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Efficient Water Use in Ornamental Production

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Abstract

Growers in the north west of Europe tend to be more technologically savvy and innovative compared with Mediterranean or eastern European regions. However, there is a need, and a desire, to apply basic practices well, and learn more about newer technologies, and the Fertigation Bible is an importance resource to help growers do this.

INTRODUCTION

FERTINNOWA was a European project that collected information on water use from several EU countries. The project concentrated on horticulture across Europe. As a result of the project, a "Fertigation Bible" was created, which brings together all current information on ways to collect, store, clean and recycle, for farmers to use, for free. https://www.fertinnowa.com/the-fertigation-bible/.

In the talk I give a couple of examples from each section of the Fertigation Bible. It is a huge document, so it is worth focusing in on areas that are relevant for you and your business.

Water provision

Water can come from multiple sources (mains, borehole, river etc.), and each can have issues associated with them. The best quality water is rainwater, which you do not have to pay for if you collect it yourself before it hits the ground. However, it is a misconception that rainwater is free, as investment is required for efficient collection and storage. Water silos of varying sizes can

be used – it depends on the amount of capital you have available to invest. Alternatively, ponds and reservoirs to hold water can be anything from a small clay-lined affair to a huge, properly lined reservoir. The Fertigation Bible gives average costs to install both silos and reservoirs of varying size. It also gives examples of easy wins to improve water quality – such as adding a float to your water pump to avoid sucking up sediment – through to more expensive options such as climate models. Improving the quality of stored water can be done using four different approaches: altering chemical composition, particle removal, algal removal, and disinfection. Again, the Fertigation Bible gives information about different methods to use all of these approaches. For example, a relatively cheap method to treat algae is to use blue food dye, which cuts out the wavelength of light algae need to photosynthesise (e.g. Dyofix Pond Blue). A more expensive option is to use ultrasound pulses to disrupt algal movement.

Drip systems

There is a section on fertigation equipment, and in the talk I use drip systems as an example of the Fertigation Bible giving different cost options. Drip systems can be split into three cost levels. The cheapest lies flat on the soil surface. For a better water flow, drip emitters costing 2-3 p each can be added. Drip tape with pressure-compensating drip emitters, for use on slopes, costs just under £4 per metre, but allows more controlled irrigation over problematic contours. The most expensive form of drip irrigation is tape buried beneath the soil surface to deliver water directly to the roots. This can cost between £900-2000/ha, and can have a shorter lifespan, but can reduce evaporation and water loss.

Fertigation management

There are a host of different ways to manage fertigation in your system. The range of technology and products to help you do this is increasing all the time. It can involve whole system approaches, such as water deficit irrigation (keeping plants dry almost to the point of wilting before watering), or specific technology to measure soil water, crop water or plant tissue nutrient status. The project found differences between countries in their approaches – in the UK growers tend to send leaf samples off for analysis very infrequently, usually when a problem starts appearing, whereas growers in Germany pay for analysis on a very regular basis so that they can respond to changes in the plant before any problems occur.

Preventing pollution

Finally, there are multiple options for cleaning wastewater before it goes back into the environment. If your site is on a slope (even a slight one), it may be worth digging a ditch or pond to collect runoff or water percolating through the soil. It will collect and allow excess nutrients to settle out of the water. Duckweed can be grown to take up these nutrients. Digging a ditch or trench with reeds grown in clay pellets requires slightly more investment. Water enters one end of the ditch, the reeds take up the nutrients, and as the water progresses through the channel, the nutrients are taken up, and the much-improved water can either be reused or allowed to flow into a river. The reeds require cutting once or twice a year. Constructed wetlands are the most expensive option for collecting water runoff in an agricultural setting. They can be vast, or a long, relatively narrow series of ponds containing reeds and other marginal plant species.

These ponds slow down the flow of water, allowing the nutrients to settle out of the water. The plants then take up the nutrients. This is a slower process, but can be relatively cheap once in place, and can have the added benefit of attracting wildlife.

There are also more experimental options being developed, for instance iron oxide-coated sand. This sand is placed in a filter, and as water runs through it, the sand extracts any remaining phosphorus from it. Researchers have recently figured out how to remove the phosphorus from the sand so that it can be used again. It is currently being tested in the field, on the continent.