

# Cultivation manual

## Spathiphyllum seedlings

### Recommended guidelines

This document consists of a number of guidelines for cultivating Spathiphyllum seedlings produced by Van der Voort Young Plants b.v. and sold by Floricultura b.v. It encompasses the varieties 'Chopin', 'Strauss', 'Torelli', 'Bellini', Vivaldi and 'Mozart'.

These production guidelines were developed by means of frequent inspections during the cultivation of Spathiphyllum at various nurseries. The data concerning such factors as climate and fertilising were recorded simultaneously at the nurseries in the various growing areas. This data became the basis for the guidelines, as discussed here, to be followed in the various production areas.

### Production periods

Length of production period from seed tray:

Spathiphyllum length	Weeks
Spathiphyllum 9 cm	approximately 16 to 19 weeks
Spathiphyllum 12 cm	approximately 18 to 22 weeks
Spathiphyllum 14/15 cm	approximately 23 to 28 weeks
Spathiphyllum 17 cm *	approximately 26 to 29 weeks

\* This is a compact model of 17 cm with 3 plugs out of 390-cells. Our production period is shorter because we put more plugs in it.

### Duration of the various production stages

Spathiphyllum 9 cm

- the plants remain closely spaced for approximately 6 to 7 weeks
- once the plants have been spaced out (after flowering treatment) to 46-50 plants/m<sup>2</sup> for a duration of approximately 10 to 12 weeks.

Spathiphyllum 12 cm

- the plants remain closely spaced for approximately 10 to 11 weeks
- once the plants have been spaced out (after flowering treatment) to 26-30 plants/m<sup>2</sup> for a duration of approximately 8 to 11 weeks.

Spathiphyllum 14/15 cm

- the plants remain closely spaced for approximately 12 to 14 weeks
- once the plants have been spaced out (after flowering treatment) to 18-22 plants/m<sup>2</sup> for a duration of approximately 11 to 15 weeks.

Spathiphyllum 17 cm

- the plants remain closely spaced for approximately 19 to 20 weeks
- once the plants have been spaced out (after flowering treatment) to 16-18 plants/m<sup>2</sup> for a duration of approximately 7 to 9 week.

All of this depends, of course, on the growth of the plants and the appearance of the flowers on the plants. The period during which the plants are grown from seed and the time at which the flowering treatment is given are important factors.

## Climate

Daytime temperature:	21°C
Average 24-hour temperature:	21-22°C
Night temperature:	20-22°C

Target value for relative humidity in the night between 80-85%. At daytime between 70-75% shade when light intensity reaches approx. 100-120  $\mu\text{mol}/\text{m}^2/\text{s}$ . In springtime *Spathiphyllum* has to be shaded earlier during the day. This is necessary in conjunction with light-sensitive planting stock. The young plants have just emerged from a typically low-light winter period, and this makes them more vulnerable to damage from excessively high light intensities.

## Fertilizing

The tables (Target value analysis for *Spathiphyllum*) below give the target values for the various elements used in fertilizing *Spathiphyllum*. These values apply to *Spathiphyllum* varieties 'Chopin', 'Strauss' and 'Vivaldi'. These target values were developed by taking simultaneous soil and leaf samples at a number of nurseries and then comparing this data with data collected at the end of the production period (flowering phase). Following these tables, the quantities of fertilizers used in the A-container and B-container solutions are given in terms of their quantities/1,000 liters of water.

### Target value analysis for *Spathiphyllum* (based on 1:1.5 volume extract)

#### Growth & flowering

EC Ms/cm:	0.7 - 1.0
pH of water:	5.6 - 6.0

#### Cations (mmol per liter/kg)

NH <sub>4</sub> <sup>+</sup> ammonium	K <sup>+</sup> potassium	Na <sup>+</sup> sodium	Ca <sup>++</sup> calcium	Mg <sup>++</sup> magnesium
0.1	2.5	< 2.0	1.9 – 2.2	1.25

#### Anions (mmol per liter/kg)

NO <sub>3</sub> <sup>-</sup> nitrate	NO <sub>2</sub> <sup>-</sup> nitrite of Si	CL <sup>-</sup> chloride	SO <sub>4</sub> <sup>--</sup> sulphate	HCO <sub>3</sub> <sup>-</sup> bicarbonate	H <sub>2</sub> PO <sub>4</sub> <sup>-</sup> phosphate
4.0 – 6.0		< 2.0	1.0	< 0.5	0.5

#### Trace elements (micromol liter/kg)

Fe (total) iron	Mn <sup>++</sup> manganese	Zn <sup>++</sup> zinc	B <sup>+++</sup> boron	Cu <sup>++</sup> copper
8.0 – 12.0	0.6	2.0	4	0.3



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### Solution in A-container

(per 1.000 litres)

Calcium nitrate 100 kg

Fe-DTPA 3% 5 liters

of 6% 4 kg

Fe-EDDHA 4 kg

### Solution in B-container

(per 1,000 liters)

Mono-potassium phosphate 17 kg

Magnesium sulphate 30 kg

Potassium nitrate 25 kg

Potassium sulphate 10 kg

Manganese sulphate 800 grams

Zinc sulphate 210 grams

Borax 20 grams

Copper sulphate 16 grams

Sodium molybdate 32 grams

### More about these target value analysis for *Spathiphyllum*

In cases where potting soil mixtures are used, the phosphate level will be more than sufficient during the early production phase. When starting production, fertilize with both the A-container and B-container solutions. This is determined by the speed of growth and the sturdiness of the plants.

