UC CE UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources | UC Cooperative Extension

Imperial County Agricultural Briefs

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Features from your Advisors

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DATE PALM IRRIGATION RESEARCH PROVIDES ECONOMIC, ENVIRONMENTAL BENEFITS

Saoimanu Sope, Communications Specialist, UCANR Office, Irvine, CA

An integrated drip and flood irrigated date palm in the Coachella Valley. All photos by Ali Monatzar.

Historically, date palms are grown along riverbeds or in areas with groundwater because they require an abundance of water to produce a good crop. Unlike lettuce or table grapes, date palms are deceptive in that they do not immediately wilt if underwatered. Eventually, however, the lack of water leads to decreased yields and fruit quality.

The default for date growers is to apply excessive water, but doing so is neither economically nor environmentally sound. Thankfully, Ali Montazar, UC Cooperative Extension irrigation and water management advisor for Imperial, Riverside and San Diego counties, has developed knowledge that enables growers in the region to establish irrigation guidelines they can use with confidence.

"Water issues in California's desert are very different than in the Central Valley," said Montazar. "There is no groundwater to recharge so growers in the desert only have the Colorado River."

Since 2019, Montazar has been focused on irrigation management for date palms in the Coachella Valley, the largest producer of dates in the United States. Montazar's research identifies how much water is needed for the crop and the best water delivery method according to location, soil type and conditions, and date cultivars.

"Dates require a lot of heat and light, which is why they do well in the desert. But they also need a fair amount of irrigation," said Robert Krueger, a U.S. Department of Agriculture horticulturist and Montazar's co-author of a paper on date palm irrigation management.

Much of what we know about date palm production comes from the Middle East, which has a climate similar to the low desert of California. "That information is from many, many years ago though," explained Montazar, whose research asserts that drip irrigation cannot be the only form of irrigation for date palms.

"Ali is the first to really look at micro-sprinklers and flood irrigation for date palms," said Krueger, adding that the other advantage of Montazar's research is that it prepares growers for production during times of reduced water supply.

Albert Keck, president of Hadley Date Gardens, Inc. and chairman of the California Date Commission, described Montazar's research efforts as "subtle yet incredible and profound," adding that his findings not only benefit other farmers but also cities relying on water from the Colorado River.

Keck, one of the largest date growers in his region, is well aware of how disruptive, expensive and time-consuming irrigation for date palms can be. Montazar has enabled growers like Keck to irrigate less without sacrificing yield or quality.

"Ali might save us a tiny percentage of the amount of water we're using. It might be a 5 or 10% savings. It doesn't seem like much, but it's an incremental improvement in efficiency," said Keck. "And if you add all of these improvements up, say, along the U.S. Southwest, then that has a pretty profound impact."

Montazar recommends that date growers in his region use a combination of drip and two to three flood irrigation events to manage salinity levels derived from the Colorado River. "We cannot maintain salinity issues over time if we're only relying on drip irrigation in date palm," explained Montazar.

Drip irrigated date palms in the Coachella Valley.

Flood irrigation pushes the salts below the root zone, when they would otherwise build up within the root zone preventing efficient water uptake. It also aids in refilling soil profiles quickly and more effectively since drip has lower a capacity of delivering sufficient water.

“Growers know what they need to water their crop within a broader parameter. But Ali has narrowed that window and helped us become more precise with our irrigation,” Keck said. “There’s still room for improvement but we’re spending less money, wasting less time and using less water now, and we’re still getting the same positive results.”

Currently, Montazar is collaborating with the California Date Commission on developing guidelines for best irrigation management practices in the desert for date palms, which should be available by the end of 2023. These guidelines are based on a four-year data set from six monitoring stations and extensive soil and plant samples from commercial fields located in the Coachella Valley, Imperial Valley and near Yuma, Arizona. Additionally, Montazar is working to quantify how water conservation impacts growers economically.

