



# NEWSLETTER

## Driftless Ag Update

Ag news for La Crosse, Vernon, and Crawford Counties from UW-Madison Extension



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Here's your November Driftless Ag Update!

Hello and congratulations on receiving our November Driftless Ag Update! This newsletter is co-written by your local UW-Madison Extension Ag Educators, Beth McIlquham (livestock) and Sam Bibby (crops).

**Please contact your local extension office for the print version of any article included in this newsletter.**

## **Notes from your Regional Crops Educator- Sam Bibby**

- Farmers, including myself, will often build farm equipment instead of buy it, either to save a buck, or create something that they can't buy. When it comes to ag technology and software some folks are trying the same approach. After building my own GPS lightbar to spread fertilizer using a free software created by farmers I thought I should write about some of the most popular DIY solutions in ag technology.
- After 4+ inches of rain over the last two weeks it has turned muddy quick. Avoid field work, especially tillage until it dries up. If manure must be spread, run tires on the lower end of the manufactures PSI range and use a controlled-traffic-pattern. Compaction is often an invisible yield limiting factor. Read more on avoiding, testing, and remedying compaction below on page 5.
- Interested in doing on-farm research? Want to dial in your nitrogen rate? Consider applying for an NOPP grant and running a nitrogen rate trial. (They pay for all the inputs and provide a stipend to the farmer) I am happy to help you apply and carry out a trial. Got an idea not related to nitrogen? We can tackle that too. Reach out sooner rather than later so we can get a plan together for next year.

## **Notes from your Regional Livestock Educator- Beth McIlquham**

- Beef Quality Assurance (BQA): Certification expires every three years. If you were certified in 2021 or 2022, it may be time to think about getting re-certified. Online and in-person trainings are provided. Note that in-person trainings require registration. More information can be found at <https://go.wisc.edu/jmhp50>. If you are unsure of your certification status, please visit [www.bqa.org/contact-us](http://www.bqa.org/contact-us) or call (303) 850-3473.
- Assessing Winter Feed Needs: After a challenging growing season, it may be a good idea to get your winter feeds tested to ensure that your animal's are getting the nutrients they need. If you have cow's, keep in mind that 75% of fetal growth happens in the third trimester. Providing adequate nutrition during that time is key. Check out the UW Soil and Forage Lab for more information on testing. <https://uwlabs.soils.wisc.edu/forage/>
- Disease Digest: By now, most people have heard of highly pathogenic avian influenza (HPAI) H5N1. To date, there have been no cases detected in Wisconsin that contain the genotype associated with dairy cattle in other states. However, the first case of H5N1 was found in swine in Oregon. For animal owners of all kinds, be sure to evaluate your biosecurity protocols to be sure they are working for you. More information about biosecurity can be found at: <https://livestock.extension.wisc.edu/>

# What is Open-Source Software, and How Does it Fit in Ag?

Written by Sam Bibby

Open-source software (OSS) is a software product for which the code is freely available to the public to use or modify. This is essentially the opposite from what we call proprietary software, which is privately owned and licensed. Open-source software may sound like something that would only be useful to an IT specialist or computer software engineer, but it is relevant to many of us in the ag industry, especially farmers. Open-source software is usually developed by a group of people who have a mutual interest in creating a software product that fits their specific needs and often avoids the high cost of similar pay-to-use products.

Many programs and software products we use are open-sourced; for example, Android, the world's most popular mobile operating system is OSS. The web browser Firefox, the computer operating system Linux, and the programming language Python are all more examples of OSS used by millions of people today. While OSS projects have been popular in the computer science world since the 1990s, there has been little interest in projects related to agriculture until quite recently. As more farmers have now grown up in the age of computers and software development, we are starting to see an increase in open-source projects related to agriculture. Many of these projects aim to develop technology that doesn't currently exist, avoids the high cost of existing proprietary technology, or fits a specific need not catered to by larger for-profit companies.

