

Improving profits by reducing surface ponding

“Crop losses due to surface ponding affect my profit and I want to do something about it.” This sentiment is shared by many vegetable growers, but just how big an issue can it be? The extent of these losses was recently highlighted in onion crops grown in Horowhenua and Hawke’s Bay by Paul Johnstone of Plant & Food Research.

Working in commercial fields, Paul followed areas where surface ponding was evident after rainfall and irrigation events and compared these with nearby areas that had not ponded. At the end of the season, yields were quantified in both the affected and unaffected areas.



Yield loss in ponded areas ranged from 60 to 80%, representing a substantial loss of productivity. In addition to lower total yields, ponding also reduced the proportion of onions that were in the most profitable size range for growers.

The overall impact on the grower’s bottom line was heavily dependent on the cumulative area affected. However, the work showed that it doesn’t take much for the losses to stack up. One good example was where a leaky pipe fitting caused widespread ponding during irrigation. This area was about 0.2 ha in size, and cost the grower about \$1,700 in lost income.

The cost of fixing the pipe was only about \$10. In a separate field, a similar-sized area was affected by ponding during a big rainfall event in the spring. The result was complete crop loss, totalling about \$3,500 in lost income. In both cases the affected areas cost the same to grow as the rest of the paddock.



Although the work focused on the impact of surface ponding in onions, the results apply to other vegetable crops too. “Most crops do not like wet feet especially during germination, emergence and early growth. Surface ponding during these periods, often from heavy rain, can significantly affect establishment and final yield outcomes”, Paul notes. In the worst case, some crops require complete replanting, which is costly and can result in supply delays.

In addition to crop impacts, Paul also tracked the physical characteristics of the soil in ponded areas. “We found that soil in these areas typically had poor aggregate structure, which in turn affects drainage and aeration characteristics. Good soil condition is difficult to restore quickly, so protecting what you have is important.”



Like many, Hawke’s Bay grower Scott Lawson is looking to limit the effect of ponding damage on his property. “In the past, water would sit in low-lying areas of our paddocks and our crops would often die. Fungal diseases and weeds were also a problem”.

To help to address this issue, Scott has implemented a number of management approaches to move water away from the soil surface. “It starts by promoting good soil structure, which we do by building organic matter levels, reducing cultivation and working hard to eliminate compaction.

We’re also in the process of adopting seasonal controlled traffic approaches, which confines the movement of our tractors to set areas in the paddock.

These practices help us to maintain good drainage. We also use in-field practices like furrow diking to reduce the movement of water within the paddock.”

Paul is working with LandWISE to develop a simple tool that can be used to predict losses associated with surface ponding. By calculating the size of the affected area and measuring crop yields, growers can estimate the potential economic value associated with a ponding issue.

With this knowledge, growers can then make decisions to match the scale of the problem. “There’s no point throwing \$1,000 at a \$10 problem”, Paul notes. “But equally, there’s every point in spending \$10 to fix a \$1,000 problem.”



Support for this work was provided within the ‘Holding it Together’ project, which was funded by MAF Sustainable Farming Fund, Fresh Vegetable Product Group, Potatoes New Zealand, Ballance Agri-Nutrients, Hawke’s Bay Regional Council, Auckland Regional Council, Horizons Regional Council and Environment Waikato.

For more details contact:

Dr. Lindsay Fung (Lindsay.Fung@hortnz.co.nz), Vegetable Research and Innovation Manager, Horticulture NZ.