



Optimization tips for growing cyclamen in California adapted for outdoor use

We have observed two methods of growing cyclamen in California: a first one as “**bedding plants**” and a second as “**pot plants**”. The first one is the most frequent way.

The basic difference between both methods lays in the precision of environmental protection of the crop, irrigation and fertilization. When talking with sales people and growers, we realized the difficulty to confront high investments to improve crop conditions even when the aim is to improve the crop environment, the irrigation system and the feeding.

The **goal** is always to improve the quality while keeping costs as low as possible.

Our proposal is to consider some small investments and to optimize the results with more accurate applications and control throughout the culture.



1. Environmental control

The Californian climate is very suitable for growing cyclamen from summer up to the winter months. Warm temperatures with daily average between 60°F/70°F (15°C/20°C) from May to December combined with the usually low humidity levels make it easier to control the growth.

It is maybe for this reason that the facilities in this area in general do not have any special protection for growing. They are equipped with shade structures of black cloth providing 50/70% of shade with optimal values of 3000 à 4000 fc light (300 to 400 w/m²).

Although this will be sufficient for growing cyclamen, this type of structure may represent a certain risk with respect to several key points during the culture:

- Strong rains can cause leaching of soil, a lower E.C. level, and consequently induce a delay of growth and flowering which are usually irreversible if they are not detected in time.
- During the winter months (November until January) when days are shorter and average temperatures are lower, the amount of light is very limited under this type of structures. We know that the maximum level of light may reach values of even 5000 fc (500w/m²) without any risk for the culture.
- Risk of proliferation of diseases like Anthracnose, Erwinia, Botrytis, etc, caused by heavy rains. Because of the splashes of rainwater, these diseases can proliferate quite rapidly.
- With shade houses, the risk of frost damages is very high, even in areas where it freezes rarely.



A mixed structure of plastic combined with shade cloth and maximal lateral ventilation, can contribute to better results. As from the beginning of November, in most warm zones of California, this shade cloth can be removed in order to recover light levels adapted to the crop.



Glasshouse with shading cloth on the outside

2. Pots, soil and culture trays



When making a selection of pots and culture trays, one has to take into account several points with direct effect on irrigation, asphyxia risks and diseases of the crop:

- **Choose pots with highly draining bottom design.**

Some manufacture have designed a bottom with two levels with up to 8 holes on each level. This allows good oxygenation of the soil and correct drainage at the same time.

These are essential conditions for accurate nutrition.



Pot with good drainage on 2 levels

- **Choose pots that guarantee total opacity (often of the thermoformed type, black inside).**

Cyclamen roots are very sensitive to the passage of light which limits its capacity of absorption and, in consequence, increases the asphyxia risks.

- **Choose a soil with good structure and drainage.**

During of our visits we have seen that some of the mixtures contained up to 30% perlite. This type of mixtures seems to be formulated to compensate possible excesses of irrigation.

Our proposal for pots of 4" (10.5 cm) is to improve the water holding capacity by using a mixture composed of fiber peat moss, white peat (fraction 0-1") and 15% of perlite.



Good draining substrate



Good draining soil improves the right development of rootsystem

- **Choose the right culture tray** which holds the pots completely and has openings in the bottom in order to drain water as much as possible. With this kind of tray we get the best moist and temperature buffer effect for a perfect rooting. It is advisable to space the cyclamen in the same trays. Available up to 16 holes per tray for 4" (10.5 cm) pot.



Culture tray holding the pots completely



Elevated culture tray

Never re-use trays for the next crop unless they are correctly disinfected.

- **And last but not least, select a tray which will support the pots correctly and create an air space between the tray and the ground.** This will avoid flooding issues and re-absorption of water, and thus make the irrigation much more even.

This option is often even better than the traditional crop benches because it allows a very favorable “cooling” effect for the roots with minimum temperature and humidity alterations.



Elevated culture tray

Vectors of infections are always present in the ground so this crop placing method will make it possible to isolate the cyclamen from diseases that may infect them.

3. Irrigation



Within the concept of growing “pot plants” (very precise and controlled irrigation system with drips or flood systems) we can regulate the water amounts per plant with sufficient accuracy and maintain good control of growth as well as healthy roots.



*Lack of healthy roots
due to an excess of water and drainage deficiency*

Within the concept of growing “bedding plants” the overhead irrigation system is the most usual system for watering cyclamen. The temperatures and humidity of the Californian climate as exposed previously, tolerate the use of this second watering system without too many risks. It is advisable to always water in the morning. There are several sprinkler irrigation systems, but most of them stop being efficient when the canopy covers the pot. In that case a long irrigation time is necessary, leading to flooding issues and unnecessary waste of water.



How to water?

Irrigation is possible with boom systems, which have nozzles that make it possible to reach the heart of the plants very effectively and water with great homogeneity. These systems may be more or less computerized and require significant financial investment.

As an alternative, we propose manual irrigation with hose which can be most effective and homogenous if used correctly. To achieve good results, it is important to consider:

- a larger drop size than a sprinkler system
- the angle of the nozzle (appr. 45° from ground level)
- regularity in application to guarantee a good execution of the work.

As it is manual work, it is very important that always the same person (or group of persons) executes the watering and that he or she has been correctly taught how to do.