## **Ag Open GPS**

One of the most popular projects with tech-savvy farmers is Ag Open GPS. Ag Open GPS is a project started by Brian Tischler from Alberta, Canada. The project aims to provide an inexpensive auto-steer solution for farmers with all the functionality you might find in today's branded products. The software is completely free, only requires a generic GPS antenna, receiver, and Windows tablet to run as a conventional lightbar with a coverage map.

This setup will achieve pass-to-pass accuracy of <math><1.5\text{m}</math> although, in personal experience, it is better than this in the Midwest. Adding RTK corrections via NTRIP or a radio base station will allow for <math><1\text{cm}</math> accuracy. Adding a circuit control board and a few other components allows for auto-steer functionality with the same accuracy. Additional functions include section control, automatic implement lift, and more in development.

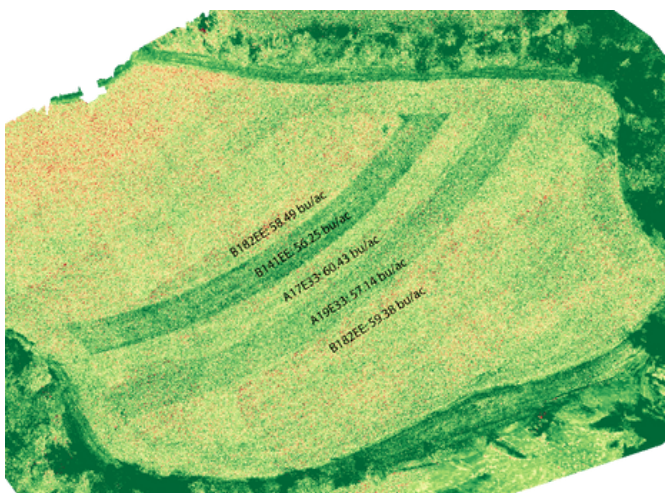


Figure 1: Ag Open GPS utilized as a lightbar/coverage map



## Farm OS

Farm management software is also a growing sector of ag technology and has a well-developed OSS option called Farm OS. This application is designed for farmers and farm workers to easily access and record farm operations. Farm OS operates as a web application which means it must be hosted on a server of your own, or you must pay some small annual fee to host it on another server. The advantage to it being a web app and not a static Excel document means farmers can integrate sensors and real-time data logging into the application.



## Web ODM

Web ODM (Open Drone Map) is an OSS that makes combining individual drone images to form larger high resolution orthomosaic images for analysis, easy and available for anyone. Commercial options for the same process can cost more than \$1000 a year for a subscription. Web ODM can analyze an image with plant health indicators such as NDVI, LAI, and many more.

Figure 2: Web ODM used to combine UAV images and measure NDVI

## Open Weed Locator

Open Weed Locator is a project started by PhD student Guy Coleman to detect and spray individual weeds in a fallow field environment. All software and hardware design plans are freely available. In crop weed detection is currently in development.

## ArduPilot

Drones are one of the hottest topics in agriculture today and many of them are flying with a software that is adapted from one of the most successful open-source projects. ArduPilot is a drone or UAV flight control software. ArduPilot has been around a long time and did not start as an ag related project but today many drones built for commercial and hobby use are utilizing the ArduPilot software in some way.

## Conclusion

While many of these projects lack the customer support and user-friendliness of a commercial product, if you are a tech-savvy farmer, or have tech-savvy kids, the cost and functionality may be worth it. As a bonus, you won't be stuck paying or waiting for service since you will likely be stuck doing any fixing yourself.





Francisco Arriaga, Brian Luck, and Geoffrey Siemering

# Managing soil compaction at planting and harvest

## Soil compaction

is the increase in soil density due to pressure being applied to moist or wet soils, typically from heavy vehicles. Compaction can happen any time of the year, but the risk during rainy planting and harvest months is often greater. There are some simple guidelines you can use to minimize soil compaction, figure out where exactly it has occurred, and determine how to fix it.

## Effects of soil compaction

Soil compaction reduces field productivity in many ways.

