Wisconsin Crop Manager

Volume 23 Number 30- - University of Wisconsin Crop Manager - -October 13, 2016

Contents

What is happening in the corn plant during the month of October?

Joe Lauer, Wisconsin Corn Agronomist Corn

For most of Wisconsin hybrids (~100 day), each plant typically develops 20-21 leaves, silks about 55-60 days after emergence, and matures about 120 days after emergence. All normal plants follow this same general pattern of development, but specific time intervals between stages and total leaf numbers developed may vary between different hybrids, seasons, planting dates and locations. The rate of plant development for any hybrid is directly related to temperature, so the length of time between the different stages will vary as the temperature varies. Environmental stress may lengthen or shorten the time between vegetative and reproductive stages. The length of time required for the yield components of ear density, kernel number, kernel weight varies between hybrids and environmental conditions.

During October, frost has no effect on yield. However, lodging from disease, insect damage or hail can result in physical loss of yield. Grain harvest usually begins at about 25% grain moisture and is completed by 20% grain moisture. Some grain drying is usually necessary to get moisture down to 13-15% for long-term storage.

Yield

Ears per unit area, kernal number per ear and kernal weight all contribute to yield. These yield components of corn are determined early in the life cycl;e of the corn plant. It is true that yield is the end product but the plant must go through a number of stages to produce yield. Understanding this process won't necessarily put "money in your pocket", but by knowing when yield components are determined helps to interpret management and environmental factors influencing yield.

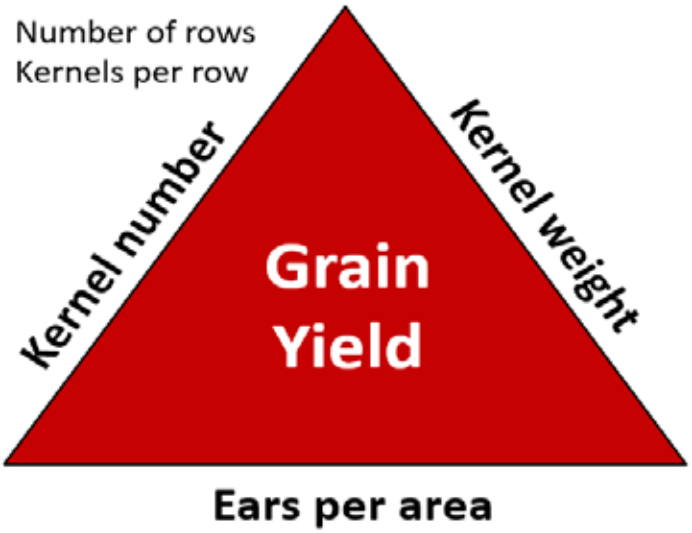

Figure 1. Yield Components of Corn.

Ear number, kernel number and kernel weight are determined at six critical stages: at planting and emergence (VE-V4) when the potential number of ears in an acre is at a maximum; when the ear sets the maximum number of kernel rows (V5-V6); when the ear sets the maximum number of kernels along length of the ear (V15-VT); when the maximum number of ovules are pollinated to form developing embryos (R1-R2); when the maximum number of kernels is determined (R4-R5); and when the maximum kernel size is established (R5-R6).

Moisture

While corn grain yield is determined over the full season, at some point during the growing season yield is no longer the main production objective. Rather grain moisture becomes the main production focus and directly influences grain quality during storage. Grain quality is often established by conditions at the very end of the growing season. During wet fall weather growers need to move quickly on deteriorating grain.

Post mortem

The corn ear can tell us much about a plant's development during the growing season. Abnormal ear development has multiple causes – environmental stresses, pests, cultural practices. Combined with information on field history, knowledge of ear and kernel anomalies can be an effective diagnostic tool in troubleshooting corn production problems. Understanding how corn ears respond to stress can help determine the nature of the stress, when it occurred, and how it might be managed or avoided in the future. See "Troubleshooting Abnormal Corn Ears" at http://u.osu.edu/mastercorn/.

