The registration period for the February 2, 2018 CCA Exam begins October 2 and closes December 8. Online registration is available on the CCA website. Study materials for the International exam may also be found on the CCA website by clicking on the Exam tab.

One of the most common questions I get is “How should I start studying for the exam”? My answer is always the same. Start by going to the CCA website and review the Performance Objectives for the exam(s) you want to take. The International and Wisconsin Performance Objectives list all the potential subject matter which can be on each exam. Use them as a study guide to determine areas where you are prepared and areas where more study is needed.

To help prepare for the Wisconsin exam, UW Extension has prepared several resources which you may find useful. Approximately 50 short YouTube videos have been prepared specifically for the state exam. Although all performance objectives are not covered in these videos, the major points of crop production are addressed. The videos are grouped in three playlists:

- Soil Science Fundamentals for Field Crops
- Field and Forage Crop Fundamentals
- Weed, Insect and Disease IPM for Field Crops

Additionally, over 100 electronic resources have also been developed by UW Extension specialists and can be useful for both exam preparation and as well as background information for general and specific crop production recommendations. A list of relevant UW-Madison websites is also available at the end of this list which contains more references.
To be considered, the 2018 Nomination Form must be completed and 2 letters of reference must be provided and submitted to Bryan Jensen. Nomination Criteria will help with the nomination process.

Deadline for submission is March 2, 2018. The 2018 recipient will receive a commemorative plaque and a $500 cash award at the January 2018 CCA Luncheon. Contact Bryan Jensen (bmjense1@wisc.edu, 608-263-4073) if you have questions.

Wisconsin Fruit News-Oct 6, 2017
Janet van Zoeren and Christelle Guédot, UW-Extension
http://go.wisc.edu/091685

This is the final newsletter of the 2017 season. Thank you for reading! We look forward to a quiet winter, and to be starting up again in the spring!

This week you can read about:

• Last issue this season — thanks for reading!
• Fruit insect report
• Plant Disease Diagnostic Clinic update
• Fall treatment for Phytophthora root rot of raspberry
• Post-harvest management in the vineyard
• Wine and table grape developmental stages
• Brown marmorated stink bug update / late-season apple damage

A Visual Guide to Soybean Growth Stages
Shawn Conley, State Soybean and Small Grains Specialist

Understanding and being able to correctly identify the growth stages of soybean is important for making sound agronomic management decisions. This guide describes the growth stages starting with germination, progressing through the vegetative stages (V) and concluding with the reproductive stages (R). Coolbeans!

To view the visual guide, go to this site: http://www.coolbean.info/library/documents/2017_Soybean_Growth-Dev_Guide_FINAL.pdf
UW/UWEX Plant Disease Diagnostic Clinic (PDDC) Update October 6

Brian Hudelson, Sue Lueloff, John Lake and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from September 30, 2017 through October 6, 2017. The 10/06/17 PDDC Wisconsin Disease Almanac (i.e., weekly disease summary) is now available at:

PDDC Summary- October 6, 2017

UW/UWEX Plant Disease Diagnostic Clinic (PDDC) Update October 13

Brian Hudelson, Sue Lueloff, John Lake and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from October 7, 2017 through October 13, 2017. The 10/13/17 PDDC Wisconsin Disease Almanac (i.e., weekly disease summary) is now available at:

PDDC Summary- October 13, 2017

Sampling Soils for Testing

John B. Peters and Carrie A.M. Laboski

A soil test is the only practical way of determining whether lime and fertilizer are needed for a specific crop. However, if a soil sample does not represent the general soil conditions of the field, the recommendations based on the sample may be misleading. An acre of soil to a 6-inch depth weighs about 1,000 tons, yet less than 1 ounce of soil is used for each test in the laboratory. Therefore, it is very important that the soil sample be representative of the entire field.

This four page publication is attached at the end of this newsletter.

Weed Identification Series, Barnyardgrass

Mark Renz UW Madison Associate Professor and Extension Specialist, Chelsea Zegler UW Madison Associate Research Specialist

Well the season is nearly over, but we wanted to point out a weed species that had a prolific year: Barnyardgrass. This species has long been present in Wisconsin, but until this year I rarely saw it in fields. This year it was common throughout the state in fields, on the side of roads, in ditches, wetlands, and even in urban areas. I chalk this up to the wet year, as this species prefers wet vs dry soils. Once established however it will survive in a range of conditions, so it should be no surprise that it ranks as one of the world’s worst weeds. It has been documented to be a serious weed in over 42 countries.

