Rhizomania in the SMBSC Growing Area

Rhizomania was first identified in the United States in the sugarbeet growing areas of California. Since its discovery in California, rhizomania has spread to all sugarbeet production areas in the United States. Rhizomania was first identified in the SMBSC growing area in 1996. Since the disease was first identified, rhizomania has been identified in most if not all of our growing area. Rhizomania resistant varieties have been grown at SMBSC since the late 1990’s. In this edition of the Agricultural Beet, we will discuss rhizomania, its symptoms and the control measures we currently have available to us.

Symptoms of Rhizomania

Rhizomania is a viral disease of sugarbeets. It is caused by a virus named Beet Necrotic Yellow Vein Virus (BNYVV). The virus enters the sugarbeet roots via a common soil fungus (polymyxa betae). Symptoms of rhizomania include constriction of sugarbeet taproots, root bearding (a mass of feeder roots in place of the tap root), and fluorescent yellowing of the foliage. Rhizomania infection can be a devastating disease to susceptible sugarbeets. In the 2010 SMBSC Official Variety Trials, a rhizomania susceptible check variety was included at each location to gauge the levels of rhizomania present in the trials. This susceptible check variety yielded 28% lower than the average recoverable sugar per acre for the trial locations. Rhizomania can affect both the yield and sugar contents of infected sugarbeet fields. Figure 1 shows some root bearding symptoms on a susceptible variety compared to a resistant variety on the right of the picture. Figure 2 shows a sugarbeet root with root constriction symptoms.

Figure 1. Root Bearding compared to healthy roots. Photo from American Phytopath Society courtesy of G. C. Wisler.
Rhizomania Control Strategies

The current control measures for rhizomania are largely based around varietal resistance. Varieties with some resistance to rhizomania began being introduced in the SMBSC growing area in the late 1990’s. All the varieties planted currently at SMBSC have some source of rhizomania resistance in them. There are currently two main sources of rhizomania resistance in our sugarbeet varieties, and several minor genes. The Rz1 and Rz2 genes are the two main sources of genetic resistance currently. It is believed that all varieties grown in SMBSC contain one of these two resistance genes. In addition to these main resistance genes, minor genes have been found that can also contribute resistance to the sugarbeet plants. In the last year, varieties that incorporate two sources of rhizomania resistance are being introduced into our growing area. These varieties are usually called multi-source rhizomania tolerant varieties. Figure 3 shows a strip trial in the SMBSC growing area in 2010. This field has high levels of rhizomania present, and the variety with multi-source rhizomania resistance appears to be the most tolerant of all the varieties included in the strip trial. The multi-source resistant variety shown in the picture is Crystal RR850. In fields that are known from the past to have high levels of rhizomania, these multi-source varieties are a good choice to withstand rhizomania pressure.

Crop rotation is another important factor in rhizomania levels in a field. Shorter rotations will put more pressure on the varietal resistance. The more times, sugarbeets are planted on a field, the higher the inoculum levels of the disease become. This selection pressure for more aggressive strains of the disease can begin to overwhelm the genetic resistance in the plant.

Rhizomania is favored by warm and wet conditions. Situations where soils remain saturated for longer periods of time favor disease development. Good field drainage can help remove excess water and shorten the periods of time when infections occur.

SMBSC has been dealing with the disease of rhizomania for many years now. Tools are available to help lessen the effects of the disease. Contact your agriculturist if you find patches in your fields with rhizomania symptoms. This disease is changing over time, and it is important...
that shareholders document any issues in their fields each year. This is important, so different management tools, such as more tolerant varieties and multi-source resistant varieties can be properly placed on the field the next time the field is planted to beets.

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