October is also the month to learn how your management style interacted with the environment. It is the time to evaluate your on-farm trials and observations. It is important to write down these observations about how your land responded to your management and decisions you made this past year.

Phomopsis seed decay – An Increasing Issue for Delayed Soybean Harvest in Wisconsin

Damon L. Smith, Extension Field Crops Pathologist,
University of Wisconsin-Madison

As the rain continues in Wisconsin and the 2016 soybean harvest gets delayed longer, Phomopsis seed decay is going to become an increasing concern. Phomopsis seed decay (Fig. 1) of soybean is caused by the fungus Diaporthe longicolla which is the same fungus that causes pod and stem blight (Fig. 2). This fungus also causes

Table 1. Maximum storage time (months) of corn.*

Temperature (°F)	Corn moisture content						
	13%	14%	15%	16%	17%	18%	24%
40	150	61	29.0	15.0	9.4	6.1	1.3
50	84	34	16.0	8.9	5.3	3.4	0.5
60	47	19	9.2	5.0	3.0	1.9	0.3
70	26	11	5.2	2.8	1.7	1.1	0.2
80	15	6	2.9	1.6	0.9	0.9	0.06

* Based on 0.5% maximum dry matter index - calculated on the basis of USDA research at Iowa State University. Corresponds to one grade number loss, 2-3% points of Total Damaged grain.

Figure 1. Soybean seed affected by Phomopsis seed decay on the left compared to healthy seed on the right.

"zone lines" that are often observed in split stems and tap roots. These "zone lines" were once thought to be cause by the charcoal rot fungus, but we now know that is incorrect. You can learn more about "zone lines" by CLICKING HERE.

What does Phomopsis seed decay look like?

The fungus that causes Phomopsis seed decay can infect soybean plants early in the season and colonize pods and infect seeds near, or at maturity. Infected seed will often be shriveled or undersized (Fig 1.) and can have a white or chalky appearance. If pods are opened in the field a white cottony "mold" (different than that of white mold) can be observed. Infected seed can pass the Phomopsis seed decay fungus on in seedlings of the next soybean crop. Therefore, it is important to identify Phomopsis seed decay especially in soybean-seed fields.

Figure 2. Symptoms and signs of soybean pod and stem blight.

What conditions are favorable for Phomopsis seed decay?

Warm and wet weather during pod fill and maturity favor the development of Phompsis seed decay. The conditions were prevalent throughout much of the state in of Wisconsin in 2016. Soybean varieties that matured early are also more prone to Phompsis seed decay. Other stresses such as nutrient deficiencies or virus infections can also increase the occurrence of Phompsis seed decay. Infested seed is a likely source of Phompsis seed decay, however, the fungus can survive on soybean debris and certain weeds like velvetleaf.

How should I handle soybeans with Phomopsis seed decay?

Scout fields before harvest to get an idea of how much Phomopsis seed decay you might have in a field. Scout multiple plants in at least 5 locations in a field, opening pods to determine if Phomopsis seed decay is present. In fields where Phomopsis seed decay is observed, harvest should be prioritized as soon as combines can enter the field. Seed infected with the Phomopsis seed decay fungus will continue to rot in the pod until they are harvested.

How should I manage Phomopsis seed decay in the 2017 soybean crop?

Harvested grain intended to be seed for the 2017 crop should be cleaned thoroughly and undersized or damaged seed removed. Seed with an extremely high incidence of Phomopsis seed decay should not be used. Using a fungicide seed treatment may help improve emergence of infected seed. Resistant soybean varieties should also be used. Choose later maturing varieties

appropriate for your location. Earlier maturing varieties tend to be more susceptible to Phomopsis seed decay. Finally, cultural practices such as rotation (corn or wheat are preferred) and tillage to manage infested residue should be considered in high-risk fields.

Additional Resource

A fact sheet about Pod and Stem blight and Phomopsis seed decay has been developed by a consortium of soybean extension pathologists. You can download that fact sheet by clicking here.

2016 WSA Soybean Yield Contest

Shawn P. Conley,Soybean and Wheat Extension Specialist

This is a friendly reminder that entry forms for the WSA Soybean Yield Contest need to be post marked by October 15, 2016.