Barnyardgrass is a summer annual grass that begins to germinate in May with the foxtails. If present it can grow as large if not larger than foxtails, but one of the reasons I bring up this species at the end of the year is it can produce huge numbers of seeds. Research has shown that one plant can produce in excess of 750,000 seeds. Doing some quick math and looking at some of the populations I think it is safe to assume we will have large barnyardgrass seedbanks in our soil for years to come. The bad news is that seeds can remain viable for up to 4 years, even longer under specific conditions.

The good news is this plant is a fairly easy annual grass to identify. It lacks a ligule and auricle (see factsheet if you don’t know what those are) and has flattened stems. These three characteristics make it easy to identify when young before it flowers. We have a range of products in crops we grow that effectively manage this plant.

So in conclusion be on the lookout for this plant in 2018, especially if seen nearby in 2017. Check out the factsheet to learn about how to ID this species.

For more information on this species from the Weed Science Society of America click here:

http://wssa.net/wp-content/themes/WSSA/WorldOfWeeds/barnyardgrass.html
New CCAs!

Bryan Jensen, UW Extension

The Wisconsin CCA Board takes great pride in welcoming a new group of Certified Crop Advisers. Please review the list and extend them a warm welcome and congratula-
tions on a job well done!

Wisconsin CCA’s Achieving Certification in 2016:

- Ailts, Joe
- Allen, Zachary
- Braml, Joe
- Cartwright, Julie
- Clark, Christine
- Cornell, Caleb
- Franz, Benjamin
- Heddcke, Janet
- Henderson, Haily
- Hinz, Douglas
- Kell, Eric
- Kloth, Ashley
- Kuenstler, Steven
- Matelski, Morgan
- Meyer, Bill
- Mlostek, David
- Morgan, Danielle
- Much, Kyle
- Murry, Bradly
- Pape, Andrew
- Post, Ethan
- Sander, Craig
- Scheel, Ashley
- Sytsma, Paul
- Wisth, Hannah

CCAs Reaching the 20 Year Milestone!

Bryan Jensen, UW Extension

Just as we celebrate the new CCAs it is also time to honor those who have been certified for 20 years! Look through the list and see how many names you recognize. Wis-
consin Agriculture is a small world. My guess is you will recognize several. Congratulations to all!

CCAs reaching the 20 year milestone:

- Afdahl, Kurt
- Bauer, David
- Bensend, Andy
- Brunner, William
- Busse, Lisa
- Durst, Daniel
- Edgar, Christopher
- Ehlers, Kevin
- George, Patricia
- Haynes, Mark
- Heise, Randy
- Hoffmann, Steven
- Knutzen, Paul
- Kufalk, Brad
- Mullooly, Patrick
- Petersen, Brent
- Petrie, Thomas
- Popple, Timothy
- Prill, Todd
- Riemer, Clark
- Schofield, Matthew
- Weihing, Mark
- West, David
- West, Brian
A soil test is the only practical way of determining whether lime and fertilizer are needed for a specific crop. However, if a soil sample does not represent the general soil conditions of the field, the recommendations based on the sample may be misleading. An acre of soil to a 6-inch depth weighs about 1,000 tons, yet less than 1 ounce of soil is used for each test in the laboratory. Therefore, it is very important that the soil sample be representative of the entire field.

Before collecting soil samples, you should determine the overall approach of the nutrient management program. This will affect the number of samples needed and method by which samples will be taken. Specifically, will nutrient and lime applications be made at a single uniform rate for the whole field being tested or will applications be made at variable rates to field areas that have been identified as having different soil test levels?

**Goals of a soil sampling program**

When sampling soils for testing and obtaining fertilizer and lime recommendations, the most common objectives are to:

1. Obtain samples that accurately represent the field from which they were taken.
2. Estimate the amount of nutrients that should be applied to provide the greatest economic return to the grower.
3. Estimate the variation that exists within the field and how the nutrients are distributed spatially.
4. Monitor the changes in nutrient status of the field over time.

**Selecting a soil sampling strategy**

Before selecting a sampling strategy, consider analytical costs, time and equipment available, field fertilization history, and the likelihood of a response to applied nutrients.