The weakest point of cyclamen lies in their roots because of asphyxia caused by an excess of water, especially when temperatures are high. Most of diseases such as Erwinia, Fusarium, Phytophthora, etc find their way into cyclamen after inadequate control of irrigation. Therefore our objective is to give adapted doses of water with maximum effectiveness.



Healthy roots as result of right air/water balance

Our suggestion:

The point is to find an irrigation process which combines the relatively little precision that supposes the manual irrigation with judicious use of the culture elements (soil, pots, trays, etc) so that they offer maximum buffer of the irrigation.

When to water and what amount?

The decision for watering can be taken when two thirds of the top of the pot is dry, while avoiding to saturate the remaining third again in view of the previous irrigation. In extreme situations, one can expect the peat to suffer a slight contraction in the pot. This allows the cyclamen roots to be oxygenated and to enhance their secondary and more active roots. It also will contribute to a balanced growth of the corm in respect to the canopy.



Dry upper third of substrate illustrates good watering control



Peat contraction due to limited watering

Please remember that pots in an elevated culture tray will buffer the humidity longer due to the cooling effect caused by the space between tray and ground.

Our cyclamen are really strong and these stressful irrigation conditions will make them perform even better in landscape plantations and gardens.



Correct development of corm due to a balanced feeding program



4 . Feeding

There are two options of fertilizer throughout the culture time:

- **Slow release fertilizer** of which the newest versions are available in different release rates and balances. This option is the easiest and the most practical, even though it is always subject to sudden changes of temperatures and strong rains when the crop is grown under shade cloth.

In facilities where ventilation is not optimum it is better not to choose for this option.

- **Water soluble fertilizer** during irrigation with an injector located in the production area and adaptable to the hose. This is a safer and more economic option than the first one. Thanks to the control of the E.C. the grower can either reduce the amount of feeding in case of heat, or increase it in case of strong rains. This option makes additional supply possible when from November to January the irrigation frequencies are lower. It is then important to increase the E.C. , in particular for the flowering stage. When using a soil provided with preplanting fertilizer (SME 2-3 ms/cm and 75/100 ppm N) it is advisable to initiate the feeding four weeks after spacing. Until then, water with clear water.

- **Slow release fertilizer with moderate release + complementary liquid fertilizer:** this alternative combines both options.

The hardness of the water, its calcium and magnesium degree, is to be verified by means of a water analysis in order to select a suitable fertilizer. In case of hard water many fertilizers acidify with ammonium (NH₄). It is recommended not to exceed more than 5% of Nitrogen in ammoniacal form. This Nitrogen source accelerates the demand of water and consequently unbalances the irrigation guidelines.

In the following chart expressed in ppm we propose constant concentrations from 50 up to 75 ppm of Nitrogen and 150 ppm of Potassium for the growing stage. This balance contributes to more compact plants and reduces the water demand when the temperatures and the watering frequency are high.

In flowering stage (November/December) when the average temperature and the watering frequency are lower, we even propose 150 ppm N and 300 ppm of Potassium. From November onwards and when the daily average temperature is around 15°C (60°F) the Nitrogen is mainly taken up by the flowers and less by the leaves. For early flowering stages during the months of August/September we propose our Tianis® series, maintaining the feeding growing stage method as for Latinia®.

Nutrients needs in growing and flowering stage

NUTRIENTS ppm or mg/l	Nitrogen		Potassium		Phosphorus		Calcium		Magnesium		Iron
	NO ₃ ⁻	N	K ⁺	K ₂ Or	H ₂ PO ₄ ⁻	P ₂ Or ₅	Ca ²⁺	CaO	Mg ²⁺	MgO	Fe ²⁺
LATINIA® Growing Stage	200-300	50-75	120-130	150	100	70	50	75	12	20	1
LATINIA® Flowering Stage	650	150	240-260	300	100	70	50	75	12	20	1



Chemical growth regulators

With a correct application of the previously exposed crop factors, the use of any growth regulator would not be necessary.

Nevertheless, as alternative to some uncontrolled irrigation and feeding issues, some producers use **B-NINE (daminozide)**.

Like all growth regulators, it must be applied at the most suitable moment to be effective: in general, one month after potting and just before spacing.

The doses with high temperatures are between **3000 and 4000 ppm** applied by pulverization avoiding the treatment to penetrate inside the plant. More than one treatment is not recommendable as this will delay the flowering with two to three weeks. If you have no experience with this regulator on cyclamen, we recommend to test it on small batches in parallel to the production. This regulator can have a synergic effect if the crop is taken from the driest side.

Crop Schedule:

DURATION OF CULTURE FROM (in weeks)	SOWING	POTTING 4 " Pot (10,5cm)		SPACING 25pl/m ²		FIRST FLOWER BUDS
		Plug 0,9/1,1 " (23-28mm)	Plug 1,2/1,4 " (30-35mm)	Plug 0,9/1,1 " (23-28mm)	Plug 1,2/1,4 " (30-35mm)	
ESSENTIAL TIANIS®	27 -28	14	12	10	9	2
TIANIS® FANTASIA	29-30	16	14	12	11	3
ESSENTIAL LATINIA®	28-29	15	13	11	10	2
LATINIA® FANTASIA	31-32	17	15	13	12	3