



UNEXPECTED HEAT STRESS!

As a perennial species, when growing wild, *Cyclamen persicum*, native to the Middle East, goes through a cycle consisting of dormancy, owing to its bulb, growth, in autumn, and flowering, in late winter and spring. This explains this ornamental plant's difficulty in resisting too abrupt temperature increases.

In Europe and in the other regions in the world where cyclamen is grown, the climates can be very different, though **whatever the climate, your cyclamen is liable to go through a period of unexpected intense heat**. This diversity of climates ranges from the extreme North Atlantic, with cold summers, to zones in the southern Mediterranean, like the Middle East, with hot winters. Nevertheless, in autumn, at latitudes of 30-50° north or south, a heat wave can always occur unexpectedly, affecting the quality of your cyclamen crop.

Today, as a cyclamen grower, you generally have **the means to deal with an unexpected heat stress** so as to achieve an optimum plant quality by acting on different levels, e.g., **use of new varieties, changes in shading and ventilation methods, more accurate irrigation, adapted substrate and better fertilization recipes**.

Nonetheless, in spite of the experience and the available technologies, heat can occur when you expect it the least, whatever the climate, particularly in autumn. This unexpected rise in temperatures is often the cause of a loss of quality, *favouring* the outbreak of diseases such as *Phytophthora*, *Erwinia*, etc...



Crops after undergoing a «heat stress »!



1- LET US SPECIFY WHAT «HEAT STRESS» IS

Levels of light:

The maximum daily light radiation for cyclamen must range from ; ~ 2,500 fc (300 w/m² , 25,000 lux) to ~ 5,500 fc (600 w/m² , 55,000 lux), it depending on the average daily temperature (ADT), crop stage, kind of pot (terra cotta or plastic) and also on the buffer effect of the substrate.

Levels of temperature

In order to ensure regular and appropriate growth without alterations in the crop, **the ADT* must range between 50 to 68 °F.**

When the ADT exceeds 77 °F, the crop is considered to be at risk of heat stress.

Check ADT Technews:



2- CONSEQUENCES OF A SUDDEN INCREASE IN TEMPERATURE

Under all types of climates, the temperatures can fluctuate and affect your crop more or less seriously.

The consequences of excessive heat conditions are:

- Growth acceleration that is difficult to control.
- Difficulty in managing irrigation:
 - In case of hydric stress, the substrate loses moisture. This affects the capillary roots, which get dehydrated.
 - In case of excessive irrigation, the growth accelerates and the risk of root asphyxia increases.
- Physiological disorders such as burns or deficiencies.
- Proliferation of diseases in weakened plants.

A plant too large for its pot and at an advanced stage will be less resistant to heat than a small plant at the initial stage. The more advanced the crop cycle, the more irreversible the damage can become. Heat causes the plant demand for water and leaf transpiration to accelerate, while there is a decline in the capacity of water absorption by the damaged roots. Then, the tissues get thinner and soft, and the roots weaken, which causes much stress to the plant.



3- WHAT ARE THE SYMPTOMS? HOW TO ANTICIPATE?

a. Root loss



An unexpected raise in temperature causes intense evaporation of water from the substrate. This, combined with insufficient shade, can weaken the capillary roots, which get dehydrated.

The progressive or sudden loss of capillary roots is the result of inappropriate irrigation management when faced with a temperature increase (plant on the right).





SOLUTIONS !

When in hot weather, begin by:

- **Irrigation control** by lowering the volumes of water, but increasing the frequency.
- **Shading** by "whitening" the greenhouses with paint or lime or by using sun filters.

Previously, to develop a healthy and abundant root system :

- **A balanced substrate** with good buffer effect.
- **Rooting stage feeding** control: only use "starting charge fertiliser"
During this phase, use only the starting charge fertiliser in your substrate and water with clear water
ROOTING Technews : 
- **A white pot** (ex: thermoformed/black inside), **so as to reflect the light better**.
In fact, if hot periods are expected, avoid black pots, since they attract extra heat that is harmful to roots.
For further information on the choice of pots, our TechNews on POTTING: 



b. Excessive foliage and flowers at the level of the leaves



The unexpected occurrence of high temperatures at the flowering stage entails several consequences: **the plant swells and then the growth gets impeded**, the flower stems are hardly above the foliage. Then, growth restarts and there appears a crown of supplementary leaves. As a result, there is a **significant loss of crop quality**: plant weakening, softer plant habit, exposure to diseases and shorter shelf life of the plant.



SOLUTIONS !

