SHEPHERDS BUSH FIELD REPORT

Introduction

At Shepherds Bush lettuce is grown hydroponically. The owner, Peter Mallone, has had many years of low crop yield believed to be caused by water born pathogens, Pythium in particular. An Aqua-Hort copper ioniser was installed and the results reported below.

Customer Profile

Shepherds Bush grows a number of lettuce varieties hydroponically under plastic. The current owner, Peter Mallone, was semi-retired and bought the business a few years ago dreaming of a relaxed life style far away from the Auckland City 'pressure cooker'. He supplies to a large number of supermarkets and restaurants.
The operation has the potential to produce 22,500 lettuces every 4-6 weeks. The water is sourced from a bore, stored in a 25,000L water tank, treated with ozone and then supplied to two nutrient tanks. Pumps feed the nutrient solution to one side of the tray's. Through gravity the nutrient solution flows down to the other side and then back to the nutrient tanks where it is circulated over and over again.

Business Situation

Peter has found it difficult to meet client's orders due to the crop losses which are mainly caused by plant diseases. Microbial tests indicated that Pythium was the main cause of his problems. He

installed an ozone water treatment system and in addition he has tried a number of chemical treatments such as Hydrogen Peroxide and copper sulphates. None produced consistent results and so Peter kept looking for a better solution to provide the crop yield and to satisfy client demand for his lettuces.

The Solution

For some time it has been known that a controlled dose of copper ions can make a significant contribution to the control of fungus attacks, especially Pythium and Phytophthora. A controlled dose of copper ions has hitherto been extremely difficult. Copper ions applied chemically, as with salts, form very quickly complex chemical bindings and then loose their lethal effect on zoospores. The ioniser injects free copper ions(Cu++) via an electrolytic process and the dose rate can be accurately controlled.

Novozone offered Peter a trial run with the Aqua-Hort Mini copper ioniser. The ioniser was installed after the nutrient dosing equipment and injects copper ions into the nutrient solution. The maximum flow rate for this machine is 5 m3/h. The machine is fully automatic, once the copper dose rate is set the machine compensates for any EC and flow variations. The copper concentration is displayed on a LCD display. A chemical test kit is supplied with the machine and used to check the dose rate.

The Microbial Tests

In order to determine the efficacy of the copper ioniser a microbial test was conducted by Milennium Diagnostics Ltd. The test involves adding specially prepared pine needles to the nutrient solution. The needles act as a bait to attract the pathogens, which are then grown in agar under laboratory conditions and examined. A number of tests were done under different copper dose rates and the results summarised as follows:

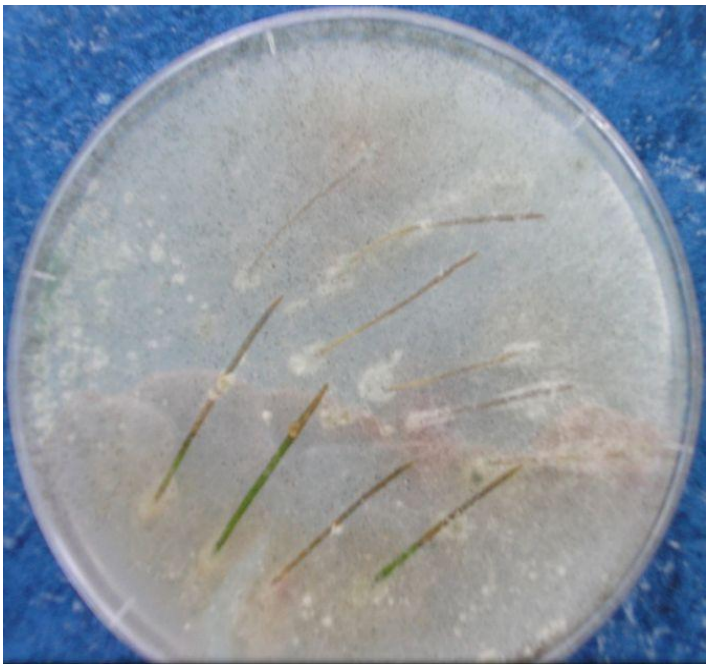
Photo-1 Nutrient solution untreated

The raw water supply was heavily contaminated with Pythium spp, Fusarium oxysporum, Fusarium solani and Rhizoctonia spp.

Photo-2 Nutrient solution treated with 0.2 ppm Cu++

The treated water samples had a fundamental change in the phyto pathogenic fungi profile with the 0.2ppm dominated by saprophytic Paecilomyces spp with a single colony of Pythium growing.

Photo-3 Nutrient solution treated with 0.7 ppm Cu++



The 0.7ppm treated water sample yielded Rhizopus stolonifer which is a specialist in post harvest disease and Penicillium which again specialises in post harvest rots. These two fungal species are ubiquitous and the water sample was most likely contaminated in situ by dust.

Stephen Ford, Technical Director of Milennium Diagnostics Ltd believes that the NFT water that has been treated by the Copper Ioniser has been significantly improved for use as an irrigation supply for Horticultural Crops

The Benefits

For Shepherds Bush the most difficult growing times have been in early summer as the temperature under the plastic rises rapidly. In the past crop losses have then been significant and have made it hard for Peter to fill orders.

With the addition of the copper ionizer the plants are flourishing at all levels of production and the tray's are now full of lettuces. The increase in crop yield is adding significant dollars to his business. Very important for Peter was that the cost of the Aqua-Hort ionizer, including depreciation and spare

electrodes is about x% of revenue

As can be seen in the pictures, the roots are healthy and well developed and support a strong head. The fine roots improve calcium uptake which is important for resistance and shelf life

An additional benefit is the clean recirculation system. Clogging up of the feed tubes, which causes a tray to be starved of water, is a thing of the past.