

Central Wisconsin Agricultural Extension Report



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Unmanned Ariel Vehicles (UAVs), also known as drones, are a new topic in the world of agriculture. They allow farmers, agronomists, and other agriculture related people to manage their properties, crops, and animals using this flying object. Agriculture is not the only field in which these devices are used. Many UAVs are also used in the military.

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The uses of these devices may vary. They are very convenient for agronomists and farmers to use. They allow you to see things from a “bird’s eye view”. They are a big tool in crop management. With the use of a UAV, an agronomist can look at fields and look at the lay of the land and the overall crop stand. Using infra-red imaging, agronomists and the land owner can look at a field and diagnose healthy from unhealthy plants. The healthy plants will reflect back more infra-red radiation than an unhealthy plant. Many plants that contain a fungal infection will not reflect back a lot of radiation. Many farmers would also appreciate the UAV because it could save them money and increase yield potential. An example of this would be if a farmer had a big field and wanted to know whether or not to spray it, he or she could then get imaging from the UAV and only spot spray the weedy areas rather than spray the whole field. Another thing you could do with the pictures from the UAV is look at them and see what the problem is or predict what the future holds for that crop, saving the grower a lot of money.

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The UAVs can be equipped with many different features. One feature I already talked about is the infra-red imaging technology. Another would be a mapping feature. You can take the card out of the UAV and plug it into a computer and use a special mapping program in which you can mark out the fields and field borders that you want the UAV to image. There is also a feature in the control panel that allows the operator to command the UAV to return home. This will prevent the UAV from getting lost or the operator losing it. Currently, the biggest problem UAVs are facing is that the Federal Aviation Administration (FAA) has not yet regulated them. They are going to regulate them, but this may not be until 2016 or 2017.

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Pat Cauley is a senior at Mauston High School, who has been job shadowing Craig Saxe at the Juneau County Extension Office and is learning many things about agriculture. This experience will be useful in his career decisions as his future plans are to attend UW-Platteville to study agribusiness.

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Implement of Husbandry Law By: Ken Williams, Waushara County

Farmers and producers across Wisconsin still have a lot of questions concerning the Implement of Husbandry Law, WI Act 377, which was signed into law in April of 2014. One of the major misconceptions is that many people have thought that if you have an overweight piece of farm equipment that you simply applied for a permit. The reality is the fact that the Maintaining Authority (MA), be it the state, county or the local township, is not obligated to authorize a permit for the operation of overweight equipment.

All indications are that more permits are being denied than are being approved. To decide if you have equipment that could need a permit to legally operate on Wisconsin roads you need to determine if any of your equipment exceeds 23,000 lbs. on an axle or if it exceeds the new IOH/Ag-CMV gross vehicle weight table which may be found at: www.dot.wisconsin.gov/business/ag/weight.htm. If you have equipment that would be overweight then the next thing you will need to do will be to determine what option the MA for the roads you will be traveling on have adopted. If the MA adopted Option E then all equipment must abide by the 23,000 lb. per axle and 92,000 lb. (depending on vehicle length) gross vehicle weight (GVW). If the MA adopted Option F then there is the same 23,000 lb. per axle and 92,000 lb. GVW with the exception that for category B IOH the 23,000 lb. per axle limit does not apply.

Other points to remember is that for all roads, bridges or culverts that are posted with a weight limit, those weight limits apply regardless of WI Act 377. If a road is posted Class B, the 60% weight restriction also applies to axle weight or wheel combination weights. That means 60% of 23,000 lbs. is 13, 200 lbs.

In many cases the price of manure application will certainly be impacted as legal loads will require about double the number of hauls from last year. In the long run dairy producers may need to look at alternative options for spreading dairy manure. Irrigating on growing crops would offer a way to utilize the value of the water in the manure as well as the crop nutrients. Land spreading on existing fields of alfalfa may offer another window for application. Another option may be to look at the inclusion of winter wheat in a crop rotation program. This would open up land during the month of August, normally a dry period, which would reduce the issues of soft roads or fields in the late fall or early spring.

The passage of WI Act 377 has enlightened law enforcement on the reality of what various types of farm equipment actually weigh. This reality along with the fact that penalties for being overweight are calculated back to 80,000 lbs. means that farmers need to take this law seriously. Equipment that weighs 96,000 lbs. is only 4,000 lbs. over 92,000 lbs. but the fine is calculated back to 80,000 lbs. So for citation purposes the fine is calculated on an overweight amount of 16,000 lbs.

