# NITROGEN IN THE CULTIVATION OF CYCLAMEN AND MOREL GENETICS

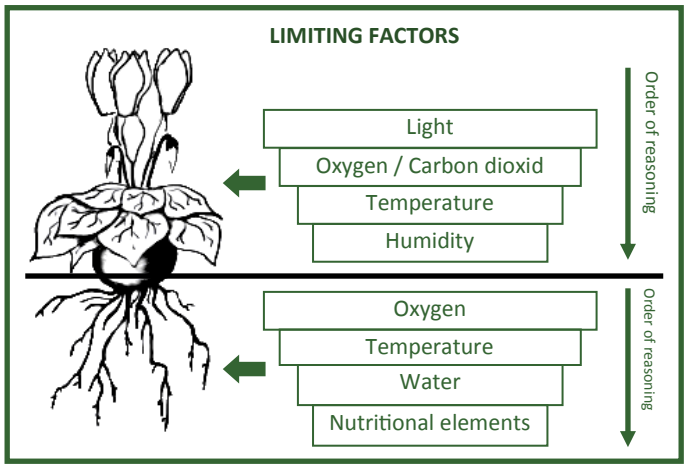
**Nitrogen plays a predominant role in cyclamen cultivation and must be adapted according to the different growth factors and the chosen genetic solutions.**

**What are these different factors and how do they interact with the effects of nitrogen?**

## I – VEGETATIVE GROWTH

### A - Limiting factors

The cyclamen's growth depends on basic factors. If some are lacking, growth is limited. It is important to prioritise these factors according to their limiting aspect as the plant's yield potential is determined by the most limiting element.




Light is the 1st limiting factor. If there is insufficient light it will be difficult to plan a cultivation. However, in most growing programs, light levels are significantly higher than those needed by cyclamen.
Consequently, we usually talk of maximum radiations or of % shade. Cases of insufficient natural light and cultivation requiring added artificial light are rarer.

### B - The balance and hierarchy of growth factors

Among the growth factors, some are more important than others and must be considered as priorities. Looking for the perfect fertiliser recipe is pointless if the basic elements such as temperature, light, humidity and water are not sufficient and balanced.

What is the **order of priority** of these elements?
It was presented in the growing recipe tables of the previous Extra-large cyclamen and Halios® HD TechNews factsheets. Always assuming sufficient light levels, the **first element** to consider is the **ADT*** in the greenhouses (for more details see the ADT* TechNews), **followed by light control**, then the irrigation which must be adapted to the temperature. The light is controlled thanks to the different shading techniques, the irrigation thanks to its frequency and the quantity of water provided with each watering.
An optimal balance between these elements enables the transpiration of the cyclamen to be controlled and results in compact and continuous but unforced growth, without any damage to the fragile root system.

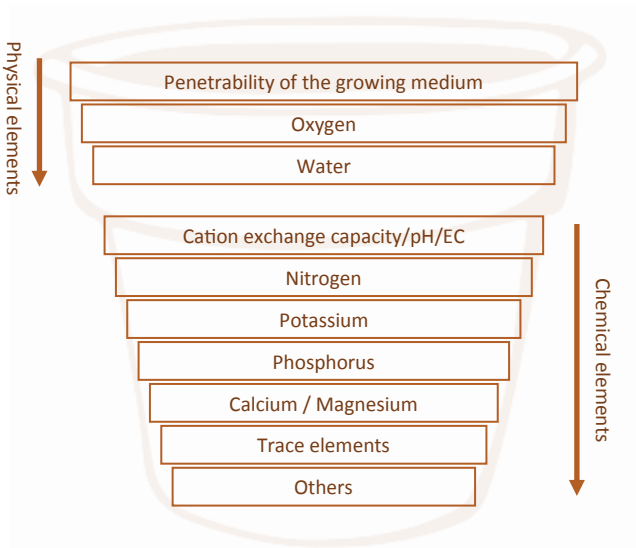
Humidity is sometimes difficult to control and the techniques to put in place can be expensive. However, precise watering can help to prevent excessive levels of hygrometry.

In the order of priorities, fertilisation should be the last factor to take into account because it can be easily adapted depending on the priority growth elements and the choice of the different Morel genetics solutions.

## II – NITROGEN AND FERTILISATION

### A - Nitrogen and the vegetative growth of the cyclamen

In the growing medium the main limiting factor, before water, is the availability of oxygen to the roots. Before considering the chemical limiting elements, it is essential to take into account the physical elements of the potting soil in order to ensure that the root system is able to breathe.




To obtain controlled growth, nitrogen is the most limiting factor of the nutritional elements, generally serving as a reference value with which the others must be balanced.
It acts as an accelerator or a restraint to growth in the cultivation of potted plants.

Due to its own physiology and its rate of growth, the cyclamen requires 50% less nitrogen than other cultivated species.

| Ornemental species | Nitrogen input in ppm per watering |
|---|---|
| Morel F1 Cyclamen | 75 to 100 |
| Chrysanthemum | 150 to 200 |
| Poinsettia | 150 to 200 |
| Vegetative petunia | 150 to 200 |
| Pelargonium | 150 to 200 |



*ADT - Average Daily Temperature - in greenhouse

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### B - The role of potash

Potash is another key element. It counteracts the nitrogen by acting on the opening and closing of the stomas thereby regulating the transpiration of the cyclamen in periods of high temperatures. N/$K_2O$ balances approaching 1/3 are recommended in order to obtain firm tissues, thereby improving resistance to various diseases.

