

Cut Flower Peony Production

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Introduction

Peonies are a perennial plant grown outdoors or under protection as they require a cold period (50 nights below 5C) for successful cultivation. Peony rootstocks for cut flower production are available from late autumn to early spring. These are graded according to the number of buds called 'eyes' commonly 2-3 eyes or 3-5 eyes. Cut flower growers normally use 3-5 eye planting stock. Prices for rootstocks typically vary between .50c to €3.50 from Dutch suppliers depending on rootstock size and variety. The Netherlands remains a major producer of cut flower peony with peak production in May-June.



P. 'Sarah Bernhardt'



P. 'Duchess De Nemours'



P. 'Festiva Maxima'

Cut Flower Varieties

Varieties for cut flower production are available in various colours including pink, red and white. At present the pink variety Sarah Bernhardt accounts for almost 50% of the cut flower market. Other popular varieties include Duchess de Nemours, Dr Alexander Fleming and Kansas. Careful consideration must be given to selecting varieties that are less prone to disease and are suitable for local growing conditions.

Variety	Colour	Flowering Time	Bloom Type
Dr Alexander Fleming	Deep pink	Mid season	Double
Duchess de Nemours	White	Mid season	Double
Festiva Maxima	White with red	Early	Double
Kansas	Red	Early	Double
Red Charm	Deep red	Early	Bom
Red Sarah Bernhardt	Red	Late	Double
Sarah Bernhardt	Pink	Late	Double

Table 1. Sample of Peony cut varieties & characteristics (GreenWorks, NL).

Site Selection

Peonies require free draining soil and a sunny aspect for good establishment, growth and flowering. If the ground is liable to surface water (clay soils) it is advisable to plant the peonies in 'potato ridges' to prevent root rot disease. Peonies will tolerate various soil types – sandy, clay to peaty but all must be free draining. Shelter belts are also beneficial to prevent wind scorch on young shoots but ensure the crop is not over shadowed and has sufficient sunlight.

Planting

Prior to planting ensure the site is treated to eliminate perennial & annual weeds. Nutrient and pH levels should be checked by soil analysis and amended as required. Peony rootstocks are best planted fresh in autumn – October/November before ground conditions become too wet or cold in winter. Planting can be delayed until March. However rootstocks must be stored at the proper temperature to ensure dormancy is not broken too early with cold temperatures. As a guide follow outdoor soil temperatures eg 2C in December or -2C Jan-Feb. Also during storage ensure rootstocks do not dry out and switch off any fans in the cooler. If requested, rootstock suppliers often store and organise delivery in spring.

Initial root size at planting	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
2/3 eyes	0	1	3	5	8	9
3/5 eyes	0	3	5	7	9	10

Table 2. Projected stem yield per annum of Peony Sarah Bernhardt.

Peonies are planted at a rate of up to 4 plants per m² depending on variety. On clay soils prepare a bed 1.5m wide which is sufficient for 2 ridges. Allow up to 50cm between plants in each row. For more vigorous varieties such as Sarah Bernhardt 60cm spacing is recommended. Rootstock are planted 5-7cm below the soil surface normally with the root upright. Some growers use manual & mechanical methods to plant large areas. Deeply planted rootstocks will produce fewer flowers whilst too shallow, roots can dry out or be exposed to herbicide damage. Most Peony varieties do not require staking however the variety Duchess de Nemours has weaker stems and may require support.



Peony crop in raised beds on clay soil.

Crop management - Integrated Pest Management

Weed Control

Weed control in Peony crops is especially important prior to planting. Several weeks prior to planting treat the selected planting site to control annual weed seeds and perennial weed roots. Once the crop is in-situ weed control takes place all year round but is particularly important during the dormant season. An effective monthly weed management programme can include contact and pre-emergent

herbicides. Weed control using contact herbicides will prevent the establishment of weeds and help to maintain good hygiene. This is particularly important between November and January to prevent disease spores overwintering in weeds. Pre-emergent herbicide applications can be applied until Peony shoots emerge (but before leaves unfurl) with the use of linuron based herbicides. Herbicides are best applied when weeds are actively growing or germinating. The use of a hood on the applicator can prevent spray drift damage to the crop. One of the most common sources of damage to Peony crops is from the application of translocated herbicides. Avoid using glyphosate based herbicides as these can cause long term damage to the crop. The risk of herbicide damage depends on various factors such as the active ingredient, soil type and depth of roots. If herbicide damage does occur expect a 2-3 year recovery time during which no flowers will be harvest.

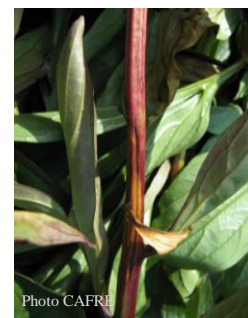
Botrytis

A common and potentially devastating fungal disease in Peony crops is Botrytis. Wet and humid weather creates ideal conditions for Botrytis to attack. Botrytis can appear early or late in crop growing stages with spores overwintering in weeds & foliage. Preventative controls are important to reduce the risk of Botrytis. One of the first steps is to select varieties which are less prone to Botrytis. Avoid varieties such as Charles White, Flame and Mother's Choice. A preventative regular fungicide spray programme is normally necessary and the most effective method to prevent infection. A fungicide programme should begin when shoots emerge above ground in March and finish in Mid October when the stems are cut back for the winter. The interval between applications is weather dependent but normally does not exceed 7-10 days in humid weather. Botrytis infections near harvest time can attack the base of flower buds in May/June which results in significant loss of crop yield. Always rotate fungicides with different modes of action and read product label instructions. A high water volume is important to ensure good coverage. Test new sprays on a sample area before applying to the whole crop. Iprodione is reported to affect some Peony cultivars under certain growing conditions.