- **Stunted roots**—Plant roots are unable to grow through compacted soils, resulting in root systems unable to support healthy crops. Wisconsin research has shown compaction can cause up to a 50% decrease in crop yields.
- **Decreased internal drainage**—Water (either rainfall or irrigation) will not internally drain through compacted soils, resulting in longer time periods when the ground is too wet for field operations.
- **Greater fertilizer needs**—Prolonged wet conditions lead to soil nitrogen losses due to increased denitrification.
- **Increased susceptibility to drought**—Lower soil porosity leads to reduced water holding capacity.
- **Increased fuel consumption**—Tractors require more fuel to till compacted soils.
  - **Lower biological activity**—Compacted soils contain fewer pore spaces, reducing soil aeration and biological functions like residue decomposition.
- **More soil erosion**—When soils are compacted, soil aggregates are destroyed and runoff and erosion increase. Reduced internal drainage leads to greater runoff and lower soil moisture.

## I had to plant/harvest while my fields were wet. Are they compacted now?

If you worked your fields while they were wet, there is a good chance your soils are compacted to some degree. However, the exact soil conditions when you worked your fields have a dramatic impact on the likelihood and type of soil compaction. Use the flowchart in figure 1 to help figure out if your soils are compacted and how they might be repaired. Most important in determining if compaction occurred is whether the field soil was saturated or at field capacity when worked (see box below).

### Soil water content effects on compaction potential

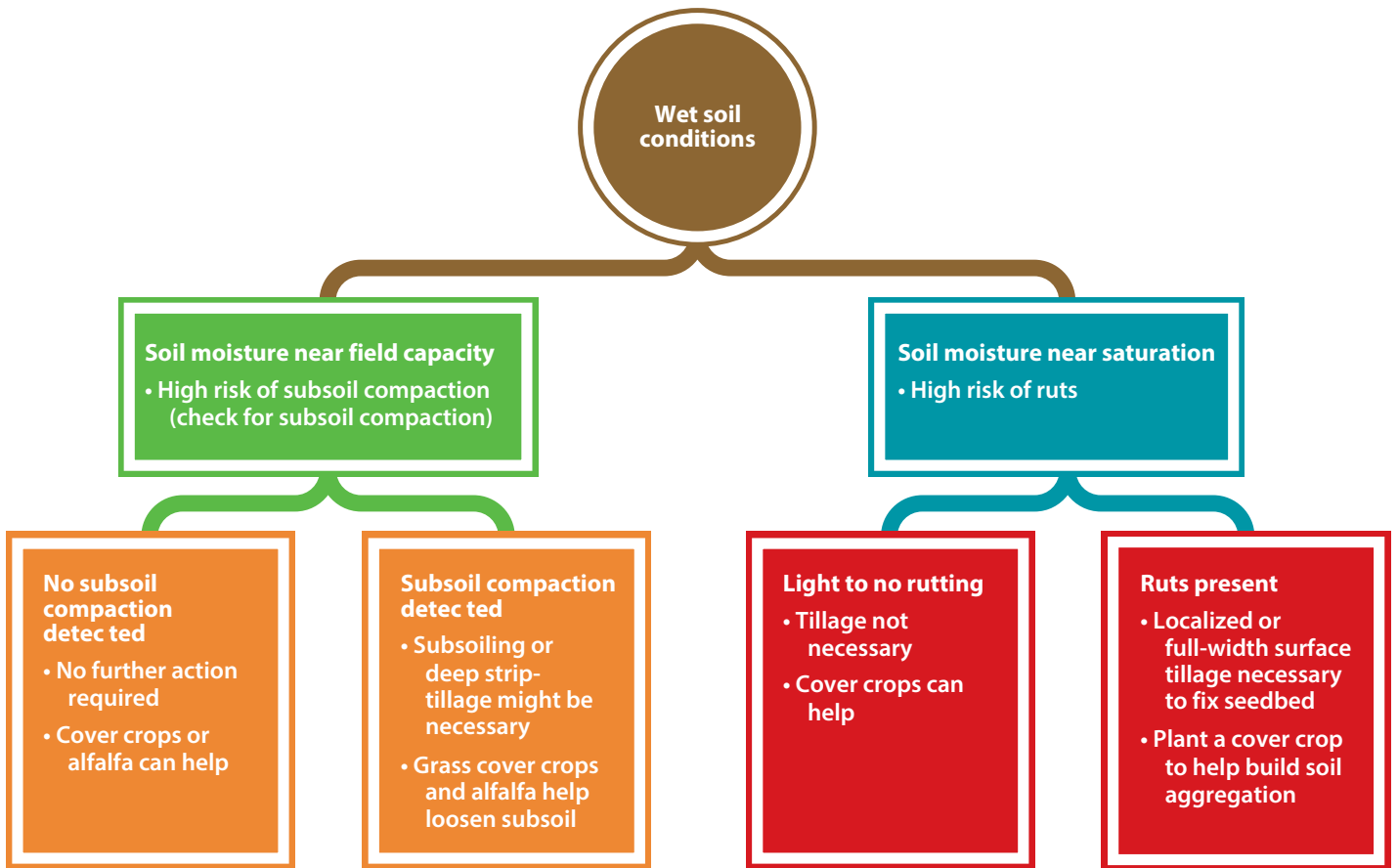
**Field capacity** is defined as the soil water content after the soil has been saturated and allowed to drain freely for about 24 to 48 hours. Soils are most susceptible to compaction when their water content is at or near field capacity because the proportion of soil pores filled with air and water is just right for compaction to occur. Soil well below its field capacity naturally contains tiny air pockets that work as shock absorbers and support heavy weight without the soil particles smashing together. Also, soil aggregates help dissipate loads when the soil is drier.

