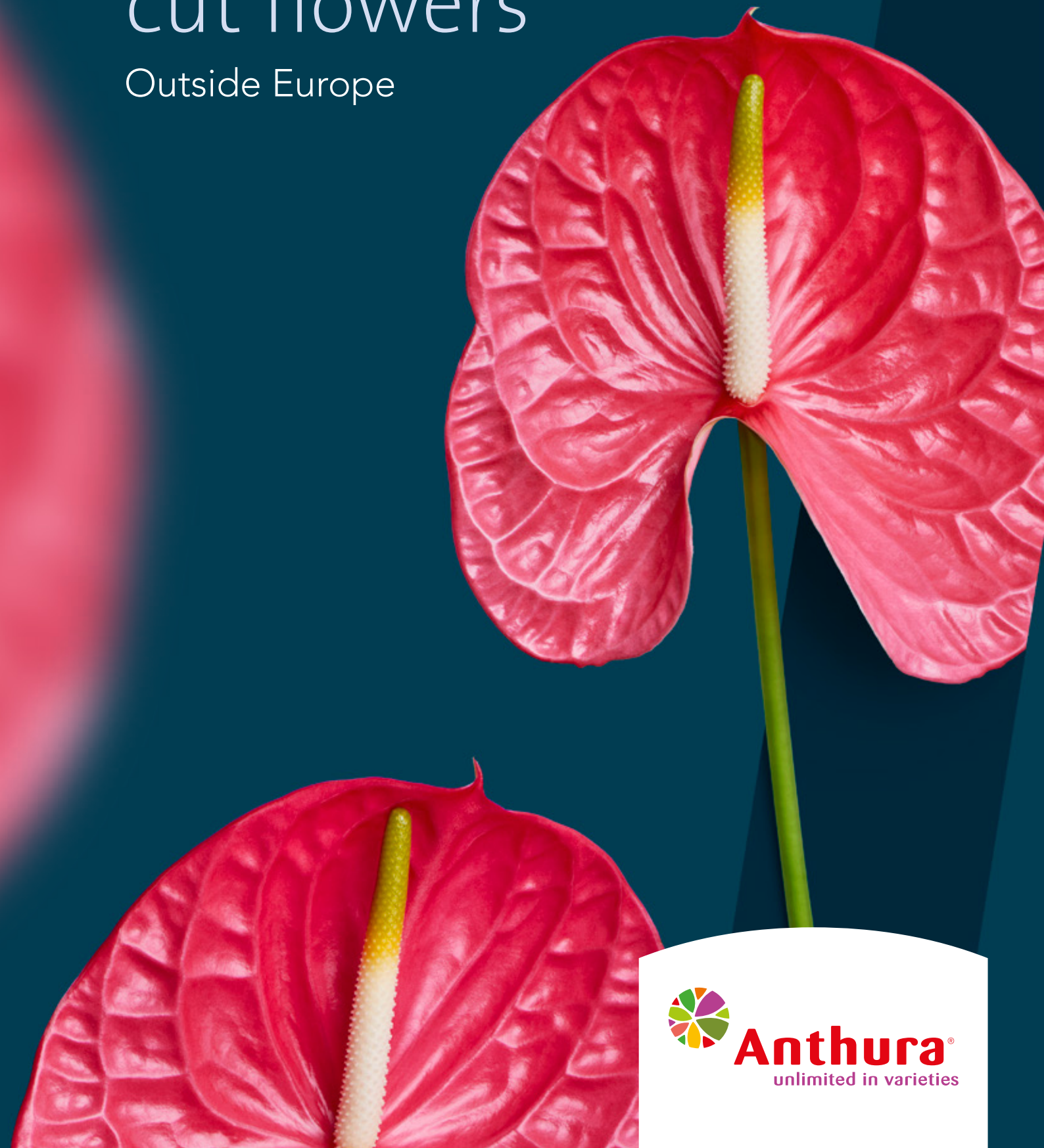
Cultivation guide Anthurium cut flowers

Outside Europe



Anthura®
unlimited in varieties

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Introduction

As a specialist in Anthurium breeding and propagation, Anthura recognizes the importance of knowledge. We constantly strive to broaden and deepen our knowledge, aiming to produce strong and healthy young plants for the Anthurium cut flower cultivation. The next step takes place with you - the grower - during the cultivation of Anthurium cut flowers.

This cultivation manual has been compiled to provide you with background information about the Anthurium cultivation. Our website also regularly publishes articles addressing specific and up-to-date cultivation issues on the "Expertise" page.

