

## Cultivation recommendations for geranium

**Advice:** Exact planning can avoid problems!

### Date of delivery

depends on many factors:

- Plant specification required?
- What type of cultivation technique will be applied?
- Available growing area at what date?
- Marketing period?

Example for cultivation for sale end of April, northern climate – for the South approx. 2 weeks can be deducted.

Pot Size	Number of weeks from purchase until sale
6 inch	Zonals: 12-14/Ivies: 14-16
5 inch	Zonals: 10-12/Ivies: 12-14
4 inch	Zonals: 8-10/Ivies: 10-12

Zonals not and Ivies once pinched!

Unrooted cuttings stuck directly in the pots require approx. 3 additional weeks of cultivation period.

### Preparations before the plants arrive

- Prepare the growing area and disinfect it
- Provide new and clean pots, used ones need to be disinfected
- house-warm growing medium

### Processing of the young plants upon arrival

- Advice:** Prompt processing of the young plants and a position with optimal conditions is the precondition for quality! Pot the plants immediately upon receipt! Should this not be possible,
- open the boxes immediately upon arrival thus the plants get light and air
  - water dry plants before potting

### Growing medium

- Use quality substrates with pre-determined analysis for hygiene reasons
- Loam potting growing medium can be used, has to be sterilized by steam. Soil analysis before use.
- Components: 15-25% clay is of advantage:
  - ⇒ better buffer
  - ⇒ better leaf wetness
  - ⇒ stable pH
  - ⇒ result: more compact and hardy plants
- pH:
  - peat substrate 5,6-6,0
  - clay-peat-substrate 5,8-6,2

**Advice:** check pH during the cultivation, as it can vary depending on substrate and hardness of water.

### Feeding

**Advice:** Growing medium should be analyzed before first and last feeding.

Start feeding when the first roots are visible at the pot side. Complete fertilizer 15-10-15-2 0,1% in every watering.

Optimal amount of nutrients in the substrate (in ppm)

Main nutrients	Begin of cultivation period	Middle of cultivation period	End of cultivation period
N	150	200	150-200
P <sub>2</sub> O <sub>5</sub>	100	150	100
K <sub>2</sub> O	180	200	300
MgO	100	150	150

Slow release fertilizers can be mixed into the soil. However, high temperatures can lead to fast and uncontrolled release of nutrients leading to high amounts of salt and adverse growth

### Temperature

1. Rooting period, approx. 14 days
  - Average temperature during the day 68 °F
  - Temperature during the day 72 °F
  - Temperature at night 65 °F
  - Ventilation temperature 75 °F
2. Main growing period:
  - Average temperature during the day 63 °F
  - Temperature during the day 65 °F
  - Temperature at night 61 °F
  - Ventilation temperature 68 °F
3. Hardening phase, approx. 14 days before sale:
  - By hardening, the vegetative growth will be reduced and the plant quality will be maintained until sale.
  - Average temperature during the day 59 °F
  - Temperature during the day 61 °F
  - Temperature at night 57 °F
  - Ventilation temperature 65 °F

### Air humidity

**Advice:** Avoid too high relative humidity in the greenhouses as this reduces plant transpiration.

This will lead to:

- nutrients are not absorbed
- diseases
- disturbed growth habit
- too low transpiration
- high pressure inside the cells (Turgo pressure) leads to cell rupture.
- periferation, oedemas
- soft and puffy plants by large cells
- high risk of rotting by Botrytis

Causes:

- highly insulated greenhouses with energy-saving glass:
  - Minimum exchange of air through joins and holes
  - Humidity will stay in the greenhouse
- Watering of slabs and sand beds:
  - open water-bearing surfaces, humid areas emit a lot of water vapour

Remedies:

- Too different heating and ventilation temperatures
- Reduction of the air humidity in the greenhouse by:
  - Covering the slabs and sand beds with anti-alga film
  - Avoiding water under the benches
  - Avoid too high reduction of the temperature at night (falls below the dew point!)
  - ventilate:
    - a) by hand: Open ventilation 2 times a day for approx. 15 minutes to 20%.
    - b) computerized: input of the percentage of the humidity 80%, start dehumidification
  - Temperature of ventilation max. 7 °F higher than heating temperature

## Light

Geraniums flowering is light dependent

⇒ better growth and abundant flowering during high light periods

⇒ assimilation starts from 1.500 Lux

Optimal: the best assimilation in geraniums will be reached between 25.000 and 35.000 Lux

Shading: only to be applied in case of direct sun, if plant protection or growth retardants are used or if the light intensity reaches 50.000 Lux or more.

## Pinching

### 1. Zonals

the varieties in our assortment do not require pinching as they are:

- free breaking

Exceptions: plants in pots larger than 6 inch for fuller plants

Pinch 10-14 days after potting.

**Advice:** Late pinching will delay flowering!

### 2. Ivies

## Growth regulation

### 1. Use of growth retardants

#### 1.1. Spraying e.g. CCC 0,15%

Zonals: every 1-2 weeks, depending on weather conditions

Ivies: every 1-2 weeks, depending on weather conditions

Start spraying:

- cuttings directly stuck in the pot: 3 weeks after sticking

- rooted cuttings planted in the pot: 1 week after potting

**Advice:** Concentration and frequency depend on the variety and the stage of development in the plant.

#### 1.2. Preconditions for the use of CCC:

- Roots have to be kept moist 48 hours before and after the treatment!!

- Roots must be well developed.

- Temperature of at least 59 °F for 14 hours

- Avoid direct sun: spray on cloudy days or very early in the morning, shade from 10.000 Lux and assure good ventilation

- Spray in the morning, then plants will be dry in the evening to avoid Botrytis.

⇒ The leaves are cooler in the morning than in the evening.

### 2. Growth retardance without chemicals

Why?

- increasing ecological awareness of the population
- increasing ecological awareness of the cultivators
- future total prohibition of growth retardants
- Growth retardants can lead to damages in the plants

Measures:

#### 2.1. Choice of varieties depends on the required production criteria: compact, medium, vigorous varieties.

**Advice:** Plant, pot and production period have to be chosen correctly.

#### 2.2. Water

Elongation growth can be reduced by lower supply of water

**Advice:** Avoid totally drying of plants because this leads to yellow leaves.

#### 2.3. Temperature

“Negative-Diff”:

• High temperatures during the day and low temperatures at night lead to elongation growth.

• High temperatures at night and low temperatures during the day lead to reduced elongation growth.

Temperature during the day: 58 °F, Temperature at night: 65 °F ⇒ 7°F difference

Higher temperatures at night will moreover avoid to exceed the dew point and therefore reduce the risk of Botrytis.

- Cool-Morning:** extreme reduction of temperature from sunrise and up to 2 hours before in order to reduce the average temperature during the day. Reduction from 61 °F to 50 °F for 4 hours.  
Very useful measure in spring because of the relatively cold early morning hours.  
More efficient and economic temperature strategy than the above-mentioned, as no additional heating at night is necessary in order to keep night temperatures higher, and day temperatures do not have to be kept low.
- Combination:** Cool-Morning and “Negative-Diff” can also be used both. So the average temperature during the day can be reached by higher temperatures during the night.  
Temperature during the day 10-17 h 63°F, temperature during the night 17-6 h 67°F, Cool-Morning from 6-10 h, 50-54°F.