It seems counterintuitive, but soils that are fully saturated (i.e., their pores are completely filled with water) are less susceptible to soil compaction than those at field capacity. Since water cannot be compressed, a saturated soil can bear heavy equipment without compacting. However, soils at or near saturation are very prone to rutting and smearing near the surface.

## Key facts

- Whenever possible, wait for drier soil conditions before entering fields.
- Reduce axles loads and lower equipment tire pressures.
- Keep axle widths similar when purchasing equipment.
- Manage equipment traffic patterns to minimize tire tracks.
- Rutting may not indicate that deep tillage or subsoiling is needed.
- Surface tillage alone may be sufficient to remove ruts and clay smearing.
- Cover crops can help remediate soil compaction.
- Compaction repair can take multiple growing seasons.

**FIGURE 1.** Decision diagram for predicting soil compaction in fields worked while wet.



### Detecting soil compaction

There are several ways to determine if your soils are compacted. These including looking closely at the side of a small soil pit dug in your field, using a hand probe, or using a cone penetrometer. A detailed explanation of how to measure soil compaction can be found in UW-Extension publication *Soil Compaction: Causes, Concerns, and Cures* (A3367). The penetrometer method will provide the most accurate results. UW-Extension has a YouTube video showing how to use a cone penetrometer (see **Additional information**). These instruments may be available for loan through your county Extension office.

The following are easily identified signs of soil compaction. It is probably worthwhile to conduct an in-depth investigation in the areas where these signs are seen.

#### On the soil surface

- Dense surface clods that don't break down after rainfall or tillage
- Water ponding in tracks and headlands
- Wheel tracks with a smeared or glazed appearance
- Poor plant growth (e.g., reduced plant height) and stands
- Uneven plant growth or yields
- Plant leaf yellowing

#### Under the soil surface

- A hard zone of soil immediately below the depth of cultivation
- Hard clods that don't break when squeezed by hand
- No structure to the soil
- Misshapen or shallow crop roots ("J-rooting" or pancake roots)

### How to prevent compaction

#### Wait for drier conditions

The single most effective way to prevent compaction is to stay off wet fields for as long as possible. Soils are most susceptible to compaction 24 to 72 hours following a soaking rain, depending on soil type.