Versatile in cultivation and marketing

Achieving maximum growth with minimal resources is right up Anthurium's alley. In the tropical rainforest, where the Anthurium originally comes from, conditions are constantly changing. Plants and trees generally grow quickly, and as a semi-shade plant, Anthurium needs to constantly adapt to the prevailing conditions. As Anthurium is not a fast grower by nature, a different approach is needed. Anthurium is a survivor. This is also evident in farmed cultivations, as Anthurium copes surprisingly well with humid conditions and relatively cool temperatures.

Anthurium is now gaining prominence in most sales markets and in the luxury segment. This has been very successful, as many florists, garden centres, flower arrangers and event planners enjoy using these cut flowers. They are usually incorporated into bouquets and arrangements. In the business market (events, cruises, etc.) Anthurium performs well, because the flower's potential for use and shelf life are above average and there is a vast choice of colours, shapes and flower sizes. Just one or two flowers in a beautiful vase makes a powerful statement.

Global cultivation

There is ample potential for growing cut Anthurium in different climate zones, even in desert areas provided sufficient good quality water is available. An advantage of an Anthurium plant is that it evaporates relatively little water. The leathery leaves have limited evaporative capacity. On the other hand, sufficient air humidity must be taken into account. High-pressure misting and cooling systems also use a lot of water, so water consumption also depends on the growing area.

It is an advantage the cultivation is close to metropolitan areas. 'Local for local' is an important scale advantage. In addition, scalability of cultivation is an interesting advantage. Is your business based on a relatively small tropical island in the Pacific so you sell your cut flowers to hotels/cruise ships, or is it closer to a metropolis with millions of consumers? No problem: Anthurium has excellent scalability and produces flowers year-round.

Future-oriented cultivation

Climate change is becoming an increasing concern. Drought, or its opposite of excess rain, can happen all over the world. Floriculture entrepreneurs are being forced by their own beliefs, the market and/or governments to come up with solutions to important cultivation and environmental issues such as sustainability, low energy consumption and low resource consumption. In the Anthurium cultivation sector, efforts are being made to find solutions.

In temperate climate zones, it is impossible to manage without heating. As an example, the average energy demand for a cut Anthurium cultivation in the Netherlands is 20 to 22 m^3 of natural gas per square metre each year. Prompted by the steeply increasing cost of energy, many growers have taken measures. The use of additional screens, plastic foil, dehumidification methods and a different approach to cultivation have resulted in further savings. Consequently, the current energy demand is around 15m^3 per square metre per year. In warmer climate zones, in contrast, it is important to avoid excessively high greenhouse temperatures. By using screens (indoor and possibly outdoor) in combination with ventilation, it is often possible to control the amount of light and temperature. In some areas, people also use pad/fan systems to cool the temperature in the greenhouse. These systems are mainly used in areas with relatively low air humidity.

The relatively low pest and disease pressure is another factor that makes Anthurium cultivation interesting. Although there are multiple pathogens, with thrips being the main challenge, we can say that great progress has been made within the cultivation. Anthura's own research, among others, has now resulted in extensive experience with biological control agents in combination with plant protection products. This makes it possible to grow Anthuriums with minimal use of resources, which results in low residue levels in crops and cut flowers. When these aspects are combined with the above-average vase life of more than 23 days, we can conclude that Anthurium tops the list of sustainable cut flowers.

The advantages for cut Anthurium growers at a glance

1. A cut flower in the luxury segment offers great benefits to growers. It gives them a distinctive feature and therefore an improved margin position;
2. It is an annual/multi-annual crop, allowing continuity and efficiency in operations;
3. Cultivation is relatively energy-friendly, making energy costs controllable;
4. Safe and future-proof operations thanks to minimal use of crop protection products;
5. With the above-average vase life, the grower is a pioneer in sustainability, including associated market opportunities.

The following sections cover the background of cultivation.

Planting material

The planting material can be supplied in several ways. As a general rule, the smaller the plants, the more attention they require.

Plugs (type SP1)
Plugs are made by growing one micro-cutting in a paper plug until the young plants reach a height of 7 to 12 cm. At this point, the young plants are approximately four months older than the tissue culture. Plugs cannot be planted directly into a growing bed or final pot, as cultivation may be delayed for an extended period of time. In the worst case scenario, there may be loss of planting material. It is better to continue growing the plugs in a 9 cm pot under protected conditions, preferably in a nursery greenhouse. After approximately six months, the plants can be planted in the growing bed. The plants are then about 20-25 cm tall. A manual is available for growing your own planting material. In case of doubt, you can always consult your account manager or agent. When transporting the plants by air freight, the choice almost automatically falls on type SP1. This is because transport costs add up quickly when choosing larger plants.