Producers also need to remember that there were also changes to equipment lighting and marking requirements that will take effect November 1, 2015.

There have been bills introduced in the Wisconsin Senate and Assembly to change, correct or modify WI Act 377 so producers will need to be aware that additional changes could be coming in the future.

Visit the Central Wisconsin Agricultural Specialization Team on the Web
<http://fyi.uwex.edu/cwas/>

Boosting Corn Yields Depends On Improving Nutrient Balance

By: Nav Ghimire, Green Lake County

Ensuring that corn absorbs the right balance of nitrogen, phosphorus and potassium is crucial to increasing global yields, a Purdue and Kansas State University study finds. A review of data from more than 150 studies from the U.S. and other regions showed that high yields were linked to production systems in which corn plants took up key nutrients at specific ratios -- nitrogen and phosphorus at a ratio of 5-to-1 and nitrogen and potassium at a ratio of 1-to-1. These nutrient uptake ratios were associated with high yields regardless of the region where the corn was grown.

The agricultural community has put a lot of emphasis on nitrogen as a means of increasing yields, but this study highlights the greater importance of nutrient balance. According to researchers, we will not be able to continually boost global corn yields and achieve food security without providing adequate and balanced nutrients. While corn producers in the U.S. have long relied on nitrogen fertilizers to improve yields, they should not overlook other nutrients such as potassium and phosphorus.

Growers need to be as concerned about the amount of potassium available to their plants as they are about nitrogen. Corn's demand for nitrogen and potassium is similar. We need to focus on the nitrogen-potassium balance because that's where we have the greatest deficiency in terms of application.

The main obstacles to closing corn yield gaps -- that is, reaching the potential yield projected for a particular soil and climate - around the world are the inaccessibility and cost of fertilizers and the inherent nutrient deficiencies of soils in many regions in which corn is grown. On the global scale, the potential yield response to balanced nutrient applications is big. But growers should also focus on developing an integrated management program that considers factors such as optimum planting dates, plant densities and pest management.

The study revealed a sharp difference in the "indigenous" supply of nitrogen in soils in the U.S. and in other regions. In cases where no additional nitrogen fertilizers were applied, U.S. corn took up an average of 120 pounds of nitrogen per acre - compared with about 52 pounds of nitrogen per acre in regions outside the U.S. The high level of indigenous nitrogen in U.S. soils may be due to factors such as an inherently greater amount of organic matter in the soil, a history of fertilization in the Corn Belt, and the use of superior corn hybrids.

But despite the higher nitrogen content of U.S. soils, corn plants in the U.S. were not more efficient at absorbing nitrogen fertilizers from the soil than those in other regions. Nitrogen recovery efficiency, the measure of how much applied nitrogen the above-ground portion of a plant absorbs from the soil, was the same - 48 percent - for the U.S. and other parts of the world.

Nitrogen recovery efficiency in the U.S. is not higher partly because increasing fertilizer application rates can create a "declining return": The more fertilizer applied, the more difficult it becomes to extract the same percentage of the nutrients in the corn. Optimizing the timing of applications and developing alternate nitrogen sources may improve the recovery efficiency of U.S. corn production systems.

Data collected from 1976 to 2012 also revealed that the efficiency with which individual corn plants absorbed and used nitrogen, potassium and phosphorus stayed relatively consistent despite plants being grown at much higher densities. Researchers found that on a per-plant basis, corn plants are not taking up more nutrients than they were in the past. They may be taking up less because they are grown closer together, but they are more efficient at producing more grain with the same amount of nutrient uptake. Still, growers need to keep an eye on the amount of nutrients removed at harvest to ensure soil nutrient levels don't drop to the point where future yields could suffer.

Growers should not rely too heavily on modern genetics to give them the yields they expect without spending a considerable amount of effort on maintaining nutrient availability throughout the growing season.

The source of this article is *Agonomy Journal*, 2014.

Early Care of Heifers Yields Lifetime of Benefits

By: Matt Lippert, Wood County

There was a time when a minimum cost program was promoted for calves. Moderate to low intakes of milk replacer encouraged calves to more aggressively take to dry starter feed. Grains are much less expensive than milk products and were thought to lower the cost of raising a replacement. Milk replacer programs provided less protein and fat to the calf than did milk, but were adequate for calf survival. Calves grew more slowly than their potential and were at risk due to low body fat reserves and energy intake if they scoured, went off feed or were exposed to extreme weather conditions.

