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Evaluating Summer Irrigation Cutoff and Harvest Timing In Imperial Valley Alfalfa

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Introduction

Alfalfa production in California's Imperial Valley occurs under some of the most challenging climatic conditions in the state, including extreme summer temperatures, high evaporative demand, and minimal rainfall. Irrigation depends almost entirely on Colorado River water, and increasing pressure on regional water supplies has renewed interest in summer irrigation cutoffs as a water-conservation strategy.

Reducing irrigation can substantially decrease water use, but it may also affect forage production and quality. Under Imperial Valley conditions, water stress often coincides with periods of extreme heat, creating challenges for maintaining crop productivity. In addition to irrigation management, harvest timing throughout the growing season may influence how alfalfa responds to summer water limitations.

Although previous studies have examined the effects of deficit irrigation on alfalfa, information remains limited regarding how harvest timing influences crop performance under summer irrigation cutoffs in low-desert production systems. Understanding these relationships can help growers make management decisions that balance water conservation, forage yield, and forage quality.

This article summarizes first-year results from a field study evaluating the combined effects of summer irrigation cutoff and season-long harvest schedules on alfalfa production in the Imperial Valley. The objective was to assess how these management practices affect forage yield and quality and to provide practical information for alfalfa production under limited-water conditions.

Field Trials

Field trials were conducted during the 2025 growing season at the Desert Research and Extension Center (DREC) in Holtville, California (Figure 1). Alfalfa was established in November 2024 and evaluated under two irrigation strategies: full irrigation and a summer irrigation cutoff from early July through mid-October. Harvest schedules of 28-day and 35-day cutting intervals were maintained throughout the entire growing season under both irrigation treatments

The experimental field was divided into four irrigation basins that allowed independent water management. Two basins were maintained under full irrigation, while two basins received the summer irrigation cutoff treatment. Within each irrigation regime, one basin was harvested on a 28-day schedule and the other on a 35-day schedule, resulting in four treatment combinations.

Six alfalfa cultivars representing fall dormancy classes 7 through 10 were included in the study. Cultivars were randomized and replicated six times across the field. Results presented in this article are averaged across cultivars and focus on treatment effects of irrigation and harvest timing.

Seasonal dry matter yield was determined from multiple harvests conducted throughout the growing season. Forage quality was evaluated using standard laboratory analyses of crude protein (CP) and neutral detergent fiber (NDF). Seasonal forage quality values were calculated as harvest-weighted means based on dry matter yield.

Figure 1. Alfalfa field trial at the Desert Research and Extension Center (DREC) in Holtville, California, during the 2025 growing season. The study evaluated full irrigation and summer irrigation cutoff treatments in combination with 28-day and 35-day harvest intervals.

Yield response to summer irrigation cutoff and harvest timing

Seasonal dry matter yield was affected by both irrigation treatment and harvest timing (Figure 2). Across irrigation treatments, the 35-day harvest schedule produced higher seasonal yield than the 28-day schedule.

Under full irrigation, seasonal yield averaged 14.33 ton/ac with the 35-day harvest schedule compared with 13.27 ton/ac under the 28-day schedule, an increase of 1.06 ton/ac. Under the summer irrigation cutoff treatment, seasonal yield averaged 12.51 ton/ac with the 35-day schedule and 12.03 ton/ac with the 28-day schedule, an increase of 0.47 ton/ac.

Both irrigation treatment and harvest timing significantly affected seasonal yield. Yield was lower under the summer irrigation cutoff treatment than under full irrigation, and the effect of harvest timing differed between irrigation treatments.

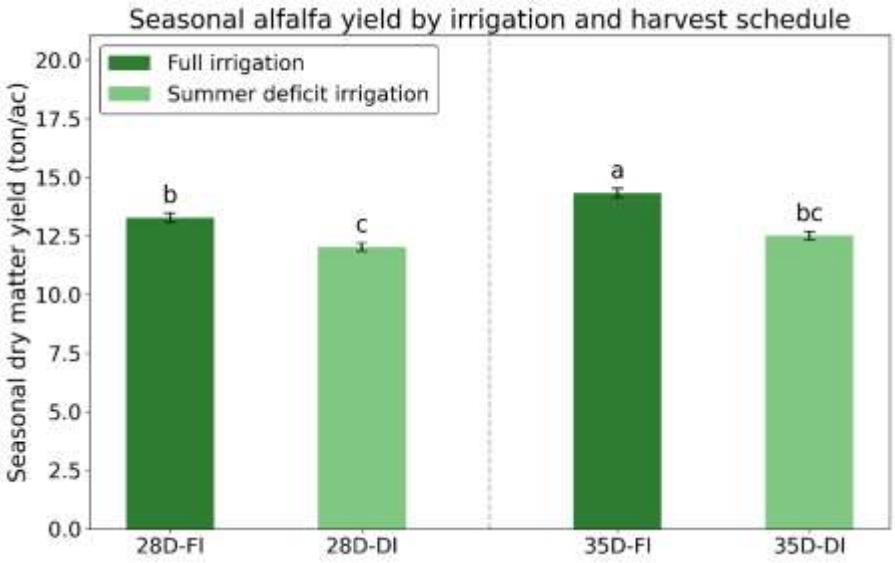

Figure 2. Seasonal dry matter yield of alfalfa under full irrigation (FI) and summer irrigation cutoff (DI) with 28-day and 35-day harvest schedules. Bars represent treatment means averaged across six alfalfa cultivars (± SE). Different letters indicate treatment means that are statistically different.