Young plants (20-25 cm) supplied in 9 cm pots
For this type, the plugs are planted in a 9 cm pot filled with rock wool cubes (grow cubes). Subsequently, the plugs are grown into plants of 20-25 cm over four months. These plants can be planted directly into the cultivation system. At the start of a cultivation or a crop rotation, growers are increasingly attaching importance to a short waiting period until the time of flower cutting of the new crop. In consultation with Anthura, it may be possible to grow the plants further up to approximately 30 cm.

All plugs and pots are supplied with one plant per plug or pot, unlike Anthurium pot plants. With one plant per plug or pot, the plants have more space during the growing phase and are more uniform. This results in high quality and production. In addition, cultivation operations such as leaf cutting become easier. Since the plants grow regularly and all plants are separate, this gives a much more manageable crop, which significantly reduces labour costs.

Type SP1, paperplug, 7-12 cm

Type 20.1, plants in pots, 20-25 cm

Cultivation plan

The young plants should be unpacked immediately upon arrival so they can acclimatize under cultivation conditions. The plants are kept dry just before packing to reduce root activity. After receiving the plants, it is important to water them immediately after planting. When planting, it is important to plant at the right depth so it enters the medium with its aerial roots already formed.

This applies to both type SP1 (when potted in a 9 cm growing pot) and plants that can be planted (20-25 cm tall). If you plant the plants in the final growing system, a depth of 12 to 17 cm is the guideline (for plants planted in a 9 cm pot). However, it is important not to plant them too deep, as the plant might stretch excessively, causing the crop to fall over faster over time. It is not a good idea to plant too shallowly either, as the plant will grow slowly and fall over too quickly. A good guideline is that the aerial roots are just within the medium, so the growing point can still catch the light. We recommend that new growers watch the instructional video on our website under 'Expertise - videos'.

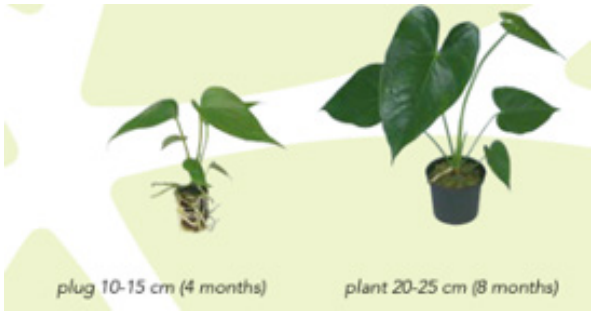
Planted too high

Excessively small plants in cultivation systems

Planting SP1 directly in the cultivation system instead of in a growing pot is detrimental to plant development and cultivation time. The plant has far too much space, leading to an unfavourable microclimate. As a result, the plant develops slowly and can produce too many lateral shoots. Planting a small plant in a large substrate volume also causes slow rooting.

Planted far too small

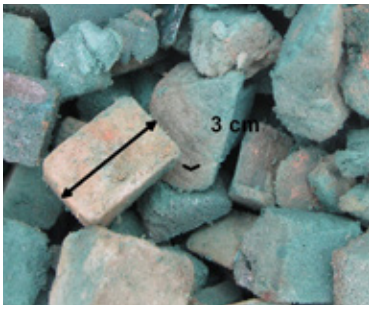
From the growing manual plug:



Planting density depends on the variety and cultivation strategy. In general, we recommend a planting density of at least 14 plants per square metre. For each bed of 1.20 metres wide, four rows are planted, with the distance between rows of plants ranging from 10 to 20 cm. The exact planting distance is calculated based on the total area of the greenhouse and the number of beds. For cut varieties that grow compactly, it is important to plant the plants close enough to the side of the bed so that the walkway is also quickly filled with leaves.

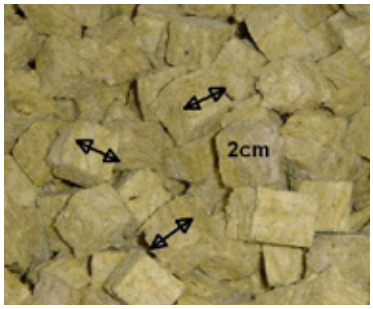
The Anthurium grows best in an airy substrate due to its predominantly epiphytic growth habit. The most commonly used substrate types are rock wool cubes (2 x 2cm), perlite and oasis. Charcoal, coconut and lava can also be used. The attached compilation shows the preferred substrate size of the different substrates.

