GERANIUMS quick & easy

**Rooted geranium cuttings**

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

**DATE OF PURCHASE**

depends on many factors:

- What for plant specification is required?
- What type of cultivation technique will be applied?
- Will the plants be repropagated?
- How many m² are to which date available?
- sales period?

**PREPARATIONS BEFORE THE PLANTS ARRIVE**

**TIP:** fast processing and optimum conditions are essential for a good quality! Pot the cuttings immediately! If this is not possible

> Open the boxes immediately after arrival in order to provide them with enough air and light
> Water dry plants before potting
> Prepare the growing area: disinfect with MENNO Florades or MENNO Ter forte (before using these products you should check whether they have been approved in your country)
> Provide new or clean and disinfected pots, disinfect with MENNO Ter forte or MENNO Florades (before using these products you should check whether they have been approved for in your country)
> The growing medium should be at room temperature

**SUBSTRATE**

**TIP:** Regularly check the pH during longer cultivation periods as it may change depending on the growing medium and/or the hardness of the water

- For hygienic reasons it is better to use industrial substrate with has a soil analysis from the manufacturer
- Own soil mix can be used, but this has to be sterilised with steam. Make an soil analysis before using the soil.
- Components: 15 – 25% clay is an advantage:
  > better buffer > better water containance > stable pH > compacter and robuster plants
- pH:
  > peat substrate 5.6 – 6.0
  > clay-peat-substrate 5.8 – 6.2

**FERTILIZER**

**TIP:** Take 2 – 3 soil samples at the beginning, in the middle and at the end of cultivation.

Start feeding when the first roots are visible at the side of the pot, this will help towards as faster rooting. Complete fertilizer 15·10·15·2 with a concentration of 0.1% in every watering. Change towards the end of the crop to a more potash accented fertilizer.

Optimal amount of nutrients in the substrate (in mg/l of substrate)

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Start of crop</th>
<th>Middle of crop</th>
<th>End of crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>150</td>
<td>200</td>
<td>150 – 200</td>
</tr>
<tr>
<td>P₂O₅</td>
<td>100</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>K₂O</td>
<td>180</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>MgO</td>
<td>100</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

**TIP:** Slow release fertilizers can be used to prepare the sustrate. However, high temperatures can lead to a fast and uncontrolled release of nutrients. Meaning to excessive amounts of salt.

**TEMPERATURE**

1. Rooting period, of max. 14 days
   - Average day temperature 18 – 20 °C (day 20 °C / night 16 °C)
   - Ventilation temperature 22 °C
2. Main growing period:
   - Average day temperature 16 – 18 °C (day 18 °C / night 15 – 16 °C)
   - Ventilation temperature 20 °C
3. Hardening plants, approx. 14 d before sale:
   - Due to a slight hardening vegetative growth will be stopped and the quality of the plant will be kept until sale.
   - Average day temperature 15 °C (day 16 °C / night 14 °C)
   - Ventilation temperature 18 °C

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HUMIDITY

TIP: Avoid excessive humidity in the greenhouses.

This will lead to:
- nutrients not being absorbed
- deficiency diseases
- less growth
- less transpiration
- high cell pressure (turgor) leading to cell rupture
- cork building, oedema
- soft and puffy plants due to large cells
- high risk of rot due to Botrytis; under the right circumstance Botrytis also attacks living tissue

Causes:
- strongly isolated greenhouses with a energy-saving roof:
  > Minimum exchange of air through joins and holes
  > Humidity stays in the greenhouse
- Watering of matting and sand beds
  > open, water-bearing surfaces emit a lot of water vapour
- Too big a difference between heating and ventilation temperatures, temperature falling below dew point.

Remedies: Reducing of the humidity of the air in the greenhouse by:
- Covering the slabs and sand beds with anti-algae foil
- Avoiding puddles under the tables
- Avoid a too low drop in the temperature at night (falling below the dew point!)
- ventilate:
  a) manual: open ventilation twice a day to 20% for approx. 15 minutes
  b) computer: enter 80% as humidity percentage or start of dehumidification
  c) ventilators cause the air to circulate
- The ventilation temperature should be no more than 4 °C above heating temperature

LIGHT

Geraniums are...
- strong growth and a lot of flowering during the time of the year when there is plenty of light
- assimilation starts from 1,500 Lux

Optimal: The best assimilation use in geraniums is between 25,000 and 35,000 Lux

Shading: Only in the case of direct exposure to the sun, when pesticides or growth retardants are used

PINCHING

TIP: Late pinching will delay flowering!

