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Opinion

Infrared Thermometer and Irrigation Water Management

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Scarcity of water and limitation water resource leads to reduction in water available for irrigation crops. Thus; Agriculture is the principal user of all water resources, such as, rainfall, rivers, lakes and aquifers. Moreover; Temperature is a critical parameter for climate which the potential productivity level for crops. On the other hand; many studies have described several such irrigation strategies for use by farmers to increase the water productivity. Thus; using a modern technology for dealing with climate change and its influence on agriculture are conceded a vital object which help to maximizing irrigation water management.

Infrared thermometer and thermal photo are new techniques which can be used to measure canopy temperature for irrigation scheduling in arid regions. Infrared (IR) thermometer measure reflected infrared radiation having wavelength longer than visible light that can be correlated to specific surface temperature of the object being measured .This method is based on the fact that canopy temperature increases due to stomata closure that is associated with water stress. For instance; the plant temperature increases after the soil water availability decrease due to the cooling associated with transpiration decreases then plant become stressed.

Infrared could be used to measure canopy temperature without physical contact to the plant. Consequently; determine the critical irrigation time and the amount depending on the relationship between canopy-air temperatures and vapour pressure for no stress condition of crops, which used to quantify crop water stress index.

The crop water stress index (CWSI) values indicated the moisture stresses and also reflected the water requirement at different crop growth Stages of crop.The crop water stress index (CWSI) definition with the following equation:-

Figure 1: Canopy temperature for some crop using infrared thermometer.

$$CWSI = \frac{(T_c - T_a) - T_{base}}{T_{max} - T_{base}}$$

Where:-

Tc = Canopy temperature (C°).

Ta = Air Temperature (C°).

Tbase = the base temperature for crop (C°).

Figure 2: Thermal image for determine canopy temperature and irrigation management.

Finally, using infrared thermometer and thermal photo will become a vital process to irrigation planning and helping decision making to manage and maximizing the efficiency of water productivity.

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