Consumptive-Use and Yield of Alfalfa in Northwestern New Mexico

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Note

- The fine line in the graph on the next slide designates ET at the average San Juan County, NM yield of about 5 tons per acre (ET at this yield = ~ 38 inches)
- Yields of greater than 7 tons per acre, however, are common at this location under good management.
Alfalfa Yield as Related to Consumptive-Use

Mean of 5 varieties and 3 years
Dry Forage Yield (tons/acre) vs. ET (inches)

Alfalfa Yield per Cut as Related to Consumptive-Use

- **Cut 1**: $Y = -0.69 + 0.218w$
- **Cut 2**: $Y = 0.46 - 0.343w + 0.085w^2 - 0.0038w^3$
- **Cut 3**: $Y = 0.46 - 0.297w + 0.074w^2 - 0.0034w^3$
- **Cut 4**: $Y = -0.55 + 0.137w$
Note

• The following graph shows ‘smoothed’ (or mean) curves for daily alfalfa ET over the entire first year and subsequent year growing seasons.

• The mean ET curves do not reflect daily ET variability during cutting periods:
  – For irrigation scheduling, the daily estimate of ET should be increased by about 20% (from the mean) for the 10 days before cutting and decreased by 20% for the 10 days after cutting.
Established: \[ \text{ET} = -0.686 + 0.0134(d) - 5.714 \times 10^{-5}(d^2) + 7.319 \times 10^{-8}(d^3) \]
First Year: \[ \text{ET} = -0.365 + 0.0067(d) - 1.782 \times 10^{-5}(d^2) \]

Alfalfa – 3 year avg.

7 oven-dry tons per acre
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Reference ET vs. Alfalfa ET

• The reference evapotranspiration (ETo) shown on the next slide is calculated by the standardized Penman-Monteith method as recently approved and supported by ASCE, ASAE and IA.

• FAO-56 Report
The equation for the Alfalfa Crop Coefficient ($K_c$) is given by:

$$K_c = 0.002G - 1.323 \times 10^{-6}G^2 + 3.387 \times 10^{-10}G^3 - 2.9385 \times 10^{-14}G^4$$
References

• NMSU Agricultural Science Center at Farmington Annual Reports: [http://farmingtonsc.nmsu.edu](http://farmingtonsc.nmsu.edu)