The summer irrigation cutoff reduced seasonal yield by approximately 1.24 ton/ac under the 28-day harvest schedule and 1.82 ton/ac under the 35-day harvest schedule. Despite this reduction, the 35-day harvest schedule maintained the highest seasonal yield under both irrigation treatments.

Because the same amount of irrigation water was applied within each irrigation treatment, the higher yield observed under the 35-day harvest schedule reflects greater forage production per unit of water applied. These results suggest that harvest timing is an important management factor influencing alfalfa productivity under both full irrigation and summer irrigation cutoff conditions.

Forage quality response and management implications

Forage quality was influenced primarily by harvest timing, although the response differed between irrigation treatments (Figure 3). Across irrigation treatments, the 28-day harvest schedule generally maintained higher crude protein (CP) concentrations than the 35-day schedule.

Under full irrigation, seasonal CP averaged 22.48% with the 28-day harvest schedule compared with 18.58% under the 35-day schedule. Under the summer irrigation cutoff treatment, CP averaged 22.14% and 20.53% for the 28-day and 35-day schedules, respectively.

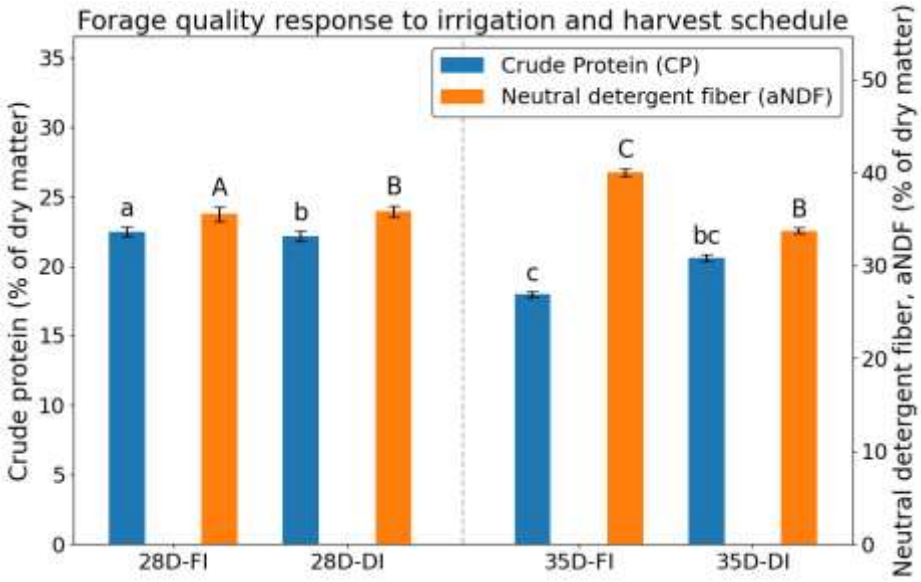

Figure 3. Seasonal forage quality of alfalfa under full irrigation (FI) and summer irrigation cutoff (DI) with 28-day and 35-day harvest schedules. Bars represent treatment means ± SE averaged across six alfalfa cultivars. Crude protein (CP) is shown on the left y-axis and neutral detergent fiber (aNDF) on the right y-axis. Lowercase letters indicate differences among treatments for CP, and uppercase letters indicate differences for aNDF. Treatments sharing at least one letter are not statistically different.

Responses for neutral detergent fiber (aNDF) varied between irrigation treatments. Under full irrigation, aNDF increased from 34.92% under the 28-day schedule to 39.34% under the 35-day schedule. Under the summer irrigation cutoff treatment, aNDF values were 35.95% and 33.85% for the 28-day and 35-day schedules, respectively.

These results indicate a tradeoff between forage yield and forage quality. The 35-day harvest schedule produced greater seasonal yield, whereas the 28-day harvest schedule generally maintained higher crude protein concentrations. Therefore, harvest interval selection should be guided by whether production goals prioritize maximum forage yield or higher forage quality.

Summary and management considerations

This field study demonstrated that harvest timing strongly influences both seasonal yield and forage quality in Imperial Valley alfalfa. Although the summer irrigation cutoff reduced overall production, harvest management affected how efficiently available water was converted into forage yield and influenced seasonal forage quality.

Under both full irrigation and summer irrigation cutoff conditions, the 35-day harvest schedule produced greater seasonal dry matter yield than the 28-day schedule. In contrast, the 28-day harvest schedule generally maintained higher crude protein concentrations and lower fiber levels, resulting in higher forage quality.