1. Zonals
   Most varieties in our current assortment do not require pinching as they are compact and self-branching.
   Exceptions: vigorous varieties can be pinched up to a max. of 8 weeks before sale

2. Ivies
   From 14 days after potting until a maximum of 9 weeks before sale. This is particularly important for the Balcon-varieties.

GROWTH REGULATION

1. USE OF GROWTH RETARDANTS

TIP: Be aware that the recommended concentration and the frequency of treatment depends on the variety and the plant’s stage of development

Spraying, e.g. with Topflor 0.025 – 0.05% (please check if within the crop of allowed products!)

Attention: Moist the plants light with Topflor (using 60 – 100 ml/m²) and carry out fewer applications

Zonals: at intervals of 2 – 3 weeks up to a maximum of 3 times
Ivies: up to 4 times
Balcon varieties: at least once each 2 weeks

Spray for the first time 2 weeks after potting

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2. GROWTH RETARDANCE WITHOUT CHEMICALS

Why?
- Saving labor
- Chemical growth retardants can harm plants
- increasing ecological awareness among the population and with growers

Best practice:
2.1. Choice of varieties
Depending on the final product wanted, select compact, medium or vigorous varieties.

2.2. Water
Elongated growth can be reduced by working with less water
TIP: Do not let the plants become completely dry, because this causes the leaves to turn yellow and helps induction

2.3. Temperature
Negative-Diff: High day temperatures and low night temperatures result in a elongated growth
High night temperatures and low day temperatures lead to reduced elongated growth (= "neg Diff").
Day temperature: 14 °C, Night temperature: 18 °C > 4 °C difference
In addition to the advantage of reducing elongated growth, an increase in the temperature at night will prevent it from falling below the dew point, thereby reducing the risk of Botrytis

Cool-Morning: Strong reduction of temperature before sunrise (can be done till 2 hours before)
in order to reduce the average day temperature.
Reduction from 16 °C to 8 °C for 4 hours
This is a very useful measure in spring because it is relatively cold in the morning.
It is a more efficient and economical temperature strategy than the one mentioned above, as no additional heating needed during the night in order to keep night temperatures higher, and very often day temperatures can not be kept as low as necessary.

Combination: Cool-Morning and "Negative-Diff" can also be used in combination. In this way the average day temperature can be achieved through higher temperatures at night.
Day temperature from 10:00 till 17:00: 17 °C,
Night temperature from 17:00 till 6:00: 19 °C,
Cool-Morning from 6:00 till 10:00: 10 – 12 °C.
Also possible in combination with dry cultivation

2.4. Defoliage
A method that is not very common but effective is taking of leafs. With early and autumn potting dates, starting from 6 weeks after potting
or in winter, large leaves from the lower part and from the centre of the plant can be removed. This will bring.
> more light between the plants
> reduction of elongation and extended growth
> more shoots
> lowers the risk of Botrytis by reducing the assimilation surface.

Unrooted geranium cuttings

PREPARATION
- Disinfect propagation area and tools with MENNO-Ter forte or MENNO Florades (before using these products you should check whether they have been approved for in your country).
- Rooting in multi packs or pots: use only new or disinfected materials

SUBSTRATE
- Use industrial propagation substrate with a pH of 5.8 – 6.2
- Use substrate without fertilizers
- Ensure the substrate contains enough air
- At the point of sticking, the substrate should be on the temperature which is needed for propagation
- Keep the substrate moist, but not wet

PROCESSING
- As fast as possible, immediately after receiving the plants
- Zonals should be potted first, then the Ivies. Open the box and store the cuttings at +8 °C
• Stick till the first leaf pair
• Water so that the young plant is firmly encased by the substrate
• If it is not possible to pot the young plants immediately, open the box and keep the plants at 2–4 °C

TEMPERATURES
Floor or bench heating is required. Make sure that the plants have plenty of air!
1st–12th day  day and night 20 °C  ventilation at 26 °C
13th–20th day day 20 °C night 18 °C ventilation at 23 °C
from 21st day day and night 18 °C ventilation at 21 °C

SHADING
Day 1–14 from 18,000 Lux
Day 15–21 from 20,000–25,000 Lux

ASSIMILATION LIGHT
This reduces the risk of Botrytis and thus the risk of cultivation. When the young plant is turgescent, apply 3,000 Lux.