### C - The different sources of nitrogen

There are 3 main sources: fertiliser, the methods to regulate pH levels and the residual nitrates in the drilling water.

- **Fertiliser**: whether it is in a compound or simple fertiliser, we recommend a nitrogen input in nitrate rather than ammonium or urea form which accelerate growth and the need for water.
- Nitric acid (HNO3) is used to **regulate the pH** of nutrient solutions when the water has a high level of alkalinity. If the level is too high it is recommended to use alternative acids such as phosphoric acid (H3PO4) or sulphuric acid (H2SO4) in order to prevent excessive nitrogen input from the acid.
- In some agricultural areas, the **drilling water** can contain high levels of residual nitrogen in the form of nitrates.

In order to determine the amount of nitrogen input which is really necessary, it is essential to carry out a full analysis of the water and an overall assessment of the 3 possible sources.

## III – NITROGEN AND MOREL

During the phase of vegetative growth, more or less nitrogen will be absorbed depending on the growing technique (ADT*/ shade/ water balance) and will have a different impact depending on the chosen genetic solution and the size of the pot.

The type of growth of the different series is summarised in the following table.

| | Growth *less reactive to Nitrogen* | Growth *more reactive to Nitrogen* |
|---|---|---|
| **Mini Flower** | Smartiz®<br>Metis® FANTASIA®<br>Metis® silverleaf | Smartiz® VICTORIA<br>Metis®<br>Metis® VICTORIA<br>Metis® PomPom® |
| **Midi Flower** | Tianis®<br>Tianis® FANTASIA®<br>Premium ABANICO®<br>Latinia® FUNFLAME®<br>Latinia® FANTASIA® | Premium |
| **Maxi Flower** | Latinia® SUCCESS®<br>Latinia® VICTORIA<br>Halios® FANTASIA®<br>Halios® VICTORIA<br>Halios® HD | Latinia®<br>Halios® silverleaf<br>Halios® BLUSH<br>Halios®<br>Halios® FANTASIA® silverleaf<br>Halios® CURLY® |

## IV – NITROGEN AND ADT* DURING THE GROWTH STAGE

The table below shows nitrogen values in ppm depending on different ADTs* (during the growth stage) and the genetic solutions. They should be taken into account when growing in standard-sized pots.

| ADT* / ppm N** | 15° to 18°C | 18 to 20°C | 20° to 25°C | > 25°C |
|---|---|---|---|---|
| Genetic solutions ***less reactive to Nitrogen*** | ≥ 100 | 75 to 100 | 50 to 75 | 25 to 50 |
| Genetic solutions ***more reactive to Nitrogen*** | 75 to 100 | 50 to 75 | 20 to 50 | 25 |

***Nitrogen doses expressed in ppm = parts per million or mg/litre*

**To sum up, the higher the temperature, the less nitrogen required whatever the type of genetic solution**.

BEWARE of sudden temperature changes. It is strongly recommended that you keep an eye on the weather forecast and adapt the nitrogen doses accordingly.

**Standard pot sizes per Morel genetic solution**

*For example, here, for a growth stage ADT of 18-20°C*

| Morel Solution | ∅ pot | Morel Solution | ∅ pot |
|---|---|---|---|
| Smartiz®<br>Metis® FANTASIA® | 9 cm | Latinia® SUCCESS<br>Latinia® VICTORIA<br>Latinia® | 12 cm |
| Smartiz® VICTORIA<br>Metis®<br>Metis® silverleaf<br>Metis® VICTORIA<br>Metis® PomPom®<br>Tianis® FANTASIA® | 10,5 cm | Halios® FANTASIA®<br>Halios® VICTORIA<br>Halios® HD | 14 cm |
| Tianis®<br>Premium ABANICO®<br>Premium<br>Latinia® FUNFLAME®<br>Latinia® FANTASIA® | 12 cm | Halios® silverleaf<br>Halios® BLUSH<br>Halios®<br>Halios® FANTASIA®<br>décora<br>Halios® CURLY® | 17 cm |

The flexibility of each solution enables varieties to be grown in smaller or larger pot sizes. The nitrogen doses should then be adapted.

## V – NITROGEN AND IRRIGATION

A basic principle to always bear in mind is that the nutritional elements are absorbed through the capillary roots. A good root system leads to better absorption of the nitrogen and other elements impacting directly on vegetative growth.
Root development is mainly linked to water management. Therefore, in order to obtain, on the one hand, the desired vegetation volume and on the other, the root/vegetation surface necessary for healthy plants, it is essential that the watering is both precise and adapted. More and more irrigation systems are now available and are becoming increasingly accurate: low-flow drippers, fast filling and draining ebb and flow systems, ultra-thin watering mats offering minimum flow rates.

Allowing the growing medium to get too dry between waterings can result in a lack of vegetation growth. Be careful if using breathable clay pots, as they allow around 50% of the water to evaporate instead of being absorbed by the roots.



**ADT - Average Daily Temperature in greenhouse*