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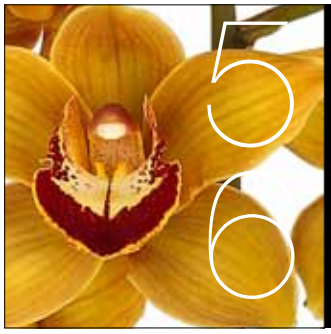





# Phalaenopsis cultivation hints

### Crop protection

Currently, integrated control is possible in Phalaenopsis, depending on the scope, a major pest outbreak may be tackled chemically and kept in check biologically. The use of chemical agents will be restricted further in future, since over recent years large numbers of non-approved active compounds have been found in soil and surface water. The authorities will force us to find a solution in an integrated approach with a view to sustainable operations. Integrated control is a solution that in future may possibly be restricted further to just biological control. It will further increase the pressure on existing and new biological agents. The search continues in nature or in untreated crops for new, natural enemies as a complement for broadening of the biological package. The objective is to be able to adequately control a disease or pest with a variety of biological controls. With regard to working with biological controls, research focuses on the effectiveness of various controls, the life-cycle of the insect, and on building up a population in the crop. In addition, it is assessed as to what crop stages a certain pest may occur and what natural enemies can be used to control it.

For instance a predator fly has been discovered and a beetle is already being pitted against various Sciara species. This lucifugal beetle lives in the top layer of the soil or the substrate, mainly feeds on the larvae and also attacks other harmful soil organisms. It is important to realise that a population first has to grow while other control organisms must be deployed.

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## Light

Light levels in the various departments are rapidly increasing, which requires that other climatic factors are accurately geared to this. More plants per square metre are cultivated and the turnaround rate has also shortened. People are increasingly trying to discover the limits of cultivation at a maximum light input. We do not know yet what that limit is, but cultivation at increasingly higher light levels and light fluctuations will increase the risk of light damage for the most sensitive species. Experience shows that Phalaenopsis can cope with quite a lot of light, but it should preferably be admitted at a constant level. Gently increasing and decreasing the light during the day is another important factor for proper performance of the plant. More often than before we already find wilted top leaves by mid-afternoon. The stomata are open at this time. That makes the plant susceptible to dehydration and light peaks. This phenomenon intensifies when the plant is dry e.g. the day before watering. We think that wilting of these leaves is not conducive to optimal plant growth.

*Phal. '332407'*

## Temperature and RH (Relative Humidity)

The late January frost may have caused stronger heat emission to the cold cover and a drop in greenhouse and thus plant temperature. For that reason we recommend to keep the LS10 screen closed to reduce greenhouse temperature fluctuations. As it may sometimes be necessary to expel humidity through a narrow opening of the roof vents in the greenhouse, the cold downdraught caused premature flower initiation in some sensitive varieties. In addition, we think that plants at the second cultivation layer directly under the cover formed more aerial roots in their search for moisture. For the next period it is important to promptly compensate for a sudden drop in RH, by for instance using the misting system. It is also possible to reduce the heating and ventilating temperatures at an early stage. Moreover, maximum window and screen positions (maximum opening of roof vents), if applicable, may carefully be modified. Night frost may still happen occasionally in clear weather.

## Heating

As RH fluctuations are quite common this time of year, it is important to accurately synchronize the top and bottom heating system. We do see major differences in plant temperature between the pot and the top leaves. The root pressure may be high if the bottom tube is hot, possibly in combination with a dry substrate, while the conditions are adverse for opening the stomata, which is the case during the day. A too high pot temperature with incorrect setting of the top screen, combined with too much ventilation and dropping plant temperatures may cause bursting of stems or the ‘guttation’ phenomenon. Cells may also burst internally, leading to Fusarium and Erwinia infection. It is as if the plant explodes.

