

# BREEDING BUSINESS

*Floricultura, breeding your success*



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ORCHIDACEAE

Don't miss this:

*"Phalaenopsis  
in the plug!"*

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## Phalaenopsis in the plug!

*Sorting increases uniformity, size and maturity*

After a lot of trial and error over the past years, we switched to delivering young Phalaenopsis plants in plugs. We are continuously improving the plug and tray system to provide the client with a better product. Always true to our slogan: 'breeding your success'. The fact that recent improvements of the plug and tray system did not yet show in the plant material quality, was not due to 'the plug' but to a different cause. The good news is that we have now tackled the problem and the plug and tray system has the level that we aimed at.

### Starting in 72-hole tray

We opted for starting in a 72-hole tray, then sorting and transferring to a 50-hole tray for reasons of past experience (the community effect) and advancing insight gained from test results. Starting point is to deliver a plug with sufficient roots, plant size and maturity. Plants must not only be sufficiently tall (have size), but also sufficiently mature to be able to perform satisfactorily at the client's. The switch from cuttings tray to plug resulted in an accelerated growth so we could deliver plants younger than before. We start in the 72-hole tray because of the initial development,

but after some time the plants must be spaced out. By sorting them at that moment and giving them more space in the 50-hole tray, the plants can gain much more maturity at our nursery. Now that we have solved the problems and the plant stock is back to normal, we can ensure that we ship the starting material with sufficient roots, maturity and size. For many years we placed our young plants in community trays with 63 plants per tray. In the 90s, we investigated whether it would be better to switch to 40 plants per tray. Then we could deliver larger plants to the clients and that allowed them to leave the plants longer and pot them at a larger size. That would shorten the cultivation period in the 12 cm pots and promote the initial development.

### Community effect

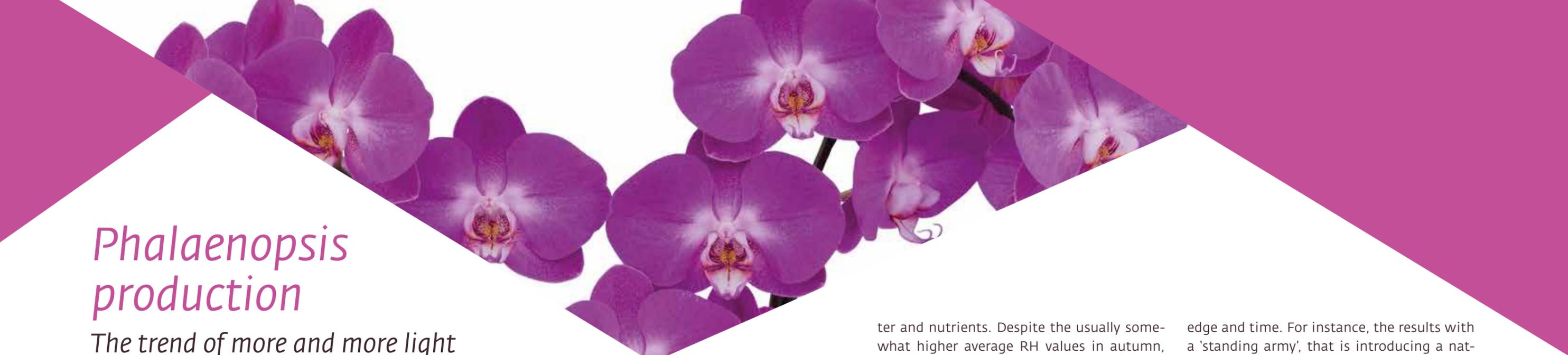
It appeared from the tests carried out at the time with different numbers of plants per tray, that the highest growth rate per plant measured in size and fresh weight, was realised in the system with the highest community effect (happy together)! When for instance Phalaenopsis plants are planted too far apart, the development is arduous and slow. The community effect improves the microclimate and speeds up the start. This insight, results from more recent tests with various tray and plug combinations in our effort to deliver uniform plant material, brought us to the system that we now use. We start from the flask in 72-hole trays. When the plants are large and mature enough, we sort them as uniformly as possible in various grades in 50-hole trays. Because the young Phalaenopsis

plants have sufficient space above as well as below the ground in the 50-hole tray and after sorting the roots will not stick to the tray, growth disturbance after potting at the client is avoided. After sorting, we give the plants ample time to gain sufficient size before we deliver them. After potting at the clients, the roots will sooner be visible on the outside of the pots and develop uniformly.