March	Week 13	Scala (pyrimethanil)	Mode of action 9
April	Week 16	Rovral WG (iprodione)	Mode of action 2
April	Week 18	Serenade (bacillus subtilis)	Mode of action 44
May	Week 20	Signum (boscalid + pyraclostrobin)	Mode of action 7 + 11
May	Week 22	Switch (cyprodinil + fludioxonil)	Mode of action 9 + 12
June	Week 24	Signum (boscalid + pyraclostrobin)	Mode of action 7 + 11
June	Week 26	Switch (cyprodinil + fludioxonil)	Mode of action 9 + 12
July	Week 29	Serenade (bacillus subtilis)	Mode of action 44
July	Week 31	Scala (pyrimethanil)	Mode of action 9
Aug	Week 34	Serenade (bacillus subtilis)	Mode of action 44
Sept	Week 38	Rovral WG (iprodione)	Mode of action 2
October	Week 42	Serenade (bacillus subtilis)	Mode of action 44

Table 3. Example of a Peony fungicide programme to prevent Botrytis.

Another crop management technique used in the Netherlands to prevent Botrytis is to cut back the crop to 10cm high in autumn (mid September to October) when foliage begins to turn brown. This can be performed using a hedge trimmer. Cutting back foliage reduces the number of Botrytis spores harbouring in dead foliage over winter and the risk of infecting next season's crop. Dutch trials indicate that later or lower cutting heights can reduce yield. Remove all debris from the crop rows and field as this can be the source of new infections.



Stem botrytis

Pests – Nematodes, Borers & Slugs

Nematodes are soil borne organisms which can affect Peony leaves and flower buds. This serious pest can reduce yields by up to 30% but is less common in UK & Ireland. Check with your supplier that planting material has received hot water treatment (2hrs at 43.5C). Borers are also a potentially serious crop pest by eating out roots & stems. This pest is also currently not widely present here. Slugs can cause damage when shoots emerge in spring and are often active at night. Treat with slug pellets at early signs of damage or slug trails.

Nutrition

A feeding programme will boost plant growth and maintain good plant health. Prior to planting or each spring perform a soil analysis to monitor the level of nutrients in the soil and the pH. A recommended soil pH for Peony is 6.5 – 7.0. If available, prior to planting some growers use farm yard manure at a rate of 4-5 tonnes/ha. Early in the growing season a top dressing of 7-14-28 or 12-10-18 with trace elements can be applied. Trace elements including Magnesium and Calcium are used to maintain good plant health. The total nutritional requirements as recommended by Peony supplier Greenworks (Table 4) are applied over a number of applications both early in the season and after flowering.

Fertiliser	Rate per Year
Nitrogen (N)	150kg/ha
Phosphorus (P205)	100kg/ha
Potassium (K2O)	225kg/ha
Magnesium (MgO)	100kg/ha

Table 4. Peony Fertiliser Recommendations Kg/ha per year - GreenWorks (NL)

Disbud, Yield & Harvest

As this perennial crop has a long production time of 20-25 years it normally takes 3 years after planting for the first commercial cropping. This is due to the time required for the plant to 'bulk up' and produce new roots and buds (eyes). In May each stem will produce several flower buds. Side buds are normally pinched out or disbudded to a single bud per stem in order to produce larger marketable flowers.

Variety	Average no. Marketable stems per plant	Average no. marketable stems per m2	% Stem length 50-54 cm	% Stem length 55 -59 cm	% Stem length 60 - 64 cm	% Stem length 65 - 69 cm	% Stem length > 70 cm	Date of first cut	Date of last cut	Date of 50% cut
Sarah Bernhardt	0.38	1.20	11%	0%	22%	0%	67%	02/06	09/06	02/06
Felix Crousse	2.46	7.87	22%	24%	20%	14%	20%	02/06	16/06	02/06
Bowl of Beauty	3.00	9.00	3%	21%	15%	11%	50%	02/06	-	02/06
Duchess de Nemours	0.79	2.53	21%	21%	26%	16%	16%	02/06	10/06	03/06
Festiva Maxima	2.00	6.40	4%	6%	77%	4%	8%	22/05	09/06	22/05

Table 5. Results of cut flower Peony varieties (3-5 eye) 2nd year after planting (Greenmount 2008).



Under Northern Ireland growing conditions peony stems are normally harvested from mid-late June. Depending on weather conditions cropping may be required more than once per day. Flower buds are ready to harvest when petals begin to open and the flower bud is soft when gently squeezed (like a marshmallow) – as shown. If in doubt, harvest stems at a slightly late stage than too early as the buds may fail to open.

Correct harvest stage for Sarah Bernhardt

Storage

Before storing cut stems ensure foliage is dry as Botrytis can occur in storage. Cut stems can be dry stored flat in cardboard boxes. Cool store at .5C to 1C for 1 week until ready to transport. Prepare for transport by placing into treated water one day before despatch and grading stems according to quality, length and opening stage. Stems in buckets can be stored at 2C. Placing into water will induce flower buds to open. Stems are normally sold at 50cm - 60cm long, with blemish free foliage and opening buds. Depending on market and quality grade, growers can expect 30p-40p at wholesale markets for common varieties.

References

- CAFRE (Northern Ireland) *Peony Cultural Notes* 2008.
- GreenWorks (The Netherlands), *Cultural Information – Peonies for Cut Flower*, <http://www.green-works.nl/>
- Kolsters BV (The Netherlands) <http://www.kolster.nl/en/678/peonies.html>