## Watering and fertilisation

In spring, during the first four to six weeks of cultivation, you can start with some more nitrogen in the form of urea for cell stretching and rooting of the newly potted plants. Urea is particularly suitable because it is available for the plant through the roots as well as through the leaves. Once the plants have got off to good start, for instance a 20-20-20 fertiliser can be applied and independent of the size of the leaves and the splitting rate (Jan, I have no idea what the “splitting rate” is!), additional urea can be added. Do note that the urea quantities may differ between the various compound fertilisers and adding extra urea may lead to plant poisoning. Also be sure to have your discharge water regularly sampled for elements. In a dry spring with little rainwater you do have to modify your fertilisation schedule when using (only) tap water. However, that does depend on the tap water quality and, consequently, on your location. Start mixing in tap water gradually, then you can postpone the moment you have to start using 100% tap water.

### $CO_2$

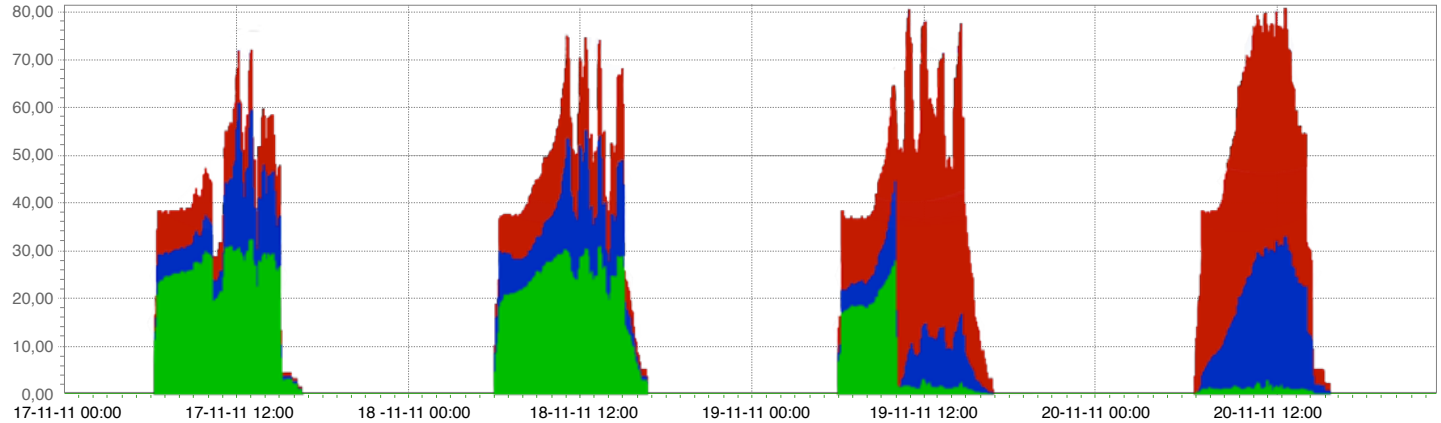
Applying $CO_2$ is usually done at the start of the dark night period, when the stomata are open. The top leaf is C3 and it still takes up $CO_2$ during the day, the lower leaves behave as CAM where this process takes place during the night. However, the plant may already need some $CO_2$ before nightfall. This is related to the quantity of light and the light duration. If the plant has the possibility to take up and store the required $CO_2$ during a more extended period, it will show a higher dry matter percentage, provided that the other factors are properly adapted to it. Cost remains a consideration in view of the losses through the ventilation windows at the end of the day. Research has shown that the plants optimally take up $CO_2$ during the first 8 hours of the darkness period and in the stages where the plants switch between closing and opening the stomata. $CO_2$ can be administered in various ways and should preferably be brought into the greenhouse below the plants. The purer the $CO_2$ the better. Regular maintenance of boilers and CHP units is important. In practice we find varying values, while in some cases application takes place throughout the day. We recommend doses between 800 and 1,000 ppm.

*Phal. 'Miraflore'*

# Miltonia stagnation

During a recent test with a GrowWatch in Miltonia cultivation, a problem seemed to develop with the photosynthesis meter. The growth of the measured plant came to a halt over a very short period. There was no recovery during the night either. Also during the following days, hardly any growth could be perceived. On 19-11 you can see that utilised light (green area) drops to almost 0. The light load (blue area) shows an increase on 20-11, but the light damage (red area) becomes enormous. The outward appearance of the plant really showed nothing special. Even the characteristic stress phenomena such as concertina-like leaves could not be observed.

