4.6 How to check the integrity of the system and how to troubleshoot

Regular maintenance work should be carried out either monthly or every three to six months. Standard periodic maintenance procedures are as follows:

4.6.1 Plant health

It is necessary to assess the plants in terms of their health and general physiological appearance. If pests or diseases are identified, systemic treatments need to be administered through the irrigation system. Treatment should be repeated periodically in order to completely eliminate the pests and diseases concerned. In the event of severe pest attacks, the plants will need to be replaced. If certain nutrients are lacking, foliar fertigation should be carried out using appropriate water-soluble fertilisers or foliar fertilisers.

4.6.2 Substrate moisture

If the level of moisture is too low or too high, the timing or frequency of irrigation must be regulated. Dielectric humidity sensors may need to be re-positioned. These oxidise after a few months and will need to be replaced.

4.6.3 Concentration of nutrients

This is checked using an electrical conductivity (EC) meter. If the EC is too high, the reservoir must be emptied and refilled with water and a review conducted on the nutrients added. Since water flushes nutrient salts when circulating through the substrate, thereby causing the water to become oversaturated with salt, the reservoir should be emptied after five to ten fillings with water and fertilisers.

4.6.4 pH of the water

This is checked using a digital pH meter. If the pH is too high, the appropriate amount of acid needs to be added in order to soften the water. If the pH is too low, pure water is added or the reservoir is emptied and refilled.

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Figure 1: Measuring water hardnes
Source: Tomaž Čufer

4.6.5 Irrigation system

If the system allows, check the water level in the reservoir. If water does not flow into the reservoir, check the functioning of the solenoid valve and whether there is any water in the water distribution system. CaCO3 may cause the float switches and solenoid valves to get stuck. If so, the CaCO3 can be dissolved using citric acid. The drip emmiters need to be checked to see whether there are any dry areas in the substrate. If the drip irrigation system does not work, acid fertiliser such as Pekacid can be used to clean it, or the emitters and hoses need to be replaced. The water filter needs to be cleaned periodically every month; the functioning of the pump needs to be checked every three months if it reaches the set pressure.

Figure 2: Machinery
Source: Tomaž Čufer

4.6.6 Automation system

The functioning of the automation process needs to be checked, including the time settings and duration of watering, the moisture levels, lighting and the fertiliser doses. If the parameters have changed, they can be adjusted to their pre-set levels. All levels need to be digitally archived.

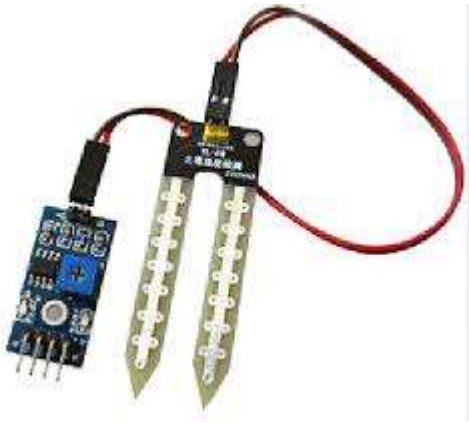

Figure 3: Software and moisture sensor
Source: Tomaž Čufer

4.6.7 Lighting system

High-pressure sodium spotlights need to be replaced after 15,000–20,000 hours of use.

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