CULTURAL DIRECTIVES

DIAMOND®-series

limonium sinensis

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CULTURAL DIRECTION 'DIAMOND'-SERIES

Introduction

Limonium sinensis 'Diamond' is a annual cut- and dry flower.

Botanical family : Plumbaginaceae.

genus: Limonium **species:** **sinensis**

common name : **'Diamond'**

All over the world limonium species can be found. At present some 200 species have been identified. Nowadays several of these are used for both fresh cut flower and dried flower production.
The tiny flowers are narrow funnel shaped, consisting of loose terminal panicles appearing in loose bows. The leaves of the 'Diamond' plants form a rosette pattern at the base of the plant, the leaves grow close to the ground. Prior to flowering the stem elongates and terminal leaves become upright.

Encouraged by the enormous success and interest for limonium, HilverdaKooij decided to develop new limonium varieties. In recent years the breeding department developed various new limonium, among those varieties named 'Diamond'.
De Hilverda B.V. 'Diamond'-series is available in an assortment of four colours, white, brons / peach, yellow and pink. These varieties are suited for in- and outdoor growing. The plant makes a rosette just above the soil which need to be planted in a light habitat. The average lengths of the stems are 60 - 80 cm.

These plants propagated from tissue culture are unique, because of its uniformity in growth, colour, quality and higher production. The plants propagated from tissue culture appear to have a higher resistance against Botrytis and mildew.

Soil

Almost every soil type can be made suitable for the cultivation of the 'Diamond'-series. Before planting all necessary precautions have to be applied for a successful cultivation. Heavy clay soils are not preferred.

Soil structure

Big differences in the profile like: sandy layers in a clay soil en peat layers in a clay- or sandy soil are disturbing for the air- and water conservation, which leads to stunt of growth.

Air and water conservation

An excess of water causes lack of oxygen. Because of this problem roots can die off. By having a good drainage and soil reparation the condition of the soil can be improved. A good permeability of the soil is a requirement.

Soils can also be sensitive to slaking (sandy clay). The appearance of slaking is fatal for the air conservation of the soil. Slaking of the soil can also be prevented by covering up the soil with plastic. By adding organic material to the soil the air and soil conservation can be improved in many cases.

Soil disinfection

Soil disinfection (steaming) with the cultivation of the 'Diamond'-series is recommended: it mostly stimulates the growth and the soil will mostly be free of weeds. Chemical disinfection also kills nematodes, wireworms, scutigerella and Rhizoctonia.

Soil preparation

Before planting out the 'Diamond'-series the soil must be properly prepared. Mostly a soil preparation of 40 cm deep is enough, unless there are disturbing layers in the soil. Mistakes with the soil preparation can't be recovered during the cultivation. A result of a bad structure of the topsoil is that planting is more difficult and the plants will have more difficulties to root. This can all lead to waste of plant material. Especially the moisture content of the soil during the preparation of the soil is an important factor. Problems like deterioration of the soil structure could arise when the clay is too humid. In the most cases the soil is prepared with a rotavator (cultivator) spading machine. On heavy soils the beds need to be extra prepared with a rotavator machine.

Planting in northern and southern Europe

Due to the difference of the climates in Northern and Southern Europe a different planting strategy can be applied.

Northern Europe:

For an outside cultivation it is important that the plants are planted out in frost free conditions. In Holland (especially along the coast) this is already possible from the beginning of April. It is possible to plant outdoor until the end of May. Indoor planting is possible from the end November till May, but in practice it is usually until the end of April. The reason for this is that the production will be at the same time as the outdoor production if planting is continued till May.

Southern Europe:

Planting can take place from September to February; however keep plants frost-free at all times. When planting in September/October, flower production can be expected from January onwards.

Planting distance

De planting distance is 30 x 60 cm. On a bed of 1 meter wide two rows are planted out. The distance between the rows is 60 cm and between the plants it is 30 cm. In most cases the paths between the beds are 45cm wide.

6 plants per net m^2 = 3.5 – 3.9 plants per gross m^2

More plants per m^2 often gives less quality stems, also damage and loss of time can be created during the harvest.

Indoor cultivation

The Plants can be planted out from the beginning of December until the beginning of April. During the first 2 weeks let the plants root at 15 °C. There after;

night < 10°C(4-8°C)
day < 10°C(4-8°C)

After 4 weeks let the temperature rise to;

night < 10°C(4-8°C)
day approximately 20°C.

This all depends on light intensity and the outside temperature. See to it that the plant is big enough (diameter 25-30 cm) when it starts with the initiation of the flowers (= enough light from mid March). With planting in the beginning of April keep the following temperatures;

night 12-14 °C
day approximately 20 °C

This all depends on light intensity and the outside temperature. In April the circumstances are already ideal for generative development, but for a good quality it is important that the plant develops its vegetation first.

Outdoor cultivation

Planting from the beginning of April until the end of May. Expected flowering with planting April 1st; mid July. Expected flowering planting end of May; end of August.
With indoor cultivation late planting (= June 1st) will lead to insufficient flowering. This is caused by the fact that indoor there is approximately 30% less solar radiation than outside. With outdoor cultivation planting is possible till June 1st.

Water and fertilizing

Cultivation until planting

The 'Diamond'-series needs potassium to guarantee the firmness of the stems. In case of indoor growing this is very important. In the vegetative stage, when it is important to build up a plant, a compound fertilizer like Kristalon blue(19-6-20-3) should be used for fertilization.

