. This further chokes out native plants. Like cheatgrass, it supports frequent fires. It is destroying already threatened Palouse prairie and ponderosa ecosystems in states to the west.

One of the people Mealor first contacted about the weed was Beth White. She is a rancher with land adjacent to the National Guard Training Area. Mealor showed her the grass and asked her to keep an eye out for it. Over the next two weeks, as she checked on cows around her grazing lands. She spotted the grass in more and more places.

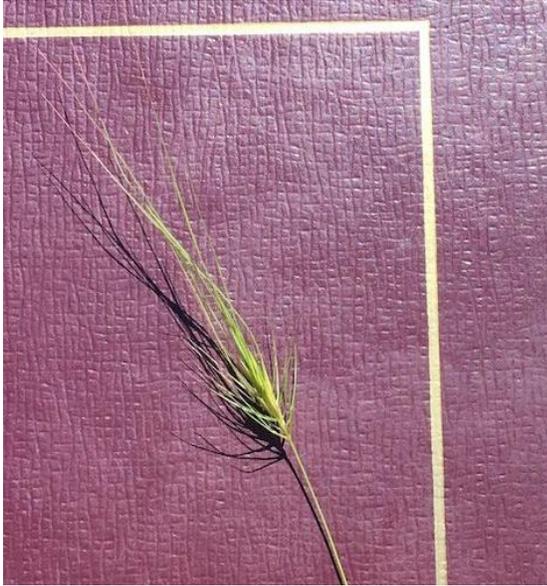
“We went from thinking it was in a couple hundred acre patch we could get our arms around to it spread to an hour’s drive from one side to the other in just a couple weeks,” Mealor says.



In June, delicate shoots of ventenata are visible amidst native plants in the Bighorn Mountain foothills in Sheridan County. (Photo by Emilene Ostlind.)

In August of that summer, a Natural Resource Conservation **soil conservationist** named Oakley Ingersoll made another discovery. He was patrolling a piece of state

land trying to get an idea of how bad the ventenata invasion was when he came across another suspicious looking grass. This one had a bristly head of sharp seeds. He identified it as medusahead.



*A stem of medusahead on the author's notebook in June.
(Photo by Emilene Ostlind.)*

Medusahead wildrye (*Taeniatherum caput-medusae*) showed up in Oregon in 1887. It took off from there in the mid-twentieth century. It spread across much of northern California and into the surrounding region. It thrives after cheatgrass driven fires and can even crowd out cheatgrass. Like ventenata, grazers can't eat medusahead. It is high in silica and its sharp seeds cause mouth injuries. In some places, it has reduced **grazing capacity** by 80 percent as it pushes out edible plants.

Ranch manager JD Hill put it this way: "What's scarier than something that outcompetes cheatgrass?"

Within a week or two of the medusahead discovery, Sheridan County Weed and Pest sprayed 200 affected acres with herbicide.

"At that point, we treated every known acre in the state of Wyoming," Meador says, "but we found it late enough in the season that there was not a lot of time to survey other places."

Meador talks like a scholar, dresses like a ranch hand, and signs his emails "Grace and peace." He specializes in invasive plant ecology with a focus on sagebrush ecosystems and rangelands. He is described as "the guy who wrote the book on cheatgrass in Wyoming." (He is the lead author on the 2013 *Cheatgrass Management Handbook*.) He wasn't exactly sure how medusahead and ventenata would act in northeast Wyoming. He did know the threat these two grasses could pose to wildlife and agriculture. He was already in contact with a strong team of specialists, land managers, and ranchers in the region.

Meador teamed up with Luke Sander. Luke is an energetic young man who is the supervisor for Sheridan County Weed and Pest. The two reached out to everyone they could think of who might care about the new invasive grasses. They contacted Wyoming Game and Fish, US Fish and Wildlife Service, conservation districts, and ranchers. They called a meeting at the end of the summer of 2016. At the meeting they began to make a plan for controlling the two new grasses.

They focused on a few actions. First, they would thoroughly survey Sheridan County (and beyond as necessary) for the two

grasses. They would make careful maps of the plants' distribution. Using those maps, they would create **landscape** management strategies to best contain the grasses' spread. Second, they would spray the infested areas with **herbicide**. They would carefully study those treatments to determine which chemicals sprayed at which time of year worked best to knock back invasives while letting native plants grow.

"It feels kind of like we are . . . doing a military planning exercise: We stare at maps and we draw polygons," Mealor jokes.

Along with this on-the-ground work, the group committed to sharing all their data and information. Having the data in one place makes it easier to analyze observations and treatments across the landscape. All of the partners agreed to inform the public about the threat of medusahead and ventenata through signs, pamphlets, presentations, and other outreach.

Wyoming has its share of other noxious weeds to control such as leafy spurge, dalmation toadflax, spotted knapweed, and cheatgrass. Because ventenata and medusahead are not spread throughout the state yet, there is an opportunity to limit their spread. If everyone focuses on it as a high priority it maybe be possible to prevent it from getting worse.