#### Manage farm traffic

Repeating travel patterns between transport equipment and the harvester (i.e., driving in the same wheel track) can reduce the damage of operating on wet soils and will confine damage to specific and well-known locations in the field (figure 2). Global Positioning System (GPS) guidance is helpful, but regular traffic patterns can also be achieved with some awareness and discipline on the part of the operator.



## Optimize vehicle parameters

- Maintain tires at the tire manufacturer's recommended pressure to spread the machine's weight over a greater surface area.
- Attach dual wheels wherever possible.
- Use machines equipped with tracks to spread the machine's weight over a greater surface area. Using machines with uniform wheel track spacing reduces the risk of soil compaction (figure 2).
- Consider carrying half or reduced loads out of the field.
- Use tractor-based transport equipment such as grain or dump carts within the field and load transport trucks (which have high-pressure tires) at the edge of the field.

## How to restore compacted surface soils

### Light tillage

If ruts are present, surface tillage is necessary to improve the seedbed for planting. Tillage can be localized only to rutted areas. The presence of ruts does not mean you definitively have compacted soil below the surface.

### Cover crops

If shallow compaction (less than 6" deep) is detected, planting a cover crop will help break apart the compacted soil and restore soil aggregation through natural root action. Fibrous-rooted cover crops (e.g., cereal rye) are more effective than tap-rooted cover crops (e.g., clover).

## Freeze/thaw

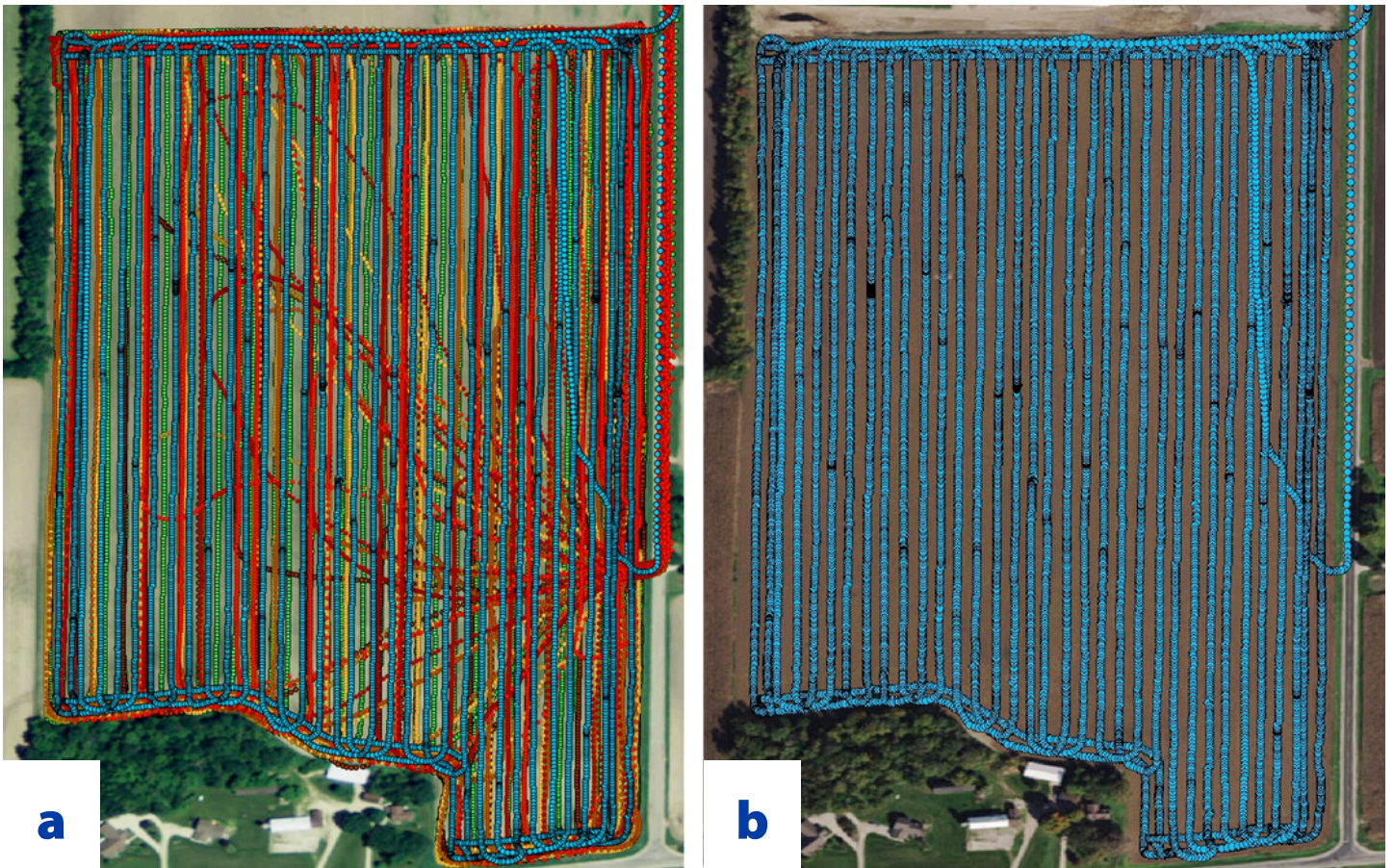
Winter freeze and thaw conditions may alleviate shallow compaction depending on soil type and other conditions. Compaction should be measured with a penetrometer in the fall and spring to determine effectiveness.