After many years of focusing on the low input approach, higher milk product intake has been revisited. Much higher gain was observed preweaning. It was found that even if at 6 months of age the weights of calves on the two separate programs were similar, the performance at first lactation and lifetime favored calves that were allowed higher milk product intakes (2,200# advantage in first three lactations, Cornell).

These new programs are not without their own challenges. Calves prefer milk replacer and do not aggressively begin calf starter intake. The high energy programs do not allow for inconsistencies in mixing or being mixed with too little water and too many solids. It is more critical to make sure calves have access to fresh water all year long. The high energy programs are more expensive per day. You must use a milk replacer made for this; you can't just feed more or mix more powder in the water using a conventional milk replacer.

Utilizing these programs, Holstein heifers can calve at one year-ten months of age and weigh 1250-1300 pounds (1.8 pounds of gain per day), and they can have adequate frame-skeleton and muscle not fat. Calves can double their weight from birth-to-7-week weaning age and not be fat. Similar early growth can be accomplished with pasteurized milk instead of milk replacer, although it is often supplemented with vitamins, minerals and/or medications.

The large effects in mature animals that can be traced to care during the first weeks of life have opened up much more study. Additional benefits have been found in some trials when calves are fed three times a day instead of twice, even if the same amounts of milk solids are consumed. Some recent studies have shown benefit to feeding colostrum beyond the first 24 hours, even if the antibodies are no longer absorbed into the blood stream. Immune system development is more difficult to measure than milk production; but it appears that the increased production as a mature animal as a result of neonatal feeding and care is in part related to improved immune system development.

A key component of the success of higher nutrition for newborn calves is a successful transition at weaning. To promote rumen development, grain intake from starter and grower is more important than early availability of hay.

Dairy replacement heifers are not like animals being finished for slaughter in a feed lot. Even with emphasis on high nutrient quality and intake immediately after birth allowing for early calving, replacement heifers need only gain 1.8 pounds per day to reach adequate size well before two years of age. Their potential weight gains if fed high concentrate diets are much higher. High forage programs including high quality pasture can be utilized to develop these heifers. Research at the UW has shown benefits in health and performance when heifers have grazed.

Surveys indicate that dairy producers are freshening replacements at a younger age. Some producers with high producing herds now successfully have nearly all replacements freshening by two years of age. It is not necessary to breed animals to calve earlier than one year nine months to accomplish this. First lactation production is often much lower when replacements calve extremely early. Well managed and fertile heifers can nearly all conceive within a three month window from one year ten months to two years of age.

Reduced total rearing costs, reduced manure production from replacements, higher lifetime production and improved immunological status are all positive lifetime benefits of care given to calves before they are weaned.



New Resources for Irrigation Managers Submitted By: Ken Schroeder, Portage County

Authors: John Panuska and Scott Sanford, University of Wisconsin-Madison, Biological Systems Engineering Department, Office Phone: (608) 262-0605, E-mail: jcpanuska@wisc.edu.

As the 2015 growing season approaches, thoughts turn once again to getting into the fields and planting. After planting, the daily management of your investment becomes the priority. Maintaining optimal root zone soil moisture conditions is one of several important management activities. Too much water application can leach valuable nutrients out the root zone while insufficient soil moisture can adversely impact crop yield and quality. Irrigation has become an important tool to manage root zone soil moisture. Tools to manage root zone soil water include soil moisture tracking (irrigation scheduling) and monitoring. Irrigation scheduling along with rainfall forecasts can be used to project soil moisture conditions into the near future (1-3 days) while soil moisture monitoring can be used to ground truth scheduler predictions. UW-Extension recently developed two new publications and a crop irrigation web site to assist you in making irrigation water management decisions. Both publications are available at the UWEX Learning store web site (Learningstore.uwex.edu/) in both electronic (PDF) and hard copy format.

New Publications: 1) *Irrigation Management in Wisconsin – The Wisconsin Irrigation Scheduling Program WISP* Publ. No. A3600-01 is an update to an older version with the same name. The new publication includes some new information on water evaporation rates from sprinkler irrigation systems, but also retains the original information.

