Setting up a new overhead irrigation area

Production nurseries traditionally continue to expand production areas over time leading to accumulated problems of poorly sized mainlines, unsuitable pumping systems and odd shaped growing areas. Growers regularly comment they never planned to expand or grow to their current size, and if they had their time over they would certainly plan well beyond their current expectations. Taking some time now, to plan the size and location of future growing areas, water storages, roadways and structures will save many dollars in capital and operational costs in the future.

Installing a mainline now that is oversized for current requirements is a shrewd and prudent investment in the future of any business.Mainlines are one of the most common issues that limit the ability of production nurseries to expand their growing areas. Mainlines are often too small to carry the flow and pressure required in expansion plans, contain too many restrictions such as corners and elbows, and can be inaccessible often running under growing areas, structures, and concrete. Increasing the flow and pressure through existing mainlines to support new production areas can put the mainline under excessive strain leading to leaks and pipe failure, as well as substantially increasing pumping and maintenance costs.

Pumps or pumping systems are often located in small hot pump shelters, lacking room to upgrade, and not central to the growing areas. Many pumping locations also have insufficient room for expansion; for multiple pumps, disinfestation systems, storage tanks, and are often serviced by a limited electricity supply.
Growing areas are not always well planned and easy to irrigate. Growing areas that due to expansion, fill in the gaps between the established growing pads, are often irregular in shape, long and narrow, triangular, or some other strange shape that makes it extremely difficult to design efficient irrigation systems.

Deciding on a suitable irrigation system for a new growing area or upgrading an existing production area can be simplified by following a stepped approach. The first step is to conduct some background research on the current irrigation system and the crop or crops to be produced. Identify the available irrigation water flow and pressure, the irrigation window or available irrigation run times, the growing media parameters such as absorption rate and AFP, the crop water demand and if multiple crops are to be grown are they of similar water use requirement, and finally the container size or sizes. Be aware of current and future access requirements for setting out new plants and selecting and removing orders, and any possible future materials handling issues such as palletising.

Next, a decision must be made on the sprinkler spacing, subject to the dimensions of the production area, the crop, container size, access and available irrigation parameters. The further sprinklers are spaced apart, the larger the droplet required to cover that distance and the more force required to propel the droplet, leading to the splash of water and growing media out of the containers, compaction of the growing media, disturbance of young planted material and generally low application rates requiring long irrigation run times. Small or close sprinkler spacing provide many obstacles such as the irrigation sprinkler risers, and can be more expensive requiring more laterals, risers, supports, and irrigation fittings, but irrigation applications can be extremely uniform with higher application rates.

Next the crop is another issue that must be addressed, the plant type, the density of planting and cropping cycle are all important. If the plant type is rosette or grass-like then gentle irrigation can be suitable, but if the planting density is high and the plant type has leaves capable of shedding the irrigation, then larger droplets or a stream rotator type sprinkler could be selected that will more effectively penetrate the foliage and irrigate the container.

It is important to view a sprinkler in operation before making a selection to ensure the grower is comfortable with the sprinkler operation for the selected crop.

The riser height is the next important consideration. The sprinkler riser should be high enough to ensure the irrigation application is not intercepted by any foliage, and not excessively high that the wind forces the application off target. Sprinklers are designed and specified to be located at specific heights above a crop to ensure the irrigation water covers the required distance; too low and the sprinkler will not cover the area and too high and the sprinkler will throw water outside the area upsetting the performance of the system. It is best to maintain the sprinkler risers as low as possible according to specifications and secure the riser tightly to a support to achieve the best results. Small extension risers can be screwed onto existing risers if more height is required for short periods of time as the crop reaches maturity.

The next step is selecting the jet or nozzle in a sprinkler which will determine the irrigation application rate of the system. Often the jet size in a sprinkler will also affect the wetted diameter or the throw of a sprinkler. The selection of a jet or nozzle size may also be limited by the flow and pressure available in the system. The application rate of a sprinkler is important in relation to the ability of the growing media to absorb the irrigation application and also the available time window to operate the irrigation in this area.

Sprinklers can be selected with the ability to direct the irrigation application totally to the growing area or others can be fitted with road guards to prevent unwanted irrigation reaching sensitive areas. Gear driven sprinklers are available that direct their irrigation to full or part circles but are often more expensive, operate at high pressures and most often do not meet the other performance parameters.

Providing the irrigation application wastewater can be collected and directed to storage for reuse full circle sprinklers are most often the preferred selection. Road guards direct the irrigation that would normally fall outside the planned irrigated area back onto the growing pads and upset the uniformity of the application but can prevent irrigation spray reaching sensitive areas if required.

Designing the system to meet or preferably exceed accepted industry bmp parameters will provide a system best able to apply the required irrigation effectively.

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