Cultivation guide

Anthurium cut flowers

Within Europe

Anthura®
Creating blooming happiness

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Cultivation guide anthurium cut flowers

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.

From 2009 to 2018, anthurium sales struggled in Europe. Partly in response to this, cultivation acreage decreased, especially in the Netherlands. Current acreage is about 30 ha in the Netherlands and about 20 ha in Italy. These are the two main producing countries. There is also production in Poland, Spain and Portugal. With the exception of flowers grown in the Netherlands, most of the flowers are sold in the production country.

In case of cultivation in the Netherlands, the stock function has completely shifted and lies with the grower in the greenhouse. Anthurium now profiles itself in the market as a full-service product in the luxury segment. This has been very successful, as many florists, garden centres and flower arrangers enjoy using anthurium. 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. By responding to market demand, you can differentiate yourself as a grower, and price is not usually an issue. Meeting customer needs is now the top priority for growers.

As a new grower of anthurium cut flowers, it is important to choose your position. This especially applies when selling through the Dutch marketing system. There are several partnerships between growers you can join. But there are also growers who operate independently and have struck a balance between clock, clock presales and direct sales to wholesalers. Grower associations mainly focus on sales via online stores (links). Both anthurium cultivation and sales are stable. In the long term, however, more and more space is emerging, as succession is a key issue for a number of companies that have not yet found an answer.

Production of cut anthurium is possible in almost all European countries, provided the flowers can be sold locally through wholesale markets and direct sales. With the exception of Belgium, there are no other growers who grow abroad and sell their anthurium cut flowers through the Dutch sales system. Among other things, this is due to transport issues. By marketing the flowers locally, there is a significant difference in transport costs for the grower.

Solutions to key future cultivation and environmental issues

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. The average energy requirement for a cut anthurium crop in the Netherlands is 20-22 m^3 of natural gas per square metre per 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. This brings the current energy demand to around 15 m^3 per square metre.

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. 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. Almost all growers in Europe are opting for a larger plant type. The larger the plant, the faster you will be back in production.

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 in a growing bed or a final pot. 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.

6 cm rock wool plug (type 6SP1)

For growers who want to do part of the growing themselves, but cannot or do not want to pot the plugs, the 6 cm rock wool plug is a great solution. These plantlets are 13-20 cm tall and have a growth time of eight weeks after potting up upon delivery. When choosing this type of plug, growers will need to allow for a growing period of two to three months before plants can be planted in the bed. When growing type SP1 and type 6SP1, it is necessary to consider the appropriate climate settings. Anthura has a cultivation manual available for growers who are interested in growing plants themselves. During the growing phase, the microclimate around the plants is very influential. Disruptions to the microclimate can lead to severe growth retardation or even loss of planting material. Therefore, it is not possible to plant type SP1 and 6SP1 directly in the growing bed.

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.

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, that significantly reduces labour costs.

Type SP1, paperplug, 7-12 cm

Type 6SP1, rock wool plug, 6 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 plan-ted 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

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. We will gladly calculate this exact planting distance for you.

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 1x perlite weg and oasis.

Excellent root growth in perlite

The choice depends on the grower's preference and also on availability and price. Anthurium cultivation takes at least five to six years, which is 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. When it comes to choosing a substrate, good advice is half the battle. Pay particular attention to the quality of the substrate. With oasis, it is important to let the bags air out thoroughly and use Dolokal before planting.

Anthurium is grown in beds, gutters or pots. Preference is given to cultivation systems that are separate from the soil. In addition, cultivation on gutters is recommended. This cultivation method uses a smaller substrate volume and the water supply is better. In the cultivation of pot plants, the dripper is usually the weak link. In addition, watering can never be optimal as the number of plants in a pot varies. 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.

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 is recirculated and disinfected by a UV unit or a heater.

Drainage of a cultivation bed

Cultivation in a pot system

Cultivation in a W-gutter system

Production

Unexposed, an average of around 70-140 flowers per square metre per year can be harvested. Lighting is not necessary for successful cut anthurium cultivation. With lighting, part of the production shifts from spring to winter and the number of cut flowers per year can be about 15-20% higher. Lighting can lead to more stable sales and labour requirements, in addition to some production increase.

Production can be shifted in order to produce more around the holidays, for example. Some varieties cannot be cut for long periods of time. This is also known as saving the flowers. Other varieties, in contrast, can be cut younger. With the right young leaf break schedule, additional production can also be achieved and there are also opportunities in terms of climate (e.g. higher temperatures). During January-March, production is at a lower level. Depending on the heating and lighting schedule, the spring peak can be moved forward. Production will peak around late April/early May due to increasing natural irradiance.

