Extension Connection

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UC CE

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

UC Cooperative Extension

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Introduction from our Area

County Director

Dear Readers:

As the summer heat turns up, we're keeping things cool by preserving knowledge and sharing stories that are ripe for the season. In this issue, you can read about exciting milestones from our Master Food Preservers, fresh insights into agricultural water use, and updates on challenges facing our landscape, from aloe thrips impacting aloe to fungal threats to agave health. This issue is hot off the press and one you won't want to miss!

April was one of our many months dedicated to building and strengthening partnerships. We connected with the City of Escondido, County partners, stakeholders, and job seekers at the Future of Food Job Fair in Escondido. We reunited with UC Riverside at an Agriculture Roundtable to discuss the future of education, sustainability, technology, and workforce development in our growing agricultural sector here in Southern California. We also enjoyed connecting with growers and community members at Graze at the Fields alongside San Diego Farm Bureau.

In May, our team had the pleasure of hosting UC Regent and Vice Chair Maria Anguiano and UC ANR leadership to showcase the breadth and impact of our programs. The visit featured hands-on mozzarella making with Leah Taylor, Shirley Salado, and our Master Food Preservers, as well as engaging presentations from local 4-H youth, and a memorable visit to the Carlsbad Strawberry Company and Flower Fields, where we picked strawberries and blueberries with Farm Bureau leaders. Advisors Eric Middleton, Gerry Spinelli, and Matt Fatino also led mini-lessons on measuring water salinity and pH and identifying local pests and weeds.

In June, I attended our Berry Production workshop led by Small Farms Advisor Ramiro Lobo where we explored berry cultivation and management. We tasted berries, discussed challenges, economic perspectives, and strategies for sustaining local production in a changing environment. This was a fruitful opportunity to learn directly from experts invested in regional agriculture.

We look forward to sharing more updates as the season continues, especially at the San Diego Fair ongoing this month into July. There's berry more to come: your engagement helps us to extend research-based knowledge to communities in ways that create meaningful, lasting impact. Stay cool and stay connected!

Chandra Richards

UC Cooperative Extension
San Diego and Imperial Counties

UC Cooperative Extension
University of California
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Are Your Aloes Dying? It May Be Aloe Thrips

Written by: Eric Middleton, UCCE Area IPM Advisor in San Diego, Riverside, and Imperial Counties

If you live in Southern California and your aloes are darkening and starting to die back, it could be caused by a new invasive pest called aloe thrips *(Hercinothrips dimidiatus).*

Aloe thrips is an invasive thrips species that was recently confirmed to be present in San Diego, Ventura, and Santa Barbara counties in early 2026. This was the first documented case of aloe thrips in North America, and previously it had only been observed in South Africa and parts of Europe with a Mediterranean climate. Aloe thrips feed on the surface of aloe leaves causing black spots and heavy scarring that eventually starts covering the entire leaf (Figure 1a and 1b). As damage progresses, the plant dies back as everything turns black or bronze and sections of the aloe begin to wither away completely (Figure 1c and 1d). Aloe thrips are only known to feed on *Aloe arborescens*, Aloe vera, and hybrids of either of these species, but there is also a lot we don't know about this pest, so keep an eye out on any aloes you have.

Figure 1. a) Early signs of aloe thrips damage where scarring and black spots become visible; b) A closer view of scarring and blackening caused by aloe thrips; c) Heavy aloe thrips damage characterized by significant scarring and blackening of leaves; d) Dieback caused by aloe thrips as entire sections of the aloe plant turn black, wither, and die.

The thrips themselves are very small, but pretty distinctive if you run into them. Adults are slender dark insects around 1 mm long with 3 visible whitish bands on their backs and are often found near the crown of the aloes (Figure 2a and 2b). They are hard to spot even under ideal conditions, so magnification and some patience will help a lot. Immature aloe thrips are shiny and almost wet-looking with red, brown, and pale coloration (Figure 2c). They also usually have drops of dark liquid feces hanging on the tip of their abdomen, and you can see shiny flecks of these feces when it dries on the surface of the aloe leaves as well.

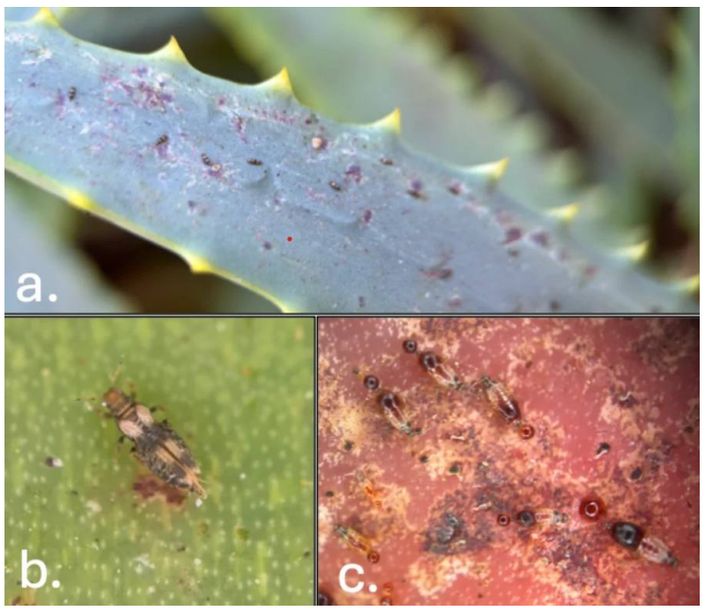

Figure 2. a) A group of adult aloe thrips seen without magnification on the surface of an aloe leaf; b) Magnified adult aloe thrips where 3 horizontal light bands are visible on their wings; c) Magnified immature aloe thrips with a shiny appearance and droplets of feces on their abdomens

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When it comes to management, getting rid of heavily infested and damaged plants is probably the best course of action. We don't currently know what control methods work best for this pest, so keeping infestations from spreading is key. If additional control is necessary, a foliar application of spinosad is likely a good option since it is effective against many thrips species and is available to both professionals and members of the public (but again, we don't have any data on how effective various methods are yet!).

