

Setting up success with good potato crop establishment

Potatoes

19.08.2020



Mid tuber bulking. Source: Yara Fertilisers

Potato crop establishment sets the foundation for high yields. Sustainable crop production practices that increase nutrient use efficiency, reduce the impacts of weeds, pests and diseases - while preserving soil structure - ultimately support grower profitability.

Yara Agronomy and Crop Solutions Manager David McRae said a holistic approach to crop establishment, starting with the selection of quality seed, to application of first-class seed treatments and targeted use of starter fertiliser, have cumulative benefits for plant health.

“The role of nutrition for crop growth, yield and quality is well known. However, nutrition also has additional and often unexpected effects on plant-susceptibility to pathogens and pests by altering their chemical composition,” he said.

Syngenta Technical Services Lead Brandy Rawnsley said the “strategic use of the right type and quantity of fertiliser, alongside a sustainable crop protection program, should be considered industry best-practice”.

Of the numerous soil-borne fungal diseases, Brandy said Rhizoctonia was a particular challenge affecting crop emergence.

“Like many soil-borne diseases, Rhizoctonia spp. is a relatively weak pathogen,” she said.

“The fungi penetrate the young, succulent tissue of germinating tubers and reduce early growth and vigour.”

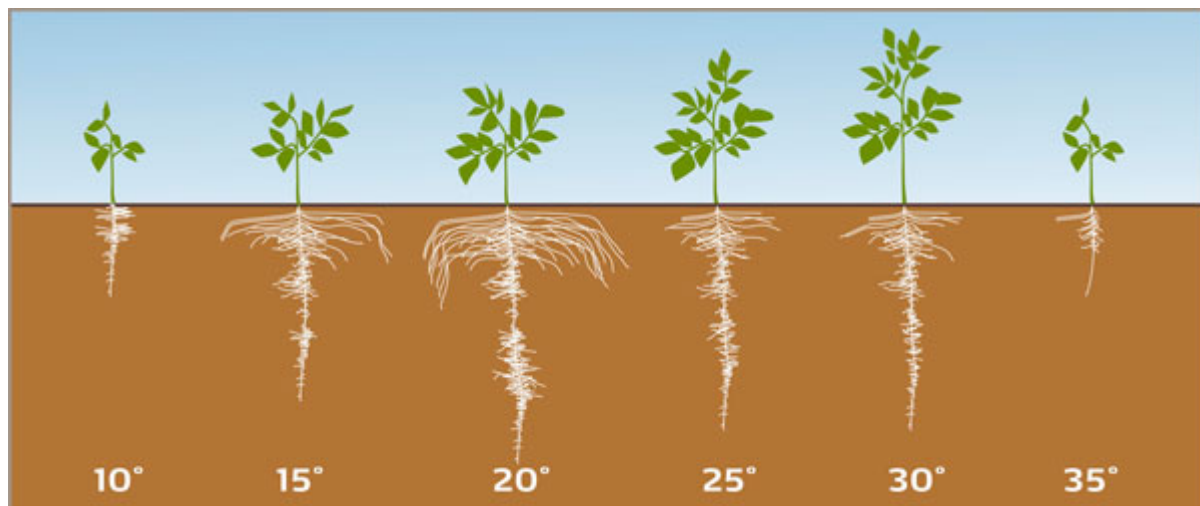
Having adequate supplies of phosphorus and zinc will support general root health and promote a healthy plant with tolerance to disease.

“Knowing the paddock history in terms of nutrition and disease risk is vital for implementing good crop management strategies,” Brandy said.

“Fertilisers used in combination with a seed dressing and in-furrow application of an appropriate chemical ensures good crop emergence and promotes strong crop growth for the season.”

The challenge

Optimising the nutritional status of potatoes can be a challenge as the plant has a relatively sparse and shallow root system compared to cereals. For this reason, potato plants cannot exploit nutrients at depth. High and low soil temperatures also influence root growth and development. Cool conditions favour rapid initiation of tubers and the greater tuber numbers. Conversely, fewer tubers are set at high temperature and these conditions favour microbial rots.



REF: SATTELMACHER ET AL - 1990

Root growth as affected by soil temperature. Source: Yara Fertilisers

The role of phosphorus and zinc

During crop establishment, phosphorus promotes rapid canopy development and root cell division—as well as tuber set and starch synthesis. Optimum supply of phosphorus is essential for optimising tuber yield, solids content, nutritional quality and resistance to some diseases. Phosphorus deficiency causes stunted plant growth with upright shoots.

“Crop fertiliser programs that supply high rates of phosphorus without adequate rates of zinc can result in zinc deficiencies,” David said.

Zinc, a micronutrient, promotes healthy green foliage, particularly in early stages of plant growth. Zinc maintains cell wall integrity and increases protein content for improved tuber quality and yield. Improved stability of plant membranes assists tolerance to fungal diseases. Zinc deficiency appears as leaf chlorosis which are upwardly cupped and narrow, leading to necrosis on older leaves.

“High soil phosphorus can actually inhibit zinc uptake of the plants so both nutrients should be applied together to help the developing root system maximise uptake.”

In summary

Potato nutrient requirements vary depending on the crop growth stage from plant development through to tuber initiation and bulking. Potato crops with an optimal nutritional status have a solid foundation to improve yields and deliver premium quality. They also have the highest resistance to disease. Plants suffering from nutrient deficiencies are more susceptible to diseases and pests.



Tuber initiation - early tuber bulking. Source: Yara Fertilisers