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Average daily temperatures of 20 °C or more prevent etiolation and accelerate the growth of young shoots that will bloom in 18 months' time.

Cymbidium production forecast

The summer in the Netherlands and Northern Europe was exceptionally hot, with two heat waves that will have a major impact on production from now until next spring.

The high temperatures will cause delays to flowering, especially at growers with no or insufficient cooling (with a mist installation). For more, read the article about 'Humidity, the options' on pages 8 to 9. The time that the flower branches remain in place is directly related to the level of insufficiency in the cooling (due to no cooling or systems unable to cope). This delays etiolation, and consequently flowering.

Average daily temperatures of 20 °C or more block etiolation and accelerate the growth of young shoots that will bloom in 18 months' time. As a result, the plants that should have flowered before 1 November might only bloom in November, and the plants intended to be in bloom at Christmas may also be delayed at these growers. There will also be major differences between plants at the same grower. Moreover, a number of growers will suffer lower production in the early range due to flower branches drying out. Quality will also be lower, with more anther caps, red flowers and drying of the upper buds. This will not have any influence on the production of the mid and late ranges before the flowering time.

At the time of writing, this is not expected to be high. More branches, but in many cases a lighter quality, fewer heavy branches, and fewer flowers per branch. It is quite possible that more losses in plants will occur. We've already observed this in a number of cases. It's caused by a combination of high temperatures, lower humidity, and the use of less suitable irrigation water, such as tap water. This causes the EC in the pot to rise, especially where the substrate is in contact with the air at the top. Species that are not unable to withstand this high EC suffer burned roots, and when the conditions causing drying out change (dark, rainy weather, autumn) and humidity increases, the burned area of the root at the base of the plant (bulb) will rot. This can cause an attractive plant to wilt from one day to the next. Attractive plants grew better, evaporated more, and consumed more water. The higher EC of supply water reinforced this process. This will not affect, or barely affect, growers with efficient cooling. In addition, it will be rarer at growers with sufficient irrigation water, and where clean water is sprinkled from above from time to time.

Early range, flowering in September/October

This range has finished flowering, or is about to. The cooling period for branch growth has arrived. The average daily temperature must be kept at 12.5 to 13 °C for a period of at least 90 days, but preferably 100. Spacing branches, cleaning etc. must be carried out at the beginning of the cold period, not at the end, to avoid production losses.

The plants must be left where they are for at least 1 month before the average 24-hour temperature is raised to 20 °C in late January to mid-February. If it's warm outside during the cooling phase, try to keep the plants active. One thing to take into account is approximately 3 litres of evaporation per m²/week. Give clean water (or maximum 0.25 EC) during the cooling period. Always test the EC, pH and quantity of drain water!

The average daily temperature of the plant and surroundings must be raised to 20 °C from the end of January at the earliest until St Valentine's Day. If you start a few weeks later, yields improved and flowering is slightly delayed, but it's important that the desired average temperature is reached. If the daily, weekly, or monthly average is less than 20 °C, the plants will flower later. You won't notice anything if it's hot in March to April, but these months are notoriously unpredictable.

That can mean cold snaps, in which case you'll have to leave the heating on if you want plants to flower on time. A perforated AC foil screen makes it easier to raise the temperatures of plants and greenhouses in the January to March period, especially if it's cold, and also saves a lot of energy. Close the windows mid-afternoon to trap the heat and save energy.

Christmas range

The Christmas range must be treated in the same way as the early range, except 2 months later. This range must be ready by St. Valentine's Day. Any delay leads to production losses, which will increase in line with the length of the delay. This will only become more acute if the weather is good in March (much more light and much lower humidity).

In the first 2 weeks after moving Cymbidium, the plants always evaporate up to 50% less than normal. From early April onwards, the average daily temperature must also be 20 °C, so heating will also have to be used it the weather is cold or wet.

Pay close attention to water consumption in the coming period. There are cultivars that flower around Christmas, and absorb a lot of water during etiolation. If you're a 'dry' grower and it's sunny, you will have to incorporate an extra round of drip irrigation, otherwise, the branches will suffer moulting. If you're a 'wet' grower, then it's better to skip a round of drip irrigation in mild, rainy weather. Measure the supply and drain water weekly; check the EC of the drain water from different species. You can also check if the EC of the drain water is rising. If it is, it means the plants are absorbing less nutrients, or none at all, so lower the EC!

Late range

The late range must now be heated with a daily average of 20 °C to 21 °C. For really late flowering plants (June to July), this must be maintained until Christmas, and some growers might even continue until early to mid-January. Growers who can also achieve the right climate during flowering in June, through cooling or otherwise, can achieve high-quality branching at high temperatures.