Energy demand

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, the CO_2 requirement is low and there is a wide bandwidth in terms of cultivation temperature, making natural heating possible. It is also fine to work with a light sum per week.

Air humidity

Anthurium can be grown in highly insulated greenhouses. Additional façade insulation, bubble foil, or a fourth movable or fixed foil screen are becoming more common. As a result, gas consumption per square metre has now dropped to below 15 m^3 per year for heating.

Dehumidification

Although anthurium can be grown moist, they definitely need basic moisture removal. This can be done by using dehumidifiers in addition to conventional moisture removal (by tube, screen gap, etc.). When these machines are used, water is extracted from the greenhouse air and actually removed from the greenhouse. Drainage of moisture due to higher tube temperatures often actually stimulates evaporation too much, requiring unnecessary additional moisture removal.

Dehumidifying greenhouse air

Anthurium can release some of its root pressure through guttation

Temperature

In the tropical regions where anthurium originally comes from, there are considerable temperature fluctuations. In the evening, the temperature can drop as low as 16°C in some areas while during the day it gets close to 30°C. The plant is protected under foliage, so temperature fluctuations are gradual. In current cultivation practice, we also apply these dynamic cultivation temperatures with the aim of using as little energy as possible. Several studies have shown that in the right conditions, anthurium can be grown perfectly well at temporarily lower temperatures.

Light

Lighting is not necessary for successful anthurium cultivation. The current assortment is much less sensitive to flower bud abortion, which means that winter production is guaranteed even under natural Northern European light conditions.

Light compensation is used in anthurium, whereby a certain light sum per week is usually targeted. This allows lighting at times when it is most advantageous in terms of energy consumption.

CO_2

Additional CO_2 dosing can have a minor effect on production, which is highly cultivar-dependent. In some cultivations, extra CO_2 gives a slightly larger bract diameter. The CO_2 level should not fall below the outdoor value.

Chalk as a screen

Even under Northern European conditions, it is advisable to apply a light coating to the greenhouse cover from late April to late August. In modern greenhouses, a screening percentage of around 40% is sufficient. Depending on conditions and greenhouse equipment, this may go up to 60%.

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 providing 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.

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 drip 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.

Kurkschade

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 2,000 m^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.

Fertiliser advice cut anthurium

Average scheme EC 1,5 | Starting water: rainwater | Tank volume 1000 litre | Solution 100 times concentrated

Solution A (Tank A)										
Calcium Nitrate		43	kg.	$Ca(NO_3)_2$	18,80%	Ca	1,10%	$N\text{-}NH_4$	14,40%	$N\text{-}NO_3$
Potassium Nitrate		3,3	kg.	KNO_3	38,40%	K	13,70%	$N\text{-}NO_3$		
Calcium chlorid	liquid	20	ltr.	$CaCl^{2+}$	35,00%	Ca				
Micro-elements										
Manganese sulphate		34	gram	$MnSO_4$	33%	Mn				
Zinc sulphate		200	gram	$ZnSO_4$	23%	Zn				
Borax		180	gram	$Na_2B_4O_7$	11%	B				
Copper sulphate		45	gram	$CuSO_4$	26%	Cu				
Sodium molybdate		45	gram	Na_2MoO_4	40%	Mo				
Iron chelate	3,1 ltr. or	4	kg.	Fe-DTPA	3%	Fe				

Solution B (Tank B)							
Mono Potassium Phosphate	16	kg.	KH_2PO_4	28,50%	K	22,70%	P
Potassium Nitrate	21,7	kg.	KNO_3	38,40%	K	13,70%	$N\text{-}NO_3$
Potassium Sulphate	4	kg.	K_2SO_4	41,50%	K	18,00%	S
Magnesium Sulphate	35	kg.	$MgSO_4$	9,90%	Mg	13,00%	S

Fertilization scheme

When the starting water contains nutrients, the nutrition schedule has to be balanced correctly. Bicarbonate (HCO_3) 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.

Nutritional advice:

mmol/litre		ppm/mg litre
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

µmol/litre		ppm/mg litre
21,2	Fe tot.	1,19
2	Mn	0,11
6,9	Zn	0,45
18,6	B	0,2
1,8	Cu	0,12
1,8	Mo	0,17

Nutrients in mmol/µmol litre

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.

