Peony Care newsletter: May

Dear peony grower,

We hereby send you our Peony Care Newsletter. The information that is currently relevant to the crop of peonies will be given special attention. We trust that this information will be helpful in achieving a successful crop. Feel free to contact us when you have questions or comments!

To fight against Botrytis

Because of its fast growth, the peony is hardly resistant to climate change. One of the resulting damages is almost certainly Botrytis. The fungus will especially keep causing problems when the peony doesn't get protection during growth. In that critical period extra sprayings of the peonies are absolutely necessary. Good and effective resources in that case are Teldor, Kenbyo, Luna and Switch.

Especially Luna is a valuable asset in terms of effective resources. The Luna-family consists of three branches. Luna PRIVILEGE is a resource specifically for land use, where Luna SENSATION and Luna EXPERIENCE are used for the spraying of the leaves. The systemic characteristics will also make Luna EXPERIENCE usable even under cold circumstances.

When Luna SENSATION is being used just before the flowers start to bloom, it means that there will be a very low percentage of Botrytis on the flower buds. But it also ensures a remarkably low failure in the cooler.

Don't spray for two days after night frost, because of weak / sensitive crop due to night frost.

The so-called flower bud-Botrytis is the same Botrytis that causes collapses in your crop. Therefore it goes without saying that plots who have had many collapses are most prone to flower bud-Botrytis.

A major problem every year is bud loss with peonies. Although Botrytis grows most quickly during wet and warm weather, the biggest problems arise during cold and wet conditions. Just before flowering. In that case the flowers do not ripe off and then they stand on the plant too long in a fragile state. And the fungus will grow into the flower bud from the little leaf underneath the flower. If the weather conditions become warm and humid, the flower buds will collapse in large numbers.

In that case in may be necessary to do a couple of extra sprayings just before flowering. Good and effective pesticides are Teldor, Kenbyo and Luna SENSATION. You will get the best results when the flower buds are wet as a result of dew. Because it means the agent will flow around the flower bud easier. You can also make use of a good wetting agent and make sure you spray from two sides.

An example of Botrytis in a flower bud

An example of Botrytis in a flower bud

Shot hole disease

By means of shot hole disease holes arise in the leaf. Not only will they reduce the growth and ornamental value of the crop, they also create an raid port for other pathogens. Including, for example, Botrytis. The emergence of holes in a leaf is best known from shot hole disease in Prunus. That is why initially there was talk of shot hole disease in peonies.

Across the last ten years damage from shot hole disease has increased in the cultivation of peonies. The cause is not yet known.

Symptoms

First red-purple spots become visible on the leaf. At a given moment these spots dry in from the core to the outside. Holes arises in the leaf because the dried in tissue falls from the leaf. A colored red edge stays visible around the hole. Typical characteristics are that the shape of the edge of the hole is irregular and that the size of the spots and holes varies greatly. From less than a centimeter to multiple centimeters.

Sensitivity of the crop and circumstances with infestation

Clear from discussions with growers it seems that the time on which the first symptoms are perceived varies. But more than once it was indicated that shot hole disease especially arises just before flowering or with spreading of the leaf. And it happened that the symptoms were perceived after the flower harvest. A crop that does not grow properly seems especially sensitive for infestation. And it looks like that humid periods stimulate the infestation. It seems that shot hole disease does not exist in a young crop (until several years after planting). Also in greenhouse cultivation shot hole disease is not known.

Two examples of shot hole disease

Experiences with disease control

In peony crops various broad working fungicides are applied against Botrytis. A lot of these agents are also advised to fight a wide range of leaf spot diseases in several ornamental crops. But despite the efforts of fungicides against Botrytis, the problems with shot hole disease have increased. And field experience with shot hole disease control in peonies is very limited. After diagnosing shot hole disease, a couple of growers sprayed more with broad working fungicides. Also spray with Epsom salts to make the leaf harder.

Image database expanded with deficiency diseases

The image database ‘diseases, pests and weeds’ has been expanded with a new category: ‘deficiency diseases in nurseries’. Follow this link to get to the image database.

Fertilizing

Nitrogen: the element which a plant absorbs the most and the easiest. With strong growth, with vegetative growth (height growth) the first few weeks, a lot of nitrogen is needed. With nitrogen deficiency a light green color arises, there is less height growth, flowering too early and the plant will be very sensitive to fungal diseases.

