Controlling tuber initiation and tuber growth for an optimum harvest

Whether your production is for the markets of direct consumption, processing or seed, the achievement of uniform size at harvest is a concern for all growers

Maximizing the number of tubers

In the early stages of the growth cycle, each potato plant initiates a certain number of tubers but only some of these will survive and grow. Only the tubers that reach a sufficient diameter at the end of the initiation period will remain viable until harvest.

This complex stage driven by hormonal signals from the foliage depends on climatic factors (photoperiod and temperature) and cultural factors (variety, density, nutrition and water regime).

At the beginning of the cycle, growers must be able to ensure the availability of water and nutrients to maximize initiation particularly the availability of phosphorus, which plays a crucial role regarding the number of tubers.

"Availability of water and nutrients (including phosphorus)"

Promoting the growth of tubers

Heat stress and inadequate or fluctuating water supply negatively affects tuber growth and decreases the production of starch, which is vital for tuber growth. In addition, a regular supply of nitrogen and potash (the very soluble macro nutrients) promotes tuber growth significantly.

During the tuber filling phase, limiting the impact of climatic stress is essential to maximize tuber fill.

"Limiting the impact of climatic stress"

An experimentation program to deliver results

In the quest to maximize yields and examine influences on the different phases of the potato cycle, Lallemand Plant Care in partnership with Richard Austin Agriculture, has been monitoring planting programs, utilizing a number of product combinations. Firstly, a PGPR (Plant Growth Promoting Rhizobacteria) microorganism (*Bacillus amyloliquefaciens* strain IT45) - RISE™ P DualTech- was introduced with a fungicide at planting to stimulate root development which enhances the ability to extract nutrient and water reserves from the time of planting to the tuber initiation period.

From tuber initiation onwards, the emphasis was placed on the plant's water retention capacity and limiting the impact of climatic stress on tuber enlargement with two applications of concentrated natural Glycine Betaine (IntraCell®).

Bacillus amyloliquefaciens strain IT45

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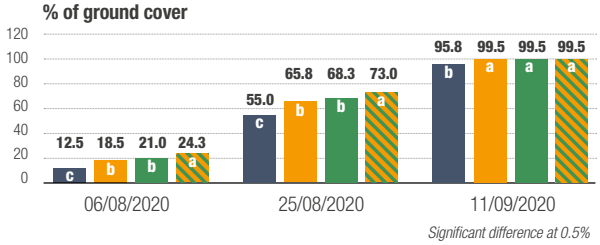
Richard Austin agriculture ltd
Agricultural Consultants & Laboratory Soil Analysis

Lincolnshire, England, 2020

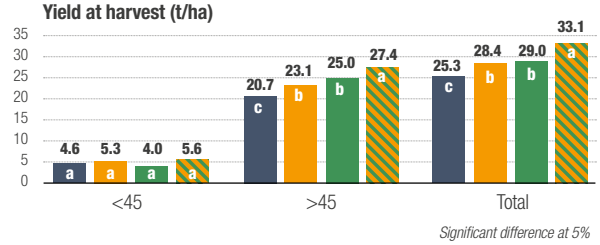
Objective	Evaluate the efficacy of chemical and biological in-furrow application treatments in potatoes
Variety	Maris Peer
Type of soil	Silt
Trial layout	Randomized complete block design (RCB) with 4 replications of 8 m x 2 rows

Applications

Treatments	Planting (in furrow) 10/07	Tuber initiation 14/08 (foliar spray)	4 weeks after tuber initiation 11/09 (foliar spray)
Untreated control	—	—	—
Chemical reference	Allstar 0.8 L/ha (*Fluxapyroxad* 300 g/L)	—	—
Biological reference	RISE™ P DualTech 1 kg/ha	IntraCell® 1 kg/ha	IntraCell® 1 kg/ha
Biological reference + Chemical reference	Allstar 0.8 L/ha + RISE™ P DualTech 1 kg/ha	IntraCell® 1 kg/ha	IntraCell® 1 kg/ha



Significant difference at 0.5%



Significant difference at 5%

A significant advance in plant canopy development was observed with the RISE™ P DualTech treatments, which is key to obtaining good tuber initiation.

We were then able to protect this strong early development with two applications of natural glycine betaine, which helps to retain tubers that would otherwise be prone to reabsorption when the crop is subjected to climatic stress.

The harvest results for the treatments were all significantly higher than the untreated control. The chemical reference yielded 3.1 t/ha more, the biological reference yielded 3.7 t/ha more and the combination of chemical and biological treatments yielded 7.8 t/ha more.

This combination treatment yielded 4.7 t/ha more than the chemical reference alone. The total cost for the biological treatments used in this trial is £104/ha ex. VAT at farm gate.

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