WATERING IN ROOTING
1. SPRAY MIST:
• Use fog and do not water!
• Only fogging when leaves are dry up
• With strong heating you need also the fog at night
• One day after potting the cutting must be rigid
• Cuttings which have been dehydrated for a longer period become yellow and losses have to be expected
• After approx 10 days the cuttings should be hardened and grow without fog

2. ROOTING WITHOUT FOG, UNDER FLEECE
TIP: Do not cover directly with foil or fleece because the risk of Boytrytis will be high due to condensation.
• After the callus has been builded (10th day), remove fleece immediately
• When using a foil tunnel, the young plants have to be aired from the 4th day, at least at night.

USE OF GROWTH RETARDANTS
The first treatment with Topflor (may only be used until 13th July 2010) 0.025–0.5% should be carried out after 2 weeks in the case of Balcon varieties and after 3 weeks in the case of Ivies and Zonals, depending on the requirements. A second treatment may be needed, depending on the quality of the cutting and the characteristics of the variety. 2 treatments are recommended for Balcon varieties.

PREVENTING BOTRYTIS & PYTHIUM
• Ventilated well
• After 10 days spray with Rovral WG 7g/ar can be repeated after about one week
• Preventive drench on substrate and plants with Previcur 0,1% (pay attention to the manufacturer’s instructions),
or Fonganil Gold 0.0125%

P&D CONTROL OF GERANIUMS
TIP: The better the plants are checked,
> the faster a pest can be detected,
> the earlier measures can be taken,
> the lesser the damage,
> the more successful the control!

Diseases
**XANTHOMONAS**
SYMPTOMS:
Leaves wilt and die, roots are usually in good condition. Stems and leaf petioles turn black, then start to rot.
Zonals tend to develop blacker stems and wet rot. Ivies develop more towards dry rot.
PREVENTION:

TIP: Pay attention to hygiene!

- Disinfect all tools and equipment, especially when cuttings are harvested
- Separate old and new plants
- Avoid stress in the plants by:
  - optimum ventilation (reduce humidity!)
  - the right temperatures
  - proper feeding
  - avoiding permanent dripping

Attention!: P. grandiflorum and capitatum can be latent carriers of Xanthomonas, even if they do not show any symptoms.
The risk of transferring the infection is big.

IN THE CASE OF INFECTION:

- Plants and pots must be destroyed immediately. (Not onto compost heap!)
- Thoroughly disinfect all infected places

PYTHIUM AND PHYTOPHTORA

SYMPTOMS: Wilting plants, roots and/or root collars become putrid and transparent.

<table>
<thead>
<tr>
<th>commercial name</th>
<th>active substance</th>
<th>concentration</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previcur N/Proplant</td>
<td>propamocarb</td>
<td>0.15%</td>
<td>by watering</td>
</tr>
<tr>
<td>Fonganil Gold</td>
<td>metalaxyl M</td>
<td>0.0125%</td>
<td>by watering, Fonganil Neu#: 0.05%</td>
</tr>
<tr>
<td>Aliette WG</td>
<td>fosetyl</td>
<td>0.25%</td>
<td>when not rooting through and through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5%</td>
<td>in the case of well developed plants</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water 9 till 12 cm pot with 2 l/m²</td>
</tr>
</tbody>
</table>

BOTRYTIS

TIP: The plants need air and light! Constantly check cultivation conditions, especially when the weather is dull.

When needed the crop conditions need to be adapted.

SYMPTOMS: Grey mould

PREVENTION: Optimise crop conditions, especially: water/light/air/temperature

<table>
<thead>
<tr>
<th>commercial name</th>
<th>active substance</th>
<th>concentration</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rovral WG</td>
<td>iperdion</td>
<td>Zg/ar</td>
<td>Do not use at temperatures below 12 °C</td>
</tr>
<tr>
<td>Signum</td>
<td>boscalid, pyraclostrobin</td>
<td>0.15% g/m²</td>
<td>Could cause spray spots, could prolongate the rooting process</td>
</tr>
<tr>
<td>Teldor</td>
<td>fenhexamid</td>
<td>0.2 g/m²</td>
<td></td>
</tr>
</tbody>
</table>