Because aloe thrips was only found here recently, we're still trying to figure out where all it is in California and we could use your help. If you run into *Aloe arboresecens* or Aloe vera that is blackening and dying back and especially if you also see striped thrips on the plant, please let us know! Note the location, take some pictures, email them to aloe.thrips@gmail.com, and we'll verify if it looks like aloe thrips damage. You can also reach out to Eric Middleton directly at egmiddleton@ucanr.edu. This is especially useful to us if you are anywhere in the US outside of San Diego, Ventura, or Santa Barbara Counties, since aloe thrips hasn't been confirmed outside of these three counties. Let us know, and together, we can track this new invasive pest and hopefully come up with better management solutions shortly!

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Why one gallon of irrigation water per square foot per week is a good place to start for urban agriculture in San Diego

Written By: Gerry Spinelli, UCCE San Diego Production Horticulture Advisor, and Derrick Robinson, Urban Ag, Food Systems, and Environmental Issues Advisor

If you like growing food and flowers but you don't like math, welcome to the club! In this article we will give you a good rule of thumb for irrigation scheduling, based on educated guesses that take into consideration San Diego's weather, vegetable crops, drip irrigation systems and San Diego's municipal water salinity.

We believe that an imperfect educated guess is a lot better than a wild guess based entirely on gut feeling. I grew up growing olives and vegetables using the second method to decide how much to irrigate. I wish someone had given me this rule of thumb 30 years ago.

A range is better than a rule of thumb

If you want to learn how to decide how much irrigation water your urban vegetable garden needs every week of the year, keep reading. If you are too busy and you want an answer fast, start with one gallon of water per square foot of garden per week and adjust with soil or plant observations. With few exceptions, the right irrigation requirement will range between a tenth of a gallon and two gallons of water per square foot of garden per week.

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For example, if you have a 4 ft by 8 ft bed, the total surface area is 32 square feet. Start by irrigating with 32 gallons of water per week. You may be a little on the heavy side in winter (but this will help leaching salts before the upcoming dry season) and a little short in summer (when it's probably good to double it).

You will almost certainly have to split this weekly application into three or more irrigations. For example, if you irrigate thrice a week, then you will apply 11 gallons per irrigation. The next question is: how long should I run my system to apply 11 gallons of irrigation water? We will cover this question in our next article.

This rule is somewhat flexible and it's a good place to start, that you can later adjust based on your experience, plant observations, soil moisture measurements, unseasonal weather, etc. What we hope you will learn from this article is that almost certainly applying 3 gallons per square foot per week means overirrigating and applying 0.01 gallons per square foot per week means underirrigating. Again, the real number will almost certainly fall between 0.1 gallons (or 13 fluid ounces) and 2 gallons per square foot per week.

Our hope is that by giving you at least the right order of magnitude and a reasonable range we will reduce the amount of overirrigation and provide a reference point for those that are just starting. You can also use this rule for a "back-of-the envelope" calculation to compare your water consumption reported on your water bill. In the following paragraphs we will provide additional quantitative information to adjust the irrigation requirement up or down.

Weather seasonality

In temperate climates the evaporative demand of the atmosphere is highly seasonal. Water evaporates fast from clothes drying on a line in June and slow in January. Irrigation scientists invented the concept of reference evapotranspiration (called ETo) to capture this seasonal variability and the effect of location. They filled the state with weather stations that measure reference evapotranspiration over a grass surface. You can download the data from https://cimis.water.ca.gov/.

Reference evapotranspiration is the evapotranspiration that grass has on a given day in a given location.

Weather in San Diego is usually very stable. We define stability as not too hot in summer and not too cold in winter. For example, weather in the Central Valley is characterized by more extremes in the winter and summer months and thereby defined as less stable than weather in San Diego. As a result, the weekly reference evapotranspiration is only four times larger in the hottest week of summer than it is in the coldest week of winter (Figure 1). This uniformity in seasonal weather is larger the closer you are to the coast, whereas we encounter marked seasonal differences as we move inland. This relative stability allows us to give you an average rule of thumb and a relatively tight range of options for weekly irrigation requirements.

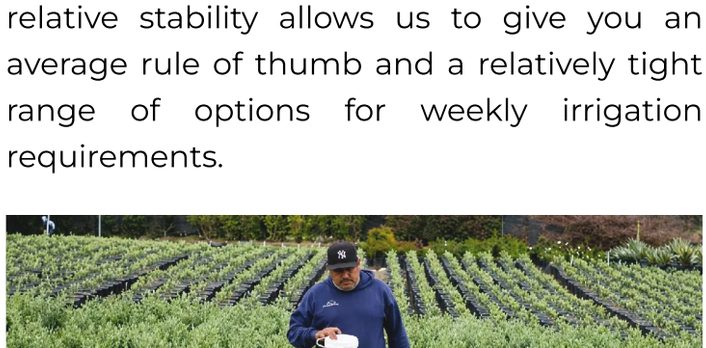

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Figure 1 shows the weekly reference evapotranspiration average for the past four years for each week of the year from the CIMIS stations of Torrey Pines, Miramar, Escondido and Fresno expressed in units of gallons per square foot. Notice that Torrey Pines shows a relatively stable reference evapotranspiration throughout the year, because it is heavily influenced by the marine layer. Also, notice the decrease in May and June compared to April: this is the effect of what we call May Gray and June Gloom. This station represents conditions of those of you that grow closest to the coast. Miramar shows very different conditions, with higher reference evapotranspiration throughout the year, despite being only ten miles inland from Torrey Pines. Similarly, Escondido weather represents inland locations in San Diego county. We believe that with these three stations we capture the conditions of most community gardens in San Diego county. Finally, Fresno is there for reference: it shows a tenfold increase between the lowest and the highest weekly reference evapotranspiration.

This graph should give you a quantitative idea of the seasonal variation of irrigation requirements at your location.

Crops

To adjust for the effect of the crop, irrigation scientists invented the idea of crop coefficient (Kc). This is a number used to adjust reference evapotranspiration for the effect of the crop. It's a surprisingly conservative number and it ranges between 0.1 and 1.25 for any crop in the universe. To adjust reference evapotranspiration for the crop coefficient, you simply multiply the two.