Cocos, approx. 10 cm

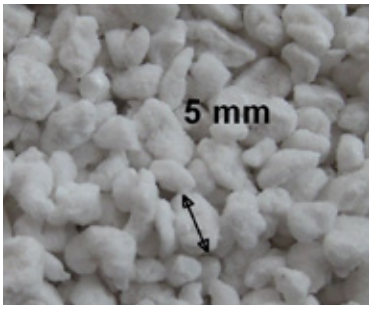


Oasis/foam, approx. 3 cm

Charcoal, approx. 4 cm



Rock wool, approx. 2 cm



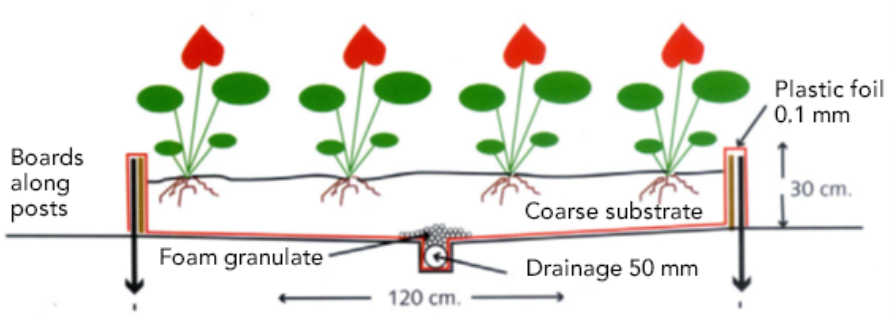
Perlite, approx. 5 mm

Lava cubes, approx. 1 cm

Excellent root growth in perlite

The choice depends on the grower's preference and also on availability and price. Cultivation of Anthurium takes at least five to six years, which is partly why it is important that the substrate has a stable structure. Most importantly, the substrate should provide enough space for root growth and oxygen storage. Even when choosing a substrate, good advice is half the battle.

Anthurium is grown in beds, gutters or pots. Preference is given to cultivation systems that are separate from the soil. The slope must be chosen in accordance with the respective cultivation system. This ensures optimal water distribution over the entire bed, while still draining the drain water.



Schematic representation of W gutter

Cross section BEDS (W gutter)

Easy set-up of cultivation beds in the tropics

Too steep a slope can cause drying out at the head of the bed and results in a wet substrate at the lowest point. Moreover, the irrigation system will empty at the lowest point, which will also lead to an overly wet substrate. Keep to a slope of at least 0.05 percent (= 5 cm per 100 metres). When a greater incline is required, extra measures need to be taken with respect to the irrigation system. Depending on regulations, recirculation of drain water is mandatory. It is recommended that drain water be recirculated and disinfected by a UV unit or a heater.

Self-made W gutter system

Production

On average, between 70-140 flowers per square metre per year can be harvested, depending on the cultivation situation and choice of varieties.

Anthurium production allows for shifting. Some varieties cannot be cut for long periods of time. This is also known as saving the flowers. Other varieties can be cut at a younger stage. With the right young leaf break schedule, additional production can be achieved. A few weeks after the start of the rainy season or winter, production will decline to increase again with a delay when weather conditions improve.

Irrigation system

It is important for all cultivation systems and substrates that a suitable irrigation system is installed. Our preference is a system with both a sprinkler system (two pipes per bed, with 360° sprinklers with 60 cm nozzle distance, releasing 40-60 litres per hour per nozzle) and a drip line (20-25cm drip point spacing (1-2 l/hour/drip point). Sealable nozzles/drippers should preferably be used. To provide sufficient water to the relatively drier head ends of the beds, a double in-line hose is advised at that location. By using a coupling piece, the in-line hose can easily be duplicated.

Cultivation bed with 1 rain pipe (recommendation is 2 rain pipes)

In the cultivation system (beds or gutters), a drain hose is placed in the longitudinal direction of the bed and in each cultivation gutter. When working with a pot system, the drain water is collected in a profile. The drain water is discharged to the drain water silo by a slope. After disinfection, the drain water can be reused. When the cultivation only uses one sprinkler system, suberization damage may occur in the flowers in the first six months of cultivation. It is therefore worth considering T-tape hoses for watering during the first cultivation phase.

As multiple varieties are planted in a greenhouse, it is important to consider the water requirements of each variety. Depending on water demand, varieties should be planted together in a compartment with a tap. In addition, temperature and light levels play a role in determining the position of each variety. The damage susceptibility of varieties should also be taken into account. Varieties with a pale flower colour tend to get damaged more quickly and our advice is to position them as close to the processing area as possible.

Corking

Water

Water must be free of chemicals, visible contamination, and diseases. Elements like sodium and chlorine should stay below 4 mmol/litre, and bicarbonate levels (HCO_3) should not be too high either (<6 mmol/l). In the absence of optimum water, water partially treated by osmosis must be used.