### Most clients opt for 50-hole tray

Over an extended period, we also tested a 60-hole tray as a final tray, in addition to the usual 50-hole tray. Clients who have seen both trays, prefer the 60-hole tray on first sight. However, when looking closer at the plants and also assessing plant size, roots, maturity etc., the preference still shifts to the 50-hole tray. That is mainly because more light (in winter) and space can be offered.

Unfortunately, and that really hurts, until recently we failed to deliver good quality material because of cultivation problems due to inferior water quality. Since a few months, the problems are behind us and that shows in the quality of the plants we currently deliver. We are convinced that now, like before, we can deliver the varieties that bring you the highest yield!



# Phalaenopsis production

*The trend of more and more light seems to be shifting*

## Light in production

Currently, the trend of more and more light in the production of Phalaenopsis seems to be shifting. Maybe we are now close to the maximum or perhaps we were even producing 'on the edge'. Various tests that are still running show that it is possible to give substantially less light without affecting plant quality and growth. Now we must wait and see whether it still has an influence on flowering abundance. What did appear from various completed trials is, that when stomata open, sometimes already early in the afternoon, it is not recommended to keep the light at the maximum (dependent on the installed power) or to let much (sun)light in. The plant still utilises some light, however, excessive light quantities (for instance more than 100 PAR) are not used efficiently.

Higher light sums are realised by a longer day length and by allowing higher light levels. Particularly when switching on the lamps early in the morning (just to achieve the light sum in autumn and winter), a plant can already get in a state of 'depression' early in the afternoon. Using more growth lighting increases the leaf temperature and the VPD will get higher around the foliage. It appears that in the second half of the afternoon, it is harder for the plant to evaporate. By the way, this also applies in other seasons.

## Depression

Depression occurs when the stomata open during the day (so when the malate has gone). If at that moment the RH is very low (that may happen in cold weather and frost), the CAM plant Phalaenopsis will protect itself from dehydration by closing the stomata again. The plant temperature will then increase, the assimilates built up by the plant until that moment and the thermal energy released in the process, cannot be transported and are lost. This is a waste of energy, after all, something has been produced that cannot be put to use. At first sight, no change in the appearance of the plant can be observed. Up to a certain level the plant can handle an increase of light. But when the plant is insufficiently able to handle the additional light, the foliage will show the negative consequences after two to three days. At first, light utilisation improves, the photosynthesis yield then still improves. Grow-Watch results shows that from the electron transport (ETR). The next stage during which the higher light level is maintained for too long, an adverse light load may occur for the plant. In turn, this can result in light damage and foliage damage. In practice this can be observed from the leaf edges, leaf spots and light-green but also dull leaves. In that case the plant hardly does not make use of the CO<sub>2</sub>, lighting, temperature and uptake of wa-

*"Plant already in a depression early in the afternoon"*

ter and nutrients. Despite the usually somewhat higher average RH values in autumn, care should still be taken at lower RH values in the afternoon when stomata are open. But not only when the stomata are open. The leaf thickness meter shows that at suddenly dropping RH and closed stomata, the leaves become thinner because they still evaporate moisture. That is caused by the fact that the stomata are never all closed for 100%. Controlling the RH, for instance by regulating the moisture deficit, makes it easier for the plant to handle light. Improved control at more light will improve the light utilisation and the transport in the plant for uptake and evaporation remains unaffected.

## Rise of thrips

In the autumn, caterpillars often cause more problems than in the rest of the year. Still, in 2016 we already had caterpillar problems before week 30. Light traps and pheromones can help with scouting and to (minor) degree with controlling. When switching on the lights, be aware of the periods when screens and ventilation windows are open. After all, moths/butterflies and insects from outside could be attracted. Fortunately, Phalaenopsis is not a 'very tasty crop' for insects. Yet we have witnessed an increase of particularly thrips in recent years. When in doubt, have the thrips identified to be able to take suitable measures. Particularly when using natural enemies this is of great importance. In many cases a specific enemy is required for a certain pest insect, in this case thrips. We hear positive stories about organic crop protection in several crops. However, it often requires investment of money, energy, knowl-

edge and time. For instance, the results with a 'standing army', that is introducing a natural enemy before a pest insect appears in great numbers, can be called encouraging.