It turns out that crop coefficient is mostly a function of canopy cover, i.e. the percentage of ground covered by the crop. If your canopy is sparse (i.e. you see a lot of soil a little green), then the crop coefficient will be on the low side; at 50% canopy cover, the crop coefficient is around 0.8. This is like saying that your crop uses 80% of the water that grass would use in the same conditions.

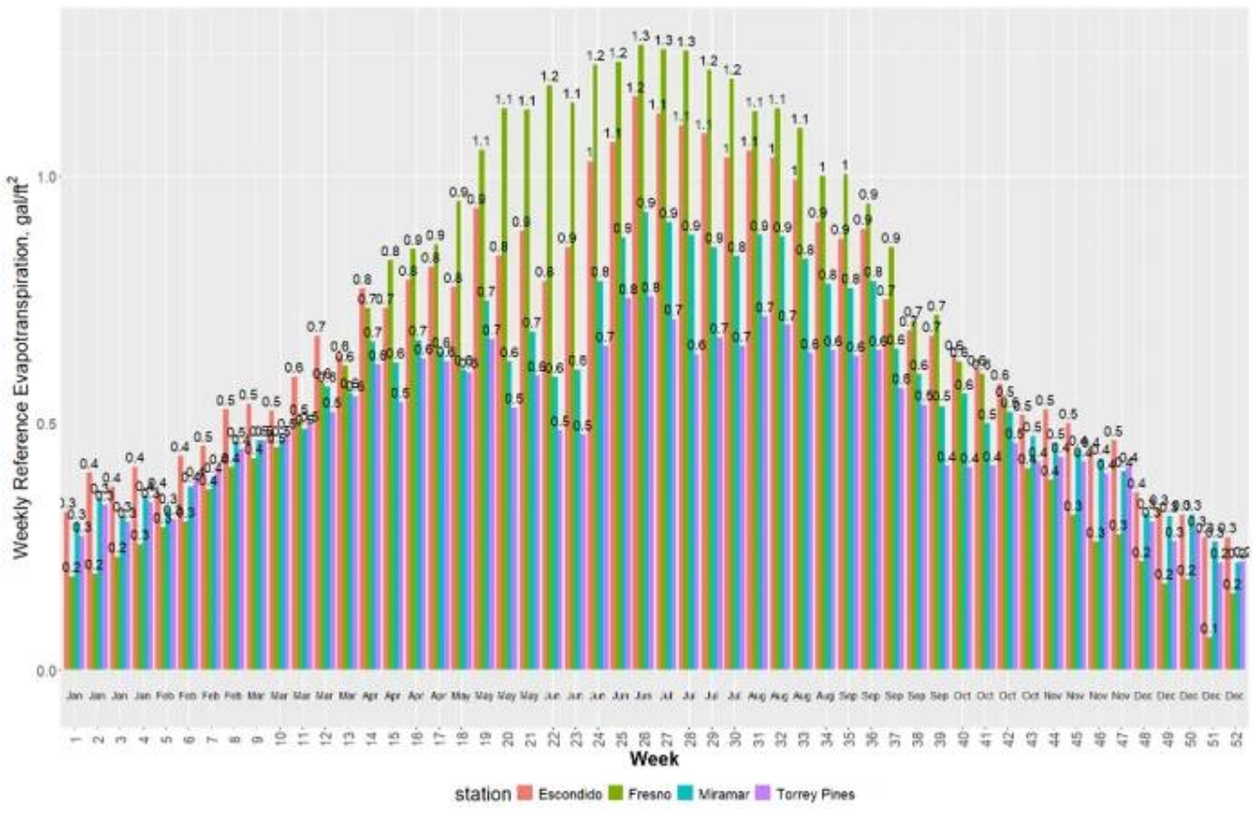

Figure 1. Weekly average reference evapotranspiration in gallons/ft² for three CIMIS stations in San Diego and one in the Central Valley. The average is based on the last 4 years of data.

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Figure 2 is taken from “Estimating crop coefficients from fraction of ground cover and height”, by Allen and Pereira, 2009 and shows crop coefficients as a function of canopy cover for many vegetables. The details of these graphs are far more complex, but we show them to make the point that crop coefficient for your vegetables probably ranges between 0.3 and 1.1. You can also use a smartphone app like Canopeo to estimate the percentage of canopy cover of your vegetables and thence infer the crop coefficient from the graphs below.

