Scientists tackling software-based optimisation of plant growth in horticulture

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Ton Baltissen, researcher at Wageningen University and Research Centre, in the Netherlands, who works in the Applied plant research (PPO) department, gives youris.com the low down on the advantages of relying on software management to optimise nursery plant growth and predicts what is likely to come next.

What is the difference between the level of computerisation of glasshouse nurseries and outside nurseries?

In the Netherlands, the complete nursery stock area is about 20,000 hectares. Only a small part of nurseries are in greenhouses, less than 5%. Outside there's more mechanisation than computerisation, mainly used to make the labour easier, for logistics and for weed control. In the last years, the trend is going toward using sensing technologies for precision agriculture, for example assessing the moisture content of the soil. By contrast, in glasshouses and container fields' nurseries, it is easier to control growth. We have greater mechanisation and automatisation than outdoors also partly because of the high cost of labour in the country. This allows the control of the air, water, oxygen, nutrients. There is also an element of robotics coming in, which we do not see outside.

How does software assisted management help optimise the trees and plants production?

It helps control growth, get a better crop quality, ensure fewer fertilisers are required and analyse actions and costs to develop new growing strategies. Besides, information about the amount of water given, the time it is being given, the quality of the water, gets registered by the software. As a result, you can learn from it year-on-year and also compare data with other growers.

What is the rationale for increasing the use of software in nurseries?

Software assisted optimisation in nurseries is growing because summers are getting drier and growers are having problems with the amount of water at their disposal and with its quality. There is also software available for administration functions, order delivery, stock, cultivation and internal logistics. Until now, it was considered difficult to make software for the outdoors nurseries since there are so many different crops that need to be managed differently. It was also unattractive because the potential market is not that big. By contrast, in glasshouses where food crops are produced there are big growers and a lot of hectares of the same crop, so for producers it is very interesting to invest in software.

What is coming next?

In the future, we will see more control of the amount of water needed for the crops. And perhaps we may be able to go from measuring water in the growing substrate to a direct measurement in the crop. For example, it could be done by measuring the thickness of the leaves or of the stem, to avoid interacting with the roots, the container, and the plant. Other improvements would come from refining existing sensors. At present sensors measure salinity but we don't know whether it is potassium, calcium, nitrate, phosphate etc. I think there will be more

development to see what kind of ions are producing the salinity in order to best balance the use of fertilisers. Moreover, at present most sensors are stand-alone systems whereas in the future they will be more integrated to automatically update the computer.

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