ENGAGE
The Power of Nutrition

Aqualatus®

Trial Report and Business Case

Artichoke

Crop | **Artichoke** (Green tapered, Globe and Violet tapered)

Region of trial | **Lorca, Murcia, Spain**

Co-operators | **Agroliner, Almería, Spain and CRICKET, Lorca, Murcia, South-East Spain**

Trial Duration | **6 months**

Aim of Trial | **To see if a reduction of water and fertiliser was possible under normal growing conditions through the winter period**

CRICKET Produce is one of the largest growers in Spain and has been since 1989. They now farm over some 3000 Ha of broccoli and artichokes along with cauliflower, cabbage and melons.

INTRODUCTION

CRICKET is based at the very heart of the Guadalentín Valley (Lorca, Murcia, South-East Spain). This area, which enjoys a mild climate and offers a privileged natural environment, has become one of the best areas in Europe to grow fruits and vegetables. CRICKET's artichoke production season is from November until the end of April however the crop is in the ground for some nine months. They are currently working on different varieties and types of artichoke so it is possible to enjoy this vegetable all year round.

CRICKET, as with most growers in Murcia is under increasing pressure in water availability and as much of the growing area is on a gradient, they are very aware that much of the water applied is either lost to the crop through drainage or from surface run-off.

AIM OF TRIALS

The aim of the trials was to see if a reduction of water and fertiliser was possible under normal growing conditions through the winter period. Two locations were chosen, the first on the base of a valley alongside a dry riverbed and the other on a gradient (see right) where surface run off is more pronounced.

Average day temperature for the region in the growing period is 25°C with night temperature being 12°C. This year however temperatures have been 2-5°C higher through the period of November-February, so the trial had become more important due to the higher volumes of water and fertiliser required.

TRIAL 1
Green tapered and Globe artichoke

The artichoke varieties in this area were grown on a flat valley base and so irrigation runoff was acceptable however the temperature in the area is naturally higher due to the protection of the surrounding valley therefore loss of moisture to the crops from evaporation and drainage are the larger concerns. The trials area would cover approximately 7 hectares due to the minimum area set-up of the feed station. Aqualatus was applied to the crops via drip tape irrigation which was buried beside the crop at one tape per row of plants. Crop planting dated was 15th of September 2015 and Aqualatus was added to the fertiliser and water at 2.0 litres per Ha (1 quart per acre) for the first application and then subsequent applications were applied at 1.0 litre per hectare (1 pint per acre) for subsequent application at monthly intervals.

Engage Crop Solutions distributor in the area, Agroliner, convinced CRICKET produce to reduce the irrigation timing from day 1 by 33% from 45 minutes per day to just 30 minutes. This was difficult to achieve as it meant reducing the amount of water applied would be many thousands of litres of water and the agronomist was sceptical having used polyacrylamide hydrogels in the past.

Within two weeks CRICKET's agronomist's fears were calmed as the crop with Aqualatus and lower irrigation had a moisture level at 30 inches of 64% compared to the control at 43% which is an increase of 21%. This had amazed CRICKET'S agronomists as this level of moisture is generally not seen in this crop in between irrigation rounds let alone with a 33% reduction in irrigation and fertiliser volume.

They were also amazed at the quality of the crops due to the reduction in fertiliser by 33%. Leaf size and colour was excellent and heads were forming, free of calcium deficiency (black tipping) which they generally see every season once temperatures increase.

A decision was taken to possibly reduce the irrigation timing further to 50% or to carry on at the current levels and see what the difference would be once the crop matured with heads. The decision to carry on at the current level was taken and a second trial was added using violet tapered artichoke further round the valley to an elevated crop which was due to be planted in October.

Also, it was noted that the Aqualatus trial would impact on another trial, that of fertiliser yield impact study by elevating and decreasing nitrogen and phosphorus levels. Mark Horner, commercial director of Engage assured the team that not only would that not undermine the trial but enhance. The team would be eager to see the results.

Engage Trial visit

Mark Horner from Engage visited the trials site and was very pleased to see the trials still in full flow. He met with the agronomists and production manager of CRICKET who had been extremely impressed by the performance of Aqualatus.

The irrigation timings had remained the same and two important areas had been affected. The yield of the crop had been increased by 15% however more importantly the uniformity of production had been far more consistent in the treated area.

The second area which was highlighted by CRICKET was the reduction in the presence of disease. In the Aqualatus treated area pathogenic pressure had been far less to the point where hardly any curative pesticides had been applied to the crop, whereas in the untreated area a regular programme of fungicides had been required.

Discussions with Mark Horner yielded the answer to this. The reduction of water and the management of water under the surface reduced the humidity at the base of the crop and through the foliage canopy which meant the conditions for natural pathogenic pressure were significantly reduced.