"Ventilate and heat in good time"

This is possible with higher greenhouses with a mist installation and/or external screen, but if that is not the case, the risks are high. Excessive daytime temperatures will result in accelerated flowering, smaller flowers, and brighter colours. The temperature must be reduced gradually over 10 to 14 days. The temperatures can then drop to 8 to 10 °C, depending on the weather and the humidity. When the temperature drops below freezing, it can easily be lower than 10 °C without any problems. The evaporation is more than sufficient in these conditions. If it's unusually warm for the season, then you'll have to switch on the minimum tube for 60 to 90 minutes each day to activate the crop, in addition to ventilating well.

It keeps the roots healthier. The water temperature must be at least 12 °C.

Mid range

The mid range will build up cold for flowering for the following year during etiolation and the flowering from November. This process is virtually 'natural'. Easter is in the 2nd week of April, so you can try to advance production expected in mid-April by 2 weeks. That should be possible.

You can also decide to leave the range, or part of it, for Mother's Day. If you'd like some ideas or suggestions about this, please contact us.

"Over the coming period, pay close attention to water consumption"

The crop in the late range can still absorb a lot of nutrients until mid-January. If the EC of the supply water is 0.7, the drain water can easily have an EC measurement of 0.4. If the level of the EC drain increases, reduce the EC by 50% immediately! Check the EC and pH levels of the drain water of various species weekly, and make sure that the plants evaporate around 2 to 3 litres /m²/week on average. That is equal to the amount on an average summer's day!

Humidity

Over a year, there are two main points regarding humidity regulation in the greenhouse; too low in spring-summer, too high in autumn. From the end of July to mid-August, an active humidity policy is necessary. That means ventilating and heating in good time. Keeping the greenhouse closed as much as possible to achieve good quality with as little gas as possible per m² is not an option, as it compromises quality!

Therefore, ventilation lines are required on or under the heating lines. When the temperature drops outside and you need a thicker coat, you will automatically use more heating and most of the climate problems will disappear. In freezing weather and/or a northeast wind, the humidity in the greenhouse can become too low. In these cases, the "switch" must be set back to "save humidity". That means less ventilation and keeping screens closed (more pinching) to maintain humidity levels in the greenhouse. AH (absolute humidity) can be a good tool to check the difference between indoor and outdoor humidity, and to adjust the heating and air control system accordingly.

Phalaenopsis
Autumn and winter cultivation tips

Research has shown that if there's less than 9 to 10 hours of light, there's not enough light for plants to photosynthesise efficiently.

The summer in the northern hemisphere is over, and excessive light peaks are no longer a problem from around week 40 onwards, or at most between 12:00 and 14:00 on sunny days during cultivation week 1. As a result, these higher light levels, if they exist, can be allowed to enter the greenhouse more easily to achieve a certain amount of light. After mid-October, the natural light is so low that there's not enough natural light for most crops, and artificial lighting is required.

Due to the lower radiation from outside, the lamps will have a much greater influence on cultivation in the coming months. Consider preventing salting of the upper layer by turning on the lighting for more hours. Refresh completely with clean water regularly. That refreshes the roots and the top layer of the pot.

In the past, before we used lighting, week 39/40 was known for branching. These usually occurred in or after week 40, because as the days get shorter, the plants become more sensitive to fluctuations in temperature and light. Bear in mind removing chalk, 25 to 40% more light. Lower outside temperatures and therefore also lower greenhouse and plant temperatures.

"The plant makes more photosynthesis products, so it can grow better"

Lighting lengthens the day, which reduces the tendency for branching. However, if the heating system or lighting fails and the temperature drops too much, it can easily occur again. This sensitivity disappears slowly after the New Year.

Research has shown that plants need at least 9 to 10 hours of light to photosynthesise efficiently. If you turn on the lights at 01:00, it will be 10:00 or 11:00 nine or ten hours later, at which point there will be more natural light. So, at the moment you get more free natural light, the plant uses it much less. Then it is wise to switch on the lights a few hours later, and save money. The plant makes more photosynthesis products, so it can grow better. Lighting for more than 16 hours a day is not effective. It's better to start at 05:00, and allow more natural light in during the day. After 15:00, natural light decreases quickly, and the lights can be switched off at 18:00. That means 14 to 15 hours of light per day. If the lighting capacity is low and the sky is very cloudy, it's better to maintain 16 hours of light per day.

In the winter, reducing the amount of nitrogen or calcium in the supply slightly to make the plant hardier is not a bad idea at all. That can be done by replacing a few kilos of mixed fertiliser with calcium nitrate. The EC can also be varied throughout the year. Another important factor is urea. That can be reduced by 30 to 50% in the autumn/winter by replacing part 20-20-20 with, for example, 7-11-27.