### Light response Miltonia to crop treatment




| | 17-11-11 00:00 | 17-11-11 00:05 | 17-11-11 00:10 | 17-11-11 00:15 | 17-11-11 00:20 | 17-11-11 00:25 | 17-11-11 00:30 | 17-11-11 00:35 | 17-11-11 00:40 | 17-11-11 00:45 | 17-11-11 00:50 | 17-11-11 00:55 | 17-11-11 01:00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Utilised light (Florwatch P3) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Light load (Florwatch P3) | | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Light damage (Florwatch P3) | | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |

The photosynthesis meter can measure the utilised light for the plant. If through any cause the plant uses little light for photosynthesis, this light means a load for the plant. This is shown in the measurements in light load and light damage. The former of the two does not contribute to the photosynthesis and it does not damage the crop. In the event of light damage, the plant quality does deteriorate. This is not always directly visible. When light damage is measured, usually the leaf temperature rises which increases the utilization of sugars in the plant. This can lead to exhaustion of the plant. It is eating into its reserves without it having any positive effect on growth. Eventually the leaf ends may get necrotic.

A second effect is that if there is more light damage during the day, the plant cannot sufficiently recover at night. The next day the plant cannot resume normal growth.

Every night the plant should recover from the load during the day. After satisfactory recovery, the plant can achieve proper growth time and again. If the plant does not recover sufficiently, it is less resistant to environmental extremes.

The photosynthetic efficiency in Miltonia during a day with sufficient light drops to about 50%. During the night efficiency is restored to roughly 80%.

The measured plant had a photosynthetic efficiency during the day of less than 5% and recovery during the night of less than 50%. In other words, the plant was at a complete standstill.

We discovered that the plant was at a standstill because of these measurements, but the plant showed no detectable signs. Lighting only increases the load on the plant and it will take longer to recover. In addition, a plant at such a standstill hardly takes up any water and nutrients. In such a situation, watering on the basis of weather or time may have disastrous results. Plants that are too wet are more susceptible to inhibited root growth and diseases.

GrowWatch has already helped to find a number of important factors for cultivation control. A vapour pressure deficit of 1.0 kPa seems to be the highest value at which the plant can still cool itself. This means that at a greenhouse and plant temperature of 25°C the RH must not drop below 70%. If the leaf temperature is 2°C higher than this greenhouse temperature, the RH must not drop below 80%. Lowering the temperature or increasing the RH through misting is the best recommendation. For light it appears that light stress occurs above 400 µmol/m²/sec approx. (approx. 200 W/m² or 22.000 lux). The optimum value seems to be 100 µmol/m²/sec. Above 200 µmol/m²/sec the benefits of additional light rapidly decreases.

In the morning the plant can handle light better than at the end of the day. Admitting additional light at the end of the day does not make sense. For $CO_2$ it has become clear that values higher than 1,000 ppm are more likely to be inhibitory than positive.

Measurements showed that a minor treatment with a weed control agent was the cause of the sudden stop of the plant growth. We have not seen a recovery. Yet at least for five days

*Milt. 'Newton Falls'*

growth was at a complete standstill. This means there was no assimilation and no uptake of water. Earlier experience in other crops already showed that the use of crop protection agents may inhibit the water uptake for sometimes more than a week. You can conclude that also the assimilation is inhibited or stopped. We think that every crop protection agent will have an inhibitory effect on photosynthesis.

