EXTRA-LARGE CYCLAMEN (pots Ø from 17 to 22 cm / 6.75-8.5")

Successful cultivation of extra large cyclamen requires a specific organisation in terms of planning, greenhouse fittings, equipment...
The choice of varieties is essential.
Only the most vigorous plants will provide good results.
Each phase of cultivation has its own objectives and needs.
All phases have constraints to be aware off and to adapt to.

I – PLANNING

Producing an extra large cyclamen takes more time than to produce a cyclamen of traditional size. In general, it is necessary to allow 5 to 10 weeks extra, i.e. approximately (according to the climatic conditions and pot sizes) 22 to 27 weeks after repotting the young plant of 15 weeks.
Growth with abundant flowering will only take place under sufficiently cool climatic conditions (average daily temperature (ADT*) of approximately 15°C/59°F). Thus, the time of flowering phase will be variable according to various climates.
Calculation of repotting date will be made by studying greenhouse temperature statistics to determine the beginning of the flowering.

II – YOUNG PLANT

This is a transplanted young plant of approximately 15 to 16 weeks.

III – GROWTH PHASES: aims and constraints

The cultivation of cyclamen can be divided into 3 distinct phases with different objectives and constraints.

1 – ROOTING PHASE (6 to 8 weeks)

Aim: the development of a root system sufficiently efficient to feed in the future a very large volume of foliage. This is an essential phase to ensure the quality and viability of the product.
With an **ADT* of 20°C (68°F)**, 6 to 8 weeks will be necessary, depending on the pot size.

Constraints

- **ADT < 20°C (68°F)** would lengthen the time required to obtain a sufficiently effective root system. It is strongly recommended not to space the plants and install in the final irrigation system before this phase is finished.
  This prolongation increases the **risk of asphyxiation** of the roots, watering is carried out from the top, the quantity of water given is not precise.

- **ADT > 20°C (68°F)** creates a risk of acceleration of vegetation growth, i.e. excessive foliage. Indeed the roots are not yet developed enough to allow the cyclamen the necessary transpiration to cool its foliage.
  This situation creates an unbalanced ratio between roots/foliage.

- The difficulty of controlling water amounts can lead to:
  - ✓ heterogeneity of the cultivation and appearance of large leaves, before settling into the final watering system
  - ✓ asphyxiation of the roots by re-absorption of stagnant water under the pots

2 – GROWTH PHASE (12 to 14 weeks)

Aim: develop a round structure and compact vegetation (dense, hard, and stable) until the desired dimensions are reached (homogeneous according to the pot size).

Good root system in ebb/flow

Good root system with drip irrigation

Constraints

- **ADT of 25°C/77°C and more** accelerates the growth, that prevents the vegetation to stay well structured and compact and prevents good root development. Then the cells grow too quickly and are soft. With such temperatures and too much watering, a dangerous spiral is set up in which the plant requires even more water and develops too quickly in relation to the roots, thus creating an imbalance.
  The bigger the amount of water is, bigger is the risk of asphyxiation of the capillary roots. Equally within this spiral, the quantity of water necessary for the excessive transpiration of such a vegetative mass cannot be absorbed by roots which did not develop correctly.
  Weak roots imply, in the short and long-term, increased risks of disease, deficiencies, burns…
  Another risk is the loss of roots. What are the principal causes:
  - ✓ irregular watering or too high water flow
  - ✓ a badly adapted substrate (draining too much or too heavy)
  - ✓ insufficient pot quality :
    - o see-through plastic pot
    - o terracotta pot that transpires too much
- **ADT < 20°C (68°F).** Under these conditions, the vegetation will not develop enough to cover the surface of the pot.
- **Too much humidity.** The extra-large cyclamen must be able to transpire correctly to cool its large vegetative mass. Too much moisture slows down this transpiration and also decreases the capacity for absorption of water by the roots. In this case the cells are fine, soft and the root development is insufficient and weak.
- **Flower removal**. Before the flowering phase some first flowers appear, the plant tries to flower. It is in fact a false flowering.
  It is important to remove these flowers so the plant can keep its energy for the vegetation and can continue to develop sufficiently. Moreover, these first flowers are generally of poor quality.

