

Tobacco Rattle Virus.....An Old Problem with New Symptoms

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Tobacco Rattle Virus (TRV) has been an issue in the Columbia Basin for many years. This virus, vectored by the Stubby Root Nematode ([SRN] *Paratrichodorus* species), has a wide host range as does the nematode. Fortunately the virus alone does not seem to cause damage on hosts other than potatoes and for the most part, neither does the nematode (onion is a notable exception). However, when it comes to potatoes, when TRV is transmitted to potato tubers during the feeding of the nematode, substantial damage can occur (Photo 1). This damage is known as corky ring spot (CRS) or "spraing" as it is commonly referred to in Europe. Complete fields have been lost due to this damage, rendering the tubers fit only for processing at a flake plant. Significant and widespread damage due to this disease was seen in the early 90's when Temik was removed from the market place. Apparently this product was, unknowingly, very effective in controlling the SRN. Research accomplished in the early to mid 90's proved that Telone II was very effective in controlling SRN and therefore, also controlled CRS.

The story would likely have ended there if not for the introduction of the new nematicide called Vydate. While Telone II required application prior to planting potatoes, generally in the fall, Vydate was registered for use during the cropping season. This product therefore provided an option for potato growers who decided to grow additional potatoes after the fall fumigation season had ended. They did not have to wait until soil temperatures in the spring were high enough to allow soil fumigation. Also, some growers have decided to use Vydate instead of Telone II, either because of the particular economics of that potato crop and/or because of the insects that Vydate controls. Since Vydate also controls root knot nematodes and the biology of these plant pathogens was already known, the recommended first use of Vydate in the season was based on when nematodes in the soil would first be attacking the newly developing tubers (around 850 degree days). Waiting until 850 degree days in fields not treated with Telone II represented a time that emerging potato plants were not protected from SRN containing TRV. That short window without protection has apparently resulted in new symptoms due to infections by TRV.

Early in the growing season in 2005 a field containing ½ Russet Norkotah and ½ Ranger Russet had very specific poor emergence issues. Close observations of the plants that had not emerged revealed thickened distorted stems, with leaves trying to form far below the soil line (Photo 2). Emerged but stunted plants adjacent to plants not yet emerged had uncharacteristic coloration of leaves similar in some ways to that caused by *Alfalfa Mosaic Virus* (Photo 3). Testing with ELISA and PCR confirmed these distorted poorly emerging plants and those with these "yellow" symptoms in the leaves were infected with TRV. Stubby root nematodes associated with these bare batches were also found to be viruliferous (containing TRV) while others found in areas where plants appeared normal were not. This field had been scheduled to receive Vydate at about row closure. Since no CRS issues at harvest were seen in either cultivar, the use of Vydate as prescribed based on the label, apparently prevented large scale losses or even tuber rejection.

Once these symptoms were recognized as potentially caused by TRV, many other situations over the last several growing seasons have been seen due to TRV, and in some cases, may have resulted in significant losses if not identified early. Damage has been seen in other Russet Norkotah fields (Photo 4), Shepody (Photo 5) and Ranger Russet (Photo 6). These problems have been found throughout the Columbia Basin potato production area. In most cases foliar symptoms have not been seen (yellowing patterns in the leaves) but delayed emergence and distorted stems are always present.

While not all the research has been done to answer all the questions these new symptoms due to TRV have raised, control can be achieved by the use of Telone II (since to our knowledge delayed emergence, distorted stems, and foliar symptoms have not been seen where Telone II has been applied). In addition, we believe that these symptoms can also be controlled with the use of Vydate with one important difference in its usage. Vydate is now recommended as an in-furrow treatment at planting. The in-furrow use has not been systematically tested in the Columbia Basin to control these newly found symptoms. However, given what we know about the SRN, timing of infection, and the result of the timing of applications of Vydate in the past at or about row closure, we believe an in-furrow application will control these issues. If Vydate is used, consult a current label of the product to ensure proper usage.

General recommendations for controlling CRS begin by remembering that any field previously found to have this disease must be considered always to have the disease and control measures should be specifically budgeted, scheduled, and correctly completed. The challenge most often is when fields are rented and the history of this problem is not always remembered or communicated with the new renter. Remember, just because a field has SRN does not mean the nematodes contain the virus. SRN by themselves do not cause any significant problems in potatoes. There are procedures that can test individual SRN to see if they are viruliferous or not. If the test shows they are, then chemical control is required. If the SRN tests are negative for TRV, this does not guarantee that no TRV is associated with SRN in the field.

If symptoms like these appear in fields this season, we would be happy to confirm whether or not TRV is responsible.



Photo 1. Typical internal symptoms due to TRV.



Photo 2. Thickened stems with abnormal production of leaves below ground due to early infection by TRV.



Photo 3. Symptoms of TRV in Russet Norkotah.



Photo 4. A "hole" in a field of Russet Norkotah caused by TRV. Notice the different rates of emergence.



Photo 5. IR photo showing "holes" with poor emergence due to TRV.

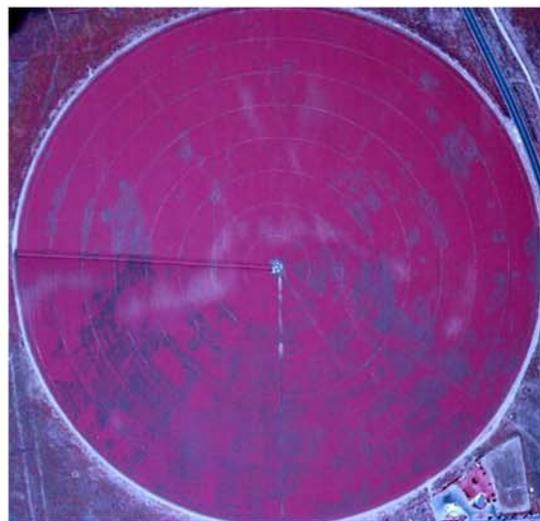


Photo 6. IR photo showing substantial wide spread emergence issues due to TRV.