CORK BUILDING

PREVENT: • Optimise conditions of cultivation, especially water/light/air/temperature
        • In case of thrips and mites, pest control

PELARGONIUM RUST

SYMPTOMS: Yellow spots with brownish necrosis on the upper side of the leaf, reddish-brown rust spots on the backside of the leaf

PREVENT: • Avoid high humidity
        • Ventilate well
        • Pots should not be placed too close together
        • Do not water from above
        • Water in the morning

CONTROL: • Destroy the plants. (Not on compost heap!)
          • Use fungicides

<table>
<thead>
<tr>
<th>commercial name</th>
<th>active substance</th>
<th>concentration</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASF Maneb Spritzpulver</td>
<td>maneb</td>
<td>0.2%</td>
<td>Use if there is any risk of infection</td>
</tr>
<tr>
<td>Dithane Ultra Neotec</td>
<td>mancozeb</td>
<td>0.2%</td>
<td>Use if there is any risk of infection</td>
</tr>
<tr>
<td>Ortiva</td>
<td>azoxystrobin</td>
<td>0.08%</td>
<td></td>
</tr>
<tr>
<td>Polyram WG</td>
<td>metiram</td>
<td>0.2%</td>
<td>Use if there is any risk of infection</td>
</tr>
</tbody>
</table>
**Score**
difenoconazol 0.4 l/ha Max. of 3 applications

**Systhane 20 EW**
myclobutanil 0.3 l/ha Max. of 3 applications, check compatibility!

**Discus / Stroby WG**
kresoximmethyl 0.15 kg/ha 2 applications

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## Pests

### THRIPS (FRANKLINIELLA OCCIDENTALIS)

**TIP:** It is very important that any infection is discovered in time. Once buds are formed, thrips control becomes increasingly difficult. Check for thrips with sticky traps. One blue sticky trap per 50 m² immediately above the plants.

For biological control, use Amblyseius sp. During the propagation phase and as long as the pots are standing pot to pot, this is economical. After spacing, continue to check with blue sticky traps. If necessary, repeat use of beneficial mites or apply effective pesticides before the plants begin to flower! Zonals are in general less susceptible to thrips than Ivies. This can be considered when using mites.

When using chemicals, spray three times per three to four days. Repeat this block treatment if the infection returns. To prevent resistance different active materials can be used.

<table>
<thead>
<tr>
<th>commercial name</th>
<th>active substance/biol. control</th>
<th>Concentration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conserve</td>
<td>spinosad 0.15 ml/m²</td>
<td></td>
<td>Can be integrated into biological control measures.</td>
</tr>
<tr>
<td>Mesurosl flüssig</td>
<td>methiocarb 0.1%</td>
<td></td>
<td>Spray damage (spots) possible.</td>
</tr>
<tr>
<td>Neem Azal-T/S</td>
<td>azadirachtin 0.3 ml/m²</td>
<td></td>
<td>May damage flowers. Can be integrated into biological control measures.</td>
</tr>
<tr>
<td>Vertimec</td>
<td>abamectin, Amblyseius sp. 0.025%</td>
<td>Preventative 25–30 insects/m²</td>
<td>Use at intervals of 7–14 days, depending on the degree of infection.</td>
</tr>
</tbody>
</table>

### APHIDS (AULACORTHUM AND MACROSIPHUM)

The biological control of aphids is very successfully with Aphidius colemani+ervi and Chrysoperla carnea. Chrysoperla carnea can also be used against spider mites and small caterpillars. In the case of the Aulacorthum solani and Macrosyphum euphorbiae aphids it is possible to use Praon sp. and Aphelinus abdominalis. If an infection is still small, apply one insect/m², 1–2 releases. Yellow sticky traps catch flying aphids. It may be necessary to use Pirimor Granulat against Macrosyphum euphorbiae and Aulacorthum solani.

In the case of Aulacorthum solani, the use of beneficial insects is difficult as the aphids damage the plants rapidly. They particularly cause strong leaf deformation in the case of Ivies. Aphidius ervi is the only really effective remedy and should be used in combination with other enemies of these parasites.