## Watering frequency

Evaporation decreases in the autumn. So, make sure the drying time does not become too long and adjust your litres to ensure that the watering frequency does not become too low. Experience and studies have shown that a watering frequency of 1x per 4-5 days results in the best growth and the lowest waste (this depends on the substrate you have chosen). This is not just an old preconceived notion, it has proven to be a tried and tested formula over the years. It is not without reason that vegetable growers were quick to adjust and make sure their rockwool mats would not get too wet. They stop watering in the afternoon, in many cases night watering is completely cancelled and, on top of that, the water amounts are reduced.

# Miltoniopsis

## Effect day length variation; continued

Over the past years, we had various investigations carried out at our test departments in Miltonia with the purpose of optimising shoot and spike formation. Shoot formation is particularly high on our priority list. First of all: how do we get shoots on the plant when we want it and what must we do to ensure that preferably just 2 shoots are developed, and then also of the same size. That is the only way to produce a nice plant with 3 or 4 spikes, while the spikes also flower at the same time.

Spike development is best on young shoots of some 10-12 cm long while cooling by day to 20°C and by night to 16°C with a 12 hours day length. The first real breakthrough was achieved by raising plants at a constant day-neutral day length (12 hours day and 12 hours night) and increasing the day length by about 3 hours when the pot is fully rooted. That resulted in more shoots in most varieties, up to 80% plants with 2 shoots. See Newsletter 2015 spring pages 7-9.

### Effect of shoot branching

A follow-up study in 2015 looked for the moment where the effect of shoot branching was best. Also refer to Newsletter April 2016 pages 4-6. Since growers do not have smaller sections to carry out these treatments properly, growers asked us if we as plants supplier can make sure that the young plants we deliver already have initiated the shoots. That would make life much easier for the growers (temporarily), by potting, growing, cooling and flowering plants with shoots. We carried out a test with plants of the same variety, giving plants in the 52-hole tray, plants that had just been potted and plants that were fully rooted in the 12 cm (some 12 weeks potted), 12 weeks with 12 hours day length. Then we increased the day length by 3 hours to 15 hours for 8 weeks and subsequently placed them back to 12 hours. The test made it clear that the best effect was realised with firmly rooted plants. But to our surprise, some varieties did not respond by producing shoots after day length increase (they were not visible after 8 weeks). Yet when the plants were placed back from the 15 hours day length to 12 hours, they responded very strongly by producing shoots. We had not expected that. On the contrary, most varieties did respond from Short to Long.