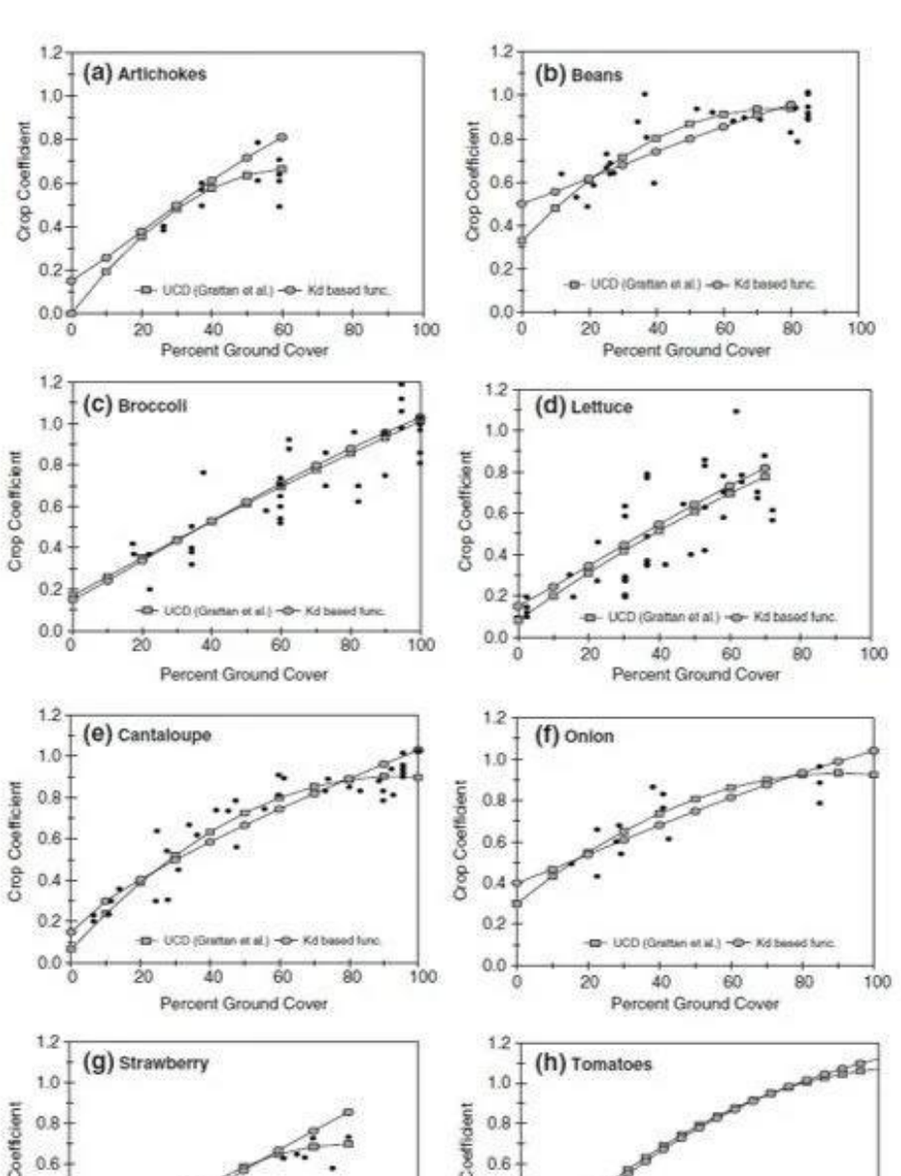

Figure 2. Examples of crop coefficients for vegetables as a function of percentage of canopy cover (from Allen and Pereira, 2009). Original caption: Kc versus fc for seven vegetable crops in California reported by Grattan et al. (1998) (a–g) and tomatoes in California by Hanson and May (2006) (h), showing data and regression equations by Grattan et al. and Hanson and May (2006) with Kc estimated using Eqs. 6, 7a, and 10. The small black symbols represent measured data.

For example, let’s say that it’s week 8 and you are in Escondido. Your lettuce covers roughly half of the ground of your 4 ft x 8 ft raised beds. From the graph in Figure 2, you obtain a crop coefficient of 0.7. From Figure 1, you obtain 0.5 gal/(ft² week). So, your lettuce needs 0.5*0.7 = 0.35 gallons per ft² this week, and your 32 ft² bed needs 0.35*32 = 11.2 gallons.

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Irrigation system performance

To estimate your irrigation requirement, you also need to account for the performance of your irrigation system. There is a parameter called distribution uniformity (DU) that ranges between 0 and 1, with higher numbers signifying more uniform irrigation system performance. In practice, distribution uniformity for sprinkler systems ranges between 0.5 and 0.75, while for drip it ranges between 0.75 to 0.95. The lower the distribution uniformity, the more water you need to apply to make up for unevenness. To calculate this effect mathematically, we divide the requirement calculated above by the distribution uniformity number. Since distribution uniformity is always a number smaller than 1, by dividing by it, the irrigation requirement always increases. In a community garden, you almost certainly use drip irrigation, so we picked a distribution uniformity in the appropriate range for drip systems, but if you use overhead sprinklers, you certainly will have to irrigate more. We recommend measuring the distribution uniformity.

Irrigation water salinity

One of the goals of irrigation is also to leach salts below the rootzone. This is particularly true in Southern California, where we irrigate with mostly Colorado River water that has a lot of salts. Irrigation scientists invented the concept of leaching requirement (LR), or the fraction of water applied that drains below the root zone and leaches salts beyond the root zone.

If I apply one gallon of water to my plants and a quarter gallon drains below the rootzone, then I'm applying a leaching requirement of 0.25. To calculate how much water to apply to achieve a certain leaching fraction, we divide by (1-LR).

The recommended leaching requirement depends on the irrigation water salinity and on the crop sensitivity. There are a lot of details here, but generally San Diego municipal water has levels of electrical conductivity (ECw) around 0.9 dS/m, that is relatively high. For reference, irrigation water from the State Project from the Sacramento River has electrical conductivity less than 0.5 dS/m. If you irrigate from a well, all bets are off, and you need to call us to come measure the electrical conductivity of your water.

Table 1 shows a table from "Drought Tip – Managing Salts by Leaching" by Cahn and Bali. In the table, we must pick the column of 1 dS/m for the salinity of irrigation water. Vegetables generally can tolerate a soil salinity (ECe) between 1 and 2.5 dS/m (read that article for more details), so we need to pick the corresponding rows for soil salinity in the table. Thus, the recommended leaching requirements for our conditions range between 0.09 and 0.25. I highlighted the cells in the table with a yellow rectangle.

Soil salinity (ECe), dS/m	Salinity of irrigation water (ECw), dS/m												
	0.2	0.5	0.7	1	1.3	1.5	2	2.5	3	4	5	6	7
0.5	9	25	39	67	108	—	—	—	—	—	—	—	—
1	4	11	16	25	35	43	67	100	—	—	—	—	—
1.5	3	7	10	15	21	25	36	50	67	114	—	—	—
2	2	5	8	11	15	18	25	33	43	67	100	—	—
2.5	2	4	6	9	12	14	19	25	32	47	67	92	—
3	1	3	5	7	9	11	15	20	25	36	50	67	88
3.5	1	3	4	6	8	9	13	17	21	30	40	52	67
4	1	3	4	5	7	8	11	14	18	25	33	43	54
4.5	1	2	3	5	6	7	10	13	15	22	29	36	45
5	1	2	3	4	5	6	9	11	14	19	25	32	39
5.5	1	2	3	4	5	6	8	10	12	17	22	28	34
6	1	2	2	3	5	5	7	9	11	15	20	25	30
6.5	1	2	2	3	4	5	7	8	10	14	18	23	27
7	1	1	2	3	4	4	6	8	9	13	17	21	25

Table 1. Recommended leaching requirement based on irrigation water electrical conductivity and desired rootzone soil salinity (from Cahn and Bali, 2015). Original caption: Leaching requirement, expressed as a percentage, to achieve a desired soil salinity concentration (ECe) in the crop rootzone using irrigation water of varying salinity concentration (ECw). The intersection between ECw and ECe values corresponds to the appropriate LR.