YIELD DATA

Artichoke yield data - 33% less water

The following data highlights the benefit of Aqualatus by reducing water and fertiliser applications by 33%.

	Average Yield/grams per plant	
Cultivar	**Control yield**	**Aqualatus yield**
Green tapered/Globe full programme	1708.4	1964.3

Reduction in nutritional applications

	Average Yield/grams per plant	
Cultivar	**Control yield**	**Aqualatus yield**
P_2O_5 rate (kgha-1) 50		
50kg/Ha	1381.7	1480.8
200kg/Ha	1466.9	1440
N rate (kg ha-1)		
0kg/Ha	1236.6	1344.5
150kg/Ha	1365.2	1414.8
300kg/Ha	1649.9	1598.8
450kg/Ha	1785.5	1776.2

As can clearly be seen Aqualatus, even with a 33% reduction in water and fertiliser still managed to achieve higher yields in all plots apart from the highest nitrogen applications. The reduction was made reducing the timings of watering to reduce overall application.

TRIAL 2

Violet Tapered Artichoke

In the second trial, Aqualatus was applied to a 5 Ha block of violet tapered artichokes. Aqualatus was applied from Day 1 irrigation at 2 litres per hectare (1 quart per acre) and subsequent applications were applied monthly at 1 litre per ha (1 pint per acre). From day 1 irrigation, applied via buried drip tape, the length of irrigation timing was reduced from 45 minutes per day to just 22.5 minutes per day, a reduction of 50%.

The aim of this trial was to see if Aqualatus could maintain the crop to the standard of normal irrigation volumes with a reduction of 50%.

As the site was on elevated ground it would be interesting to see if the added issue of water runoff made a difference to the trial and water loss.

Trials visit

Mark Horner from Engage Crop Solutions, with the Agroliner team, visited the site to see a very happy agronomist as the crop was looking very good and reduction of pesticides had been repeated as before. The crop quality was equal to that of the standard irrigation practice and possibly the Aqualatus treated crop was slightly advanced in maturity, however, this was difficult to assess due to the size of the area.

Surface water runoff had been significantly reduced however it had not been completely eradicated by the Aqualatus so a discussion was had as to moisture levels. It was found that Aqualatus was maintaining the soil moisture level to between 55-65% in between irrigation rounds even with far greater time between applications.

As the crop rows in the area ran horizontally along the hillside it was felt that the soil ridges were acting as surface drains and the elevated moisture levels under the surface were leading to some surface water runoff.

It was felt by all that this meant the timing of irrigation could be reduced even further so it was decided by the agronomist that as reducing daily timings would be impractical due to the set-up of the feed station, the irrigation should be turned off every third day to allow for a 30% reduction of the 50% level. **This would mean the overall reduction in irrigation would be 65%.**

This was exciting for all as the overall savings in **water and nutrients, power and pesticides** would mean that the widespread use of Aqualatus across the growing areas was very attractive to CRICKET.

YIELD DATA

Violet Artichoke yield data - 50% less water

The following data highlights the benefit of Aqualatus by reducing water and fertiliser applications by 50%.

	Average Yield/grams per plant	
Cultivar	**Control yield**	**Aqualatus yield**
Violet full programme	1139.6	1178.5

Reduction in nutritional applications

	Average Yield/grams per plant	
Cultivar	**Control yield**	**Aqualatus yield**
P_2O_5 rate (kgha-1) 50		
50kg/Ha	1014.5	1102.3
200kg/Ha	1227.8	1251.9
N rate (kg ha-1)		
0kg/Ha	989.6	1045.5
150kg/Ha	1089.9	1096.5
300kg/Ha	1124.9	1120.4
450kg/Ha	1393.4	1377.3

As can be seen above Aqualatus even at 50% reduction in both water and nutrients managed to slightly increase yield by 4%.It also performed well in the nutrient trials with yield increases over the control in all but the highest nitrogen loads.

TRIAL CONCLUSION

For CRICKET farms, the trial proved that their light sandy ground and topography meant that much of the fertiliser and water applied was lost to waste and created issues of water availability and also pollution into the nearby river.

Aqualatus eradicated theses issue without having to compromise in yield or quality of crop and reduced overall pesticide use due to reduced pressure from disease. Aqualatus saved 33% of fertiliser and water in the green artichokes and 50% in the violet crop grown on a slope. CRICKET farms have no moved to establishing commercial use of Aqualatus across all artichoke production.

For more information on Aqualatus or any other products, contact us on

t: + 44 (0) 1257 226590

e: info@engagecropsolutions.com

aqualatus.com