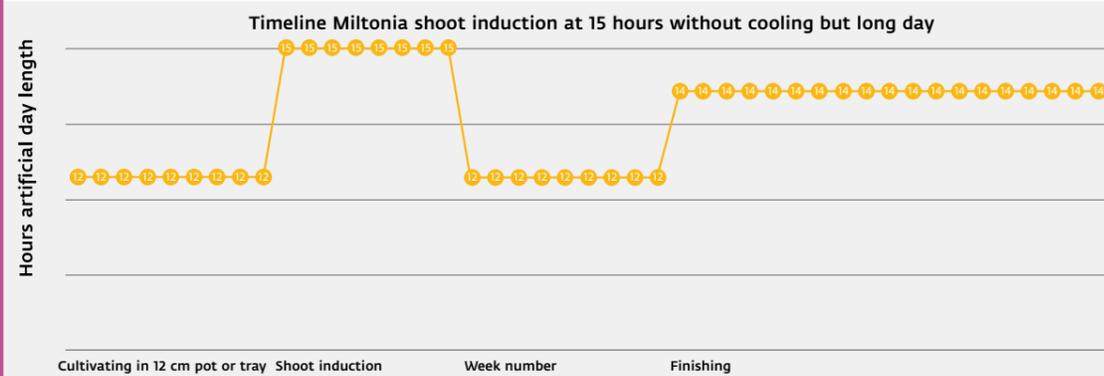
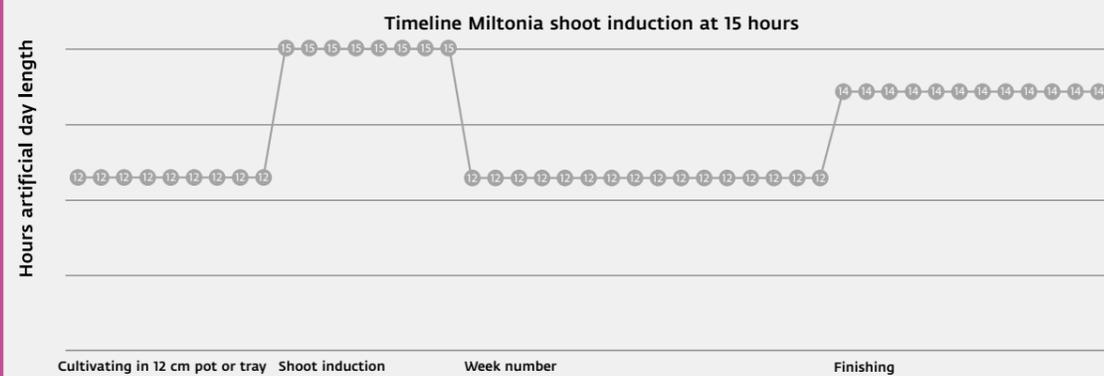
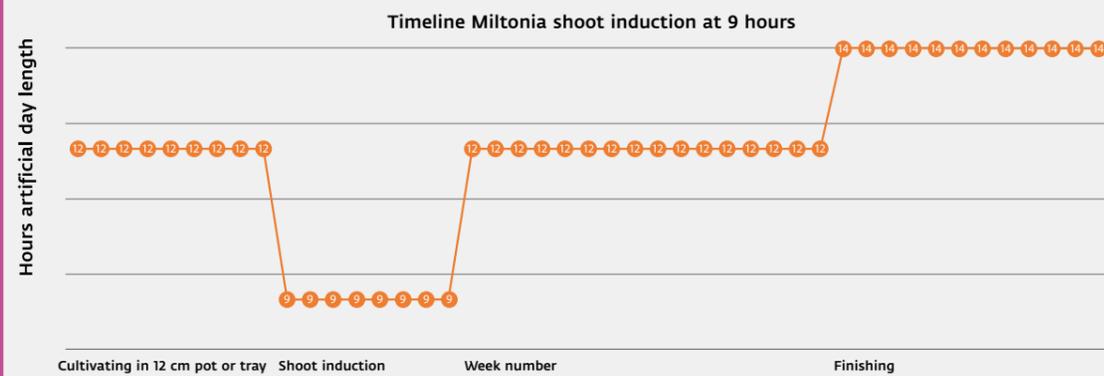
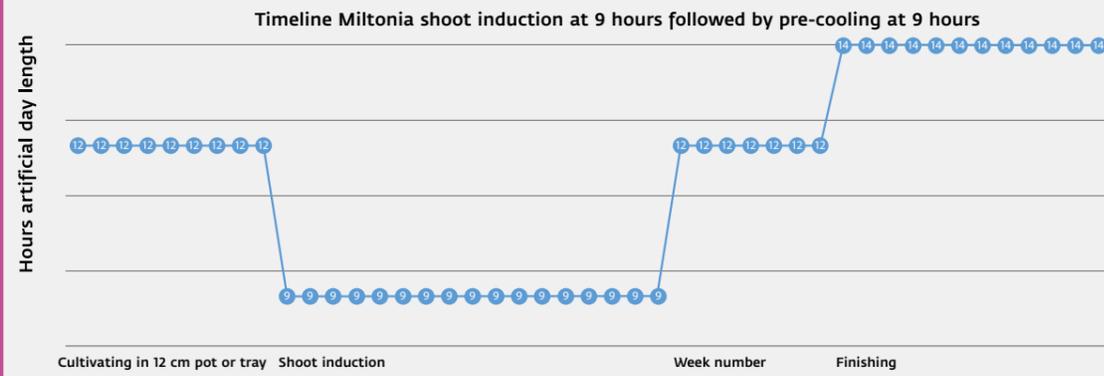
### Follow-up test

