Potato harvest is rapidly winding down with storages quickly being filled. Warm weather has slowed down the harvest because tuber pulp temperatures commonly exceed 65 F by late morning to early afternoon. With the arrival of October, cooler weather should enable smooth harvest for the rest of the year.

We have also been harvesting our plots at Hancock. The quality has been good to excellent with few misshapen or green tubers and good internal quality even though we had a fair amount of brown center earlier in the year. The brown center has apparently dissipated as we saw almost none from our plots and hollow heart never increased above 5%. We have seen minimal breakdown, but there is some leak and pink rot infecting tubers in some fields.

More importantly we saw a substantial increase in pink eye from early to mid September in our tillage trial at the Hancock Ag research Station. We harvested the trial on September 17 and witnessed increases in the number of tubers affected by pink eye and the severity of the symptoms. In addition, we found a dozen or so tubers that had progressed to the point of stem end decay. Some grower fields have also seen substantial increases in pink eye over the past 7 to 10 days. The warm September conditions likely increased the incidence of pink eye.

If you have pink eye affected potatoes, you need to take steps to prevent problems from arising once you put them into storage. Tubers harvested from fields with a high incidence of pink eye should be processed or marketed direct from the field if possible. Pink eye tubers that have to be stored should be kept in separate cellars and moved quickly if issues arise in the storage.

Pink eye affected tubers put into storage need to be aggressively managed to prevent secondary infection and tuber breakdown. Air circulation and oxygen are critical to preventing development of storage issues. Air circulation is important for removal of free water from the surface of harvested tubers. Outside air is important for preventing the development of anaerobic conditions. Outside air should be brought in for at least 4 hours per day to remove CO\textsubscript{2} and replenish oxygen in the storage atmosphere. Oxygen is critical for promoting wound healing and the healing of the pink eye affected tissue and inhibiting the growth of anaerobic bacteria.

Hope the remainder of the storage season goes well.
Potatoes
It’s been a wild ride through the harvest season. For the most part the harvest period has gone smoothly with some beautiful tubers now in storage. Exceptions to the rule have appeared and serve as a reminder that we have to remain vigilant and to maintain our high production standards. The two diseases of recent note are bacterial ring rot and powdery scab, two diseases that no one really wants to talk about, but both can become major issues if not attended to. In recent days, samples of both diseases have passed through our diagnostic laboratory. Let’s review some of the basics in recognition and control for both diseases.

Bacterial Ring Rot
This disease appears periodically somewhere in the U.S. potato industry and there have been some very costly outbreaks of bacterial ring rot over the past 50 years. The bacterial pathogen is tuber-borne and spreads primarily during the seed cutting and planting operations. The pathogen can survive on storage walls, sorting and piling equipment, trucks, treads of truck tires, seed cutters, planters and used burlap bags for up to 5 years under cool temperatures and low relative humidity if these materials are not thoroughly and routinely disinfected. The pathogen has the potential to spread throughout a production area and losses can be devastating. There is a zero tolerance for the pathogen in seed certification programs and this zero tolerance has been a major factor in controlling the pathogen over many years. We have not seen the pathogen in Wisconsin for close to a decade thanks to the vigilance of the seed industry. Unfortunately, the ring rot pathogen was recently identified by Amy Charkowski’s lab on tubers in at least two fields in central and southcentral Wisconsin. In each of these two fields of Summit Gold there is roughly one rotted tuber per hill. Since the planting of infected seed is implicated in both fields, seed purchase and planting records will be used to track down the out-of-state seed grower who provided the seed for planting in Wisconsin. Tubers are currently rotting rapidly in the field under the warm conditions we’ve experienced in recent weeks. Typical symptoms on tubers initially appear as a pale yellow to light brown cheesy rot beginning at the stem end. In advanced cases, the vascular ring will separate from adjacent tubers and the rot extends to the outer tuber surface. Secondary infection by a multitude of other decay organisms quickly leads to the disintegration of infected tubers. There are foliar symptoms associated with ring rot that include wilting of lower leaves during periods of warm temperatures, interveinal chlorosis and necrosis of leaves and an upward rolling of leaves in advanced cases. There are other key symptoms of the disease and I invite you to pull out your “Compendium of Potato Diseases” and turn to page 9 for a complete description.

At this stage of the growing season, we are most concerned with the tuber symptoms and what can be done now to insure that we don’t observe this disease next growing season. We’ve discussed the identified problem with both growers and learned that the fields in question are being harvested last in their operations to allow time for the decay to
proceed in the field. Remaining sound tubers will then be harvested if possible and sold for fresh market consumption. We’ve advised the growers involved that if they proceed with harvest, all equipment that comes in contact with the infected tubers needs to be pressure washed and then thoroughly sanitized after use to reduce the potential for moving the bacterium to other farms. Sanitizing chemicals include quaternary ammonium and phenol containing compounds. There are several products on the market that are effective when used at the label recommendations. We view the sanitation procedure as a two step process and stress the importance of first pressure washing equipment, pavement, tires, pallets, boxes, etc. that comes in contact with infected tubers to remove all dirt and debris and then to wash with one of the disinfectant chemicals. The longer the chemical is in contact with the exposed surface, the more effective it will be at killing bacteria on that surface. There should be a minimum exposure to the disinfectant of 10 minutes before the surfaces are rinsed with clean water. It is important that vehicles moving off of these farms and traveling to other potato farms be sanitized at the time of departure to reduce the risk of moving this bacterial pathogen off site.