## How to restore compacted subsurface soils

### Deep tillage

If subsoil compaction (deeper than 6") is detected, subsoiling or deep strip-tilling can be helpful. Deep tilling involves breaking up a hardpan using long shanks usually to a depth of 12" to 15". This should only be done when the soil is at a moisture that allows the soil to crumble at the depth you are tilling. Till only to just below the compacted zone (2" to 3" below) as deeper

**FIGURE 2.** Part a shows an uncoordinated traffic pattern of two mergers, one forage harvester, and six transport trucks collected once per second during harvest. Part b shows the same field with a simulated traffic pattern where every machine follows in the path of the forage harvester. Although the entire field is impacted by machinery in both scenarios, corrective measures would be needed only on tire ruts from managed traffic (b) rather than the entire field (a).





tilling risks even deeper compaction and uses much more fuel. Deep tilling has shown yield benefits in sandy to clay loams but in finer textured soils the benefits may only be short-term due to recompaction.

### Vary tillage depths

If a subsurface hardpan of soil has developed, tillage depth may be altered to break this up.

Tillage is not a permanent solution to address soil compaction. Identify practices that caused the compaction and modify as needed.

## Restoration for no-till/ low-till fields

If ruts must be repaired for seedbed planting, tillage in only the affected area is recommended. Soils in long-term no-till fields have a greater ability to recover from compaction than soils managed with conventional tillage. The higher organic matter content and aggregation normally found in no-till soils makes them more resistant to soil compaction and resilient in recovery. Research from Kentucky shows that surface compaction in a no-till field disappeared completely after two years of normal operations (Murdoch and James, 2008).

## Additional information

View the YouTube video "Using a penetrometer to detect soil compaction" at [https://youtu.be/Zq\\_785JqRq8](https://youtu.be/Zq_785JqRq8).

View UW-Extension publication *Soil Compaction: Causes, Concerns, and Cures* (A3367) at <https://learningstore.uwex.edu/Assets/pdfs/A3367.pdf>.

## References

Murdoch, Lloyd W. and John James. *Compaction, Tillage Method, and Subsoiling Effects on Crop Production* (AGR-197). 2008. University of Kentucky Cooperative Extension Service. <http://www2.ca.uky.edu/agcomm/pubs/agr/agr197/agr197.pdf>.

