COLORADO CATTLEMEN'S ASSOCIATION

ADVANCING THE LEGACY

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WEBINAR Highlights – Irrigation Scheduling Basics

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Irrigation Scheduling is about timing the amount of water to apply based on:

- Soil water content and capacity of the soil to hold water
- Evapotranspiration (ET) rate of crop or forage
- Capacity and efficiency of the irrigation system

To properly schedule irrigations, you need to know your:

- Soil (Texture and Available water holding capacity (AWHC)
- Crop growth stage, rooting depth and ET
- Irrigation system rate of application and efficiency

Evapotranspiration is affected by;
1. Solar Radiation: Energy from the sun
2. Temperature
3. Wind
4. Humidity
5. Crop
6. Stage of Growth: Crop Coefficients
7. Soil moisture and salinity
8. Stand density, plant nutrition, crop variety etc.

Pivot irrigation. Photo: Phil Brink

Helpful Terms:

Field Capacity (FC): is the amount of water that remains in the soil after all the excess water at saturation has been drained out. If sandy soils are allowed to drain for approximately 24 hours after saturation, field capacity is reached. Heavy soils may take longer and up to 3 days.

"Permanent Wilting Point" (PWP): When plants take up all the Available Water for a given soil, soil cannot supply any water to keep plants from dying.

Available Water Holding Capacity (AWHC or AWC): the water held between field capacity and permanent wilting point.

Dynamic Water Holding Capacity (DWHC) is influenced by the percent of Organic Matter, level of compaction and salinity of the soil

NRCS Web Soil Survey Link: https://websoilsurvey.nrcs.usda.gov/app/

To calculate Available Water (AW) for a given crop: AW = Root Depth (inches) X AWHC (in/in)

Obtain crop water ET rates from: www.coagmet.colostate.edu

Management Allowed Deficit (MAD): The portion of the water that a crop plant can extract from the soil without causing more than acceptable harm (Yield and/or Quality). MAD depends on: Soil type, Crop, Stage of growth. **MAD = % Allowable Deficit x Available Water (AW)**

NRCS Estimating Soil Moisture by Feel and Appearance website link:
https://www.nrcs.usda.gov/sites/default/files/2022-09/Estimating%20Soil%20Moisture%20by%20Feel%20and%20Appearance.pdf

How do I actually schedule my irrigation? Need to determine:
- What is my MAD? What irrigation depth will I use?
- MAD = Root Depth X AWHC X Percent MAD
- MAD / Irrigation Efficiency = Irrigation Depth
- How long since I last irrigated: in days
- What is ET for those days
- What is the rainfall over 0.1 inches
- Calculate (and do a field check): Deficit = ET x days – precip