The greenhouse 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 the autumn and winter months, many growers use active dehumidification, by Drygear, for example. These machines remove excess moisture from the greenhouse air. The resulting heat is returned to the greenhouse. By using active dehumidification, it is possible to leave the AC foil closed. After all, using gaps for moisture also dissipates heat, which is not welcome.

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.

Anti condensation foil screen

Simple low-pressure humidification

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.

The general rule is that it is important to resolve any temperature differences. The use of fans is standard. Infrared plant temperature and PAR measurements in the greenhouse are also standard in cultivation.

The heating system generally consists of a pipe/rail system. Most growers also use an upper net. The upper net can 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.

Fog in the greenhouse through high-pressure fog system

Climate

Temperature

Anthurium is a subtropical plant. Temperatures below 15°C and above 30°C have to be avoided as much as possible. Night temperatures of around 15°C 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.

Relative humidity

However, anthurium is sensitive to insufficient air humidity. When air humidity is too low, photosynthesis takes place at a lower rate 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 moisture deficit) 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.

Leaf contamination caused by chalk or nutrient elements from 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. Outside this period, the radiation sum per day drops below 6-7 mol to reach around 1.5-2.0 mol per day in December and January.

Climate parameters cut anthurium

	Desired			Damage threshold
	Day	Night	24-hour period/sum	
Light	300 µmol/m²/s / 15-20klux		7-9 mol/m²	> 450 µmol *
Temperature	22-27°C	17-21°C	19,0-23,5°C	< 15°C >30°C**
Moisture deficit (MD)/RH	6 gr/m³ / 80%	> 2 < 4 gr/m³ / <95% > 75%		> 8 gr/m³ / <65%***

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

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

Crop in which the leaves are halved

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 Swirskii 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. Thrips 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

Physiological root reduction:
Root rot due to root glassiness can occur during April-October when there are large climatic variations in cultivation.

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.

Root glassiness

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.

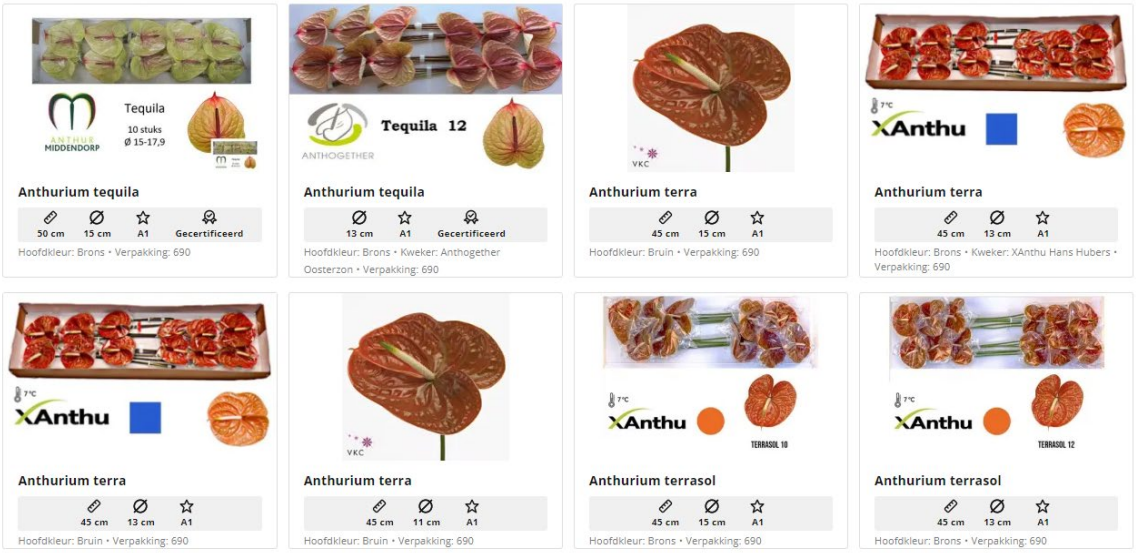
When the flowers are cut, they are transported to the shed using harvesting systems. Usually, harvest carts with a mast are used, which is fitted with a carousel with harvest vases on both sides. In the shed, the flowers are then manually sorted by size. By means of an internal transport system, the packing stations are fed with a constant supply of anthurium cut flowers.

Hanging harvesting system in combination with the upper net of the heating

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 flo-wers. 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.

Packaging method Europe



Wholesale webshop offer

Anthurium packed on water (source: Anthogether)

(source: Anthogether)

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.

Anthurium with extra long stems (source: Anthogether)

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.

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.

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.

Anthura B.V.

Sales Department
T +31 10 529 19 19
info@anthura.nl