3 – FLOWERING PHASE (4 to 5 weeks)

Aim: Abundant flowering with straight, centered, solid, thick stems.
The flowers must be standing nicely above the foliage.

(*) ADT : Average Daily Temperature

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3 – FLOWERING PHASE (4 to 5 weeks) continuation

Constraints

- **An ADT *> 15 ° C (59°F)**. An abundant flowering requires an average of cool temperatures leading to a lower transpiration flow and a concentration of energy for the flowering plant. The larger the vegetative mass is , the lower the ADT* must be.
  Without this adapted ADT, flowering is slowed down, the stems are too thin, the flowers small and faded.
- **Light intensity too low**. It must be sufficient to allow the photosynthesis required for flowering.
- **Humidity level too high** represents a risk of Botrytis.

IV – SOLUTIONS IF ADT*IS TOO HIGH

1 – DURING ROOTING AND GROWTH PHASES

The objective is to put plants under conditions where their transpiration flow, necessary to their cooling, is reduced. It is thus important to increase **the shade** until reaching the levels of light intensity recommended in the following table.
The **control of water amounts** is essential. It must be split, i.e. more frequent, but with a lower level of watering each time. This control is difficult during rooting; the objective here is to keep the top layer of the compost, near the bulb, dry. During growth this makes it possible to limit the transpiration of the plant to the bare minimum, without risk of asphyxiation of the roots (see table "Watering and fertiliser").
Fertiliser will also have to be split according to the ADT* and the frequency of watering (see table "Watering and fertiliser").
Good **ventilation** is very important, particularly during growth, to evacuate moisture released by transpiration of the plants and to reduce the accumulated humidity in the greenhouse.

2 – DURING FLOWERING PHASE

The growth phase will be prolonged, awaiting for averages of temperature adapted to flowering and permitting to reduce shade. Do not forget the need for increasing light intensity as the days shorten. In the long term shade will be recommended only during the hottest hours, at the zenith.
The stripping of the first flowers will be also necessary.

V – SOLUTIONS IF ADT* IS TOO LOW

1 – DURING ROOTING AND GROWTH PHASES

The objective is to regulate the average temperature by reducing shade. During growth it will always be essential to adapt water amounts and respect the balance between quantity of water/fertiliser per watering.

2 – DURING THE FLOWERING PHASE

In this case it is recommended to maintain relative humidity lower than 85% in order to avoid saturating the greenhouse, which would present a high risk of developing Botrytis.
The **regulation of water** is a good means to fight against moisture.

HALIOS 17 – 22 CM (6.75-8.5")	ROOTING		GROWTH			FLOWERING	
Duration (young plant of 15 weeks)	6 - 8 weeks		12 - 14 weeks			4 - 5 weeks	
Temperature (ADT*)	<20°C (68°F)	>20°C (68°F)	<20°C (68°F)	20°C (68°F)	25°C (77°F)	15°C (59°F)	<20°C (68°F)
Maximum light (instantaneous reading)	400 W/m²	300 W/m²	500 W/m²	400 W/m²	300 W/m²	500 W/m²	400 W/m²

VI – FIGHT AGAINST EXCESSIVE RELATIVE HUMIDITY

To make a successful culture of extra-large cyclamen, good ventilation is essential. It allows active transpiration to cool their foliage.
Limiting water amounts to the strict needs of the plant helps to fight against excessive humidity.