Wolkowski, Richard, and Birl Lowery. *Soil Compaction: Causes, Concerns, and Cures* (A3367). 2008. University of Wisconsin-Extension. <https://learningstore.uwex.edu/Soil-Compaction-Causes-Concerns-and-Cures-P1419.aspx>.



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## Producing Quality Beef Workshops

The Wisconsin Department of Agriculture, Trade & Consumer Protection, Wisconsin Beef Council, and UW Madison Division of Extension Livestock Program are hosting a series of workshops that will focus on producing quality beef in Wisconsin.

## Producing Quality Beef Workshops

To register, visit <https://bit.ly/3GSZtuJ> or call the Wisconsin Beef Council at (800) 728-BEEF (2333) or 608-833-7177.

### Dates and Locations:

- Dec. 3 - Equity Richland Center
- Feb. 12 - Bloomington Livestock Exchange
- Feb. 26 - Altoona Equity Coop Livestock
- Feb. 28 - Milwaukee Stockyards



## Producing Quality Beef Workshop

Equity Richland Center (26702 County Hwy O, Richland Center, WI)  
Dec. 3, 10:00 am - 3:00 pm

### Topics will include:

- Live cattle evaluation and discussion with packer & sale barn manager
- Impacts on value: shrink, mud, dirt and fitness for transport
- Meat quality defects - real examples from the packing plant
- 2022 National Beef Quality Audit Results
- Quality and yield grades discussion and hands-on practicum
- Pre-harvest factors that impact meat quality
- Feeding and management practices to produce cattle the market seeks



To register, visit <https://bit.ly/3GSZtuJ> or call the Wisconsin Beef Council at (800) 728-BEEF (2333) or 608-833-7177.



## Beef Quality Assurance (BQA): Date and Locations Announced

Register for in-person beef quality assurance trainings. Re-certification is required every 3 years. The Equity Coop Monroe, N1365 State Road 69, will be hosting on December 10th, 2024 at 1PM.

To Register, please call: 1-800-728-2333 **OR** the Monroe County Extension Office: 608-269-8722



## Badger Crops and Soils Update Meetings

Access the latest agronomic, pest, and nutrient management research from the University of Wisconsin and learn how it can be applied to Wisconsin's farmland.

**EAU CLAIRE**  
December 3

**ARLINGTON**  
December 4

**APPLETON**  
December 5

**VIRTUAL**  
December 6

Early bird registration open until October 14.  
Registration, student pricing, agenda, and more information available online.

[go.wisc.edu/BadgerCropUpdate](https://go.wisc.edu/BadgerCropUpdate)



Agriculture Institute  
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Register Today!



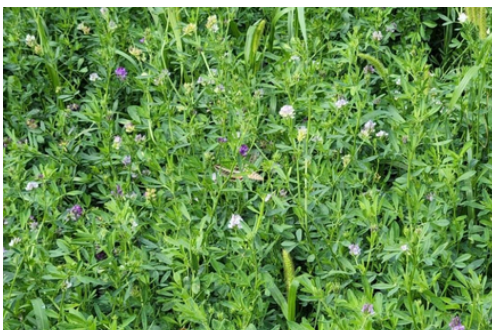
## December 17-18th Wisconsin Water and Soil Health Conference

Join us at the 2024 WWASH Conference, where on-farm research meets the implementation of soil health practices. Experience engaging keynotes, interactive breakout sessions, and insightful round tables designed to deepen your understanding of agronomy, water quality, and soil health. Gain valuable insights and practical knowledge to apply on your farm or the farms you work with.

More information and registration:  
[cropsandsoils.extension.wisc.edu/wwash](https://cropsandsoils.extension.wisc.edu/wwash)

## Livestock Risk Protection Insurance: A Tool to Help Manage Risk

Price volatility has increased over the past decade and external factors such as trade disruptions or media reports of health scares can quickly cause prices to drop. Beef producers are taking on significant risk. To help mitigate that price risk, beef producers can consider using Livestock Risk Protection Insurance (LRP) to protect against unforeseen price drops.