**Sampling fields for a single whole field (uniform) recommendation**

With conventional sampling, you will receive a single set of nutrient and lime application guidelines that are based on sample averages. The sampling guidelines in Table 1 are based on when a field was last tested (more or less than 4 years ago) and whether the field was responsive or nonresponsive the last time it was tested. The field is considered to be in the responsive range if either soil test phosphorus (P) or potassium (K) levels are in the high (H) category or lower. A nonresponsive field is one where both soil test P and K levels are in the very high (VH) or excessively high (EH) categories.

Each sample should be made up of a minimum of 10 cores to ensure accurate representation of the nutrient needs of the field. Research has shown that taking 10 to 20 cores provides a more representative sample of the area than when samples are made up of fewer cores. When gathering soil cores to make a composite sample, use a W-shaped sampling pattern (as shown in Figure 1) over the whole area the sample represents. Be sure to thoroughly mix the cores before placing approximately 2 cups in the sample bag.

For best results, submit multiple samples for all fields. When at least three samples are provided for a field, samples that are significantly higher than the field average may be discarded and an adjusted average calculated. Using an adjusted average will improve the quality of nutrient management decisions for the grower.

**Table 1. Recommended sample intensity for uniform fields.**

<table>
<thead>
<tr>
<th>Field characteristics</th>
<th>Field size (acres)</th>
<th>Suggested number of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields tested more than 4 years ago OR fields testing in the responsive range</td>
<td>All fields</td>
<td>1 sample/5 acres</td>
</tr>
<tr>
<td>5–10</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11–25</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Nonresponsive fields tested within past 4 years</td>
<td>26–40</td>
<td>4</td>
</tr>
<tr>
<td>41–60</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>61–80</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>81–100</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

* Collect a minimum of 10 cores per sample.
average helps ensure that no part of the field is under-fertilized.

Where only one or two samples are taken in a field, no sample will be discarded, whereas one sample can be discarded if three or four samples are taken, and up to two samples may be discarded from fields having five or more samples. The criteria that determine if soil samples should be omitted from the field average include:

- If the average soil test P for a field is 35 parts per million (ppm) or less, samples that exceed the field average by more than 5 ppm may be removed and the field average recalculated.
- If the field average is greater than 35 ppm P, no samples will be discarded.
- If the average soil test K for a field is 175 ppm or less, samples that exceed the field average by more than 20 ppm may be discarded and the field average recalculated.
- If the field average is greater than 175 ppm K, no samples will be discarded.

It is not appropriate to vary nutrient application rates across sampling areas when using the whole field (uniform) soil sampling scheme.

**Sampling fields for site-specific management**

Site-specific management requires a distinct picture of the magnitude and location of soil test variability. Sampling soils for site-specific management usually involves taking many more composite samples than sampling for a single recommendation. A global positioning system (GPS) is used to record the geographical coordinates of each sample. This information is used to generate an application map by using various mathematical techniques to interpolate the nutrient application rate between sampling points. Using variable rate application technology, these fields can be managed more intensively than the conventional approach of one fertilizer and lime rate per field. A careful evaluation of the economics of this intensive

of a sampling system needs to be done before proceeding.

When using a site-specific approach to soil sampling, sample handling and testing are similar to the traditional system, but recommendations may vary from one part of the field to another, and these areas must be managed separately to realize the potential advantages of intensive soil sampling.

Several sampling strategies can be used to guide variable-rate fertilizer and lime applications. Grid sampling uses a systematic approach that divides the field into squares of approximately equal size (grid cells). The sampling technique used is known as grid-point sampling. A grid-point sample consists of at least 10 cores collected from a small area (10-foot radius) around a geo-referenced point. When using a grid sampling approach, Wisconsin research recommends a sampling strategy based on an unaligned systematic grid (Figure 2). Sampling points should be unaligned because sampling in a uniform grid arrangement may lead to biased results if aligned with row patterns. Fields that have soil test P and K levels in the nonresponsive categories should be grid-point sampled on a 300-foot grid. This is equivalent to one soil sample for every 2 to 2.5 acres. Where there is no information about the P or K status of the field or where previous tests were in the responsive range, a 200-foot grid size should be used. This is equivalent to approximately one soil sample per acre. Wisconsin research indicates these small grid cell sizes are needed to adequately characterize the variability in soil fertility. A larger grid cell size (such as 5 acres) may not adequately describe the field variability and may limit the potential economic benefits of site-specific management.

**Other considerations in selecting a sampling strategy**

Select the sampling strategy appropriate for the field size and topography.

