

Scab Diseases of Potato

Farming is not for the faint hearted and perhaps growing potatoes is even more so. Potato prices can change directions like the wind and growing a potato crop from planting to harvest can be a challenge. A disease can suddenly appear and take away all the hard effort and money spent to get the crop to that point. Potato scab is one problem that growers can find challenging. It can be especially frustrating because scab is mainly just a cosmetic injury but the losses can still be substantial.

There are actually two types of scab, powdery scab and common scab. Common scab is just that, more commonly encountered in potato fields while powdery scab is more severe but usually not as widespread of a problem. Although the symptoms can sometimes be very similar, they are caused by two different organisms and require different treatments.

Common scab is caused by an atypical bacterium called *Streptomyces* spp. The symptoms of common scab can vary a great deal depending on which species and strain of scab is involved, environmental factors, and potato variety. Generally speaking they are very superficial lesions on the surface of the tuber. Some are very superficial and cause a rough, tan lesion (russet scab), or slightly raised lesion (erumpent scab), or may cause a slightly sunken lesion (pitted scab). Whether it is russet, erumpent, or pitted scab, they are all common scab caused by *Streptomyces* that can be seed borne or soil borne.

Common scab can be found wherever potatoes are grown. It can also affect many other roots crops such as radishes, carrots, beets, and turnips. Newly formed tubers are especially susceptible to infection on through the 5 week period that the tubers are developing. The bacterium enters the tubers through lenticels and stomata. Usually it is not until the tubers have enlarged that the lesions become noticeable.

Management of common scab requires several different strategies. The problem can be reduced by not planting scab infected seed. Seed treatments can also reduce the amount of infection if the scab is seed borne. However the key to managing common scab is irrigation management. Saturated soils inhibit common scab. Keeping the field at or near field capacity during the period that tubers are developing (4-6 weeks) helps prevent infection. Tuber development begins very early so from the time the stolon ends begin to swell until the tubers enlarge fully. It is during these early stages of tuber development that the tubers are most susceptible to common scab infection. But keeping the soil at or near field capacity will inhibit common scab from developing. Conversely, allowing the soil to become dry during this time will allow common scab to occur.

Soil pH can also greatly influence the development of common scab. Like most bacteria, *Streptomyces* spp. grows best in neutral to slightly alkaline conditions but do poorly in acidic conditions. A soil pH of 7 is ideal for scab development. Fields with a history of common scab should maintain a pH of 5.5 or slightly lower. However, be aware that there is an acid tolerant strain of common scab. Again, using scab free seed is important to avoid introducing new strains into a field. Besides lowering pH, 4 to 5 year rotations will help control soil borne common scab.

Powdery scab can be confused with the more severe forms of common scab. This scab is caused by *Spongospora subterranean* which is neither a bacterium nor a fungus but actually more closely related

to slime mold, a plasmodium. It can become a chronic problem once it becomes established in a field. Luckily it is not as a widespread problem as common scab. Still, awareness is the best way to avoid many of these problems. It also produces a scab lesion, but has a definite ruptured or burst appearance on the surface of the tuber. Underneath will be a powdery mass of spores which is absent from common scab. Because it can be a long term soil borne problem if it becomes established in a field, the use of clean seed is very important. Make sure that the seed potato that is being used comes from an area that does not have powdery scab. Powdery scab is aggravated by wet soils which can cause more severe lesions. If it does become established in a field then 3 to 10 year rotations are recommended. Nightshades can also serve as a host which should be controlled.

A field trial was conducted this year in which we looked at several products to help manage powdery scab. Although variability in the field made it difficult to make any real solid conclusions there was a trend with the application of zinc fertilizers having an effect of lowering the amount of powdery scab infections. In this study the zinc was applied as $ZnSO_4$ in the seed furrow at planting at 15 lbs/ treated acre. The addition of biologicals may be of benefit also. We will be repeating this study in 2016 to see if we can get more conclusive answers.

It may require the help of a qualified individual to determine if you are dealing with common scab or powdery scab. Powdery scab is best managed by avoidance. Using powdery scab free seed is the best option. If it does develop in a field then long term rotations out of potatoes will be required or costly soil fumigations will be needed. Common scab can be best managed by lowering the soil pH to 5.5 and careful irrigation management during early tuber development.

Figure 1. Common scab lesions on newly formed young tubers.



Figure 2. Common scab lesions on mature tuber.

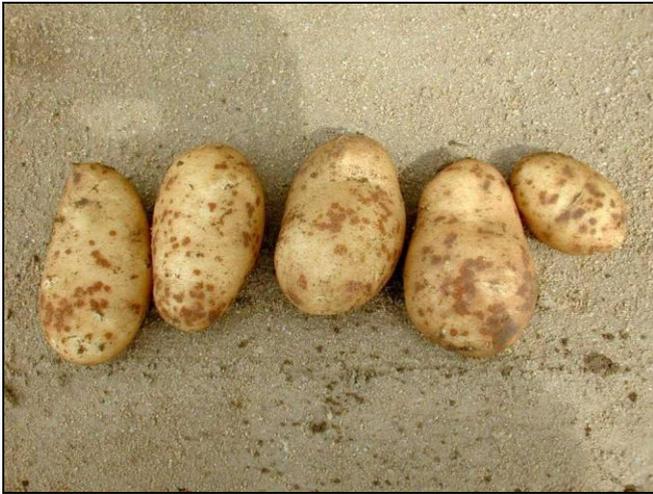


Figure 3. Typical powdery scab lesions on tubers.



Figure 4. Severe powdery scab lesions on potato tuber.



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