“Growers from United Arab Emirates, Egypt, Tunisia and Mexico have already reached out asking for this information,” Montazar said, while reflecting on a presentation he made to a group of international date growers in Mexico late last year.

To read the paper on date palm irrigation, published in MDPI’s *Water* journal, visit: https://www.mdpi.com/2073-4441/12/8/2253.

A monitoring tower in an experimental date palm field.

THE IMPORTANCE OF IDENTIFYING AGRICULTURAL WEEDS

Oli Bachie, Director, UCCE Imperial County; Agronomy & Weed Management Advisor, UCCE Imperial, Riverside, and San Diego Counties

While the term "weed" means different things to different people, it is widely agreed upon to refer to any plant growing where it is not wanted. A weed survey of Imperial Valley (IV) agriculture was conducted by UCCE Imperial County recently with the objectives of identify weed distribution throughout the valley, identifying weed distribution by soil types of the valley, identifying common weeds within agronomic and vegetable crops, understanding weed distributions differences between conventional and organic production systems, and identifying weed distribution differences between continuously farmed lands and fallow fields. We will publish the details of this survey and identified weed species and distribution in the Imperial Valley in the upcoming issues of our Ag Brief.

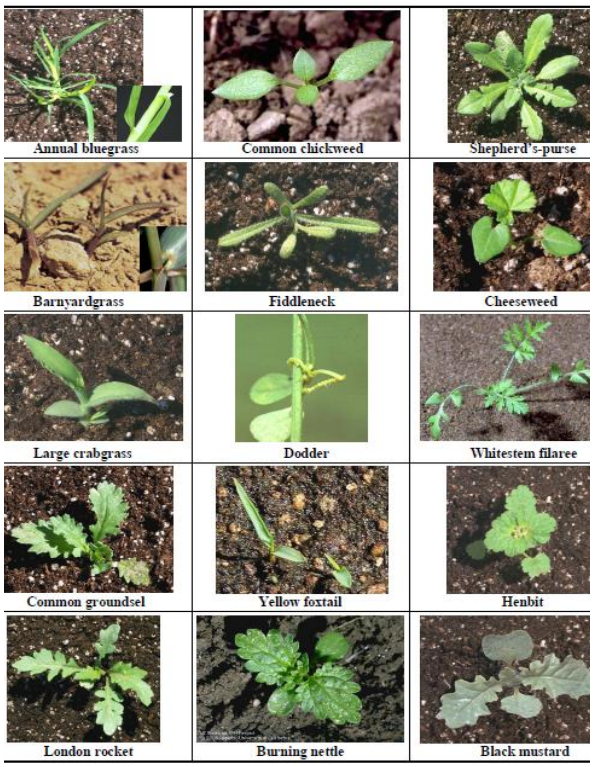

Figure 1: common weeds in alfalfa fields

In the meantime, this issue discusses the importance of weed identification, classifications of weeds and some major and difficult to control weeds of the IV region. Most growers and PCAs recognize that correct identification of weeds is an important key to effective weed control. Some people refer to identification of weeds as "a halfway to controlling weeds". Identifying weeds throughout their growth stages (seedling to adult stage) is essential. While weeds at seedling stages are most susceptible to chemical or mechanical control, identifying weeds at their mature stage is equally important to understand why weeds should not be allowed to reach adult stage and produce seeds (controlling before seed production suppresses weed seedbank in the soil). Other importance of proper weed identifications are that (1) different herbicide (s) is / are used to control different weed species. Herbicide weed management may fail with inappropriate selection of a herbicide (s), (2) that all weeds do not cause equal amount of damage to crops, hence it is necessary to identify if the weed (s) you have is / are of significant economic importance, (3) weeds that emerge with or before the crop may cause more damage than those that emerge after the crop has established full canopy, (4) different weed species, and even variants within

the same species may respond to management tactics very differently, (5) different weed species may have different modes of reproduction, etc.