The plant temperature in the autumn and winter is very important, and it's particularly relevant to know minimum temperatures. It's especially important to avoid excessive cooling of the plant when the lamps are switched off at the end of the afternoon. This can be done by increasing the pipe temperature, closing screens and/or windows in good time, etc. Also, remember that your irrigation water should not be too cold (at least 20 °C). Try to make sure that the temperatures of the pot, leaf and greenhouse are similar to each other.

Phalaenopsis suffers little from pests, but attacks by caterpillars and thrips can occur regularly in the autumn. Both pests can be clearly identified by catch lamps and catch plates. Check these regularly so you can intervene in good time. This will allow you to better understand the attack plants are suffering. Thrips can be a major problem since they cannot be reached with pesticides in the flower buds.

"It's especially important to avoid excessive cooling of the plant when the lamps are switched off at the end of the afternoon."

No adequate measures against Lyprauta (potworm) have been found yet. What still works best is: cultivate with less water! In the beginning in particular, try treating the area against mosquitoes. Some growers of a number of exclusive orchids have switched to finer mixtures in which mosquitoes can no longer fly. This has considerably minimised damage by the Lyprauta.

"What still works best is: cultivate with less water."

Adrie Smits
Cultivation Adviser
Phalaenopsis, Cymbidium
Miltonia, Odontoglossum

In the past few months, we've experienced some extreme days in the Netherlands in terms of temperatures.

Humidity as a control mechanism and an important growth factor.

This year saw the highest temperature ever measured of more than 40 °C. At this temperature, air can contain 54 g of water per m^3 at 100% RH. An RH of 35% during the day means there is only 18 g left. The humidity difference represents 36 g of moisture that can be extracted from the plant. We know that when the stomata are closed, water is still extracted from the leaf, even in the case of Phalaenopsis, If you got out of the car in Death Valley and went for a walk without drinking first, you would rapidly pass out due to the lack of humidity.

The stomata of Phalaenopsis open in the afternoon at most growers cultivating this plant. With such a large humidity deficit, the stomata close to limit dehydration. This stops the plant absorbing the CO_2 it needs for photosynthesis the following day. If the circumstances improve later in the day, some CO_2 can still be absorbed. However, CO_2 absorption is almost certainly insufficient. This automatically places limits on the light the plant can handle the next day. The stomata of Cymbidium, Miltoniopsis and Odontoglossum also close when the humidity is too low.

"The best advice is: limit the total amount of daylight"

In addition to the plant losing moisture, the plant will be unable to photosynthesise if the greenhouse temperature is too high. On the other hand, every degree increase in temperature will increase the amount of sugars a plant burns. With C-3 plants that normally grow during the day, the stomata have to open to absorb CO_2. This means that the plant's sugar reserves are rapidly depleted on these hot days.

A lack of photosynthesis products has a negative influence on the formation of flower branches and flowers. Basically, these crops have difficulty coping with light after a day of extreme heat. The best advice is:

limit the total amount of daylight, and take into account that the plant will be struggling at the end of the day. It's better for it to be too dark at the end of the day than too light! Even better is to lower the greenhouse temperature and increase the air humidity with high-pressure mist. Some Cymbidium growers maintained greenhouse temperatures around 30 °C with much more favourable humidity. In this case, the greenhouse must have a good screen installation and a good layer of chalk. At this temperature of approximately 30 °C, a Cymbidium stops evaporating and photosynthesising.

For most crops, the stomata open more when the humidity is right. That allows more CO_2 to be absorbed and more sugars to be produced. In addition, a number of orchids are able to produce more stomata per cm^2 of leaf on newly formed leaves, and with some crops the stomata are also larger in the presence of higher humidity. This offers the plant more possibilities to cool itself better, and absorb sufficient CO_2. This in allows the plant to develop better,

and it is a vegetative action. Note that when extra food is added, this is also a vegetative action. Ultimately, this can easily reduce generative control. It has been shown that strong vegetative growth in both Phalaenopsis and Cymbidium can be detrimental to flowering if this is not responded to in time or insufficiently. The best advice here is to apply an extra generative action in the form of more light. Light is a generative action.

Balancing growth and flowering, with Phalaenopsis as an example:

Bloom		Growth	
Light	more than growth	**Light**	vanaf 3 mol/dag
Temperature	18-25°C	**Temperature**	>26°C
Insufficient humidity	6-10 gr/m^3	**Insufficient humidity**	4-6 gr/m^3
Nutrition	12-14 mmol/l N	**Nutrition**	>14 mmol/l N
Water	limited	**Water**	plenty
CO_2	800-1.000 ppm	**CO_2**	depends on RH and light, among other things.