Leaf margins caused by high sodium

Water consumption for cultivation depends on climate, substrate and crop age. To a great extent, the relative air humidity in the greenhouse determines water consumption. The system should be capable of delivering 3-5 litres per square metre per day in situations where there is no adequate humidification system. If the optimal relative humidity (RH) can be maintained, the maximum water consumption is 2-3 l/m^2 per day. This amount should be given within three to five hours. Drainage water should always be disinfected before reuse. A basin size of about 2,000m^3 per ha normally meets the annual water requirements of the crop.

Fertilization

In Anthurium cultivations, single fertilizers are mainly used via a Dosatron® or A and B container system. General advice based on an A and B container composition is given below. The requirements can differ according to the type. Customized advice can be given by Delphy or another consulting firm. You can also ask for advice on the basis of mixed fertilizers.

FERTILISATION ADVICE

Crop	**Cut Anthurium**	17-Oct-22	**Feature**	**Average scheme EC 1.5**
Name	**Anthurium**			**Starting water: rainwater**
Container volume	**1000 litres**	Solution **100 ×** concentrated		**Remarks**
Solution A				
Calcium nitrate				
Potassium nitrate		**kg**		
Calcium chloride	liquid	**litres**		
Trace elements				
Manganese sulphate		**grams**		
Zinc sulphate				
Borax				
Copper sulphate				
Sodium molybdate				
Iron chelate				
Solution B				
Mono potassium phosphate				
Potassium nitrate				
Potassium sulphate				
Bittersalt				

Fertilization scheme

When the starting water contains nutrients, the nutrition schedule has to be balanced correctly. Bicarbonate (HCO3) has to be neutralized with acid (phosphoric acid or nitric acid) in order to achieve the correct pH. The pH of the feed water should amount to approximately 5.8-6.2 and the EC to 1.2-1.4 mS/cm in the summer and 1.5-1.8 mS/cm in the winter.

No ammonium should be given as it significantly lowers the pH. During cultivation, the pH of Anthurium already drops significantly by nature. An optimal K:Ca ratio is around 1.2:1.

Brown spots caused by calcium deficiency

In recent years, it has been common practice to include chlorine (1-2 mmol) in the nutrients as well, allowing the amount of nitrate to be reduced, which can reduce plant resistance and susceptibility to insects. Care must be taken with boron: high boron levels affect the leaf margins, so the amount should be 20 µmol at most.

Leaf margins caused by high boron

Nutritional advice:

mmol/ltr		ppm / mg ltr
6,9	**NO3-N**	96,6
1,7	**SO4**	163,2
0,9	**H2PO4**	87,3
0,3	**NH4**	5,4
3,8	**K**	148,6
2,8	**Ca**	112,2
1,4	**Mg**	34,0
1,6	**Cl**	56,7

umol/ltr		ppm / mg ltr
21,6	**Fe tot.**	1,21
2	**Mn**	0,11
7	**Zn**	0,46
18,9	**B**	0,21
1,6	**Cu**	0,10
1,7	**Mo**	0,16

Nutrients in ppm/mg litre

Greenhouse equipment

Several installations are required to make the greenhouse suitable for growing cut Anthurium. The minimum requirement for screens is a preferably movable sunshade to control the influence of irradiation. In temperate regions, an energy screen is also important. Growers are increasingly using anti-condensation (AC) foil as a third movable screen. This screen can be closed on cold days to save energy and maintain the climate (RH). A movable AC foil is generally used for two winters. Some growers also work with two screens and a fixed AC foil. The foil is installed in October and removed in spring. In tropical regions, people also work with a fixed sun screen over the ridge of the greenhouse structure or grow under shade net structures. In tropical regions, cultivation can only be done under a shade net; the disadvantage of this is that the crop gets wet every time it rains and the fertilizers wash out. A rain screen inside the greenhouse can then be used.

Simple rain screen

Simple fixed screen

In the more high-tech greenhouses, the façade is equipped with roll screens and can also be wrapped with AC foil if required. It is also possible to save additional energy by applying bubble foil to the outside of the façades and base of the greenhouse. This results in significant savings. In more tropical regions, people generally opt for a fixed sunscreen on or against the façade to protect the plants from too much light coming in from the side.

In the spring and summer months (depending on the cultivation location), it is essential that the crop grows at the right RH. High-pressure humidification (min. cap. 350 cc/m²/hour) is used for this. On very hot days, this can be used to flatten the temperature peak and, if necessary, can also be used in addition to a low-pressure system. A properly functioning humidification system is essential for growers in temperate and warm regions. A disadvantage of a low-pressure system is the fact that the crop gets wet. This is especially annoying for employees. During crop work, they often have to work in a rain suit or with a plastic apron. The concrete paths also become wet and slippery. In tropical areas, a misting installation is unnecessary. When deploying pad/fan systems, it is important to fine-tune the sizing of the greenhouse. The length of the beds is limited to about 50 meters in most cases. With longer beds, it is not possible to cool the greenhouse properly.

