

## Montana Potato Weather Data and Disease Report

August 18, 2017

There have been some spikes in Late Blight severity units for Churchill North, Polson and Townsend. There is still heavy, dense foliage in most fields resulting in high humidity in the canopy. The P-Day accumulation has been met for all varieties. We are a little more than half through 3<sup>rd</sup> inspection and some potatoes are already being defoliated. Including a protective fungicide and a systemic insecticide at vine kill should provide protection through harvest. Preventative fungicides are recommended for fields that will be kept growing through the first week of September. Use fungicides that have broad spectrum control for both late blight and early blight. Because our weather is still relatively hot and dry, and no major weather systems are forecast, cost-effective preventative products should be adequate. **SEE BELOW FOR LATE SEASON DISEASE CONTROL RECOMMENDATIONS**

<u>Site</u> <u>Recommendation</u>	<u>Accrued Severity Values</u> <sup>1</sup>					<u>P – Days</u> <sup>2</sup>	<u>Fungicide Spray</u>
	7/21	7/29	8/4	8/11	8/18		
<i>Churchill West – MSPUD1</i>	8	21	22	24	25	450	<sup>3</sup> LB, EB – all cultivars
<i>Churchill North – MSPUD2</i>	15	25	35	40	46	474	LB, EB– all cultivars.
<i>Churchill South – MSPUD3</i>	10	10	10	10	12	492	EB – all cultivars
<i>Toston – MSPUD4</i>	13	16	18	18	18	495	LB, EB – all cultivars
<i>Dillon – MSPUD5</i>	0	6	7	7	9	424	EB, early and mid cvs.
<i>Twin Bridges – MSPUD6</i>	0	0	0	0	1	405	EB– early and mid cvs.
<i>Ronan – MSPUD7</i>	3	8	12	12	15	438	EB– all cultivars.
<i>Polson – MSPUD8</i>	8	12	19	24	29	474	LB, EB– all cultivars
<i>Kalispell – MSPUD9 (offline)</i>	6	6	9	10	15	453	EB– all cultivars
<i>Townsend – MSPUD10</i>	9	18	24	27	34	499	LB, EF – all cultivars

<sup>1</sup> A threshold of 18 severity values is used for prediction of late blight disease development. Late blight is anticipated 7 to 14 days after 18 severity values have accrued from emergence when inoculum is present.

<sup>2</sup> A threshold of 300 P-Days is used to schedule preventative sprays for Early Blight for early varieties, 350 P-Days for medium season varieties, and 400 P-Days for late season varieties. P-days are calculated from emergence.

<sup>3</sup>LB = Late Blight  
EB = Early Blight

### **Late Season Disease Control – from the Barry Jacobsen archives, 2015**

Pythium leak is caused by the common soil inhabiting oomycete, *Pythium ultimum* var. *ultimum*. This pathogen is found in all soils and enters potatoes only through wounds and is active only at temperatures greater than 50<sup>0</sup>F and temperatures of 69-86<sup>0</sup>F and when soils are wet. Typically this is a problem in MT when we have a warm, wet harvest period. For optimal control growers can use an infurrow fungicide spray at planting and an application at flowering plus 14 days and 28 days. A maximum of three applications are allowed per season so if you have not done three applications and *Pythium leak* is a potential problem you can still make an

application up to 14 days before harvest- I would certainly not do it at vine kill since a living plant is needed for downward translocation of the fungicide in the plant. These same timings will work for Phytophthora pink rot although this disease is not common in MT. Ridomil Gold MZ, or Ridomil Gold/Bravo SCL, Metastar 2E, Ranman and Ultra Flourish (labelled for planting time only) are fungicides that will give control. Growers should avoid where possible, harvesting when soil temperatures are above 69<sup>0</sup>F. Be sure skins are well set and avoid harvest injury. Allow tuber injuries to suberize in storage at temperatures less than 60<sup>0</sup>F at high humidity. Avoid free water! If leak occurs in storage increase air movement, cool to less than 50<sup>0</sup>F and turn off humidification as quickly as possible.

Where late blight severity units have exceeded 18 growers should continue fungicide coverage through vine kill. Where vine kill will occur in the next 10 days a final application of mancozeb (Dithane, Manzate, Penncozeb, Ridomil Gold MZ products), chlorothalonil (Bravo, Echo, Ridomil Gold Bravo and other products) or TPTH (SuperTin, AgriTin) will provide good protection through vine kill. TPTH is perhaps the best antisporulation product for late blight and some growers use it with their vine kill chemicals. Where late blight is not a potential, fungicide sprays can be stopped 7-10 days before vine kill. Be sure to have good insecticide coverage **until vines are dead**. Remember at this time of year potatoes are often the only green thing around and are highly attractive to aphids that spread viruses.