Click here to obtain a PDF of the form.

Guidelines for Soil Compaction Management During a Wet Harvest Season

Francisco Arriaga, Assistant Professor and Extension Specialist, Dept. of Soil Science; francisco.arriaga@wisc.edu

Brian Luck, Assistant Professor and Extension Specialist, Dept. of Biological Systems Engineering; bluck@wisc.edu

University of Wisconsin-Madison, and UW-Extension

Fast Facts:

- Waiting for better soil moisture conditions is best, but not always possible.
- Reduce axles loads and maintain low equipment tire pressure.
- Managing equipment traffic pattern can help contain and reduce soil damage.
- Don't assume subsoiling is needed.
- Surface tillage might be needed to address ruts.
- Cover crops can help.

Background:

Crop yields are decreased in compacted soils. This reduction in yield is caused by a reduction in root growth, water infiltration and plant water availability. Therefore, it is important to reduce the risk of soil compaction. Wet soil conditions in the fall increase the risk for causing soil compaction during harvest operations. Below are some guidelines to help prevent forming, diagnose, and manage soil compaction during wet harvest conditions. Preventing soil compaction from happening is usually the best management approach when possible.

Guidelines:

One of the main issues during wet harvest is the creation of ruts from equipment traveling in a field. Rutting creates an uneven soil surface which affects seed to soil contact during planting the following season's crop. Also, ruts are a sign of surface soil compaction and clay smearing which increase the likelihood of soil crust to form. An effective strategy to reduce the risk of ruts is to manage traffic patterns in a field.

Most discussions of traffic pattern management within agricultural fields involves uniform machinery sizing and Global Positioning System (GPS) guidance of machines. However, it can also be achieved with some awareness and discipline on the part of the operators. This is even easier in wet conditions where rutting has occurred. Maintaining repeated travel patterns between transport equipment and the harvester (i.e. driving in the ruts) can reduce the damage of operating on wet soils and will confine any damage to specific and well known locations in the field. Figure 1 shows GPS data, collected once per second, on every piece of equipment involved in an operation harvesting alfalfa for ensiling. The left image shows the paths of two mergers, the forage harvester, and six transport trucks. The right image only shows the path of the forage harvester, simulating managed traffic, where every other piece of machinery is staying within the forage harvester tracks. Although the entire field is impacted by the operation of the machinery future corrective measures could be taken on the locations of the ruts rather than applying the correction to the entire field.

Some other machinery specific considerations for operating in wet conditions are to: 1) utilize machines equipped with tracks if possible, 2) maintain tire pressures as low as practical, 3) attach dual wheels wherever possible, 4) consider only carrying half (or reduced) loads out of the field, and 5) utilize tractor based transport equipment within the field while loading transport trucks at the edge of the field. Using equipment equipped with tracks spreads the mass of the machine over a greater area which reduces the overall pressure exerted on the soil. This effect is also achieved by running tire pressures as low as practical and implementing dual wheels wherever possible. Reduction of the total machine weight by only carrying half loads out of the field will reduce the total pressure exerted on the soil as well. There is a harvest efficiency consideration with this, in that it will take longer to harvest, so a judgement call on whether this is a good approach will need to be made based on crop quality and weather conditions. Finally, utilizing grain carts or dump carts to carry the product out of the field will reduce compaction with that equipment having larger tires and spreading the load over a larger area as opposed to utilizing trucks.