Sometimes additional stem length can be achieved through an additional gift of ammonium nitrate. But remember; nitrogen does not only make green leaves bigger, but also the leaves of the flower itself. In other words; more nitrogen leads to bigger flowers.

Phosphate: has a very favorable effect on the formation of the main root system. A few weeks before flowering, phosphate, in collaboration with potassium, has a favorable effect on flower formation with larger and thicker flower buds. That is why it is advised to give additional phosphate and potassium before flowering. With a phosphate deficiency the leaves stay smaller, are more pale, bloom abandonment can be an issue and the leaves will show a reddish-purple discoloration (deficiency symptoms can arise with low temperatures). Because phosphate binds itself easily to soil particles, excess symptoms rarely occur. But a large excess can make sure that magnesium is no longer absorbable by the plant. Which in turn leads to magnesium deficiency.

Potassium: ensures the sturdiness of the leaf and stem and, together with phosphate, it provides for bigger and thicker flower buds somewhere around the flowering period. Sufficient potassium causes the plant to better defend itself against fungi and bacteria. A potassium deficiency leads to yellowing of the edges of the leaf, starting with the older lower leaves. Another result of potassium deficiency is smaller leaves and thinner branches. Too much potassium gives salt damage and it shows poor growth of the plant. At a very high potassium gift the absorption of calcium and magnesium becomes more difficult.

Magnesium: takes care of the fresh and healthy green look of the plant. Besides that magnesium has got a function for the cell wall and sturdiness of the tissue. And it is a building block for various enzymes. With a magnesium deficiency the leaf turns yellow while the leaf veins stay green (deficiency symptoms can arise with low temperatures). Excess rarely occurs.

Calcium: is being used by the plant for sturdiness and build-up of the cells. It is the backbone of the plant. And besides that calcium is very important for water regulation and it is essential for high temperatures. At length, the plant evaporates a lot at a high temperature and that is why the plant needs to absorb more water. A calcium deficiency arises at a too rapid growth and a high humidity. In that case the plant cannot evaporate or too little. And when the plant is not able to evaporate water with nutrition can no longer be absorbed. Young leaves (leaf edges) die as a result of deficiency and the plant is more sensitive for a fungal infestation. It is also absolutely necessary to give calcium in the greenhouse, but a slightly lower dosage when using ditch water.

Spore elements: in the cultivation too little attention is paid to this. While spore elements are the vitamins and minerals for the plant. These are the spore elements:

- Fe – Iron;
- Mn – Manganese;
- B – Boron;
- Zn – Zinc;
- Cu – Copper;
- Mo – Molybdenum;

(High numbers usually means a high Ph)

All these elements have an important function and they are the building stones of the plant. They are also necessary for water regulation, cell division and metabolism of the plant. Plants absorb these spore elements through the roots, so it is important the plant has a 'wig' with roots. During each feeding session it is important to give additional spore elements, because in the nutrition we buy in this business, there are little to none of these elements present.

Measuring = knowing

In fixed periods regularly take a ground / leaf sample so that you can get a better picture of the needs of the plant.

Normal fertilization gifts kg / ha for peonies annually

(With normal ground valuation)

N-need	150 kg / ha
Phosphate, kg P2O5	100 kg / ha
Potassium, kg K2O	225 kg / ha
Magnesium, kg MgO	100 kg / ha

Just before flowering one may fertilize correcting / guiding with:

- Nitrogen through foliar treatments in connection with larger flower bud;
- Magnesium through foliar treatments in connection with color;
- Calcium through foliar treatments in connection with hardness;
- Spore elements (manganese and iron among other things) in connection with color.

Nematodes

Free-living nematodes: prick the roots of the host plants only superficially. The nematodes occur on sandy and silty soil. These free-living nematodes have got a lot of

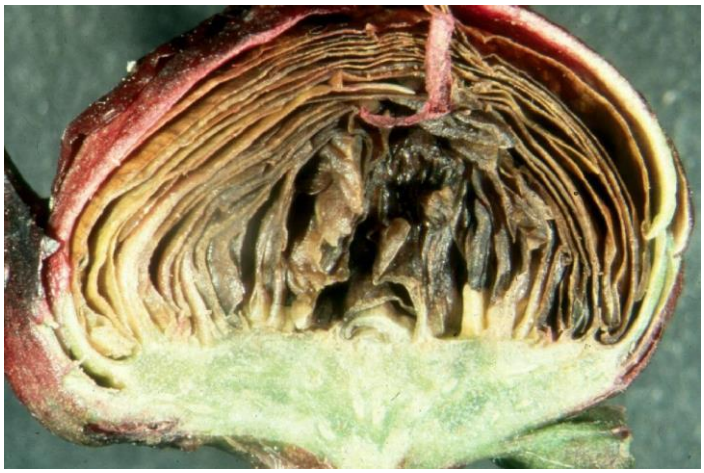
host plants. Economically speaking they are the main cause of problems. All free-living nematodes are capable of transferring the so-called tobacco rattle virus (TRV).