Mealor and Sander's group met again in 2017 where they gave themselves the name Northeast Wyoming Invasive Grasses Working Group (NEWIGWG). Their mission is "To minimize impacts to rangelands for wildlife and agriculture by reducing,

containing, or eradicating medusahead in northeast Wyoming." They aimed to contain ventenata, since it has spread more, and eradicate medusahead. That means they are going to try to get rid of every last medusahead plant in the state.

"I think 'eradicate medusahead' is a pretty lofty goal. We all think that," Mealor admits. "But we thought we would go ahead and say the word to try to hold ourselves to a high standard."

The group began to apply for funding to cover the costs of the work they had planned for the coming growing season.

One of their early supporters was Lindy Garner, invasive species coordinator for the US Fish and Wildlife Service. She quickly realized that NEWIGWG effort had all the elements for potential success.

Medusahead and ventenata also are a threat to National Wildlife Refuge System lands and to the sagebrush ecosystem which holds sage grouse. The sage grouse is one of the focuses of her work with the agency. Wyoming is home to the largest remaining populations of greater sage grouse. They were almost listed as an endangered species in 2015. They avoided listing because the state of Wyoming and federal agencies agreed to continue massive efforts across the West to protect them and their sagebrush habitat. That means keeping invasive grasses out.

One tool the group has is "early detection and rapid response." This idea is based on how doctors find and treat cancer. Early detection and rapid response has long been a strategy for dealing with new invasive strategies. Recently the Department of the

Interior made a 60-page document describing the process. Now land managers can use that document in their plans.

Garner heard that the National Invasive Species Council was looking for pilot projects to demonstrate early detection and rapid response. “I said, hey, there’s this one. They’ve got their act together.” The council gave some early funding to NEWIGWG. That opened the door to additional federal agencies getting involved and helped set NEWIGWG in motion.



Luke Sander, supervisor for Sheridan County Weed and Pest, is at the frontlines of the fight against ventenata and medusahead in Wyoming, coordinating spraying of thousands of acres each growing season among other tactics. (Photo courtesy Luke Sander.)

In its first three years, the group raised over \$900,000. They directed the money to surveying more than 20,000 acres for the two grasses each summer.

They used people, drones, remote sensing, and other approaches. The group also sprayed every known acre of medusahead. They sprayed this grass first because it was less widespread. They sprayed thousands of acres each fall. Partnering organizations worked with private landowners to control ventenata.

In 2016 and 2017, they used a mix of the herbicides Plateau and Milestone. Both of these were approved for grazing lands and

were known to be effective on annual grasses. “With Plateau/Milestone, you get pretty good control for a year and then . . . ventenata starts **infiltrating** back in,” says Sander. “In some places in the second year it looked like we had never even been there.”

In 2018, they received special approval to use a **chemical** called Esplanade. This herbicide works better, but is not yet widely approved for grazing lands. Esplanade soaks into the top inch or two of soil. There, it stops root growth, killing invasive grasses with shallow roots. “Your other natives are a little deeper rooted so they can grow through it just fine,” Sander explains. “It is a very selective herbicide at the correct [application] rate.” Plateau/Milestone needs to be sprayed in the fall to protect native plants, but managers can spray Esplanade throughout the growing season. Esplanade is set to be approved for widespread use on grazing lands later in 2020.

Almost all of the spraying is done by air. This is cost effective because a plane takes a few hours to treat an area that would take a ground crew days. It is still expensive. “All those medusahead treatments have gone out at no cost to landowners. Zero. Which is starting to get pretty expensive,” Mealor says.

“Sustainable funding has been one of the big pushes,” Sanders adds. “We can gather a bunch of grant money because its new and [exciting] and there is a bunch of hype around ventenata and medusahead for three or four years, but we need a funding source that we can rely on for 15 to 20

years.” Even if a dose of Esplanade beats the weeds back for three or four years, “We’re assuming that we have to do two treatments and possibly three treatments to be able to completely remove it from the area,” Says Sander. “We kind of have a 10-year plan in place for areas, and knowing that going forward we have to manage funding to be able to have money to come back and re-treat.”

There is also a research component to NEWIGWG’s work. “We have flight tracks and spray tracks from all the aerial pilots. They have mapping programs in their planes and they give us the data afterwards so we can see exactly where they turned on, where they turned off,” Sanders says. “We keep track of what they sprayed, the rates, and the time of year, weather conditions, all that stuff.”

Then Mealor and his students follow up. They monitor effects of spraying on invasive grasses and desirable native species. They analyze their findings using the maps of herbicide application.

Sanders says it has been cool to collaborate. They now have hard figures and facts about what the herbicide is really doing to the landscape. “It’s very surprisingly positive from everything we have seen, so far, so that’s good.”

NEWIGWG has also been informing the public. One method was putting up information signs and boot brushes at eight locations. They wrote and printed a one-page “field guide” to help citizens and partners identify two grasses. NEWIGWG members have given over 15 public presentations. Finally, they began hosting an

annual “Medusa-Nata Tour” that attracts attendees from all over Wyoming and several surrounding states and Canadian provinces. Federal representatives from around the West and Washington, DC, attend the tour. The group estimates that they have reached 4,500 people about the threats of medusahead and ventenata and how to respond.