While identifying weeds, it is also important to know if the weed is terrestrial or aquatic, annual, biennial, or perennial, the seasons of germination and their growth behaviors (*Summer annuals, Winter annuals, biennials, or perennials).*

- ✓ *Summer annuals* germinate in spring and summer, produce flower and fruit in mid- to late summer and die in the fall. Examples include velvetleaf, foxtail, and cocklebur.

- ✓ *Winter annuals* germinate in the fall and winter, flower and fruit in mid- to late spring and die in the spring and summer. Examples include filaree, shepherd's purse, and wild mustard. Biennials live for two growing seasons. Seeds germinate and overwinter as a basal rosette with a thick storage root. The stems flower and produce seed in the 2 summers of the second season and die in the fall. Examples include wild carrot and burdock.

- ✓ biennials - complete their life cycle in 2 years.

- ✓ *Perennials* live more than two years and may reproduce many times before dying. Perennials can be simple *herbaceous*- reproduce only from seeds but if the plant is injured or cut, each piece usually regenerates into a new plant (examples, dandelion, and plantain), *Creeping herbaceous*- over-winter and produce new vegetative structures such as rhizomes, tubers, stolons, bulbs, corms, and roots (examples, nutsedges and bermudagrass, or *Woody plants*- plants that have woody stems.

On the other hand, weeds can also be identified as; (1) *Dicots (dicotyledons)* – weed seedlings that produce two cotyledons, and their leaves have netted venations (examples, mustard, nightshade), a common characteristic of broadleaf weeds, (2) *Monocots (monocotyledons)* – these whose seedlings produce only one cotyledon and that the leaves have parallel venations. Monocots can be further categorized as (a) g*rass weeds*- weeds whose leaves may or may not have ligule or auricle, their leaf sheaths split and wrapped around a **rounded or flattened stem** (examples, foxtail, barnyard grass) (b) *Sedges*- are differentiated from grasses in that their leaves do not have ligules or auricles and their leaf sheath are continuous around the **triangular stem** (examples yellow nutsedge and purple nutsedge).

Some difficult to control weeds of the Imperial valley.

Annual sawthistle, Palmer amaranth, fleabane, Horseweed, Mexican sprangletop, puncture vine and many other weeds have emerged in the low desert as resistant to multiple herbicides and difficult to control weeds. We will discuss the details of these and potential management aspects in future issues.

Figure 2: Resistant & difficult to control

Other difficult to control weeds of the IV are the sedges. Nutsedges are also common weeds in landscapes and gardens in the coastal valleys, Central Valley, & southern California. Purple nutsedge is not as widespread in California as yellow nutsedge. They are perennial plants / weeds commonly found in shallow water or moist soils. Although they resemble grasses, they are not a grass and often grow in thick clusters. There are two major types of sedges, the yellow and purple nutsedge. Yellow nutsedge spikelets are straw-colored to gold-brown with many flowers while that of the purple nutsedge spikelets are dark reddish to purplish brown with few flowers per cluster (Figure 3). There are generally three leaves growing from the base of a nutsedge plant that curve over and bend back toward the ground. Purple nutsedge can be distinguished from yellow nutsedge by its shorter stems (grows only up to 1-1/3 feet tall), whereas yellow nutsedge stems can grow up to 3 feet tall. All sedges have triangular stems. Purple nutsedge has shiny, dark green leaves that are rounded at the tip. The flower has multiple stalks that are purple to reddish-brown in color. Yellow nutsedge has light green leaves with pointed tips.


Figure 3: Nutsedges, Purple (left), yellow (right)

Nutsedge commonly reproduce by tubers or "nutlets" that grow from horizontal, underground, creeping stems called rhizomes. Tubers of yellow nutsedge are produced singly, while purple nutsedge tubers are produced in chains, with several on a single, horizontal, underground stem (figure 4). Within a single growing season, one tuber can give rise to hundreds of shoots. Sedges can be easily identified by their tall, flower-bearing stems. While sedges prefer moist soil, they can establish and thrive even in dry soil. They also thrive in waterlogged

soil, & their presence often indicates drainage is poor, irrigation is too frequent, or sprinklers are leaky. Nutsedges are also a problem in lawns because they grow faster, have a more upright growth habit, resulting in a nonuniform turf.

