

Irrigation Water, Correctly Magnetised, Produces Better Crops and more Profit

A commercial farm assessment of the benefit of Magnetically Conditioned Irrigation Water resulted in brassica plants reaching plant-out stage one week earlier than normal and using 30% less nutrient.

Russian scientists in the 1920's discovered that magnetically conditioned irrigation water gave increased yields of tomatoes. More latterly, in the 1980's the Israelis did further research into it's benefit in horticultural and livestock production, resulting in improved production figures. Their work also showed that livestock drank 10-12% more water. In Britain in 1991/93 a Norwegian company confirmed the Russians findings in a two year controlled tomato trial, monitored by ADAS, in which a reduction of pipe biofilm was also observed. Following this trial, research attention was turned to livestock enterprises where equally good results have been produced.

A recent assessment of the Correct Magnet System has been carried out at a large Lincolnshire arable farm in a plant raising nursery. Gary White, Farm Manager for J W Grant & Co, learnt about the Correct Magnet Company when he tried the Fuel Ring Magnet on one of his tractors. He was so pleased with it that he purchased magnets for some of the other farm vehicles and is now saving 1 Litre of fuel per running hour on some of these. With this positive experience he was prepared to carry out an assessment of Correct Magnets on the mains water supply to the brassica plant nursery.

Observations are:-

1. After installation of the magnets there was a drop in water pH from 8.5 to 7.0. Gary White says, "this will be a very positive step in carrying more nutrients in solution."
2. The conductivity of the nutrient solution increased by 150. This can only mean that nutrients had become more available and less nutrients were therefore required in the mix.
3. This provided a saving estimated at 30% of total nutrients.
4. By week 6 the plants were ready to plant out. This is earlier than normal for the time of year. However, due to adverse weather conditions it was decided to delay planting out for an extra week.

This year, acid dosing was introduced for the first time so it was going to be difficult to say whether the magnets had made any difference. Fortunately the acid dosing did not start until 10 days after the magnets were installed. A rise of the Electro Conductivity occurred shortly after the magnets were installed and it was necessary to reduce nutrient levels before the acid dosing was switched on. This confirms that magnetic treatment increases the availability of nutrients.

A similar experience was related by Neil Chambers, a plant technical manager in Lincolnshire, when he tried out the Correct Magnet System during the four weeks before flowering of Polyanthus plants under glass. After the magnets were installed the pH dropped from 7.6 to 6.6 and a rise in the EC followed from 1200 to 1500, which enabled him to reduce nutrient feed, but in this case there was no acid dosing. He was pleased with his experience with the system, which had no detrimental effects to the plants. An interesting observation by him, which had not been reported before, was that there was quicker penetration of the compost by the nutrient solution, a further benefit. These results of the pH effect and the increase in nutrient availability confirm again that they do occur without acid dosing.

So how do the Correct Magnets work? Magnetism changes the ionic charge on the calcium salts thus preventing scale formation and cleaning pipes and heating elements in hard water areas which keeps nozzles free from scale and biofilm. Secondly, it changes the type of calcium salt to Aragonite crystals, which are either deposited in the bulk of the water, or precipitate as a soft sludge in static water and can easily be hosed away. Thirdly, it increases solubility of chemicals and nutrients in water. Water is made up of H₂O molecules which are loosely bound together in clusters. By passing water through a strong magnetic field the cluster size is reduced, thereby producing an increase in surface area, hence more nutrients and chemicals get into solution making them more available to plants. The reduction in cluster size causes a drop in pH, which, as pointed out above, enhances the availability of nutrients and chemicals. The reduction of cluster size also reduces the surface tension, the combination of both provides better leaf coverage. The last three effects make nutrients and chemicals more available in foliate feeding and in chemical spray applications. It is essential that the magnetic field is correctly configured, as has been achieved in the Correct Magnet system, if positive results are to be obtained.

This leads on to a new use for magnets in arable farming and horticulture, i.e. in crop spraying. All of the above properties will enhance the efficiency of spraying, and recently a trial was set up with the help of Stuart Plumridge, a spray contractor in Worcestershire. A simple exploratory trial was set up to evaluate the efficiency of Glyphosate at three different concentrations. The recommended rate is shown as 100% in the table below and the weaker solutions being at 75% and 65% of the recommended rate. Three plots 24m x 10m were pegged out with a 2m strip between each plot and at the start to allow for each new concentration to work through the pipes on the sprayer. The magnet was applied for spraying the lower two concentrations but was omitted when spraying the 100% concentration. A water conditioner was added at 1% of the total spray volume. The table below shows the spray assessment results.