In our opinion a good recommendation is to watch how a plant responds to a crop protection agent. Without testing, it seems to be a good recommendation to limit the quantity of admitted light and to check carefully that plants do not stay wet for too long. Regular watering directly causes major quality problems in Miltonia, which may easily result in rejects and plants with a shorter shelf life

*Milt. 'Princess Diana Red Baron'*

# Cymbidium cultivation hints

### Snails and slugs

Snails and slugs do more damage in Cymbidium than people realise. Small snails feed on roots, larger slugs may cause problems later in the season. Usually after a warm and humid period they multiply easily. Preventive control is the most effective method. First of all make sure the pathways are clean and that weeds do not get a chance. Secondly, spread slug pellets in April-May. A second treatment in August-September will ensure that snails do not get a chance to reproduce. If you have many snails, we recommend spreading slug pellets according to the dosage instructions every three weeks.

### Red spider

Red spider is a persistent pest which certainly in warm and dry spring weather may suddenly break out massively. Be sure to scout your crop regularly. Biological control has proven to be reasonably effective, but two issues are important in this connection. Firstly, a somewhat more humid climate should be created in which the predatory mites thrive and the spider mite does not feel as happy. Secondly, practice careful and regular monitoring so you can intervene in a timely fashion by putting out more predatory mites and/or through local chemical control measures.

### pH - water

The pH has a major influence on growth and flowering of plants. A good pH has a major positive influence on the uptake of nutrients. Similarly, an incorrect pH has a negative influence. The drip water is generally controlled effectively, but in some cases algal growth in the basin may result in an excessive pH of the source water. Therefore, you must check this water regularly. A light and warm month of May usually results in an algal explosion. Covering (keeping out the light), aerating and possibly adding acid are methods to keep the pH in the correct range.

*Cym. 'Mighty Flor'*

# Cymbidium production prognosis

## EARLY RANGE

The early flowering during the past season in The Netherlands, that is flowering before 1 November, can first of all be explained by the fact that it had been very sunny from late March until mid June 2011. As a result, everybody easily realised the required average 24-hour temperatures of 20°C. At the moment it could become too warm, we had to deal with a bad (cool, rainy)summer. That meant the weather was not nice for the beach, but ideal for the early range to flower earlier at still that average 20°C!

This explains why there was a much greater supply of both large-flowered and small-flowered Cymbidium as well as potted Cymbidium pre-Christmas.

You can put this knowledge to your advantage if the weather conditions this year in April and May should be exactly the reverse. Heating the greenhouse additionally to ensure that the required 24-hour average of 20°C is realised can once again result in early production!

If you have not heated sufficiently for the range that should flower before 1 November and, consequently, you have not realised the required 24-hour averages, it is unfortunately not possible to compensate for that. Outdoor temperatures have been low until mid-March and you should have heated additionally because of the lack of sunshine due to the cloudy weather. 24-hour averages above 21°C have the adverse effect. Compare it to leaving home late and trying to make up for that by speeding.

However, also for the range that should flower before Christmas it is necessary to ensure the correct temperatures at the right time. If the weather remains cold and dark until the end of May or even later, followed by hot summer months and then again a dark and cool autumn, there is a major risk that flowering does not come before, but also in a smaller or greater part, after Christmas.

You will never be alone in this scenario, so with many colleagues you will experience a repetition of the supply season 2010-2011.

*Cym. 'Mystery Red Dream'*

Particularly in the very early range you should prevent large fluctuations between day and night temperatures during the period June-July. Black pollen caps and lip-flushing are possible species-specific consequences.

Dark and cold weather in August may once again cause delayed stem stretching. Again additional heating will be required. Even if the weather should be fine in September or October, you can never know in advance. However, if July or August become very sunny, you should consider whitewashing very lightly!

## MID-SEASON RANGE

This past season, the mid-season range produced less than last year. That was mainly caused by a 10% higher production during the season 2010-2011, but with shorter stems. In 9 out of 10 cases a higher production in one year will cause a lower production in the next season. The flower crop has been too high so fewer shoots are produced. This season we experienced lower production and heavier stems.

Since last autumn had poor light also, generally not many shoots will have been produced. A more accurate assessment will have to wait until next autumn. Generally, the mid-season varieties can be treated in the usual way. Allow light, do not whitewash too soon, and preferably do it as lightly as possible. It is important to heat in order to promote an active crop if it should be too dark and cold in August-September.