These fertilising recommendations apply to both sprinkler circuits and to ebb and flow systems. When using a sprinkler circuit, fertilize with an EC between 2.5 – 3.0 ms and rinse off (EC around 1.2 ms and use wetting agent) thoroughly. When in doubt, measure with an EC meter next to the plants.

When using an ebb and flow system, irrigate with an EC of 2.5 – 2.8 ms. The recommendations for the ebb and flow systems assume a total EC, including the EC of the recirculation water. The kind of water being used for sprinkling applications can result in differences in the nutrient composition of the sprinkling water. For this reason, it would be advisable to monitor this by taking leaf and/or soil samples. At the end of production, the figure indicating the potassium level in the soil sample can be extremely low due to more absorption by the plants. The leaf samples, however, will usually show adequate potassium levels.

Since these are general guidelines, there can be differences from one nursery to another. For instance when other potting soil mixes and/or fertilizer values are applied. It is recommended to take a sample for monitoring purposes once every 3 to 6 weeks to see how well the target value analysis is being met.

If a grower don't use A-container and B-container solutions they can use basic fertilizers. For propagation please use a basis fertilizer of 20-20-20 or 20-10-20 (Nitrogen, Phosphor, Potassium). After spacing switch to a basic fertilizer of 15-11-29.

### Technical information

1 gr 20-20-20/L = 0.9 EC

1 gr 20-10-20/L = 1.2 EC

1 gr 15-11-29/L = 1.0 EC

If they can rinse off (with an EC around 1.2 ms), fertilize with an EC between 2.0 and 3.0 ms. If they can't rinse off, fertilize with an EC of 2.0 ms (not higher)

## Diseases and pests

The following information addresses only the most commonly found diseases and pests in *Spathiphyllum* production. When other symptoms of diseases or pests are found, a specialist should be consulted.

### Snails and slugs

Snails and slugs can cause a lot of damage by feeding on young leaves. There are various methods of control; consult your dealer for more information.

### Thrips

Once flowers have opened completely, check for damage done by Western flower thrips. Thrips are attracted to the flower's sweet fragrance when the pollen is released.

### Fungi

The most common fungal diseases affecting *Spathiphyllum* are *Pythium*, *Phytophthora* and *Cylindrocladium*. Take preventive measures and, if an attack is observed, apply corrective measures. If there are doubts about whether or not the roots have been affected by fungi, treat the plants with an agent that controls *Phytophthora* and/or *Cylindrocladium* about 1 to 2 weeks before spacing the plants out.

*Always rinse off the plants with clean water after applying plant protection agents!*

## Flowering treatment

Obtaining natural flowering for plants in small pots has not yet been achieved. This means that the plants have to receive special treatment to get them to bloom. The agent used for this is GA<sup>3</sup> (active ingredient: gibberellic acid A3, 9.6%). Examples of this product on the market are Berelex, Florgib or Progridip.

### For 9 cm pot plants

Spray with 200 ppm GA<sup>3</sup> in 10 litres of water; this will treat approx. 6,100 plants covering 50 m<sup>2</sup>. This flowering treatment has to take place approximately 5 to 6 weeks into the production period (after having been transplanted from the seed trays to the 9-cm pots). This is thus before the plants have been placed farther apart. Flower induction will then take approx. 10 to 12 weeks.

### For 12 cm pot plants

Spray with 200 ppm GA<sup>3</sup> in 10 litres of water; this will treat approx. 3,200 plants covering 50 m<sup>2</sup>. This flowering treatment has to take place approximately 7 to 8 weeks into the production period (after having been transplanted from the seed trays to the 12-cm pots). This is thus before the plants have been placed farther apart. Flower induction will then take approx. 11 to 13 weeks.

### For 17 cm pot plants

Spray with 250 ppm GA<sup>3</sup> in 10 litres of water; this will treat approx. 1,600 plants covering 50 m<sup>2</sup>. This flowering treatment has to take place approximately 14 to 15 weeks into the production period (after having been transplanted from the seed trays to the 17-cm pots). Flower induction will then take approx. 12 to 15 weeks. Use a spreading agent for better distribution and absorption (10 ml spreading agent/10 liters solution).



During the spring, flower induction will be 10% to 15% faster than in the autumn. October, November and December are the most difficult months to get *Spathiphyllum* to bloom. If the plants do not meet the minimum height requirement once the desired flowering treatment period has been reached, the flowering treatment must be postponed until this height has actually been reached.

After October, the growth of the plants decreases so that the flowering treatment will have to be done 5 to 6 days later. In the spring, the increased growth rate of the plants will allow the flowering treatment to be applied earlier. It is advisable to treat the plants late in the afternoon or during the evening hours so that the leaves remain wet longer for better absorption of the agent. During periods of high temperatures in the summer, the effect of the agent can be reduced; in this event, it would be advisable to repeat the treatment after about 6 days. It would also be advisable to conduct flowering treatment tests yourself and record the results to obtain a better picture of the results of these treatments at your own nursery.

These guidelines were written as based on the average Dutch nursery and the growing conditions typical for the Netherlands. For this reason, other values may apply in other cases. With this information, growers should be able to make a good start at producing high quality *Spathiphyllum*. Naturally, experience is always the best teacher. For this reason, it would be advisable to record production data to obtain a better picture of your own growing conditions.