<table>
<thead>
<tr>
<th>commercial name</th>
<th>active substance/biol. control</th>
<th>concentration</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pirimor Granulat</td>
<td>primicarb 0.05%</td>
<td></td>
<td>Can be integrated into biological control measures.</td>
</tr>
<tr>
<td>Plenum 50 WG</td>
<td>pymetrozil 24 mg/m²</td>
<td>Max. 3 applications, can be integrated into biological control measures.</td>
<td></td>
</tr>
<tr>
<td>Neem Azal-T/S</td>
<td>azadirachtin 0.3 ml/m²</td>
<td>May damage flowers. Can be integrated into biological control measures.</td>
<td></td>
</tr>
<tr>
<td>Confidor WG 70</td>
<td>imidacloprid 0.05%</td>
<td>Check compatibility; the use of Confidor reduces the success of treatment with Encarsia!</td>
<td></td>
</tr>
<tr>
<td>Mospilan SG</td>
<td>acetamiprid 0.15 g/m²</td>
<td>Check compatibility; the use of Mospilan reduces the success of treatment with Encarsia!</td>
<td></td>
</tr>
</tbody>
</table>

Aphidius colemani und Aphidius ervi

- release 1–2 insects/m² as a preventative measure or in the case of infection
- It is best to combine both methods in order to combat several types of aphids.

Parasitic wasp

- 0.5–1 insect/m² as a preventative measure
- At least 3 releases at 14-day intervals; in the case of infection 1–2 insects/m², at least 2 releases at 14-day intervals.

Green lacewing

- As a preventative measure or with infection
- 40 eggs/m² or 5 larvae/m²
- With eb-flood benches case larvae may drown as they surch for food

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### SPIDER MITES AND TARSONEMID MITES

**TIP:** Spider mites and Tarsonemid mites are also discussed with the biological thrips control!

#### SPIDER MITES

<table>
<thead>
<tr>
<th>Commercial Name</th>
<th>Active Substance/Biological Control</th>
<th>Concentration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amblyseius sp.</td>
<td>25 – 30 insects/m², as a preventative measure</td>
<td>2–4 times at 14-day intervals</td>
<td></td>
</tr>
<tr>
<td>Kanemite SC</td>
<td>acequinocyl 0.125 ml/m²</td>
<td>Test on damage before using</td>
<td></td>
</tr>
<tr>
<td>Apollo</td>
<td>clofentezin 2.4 ml/a (0.04%)</td>
<td>No more than 1 application</td>
<td></td>
</tr>
<tr>
<td>Kiron</td>
<td>fenpyroxamat 0.09 ml/m²</td>
<td>No more than 1 application</td>
<td></td>
</tr>
<tr>
<td>Magister 200 SC</td>
<td>fenazaquin 0.5%</td>
<td>2 treatments at 14-day intervals or in alternation with other products</td>
<td></td>
</tr>
<tr>
<td>Masai</td>
<td>tebufenpyrad 0.02%</td>
<td>Very successful when mixed with other products</td>
<td></td>
</tr>
<tr>
<td>Micula</td>
<td>rapeseed oil 1.0 – 2.0% not mixed, 0.1% if mixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milbex knock</td>
<td>milbemectin 0.05 ml/m²</td>
<td>Close related to Vertimec, avoid spray spots with Vertimec</td>
<td></td>
</tr>
<tr>
<td>Neudosan Neu</td>
<td>green soap 1.2 ml/m²</td>
<td>Can be integrated into biological control measures</td>
<td></td>
</tr>
<tr>
<td>Vertimec abamectin</td>
<td>0.025%</td>
<td>Does not cause damage to flowers</td>
<td></td>
</tr>
<tr>
<td>Ordoval</td>
<td>hexythiazox 2.6 g/m²</td>
<td>No more than 1 application, only for young animals and eggs</td>
<td></td>
</tr>
</tbody>
</table>

#### TARSONEMID MITES

<table>
<thead>
<tr>
<th>Commercial Name</th>
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</tr>
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<tbody>
<tr>
<td>Vertimec</td>
<td>abamectin 0.025%</td>
<td>Does not damage flowers.</td>
<td></td>
</tr>
<tr>
<td>Kiron</td>
<td>fenpyroxamat 0.09 ml/m²</td>
<td>No more than 1 application</td>
<td></td>
</tr>
<tr>
<td>Masai</td>
<td>tebufenpyrad 0.02%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amblyseius sp.</td>
<td>25 – 50 insects/m² as a preventative measure</td>
<td>2–4 treatments at 1-day intervals</td>
<td></td>
</tr>
</tbody>
</table>