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Putting it all together

Those of you that made this far will be rewarded with the gift of knowledge. Your prize (or punishment?) is the below equation, that is used to calculate the irrigation requirement of any crop. It uses reference evapotranspiration (ETo), the crop coefficient (Kc), the irrigation system's distribution uniformity (DU) and the leaching requirement (LR) to calculate the total irrigation requirement.

$$Irrigation\ requirement = \frac{ET_o\ Kc}{DU\ (1 - LR)}$$

We used this equation to create a matrix of all possible scenarios given the highest and lowest value of each parameter (Table 2). We obtained results ranging between 0.1 and 2 gallons per ft² per week.

Going back to our Escondido lettuce example, let's say your measured Distribution Uniformity is 0.93, and the electrical conductivity of your water (ECw) is 0.7 dS/m. Lettuce can withstand 1.5 dS/m of soil salinity (ECe). From Table 1, we obtain LR=10%, so 1-LR = 0.9 . Applying the equation above we obtain: Irrigation requirement = (0.5*0.7)/(0.93*0.9) = 0.42 gal/ft² week, or, for a 32 ft² bed, 0.42*32 = 13.4 gallons/week.

Conclusion

We hope that we provided a quantitative framework to calculate the irrigation requirements for a community garden or other outdoor urban agriculture production facility. It's best to measure all the parameters in the calculations, but if you can't measure them, pick a reasonable value from the range indicated above. Most likely you'll calculate a better number than a guess entirely based on gut feeling.

	Reference Evapotranspiration	Crop Coefficient	Distribution Uniformity	Leaching Fraction			
	ETo	Kc	DU	LF			
Minimum	0.5	0.3	0.75	0.1			
Maximum	1.5	1.1	0.95	0.25			
					Irrigation requirement		
	ETo	Kc	DU	LF	inch/week	gal/(acre week)	gal/(ft² week)
1	0.5	0.3	0.95	0.1	0.18	4764	**0.11**
2	0.5	0.3	0.95	0.25	0.21	5717	**0.13**
3	0.5	0.3	0.75	0.1	0.22	6034	**0.14**
4	0.5	0.3	0.75	0.25	0.27	7241	**0.17**
5	0.5	1.1	0.95	0.1	0.64	17467	**0.40**
6	0.5	1.1	0.95	0.25	0.77	20961	**0.48**
7	0.5	1.1	0.75	0.1	0.81	22125	**0.51**
8	0.5	1.1	0.75	0.25	0.98	26551	**0.61**
9	1.5	0.3	0.95	0.1	0.53	14292	**0.33**
10	1.5	0.3	0.95	0.25	0.63	17150	**0.39**
11	1.5	0.3	0.75	0.1	0.67	18103	**0.42**
12	1.5	0.3	0.75	0.25	0.80	21723	**0.50**
13	1.5	1.1	0.95	0.1	1.93	52402	**1.20**
14	1.5	1.1	0.95	0.25	2.32	62883	**1.44**
15	1.5	1.1	0.75	0.1	2.44	66376	**1.52**
16	1.5	1.1	0.75	0.25	2.93	79652	**1.83**

Table 2. Matrix of weekly irrigation requirement scenarios based on the range of reference evapotranspiration, crop coefficient, distribution uniformity and leaching requirement expected for community gardens in San Diego county.

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Going back to our Escondido lettuce example, let's say your measured Distribution Uniformity is 0.93, and the electrical conductivity of your water (ECw) is 0.7 dS/m. Lettuce can withstand 1.5 dS/m of soil salinity (ECe). From Table 1, we obtain LR=10%, so 1-LR = 0.9 . Applying the equation above we obtain: Irrigation requirement = (0.5*0.7)/(0.93*0.9) = 0.42 gal/ ft² week, or, for a 32 ft² bed, 0.42*32 = 13.4 gallons/week.

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We hope that we provided a quantitative framework to calculate the irrigation requirements for a community garden or other outdoor urban agriculture production facility. It's best to measure all the parameters in the calculations, but if you can't measure them, pick a reasonable value from the range indicated above. Most likely you'll calculate a better number than a guess entirely based on gut feeling.

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Fungal Threats to Agave Health: Identification and Management

Written By: Ana M. Pastrana, UCCE Plant Pathology Advisor, Imperial, Riverside, and San Diego Counties and Andrea G. Monroy-Borrego– UC ANR - Staff Research Associate

Introduction to Plant Disease

Plant disease development is not a random event but rather the deterministic outcome of three converging conditions:

This conceptual model, the disease triangle, explains why identical pathogens may cause devastating losses in one setting yet remain inconsequential in another. Disease does not arise from the pathogen alone; all three components must align simultaneously and with sufficient intensity. Management strategies gain practical power from this framework because disrupting any single side of the triangle can reduce or prevent disease, even when the remaining components are present. A fourth dimension, time, is often considered by some pathologists, as the duration and continuity of favorable conditions profoundly influence cumulative disease severity (Figure 1).

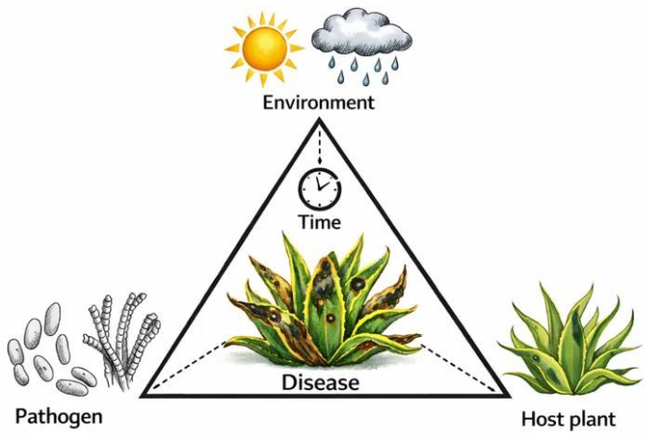

Figure 1. Disease triangle, based on the classic plant disease triangle (OpenAI, 2026

Effective disease management in agave begins before a plant is placed in the ground. The selection of species or cultivars appropriate to the anticipated growing conditions determines a plant's success or failure. It is important to consider the moisture regime, soil type, and temperature range; a plant that is not stressed has less susceptibility to opportunistic pathogens.