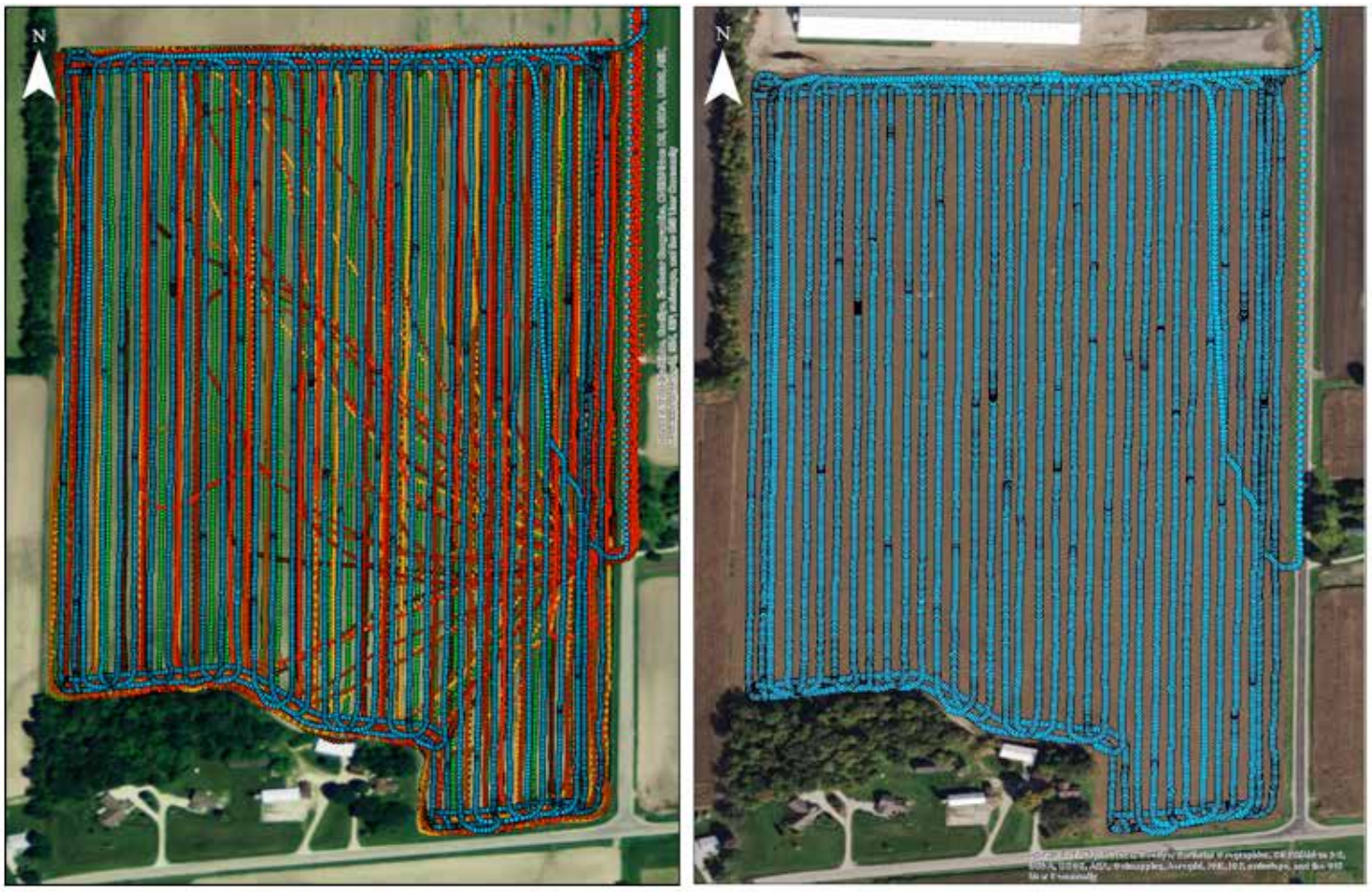

Figure 1. Global positioning system data of an alfalfa forage harvest operation with all equipment involved; merger path, chopper path, and six transport truck**s (Left).** Global positioning system data of forage harvester path only simulating controlled traffic within a harvest operation **(Right).**

If there is a considerable amount of tire ruts, doing some light tillage to smooth the soil surface will help with planting operations. If ruts are present, surface tillage might be needed to improve the seedbed. Surface tillage can be done localized to those areas with ruts only if needed. Then plant a cover crop if possible, probably a grass such as cereal rye that has a fibrous root system that will help that soil surface.

If shallow compaction (<6" deep) is detected, plant a cover crop (again cereal rye would be a good option for this, maybe mixed with a legume but not necessary for this) and track compaction with a penetrometer in the fall and spring. Freeze/thaw conditions this winter can also help alleviate shallow compaction but might not always work.