The basic fertilizing depends on the nutrition condition of the soil. To get a good insight into the nutritive values it is advisable to have a qualified laboratory take a soil sample and analyze it. Have this analyzed a long time before planting is started. Depending on these values in the soil the following basic fertilizing could be used:

3-5 kg Sulphate of potash magnesia
3-5 kg Magnesium Sulphate
3-5 kg Triplesuperphosphate
⟶ per 100 m²

Cultivation after planting

From planting until the flower-induction it is important that the plants get enough water. Depending on the nutritive values, giving nutrition can be started with approximately 1 month after planting. During the period of growth, the plants mainly need potassium, nitrogen and magnesium. In this stage the most important fertilizers are nitrate of potash and nitrate of magnesium.

During flowering, until the end of the flush, a normal amount of water and fertilizer can be given. It is important that the 'Diamond'-series get enough water during the development of the stem, this to get enough length. Fertilizing has, especially for the firmness, an important influence. Most important fertilizers, in this stage, are; sulphate of potash and monopotashphosphate. With every water supply ± 1,5 EC of fertilizer must be given along. A optimum way of giving water, by which the crop stays as dry as possible, this is feasible by drip irrigation.

Target figures

A EC level of approximately 0,7 - 1,0 mS/cm in the soil is ideal to get a qualitative good stem, which also has a good durability.
The pH is also very important. Depending on the type of soil the optimum pH is ± 6,5. If the pH is to low it can raised before planting, with liming material like agricultural chalk or carbonate of magnesia.
Target figures of the main elements which need to be handled for the cultivation of the 'Diamond'-series (m mol/litre):

Ammonium	(NH_4^+)		0,1	Nitrate	(NO_3-)		2,5/2,0*
Potassium	(K^+)		1,3/2,0*	Chlorine	(Cl^-)	<	0,4
Sodium	(Na^+)	<	0,4	Sulphate	(SO_4-)		1,5
Calcium	(Ca^{++})		1,5	Bicarbonate	(HCO_3-)		0,5
Magnesium	(Mg^{++})		1,0	Phosphate	(H_2PO_4-)		0,12

*= during the generative stage

Support material

To grow a straight stem of good quality, it is important to use good support material. Alstroemeria-nets (17cm x 20 cm mesh) are most useful; one net is enough. Some of the growers only use strings. In itself this will make the process easier. However, if strings are used the Alstroemeria plants are less supported. Strings cannot be used for each variety.

Pinching

The 'Diamond'-series has the habit to make one main stem which is very heavy. After this stem is cut, a number of lighter stems follow. For the production and uniformity this is not ideal. To overcome this problem the plant should be pinched. This is only necessary when the plant develops one main stem. If the plant develops more than one stem it does not need to be pinched. The main stem is pinched when it is approximately 8 centimetres tall. When pinching try to keep two centimetres of the main stem on the plant to prevent it from drying in. Pinching (too) late or abstaining from pinching will result in lower production. The main stem will not get as many light stems as when it would be pinched.

Harvesting

When both bracts and petals are opened the stem is ready to be harvested; this is approximately 3-4 months after planting. The period from planting until the end of the first flush comes to 5 months.
Production: approximately 15-25 stems per plant.
Harvesting scissors are recommended as a helpful tool. This way plants are prevented from being torn loose.
The flowers which are harvested have to be put in water as soon as possible. Pre-treatment is not necessary. To get a good water absorption it is advisable to add some spreader or Florissant 500 to the water (10 cc/ 100 l water).

Diseases

In the cultivation of the 'Diamond'-series hardly any chemical control is applied. Because the 'Diamond –series is not very susceptible to diseases, this cultivation can be considered environmental friendly.
However; thrips causes no damage, but it is often present in the flower. This can cause problems when flowers are exported. A big advantage of the 'Diamond'-series is that they are resistant against downy mildew and grey mould (botrytis).

Spider mite Every 7-10 days spray with:
- dienochloor (Pentac)
- 50gr/20ml hexiathiazox (Nissorun)
- chlofentezine (Apollo)
- 25ml abamectine (Vertimec)
- 40ml bifenthrin (Talstar): only if plants are under a glass roof.

Thrips Spray with:
- 50ml abamectine(Vertimec): only if plants are under a glass roof.
- 50 – 75gr acefaat (Orthene)
- methiocarb (Mesurol)
- 150ml carbofuran (Curater)

Rhizoctonia Drench/spray with:

- furalaxyl(Fongarid)
- 100gr tolclofos-methyl(Rizolex): after applying Rizolex, spray with clean water.
- iprodion(200gr Rovral)
- 200ml Rovral Aquaflow

Phytophtora Drench / spray with:

- 18cc Ridomil gold
- 50 cc Parate

Stemrot/Footrot Drench/spray with:

- 150ml carbendazim(Bavistin)+ Thiram(T.M.T.D.)
- 150ml carbendazim(Bavistin)+ tolclofos-methyl(Rizolex)

Caterpillars Spray with:

- 50 – 100gr Bacillus thuringiensis (Bactospeine)
- permethrin (Ambush)
- 100ml teflubenzuron (Nomolt): only if plants are unger glass roof.
- 50gr acefaat (Orthene)
- diflubenzuron (Dimilin)

Scutigerella Soil treatment with:

- 500ml carbofuran (Curater): Pre-treatment of soil by spraying water. After using Curater, ensure you leach / wash the soil.
- 150ml Parathion: pre-treatment of soil by spraying Water. After using Parathion, spray a lot of water.

Important note: Please read all safety measures on the label or packing material each herbicide killer and stick to the quantities advised by the manufacturers.

* HilverdaKooij can not be held responsible for the result/effect on a crop due to the advice and the information in the growing manual.