

MANAGING PINK ROT IN POTATOES

Pink rot, caused by *Phytophthora erythroseptica*, is an important disease worldwide. It is found widely in Australia, particularly in Tasmania, and can cause devastating losses both before and after harvest. Even if symptoms are not severe, its presence increases harvesting costs, as diseased tubers must be culled before storage or transport.



CURRENT MANAGEMENT OPTIONS

Pink rot is a potato specialist, in that it does not grow readily on other hosts. Despite this, long crop rotations are necessary due to production of long lived oospores. These can persist

in the soil for up to seven years (Figure 1). Volunteer potatoes, and other Solanaceous hosts, must be scrupulously removed in order to break the cycle of infection.

The pathogen spreads rapidly in warm, wet soils through the movement of

swimming zoospores. Improving drainage and soil structure to reduce the potential for waterlogging is therefore an important control strategy.

The fungicides Metalaxyl, Metalaxyl-M and Amisulbrom are currently registered for control (check for your

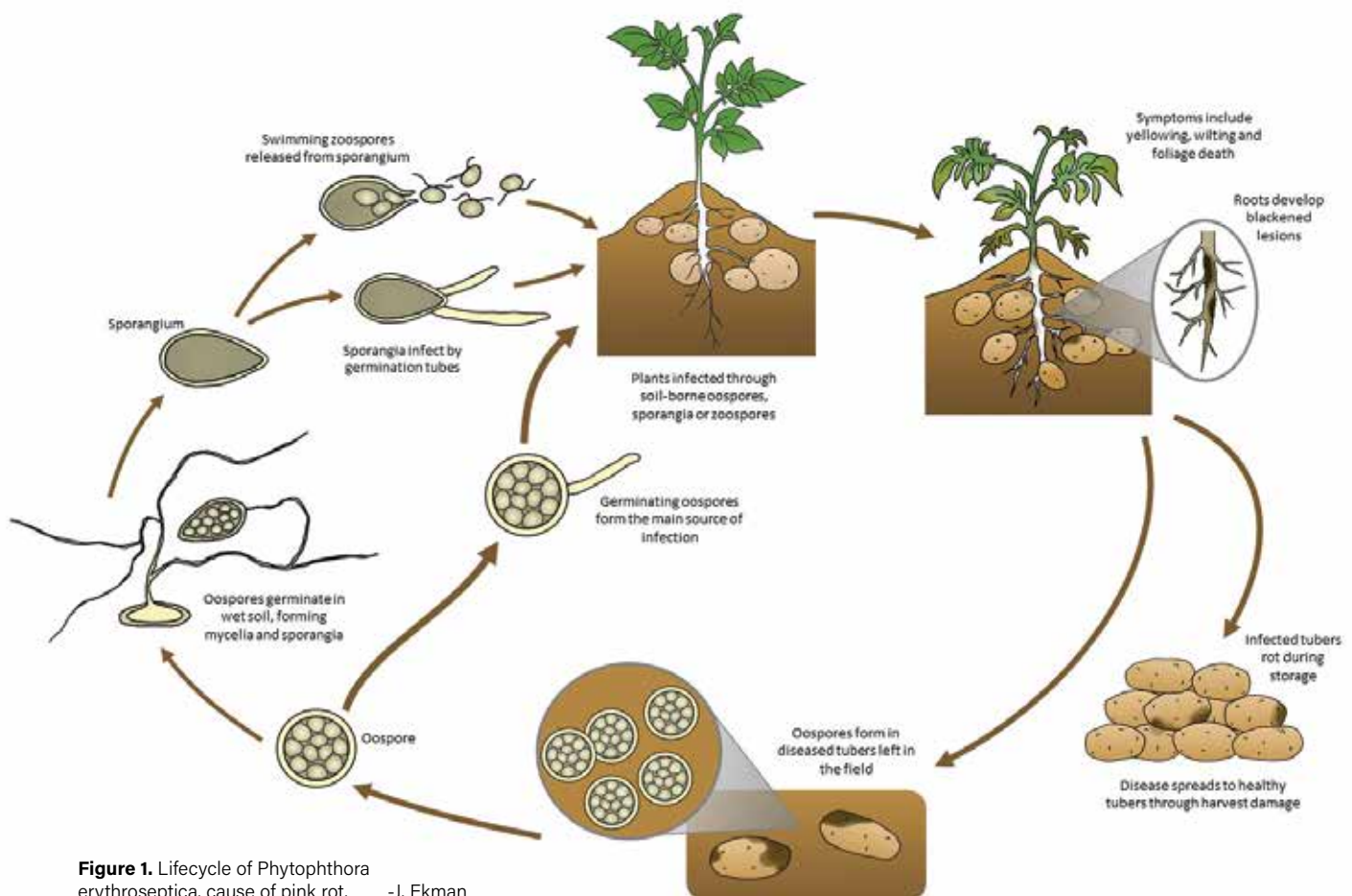


Figure 1. Lifecycle of *Phytophthora erythroseptica*, cause of pink rot. -J. Ekman

region, use according to instructions), but there are concerns regarding possible resistance.

