



DALINA® DAHLIA

GROWING RECOMMENDATIONS



IMPORTANT INFORMATION – DISCLAIMER

Whilst every care has been taken in the preparation of this Growers Manual to ensure that the information contained herein is both accurate and up-to date, neither Dalina Genetics nor any supplier of plant material can accept any liability to any party for any loss or damage incurred by reliance placed on the information in this manual or through omissions or errors, howsoever caused.

Any chemical suggested, the formulation, and the dosage must be checked against the regulations relating to such chemicals in the country of use and professional advice sought on its suitability and on the legality of such usage.

PROPAGATION

IMPORTANT

Subject	Level of importance
Initial Watering and Subsequent Watering in Propagation.	If the propagation media is too wet for the cuttings it can cause the roots not to develop. Instead callus is formed.
Light During Rooting.	Too much light during the rooting stage, e.g. because of covering with clear foil, can cause the leaves to bend downwards and push the cuttings upwards.
Fertilizing.	As Dahlia is a heavy feeder, EC and levels of pH need to be monitored closely. Usually, fertiliser is added in watering. See specification.
Daylight hours	If the daylight hours are too few (less than 14 hours), growth is reduced, or stops entirely. Instead the plant will start producing tubers. See section: Climate.

HANDLING THE CUTTINGS

As soon as the cuttings arrive, check them to make sure they are in good condition, and then leave them in the bags in which they came; then place them in a refrigerator at about 6-10°C/43-50°F until they can be stuck.

Cuttings should, however, be stuck as soon as possible after arrival to obtain the best results.

Only take small quantities of cuttings out of the bags or from the refrigerator at any one time to keep them as fresh as possible before sticking.

PREPARATIONS BEFORE STICKING



Place pots or trays on a clean, disinfected bench.

Water lightly with a fine spray with 0.8 mm holes (0.3 inch), and repeat this until the compost is thoroughly moist. It is helpful to pause between each watering to let the water permeate the compost thoroughly and to avoid compacting it. Do not saturate the compost as that will inhibit rooting. Cuttings will then produce callus, but no roots.

To combat attack from Sciaridae (Sciarid flies /fungus gnats) we recommend you add nematodes and Bacillus thuringiensis (like Vectobac) in the final watering prior to inserting the cuttings.

Refrigerator temperature

8 - 10°C (46 - 50 °F)

Propagation pots

We recommend a pot made of non woven paper filled with growing media (for example the Danish Ellegaard-pot), because that provides excellent aeration around the roots and optimal drainage. 525 plants per m², is the recommended density (49 per sq foot).

Propagation substrate

Rooting Compost: Light fine sphagnum moss peat or similar with long fibres if possible. Fertilized to an EC of 1.6 - 1.8 and pH 5.8 - 6.2.

Fertilizer in this watering

Ec (mS/m): 1.5 - 2.0.

Nematodes and Vectobac

500 000 nematodes (Steinernema feltiaella) and 5 ml Vectobac (Bacillus thuringiensis) per m². (50 000 and 0.034 fl ounces per sq foot).

STICKING

Insert the cuttings to the level of the first pair of leaves.

Keep the cuttings moist during and immediately after sticking. Use a fine spray if necessary to avoid desiccation.



Alar and Supresevits

0.03% Alar (daminozide 85%) and 0.1 %
Supresevit (Trichoderma harzianum)
1.2 l/m² (0.03 gal US/sq foot).

Plastic Film for covering cuttings during rooting

White 0.03 mm with 50-80 8 mm holes/m² (5-8 0.3 inch holes per sq foot).

Immediately after sticking, spray with Alar (daminozide 85 %) and Supresevit (Trichoderma harzianum). The Alar will reduce stretching under the plastic covering, Supresevit will protect the cutting from other fungal attacks.



Then cover the cuttings with thin white polyethylene film.

In our experience we get the best results by letting the plastic sheet rest directly on the cuttings. Ensure that you use a white film as a clear or translucent one, will allow the cuttings to receive too much light before they have any roots and that too will cause downward curving. This downward movement of the leaves can push the cutting out of the soil.

HARDENING OFF

Rooting should be visible after 10 days.

After 14 days those cultivars which root the fastest can be exposed and hardening off begun. Most of the cultivars can be hardened off after 18 days.



The plastic film should be removed and replaced with Agryl P17 netting (or a similar fabric) to prevent the leaves drying out. The Agryl would typically stay on for a couple of days.

GROWTH REGULATION

As soon as the plastic film is removed, the first growth retardant application must be given with a very fine spray of Alar.

IRRIGATION

Watering must always be done as “fertigation” i.e. with added fertilizer, as Dahlias are greedy feeders. It is best to “fertigate” moderately from overhead (but not in bright sunlight) as watering from below may damage the young roots during the rooting stage.