For that reason, in cooperation with VAN OS research a follow-up test was set up in 2016 to study this once more. First the plants were fully rooted in a 12 cm pot at a 12 hours day length. Under that treatment the plants stayed uniform. Moreover, we also wanted to know whether directly potting in a 12 cm pot in a bark mixture would give a different result than when young plants were first put in 28-hole tray with coir peat and only later, when the shoots were visible, they were moved to the 12 cm in coir peat. The initial development and handling when potting in coir peat is easier than in bark. Both methods are used in practice and there is no saying which is better. The plants that were fully rooted at 12 hours day length, were partly moved from the 12 hours to the 15 hours day length, but also, based on the previous trial, to 9 hours a day length to see whether that effect occurred again. After 8 weeks, the plants were put

back to the 12 hours day length for 16 weeks (in the test 9 weeks). That's what we refer to as the Pre-Cooling stage while in fact the plants are in the same section where vegetative phase is. Target temperatures in all these treatments were night 19°C and day 22°C. However, some of the plants that were put in the 9 hours day length were NOT returned to the 12 hours pre-cooling, but were left in the 9 hours section. The entire pre-cooling section had 9 hours day length. We wanted to know whether this might have an effect. The batch that was moved from 12 to 15 hours day was then cooled at a longer day length of 14 hours to see whether more light (longer day) in the cooling section would have a better effect. After pre-cooling for 9 weeks (= 12 hours day length, apart from 1 treatment) all plants were cooled during 8 weeks at 20-16°C (Day-Night) and subsequently finished to flowering at 14 hours day length.



## In a nutshell:



### Based on the above mentioned research and results we can conclude the following:

- Both a longer day and a shorter day cause shoot branching. A longer day is preferred because it produces speed. In pre-cooling, this speed is converted into vegetative growth (plants more easily keep forming shoots and developing).
- Some varieties scored a little better on coir, others on bark
- Cooling is a must for good flowering
- For a full crop and long spikes, a long day in vegetative phase 2 (extended day) is preferred
- The shoots must be sufficiently long (10-15 cm) before they can be moved to the cooling department, but on the other hand not too long (longer than 15 cm)
- Starting with too small plants requires a longer vegetative phase for the shoot formation stage
- Starting with too large plants leads to less satisfactory results in the shoot generative phase (uneven to no shoots)
- A shoot formation stage of 8 weeks sufficient. A longer period will not improve the result, rather on the contrary (that has not been tested, but the plant will not cope with 15 hours day length, it can stand 9 hours)

- Pre-cooling 12 hours
- Longer day in finishing results in quicker flowering, but larger risk of short spikes and fewer flowers per spike. The night temperature can also be used to influence the spike length.

The difference in substrate relates to the availability of a constant water quantity. The better capillary action of the coir requires a different watering strategy than in bark, where always enough oxygen is available in the substrate, but where water deficiency will occur sooner. Keep watching the condition of the crop closely. During the vegetative phase, at the time of ripening of 'the leek' and forming of the shoots, sufficient water is required to realise this. Changing day length (longer day) causes much drying.



# News from the variety managers

## New products ahead

### 353911®

Soon we will be delivering the first batches of 353911. A new orange variety with a flower size of at least 9 cm, a real novelty in the market. We have high expectations of this variety, but unfortunately, we will have to wait another year before its flowers at your nursery.

|                  |        |
|------------------|--------|
| Variety code     | 353911 |
| * Flowersize     | 9      |
| † Spike length   | 65     |
| ▣ Pot size in cm | 12     |



### 342693

342693 is of an even more recent date. With its many branches and a flower size of at least 10 cm this new variety is truly a wonderful new asset.

|                  |        |
|------------------|--------|
| Variety code     | 342693 |
| * Flowersize     | 10     |
| † Spike length   | 60     |
| ▣ Pot size in cm | 12     |



### 353526®

In addition to our renowned yellow varieties with a red heart, Miraflores and Limelight, and the striped or dotted yellow varieties, this number with its intense yellow colour and a substantial flower size completes the yellow range.

|                  |        |
|------------------|--------|
| Variety code     | 353526 |
| * Flowersize     | 10     |
| † Spike length   | 65     |
| ▣ Pot size in cm | 12     |



This does not apply for other newcomers. We are listing some new varieties that will appear during the coming months.

### 332373 Sweet Day®

A variety with a long crest and a flower size of at least 9 cm that meets the demands of our time.

|                  |        |
|------------------|--------|
| Variety code     | 332373 |
| * Flowersize     | 9      |
| † Spike length   | 60     |
| ▣ Pot size in cm | 12     |



Almost the entire Floricultura range in 9 cm and 12 cm pot, including the newcomers, are now flowering in the breeding department. They will also be flowering at the Trade Fair early November to which we hereby invite you!