As we move into the winter and spring movement of seed, it is important for all growers to practice sanitation and protection of the seed lots they purchase and store on their premises in preparation for planting. All seed cutters and equipment that will come in contact with whole tubers before cutting and seedtubers after cutting (trucks, conveyers, front end loaders, elevators, planters, bulk boxes, etc.) should be thoroughly sanitized before the first seed potato arrives on the farm and before the first seed lot is cut. Cutting equipment and conveyors should be resanitized at the beginning of each day and at each break. The equipment must be sprayed with disinfectant between seed lots. During the cutting operation any abnormal amount of decay should be carefully inspected and if you are not sure what is causing the decay, samples should be assayed by our diagnostic lab to determine the cause before proceeding with cutting and planting.

With care and forethought, this isolated incident of bacterial ring rot can be contained and not pose a threat to the rest of the Wisconsin potato industry.

**Powdery Scab**
The powdery scab disease is present in most potato producing areas of the world, developing best under cool, moist growing conditions. We’ve been fortunate in Wisconsin to have avoided quality issues related to powdery scab issues over the years, but we are slowly being drawn into the column of production areas where powdery scab is a production issue. We began seeing powdery scab on incoming seed shipments about three years ago. The tuber lots with powdery scab symptoms were not planted that year and were subsequently either landfilled or provided to charity for food. Subsequently in the past two growing seasons, tuber samples have arrived from three production fields where individual tubers exhibited symptoms of powdery scab. In the past week, another sample arrived with severe symptoms of powdery scab on Norland tubers. Lesions were filled with the powdery spore balls (cystosori) characteristic of this pathogen. The most recent sample represented a large field and the potential for significant losses to the grower. This is the first case we’ve seen where powdery scab will likely reduce marketability of the tubers and the grower may suffer an unfortunate loss.
The symptoms of powdery scab are often confused with the symptoms of common scab. There are some important features of powdery scab that are helpful in field diagnosis. Symptoms of powdery scab include shallow depressions filled with a powdery mass of cystosori and surrounded by torn papery edges of periderm that peel back from the lesions. It is the papery fragments of periderm that help to distinguish this disease from common scab. In addition to the tuber lesions, galls may form on infected roots and stolons. At maturity the galls turn brown and gradually break down to release powdery cystosori into the soil. The cystosori can survive for up to 6 years in the soil so short term rotations are of limited value.

Management of powdery scab includes planting seed free of powdery scab, rotations up to 10 years in duration, avoiding contaminated and poorly drained fields, avoiding the use of animal manure where the animals have ingested infected tubers and carefully managing irrigation.

Recognition of powdery scab symptoms on incoming seed can help growers avoid introduction of this pathogen to their farms. Likewise, identification of the problem on harvested tubers helps growers initiate long term control procedures to avoid making the problem worse.

**Snap Beans**

**Virus Diseases**

This past summer we’ve maintained variety evaluation plots at Oostburg, Fox Lake and West Madison. The late arrival of the soybean aphid reduced the spread of viruses at all locations, but still there were mosaic symptoms on many plants in some plot entries. Some plot entries were symptom free for the duration of the trial. In past years, the primary virus appeared to be cucumber mosaic virus with some recovery of alfalfa mosaic virus (AMV) and clover yellow vein mosaic virus (CYYV). This year, cucumber mosaic virus is virtually non existent, even in plants with severe mosaic symptoms. Dr. Ben Lockhart of the U. of Minnesota has been assaying the plants and found limited infection with AMV and CYYV). The good news is that many lines were symptom free. The bad news is that there appear to be unidentified viruses in our plots and nearby commercial acreage. Work is underway to identify these viruses and match symptoms with a known entity. In commercial acreage, virus losses were very light with limited pod necrosis in only a very few fields. That’s good news for the processing industry and local growers.

**Cucurbits**

Powdery mildew was a widespread problem on pumpkins this summer, beginning as early as late July. Cool nights, warm days and dry weather are all ideal for the spread of powdery mildew. By mid September, some of the pumpkin fields were severely affected by this disease with loss of foliage and loss of yield. Yields of pumpkins appear to be light this year due to the combined effects of cool weather and powdery mildew. In our trials at Hancock where we are evaluating cultivar resistance to powdery mildew, we are still seeing some lines with useful levels of resistance. Other lines with low or moderate
levels of resistance were overwhelmed this year with the amount of inoculum available for infection.

**Phytophthora blight**
This disease has been a recurring problem over the past few years on cucurbits in the Midwest and eastern states. Typical symptoms on fruit include a white fuzzy decay that proceeds rapidly under moist and warm conditions. We have Acrobat fungicide registered for foliar sprays in combination with copper hydroxide and Ridomil Gold for soil application at the time of planting. Both products work well in Wisconsin and at this point we are not observing the Ridomil resistance problems observed in other states. This past growing season, Phytophthora blight caused only minimal losses, but based on symptoms on some low lying plantings, we know the pathogen is still present in the production area and should not be taken lightly in years with abundant rainfall and warm conditions. Growers should note that pepper is also an excellent host for this pathogen. This should be taken into account in crop rotations.