Impact of clogged irrigation systems on citrus

Effective irrigation and fertilization are key to achieving optimal yields. The Puricare team conducted research which demonstrated not only how uneven water and fertilizer delivery were, but also how the situation could be remedied within six to twelve weeks.

THE CHEMICAL, PHYSICAL and biological quality of irrigation water has deteriorated. Increased minerals, silts and biological matter in irrigation water block and clog pipes, filters, drippers and micros in orchards. Current treatments include flushing of lines, frequent backwashing and cleaning of filters, manually checking emitters and expensive chemical dosing. Despite all these measures, drippers and micros remain somewhat clogged, resulting in uneven delivery.

More than R8 000/ha of fertilizer products are applied via irrigation systems. If the emitters are dirty and clogged it means that trees in orchards are getting different amounts of both water and fertilizer, which impact various aspects of production.

To illustrate the extent of uneven water delivery, Puricare measured micro-jets (40 orchards) and drippers (28 orchards) in Kirkwood and Addo between 2016 and 2019.

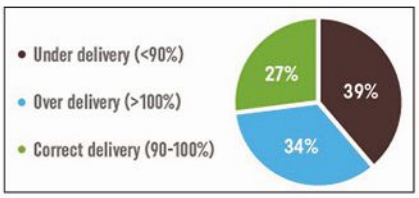
Too little or to much – water and expensive fertilizer

Two random sites of 10 drippers each per orchard were selected and water delivery measured. Actual delivery and the specified delivery for each dripper or micro-jet (at the specified pressure) were compared and presented as a percentage of the specified delivery. Note that all the orchards had standard flushing, manual cleaning and chemical dosing treatments in place – and no Puricare treatment.

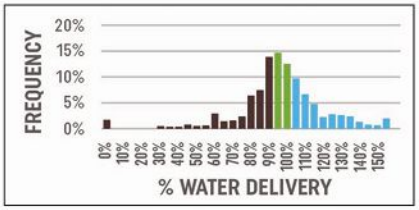
Effectively, only 22% of drippers delivered the correct amount of water and fertilizer while the other 78% delivered either too much or too little. If 7 500 cubic litres of irrigation water were applied per ha/annum for citrus, then some 5 800 cubic litres containing expensive fertilizer was applied inappropriately. The frequency distribution highlighted the actual variation in delivery due to clogged drippers. Flushing, manual cleaning and chemical dosing practices at the test locations appeared inadequate.

A similar picture was evident with micro-jets, with the study showing only 27% delivering the correct amount of water and fertilizer while the remaining 73% delivered either too much or too little. If 7 500 cubic litres of irrigation water were applied per ha/annum, some 5 475 cubic litres with expensive fertilizer was applied inappropriately. The frequency distribution highlighted the actual variation in delivery due to clogged micros. Once again – current irrigation cleaning practices appeared inadequate.

In another test study, two rows of 10 drippers were randomly chosen, marked and tested before and after installation of the Puricare unit on four citrus farms. The dripper lines were all over 10 years old. The results showed how Puricare

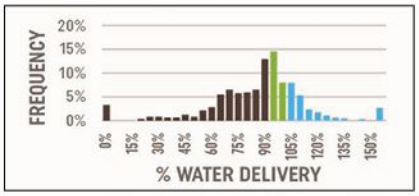


The percentage of micro-jet delivery.



Frequency distribution of micro-jet delivery in 40 orchards.

The percentage of dripper delivery.



Frequency distribution of dripper delivery in 28 orchards.

was able to achieve more uniform coverage with effectively cleaned systems – normally six to twelve weeks after installation. Furthermore, distribution uniformity (DU) increased from an average of 89% before Puricare treatment to 96% afterwards, as did the average coefficient of uniformity (CU) increased from 94 to 98%.

These studies highlighted the current status in citrus orchards and the improvement of uniform water and fertilizer delivery. The study furthermore red-flagged the limited effects of current dripper and micro maintenance practices. In contrast – the installation of a Puricare unit in every pump house would have cleaned the irrigation system and improved uniformity of water and fertilizer delivery within six to twelve weeks.

Furthermore, with every new irrigation system, the damaging effects of normal maintenance practices could have been reduced and the lifespan of the lines, drippers and micros extended.

For more information about Puricare solutions visit the website at www.nexusag.net or contact NexusAG on 021 860 8040.