353911®



Sweet Day®



342693



353526®

### Conclusion:

Based on current knowledge and information we consider the following cultivation schedule:

- Raising 1 = potting plugs in the correct size, day length 11½-12 hour, some 12 weeks (but must be rooted through). When the plants start bulbing, they must be moved to raising 2. This differs for each variety, Red Tide and Newton Falls do it more easily. When waiting too long in raising 1 and a shoot has already formed, it can never develop into 2 even shoots.
- Raising 2 = shoot formation by only changing the day length to 14-14½ hours for 8 weeks. (Difference between raising 1 and raising 2 must be at least 2½ hours, earlier studies were carried out with 3 hours. It should be noted that experience shows that a day length longer than 14 hours is less positive for growth in Miltonia and on the other hand we don't want to make the days too short because of light sum per day and intensity).
- Raising 3 = pre-cooling = same department as raising 1, day length 11½-12 hour, 8-10 weeks until young shoots are 10-12 cm long.

- Cooling = spike initiation at 12 hours day length at day 20°C and night 16°C (24 hours average 18°C), during at least 8 weeks. 1-2 weeks longer cooling improves the result.
- Finishing to flowering at 12-14 hours day length. The idea is that 12 hours is slower but the plants are more equal compared to 14 hours.

This requires at least 3 sections, including SD-raising, LD-shoot, SD-cooling+ finishing, but 4 sections where cooling and finishing are separated is better. It seems that a shorter day length of 12 hours during finishing also has a positive influence on the keeping qualities.



# Cymbidium cultivation tips

## Optimum temperature handling

### Expectations

At the time of writing, it is very difficult to make a reasonable prediction of the coming production season. Two factors cause the problem: the heatwave in June and the cold July and August. At most growers, the heatwave in June caused delays in flower spike elongation for the early range (1 November flowering). Small flowers spikes wait until the weather gets cooler. That caused a delay of a few weeks. Subsequently, July and August were on average a moderately cool summer which caused average greenhouse temperatures lower than 20°C for too long and too often. More often than expected it was 18°C, resulting in further delays in spike development. That combination may have the consequence

that at growers who have not heated to compensate the temperature deficiency, the November 1st production will partly be during November. So, prices on November 1st may be satisfactory due to lower supply than expected, but prices in November may leave to be desired. Christmas production will be on time as usual. It could still be delayed by too cold months of September and October and may partly come after Christmas, but that is not yet known at the time we are writing this. Because of the cold summer we see at growers that the spikes of the midrange are starting to elongate already. That is because it is too cold and growers are not or not sufficiently heating to realise higher tempera-

tures. 24-hour averages above 20°C inhibit spike elongation and boost shoot growth of young shoots that must flower in 18 months. The same applies for the light range, though in this case it is about branching off shoots for flowering in spring 2019.

### Early range

Plants that must flower in September-October 2018, will have to get their cool period in November. It is important that the average 24 hours temperature drops to 12½ - 13°C. That must be maintained for a period of 90-100 days. Exactly at the start of that cool period, the plants must be cleaned and spaced out. That work must have been completed at least 1 month before the temperature is increased. The average 24-hour temperatures must be about 13°C with 13-14°C during the day and 11-12°C at night. In extremely cold weather, temporarily (2 weeks), the temperature can be kept a few degrees lower to save energy. It may drop to 7°C 24-hour average.

For some varieties this is too low. Do ensure a sufficiently active climate, no matter how low the temperatures are. The plants must evaporate and take up water. Water uptake can be monitored by measuring the weight. Winters have been mild over the past years. At 12°C and higher outdoor temperatures, the crop must be activated by ventilating additionally and keeping minimal heating for 1 to

2 hours in the morning. A too short or too warm cool period will result in lower and later production. Moreover, the crop will flower during a longer period, which may disrupt the cultivation schedule for the next season. Apply clean water with a maximum of 0.25 EC during the cooling period. Always check the drain for EC, pH and quantity!