Don't assume that the presence of ruts indicates subsoil compaction. Soils are most susceptible to compaction at water contents near field capacity because the proportion of soil pores filled with air and water is just right for compaction (soil consolidation) to occur. It seems counterintuitive, but soils with most of the pores filled with water are less susceptible to subsoil compaction. Recall that liquids are not compressible, unlike air, thus can bear an equipment load whereas air would allow for a pore space to collapse. However, soils near saturation are very prone to rutting and smearing near the surface.

If deep/subsoil compaction (deeper that 6") is detected, a sub-soiling or deep strip-tillage operation might be helpful. A cover crop would help here as well, but it will depend more on the growing season required for that cover crop and its root system's ability to penetrate the compacted layer. Freeze/thaw will not help for deep compaction (need the freeze/thaw cycles, similar to wetting/drying, to loosen the soil). There is a chance that a cover crop will help here, so it might pay off to monitor compaction this fall and again in the spring to determine if a deep tillage operation (e.g. sub-soiling or deep strip-till) is needed.

It is recommended for long-term no-tillage fields with ruts or other soil damage in localized spots in the field, to just target those areas with tillage if needed and leave the rest of the long-term no-tillage field alone.

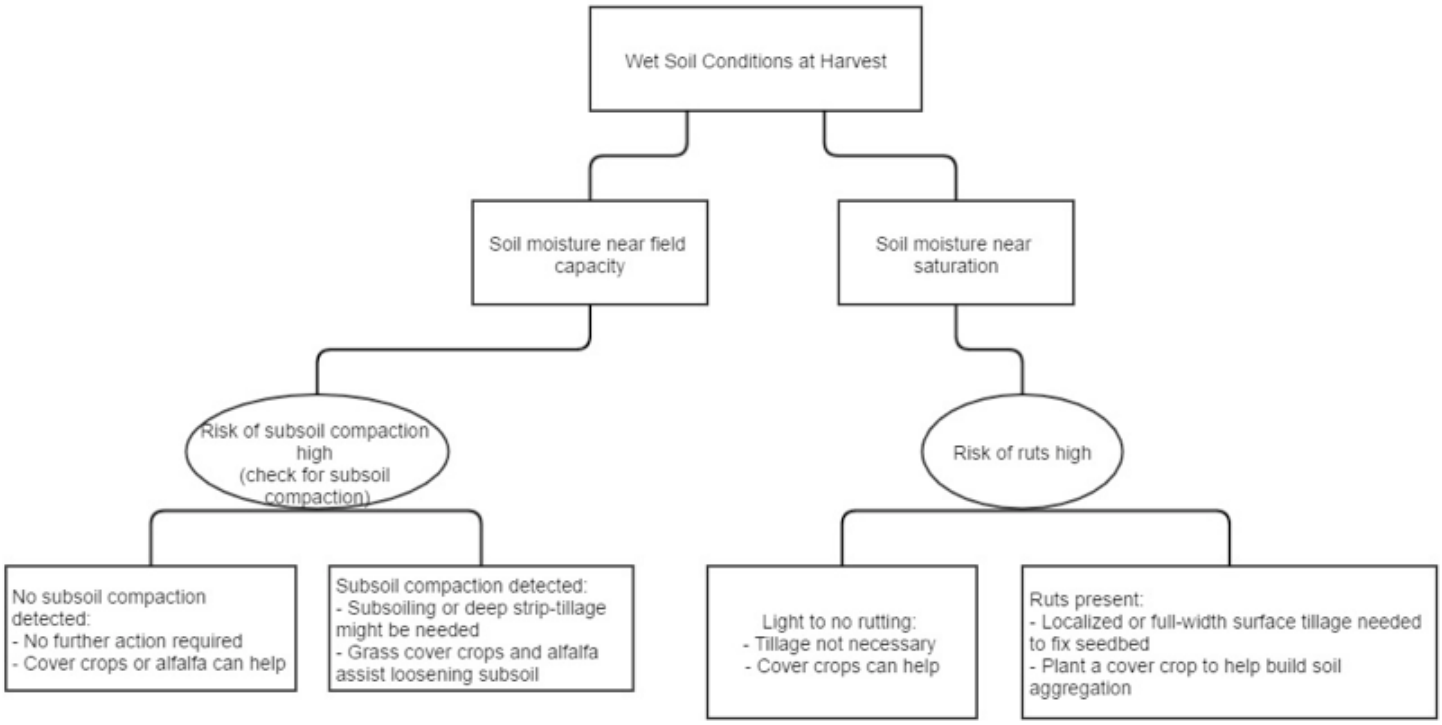

Figure 2. Decision diagram to assist in determining soil compaction presence after harvest during wet field conditions.

Soils in long-term no-tillage fields have a greater ability to "bounce" back than of conventional tillage managed soils.

In general, soils should be allowed to dry before any other operations are implemented, if weather cooperates. The diagram below can be used as an aid to assess the risk of soil compaction after harvest in wet field conditions (Figure 2). A You Tube video "Using a penetrometer to detect soil compaction" can be accessed at: https://youtu.be/Zq_785JqRq8?list=PLF17555C62D9A378B

2017 Wisconsin CCA of the Year

Bryan Jensen, UW Extension and IPM Program

The Wisconsin CCA Board is now accepting nominations for the 2017 Wisconsin CCA of the Year Award. This award is designed to recognize a CCA who is highly innovative, delivers exceptional customer service, has shown that they are a leader in their field, and have contributed to the exchange of ideas and the transfer of agronomic knowledge to the Wisconsin agriculture industry.