Pad/fan system and a movable outdoor screen

Simple low-pressure humidification

The heating system (if applicable) generally consists of a pipe/rail system. Most growers also use an upper net, which can also be used for internal transport. For both networks, it should be possible to control them independently. The lower net consists of eight tubes in an 8-metre grid and the upper consists of four tubes. In a more simple cultivation set-up, where heating is not used, internal transport is done mainly by harvest carts positioned in the middle aisle. Harvesters collect the flowers in their hands while cutting. They are then placed in a bucket of water on the harvest cart. It is important that the flowers are harvested carefully. A tutorial video is available on Anthura's website. The middle aisle should preferably be concreted. This makes it is easy to drive the harvest carts to the processing area smoothly. This helps to maintain the optimal quality of the harvested flowers.

In more tropical areas, it is better to choose a different model of greenhouse. Sawtooth-style greenhouses have the advantage of protecting the crop from weather while ensuring good air exchange.

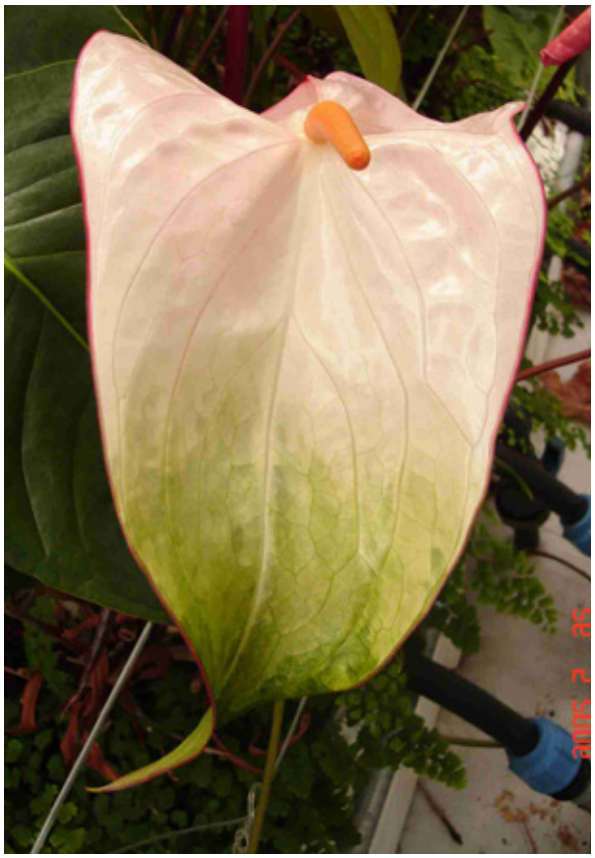
Sawtooth greenhouse

Arched greenhouse with shade net

Climate

Temperature
Although Anthurium is originally a tropical plant, it also has the unique ability to withstand high RH/low MD well. Most crops develop problems if their growing medium is moist for long periods of time. For Anthurium, this does not apply. In addition, CO_2 requirements are low and there is a wide range of cultivation temperatures, making heating unnecessary in large parts of the world. Where heating does need to be provided, a light heating system already provides the solution.

Prolonged temperatures below 15°C and/or above 30°C should be avoided as much as possible. Night temperatures of around 15°C and slightly lower are usually not directly harmful to the plant. This also applies to a maximum temperature above 30°C. At temperatures above 30°C, production can be maintained by keeping higher humidity levels. For optimal production, an average of 19-23.5°C per 24 hours should be maintained.



High 24 hour temperature in summer increases likelihood of green tongues

Star damage due to low 24-hour temperature

Relative humidity
However, Anthurium is sensitive to insufficient air humidity. Photosynthesis will be lower because the stomata are less open. Prolonged excessive air humidity, whereby the plant becomes inactive, is likely to result in a lower quality end product. It is also important to maintain a higher relative humidity (lower MD) at higher light levels.

Use clean water such as rain or osmosis water for humidification. When this is not used, the crop and flowers become contaminated with lime or algae deposits.

Simple humidification system

Leaf contamination caused by chalk or nutrient elements form the water

Light level

At crop level, approximately 300 µmol/m²/s par light (15-20 klux) should be maintained for Anthurium andreanum. In the event of too much light, the leaf and flower go pale and burning may occur. Too little light, with a comparatively high temperature, results in an over-stretched, low-quality plant with lower flower production.