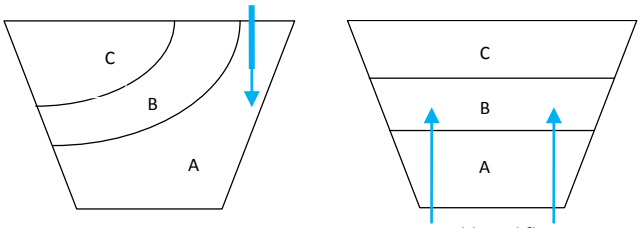

Roof and side ventilation, combined with the use of booster fans to create the largest possible air movement.

VII – WATERING CONTROL

The ebb & flow and drip watering systems are both adapted to the cultivation of extra-large cyclamen. On the other hand, we do not advise the use of the watering mat for pots Ø exceeding 17 cm (6.75''), in particular for climates of Southern European type (see our factsheet on "watering mat").

The cultivation of extra-large cyclamen requires an irrigation system as precise as possible. This implies homogeneity and well-defined doses to guarantee a limited root zone in constant balance with the demand for water during periods of heat.
A reduced root zone or a loss of roots can lead to imbalances and can cause diseases or deficiencies.

Representation of the roots zones according to the system of watering



Drip irrigation (recommended rate of 1 to 2 l/hour)

Ebb and flow (fast filling and emptying)

A = zone of active roots - B = zone of high transition with elevated EC.
C = dry zone without root

Root zone in drip irrigation

Root zone in ebb & flow

Example of risky ratio vegetation/root. Root zone too small to absorb the necessary quantity of water.

(*) ADT : Average Daily Temperature

EXTRA-LARGE CYCLAMEN (pots Ø from 17 to 22 cm / 6.75-8.5")

VIII – WATERING AND FERTILISER

The quantity of water and fertiliser must be adapted to the ADT* and to the maximum light in the greenhouse (see the table below).
The table below can be read as:
In growth phase with an ADT* lower than 20°C (68°F), maximum light of 500W/m² is recommended.

Under these conditions, it is possible to water 3 times per week, with a quantity of water from 100 to 150 cc per pot per watering, a quantity of nitrogen of 100 Ppm per watering and a ratio N/K_2O of 1/3.

HALIOS® 17 – 22 CM (6.75-8.5'')	**ROOTING**		**GROWTH**			**FLOWERING**	
Duration (young plant of 15 weeks)	6 - 8 weeks		12 - 14 weeks			4 - 5 weeks	
Temperature (ADT*) **average daily temperature*	<20°C (68°F)	>20°C (68°F)	<20°C (68°F)	20°C (68°F)	25°C (77°F)	15°C (59°F)	<20°C (68°F)
Maximum light (instantaneous reading)	400 W/m ²	300 W/m ²	500 W/m ²	400 W/m ²	300 W/m ²	500 W/m ²	400 W/m ²
Water amount per pot	Watering from above keeping the top dry		100-150cc	100-150cc	100-150cc	100-150cc	100-150cc
Watering frequency per week	1/2	2/3	*MAXIMUM REQUIREMENTS (as an indication)*				
			3	4	6	4	>5
Ppm N per watering	Basic fertiliser 1.5 Kg/m^3 Pg Mix		100	75	50	100	75
N/K_2O ratio	1/2	1/2	1/3	1/3	1/3	1/3	1/3

Data calculated for plastic or non transpiring pots.

1 – WATERING PROPORTION/FREQUENCY

The **amounts of water** advised here are given according to a **balance** between: flow of irrigation system/composition of substrate/pot type and its location.
It is recommended to maintain a stable root zone by always watering with a **constant amount of water**. It is the **frequency of watering which changes** according to the ADT* and the rate of transpiration of the plants.

2 – RATES OF LIGHT/TRANSPIRING POTS

It is possible to cultivate extra-large cyclamen with **higher rates of light** than those indicated in the table above. Such an approach creates very demanding conditions which require different **watering and fertiliser management**. Thus, in the case of cultivation in **transpiring terracotta pots**, this higher rate of light generates strong water losses through evaporation from the pot, brings a cooling effect to the substrate and produces a higher level of transpiration. Consequently, the demand for water is higher than stated in the above table.