In 2009, American research¹ indicated that calcium nutrition was important in suppressing the disease, with significant reductions in pink rot as plant calcium content increased.

The same team also determined that low pH amplified disease development, with an almost linear increase in the pathogen population between pH 5 and pH 8². However, these trials were done using a hydroponic system, so it was unclear if these effects would be repeated under field conditions.

As a result, the potato industry together with Hort Innovation, have funded a project to examine these potential management strategies under Australian field conditions.

AUSTRALIAN PINK ROT RESEARCH

Dr Robert Tegg from the University of Tasmania is a research plant pathologist working on pink rot of potatoes. He is currently examining this issue through the project "Investigating soil pH and nutrition as possible factors influencing pink rot in potatoes (PT19000)."

The first year of trials are now complete. Eleven different sites were studied across four distinct regions: Sisters Creek, Devonport, Scottsdale and Epping forest. Six of the field sites included specific field trials with research strips of calcium amendments (Nanocal and/or Calciprill/OzCal). These were either pre-spread, applied in-furrow or surface sprayed.

Individual growers, as well as field officers, helped select and set up the trial sites. . Soil chemistry, pathogen

levels, soil quality and disease outcomes were measured as were the relationships between these factors.

The objective was to assess whether the addition of calcium treatments impacted pink rot disease development and to also identify whether high levels of pink rot pathogen in the soil translated into increased disease in the crop.

SO, WHAT ARE THE RESULTS SO FAR?

Seven of the 11 sites suffered significant pink rot, with disease most severe in the NE regions. Unfortunately, according to Dr Tegg, "Calcium amendments failed to prove a silver bullet for control of pink rot, as benefits were negligible. However, there may be other benefits from increasing calcium". These could include tuber quality and pest resistance more generally.



Figure 3. Area where pink rot occurred in a field at Sisters Creek (left, - E. Blanchard, Simplot), and compacted zone along the bottom of the paddock that was expressing significantly more pink rot than the higher, non-compacted area (right, - R. Tegg).



Figure 4. Typical pink rot symptoms (left) and pink rot in combination with *Spongospora* galling and sclerotinia on the potato stem. Images taken in the field shown at right in figure 3. - R. Tegg.

The researchers did, however, find that soil quality and topsoil depth were good indicators of where pink rot was likely to appear within a paddock. Areas which were compacted, had thin topsoil or poor soil health were the most likely to suffer disease.

Similarly, other damage within the field, such as wind damage or stem canker, also increased the likelihood of pink rot. This makes sense, because if plants are stressed due to other factors, the opportunistic pink rot pathogen is more easily able to break through the plant defences and cause infection.

Another interesting discovery was that many of the cropping soils studied were highly acidic. Moreover, pH dropped by up to 0.6 units during the growing season, putting them into the sub-optimal pH 5 to 5.5 range.

“The PreDicta Pt test also provided some insights into the way the pink rot pathogen survives and proliferates in the soil” commented Dr Tegg. “Detection usually occurred mid-way

through the growing season. Detecting the pathogen before planting was more difficult, probably due to its’ sporadic distribution around the field as well as significant temperature and weather effects on the soil population”.

NEXT STEPS?

Some complementary pot trials are currently underway. So far, these indicate that very high levels of calcium (>10 tonne/ha OzCal) are required to reach the efficacious levels recommended in the US studies (>7 – 7.5). Such high rates may not be practical commercially, particularly for red ferrosols. These soils are highly buffered, making it difficult to significantly modify pH.

The field work will also be repeated this coming season, with the aim of gaining a fuller understanding of factors that increase – or decrease – field incidence of pink rot.

For more information on the project please contact Dr Robert Tegg at robert.tegg@utas.edu.au

REFERENCES

1. Benson JH et al, 2009. *Phytophthora erythroseptica* (pink rot) development in Russet Norkotah potato grown in buffered hydroponic solutions. I. Calcium nutrition effects. *Am J. Pot. Res.* 86:466-471.
2. Benson JH et al, 2009. *Phytophthora erythroseptica* (pink rot) development in Russet Norkotah potato grown in buffered hydroponic solutions. II. pH effects. *Am J. Pot. Res.* 86:472-475.

This project, *Investigating soil pH and nutrition as possible factors influencing pink rot in potatoes (PT19000)* is being funded by Hort Innovation, using the processing and fresh potato research and development levy and contributions from the Australian Government.