In North-Western Europe, there is sufficient natural light between March and October for Anthurium to grow optimally. In Southern Europe there is sufficient light year-round and in most tropical regions there is sufficient outdoor light for optimal growth, but greenhouse arrangements and installations determine whether optimal light levels can be achieved. Up to around 3,000 joules/cm²/day of radiation sum can be achieved under summer conditions. In winter, an average light sum of 200 joules/cm²/day is achievable in North-Western Europe. Using modern greenhouses and screens, optimal production for cut Anthurium can be achieved even at a weekly light sum of around 6000 joules/cm²/day outdoors.

Climate parameters overview (table)

climate parameters cut anthurium					
	desired			damage threshold	
	day	night	24-hour period/sum		
light					
temperature					
moisture deficit (MD)/RH					

*with MD max. 8 g/m³
**with MD max. 8 g/m³
**depending on light/energy level/moisture level
***depending on light/energy level

Burning of young leafs due to excessive radiation / direct sunlight.

Chalk as a screen

In the warm period, it is advisable to work with a chalk layer on the greenhouse cover. The screening percentage depends on conditions and greenhouse equipment and can reach 75%.

Plastic greenhouse deck, chalked

Crop maintenance

As Anthurium grows according to the principle of leaf-flower-leaf-flower, crop maintenance is necessary. This can be done in different ways.

Traditional

Too many leaves often leads to curved stems and damaged flower buds. Regular leaf cutting is necessary to keep the crop open and to achieve a higher production of smooth flowers. The more plants per square metre, the more leaves need to be cut, and with greater frequency. In general, least 2-3 leaves must be kept on the plant. Traditional leaf cutting is carried out every 4-6 weeks. However, this varies by variety and depends on plant density. The different cultivation strategies depend on the variety and its situation..

Half-leaf system

This system starts with halving the new leaves around 4-6 months after planting the young plants. The advantage of this system is that the crop architecture improves considerably. Thanks to the half-leaf system, more light falls on the crop and both production and quality are improved. Depending on the variety and the size of the leaf, the plants will have 4-8 half-leaves before the old lower leaves have to be removed. Leaf tearing is done every 10-14 days.

Ideal lighting into the crop using young leaf breaking method

Young leaf-breaking system

This system starts with young leaf-breaking, after first building the optimal plant by means of the half-leaf system. The advantage of young leaf-breaking is that production and quality increase and the need for labour decreases (due to less leaf cutting). Production can increase by 10%-25%, depending on the cultivar, and the flower size can be 0.5-1.5 cm larger. The plant does not have to put any energy into the formation of leaves. Young leaf-breaking cannot be carried out continuously. After breaking 2-4 leaves (4-10 months), leaves should be replaced again. The new leaf stands higher above the old leaves, as a result of which the light incidence in the bed improves strongly (optimal crop architecture).

Young leaf-breaking should be done every week. When leaf breakage goes on too long, flower quality can decrease (less calcium uptake), the flower stem becomes too short, and crop photosynthesis decreases (due to old/yellow leaves). Young leaf breaking can lead to crop acceleration, allowing you to focus on production for the holidays. Be sure to replace or allow new leaves to come through in the appropriate season.

Situation after 2.5 years of cultivation: on the left leaf halving and young leaf breaking and on the right only leaf halving

Situation due to combination of leaf halving and young leaf breaking

Aiming crops to prevent falling

After 3-4 years of cultivation (depending on the cultivar), the crop starts falling over. To manage this, timely training is needed. These days, this is mostly done by the intermediate wire system.

Further optimization of crop training is now also done with an intermediate wire in the middle of the crop or with mesh.

Crop steering by means of cross-wires

Sloping crop position after turning up the supporting mesh

Diseases and pests

In Anthurium, relatively few diseases and pests occur naturally. Pests can mostly be controlled well biologically with the predatory mites Montdorensis or Swirski in bags, or by scattering and supplementary feeding.

Nevertheless, there are some diseases and pests that can damage crops to a greater or lesser extent.

Animal infestations
Crop damage can be caused by the following creatures: thrips, aphids, spider mites and slugs. Trips and spider mites are the main pests in Anthurium.

Fungi
Crop damage can be caused by the following fungi:
Root fungi: Pythium, Calonectria, Phytophthora, Fusarium and Rhizoctonia
Plant stem: Fusarium, Rhizoctonia and Colletotrichum

In Anthurium, plant protection products can also be applied via LVM or Fog. In specific cases, spraying is preferred.

Bacterial diseases
One of the diseases which causes the most losses in Anthurium cultivations is the bacterium Xanthomonas phaseoli pv. Dieffenbachiae, but also the bacterium Ralstonia solanacearum can lead to considerable production loss. Bacterial diseases come from outside. Therefore, taking preventive phytosanitary measures is the best way to avoid them. Begin cultivation with high-quality starting material from a reliable supplier.