The Wisconsin Irrigation Scheduling Program (WISP) Though not a new tool, WISP continues to be improved. WISP is an irrigation water management tool designed to help optimize crop water use efficiency by tracking the root zone water inputs and outputs. Using WISP's water balance predictions, along with soil moisture monitoring, a grower can plan irrigation timing and amount to take maximum advantage of natural rainfall while minimizing over-application of water. WISP uses the checkbook method to track water inputs (rainfall and irrigation) on a daily basis and losses through evapotranspiration (ET) and deep drainage. The WISP tool is available on the web at: <http://wisp.cals.wisc.edu/>.

2) *Methods to Monitor Soil Moisture* Publ. No. A3600-02 discusses the advantages and disadvantages of various moisture monitoring technologies as well as approximate costs. Sensor configurations (stationary versus portable) and options for data display and management are also included. The cost for soil moisture sensors has come down and quality has improved significantly over the last 5 to 7 years. There is now a sensor for every application and budget.

New Web Site: *Understanding Crop Irrigation* <http://fyi.uwex.edu/cropirrigation/> is the new UW-Extension web site that will continue to be updated with the latest information. The site includes links to the new publications, an Excel spreadsheet version of the scheduler and a list of equipment suppliers. Future (this summer) additions will include soil-water release curves and a complete irrigation webinar training series.

We will do our best to keep you informed of new resources as we become aware of them via this newsletter and the *Understanding Crop Irrigation* web site. Like all areas of agricultural production, technologies and equipment continue to evolve. Soil mapping and precision irrigation water application are just a couple examples of current trends. A willingness to evolve your production management system to take advantage of new technologies can improve product quality and yield.

Thinking Outside the Box: Integrated Parasite Management

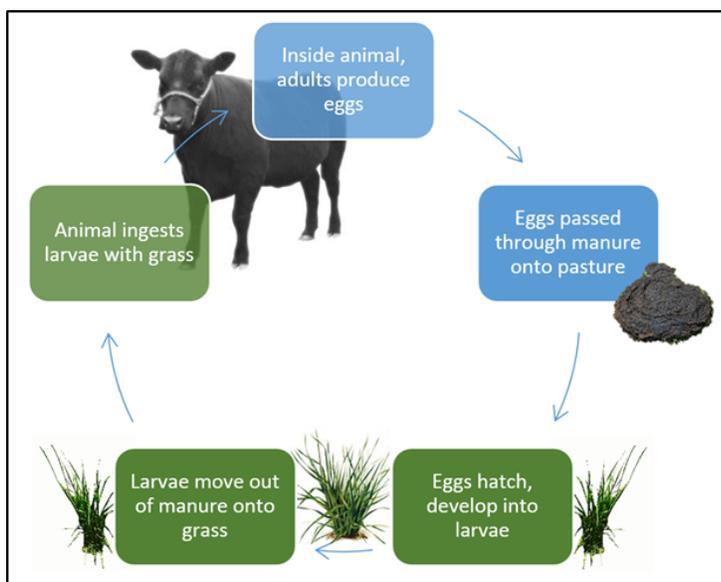
By: Lyssa Seefeldt, Marquette County

Cattle owners should take another look at their parasite management program as parasite resistance to products used for deworming isn't a question of if it will happen, but when. By utilizing multiple strategies to manage parasite load, these products will continue to work for longer. Most producers are familiar with Integrated Pest Management in the context of managing crops, but have you considered utilizing similar strategies in your parasite management program for your livestock?

Sheep and goats are more sensitive to parasitism than cattle, so it is critical to keep them in good health; but many farmers have encountered issues with parasites having resistance to deworming products. Sheep and goat owners have learned that using more than one strategy to control parasites is key to keeping their stock in good health with low levels of parasitism.

The main goal of parasite management is to somehow break the life cycle of the parasite(s) of concern. With integrated parasite management, you will be using multiple strategies to disrupt parasite life cycles, rather than just chemical methods.

General Life Cycle of Internal Parasites



How to break the parasite life cycle:

- Reduce exposure to eggs & larvae
- Reduce successful development of eggs to larvae
- Reduce ingestion of larvae

Strategies for Improving Parasite Management

Mature animals naturally develop immunity to parasites as long as they are in good health. Adequate nutrition allows animals to combat the effects of parasites. These mature animals can be used as pasture cleaners if you graze them after younger stock (they will be ingesting the parasites rather than your more vulnerable young stock). Consider utilizing multiple species in your grazing program (i.e. if you have

beef cattle, consider adding sheep, goats, or horses into your rotation) because parasites that affect cattle often don't affect sheep and vice versa, so you can clean pastures this way as well.