To reduce the risk of infection, it is also important to evaluate soil and drainage conditions before planting. Irrigation should be applied in a manner that allows the root zone to dry adequately between events, preventing the sustained soil moisture that favors root infection.

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Fertilization programs should be calibrated to crop demand and site conditions; excessive nitrogen can stimulate succulent tissue growth that is more vulnerable to foliar pathogens. The planting area should be maintained free of weeds and accumulated plant debris, which serve as reservoirs for fungal inoculum and create microclimates of elevated humidity. Sanitation of tools and equipment between plants, particularly when any disease is present, limits mechanical transmission of pathogens and should be a routine practice rather than a response to observed symptoms.

Next, we will discuss some of the most important fungal diseases affecting agave, including key symptoms and signs, as well as potential management strategies to reduce their impact.

Agave Wilt

Primary Pathogens: *Fusarium oxysporum, Fusarium solani, Fusarium moniliforme, Thielaviopsis paradoxa*.

Hosts: *Agave tequilana var. azul.* The disease hasn't been reported in other Agave species, but other agave species may also be susceptible.

Symptoms:

- Curling and dehydration of the basal and intermediate leaves surrounding the agave heart
- Discoloration, turning from green to a brownish-green hue
- Loss of root anchorage due to root rot, leading to plant collapse and death

Agave wilt caused by *Fusarium* species is a vascular wilt and root rot disease that typically initiates in the root system before becoming apparent in the aerial portions of the plant.

Early below-ground symptoms include dark, water-soaked discoloration of feeder roots. As the root function is compromised, the pathogen may colonize the crown tissue and vascular system, interrupting water and nutrient transport. Affected leaves shift in color from normal green to a brownish-green hue as desiccation and cell death proceed (Figure 2). In advanced cases, complete degradation of the root system results in loss of anchorage, and affected plants may lean, collapse, or be easily dislodged from the soil (Figure 3 and 4). Without intervention, infected individuals frequently die.

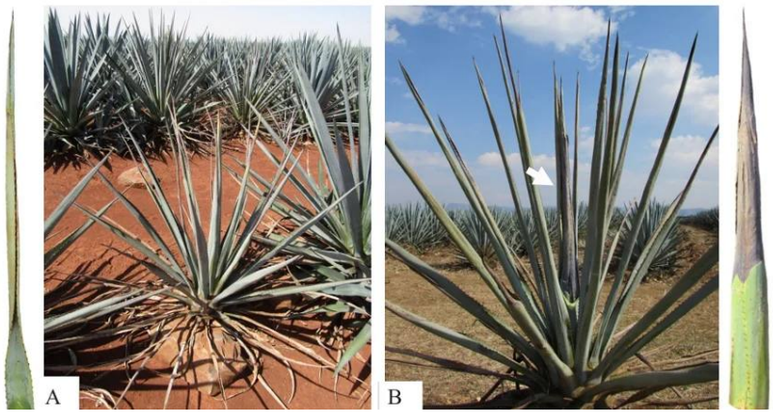

Figure 2. Plants and leaves showing symptoms of Agave Wilt. A) Plant showing wilt symptoms, the leaf exhibits curling and pronounced dehydration. B) Plant showing symptoms of dry bud rot, the bud shows rot progressing downward with a stiff, dry appearance. From López-Bautista et al., 2019.

Figure 3. Commercial agave fields affected by agave wilt, showing diseased plants. All of the plants in these affected areas exhibited reddish rot symptoms in the crown. From Ramirez-Ramirez et al., 2017.

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Figure 4. Agave hearts cut open showing agave wilt symptoms with a powdery appearance in the affected tissues (severe tissue destruction). From Castro-Valera RA., 2003.

Management strategies

Agave wilt is a devastating disease with no cure once established, making prevention your best defense:

- Start with proper site selection. Choose locations with excellent drainage and avoid areas with a history of root diseases. Prevent drainage issues before planting by using soil amendments, subsoiling, or raised beds.
- Use clean planting material from certified nurseries. Infected suckers introduce disease directly into healthy plantings.
- Prevent cross-contamination by disinfecting tools between plants and avoiding movement of soil, water, or equipment from infected to healthy areas.
- Protect plant roots from damage. Wounded roots provide entry points for infection. Keep herbicides away from root zones to prevent chemical burns, and manage soil pests that injure roots. Handle plants gently during transplanting and cultivation.
- Deploy biological protection. Apply beneficial organisms like *Trichoderma and Bacillus* species to seedlings and during transplanting. These biological organisms have shown effectiveness in suppressing Fusarium spp., but they work best as prevention, not treatment.
- Act fast when the disease appears. Remove and destroy infected plants completely, including roots. Disinfect all tools and equipment, and monitor surrounding plants closely. Never compost diseased material.

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Anthracnose

Primary pathogens: *Colletotrichum agaves, Colletotrichum gloeosporioides*

Hosts: *Agave tequilana var. azul, Agave angustifolia, Agave salmiana.* The disease hasn't been reported in other agave species, but other agave species may also be susceptible.