#### CATERPILLARS

<table>
<thead>
<tr>
<th>Commercial Name</th>
<th>Active Substance/ Biological Control</th>
<th>Concentration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conserve</td>
<td>spinosad 0.1 ml/m²</td>
<td>No more than 6 applications.</td>
<td></td>
</tr>
<tr>
<td>Spruzit liquid</td>
<td>piperonylbutoxid Pyrethrine 0.06 ml/m²</td>
<td>No more than 4 applications. Check compatibility!</td>
<td></td>
</tr>
<tr>
<td>Steward</td>
<td>indoxacarb 8.5 mg/m²</td>
<td>Max. of 3 applications</td>
<td></td>
</tr>
<tr>
<td>Turex bacillus thuringiensis</td>
<td>0.1–0.15%</td>
<td>Repeat after 2–3 weeks</td>
<td></td>
</tr>
</tbody>
</table>

#### WHITE FLY

Biological control with Encarsia formosa is recommended. Quantity: Encarsia can be bought on stickers or stripes (cheaper). One sticker is normally sufficient for 100 plants and contains approx. 30 Encarsia formosa. The insects have to be applied weekly immediately after potting. The number may be reduced later. However never apply fewer than 2.5 insects/m². Check entrance of outside with yellow sticky traps (1 yellow sticky trap/100 m²).

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</thead>
<tbody>
<tr>
<td>Magister 200 SC</td>
<td>fenazaquin</td>
<td>0.1–0.2%</td>
<td>Twice at 14-day interval or alternate with other treatments</td>
</tr>
<tr>
<td>Pride Ultra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applaud</td>
<td>buperfezin</td>
<td>0.03%</td>
<td>Can be integrated into biological control measures</td>
</tr>
<tr>
<td>Condiror WG 70</td>
<td>imidacloporid</td>
<td>0.05%</td>
<td>The use of Confidor reduces the success of treatment with Encarsia</td>
</tr>
<tr>
<td>Mospilan SG</td>
<td>acetamiprid</td>
<td>0.03 g/m²</td>
<td>The use of Mospilan reduces the success of treatment with Encarsia</td>
</tr>
<tr>
<td>Neem Azal-T/S</td>
<td>azadirachtin</td>
<td>0.3 ml/m²</td>
<td>May cause damage to flowers. Can be integrated into biological control measures</td>
</tr>
<tr>
<td>Neudosan Neu</td>
<td>green soap</td>
<td>1.2 ml/m²</td>
<td>Can be integrated into biological control measures</td>
</tr>
<tr>
<td>Plenum 50 WG</td>
<td>pymetrozin</td>
<td>0.12% or 0.072 g/m²</td>
<td>Can be integrated into biological control measures</td>
</tr>
<tr>
<td>Encarsia formosa</td>
<td></td>
<td>5–6 insects/m², can be reduced later to 2.5 insects/m²</td>
<td></td>
</tr>
</tbody>
</table>

**BLACK FLIES**

Biological control by use of nematodes (Steinernema felitae). Since 1993 Steinernema felitae have been used often as they prey on all four stages of the larvae.

Application: spray with a nozzle of 1 mm without reflection, use clear water afterwards, so that the nematodes are flushed into the soil. The result can be seen after one to two days. One preventative treatment with 250,000–500,000 nematodes/m². In the case of infection, repeat treatment after 4 weeks.

<table>
<thead>
<tr>
<th>commercial name</th>
<th>active substance/ biol. control</th>
<th>concentration</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curater Granulat, Carbofuran</td>
<td>Carbofuran</td>
<td>5 g/m²</td>
<td>May cause leaves to turn a lighter colour</td>
</tr>
<tr>
<td>Different product names depending on supplier</td>
<td>Nematodes Steinernema</td>
<td>0.25–0.5 million. insects/m²</td>
<td>Preventative</td>
</tr>
<tr>
<td>BioMükk</td>
<td>Bacillus thuringiensis, Var. israeliensis</td>
<td></td>
<td>Apply through irrigation with self-manufactured preparations, possible under EC Regulation</td>
</tr>
<tr>
<td>Typhlodromus pyri</td>
<td>Hypoaspis</td>
<td>100–250 insects/m²</td>
<td>Preventative</td>
</tr>
</tbody>
</table>