**Contour strips.** On contour strip fields, sample each strip separately if it is approximately 5 acres or more in size, following the sampling intensity guidelines provided in Table 1. Cores from two or three small strips that have identical cropping and management histories may be combined following these same recommended sampling intensity guidelines. Using a grid-point sampling approach on contour strips or small fields is not appropriate, regardless of grid cell size. This is because a grid technique may result in many soil samples being collected from one contour strip but none in other strips; additionally, grid-point samples may be on the edge of the strips and not adequately represent the strip.

**Five-acre grid-point sampling.** The 5-acre grid point sampling system for whole field management recommendations has recently become popular with soil samplers because it takes less time to collect cores, compared to the traditional W pattern. Another advantage of this approach is its ability to track changes in soil test levels over time, because soil samples are collected from the same geo-referenced point each time the field is sampled. Five-acre grid-point sampling can likely be used in some situations and not in others. For example, in fields that were soil sampled within the past 4 years and tested in the nonresponsive range, averaging the soil test results from 5-acre grid-point sampling is reasonable. This is because there previously had not been a fertilizer recommendation on these fields and some variability at excessively high soil test levels does not change the fact that no fertilizer was recommended. For fields that were sampled more than 4 years ago or where past soil test results were in the responsive range, 5-acre grid-point sampling may not be the best choice of sampling techniques. This is because 5-acre grid-point sampling may not adequately represent the variability within a field, and a comparatively small change in soil test level of 5 to 10 ppm could mean a large change in the amount of nutrients recommended. For
small fields and contour strips, taking a few 5-acre grid-point samples in each field and averaging them likely does not provide a representative sample of the field. Additionally, the total number of samples may be so few that none of them can be eliminated from the field average if it appears one is an outlier.

**Smart (zone or directed) sampling.** Another approach gaining support among researchers is smart sampling, also known as directed or management zone sampling. This approach uses information that has been collected using other precision agricultural technologies such as yield maps, aerial photographs of bare soil or crop canopy, or soil electrical conductivity measurements. Directed sampling evaluates the spatial distribution of several factors that may influence nutrient availability and crop productivity to help define sampling areas with similar characteristics. With previous comments in mind, either the W pattern or grid-point method can be used to collect samples within management zones. If the results of grid or management zone sampling do not warrant variable-rate application (for example, relatively little between-sample variation), average them to determine the appropriate single-rate treatment.

**Procedures for taking soil samples**

**When to take soil samples**

Take soil samples at any convenient time. Studies examining the effect of sampling time on soil test results suggest that test values for pH and phosphorus (P) are typically slightly higher in early spring samples than in fall samples. The effect of time of sampling on soil test potassium (K) results is dependent upon clay mineralogy and soil test level. Soil test K results may be higher in spring compared to fall on lower testing soils, but on higher testing soils, soil test K may be lower in spring compared to fall. To receive your recommendations early enough to enable you to apply the lime and fertilizer needed, it may be best to sample in the fall. Another benefit of fall testing is that fertilizer prices are more likely to be discounted then. Hayfields can be sampled after any cutting. Regardless of when you sample, it is best to be consistent from one year to the next. Winter sampling, or sampling when the soil is frozen, is permissible only when it is possible to take a uniform boring or core of soil to the appropriate depth. This may require using a portable power boring tool. Using a pick or spade to remove a few chunks of frozen soil from the surface will give inaccurate results.

**How to take soil samples**

Certain government agency programs require nutrient management plans prepared according to the current USDA-NRCS nutrient management standard (590). Soil sampling and testing procedures and nutrient application rates based on these soil tests must be consistent with the provisions of the 590 standard to be eligible for many cost-sharing programs. These provisions currently include: following the soil sampling techniques outlined above, soil testing by a Wisconsin certified laboratory, and use of nutrient application rates consistent with the guidelines contained in the University of Wisconsin-Extension publication **Nutrient Application Guidelines for Field, Vegetable, and Fruit Crops in Wisconsin** (A2809).

When ready to sample, use a sampling probe or auger. You can obtain these tools on loan from most county Extension offices (counties.uwex.edu) or fertilizer dealers. Avoid sampling the following areas:

- Dead furrows or back furrows
- Lime, sludge, or manure piles
- Animal droppings
- Near fences or roads
- Rows where fertilizer has been banded
- Eroded knolls
- Low spots
- Where stalks or large bales were stacked
- Headlands

Insert the probe or auger into the soil to plow depth or at least 6 inches. The sampling depth should be consistent. To aid year-to-year comparisons, it is important to take repeated samplings from the same field to exactly the same depth.