Symptoms:

- Irregular leaf spots ranging from brown to dark brown/black, often with well-defined edges (Figure 5)
- Sunken lesions, frequently showing concentric rings or pink/orange spore masses under humid conditions (Figure 5)
- In severe cases, rot at the leaf base, loss of the central shoot (apical meristem), and total plant collapse

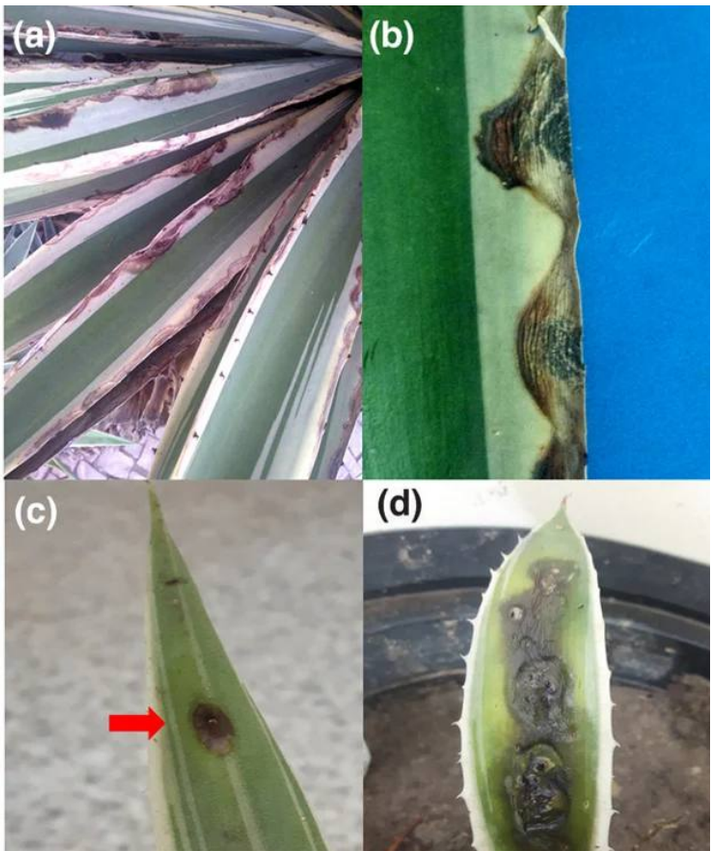

Figure 5. Anthracnose symptoms on Agave angustifolia leaves associated with Colletotrichum. (a) and (b) show symptoms on infected leaves, including elongated dark brown necrotic lesions with dry, sunken tissue extending along the leaf surface. (c) Shows a leaf with a small circular brown lesion. (d) Image of a leaf with enlarged dark necrotic lesions. From Araujo et al. 2021

Management Strategies

Anthracnose thrives on wet leaves, making moisture management your primary weapon against this disease. Understanding when and how the pathogen strikes is key to effective prevention:

- Anthracnose risk increases dramatically with prolonged leaf moisture. Optimize irrigation timing to allow leaves to dry quickly—water early in the day so plants dry before evening. Provide adequate spacing between plants to promote air circulation and reduce humidity around foliage.

- Colletotrichum fungi enter easily through wounds and cuts, making clean operations essential. Disinfect tools between every plant using effective disinfectants, and always work from healthy plants toward infected ones.

- Inspect plants frequently enough to catch initial lesions before they begin producing spores. Early intervention is critical because once sporulation begins, the disease spreads rapidly to surrounding plants. Remove infected leaves immediately and destroy all plant debris—never leave infected material on the soil surface where spores can spread.

- Few fungicides are registered for agave use in California, so consult with extension specialists or agricultural consultants before considering chemical treatments.

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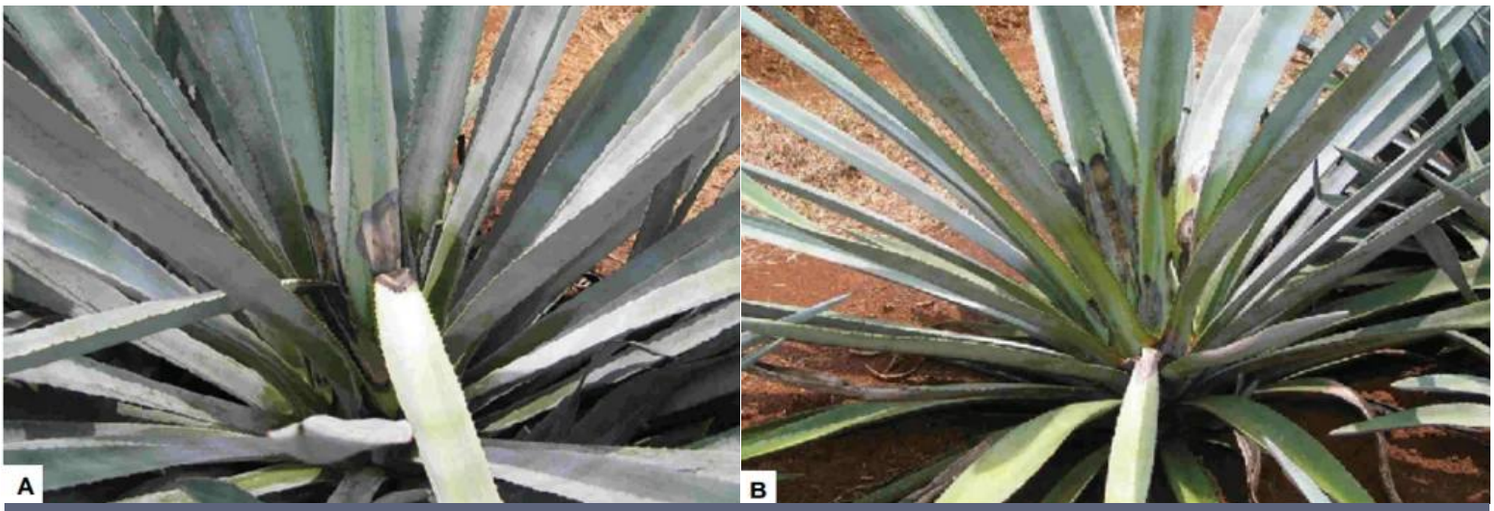

Figure 6. Agave plants showing symptoms of gray spot. A) Early to intermediate symptoms showing elongated oval, dry, gray necrotic lesions on leaves near the center. B) More advanced symptoms showing generalized chlorosis. From Rubio C., R. 2007.

Gray Spot

Primary pathogens: *Cercospora agavicola, Cercospora spp.*

Hosts: *Agave tequilana var. azul*, the disease hasn't been reported in other Agave species, but other agave species may also be susceptible.