Root knot nematodes: make sure that, when buying or processing, you are alert of infestation by root knot nematodes. A highly branched root system or visible nodules are symptoms of this. Root pruning offers some possibilities, but remaining nematodes spread rapidly across the young roots which grow in the spring. Our Green Works International Care™-treatment does offer result.

Leaf nematodes

An infestation of nematodes is clearly visible because of the deformity of the leaf. In that case the tissue looks miformed and the leaves are half grown. The growing point can sometimes dry out by young shoots.

It is also possible that bud dehydration (bud abortion) occurs. Clearly identified by black, rotten flower parts with healthy petals around. The flower buds can dry out in every stage. Sometimes the flower bud will come into bloom, but the flower is misformed.



Nematodes need water so they can spread in the crop. The nematodes move to other parts of the plant through water which stays on the leaves after irrigation or at a high humidity. During crop activities spreading also takes place. It is important not to walk or spray in the crop, because wet leaves causes spreading. Spraying should be done from the spraying beds.

The nematode causes damage the season after infection. Still the infection is recognizable in the first year. In that case the leaves show blue, tight through the veins bordered spaces. After rain this expands to the next grain space.

Nematodes hibernate, amongst other things, in a dead leaf on the ground and in the young grow points of the peony. In the spring these nematodes come up with the crop growth or they crawl upwards through a film of water on the plant. They suck on the plant for nutrition. During the puncturing and deflating of the cells, the nematodes transfer a toxic substance in the cells. This results in deformation in the growing points, drying-out of the flower buds and total growth inhibition.

Nematodes are also capable of 'hitching a ride' on weeds so that they can infect the plot.

Measures:

- Keep the plot free of weeds;
- Remove from field dried-out flower buds;
- Spray three times with Vertimec Gold in the evening when the leaf is wet from dew. Because the nematodes will then be on the outside of the leaf;
- Mow the crop in mid-August and remove all crop residues. Only do this in dry weather.

Leaf roller

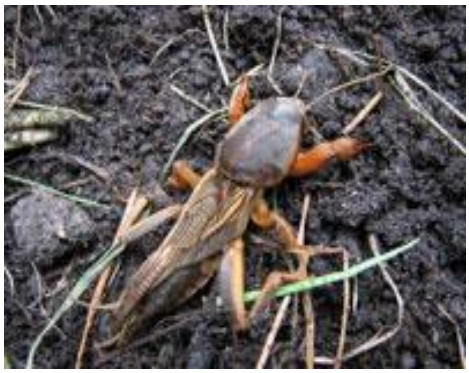
Leaf rollers owe their name to the fact that the caterpillars string themselves between the leaves. And that causes the leaves to roll up. In the case of peonies, this little black caterpillar eats its way to the flower bud of the plant. This roller isn't only hard to find, but the creature also causes damage directly to the flower bud. Therefore controlling regularly on leaf rollers is necessary. You can fight them with Decis amongst other things.

Mole crickets

Mole crickets are digging insects with highly developed forelimbs. They can be about five centimeters big. They live of larvae (cutworms and leatherjackets) and other soil insects. Supplemented with plant material.

De color of mole crickets varies from brown, russet to yellowish. To create corridors just beneath the soil surface, these mole crickets use their forelimbs as excavator. These corridors are used more than once. When digging, they bite off roots of a variety of

crops. With all its consequences. These creatures are good in flying. Often on warm evenings. They occur in wet meadows, peat soil, plots and gardens bordering ditches.



***The mole cricket (*Gryllotalpa gryllotalpa)**

From late April adult mole crickets become active. They are most active in May. The number of eggs in a nest-hole varies from a hundred to sometimes three hundred eggs. Around the nest they make the same corridors, but also drainage corridors. It takes at least two years for a mole cricket to become all grown-up. Mole crickets can live almost three years. Because the plants on the surface most of the time are dried-out or dead, nests are usually easy to track.