Customers, employees, colleagues or others associates may nominate a candidate. The selection committee is comprised of current WI CCA Board and nominees will be evaluated solely on the information provided in the nomination form and accompanying letters of recommendation.

To be considered, the 2017 Nomination Form must be completed and 3 letters of reference provided. Nomination Criteria will help with the nomination process.

Deadline for submission is March 3, 2017. The 2017 recipient will receive a commemorative plaque and $500 cash award at the January 2017 CCA Luncheon. Contact Bryan Jensen (bmjense1@wisc.edu, 608-263-4073) if you have questions.

Wisconsin CCA Exam Study Materials

Bryan Jensen, UW Extension and IPM Program

The registration period for the February 3 CCA Exam is open until December 9. 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.

The first step in exam preparation is to read the International Performance Objectives and/or the Wisconsin Performance Objectives. Performance Objectives are updated every 4 years and are broken into four sections: Nutrient Management, Pest Management, Crop Management and Soil and Water Management. All exams questions are based on these performance objectives.

To help prepare for the Wisconsin exam, UW Extension has prepared several resources for you to use. Approximately 50 short videos have been prepared specifically for the state exam and are grouped in three playlists:

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

An additional set of over 100 electronic resources have been developed by UW Extension specialists and can be useful for both exam preparation as well as for general crop production recommendations. A list of UW-Madison websites is also available on this list.

Corn Stalk Rots and Ear Rots: A Double Whammy for Wisconsin Corn Farmers

Damon L. Smith, Extension Field Crops Pathologist, University of Wisconsin-Madison

The 2016 growing season is going to end with many challenges for Wisconsin farmers. The excessively wet weather has slowed or ended harvest of corn silage and grain harvest has barely started in much of the state. Couple this with warm and wet weather is August and we have a double whammy of stalk rot and ear rot issues to contend with this fall.

Click here to read more.

UW-Madison/Extension Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Sean Toporek, Jake Kurczewski 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 24, 2016 through September 30, 2016.