Symptoms:

- Elliptical or irregular leaf spots, ranging from grayish to light brown, often surrounded by a chlorotic halo, appearing on leaves near the central head (Figure 6)
- Lesions start small but expand and can merge, especially under humid conditions
- Generalized chlorosis develops, progressing toward the center until it reaches the central head (Figure 6)
- Progressive loss of leaf tissue, which reduces photosynthesis
- In severe cases, partial defoliation occurs, leading to plant weakening and potentially plant death

Management strategies

Gray spot thrives in persistently humid conditions, making environmental management your most effective control strategy:

- Gray spot flourishes in humid microclimates around plant canopies. Provide adequate spacing between plants to promote air movement and accelerate leaf drying.
- Weeds and accumulated plant debris at the base of agaves create humid pockets that favor disease development. Maintain clean cultivation around plants and remove fallen leaves and organic debris that restrict airflow and maintain moisture near the plant base.
- Avoid excessive nitrogen fertilization. High nitrogen inputs stimulate lush, succulent growth that is particularly susceptible to Cercospora infection. Focus on balanced nutrition that promotes healthy but not overly vigorous growth.
- Use only certified, pathogen-free propagative material from reputable sources. Cercospora spp. can survive on asymptomatic planting stock, and infected suckers can introduce the disease into previously clean sites.
- Conduct routine inspections to detect early symptoms before extensive sporulation occurs. When monitoring reveals advanced symptoms on individual plants, remove and destroy entire plants away from the field to prevent further spread.
- Gray spot risk peaks during transitional weather periods characterized by high humidity, such as the end of rainy seasons and the onset of cooler conditions when plant growth slows and tissue remains wet longer.
- Few fungicides are registered for agave use in California, so consult with extension specialists or agricultural consultants before considering chemical treatments.

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UC Regents Tour UC Cooperative Extension San Diego for Hands-On Cheese Making Experience

Written By: Shirley Salado, EFNEP Community Nutrition Supervisor 2, UCCE San Diego County

UC ANR leadership welcomed Regent Anguiano for a tour and interactive learning experience at UC Cooperative Extension San Diego. ANR leadership participants included Jennifer Bunge, Associate Vice President of Finance and Capital Planning; Darren Haver, Associate Vice President for Research and Cooperative Extension; and Janine Wood, Executive Director for County Cooperative Extension. The visit was hosted by UCCE San Diego and Imperial Counties Area Director, Chandra Richards.

The day began with a meet-and-greet at the San Diego Cooperative Extension office, where volunteer Master Food Preservers (MFPs) introduced the group to the art and science of fresh mozzarella cheese making.

This engaging hands-on experience gave attendees the opportunity to explore food preservation alongside Shirley Salado, MFP and EFNEP Supervisor; Dom Fiume, MFP volunteer; and Leah Taylor, MFP and Master Gardener Coordinator.

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The morning session featured demonstrations of a variety of food preservation equipment, including a pressure canner, boiling water canner, steam juicer canner, and displays of dehydrated and freeze-dried fruits, vegetables, and herbs. Guests also viewed a rolling PowerPoint presentation highlighting the outreach workshops and educational achievements led by the program's 17 current volunteers, along with 15 trainees soon to graduate. Since its founding in 2022, the San Diego MFP program has expanded educational outreach throughout communities across San Diego County.

As with every MFP workshop, the session began with a food safety lesson emphasizing proper handwashing, hair restraints, and clean aprons. The Master Food Preserver program teaches safe, science-based food preservation methods to help Californians confidently practice food safety in their own homes.

During the fresh mozzarella demonstration, participants learned how five simple ingredients and five scientific steps transform fresh milk into soft, smooth mozzarella cheese. "The process begins with acidification, followed by coagulation, cutting and heating, draining the curds, and finally stretching and shaping," explained Salado.

The highlight of the workshop came when participants donned cheese-making gloves, dipped curds into hot water, and stretched the cheese into fresh mozzarella balls. Friendly conversations filled the room as guests shaped their cheese creations and experienced the transformation firsthand.

The session concluded with a tasting of the fresh mozzarella, plenty of smiles, and enthusiastic conversation before the group continued their tour to the Strawberry Fields and Flower Fields in Carlsbad.

Welcome new Master Food Preserver Volunteers!

Written By: Leah Taylor, Master Gardener Program Coordinator, UCCE San Diego County

The UC ANR Master Food Preserver (MFP) Program continues to empower communities across California with research-based education in safe home food preservation. From canning and dehydrating to fermenting and freezing, MFP volunteers play a vital role in helping communities reduce food waste, stretch their food dollars, and preserve seasonal abundance safely and confidently. Through workshops, demonstrations, and outreach events, these dedicated volunteers bring practical, science-backed knowledge directly to their communities.

We are excited to celebrate a major milestone—congratulations to our 15 newly certified Master Food Preserver volunteers! After completing an intensive six-month training program and hands-on practice, these individuals are now ready to share their skills and passion for food preservation with others. Their commitment strengthens our program's impact and ensures that trusted, research-based information continues to reach households throughout the region.

Please join us in welcoming and congratulating our newest certified volunteers—we look forward to the knowledge, energy, and enthusiasm they will bring to our communities! You can find our newest members demonstrating their knowledge at the SD County Fair. Look for us near the stage in O'Brien Hall.

Calendar

Stay up-to-date with seminars, webinars, trainings, events, and more!

JULY

SAN DIEGO COUNTY FAIR

June 10 - July 5, 11 AM to 11 PM

Location: Del Mar Fairgrounds

https://www.sdfair.com/

GROW YOUR GARDEN WORKSHOP

July 11, 10 AM to 12 PM

Location: Georgina Cole Library

https://bit.ly/MGGrowYourGardenWorkshop

AUGUST

LAST WEDNESDAY MEETING

August 26, 7:30 AM - 8:30 AM

Location: San Diego County Farm Bureau

LEASING LAND FOR AGRICULTURE WEBINAR SERIES

August 12

Location: Virtual

https://bit.ly/3R5yEft

For a full list of upcoming program related events for July through September, 2026, visit:

The San Diego County UC Master Gardener Event Calendar

The UC Master Food Preserver San Diego County Fair Schedule

Extension Connection

We hope you have enjoyed this issue of the Extension Connection!

We will continue bringing you the latest news from UC Cooperative Extension San Diego, and we would also like to hear from you.

What Do You Think?

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