CLIMATE

Dahlia is a plant that demands high light, and which rarely needs shading. The exception is during the propagation period when the plants have no roots, since high light levels at that time may cause too high temperatures under the plastic film, as well as increase photosynthesis, both of which can cause downward curving of the leaves. After hardening off, provide as much light as possible.

PESTS AND DISEASES

See the chapter: “Fungal diseases and insect pests” under “Further crop management”.



Agryl P17

Lightweight white non woven fabric
17 g/m² (0.056 oz per sq foot).

Rooting

Weeks 42-52: About 14 days.

Weeks 1–20: About 10 days.

Ready for potting

Week 42-52: About 4 weeks.

Week 1-20: About 3 weeks.

Growth regulator

Alar (daminozide 85%), 0.1%, 25 ml/m².
Note - low volume spray.

Mineral Nutrition

Fertigation water EC (mS/m): 1.8-2.0.

See further under “Further Growth and development”.

Climate

Day length: 14-20 hours.

Soil temperature: 22-23 °C (71-73 °F).

Rooting occurs: 21-26 °C (70-79 °F).

Air Temperature: 21-22 °C (70-72 °F).

Vents open at: 26 °C (79 °F).

Assimilation light: When natural light is below 3 000-4 000 lux (300-400 fc).

FURTHER CROP MANAGEMENT

IMPORTANT

Subject	Level of importance
Daylight hours.	If the daylight hours are too few (less than 14 hours), growth is reduced, or stops entirely. Instead the plant will start producing tubers. See section: Climate.
pH Levels in The Germination Matter.	Too low pH levels will reduce the rate of germination, causing spotting on the leaves.
Fertilizing.	Dahlia is a heavy feeder, thus the germination matter and the levels of fertiliser in the water needs to be monitored regularly.
Treatment to increase Longevity	The longevity of the Dahlia flower increases significantly after a single treatment with silver thio-sulphate (Argylene).

POTTING

About three weeks after sticking the plants can be potted.
See section: "Cropping times".

Growing media

Light, coarse sphagnum moss peat or a similar media, with a high air filled porosity.

EC (mS/m): 1.5-2.0

pH: 5.8 - 6.2.



Push the rooted young plants well down into the compost so that the soil of the young plant is below the level in the pot, but do NOT cover the bottom leaves or they will rot and cause problems.

PINCHING

Some growers prefer to pinch after the first 2 pairs of leaves to produce more bushy and floriferous plants. This, however, may increase the production time by an additional 7-10 days.

IRRIGATION

Dalina® Dahlia plants prefer a moderate drying out period between watering.

We recommend watering the pots from below or by bench flooding. This will help to keep the compost surface a little dry for the first few weeks after potting, and will avoid compacting the compost surface.

This may reduce attacks by Sciaridae, (Sciarid flies/Fungus gnats) and Ephydriidae, (Shore flies).



NUTRITION

Nutrients must be provided at each and every watering.

Dahlia is a voracious feeder that needs plenty of fertilizer. The nutrition levels must be carefully monitored. Deficiencies will immediately result in symptoms such as yellow



bottom leaves. If you use rainwater, the EC should be 1.5-2.5 in the “fertigation” water. We recommend taking a weekly sample of the compost to measure the EC and pH to ensure that these values are within the recommended limits given below.

Sample the compost from several plants a few hours after irrigation; squeeze out the liquid and measure the EC and pH of the liquid. Do not take compost from the upper third of the pot.

CLIMATE

Dahlia needs high light levels; it is rarely necessary to use shade. Additional Photosynthetic light is recommended during low light periods.



Avoid day lengths of less than 14 hours. Shorter day lengths will slow growth or may even cause growth to stop completely. The plants will also begin production of tubers which is undesirable.

There are no problems initiating flowering in Dalina® Dahlia in long days at the recommended temperatures.

The preferred results from these samples

EC: 2.5-3.5.

pH: 5.8-6.2.

The fertilizer constituents should be as follows:

Macronutrients

N	P	K	Ca	Mg	S
166	19	160	127	35	30

Micronutrients

Mn	B	Zn	Cu	Mo
1.20	0.25	0.25	0.10	0.05

Ammonium

5.6%

Climate

Day length: 14-20 hours.

Air Temperature: 17-18°C (65-68°F).

Vents open: 21-22°C (75-78°F).

Assimilation light: When natural light below 3 000-4 000 lux.

In Denmark we recommend supplementary light at 60-70 $\mu\text{mol m}^2 \text{sec}^{-1}$

CO₂ supply: 600 ppm will improve quality of plants.

Growth regulatants

Alar SP (85% daminozide), 0.2%, 70-100 ml/m² (0.23-0.33 fl ounces/sq foot.).

Number of Alar treatments: See section "Cropping times".

Fungicides that have been tested with positive results (See disclaimer)

Powdery Mildew

Candit (Kreoxim-methyl 500 g/kg).