Control

Control of the population is only necessary when you have got to deal with a lot of mole crickets. This can be done by enabling your own natural enemy. The insect parasitic nematode ***Steinernema carpocapse*** is a nematode which reduces mole crickets and cutworms in an effective way. These nematodes search for a place in the corridors of the mole crickets to wait for them to pass. Thereafter they hook on to the mole crickets, enter them and separate a bacteria which is lethal to mole crickets. After that a new generation of nematodes arises in dead mole crickets who will search for new mole crickets to infect. These nematodes cannot live very long without a 'host'. Is there no prey available, then they die. The best time to deploy these nematodes against mole crickets is from late April to late June.

Although spore elements are only needed in small amounts, they are necessary for the process to create a plant an make it grow. At a high pH, the absorption of the spore elements in the soil will prove to be very difficult. To provide the crop with spore elements anyway, we advise you to give these elements, at a high pH in the soil, using leaf nutrition from the Shuttle-range. This Shuttle-system never actually enters the

plant. In contrast to regular chelates. The advantage of this is that the plant doesn't need to put energy in breaking down chelates, which are foreign substances to the plant. And on top of that the plant can capture minerals which can be desperately needed at that moment.

Available in the Shuttle-range:

- Boron Shuttle boron (B)
- Calcium Shuttle calcium (Ca)
- Copper Shuttle copper (Cu)
- Iron Shuttle iron (Fe)
- Magnesium Shuttle magnesium (Mg)
- Manganese Shuttle manganese (Mn)
- Moly Shuttle molybdenum (Mo)
- Zinc Shuttle Zinc (Zn)
- Shuttle Seven spore mix (B + Cu + Fe + Mn + Mo + Zn + Co (cobalt))

Every Shuttle-product has got 'background nutrition'. Next to the main element of the Shuttle-product, it also contains smaller elements in small amounts to avoid a conflicting action.

The best moment to spray the Shuttle-fertilizers is when the sun is not shining too brightly. In other words: early in the morning or in the evening. This in connection with any burn damage to the crop. Also, administered minerals will be absorbed better when the crop stays wet longer.

Shuttles are mostly advised on the basis of 'soil balance analysis'.

Here in West-Friesland we often come with the same advice:

- Two liters per hectare Shuttle Seven spore mix
- One liter per hectare Magnesium Shuttle magnesium
- One liter per hectare Manganese Shuttle manganese
- One liter per hectare Amino-Max amino acid

Amino acid will be added instead of nitrogen to deliver a product which can be converted to proteins much more easily. In that case several steps will be skipped in the conversion of nitrogen into protein. The plant can use this energy for different processes. Mostly, the shuttles can easily be sprayed in combination with herbicides, insecticides and/or fungicides. The maximum concentration is 1:100.

For more information, please contact:

- Marco Culurgioni (mc@karobv.nl / 06-86 82 30 06);
- Danny Rood (dr@karobv.nl / 06-51 14 71 42).

When planting peonies (autumn 2018): the benefits of the investing in 3-5 eyes compared to 2-3 eyes:

Number of stems / flowers with plants 2-3 of 3-5 eyes:

Variety	Year	Number of stems	Number of stems
		2-3 eyes	3-5 eyes
Sarah Bernhardt	Planting in autumn: 2018		
	Spring 2019	0	0
	Spring 2020	0	3
	Spring 2021	4	7
	Spring 2022	6	8
	Spring 2023	7	9
	Spring 2024	7	9
	Spring 2025	8	9
		32	45

In the following link you will find our extensive and updated peony assortment of 2018 – 2019:

Peony Catalog 2018 – 2019

Green Works also supplies other summer flower starting material, like: Ranunculus Butterfly™, Ranunculus Romance™, Ranunculus Royal XXL™, Asclepia Beatrix® en Helleborus or. Queens™.

For more information, please consult our website or contact:

Ed Kleijbeuker nr. 0031 (0)6 24 94 64 05 | ed@green-works.nl
Daan Kneppers nr. 0031 (0)6 51 82 47 12 | daan@green-works.nl

Also, follow Green Works on Twitter and Facebook for more relevant information about peonies amongst other things.

Green Works supplies young planting material for the professional cultivation of pot plants and (summer) cut flowers. Green Works is also a large grower of peonies for the successful cultivation and trade in the Netherlands and abroad. We supply within the Netherlands and globally to professional growers and (export) traders. With support in cultivation, promotion and sales, Green Works offers a total package to put an unique and healthy product on the market: www.green-works.nl/en

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