Phytotoxicity
Watch out for phytotoxicity. Not all pesticides can be applied without causing damage in Anthurium. For adequate control measures, please contact Delphy or another consultancy. Anthurium is also sensitive to wetting agents and many other additives (sealants, among others). Before applying a new pesticide, the product must be tested on a few plants. Keep in mind the slow response of the crop when evaluating. This can take up to 10 weeks.

Harvesting, packing and selling

The flowers are ready to be cut when the spadix has ripened for three-quarters of its length. Ripening implies the discoloration of the spadix and the appearance of small dots on the opened flowers of the spadix. Readiness for cutting can also be determined by touching the flower stalk directly below the bract; it must be hard and solid. Cutting flowers is skilled work. A new harvester needs extra guidance to avoid damage to the bract.

The greenhouse is divided into cutting compartments, but a grower can vary the rate of return to a particular cutting compartment. Depending on the situation and growing area, the 24-hour temperature can be changed to influence the ripening rate. At times, this tool can be used to regulate supply. Moreover, for some varieties, it is possible to let the flowers become overripe. This possibility is used to a limited extent because it ultimately affects the production of a crop. The impact on a crop increases enormously with discoloration.

When the flowers are cut, they are transported to the shed using harvesting systems. Usually, harvest carts with a mast are used, which is fitted with a carousel with harvest vases on both sides. In the shed, the flowers are then manually sorted by size. By means of an internal transport system, the packing stations are fed with a constant supply of Anthurium cut flowers. Of course, you can also use a table arrangement, depending on the scale and availability of labour.

The bottles can temporarily hold the cut flowers together for collection later on

Internal transport of flowers using cart

Packaging

The packaging method depends on what the market prefers. The main packaging method is the single-use auction box. The stems are cut at an angle at the packing stations and provided with a bottle of water. The flowers (bract) are then fitted with a transparent plastic bag and the flowers are packed individually, by sticking them to the bottom of the box. For now, this is largely a manual process. Depending on the diameter of the bract, a box can take 8, 10, 12, 16 or 20 flowers. The most common diameters are 11-13 cm (16 per box) and 13-15 cm (12 per box). It is also possible to pack the flowers in a flow pack. This is usually done at the request of the buyer and depends on the market. For air export, the flowers are also glued to the inside of the lid. Of course, this is customized and only upon request. The numbers mentioned per box are the standard numbers used in the European market. In China, the packing density per box is much higher, as flowers are packed in a more overlapping manner.

Packaging method China

Packaging method Europe

In Europe, containers equipped with water and a top rack are increasingly being used (multi-use packaging) to pack flowers with the longest possible stem length. The total length of the box is 100 cm, often requiring a piece to be cut off the stem to make it fit. With the container packaging method, this restriction does not exist. The containers are also often fitted with printed collars to prevent the flowers from being damaged. This packaging method is highly appreciated by florists. They are mostly looking for distinctive products and are willing to pay a higher price for them. Moreover, the proportion of this packaging method fluctuates throughout the year because stems tend to be shorter in the summer months.

Labour

When packing flowers, it is important to find the right balance between speed and quality. It takes several months to train a packaging worker. A worker will pack about 200 flowers per hour on average. The upper limit is close to 220 flowers per hour. Quality comes before speed to avoid complaints from the chain. At a higher number of stems per hour, the risk of damage increases. The numbers mentioned are based on Dutch conditions, i.e. companies working with roller conveyors/ buffer systems and packing tables.

Buffer of roller tracks seen from the packing table

Bucket provided with tubes, wooden plate as spacer

The average labour requirement is four to five employees per hectare. This depends on the setup of the company. Consider, for example, the width and depth of the range and the marketing method. The main cultivation operations are: harvesting, crop operations such as leaf breaking/cutting, shoot removal and crop training. The conventional division between greenhouse labour and shed labour is 50/50. For growers who focus on marketing through the auction clock, this ratio will work out reasonably well. But for growers who are increasingly focusing on direct sales, the ratio when it comes to labour requirements will lean more towards the shed.

In terms of labour, the use of internal transport and a roller conveyor system (flower buffer) takes the pressure off employees and results in labour savings for the grower. These systems can also be equipped with special software, giving the grower or cultivation manager insight into performance per employee and per variety. Having management information at bed level makes it possible to make informed decisions. It is important that work in the greenhouse and in the shed takes place under good climatic conditions. Again, not all the systems listed are directly necessary for your business set-up. Your account manager and/or agent can advise you on this. There are several possible solutions based on your needs and taking into account your investment budget.

Conclusion

This cultivation guide has given you an insight into the Anthurium cut flower cultivation. We hope these tools will help to support you in this specialist cultivation. When grown successfully, the results are beautiful, long-lasting and colourful Anthurium cut flowers.

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