Dripline selection: Balancing cost and performance

Supplied by Netafim South Africa

Farming success will depend on important decisions by the producer and the experts he or she consults. It will also depend on many factors beyond the producer's control.

One of the many decisions to be made is selecting the irrigation method and approach, and consequently selecting the products to be installed in the field. After the long list of variables has been considered and drip irrigation selected as the optimal irrigation system for the circumstances, another long list of choices must be made regarding the configuration of the system.

Understanding dripper data

When technical dripper data is shared, we are confronted with terms that describe certain engineering features. These features determine how well a dripper does its job. On the farm, success depends on the dripper's ability to deliver a supply of water that never varies. This, in turn, depends on the dripper's ability to stay clean. Dripper clogging must be prevented at all costs, as it is very difficult to return flow once a dripper has clogged. Clogging prevention depends on dripper design and quality, as well as efficient maintenance once it starts working.

The dripper's ability to stay clean depends on turbulence. One of the most important additions to drippers as dripper design evolved, was the addition of teeth to the flow path to create turbulent flow. This made a massive contribution to clogging resistance as particles are kept in suspension through the turbulence created.

What you need to know

A typical dripper needs to reduce its inlet pressure from 1 to 0 bar and get 1 ℓ/ha through it. A complicated mathematical equation explains the pressure difference from the inlet of the dripper flow path to the outlet. All we need to understand is that the pressure difference comprises two aspects: turbulence (measured as a turbulence coefficient) and friction loss (measured by filtration area).

On the potato farm, success depends on the dripper's ability to deliver a supply of water that never varies.

Pressure loss

Pressure loss = turbulence + friction loss. It is important to understand the interaction between these two aspects. The less turbulence the dripper creates, the more it must resort to friction loss to create the necessary pressure loss. Friction loss does not contribute to keeping a dripper clean, but the more turbulence, and the higher the turbulence coefficient, the better the dripper is at keeping clean.

Turbulence coefficient

A higher turbulence coefficient translates to a more turbulent flow path in the dripper. This, in turn, translates to lower clogging risk. The dripper will be better at keeping itself clean. This value depends on labyrinth depth, width, length (number of teeth), as well as design and manufacturing excellence.

A few engineering features contribute to a higher turbulence coefficient:

- Number of teeth – less is better.
- Flow-path length – shorter is better.
- Flow-path depth – deeper is better.
- Flow-path width – wider is better.
- Filtration area – the bigger the better.

The other important contributing factor to a dripper's ability to stay clean is the size of the effective filtration area. The larger the area

of a dripper's filter, the more area is available for contaminants to accumulate and the longer it will take for contaminants to completely cover the filtration area. Therefore, the dripper with the larger filtration area will last longer.

Cost-performance ratio

Beyond what is discussed here, a variety of factors must be considered in dripper and dripline selection. The designer and/or producer must determine which attributes are necessary for the crop and circumstances.

The important goal is to maintain a balance between dripper cost and performance. Equipment cost is a sliding scale determined by a host of factors. A comprehensive portfolio of drippers and driplines is available that cover a wide range of crops and applications.

Consider a dripline selection graph where the y-axis is cost, and the x-axis is a composite of application, durability, clogging resistance, and other factors considered in dripper comparison. Movement along the x-axis will result in movement along the y-axis, which is an increase or decrease in price. The higher the values discussed, for example, the longer the dripper will last, but the higher the cost. The thicker the pipe wall, the longer the dripline will last, but the higher the cost.

Do note that quality is not one of the items listed on the virtual x-axis. Whether selecting thin-wall or heavy-wall drip, the most advanced dripper or one with fewer features, quality cannot be compromised.

Quality and budget

Although it might not seem so, it is possible to not veer from selecting quality products, while still maintaining the optimal balance between drip irrigation performance and your budgetary restrictions. Consider the necessary specifications to truly determine which dripline can be relied on in the field. Look for a product that offers guaranteed longevity, and is designed and manufactured with the explicit goal of decreasing clogging risk and delivering water uniformly and efficiently.

It all boils down to what your crop needs. The experts would, for example, not recommend the same equipment for irrigation with hard, murky water for a single season, as for irrigation with the same water where the equipment needs to last many seasons. Similarly, the same equipment will not be used for irrigation with much better water quality.

Dripline selection boils down to selecting the correct product for the crop and circumstances, selecting a quality product that can do the job at hand in difficult conditions, and selecting the product that will offer the best return on investment.

For more information, email infoza@netafim.com

Mondstuk van die Suid-Afrikaanse aartappelbedryf • Mouthpiece of the South African potato industry

CHIPS

VOL 38 NO 4 • JULY / AUGUST 2024

POTATOES SA CONGRESS & SEED POTATO GROWERS' FORUM PROGRAMME 2024

KULTIVAR- EN VERWERKINGSPROEWE ONDER BESPROEIING OP PETRUSBURG EN MARBLE HALL IN 2023

Precision breeding for resilient spuds

Empowering small-scale producers through the EDP

Market monitor: First 22 weeks at FPMs