Effectiveness of Glyphosate applied at differing concentrations

Concentration	100%		75%		65%	
Day	7	15	7	15	7	15
Leaf kill	100%		100%		91%	
Plant kill	100%		100%		100%	
Root hair loss	43%	98%	78%	98%	60%	98%

Conclusions

1. The 75% and 65% concentrations produced more rapid root hair loss than the recommended rate, possibly due to the magnetised water releasing more Glyphosate due to the lower pH. It is a known fact that potassium, which is part of the formulation of Glyphosate, has the potential to interact with calcium and magnesium. This trial is further proof that magnetism helps to make mineral salts more available in solution.
2. The end result showed that the 75% and 65% of the recommended rate were as effective as the full recommended rate, in our opinion due to lower pH, increase of cluster surface area and better leaf coverage.

Trials using this new technology are in their early stages and we continue to do research whenever possible. However, there is great scope for farmers to carry out their own experiments providing some basic rules are followed. Start by experimenting with herbicides on a small area before committing yourself to a whole crop. Secondly, only reduce the concentration where there is time to go in for a second time with a 100% concentration, if necessary. Then thirdly, start at an 85%

concentration and reduce to 80% concentration. Several farmers have already done this and one farmer who farms 240 hectares and has a £60,000 per annum spray chemical bill is already saving £12,000 per annum. Considering the maximum cost of the magnets, depending on water pipe size, is less than £520 per installation and they have a lifespan of about 40 years, it appears that fitting the magnet on his sprayer was money well spent.

Tomato trial 1992/93

This was a fully controlled trial at Chris and Janet Harvey's nurseries in Worcestershire, monitored by ADAS and Gwyn Roberts, a consultant with ADAS and now an independent horticultural consultant. It is worth considering the similarity of the increased availability of nutrients in this trial to the results from the brassica and polyanthus assessments above, which give greater authenticity to this new technology. The treated area, over a period of two years, produced 8% more yield than the control area. There was an increase of 31% in the nutrient solution uptake and improved root growth was observed at times. Camden Food and Drink Research reported the treated area produced a better quality of fruit, the taste was improved and there was a firmer and denser tomato. Each year the returning nutrient solutions were analysed to ascertain the level of individual nutrient uptake and so compare nutrient uptake of the treated and untreated areas. The results from the treated area showed that nutrients generally became more available. A single test showed that the sugar level was raised in the treated area. An interesting comment from Chris Harvey in 1995, three years after installing the magnets, was that 'Results over the past three years are undeniable. The magnetically treated area has given much better quality both in appearance and shelf life. Weights have been better as the fruit is firmer and more 'meaty' in texture. The root system has been less prone to breakdown.' Another grower on a Rockwool system reported, 'I have had to replace all the capillaire irrigation lines annually in the past, but due to the scale prevention properties of magnetically treated water, this has not been necessary after the first year of installing the magnetic unit.'

A subsequent tomato trial in Denmark confirmed the increased yield but also revealed that magnetic treatment of water lowers water pH. The untreated tomatoes suffered from Blossom End Rot, a deficiency of calcium in the fruit due to a high level of pH, whereas the treated area remained healthy. This led to the conclusion that magnetic treatment increases the availability of certain nutrients by lowering the pH, in this case calcium. Not surprisingly the treated area yielded 14% extra. This drop in pH has been confirmed as a "significant" finding in a university trial on dairy cows in UK. Prevention of lock-up has also been seen in a dairy herd, which suffered from copper deficiency due to copper being locked up by high molybdenum. With the Correct Magnet System installed on the drinking water, the cows came bulling without injecting copper to get them to do so.

This fully controlled tomato trial gave conclusive evidence of the benefits of magnetically treating nutrient solutions. Other assessments and field observations are reported from which conclusions have been drawn. The drop in pH has been confirmed in another fully controlled trial and the bactericidal, algicidal and de-scaling properties are well known facts, as is the ability to reduce surface tension. Our experience of the benefits to irrigated crops is substantial and has now been given more credence by the assessment at W J Grant & Co. With regard to herbicide, insecticide and disease treatment, research is at an early stage and further trials are in hand but farmers can experiment at their own risk. After the tomato trial, Gwyn Roberts, the horticultural consultant stated 'I believe that Magnetic treatment must be integrated with skilful crop management rather than be expected to perform in isolation. I am still convinced that the way forward is to continue to exploit magnetic treatment at the commercial end where growers can easily observe the effects on their crops and assess overall benefits to the business.'