These findings highlight an important management tradeoff between forage quantity and forage quality. Producers seeking to maximize seasonal yield may benefit from longer harvest intervals, whereas those targeting higher forage quality may prefer shorter harvest intervals.

Because many growers suspend harvest operations during periods of severe summer water stress, seasonal performance is largely influenced by harvest decisions made before and after the irrigation cutoff period. Results from this first year of evaluation suggest that harvest timing is an important management tool for optimizing the balance between forage yield and forage quality under limited-water conditions.

Acknowledgments

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Resources for New World Screwworm Updates and Entry Requirements to California for Animals

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For a map of current and past confirmed New World Screwworm cases from USDA, visit https://www.aphis.usda.gov/animals/animal-health/livestock-and-poultry-disease/current-status/us-confirmed-cases-new-world

For updated entry requirements for California, please visit these CDFA resources:

- New Worl Screwworm information website (https://www.cdfa.ca.gov/ahfss/Animal_Health/screwworm/)
- New World Screwworm entry FAQ (https://www.cdfa.ca.gov/AHFSS/Animal_Health/screwworm/docs/new_world_screwworm_entry_requirements_faq_final.pdf)
- Entry requirements into California for animals (https://www.cdfa.ca.gov/AHFSS/Animal_Health/screwworm/docs/cdfa_statewide_quarantine.pdf)
- New World Screwworm updates (https://www.cdfa.ca.gov/ahfss/animal_health/screwworm/docs/NWS_updates_for_california_producers_veterinarians.pdf)

For University based information on New World Screwworm, please visit these University of California resources:

- UC Riverside Murillo Research Group New World Screwworm information (https://murillolab.ucr.edu/screwworm)
- New World Screwworm fact sheet (https://murillolab.ucr.edu/sites/default/files/2026-06/new-world-screwworm-fact-sheet_0.pdf)
- Question and answer about NWS with an entomologist (https://news.ucr.edu/articles/2026/06/04/flesh-eating-fly-has-returned-us-what-now?_gl=1*c9ozws*_ga*ODk0NjA0ODMyLjE3ODIzOTYwMTY.*_ga_S8BZQKWST2*czE3ODIzOTYwMTYkbzEkZzEkdDE3ODIzOTYyNzAkajE1JGwwJGgw*_ga_Z1RGSBHBF7*czE3ODIzOTYwMTYkbzEkZzEkdDE3ODIzOTYyNzAkajE1JGwwJGgw)
- Detecting and Reporting Screwworm for Large Animal Veterinarians (https://murillolab.ucr.edu/sites/default/files/2026-06/detect-report-nws-large-animal-vets.pdf)
- Detecting and Reporting Screwworm for Small Animal Veterinarians (https://murillolab.ucr.edu/sites/default/files/2026-06/detect-report-nws-sm-animal-vets.pdf)
- Guidance for Pet Owners (https://murillolab.ucr.edu/sites/default/files/2026-06/guidance-for-pet-owners.pdf)

- Treatment for Screwworm Myiasis for Wildlife and Zoo Veterinarians (https://murillolab.ucr.edu/sites/default/files/2026-06/treatment-for-nws-wildlife-and-zoo-vets.pdf)
- Detecting and Reporting Screwworm for Health Care Providers (https://murillolab.ucr.edu/sites/default/files/2026-06/detect-report-nws-health-care-providers.pdf)

If you have any questions, please feel free to reach out to our office.

Imperial Valley CIMIS Report and UC Water Management Resources

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The reference evapotranspiration (ET_o) is derived from a well-watered grass field and may be obtained from the nearest CIMIS (California Irrigation Management Information System) station. CIMIS is a program unit in the Water Use and Efficiency Branch, California Department of Water Resources that manages a network of over 145 automated weather stations in California. The network was designed to assist irrigators in managing their water resources more efficiently. CIMIS ET data are a good guideline for planning irrigations as bottom line, while crop ET may be estimated by multiplying ET_o by a crop coefficient (K_c) which is specific for each crop.

There are three CIMIS stations in Imperial County include Calipatria (CIMIS #41), Seeley (CIMIS #68), and Meloland (CIMIS #87). Data from the CIMIS network are available at: http://www.cimis.water.ca.gov/. Estimates of the average daily ET_o for the period of May 1st to July 31st for the Imperial Valley stations are presented in Table 1. These values were calculated using the long-term data of each station.

Table 1. Estimates of average daily potential evapotranspiration (ET_o) in inch per day

Station	July		August		September	
	1-15	16-31	1-15	16-31	1-15	16-30
Calipatria	0.32	0.31	0.30	0.28	0.26	0.23
El Centro (Seeley)	0.33	0.31	0.30	0.28	0.26	0.25
Holtville (Meloland)	0.32	0.31	0.30	0.28	0.26	0.24

For more information about ET and crop coefficients, feel free to contact the UC Imperial County Cooperative Extension office (442-265-7700). You can also find the latest research-based advice and California water & drought management information/resources through link below: http://ciwr.ucanr.edu/.

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