More than 100 participants from across the West and beyond attended the third annual “Medusa-Nata Tour” in Sheridan County in June of 2019 to see two invasive grasses growing in the wild and to learn from Mealor, Sander, and other experts about the best practices for controlling them. (Photo by Emilene Ostlind.)

It is unknown whether the efforts to stop ventenata and medusahead will work. They will be called successful if they prevent the weeds from spreading east into more rangelands and sage grouse habitat. For now, ventenata has been found on more and more acres in Sheridan, Johnson, and Campbell counties. The known spread of medusahead has also increased. The increase in reporting is due to both actual spread and also people being more aware of and able to identify the species. Photos from the air in late summer show the telltale light brown patches of ventenata

infestation. They look like brushstrokes on the Bighorn Mountain foothills.

And yet, Sander, Meador, and the other NEWIGWG partners are still optimistic

Their new goal is to keep the species north of I-90 and east of the Bighorn Mountains. Their high priority treatment areas are close to those boundaries.

This winter, NEWIGWG is applying for funding to hire a director and coordinator. That person would write grants for funding and bringing together interested people. The current members are doing this work on top of their full-time jobs. The group continues to look for funds to cover the costs of surveying, education, research, monitoring, and spraying. In the few years they have been working, they have made progress. They better understand the weeds and how to manage them.

“I would describe this project as a flagship project to address this,” says Garner. She adds that they have all the parts to make it successful. They have the resources and they have done everything that they need to get it done.

Sander explains that the group has done more landscape treatments than anywhere in the nation. Other land managers are looking at the group to see what to do and how to do it.

Meador’s office at the extension building on the Sheridan College campus has a sweeping view across the college’s experimental agricultural fields to the Bighorn Mountains. He shares a story. Goatsrue, a plant from the Middle East, was grown in Utah in the 1980s as feed for livestock. It ended up being toxic to livestock and very invasive.

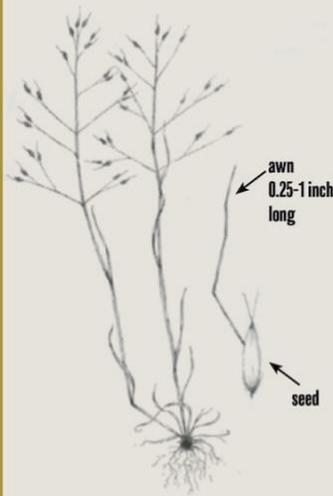
Meador relates that the goatsrue spread to 40,000 acres. “A bunch of agencies came together, very similar to what we are doing here, and implemented a goatsrue eradication program. And over ten years, they got it down to a few patches over tens of acres. They almost got rid of it.”

But then, as he tells it, administrations changed, and federal funding went away. Now there are more than 40,000 acres of goatsrue in Utah again.

“That’s the scary part.” They could put in a lot of time and money and something that is out of their control could change and undo it all. “That’s the unfortunate reality.” He knows eradicating the species is a stretch, but adds, “We have to build at least management of these species into the culture of the region. . . I think we can try.”

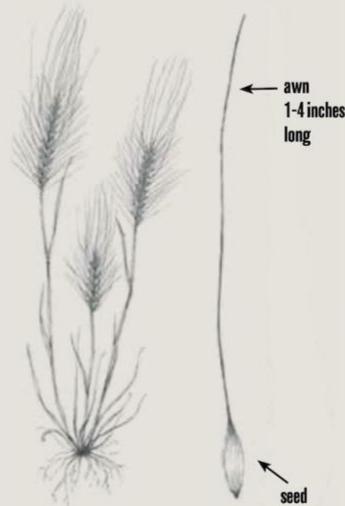
WATCH FOR WEEDS

How to identify ventenata and medusahead



Ventenata (*Ventenata dubia*)

Description: Fine grass about 18 inches tall. Each plant produces 15-35 seeds, visible June through August, on the ends of thin stems about 3 inches long, that branch off the main stem at a 90-degree angle. One distinguishing characteristic is the awns, hair-like threads poking out of the seeds, that bend at a nearly right angle half-way up.



Medusahead (*Taeniatherum caput-medusae*)

Description: Grows up to about 2 feet tall with 100 or more plants per square foot. The most distinguishing characteristic is the seedhead, visible late June until early fall. A dense cluster of spiky seeds grows around the top couple inches of the grass stem, each with a long, stiff awn sticking out of it, like a bottle brush.

If you think you may have found one of these weeds, call your local weed and pest office right away.

Botanical illustrations by Katherine Benkman, artist intern at the University of Wyoming Biodiversity Institute.

Glossary

Native A species that normally lives and thrives in a particular ecosystem

Rangeland Open country used for grazing or hunting animals

Annual A plant that grows, lives, reproduces, and dies in a single growing season or year

Soil conservationist A person who works to prevent soil erosion or depletion

Grazing capacity The number of animals that can sustainably graze on a piece of land

Landscape At a scale that covers a whole region rather than a limited area

Herbicide A chemical that kills plants

Infiltrating Moving back in

Chemical A substance that has a specific atomic makeup