



Photo provided by Phil Hamm,  
University of Oregon, Hermiston,  
OR

## *Plant Disease Fact Sheet*

# CORKY RINGSPOT OF POTATO

Wisconsin Department of Agriculture, Trade, and Consumer Protection  
Plant Industry Laboratory

<http://pestsurvey.wi.gov/>

### CORKY RINGSPOT

Corky ringspot disease (CRS) of potato is caused by tobacco rattle virus (TRV). CRS can severely damage tuber quality, leading to crop rejection by commercial processors. The disease was first discovered in Wisconsin in Buffalo County in 2007. CRS has also been confirmed in California, Colorado, Florida, Idaho, Michigan, Minnesota, Oregon, and Washington. In Wisconsin, intensive eradication and control efforts at the site of introduction have been undertaken to prevent in-state spread of CRS, but out-of-state seed sources continue to be a risk for introduction of this disease.

### LIFE CYCLE

CRS is caused by a sub-microscopic pathogen named tobacco rattle virus (TRV) and is transmitted by soil-living stubby-root nematodes (*Paratrichodus spp.* and *Trichodorus spp.*). TRV causes disease in many plant species, including a great number of common weed species; the disease it causes in potatoes is called corky ringspot (CRS). The disease spreads as stubby-root nematodes feed on the roots or tubers of infected plants and move throughout a field, transmitting the virus from plant to plant via the roots or tubers.

### FOLIAR SYMPTOMS

Symptoms of corky ringspot on potato leaves are rare, but include pale to bright yellow mottling in patterns of arcs and small rings on the leaves, called calico.

### TUBER SYMPTOMS

CRS symptoms are often not apparent until a potato tuber is cut, where dark brown rings (Figure 1) or small brown flecks (Figure 2), discolor and damage the tuber flesh. The rings or flecks may have a dry, corky appearance. The dark necrotic rings or concentric arcs are also called spraing. In some cultivars, distinct external rings may be visible on the potato surface (Figure 3, following page). Other potato viruses, including potato virus Y (PVY-N), alfalfa mosaic virus (AMV), and potato mop-top virus (PMTV) can cause tuber discoloration and disease symptoms similar to CRS.

For more images and information about potato virus symptoms and disease, see Cornell University's Vegetable MD online:

[http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Potato\\_Virus.htm](http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Potato_Virus.htm)

Figure 1. Symptoms of CRS include necrotic brown rings, shown here in the cultivar Ranger Russet.



Photo provided by Jim Crosslin, USDA-ARS, Prosser, WA

Figure 2. Brown corky flecks caused by CRS in a Russet Burbank potato.



Photo provided by Jim Crosslin, USDA-ARS, Prosser, WA

## OTHER HOSTS

Common weeds, including chickweed, cocklebur, nightshade, pigweed, purslane, prickly lettuce, and shepherd's purse are hosts of TRV. TRV can also infect garden plants including hosta, daffodil, gladiola, coral bells, bleeding heart, calendula, and sunflower. The virus that causes disease in these plants can infect potatoes. TRV has been documented in Wisconsin in some of these hosts, but infected seed potatoes carry far greater risk for causing CRS than transmission from these other hosts.

## PREVENTION

Planting certified seed potatoes is the best method to reduce the risk of all potato virus diseases, including CRS. However, potatoes from locations with a history of CRS may have a higher risk of carrying the disease. Good weed management reduces the risk of wild hosts acting as a reservoir for the virus. Once established in a field, CRS is difficult to eradicate, due to weed hosts and the persistent presence of stubby-root nematodes which can transmit the virus for several years.

## MANAGEMENT

If CRS is suspected, submit a sample to a plant disease diagnosis lab for testing, as other potato virus diseases can cause similar symptoms. If CRS is confirmed, the disease is best managed by resistant cultivars, fumigation, or crop rotation. Among the potato cultivars grown in Wisconsin, tests have indicated Russet Norkotah has a moderate level of resistance to CRS. Fumigant treatments may have limited success, since even low populations of infected nematodes can cause a severe CRS outbreak. Research has also indicated that crop rotation with alfalfa reduces CRS disease severity in the following potato crop, provided host weeds acting as reservoirs for TRV are well-managed.

## REGULATION

Wisconsin potato seed certification standards do not specifically address CRS. However, the virus which causes this disease (TRV) does contribute to total virus load, and CRS causes both external and internal necrosis; both virus load and necrosis are subject to standards described in Wisconsin administrative code chapter ATCP 156 (see below).

Wisconsin administrative code chapter ATCP 156 describes the WI certified seed potato program:

<http://www.legis.state.wi.us/rsb/code/atcp/atcp156.pdf>

Wisconsin administrative code chapter ATCP 21 describes WI plant inspection and pest control:

<http://www.legis.state.wi.us/rsb/code/atcp/atcp021.pdf>

For phytosanitary certification guidelines, contact the Wisconsin Department of Agriculture, Trade and Consumer Protection at (608) 224-4596.

For more information on soil fumigant regulations:

[http://www.datcp.state.wi.us/arm/agriculture/pest-fert/pesticides/chloropicrin\\_metam\\_sodium.jsp](http://www.datcp.state.wi.us/arm/agriculture/pest-fert/pesticides/chloropicrin_metam_sodium.jsp)

## FOR MORE INFORMATION

If you have questions, please contact:

Anette Phibbs, phone: (608) 266-7132, email: [Anette.Phibbs@wi.gov](mailto:Anette.Phibbs@wi.gov). *Information provided by R. Leisso and Anette Phibbs, Wisconsin Department of Agriculture, Trade, and Consumer Protection.*

## REFERENCES

Brown, C.R., Mojtabehi, H., Santo, G.S., Hamm, P., Pavek, J.J., Corsinin, D., Love, S., Crosslin, J.M., Thomas, P.E. 2000. Potato germplasm resistant to Corky Ringspot Disease. *Amer. J. Potato Res.* 77:23-27.

Gudmestad, N.C., Mallik, I., Pasche, J.S., Crosslin, J.M. 2008. First report of tobacco rattle virus causing corky ringspot in potatoes grown in Minnesota and Wisconsin. *Plant Dis.* 92(8):1254-1254.

Slack, S.A. Tobacco rattle virus. *In* Compendium of Potato Diseases, second edition. Stevenson, W.R., Loria, R., Franc, G.D. and Weingartner, D.P., eds. APS Press, Minneapolis, MN, 2001. 71-72.

Figure 3. External rings on potato surface are a less common symptom of CRS, shown here on the cultivar Yukon Gold.



*Photo provided by Phil Hamm, Oregon State University, Hermiston, OR*