

Irrigation Management Series

Irrigation Principles 2

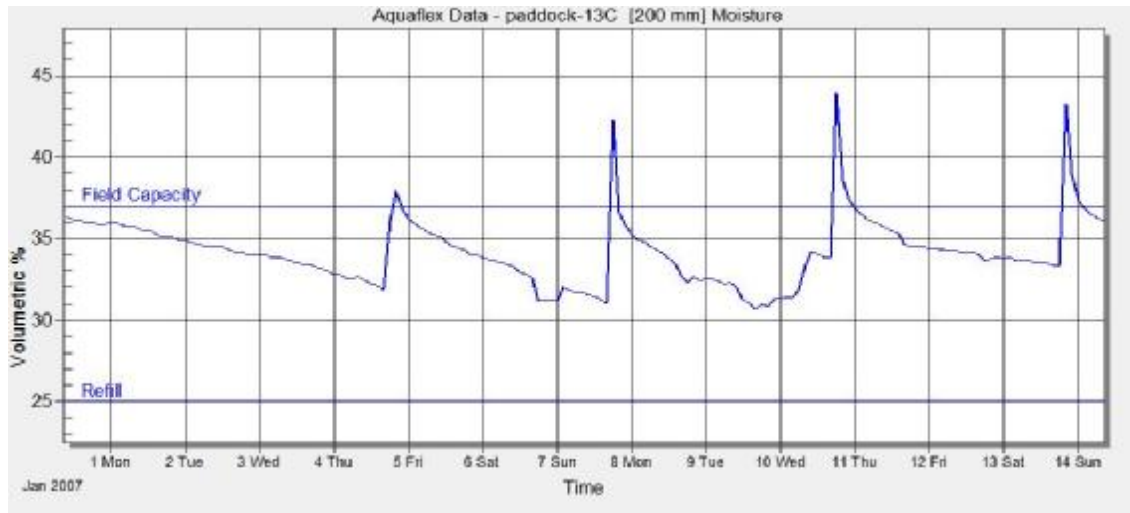
In Irrigation Principles 1 we looked at the concept of Field Capacity (FC) and Permanent Wilting Point (PWP) and how these soil properties define the Plant Available Water (PAW). Just to recap FC is the total water held in the soil after drainage has essentially ceased and PWP is the water remaining when the plants can no longer extract it and will die. The difference between these values gives you your PAW.

Even though your soil may be in the PAW zone does not mean you are producing dry matter at its full potential. As the soil dries the water is held in smaller and smaller pores and becomes more difficult for the plant to extract. Progressively stress is applied to the plant and production will be reduced from potential. It is not normally practical (or advised) to maintain soil water at or near FC all the time so a judgement has to be made as to the water content between FC and PWP production stress will ensue and this point is often referred to as Stress or Refill Point.

How do we set the Refill Point? A common rule of thumb is half the PAW or the moisture content halfway between FC and PWP. This is often adjusted on a soil and crop specific basis when there is greater understanding of the processes involved, but in general the "Rule of Half" as it is often referred to is a very good starting point.

So it is very clear you need three key pieces of information to develop a good irrigation management system. The first two is to have an idea of the FC and PWP for your soil and from this you can estimate your refill point. Thirdly you must know what your current water status is in relation to these so you can make informed decisions regarding depth and timing of irrigation. Points 1 and 3 can be directly measured using some form of soil moisture technology such as Aquaflex. After a major rain or irrigation event that has exceeded FC you will see water contents drop rapidly through drainage and then if in winter when there is little evapotranspiration to extract water the water content will change little over time. After several events such as this FC can be identified with some confidence. Using your soil moisture monitoring system you can also measure the current water status at any time, just leaving PWP to determine. Obviously allowing your soil and plants to dry to PWP and then measuring the soil water status is not going to be practical or very reliable, so in most cases a reasonable estimate can be found from published literature. In New Zealand this information is available from many sources and your consultant or farm advisor is likely to be able to assist you with this.

Just measuring soil water content is not enough. You need to understand the parameters of the soil so you can put this information in context. AQUAFLEX NZ are available to assist you with developing an irrigation management system for your operation, please feel free to contact them on 03 3848900 or visit www.aquaflex.co.nz



A time series graph of Soil Water content in relation to Field Capacity and Refill Point. Drainage after over irrigation is evident when water content exceeds Field Capacity