From late January to mid-February, the average 24-hour temperature must go to 20°C. You can start 1 to 2 weeks later, but bear in mind that if you start later, you must ensure that the desired temperature sum is realised. When you develop some 'backlog' due to low temperature, you can 'catch up' by setting a somewhat higher 24-hour average of 20½ to 21°C and spreading it out over a longer period of 3 months. Keeping higher temperatures during a shorter period is not recommended. It will cause production losses. Flower spike buds will wither and the plant will make new shoots. Starting too early at

*"Ensure a sufficiently active climate, no matter how low the temperatures are"*

higher temperatures in January may be harmful to some varieties. At higher average 24-hour temperatures on days that are short as well, the plant's energy consumption (sugars) is higher than its production. That causes the eyes that should have become flower spikes to wither and then you get shoots. There is sufficient natural light in the second half of February. An AC film screen (perforated)



makes it easier to realise higher plant temperatures during the period January-March, certainly when it is cold. That also saves a lot of energy. Do remember to open the windows in a controlled manner when it becomes sunny and the temperature could become too high. Close the windows timely in the afternoon to 'capture' the thermal energy and save power. Keep monitoring the realised 24-hour averages during the various periods of the season. Too low 24-hour averages below 20°C cause a delay, but if it gets warmer than 21°C, the flower spike elongation is inhibited. When the flower spikes are smaller than about 10 cm and it becomes too hot, the spikes will stay where they are. However, spikes longer than 10 cm elongate more quickly at higher temperatures.

### Christmas

For Christmas, you can use the procedure described above, only six weeks later. This section must be in place before Valentine. Later increases the risk of production loss, particularly when the weather is very fine early March. Spacing out in time ensures that plants are acclimatised better before it becomes too warm and too dry (low RH). Too low RH values cause withering of the flower spike bud. During the first 14 days after moving Cymbidium plants, the water uptake is always lower than usual, possibly as much as 50%. The average 24 hours temperature must also be 20°C as from early April. Heating will be required in

cold and bad weather. During the coming period it is important to closely watch the water consumption. There are cultivars that flower around Christmas and take up a lot of water during the spike elongation stage. If you are a 'dry' grower and the weather gets sunny, you must arrange additional drip watering. Otherwise your plants may drop their buds. However, if the weather remains mild and humid and you are a 'wet' grower, you had better skip one watering because some varieties may lose their roots. Measure the application and drain every week and check the drain EC for several varieties. In addition, watch the EC drain to see if it rises. In that case the plants are taking up less or no nutrients. Then lower the EC! That improves root health. The water temperature must be at least 12°C.

### Midrange

The mid-range accumulates its cold for next year's flowering during spike elongation and flowering from November. That occurs in an almost 'natural manner'. Easter 2018 is quite early, that is on April 1st. This means that in November you must decide whether you want flowering before Easter, or later more towards Mother's Day. Delaying means keeping growing as cool as possible during the elongation stage. Of course, advancing is the opposite.

### Late range

The late range now still must be heated to an average 24 hours temperature of 20°C-21°C.

For flowering in June-July this must be kept up until Christmas. Some growers even continue until early or mid-January. Nurseries that have the possibilities to realise a good flowering climate in June, are also able to realise a good spike quality at high temperatures. That is possible with higher greenhouses with a misting installation and/or an external screen. Without those, the risks will be too great. In this case, a warm spring will lead to accelerated flowering, smaller flowers and paler colours. In extremely hot weather, only an air conditioning installation will save you. Last spring-summer, the night temperatures were much too high and then a misting installation no longer works either. Finishing to cold must be spread out over a period of 10 to 14 days. Then cold can be very cold, 8-10°C, but it depends on the outdoor conditions and the relative humidity. If it is freezing, 10°C is possible. Evaporation is more than sufficient under those circumstances. If the weather is too warm for the time of year, you must not

only ventilate a lot, but you must also switch on the heating at minimum level every day for 1 to 1½ hour to activate the plants. In the late section, certainly until mid-January the crop can still take up a lot of nutrients, for instance 0.7 EC application and 0.4 EC drain. If the drain EC increases, then cut the EC by half at once! Keep monitoring every week for EC and pH drain and ensure that the plants evaporate an average of about 2 - 3 litres/m<sup>2</sup>/week. So that is almost as much as on an average summer day!

### Humidity

During the coming period, the RH will usually be high or too high. Ventilating sufficiently with screens and windows as well as heating are methods to keep the climate active. The moment it gets colder, frost or snow, the RH can easily become lower or too low. Then the ventilation rate must be reduced. One of the tools is to measure the water consumption per m<sup>2</sup> per day or week.





Floricultura®

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Of course,  
you are always  
welcome at our  
Heemskerk breeding  
greenhouse during  
the RFH Trade Fair!

## Agenda

- RFH Trade Fair, Setting 21.9 - 8 - 10 November 2017
- IPM Essen - 23 - 26 January 2018
- California Spring Trials - 14 - 19 April 2018

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