Growers should have disinfected warehouses and handling equipment. Remember bacteria that cause soft rot, black leg and ring rot can live for long periods in dried slime. Quaternary ammonium products (many product names) are good disinfectants but require surfaces to remain wet with the disinfectant solution for 10-15 minutes for good kill. Prewashing with soapy water will make disinfectants perform better

**Vine kill:** Potatoes should be physiologically mature and nitrogen levels should have declined to <700 ppm in petiole tests. Allowing potatoes to remain in the soil 10-14 days after vine kill will ensure a good skin “set” making tubers less easily damaged. Leaving potatoes in the soil longer particularly under warm conditions can lead to increased physiologic aging resulting in more stems per seed piece for your customers.

**Avoiding harvest injuries** is the best way to avoid storage problems. Bruising can be increased by:

1. Harvesting in dry cloddy soils (soil moistures should ideally be in the 70-75% moisture holding capacity range). Preharvest irrigation particularly on easily bruised cultivars such as Umatilla and Clearwater Russet can dramatically reduce bruising
2. Harvesting when pulp temperatures are >50<sup>0</sup>F. Ideal pulp temperatures of 50-65<sup>0</sup>F will help avoid bruising.
3. Poor harvester adjustment. The digger blade should deliver tubers to the top of the top of the primary chain and speed should be adjusted so that the primary is full and soil and tubers are carried to the top of this chain. Coordinate chain speed with forward speed so volume is equal to capacity. For very bruise sensitive varieties such as Umatilla removal of shakers is suggested. Adjust the speed of the secondary so that it is also full. Look for places where drops are >6 inches-make adjustments or use padding to avoid this. Be sure all chain is in good repair. **Approximately 70% of all bruise injury is done by the harvester.**
4. Avoid drops of >6-8’ on all handling equipment. Run the equipment at capacity so that tubers bounce against tubers. Pile in stages so that roll-back on the pile face is minimized.

**If frost injury is not a problem.** Once tubers are in the pile maintaining temperatures in the 50-60<sup>0</sup>F range at 95% relative humidity for 10-14 days is ideal for wound healing. When wounds are “corked over” the tuber is quite resistant to invasion by storage pathogens. Also supply plenty of fresh air since tubers are at high respiration at this time and require a lot of oxygen. After this wound healing period tubers can be cooled to final storage temperatures.

## Prior to filling the storage:

- Be sure insulation is intact in all areas of the storage and the vapor barrier is intact on walls, ceiling and doors. Cold spots can lead to condensation which can favor bacterial soft rot and lead to poor wound healing.
- Check and service fans and humidifiers: need ~ 1-1.25 cfm/100lbs of potatoes.
  - Want uniform air flow and enough to remove condensation on walls or ceilings.
  - Air flow should be sufficient to cool tubers without desiccation.
  - Monitor pulp temperature keep air supply a few degrees cooler than tubers. Want no more than 0.5-2 .0 °F from bottom to top of pile.
  - Relative humidity of 95% will prevent desiccation and promote suberization of wound periderm.
- Check all ducts before filling storage. Be sure they are free of obstructions and properly sized in relation to fan capacity.

## Post harvest Disease Control Materials

**BioSave** is a formulation of the living bacteria *Pseudomonas syringae*. This is perhaps one of the most common bacteria in the plant world. When living cells are applied to tubers they colonize wounds and use up available food resources needed by storage pathogens such as *Fusarium* for infection. We have also seen some control of soft rot and silverscurf. The product must be kept frozen until use and a tank mix is good for about 24 hours before the bacteria die off to ineffective levels. This product is compatible with Mertect and our best results have been where BioSave and Mertect are used in combination even though approximately 50% of *Fusarium* isolates tested from Montana storages are resistant to this fungicide. BioSave has been effectively used by many Montana growers and it has been very effective in our storage research trials. It should be applied in 2qt of water /ton of potatoes with uniform coverage.

**Disinfectant materials such as Purogene, Jet Oxide, Oxidate, Storox, etc** can be applied directly to tubers during piling. They will kill pathogens on the surface immediately but there is no residual activity since these materials are rapidly tied up by organic matter. These products are excellent bacteriocides but are only fungistatic not fungicidal are there use is recommended where we have frost damage.

Thermofogging of these products through the air system has been successful in research studies for bacterial diseases but not *Fusarium* dry rot. **These products may kill the *Pseudomonas* bacteria in BioSave thus do not use these products with BioSave.**

Finally, **phosphorous acid products such as Prophyte, Fosphite, Resist 57, Topaz or Phostrol** have been shown to be effective in controlling late blight and pink rot in storage. They are also likely to control *Pythium* leak but there is no data to support this specific use. All these products should be applied in 2qt of water /ton of potatoes with uniform coverage.

## Glyphosate Drift

Be careful of glyphosate drift from other uses. This product will not cause significant symptoms on senescing potato plants but it will be translocated to tubers. Affected tubers will be slow to germinate in the spring and will have multiple stunted sprouts. They will not produce acceptable yields! If drift is suspected, sample this area separately and send samples with your samples for the Hawaii winter tests. Discuss this with Nina ahead of time.