## 2024 WI Soybean Variety Trials Preliminary Data Posted

The variety trials run through UW-Madison are one of the very best resources for farmers planning seed selections for the upcoming year. Look for varieties that performed well in multiple locations and over multiple years.

<https://coolbean.info/wp-content/uploads/sites/3/2024/11/2024-WI-Soybean-Variety-Performance-Trials.pdf>



## Building a Customer Base: A Local Belgian Blue Story

By: *Beth McIlquham*

Belgian Blue beef is rare in the United States, but a local producer is shining the light on this unique breed. Didier Vanderbiest, a veterinarian from Belgium, has a deep love for these cattle and is educating others on this distinctive breed. In 2017, Didier began looking for a producer in the Midwest to partner with. In 2020, he began working with Brian Schumann, an Iowa farmer. Through this partnership, Didier was able to begin raising his cattle. Belgian Blue cattle produce very lean and tender meat. For those who prefer leaner beef, these cattle can exceed your standards. Since this is a niche market for the area, gaining customers can be challenging, but Didier's passion for this breed has helped him take the right steps to creating a customer base.

To help sell beef to local chefs, Didier visits restaurants in the area and gives out samples for the chefs to try. Believing in his product, Didier awaits calls and emails from the chefs who want to add Belgian Blue beef to their menus. Once an interested chef contacts him, they arrange what cuts of meat they will order and in what form. For example, an order Didier recently filled included four whole tenderloin, one brisket, forty ribeye, and forty 12 oz. ounce boneless short ribs. To create a customer base, Didier completed a few key steps: identified a need, created connections, and followed through. First off, Didier noticed that some chefs and other consumers are looking for leaner beef, but still want a quality-eating experience. After identifying this need and ensuring he had the resources to fill it, he began making connections. Didier gave out small samples of his beef for chefs to experiment with and try themselves. Since Belgian Blue beef is not common in this area, allowing chefs to try it out and see what Didier has to offer is a must. The last and most important step is following through. After the chefs had placed their order, Didier fulfilled it. Although this sounds incredibly simple, this step can often be overlooked when live cattle prices are high. Following through once an order is placed builds trust with customers. Once this is established, producers and consumers can count on each other.



Belgian Blue burger patties



The team at Nordik Meats working with Belgian Butcher, Sylvain



Belgian Blue New York Strip



Didier also sells direct-to-consumer. He advertises to consumers who value hormone-free, extra lean, and grass-fed beef via the Belgian Blue Beef LLC Facebook page. With a slogan of “farm-to-fork,” he continues to make reach and complete orders, like when he sells to restaurants. A key component of selling meat to customers is maintaining a great working relationship with a processor. “To achieve a perfect product, I had the opportunity to work in perfect harmony with a local slaughterhouse. USDA certification was essential,” Didier said. “When I presented my request to the head of Nordik Meats, he was immediately won over by my project. He quickly agreed to collaborate, and the result was exceptional. He even accepted the idea of bringing in a Belgian butcher to make a perfect cut.” Through open communication, Didier and Nordik Meats work together to correctly fulfill every order placed. Without this positive connection, it would be difficult for Didier to sell beef. Didier has created many lasting relationships that allow him to find success. Creating these connections can be a game changer for anyone looking to get into or expand their beef business.



***Please note that UW-Madison Division of Extension does not endorse any specific cattle breed or type of beef. We support what fits you and your operation.***

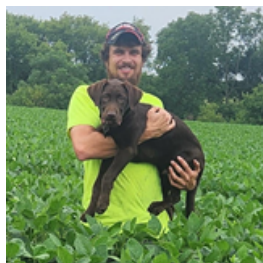
**Didier (left) and Sylvain (right) with a Belgian Blue carcass**

For more information on raising beef cattle or direct marketing beef, contact a UW-Madison Division of Extension Livestock Educator or Beef Specialist near you.

Thank you to Nordik Meats and Didier for allowing me to highlight your work in this article.

## COOPERATIVE EXTENSION SERVICE

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