Precision irrigation for ornamental plant

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A prototype of precise irrigation system tested in Italy for ornamental plants nurseries as water shortage puts pressure on growers

The dosage of water and nutrients is often excessive for some of the crops' requirement, as the most water demanding species set the standards. This happens because cost of irrigation water tends to be low in Europe. But now, water shortages are putting pressure on plant growers.

Precise water management offers one solution to make plant production more sustainable. This is what Italian partners of a EU funded research

project called FLOW-AID have tested. They developed an irrigation prototype designed for container-grown ornamental plants near a town called Pistoia, in the Tuscany region, which is considered to be one of the most technologically advanced nursery areas in Europe.

The prototype combines so-called WET sensors with so-called fertigation controllers. The latter assess the level of fertiliser application through the irrigation system. "The [WET] sensor measures the amount of water and the level of salinity [by measuring electrical conductivity] and transmits the data [via a wireless link] to a computer,"Alberto Pardossi tells youris.com. He is the project partner leading the Italian team and the director of the University of Pisa's doctoral programme in Agriculture, Food and Environment.

The software then processes these data in accordance with specific algorithms developed by the project. It also controls a series of actuators, such as the dosing pump injecting the fertiliser in irrigation water, as a means to try to optimise water distribution and limit fertiliser use. The technology can also be used to avoid salinisation of the growing medium when so-called dual water is used—a combination of well water and sterilised urban wastewater. This is made possible thanks to dedicated fertigation controller capable of blending waters of different qualities. When the WET sensor detects an increase in salinity, the controller reduces it by switching from one source to the other.

Some experts are enthusiatic about this approach. "This [technology] can effectively bring great advantages to irrigation management," says Silvio Fritegotto, agronomist, nutrition and fertigation consultant based in Poggibonsi, in the Siena province of Italy. "Not only it allows to save water but also to better feed the plant, which therefore grows better and produces better," he adds.

The type of precision irrigation is most likely to be adopted in

ornamental nurseries grown in containers in greenhouses without soil, according to Renato Padulazzi, agronomist, grower connection at Toro Agriculture, based in Fiano Romano, near Rome. "In container and soiless grown crops you need a precise control of each parameter since even a small mistake can do irreversible damages," Padulazzi tells youris.com. "On the contrary, in the open field the soil acts as a buffer, so fewer precision is is needed."

The software-based approach devised by the project has become more common and cheaper as well as easier to use in precision agriculture. However, this technology has not yet been widely adopted. In many cases, good quality water is still too cheap to change over more sophisticated and more expensive irrigation systems. Fritegotto also attributes this slow uptake of the technology to the fact that " [at least in Italy] agriculture is often linked to small-sized farms and aged farmers, while [its adoption] is...often left to individual efforts." Other experts such as Padulazzi agree: "Many times farmers do not have the adequate knowledge on water and nutrients management and don't feel the need to innovate they way they produce".

And large-scale applications are still not very common in Europe, even in ornamental nurseries, considered to be the most technologically advanced field in agriculture. Application of this technology to large surfaces could be done in open fields, for instance, in vineyards and orchards, according to Fritegotto.

Meanwhile, the European Commission is promoting economic incentives for producers to acquire equipment and technologies able to reduce water consumption without dropping productivity. Experts agree, however, that a drought is still the biggest incentive for farmers to rationalise water.

More information: www.wageningenur.nl/en/show/FlowAid-2.htm