3 – NITROGEN

Nitrogen (always in the form of nitrates) is the element of **reference** for the growth phase.
Doses must be fragmented according to the temperatures and frequency of watering. Its measured supply will allow active control of the **structure of the plant**. So, the role of potash in water consumption and its influence on transpiration rates becomes decisive in the success of voluminous, compact and stable plants.

Residual nitrates in water and/or very alkaline water require the use of acids such as nitric acid. It is therefore very important to make a **total assessment of nitrogen before fertilising**.

IX – RIGHT EQUIPMENT

1 – SUBSTRATE ADAPTED TO THE WATERING SYSTEM

in combination with the irrigation system , substrate composition plays a very important role. Whether ebb & flow or drip, it must have a chunky peat base (approximately 30% of fraction 20/40 mm -0.8-1.6'') in order to adapt to the large dimensions of the pots whilst avoiding asphyxiation of the roots.
In drip irrigation, it is necessary to add small percentages of "colloidal" parts (5 to 10% of frozen black peat or clay) in order to improve the lateral distribution of water.
In **ebb & flow**, it is necessary to consider using 10 to 15% of pearlite and/or coconut fiber in order to reduce excess capillarity and increase drainage.
Ask for advice from your suppliers.

(*) ADT : Average Daily Temperature

EXTRA-LARGE CYCLAMEN (pots Ø from 17 to 22 cm / 6.75-8.5")

IX –RIGHT EQUIPMENT (continuation)

2 – A POT ADAPTED TO THE WATERING SYSTEM

The choice of material for the pots and their design is also essential.
Terracotta, because of its transpiration, implies large water losses which therefore increase the amount of water necessary per watering. So the hydric stress can cause wounds to the capillaries which are glued to the transpiring pot.
As for **plastic**, it must be opaque to protect the roots from light.
With **subirrigation**, the design of the bottom of the pot is crucial to improve drainage. With **drip** system, lifting feet (raising up the pot) are necessary, in particular for cultivation on irregular surfaces. This way stagnant water under the pots will not be reabsorbed.

Basic design of ideal pot base in ebb & flow

Raised pot, avoiding the reabsorption of water

X – QUESTIONS/ANSWERS

1 – MOST CRITICAL PERIOD?

The period prior to flowering is most delicate and most critical.
In case of a prolonged period of heat with a significant vegetation having very important perspiration and no control on water requirement, an additional layer of leaves can develop and can strongly delay the flowering.

Foliage choking flowering

2 – CONSEQUENCES OF ROOT LOSS

If there is an unbalanced ratio between foliage/root system, root loss weakens the plant which is more likely to contract diseases. Moreover, the remaining roots can have more difficulty to absorb enough nutritive elements to nourish such a volume of foliage; deficiencies can then appear.
The loss of capillaries is often due to asphyxiation or hydric stress, a consequence of too much or too little water.
In order to avoid this excessive demand for water, it is advised to regulate the shade and the amounts of nitrogen according to temperature averages (see table "Watering and fertiliser").

Loss of roots

Leaf and flower burn

XI – THE CHOICE OF VARIETIES

With the **Halios® range**, **Morel genetic** is most adapted to the cultivation of extra-large cyclamen. In this series we have several lines with various potential for different pot size.

Best adaptability to pots Ø going up to 17 cm (6.75"):
The varieties which make up the compact mix (in particular the 2018 - 2039 - 2062 - 2075 - 2076 - 2124 - 2700 - 2910), the FANTASIA® varieties and the CURLY® varieties 2410 and 2507.

Best adaptability to pots Ø going up to 22 cm (8.5"):
The varieties of the winter mix (in particular the 2010 - 2051 - 2062 - 2071 - 2096 - 2125 - 2150 - 2290 - 2210), the 2015 - 2021 - 2127 - 2081 - 2620 and the CURLY® varieties.

(*) ADT : Average Daily Temperature

For more information, consult other technical information on www.cyclamen/professional area