Saprol (Triforin 190 g/l).

Phytophthora

Aliette 80 WG (Fosetyl-aluminium 800 g/kg).

Amistar (Azoxystrobin 250 g/l).

Rhizoctonia

Rhizolex (Tochlofos-methyl).

Insecticides that have been tested with positive results (see disclaimer)

Thrips

Regent (Fipronil).

Conserve (Spinosad).

Aphids

Confidor (Imidacloprid).

White fly

Applaud (Bufrofezin).

Admiral (Pyriproxyfen).

Mites

Floramite (Bifenazate)

GROWTH REGULATION

It is important to limit the natural height of Dalina® Dahlia as this improves the plant quality. Alar (Daminozide 85%) has proved to be the best type of growth retardant for this purpose.

Do not spray when the sun is shining, or on plants that are not turgid. However Dahlia Dalina are not overly sensitive to Alar, and no leaf scorching has been observed if these precautions are taken.

The number of treatments with Alar depends on several factors:

- 1) The time of year – a bright, dry climate lessens the need for growth retardants,
- 2) Different cultivars needs different treatments – see the Cultivar list.

FUNGAL DISEASES

If the climate is carefully controlled from the start of production it is usually not necessary to do precautionary sprays. However, the crop must be carefully monitored to detect any fungal problems which might occur.

Diseased plants must be immediately removed from the cultivation area to avoid infecting neighbouring healthy plants. All activities that damage the plants (for instance pinching) must be done with tools that are sterilized between each plant.

Too high a moisture level around the plants can cause grey mould (Botrytis). Maintain good ventilation and space promptly when necessary.

A fungus sometimes appears on dead tissues on the lower part of the plants. This is a protective fungus (Scopulariopsis sp.) - sometimes nicknamed the "barbed wire fungus" - with white hyphae. This fungus is beneficial, and protects the plants from other harmful fungal attacks like grey mould (Botrytis)

In addition to Botrytus other fungal diseases that may attack Dahlia are Powdery Mildew, Phytophthora, Rhizoctonia, Pythium, and Fusarium

INSECT PESTS

Plants cannot always be protected from insect attack, but fewer problems arise when the greenhouse is clean and the benches disinfected before the plants are moved in. Under-bench weeds should be removed since this is often a home for pests.

Several different insect pests can be troublesome: Thrips, Aphids, White fly (Trialeurodes vaporariorum), larvae (butterfly), Red spider mites (Tetranychus urticae), and Meristem mites.

We recommend placing yellow and blue Sticky traps across the whole growing area. These must be monitored and changed weekly, and it is advisable to keep a record of the type of insect caught and the numbers of each one.. In this way the grower can get a good picture of the pest levels in the crop. If biological control is preferred this monitoring is essential.



SPACING

Spacing on time is a prerequisite for good results. Dahlia grows very fast which means that it must be done promptly when it is needed. If spacing is done manually, then only one spacing is normally possible for economic reasons.

OUTDOOR PRODUCTION

Dalina® Dahlia can be produced wholly or partly outdoors.

Dalina® Dahlia Maxi is the obvious choice for this. Dalina® Dahlia Maxi is NOT dependent on shorter days in the late summer, so it is possible to produce Dalina® Dahlia Maxi as a spring/summer crop in many localities. All risk of frost must have passed, and it is not practical if day-lengths are less than 14 hrs.

Dalina® Dahlia produced outdoors can be a profitable and attractive alternative to Mums (Chrysanthemums) in the late summer. As yet there is not a great deal of experience with this type of cultivation, but it has considerable potential.



CROPPING TIMES

Obviously cropping times will vary from place to place and so we cannot make specific recommendations in this respect. The schedule which follows is therefore purely illustrative.

We suggest each grower keeps a record of the performance of the crop from day one so it can be used as guide for future crops.

TREATMENT TO INCREASE LONGEVITY

The longevity of the Dahlia flower increases significantly after a single treatment of Argylene.

Spray right before the flower opens.



Schedule

Midi in 11 cm pots

Potting week 70 pl/m ²	Spaced week 35 pl/m ²	Number of Alar treatments	Ready for sale in week
1	5	5-8	9-10*
5	8	4-8	12-13*
10	13	3-7	16-17*
15	17	3-7	20-21*
20	22	3-6	25-26*

* Based on production without pinching. Pinching will increase the production time with 5-10 days.

Maxi in 19 cm (3 liter) pots

Potting week 20 pl/m ²	Spaced week 10 pl/m ²	Number of Alar treatments	Ready for sale in week
1	5	6-10	9-11
5	8	5-9	13-15
10	13	5-8	17-19
15	18	5-7	22-23
20	23	4-7	27-28

Treatment to increase Longevity

Argylene (STS - Sølvtiosulfat) 1‰
100-150 ml/m².