Nutsedges are difficult to control. However, hand-pulling can be effective if it a small area infestation. When hand pulling, make sure that all underground structures like runners and tubers are removed. Such a control strategy must be done repeatedly if newer plants emerge. There are also herbicides that could suppress or control sedges.

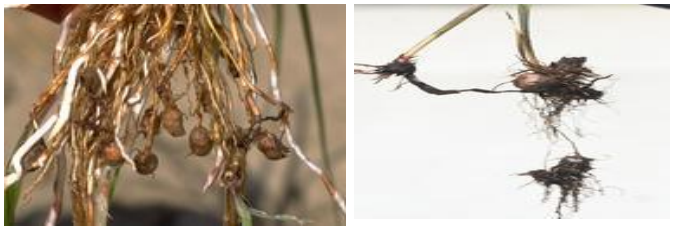

Figure 4: nutsedge roots, rhizomes, and tubers, yellow (left) and purple (right)

However, because regrowth from the roots and tubers is common, repeated herbicide applications are often necessary. In fact, chemical control efforts may go on for several years before the sedges can be eliminated. In general, the key to control nutsedge is to **kill off the nutlet with a herbicide product**, although most control products may take about 10-14 days to completely kill off nutsedges. In gardens and landscapes where mulches are used as a control strategy, they emerge through bark or mulches in vegetable and flower beds. Integrated Weed Management (IWM) that combine management approaches has greater effectiveness.

For effective identification and management recommendations of weeds in the IV, contact your PCAs or contact the University of California Cooperative Extension (UCCE) Imperial County office by emailing at obachie@ucanr.edu or calling (442)265-7700.

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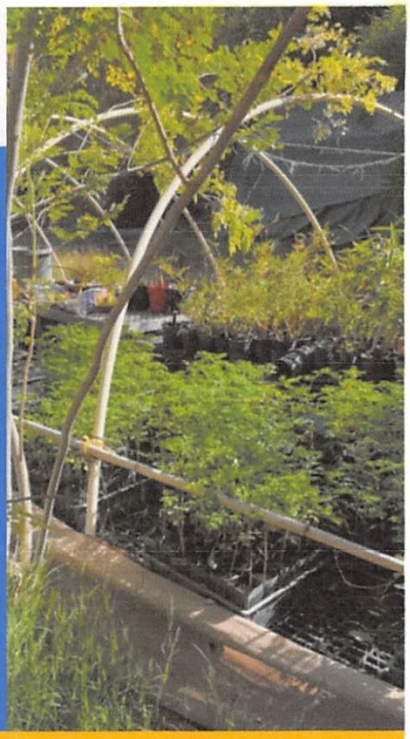
JOIN UCCE IMPERIAL COUNTY FOR A

MORINGA ROUNDTABLE



PARTICIPATE IN DISCUSSIONS ABOUT:

- Nutrient composition of moringa grown in the Imperial Valley.
- Difficulties and successes in growing moringa.
- Needs for future research and resources to improve moringa production in the Imperial Valley.

DATE, TIME, & PLACE:

JULY 18TH

9 - 11 AM

1050 E HOLTON RD, HOLTVILLE, CA 92250
OR
VIA ZOOM

Please register at https://ucanr.edu/moringaroundtable.

If you are interested in attending via Zoom, Zoom information will be emailed after registration is complete.

IMPERIAL VALLEY CIMIS REPORT AND UC WATER MANAGEMENT RESOURCES

Ali Montazar, Irrigation and Water Management Advisor, UCCE Imperial and Riverside Counties

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 31th 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/.