Plant/Sample Type, Disease/Disorder, *Pathogen,* County

Field Crops
Corn, Anthracnose Stalk Rot, *Colletotrichum graminicola*, Portage
Corn, Common Rust, *Puccinia sorghi,* Rock
Corn, Diplodia (Stenocarpella) Ear Rot, *Stenocarpella sp.*, Grant
Corn, Eyespot, *Kabatiella zeae,* Rock
Corn, Fusarium Ear Rot, *Fusarium sp.*, Grant
Corn, Fusarium Root Rot, *Fusarium sp.,* Rock
Corn, Gray Leaf Spot, *Cercospora sp.*, Rock
Corn, Helminthosporium Root Rot, *Exserohilum pedicellatum*, Rock
Corn, Northern Corn Leaf Blight, *Exserohilum turcicum,* Rock
Corn, Penicillium Ear rot, *Penicillium sp.*, Grant
Corn, Pythium Root Rot, *Pythium sp.,* Rock
Corn, Pythium Stalk Rot, *Phythium sp.,* Portage
Corn, Rhizoctonia Stalk Rot, *Rhizoctonia sp.*, Portage
Sorghum, Grain Weathering, *Alternaria sp.,* Calumet

Fruit Crops
Apple ('Gala'), Necrotic Leaf Blotch, None, Outagamie-
Apple ('Honeycrisp'), Honeycrisp Leaf Necrosis, None, Outagamie
Apple (Unspecified), Apple Scab, *Ventura inaequalis,* Portage
Apple (Unspecified), Bitter Pit, None, Jefferson
Apple (Unspecified), Bitter Rot, *Collectotrichum gloeosporioides,* Langlade
Apple (Unspecified), Black Rot (Canker), *Sphaeropsis sp.*, Clark
Apple (Unspecified), Flyspeck, *Schizothyrium pomi*, Green, Langlade
Apple (Unspecified), Phomopsis Fruit Rot, *Phomopsis sp.,* Langlade
Apple (Unspecified), Phytophthora Root Rot, *Phytophthora sp.*, Outagamie
Apple (Unspecified), Sooty Blotch, *Miscellaneous sooty blotch fungi*, Green, Langlade
Cherry, Cherry Leaf Spot, *Blumeriella jaapii*, Racine
Raspberry, Spur Blight, *Didymella applanata,* Marathon

Vegetable Crops
Garlic, Embellisia Skin Blotch and Bulb Canker, *Embellisia allii,* Dane
Garlic, Fusarium Bulb Rot, *Fusarium sp.,* Dane
Potato, Bacterial Soft Rot, *Pectobacterium sp.*, Portage
Potato, Black Heart, None, Portage
Potato, Heat Necrosis, None, Portage
Potato, Internal Browning, None, Portage
Squash (Spaghetti), Black Rot/ Gummy Stem Blight, *Didymella bryoniae*, Monroe
Squash (Winter), Sour Rot, *Geotrichum sp.,* Dane

Pepper, Unidentified Viral Disease, *Unidentified virus,* Dane
Tomato, Late Blight, *Phytophthora infestans*, Juneau
Tomato, Septoria Leaf Spot, *Septoria lycopersici*, Dane
Tomato, Tobacco Mosaic, *Tobacco mosaic virus,* Walworth

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

Wisconsin Fruit News, Issue 13

Janet van Zoeren, Christelle Guédot, and Amaya Atucha, University of Wisconsin – Madison, Departments of Entomology and Horticulture

Click here for the 13th issue of the Wisconsin Fruit News.

In it you will find information about:

- Wrapping things up for the summer of 2016
- Plant Disease Diagnostic Clinic
- Insect Diagnostic Lab update
- Spotted Wint Drosopila: 2016 monitoring update
- Spotted Wing Drosophila survey for WI berry growers
- Cranberry degree-day map and update
- Grape developmental stages
- It's never too late to think about apple scab
- Brown marmorated stink bug is preparing for winter

All newsletters will also be posted onto at the Wisconsin Fruit website, available at www.fruit.wisc.edu. There you will also be able to search by category or tag, to find crops and/or subject material of interest to you on a particular day.

Vegetable Crop Update October 9, 2016

Amanda J. Gevens, Associate Professor & Extension Vegetable Plant Pathologist

The 28th issue of the Vegetable Crop Update is now available.

In this edition, please find information on:

- 24(c) special registration updates for chlorothalonil use on potato in WI
- Late blight updates
- Information on spotted wing drosophila.

Click here to view this update.

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