Rotate pastures to minimize exposure time to parasite larva being deposited in manure. Most parasites need a few days for the eggs to hatch, so if you rotate pastures every three days, you will stay ahead of heavy re-infestation from eggs dropped in that paddock. Subdividing pastures to allow each paddock to rest longer between grazing can help you avoid having to re-enter a pasture earlier than desired to avoid parasites. Rotating pasture into crops periodically can decrease the parasite burden of a pasture as well.

Providing ways to dry out and expose eggs to sunlight such as dragging through manure pats during warm, dry weather or keeping pastures clipped and/or harvested for hay if they get ahead of your grazing schedule will decrease parasites in your pasture. Avoid grazing pastures too short, as most parasite larvae are concentrated in the bottom few inches of forage.

If you are using chemical dewormers, work with your veterinarian and utilize fecal egg counts to determine if deworming is necessary. Try to identify heavy fecal egg shedding animals and cull from your herd. Eighty percent of parasite eggs are shed by 20% of the animals in a herd: these are the heavy shedders. Deworm *selected* animals, not the whole herd. Animals that are in poor condition are

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good candidates for deworming. By using strategic deworming, such as a treatment around the birthing period when shedding is the highest, you may be able to decrease the number parasites on pasture, but still retain parasites that are susceptible to dewormers. A strategic deworming after the first full rotation through your paddocks in the spring can be a good way to decrease larvae that survived the winter as the survivors will have been eaten by your animals and subsequently killed by the dewormer (if completed before larvae mature to egg-laying worms). Rotate the class of dewormer yearly to slow build-up of parasite resistance to particular drugs. Refer to the chart below for some common drugs within the three dewormer classes. Also try to avoid underdosing with dewormer as this can lead to resistance to the product. Make sure to keep records of drugs used and if the treatment was successful. This is invaluable information when you evaluate the herd next time to see if animals need treatment.

Classes of dewormers:

Dewormer Class	Drugs	Example Trade Names
Macrocyclic Lactones	Ivermectin Doramectin Moxidectin	Ivomec® Dectomax® Cydectin®
Imidazothiazoles & Tetrahydropyrimidines	Levamisole Pyrantel Morantel	Prohibit® Strongid® Rumatel®
Benzimidazoles	Fenbendazole Albendazole Oxfendazole Thiabendazole	Safeguard® Valbazen® Synanthic® TBZ®

May/June Dairy Breakfasts



May

28 Mayor's Dairyfest Breakfast, Central Wisconsin State Fairgrounds, Expo Building 513 E. 17th Street, Marshfield 54449. 5 - 10 AM. Tickets: \$5; Children under 6 free. All attendees receive a souvenir travel mug.

June

- 14 Marquette County June Dairy Breakfast**, 7 AM-Noon
Slowey Farms, N5400 County Road A, Westfield 53964
- 19 Wisconsin Rapids Dairy-Berry Breakfast**, Lincoln High School, 1801 16th Street South, Wisconsin Rapids 54494, 6 AM-10:30 AM
\$7 (Adults); \$5 (kids 5-12); 4 and under are free
- 20 Portage County's 36th Annual June Dairy Brunch and Open Farm**
Bulgrin Grand View Farms LLC—Jack, Debbie, Tyler and family
2023 County Road N&S Milladore 54454. Donation: \$6 (adults), \$2 (children 6-10), children 5 and under free. 8 AM-12:00 Noon.
- 21 Marshfield FFA Alumni June Dairy Breakfast**, UW-Marshfield Agricultural Research Station-North, M605 Drake Ave., Stratford 54484; 7 AM– Noon
\$7 (ages 11 & up); \$4 (preschool to age 10)
- 27 Auburndale FFA Alumni Dairy Breakfast**, Auburndale Village Park, 7AM-11 AM
\$6 (ages 10 & up); \$3 (children K4-age 10); free for preschool.
- 28 Waushara County Dairy Breakfast**
Flyte's Fieldstones, LLC, W10770 State Road 21, Coloma 54930, 7:30 AM-12:00 Noon.



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