Heating in that period may sound strange, but it can be very clever. Strangely enough there is so much focus on heating costs, but in some cases labour costs are as much as twice as high as heating costs and there is less attention to that.

Heating a little more has a positive influence on the quality and schedule. That yields much more than the energy investment and it also saves labour costs because less grading is required.

Do note that in 2013 Easter is on 31 March. That means that for the medium range you must choose which varieties should flower before Easter and which ones shouldn't. We will refer to this matter next autumn.

### Advancing

Opting for advancing the April range (mid-season range) to mid-March 2013 means you must:

- ensure that sufficient cold has been accumulated during the period until the end of June;
- go to higher temperatures from early July (24 hour average 20°C);
- from November, go to a 24-hour average of no more than 15°C to advance flowering.

### Delaying

Opting for delaying the April range (mis-season range) to late April 2013 means you should:

- ensure that sufficient cold has been accumulated during the period until the end of July;
- go to higher temperatures as from late July (24 hour average 20°C);
- from November, go to a 24-hour average of at least 11.5°C to delay flowering.

## LATE RANGE

For the late range you will have to whitewash again now, certainly when it becomes very sunny.
A misting system may ensure that evaporation keeps the day temperature low enough. The flower quality will improve as a result.

Keep checking the evaporation by measuring the drain and/or the plant weight. Certainly for the very late culture it is important to postpone removing the whitewash from the greenhouse until the end of June or early July. If the weather is really excellent, then wait a while to keep the transition smooth, but do try to have it off before the middle of July. Again it must be ensured that in August-September the optimal temperatures are achieved, if necessary by heating. That is the time when the shoot development for flowering in spring 2014 is defined, but also the stem development for flowering in spring 2013!

# Sales Phalaenopsis

We noticed that Phalaenopsis growers increasingly decide what market segments (florist, garden centre, chain store) they want to focus on. This development is connected with the entrepreneur's choice for what market segment they want to produce and at what cost price they can produce. Enterprises that have not made a choice might get 'crushed in the middle'. The choice of range can be discussed endlessly. The fact is that the grower himself is still the one who knows best whether a certain variety or range fits their operation. The choice of a range is influenced by many factors, including cultivation, sales segment and market, expectations for the future, personal preference and supplier.
We notice an increasing demand in Phalaenopsis for flowers with specks, dashes, blotches and other special colours and colour variations. Basic colours such as white, pink, red, purple and yellow remain important to achieve a good balance of colours and eventually, the highest possible return on investment.
In addition to the basic colour range there is always room for specialties. Of course a ‘specialty’ only remains ‘special’ in the market if it remains limited in numbers. If several enterprises market the same variety in large numbers, there will be a considerable risk of ‘oversupply’ resulting in a price drop. That will automatically turn a ‘specialty’ into a ‘bulk product’. An enterprise can make itself stand out by for instance including a ‘specialty’ in their normal colour range.
We recommend to order a variety if constant and reliable results have been obtained in cultivation at your own nursery through various seasons. Of course factors such as shelf life and sales possibilities are important when selecting a variety. When the product is delivered at a riper stage, its shelf life and ornamental value are better. Much can still be done and improved in this supply chain and it is hard to explain this to consumers.

*Phal. 'Durango'*

The Floricultura assortment distinguishes itself with a very broad offer of varieties that are continuously adjusted to the market preferences. The range is the result of many years of fine-tuning based on experience of our customers all over the world. Recent marketing figures for Valentine’s Day 2012 show that the standard colour range fetched the highest midprice.
The majority of Phalaenopsis growers were represented at the Flora Holland Trade Fair in Naaldwijk. It is good to see how they all strove to put themselves in the picture. Flower trading companies have an enormous choice . One of the main criteria of a trader or purchaser to obtain his plants from a specific company is whether or not he or she can count on a continuously high-quality, reliable product with an excellent shelf life. Consequently, this is an excellent example of how you can make your enterprise stand out.

*Phal. '312776'*

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