Nursery & Garden Industry Queensland

Selecting an overhead sprinkler

One of the key factors for an overhead irrigation system to continue to operate effectively and efficiently for many years, is the careful selection of the sprinkler.

The sprinkler selected is a crucial part of having a system that operates to industry Best Management Practice (BMP), but is only part of the puzzle to be put together to ensure many years of comparatively trouble free operation.

The process of selecting the appropriate sprinkler can be broken into the following steps.

System pressure and flow

- System pressure and flow rates directly influence sprinkler selection.
- Test the pressure available at the proposed irrigation zone.
- Determine the flow rates available at the proposed irrigation zone.

Pressure and flow rates should be measured at a location as near as possible to the irrigation zone, not at the pumping station. The irrigation system, including main supply lines, pipes and fittings should be designed by an irrigation professional, to ensure the required pressure and flow rates can be maintained throughout the system.

Sprinkler orientation

- Determine a sprinkler orientation that is best suited to the growing area and cropping type.
- Two options are available - upright sprinklers on risers, or inverted sprinklers supported from a structure.

The height and density of mature crops, and the ceiling height of any structure will influence the selection of either an upright or inverted sprinkler. Ensure upright sprinkler risers are well secured to a support, and all sprinklers are at the same height. Inverted sprinklers must be installed straight along each lateral and at the same height. Inverted sprinklers located on droppers should be weighted to ensure effective performance.

Sprinkler height

- The sprinkler stream should not be intercepted by the crop, or be affected by obstacles such as shade house roofs.
- Sprinkler height should be minimised to reduce wind effects.
- Sprinkler height should be adjustable if changes in cropping type are planned.

Droplet size

- Sprinklers producing larger droplets provide improved canopy penetration, but large droplets can cause excessive growing media splash and plant damage on sensitive crops.
- Test to determine a droplet size suitable to the cropping type.
- Select a droplet size to match grower preference and experience.
- Stream rotator sprinklers are generally selected for extremely dense canopy situations, larger plants and large sprinkler spacing, due to their superior canopy penetrating qualities.

Sprinkler spacing

- Select a preferred sprinkler spacing to match cropping, production and infrastructure requirements. Always check for obstacles such as posts, ceiling height, and pathway locations that may interfere with supply pipes or riser/sprinkler

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locations at the intended sprinkler spacing.

- Close sprinkler spacing requires many risers, fittings and sprinklers, increasing system installation costs, and may provide obstacles to production, equipment movement and mechanisation. However, less water will be applied outside the growing area the closer the sprinklers are together.
- Sprinklers used for wider spacing have larger droplet sizes, which contact the container growing media surface with considerable velocity, causing splash of water and growing media, and increase media compaction.
- Wider spacing may cause droplets to be more wind affected.

Spray pattern

- Select a full or part circle sprinkler pattern and determine any requirement for road guards.
- 'Road guards' may be required to redirect irrigation water falling outside of growing area away from roadways and sensitive areas. However, all road guards perform this function at the expense of uniformity of the system.

Water quality

- Water quality and filtration performance impact on the ability of a sprinkler to continue to provide continued trouble free performance.
- The degree of filtration required for each sprinkler can be obtained from the manufacturer's specification sheet.

Industry BMP parameters

- Parameters have been established to evaluate overhead irrigation systems to ensure they operate both effectively and efficiently to industry best practice.
- Mean Application Rate (MAR) 10 – 25mm/hr.
- Co-Efficient of Uniformity (CU) >85%.
- Scheduling co-efficient (SC) <1.5.

The industry BMP parameters can be supplied to irrigation designers and installers as a reference standard. These performance parameters can be included in payment contracts for new installations.

Final sprinkler selection

- Choose a sprinkler that meets all the parameters in the selection steps above, is readily available, fits within budget, and has acceptable maintenance requirements.

Specification sheets are available from sprinkler manufacturers providing performance information on pressure and flow requirements, nozzle sizes, filtration, droplet formation, stream trajectory, wetted diameter at specific test heights, and any connection or assembly requirements.

NGIQ has developed a sprinkler selection tool to assist growers with their sprinkler selections. The Nursery Production Farm Management System network can provide growers with sprinkler suggestions based on the parameters listed above. Contact NGIQ to arrange a Farm Management System Officer visit.

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