1. Take at least 10 soil cores or borings for each composite sample and, preferably, at least two composite samples for every field. For nonresponsive fields greater than 5 acres in size, obtain, at a minimum, the number of samples specified in Table 1. For responsive fields, as well as all fields that have not been sampled in the past 4 years, take one composite sample for every 5 acres.

2. Thoroughly mix the sample, then place about 2 cups of soil in a sample bag.

3. Identify the bag with your name, field identification, and sample number.

4. Record the field and sample location on an aerial photo or sketch of the farm and retain for your reference. Record the GPS coordinates, if available.

5. Fill out the soil information sheet. A completely and carefully filled out information sheet will provide the most accurate nutrient recommendations.

6. Provide the soil name and field history whenever possible for more accurate recommendations. Information about legume crops previously grown on the soil and manure application history is essential for proper nutrient crediting from these sources. Include soil names and/or map unit symbols from county soil testing offices (counties.uwex.edu) or fertilizer dealers.
survey reports, web soil survey (http://weboilsurvey.nrcs.usda.gov/app/), or individual farm conservation plans. To obtain this information, contact your county Extension agent, NRCS district conservationist, or the County Land Conservation Department (LCD).

**How often to sample**

Most fields should be retested at least every 4 years to monitor soil fertility levels of immobile nutrients and pH to prevent nutrient deficiencies and avoid excess nutrient accumulation. Crop nutrient removals over a 4-year period in most cropping systems will not change soil test levels enough to affect recommended nutrient application rates. Exceptions include sands and loamy sands, which should be tested every 2 years. Also, depending on the initial soil test P and K levels, cropping systems such as high-yielding corn silage or alfalfa may require more frequent testing to adequately monitor changes in soil test levels.

**What to do with soil samples**

The soil samples and a completed soil information sheet can be taken to your county Extension office for forwarding to a certified soil testing laboratory, sent directly to the soil testing laboratory, or delivered in person.

To receive nutrient application rate guidelines consistent with those found in A2809, submit your soil samples to one of the Wisconsin certified laboratories. The College of Agricultural and Life Sciences, University of Wisconsin–Madison and the University of Wisconsin-Extension, through the Department of Soil Science, operate soil testing laboratories at Madison and Marshfield. Several private laboratories are also certified, and are listed at http://uwlab.soils.wisc.edu/wdatcp/. To become certified, laboratories must use the soil testing methods and nutrient application rate guidelines specified by WDATCP and must also meet quality control standards through periodic analysis of quality control soil samples.

To have your soil tested by the University of Wisconsin, send your samples to either of the listed laboratories. Find a sample submission form at https://uwlab.soils.wisc.edu/farm-soil/.

**Tillage system considerations when sampling**

**Moldboard plowing.** Sample to the depth of tillage.

**Chisel plowing and offset disking.** Take soil samples to ¾ of the tillage depth. When possible, take soil samples before spring or fall tillage. Sampling before tillage lets you determine the sampling depth more accurately and avoid fertilizer bands applied for the previous crop.

**Till-plant and ridge tillage.** Sample ridges to a 6-inch depth and furrows (between rows) to a depth of 4 inches. Combine equal numbers of soil cores from ridges and furrows to make up the composite sample.

**No-till.** Fields that have not been tilled for 5 or more years may develop an acid layer on the surface from the use of nitrogen fertilizer. This acid layer could reduce the effectiveness of triazine herbicides. Unincorporated phosphorus (P) and potassium (K) are also likely to build up in the surface soil. If an acid layer is suspected, take a separate sample to a depth of only 2 inches. When sending the soil to the lab, indicate that the sampling depth was only 2 inches. This sample will be tested for pH only, unless P and K are specifically requested. For fertilizer recommendations, take a separate sample to a depth of 6 to 7 inches. Fertilizer recommendations require this sampling depth because fertilizer calibration studies are based on plow-depth sampling. Sample between rows to avoid fertilizer bands.

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**Authors:** Carrie Laboski is associate professor of soil science and John Peters is director of the University of Wisconsin–Madison soil testing labs in Madison and Marshfield. Both hold joint appointments with the College of Agricultural and Life Sciences, University of Wisconsin–Madison, and University of Wisconsin-Extension, Cooperative Extension. Cooperative Extension publications are subject to peer review.

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