In order to avoid the above abnormalities, **it is recommended to anticipate the weather forecast as accurately as possible** (1 week to 1 fortnight). For anticipating a rise in temperature, you can **increase shading so as to decrease the demand for water and nutrients**. It is also necessary to **reduce the concentration of fertilisation**.

With regard to **shading**, you should do **whitening on the greenhouses** with paint or lime, which, apart from limiting the temperature increase, improves the diffusion of light, this resulting in better quality of finished plants.

c. Burns on leaves and flowers



A high level of light and high temperatures can induce the loss of roots and an increase in the demand for water. Such combination of factors causes **burns on young leaves and flowers of adult plants**, which is provoked by a disbalance between the higher demand for water and the difficulty in supplying water and enough nutrients to the affected roots.



SOLUTIONS !

In the same way as for root losses or excessive growth caused by heat, **it is necessary to manage the shade and control the irrigation so as to avoid burns.**

Such burns are also common after the removal of the whitening paints or the sunscreens, and also when the shading periods are drastically reduced. **A more cautious and calculated decrease in shading, associated with good knowledge of the climate, can prevent these burns.**

d. Diseases

Phytophthora sp



Erwinia sp



A cyclamen crop exposed to stress caused by heat with significant loss of roots can be easily infected by the diseases that affect this species.




SOLUTIONS !

Although preventive disinfection can minimise risk, avoiding any risks of stress is even more effective!

The most common diseases related to stress caused by a heat stress are *Phytophthora sp.*, *Erwinia sp* and, to a lesser extent, *Fusarium oxysporum*. In our previous Technews, we detailed the symptoms and means of prevention of such diseases.

Phytophthora TechNews: 

TechNews Erwinia : 

TechNews Fusariose : 



4- YOU CAN ALSO CHOOSE YOUR GENETICS!

As you cannot change your climate, you can change the genetics. In Morel, our range of varieties has evolved to meet the needs of the different markets and climates throughout the world.

For several years, **we have been selecting varieties that are suitable for difficult conditions, such as intense heat** at flowering stage.

We offer you the best range of products adapted to heat conditions. Indeed, our geographical location in southern France gives us the opportunity to select varieties even more adapted to high levels of light and high temperatures. **For generations, we have selected the most resistant plants**, which confers **our genetics its particular vigour and power of adaptation to different types of stress, particularly heat stress**.

The intense luminosity of the South has also led us to **select the most vivid colours**, which you can appreciate in our range of varieties.

Morel's varieties more resistant to heat:

There is a series in each size that offers you the best guarantees for sales of early season with high average temperatures.

For growing **mini cyclamen**, our series **SMARTIZ®** :



Available:
6900 SMARTIZ® mix
or separate colours

For growing **midi cyclamen**, our series **TIANIS®** :



Available:
3970 TIANIS® SUCCESS mix
or separate colours

For growing **large-flowered cyclamen**, our series **LATINIA® SUCCESS®** :



Available:
1971 LATINIA SUCCESS® mix
evolution or separate colours

METIS®/SMARTIZ®

Access the TechNews on Metis/Smartiz :













SMARTIZ®

Ideal sales period for climate type











Pot Ø in.	South				North				Advised ADT ^(a) at flowering stage in greenhouse	Plants yard ²	Culture time from sowing
											
Smartiz® FANTASIA®	2.5"								54° ~ 59° F	46	29 ~ 31 weeks
	3.5"								59° ~ 68° F	38	
	4"								68° ~ 77° F and +	30	
2.5 ~ 4" Ø Smartiz® VICTORIA <i>The VICTORIA characteristics are more pronounced when days are long 100% VICTORIA flowers</i>	2.5"								54° ~ 59° F	42	27 ~ 28 weeks
	3.5"								59° ~ 68° F	34	
	4"								68° ~ 77° F and +	25	

TIANIS®

Ideal sales period for climate type











Pot Ø in.	South				North				Advised ADT ^(a) at flowering stage in greenhouse	Plants yard ²	Culture time from sowing
											
4 ~ 5" Ø Tianis® FANTASIA®	4"								59° ~ 68° F	21	30 ~ 32 weeks
	5"								68° ~ 77° F and +	17	
Tianis®	4"								59° ~ 68° F	21	27 ~ 29 weeks
	5"								68° ~ 77° F and +	17	

LATINIA® SUCCESS®

Ideal sales period for climate type



Pot Ø in.	South				North				Advised ADT ^(a) at flowering stage in greenhouse	Plants yard ²	Culture time from sowing
											
Latinia® SUCCESS® and Flamed mix	4"							(b)	54° ~ 59° F	17	28 ~ 30 weeks
	5"								59° ~ 68° F	13	
	5.5"								68° ~ 77° F and +	12	