

MURAKAMI SEED

Culture Guideline CUTFLOWERS

CONTENTS

Blue Lace Flower (Trachymanedidiscus)	1
Brassica (Flowering Kale)	3
Delphinium chinensis	5
Dianthus japonica	7
Echinops ritro	9
Eustoma (Lisianthus)	11
Lilium	13
Snapdragon (Antirrhium)	15
Stock (Matthiola), Standard	17
Stock (Matthiola), Spray	19
Eustoma Chart by Variety	21
Stock Chart by Variety	23

MURAKAMI SEED CO., LTD.

341 OTA MACHI, KASAMA, IBARAKI 309-1738 JAPAN
PHONE +81 (0)296 77 0354 FAX +81 (0)296 77 1295

[Contact]

<http://www.murakami-seed.com>

Email: info@murakami-seed.com

All information given is intended for general guideline only and may have to be adjusted to meet individual needs. Cultural details are based on the research stations in Japan and Murakami Seed shall not take responsibilities along with crop damage or loss related to the information shown herein. Application of recommended growth regulators and chemicals are subject to appropriate regulations under the governmental or municipal rule. Always follow manufacturer's label instructions. Testing a few plants prior to treating the entire crop is best.

Culture Guideline

Blue Lace Flower/*Trachymane didiscus* Blue Murex/Sandpiper

Young Plant Operation

Stage 1(sowing stage) - 10 to 14 days (depending on moisture and temperature)

Temperature: 18 - 21 °C

Sowing and Soil: Single sowing recommended. Use a well drained and disease-free medium.

pH and EC: 6.0 to 6.8 and 0.75 mmhos

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Cover seeds with the same soil/material used for seed bed.

Stage 2/3 - approximately 2 weeks <cotyledon emergence>

Temperature: 15 - 20 °C

Light: 1,000 - 1,500 f.c. (11,000 - 17,000 lux)

Fertilizer: 50 - 100 ppm (N)

Soil Moisture: Wet slightly to dry (repeat a wet slightly and dry cycle)

Stage 4 - approximately 2 to 3 week <True-leaf development>

Temperature: 15 - 22 °C

Light: 2,500 - 3,000 f.c. (27,000 - 33,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Wet slightly to dry (repeat a wet slightly and dry cycle)

NOTE:

- 288 to 406-cell trays are available. Recommend such a large size as 288-cell tray. Carefully handle the roots (in soil) while transplanting, as they are friable.
- Blue Lace Flower is a taproot crop and does not like being transplanted, so growers must minimize the time to transplant.
- Maintain a soil pH of less than 6.8. When soil pH turns to 7.0 or above, it must be controlled in the proper range by adding dilution of calcium hydroxide (follow usage and concentration of the instruction label) to the soil.
- Do NOT apply ammonium-form fertilizers particularly in early stage.

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate or adequate initial-nutrient suggested with pH range 6.0 to 6.8. Careful not to allow plugs to dry out immediately after transplant.

Density

Plants at space of 20 to 30 cm.

Plant Net

Plant net works well. Stems on Blue Lace Flower are generally thin, so the plant net protects its breakdown from strong wind.

Fertilizer

After rooted, apply 100 to 150 ppm once a week. Maintain EC less than 1.2 mmhos/cm and pH between 5.8 and 6.8.

Temperatures

Day temperature: 18 - 22 °C

Night temperature: 10 - 19 °C

Shades need during summer season.

Light Level/Photoperiod

Can be up to 5,000 f.c. (54,000 lux) as far as temperature is maintained in the proper range. When the plants are grown under short-day conditions, day length extension to 16 to 18 hours are helpful.

Common Disease and Insects

Protections with fungicide and pesticide required.

Particularly aphids must be carefully eliminated in advance, as they like young flowering buds.

NOTE:

- Operation in greenhouse is desirable, because the plants will be stressed under the environment of extreme warm or cold and may be damaged by strong wind.

Culture Guideline

Brassica(Flowering Kale) *Brassica oleracea* Cutflower Series and varieties

Young Plant Operation

Stage 1(sowing stage) - Approximately 3 to 4 days

Temperature: 20 - 23 °C

Sowing and Soil: Single sowing recommended and use a well drained and disease free medium.

pH and EC: pH 5.5 - 6.2, EC 0.75 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed for germination stage - cover seeds lightly

Stage 2 - 1 to 2 weeks <cotyledon emergence>

Temperature: Day = 15 - 21 °C Night = 13 - 15 °C

Light: Up to 2,500 f.c. (27,000 lux) as far as temperature is in proper range

Fertilizer: 100 ppm (N)

Soil Moisture: Slightly dry

Stage 3 - Approximately 2 weeks <True-leaf development>

Temperature: Day = 15 - 21 °C Night = 13 - 15 °C

Light: Up to 2,500 f.c. (27,000 lux) as far as temperature is in proper range

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly dry

Stage 4 - 7 to 10 days <Hardening stage>

Temperature: Day = 15 - 21 °C Night = 10 - 13 °C

Light: Up to 5,000 f.c. (54,000 lux) as far as temperature is in proper range

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Normal to slightly dry

NOTE:

- 288 to 405 size tray recommended.
- Miantain a soil pH of 5.8 to 6.2 and EC in lower than 1.2 the overall period for young plant production.
- Avoid temperatures below 10 °C and above 24 °C in young plant production time; especially earlier stages.
- Apply a nitrate form fertilizer with low phosphorus - do not use ammonium form.

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 5.8 to 6.5. Young plants do not like dry stress especially in start-up time. Careful not to allow plugs to dry out immediately after transplant.

Planting Density

Recommended to plant 10 x 10 cm. apart to clean lower leaves and promote stems thinner. Carefully do not damage the roots at transplanting. A humid deficit (G/M3) must be within moderate range as actual temperature.

Irrigation

Recommend overhead irrigation after transplant, then switch to basal supply 2 to 3 weeks later. Keep the media moist. Allow the media to dry slightly between watering strokes.

Fertilizer

After rooted, apply 150 ppm of nitrate form fertilizer with low phosphorus every other irrigation. Maintain EC at about 1.0 to 1.5 mS/cm (1:2 extraction) and pH at 5.8 to 6.5. Continue fertilizing until harvest. Avoid excessive moisture and fertilization and maintain less(50 to 100 ppm(N)/ EC 0.75 mmhos/cm) several days before lowering the temperature(refer to "Temperature" below). NOTE: Too much moisture and fertilizer promotes delaying leaves coloring and leads to out of the balance in top and bottom.

Light Level

Plants must be grown under 3,000 - 5,000 f.c. (33,000 – 54,000 lux).

Temperatures

Day temperature: 15 - 22 °C

Night temperature: 10 - 15 °C

Control temperature in proper range until the desired height, then keep night temperature below 13 °C to tone up color on the leaves. The color becomes more intense under the temperature comes below 9 °C.

Supporting Net

Support nets will be helpful - enough with one layer.

Pinch

No pinching needed.

Common Disease and Insects

Protections with fungicide and pesticide; particularly Aphids, Thrips, Caterpillars, Downy Mildew, Botrytis, are required. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Culture Guideline

Delphinium *Delphinium chinensis*

Energy Series, Fashion Series and Totty Tall Sky

Young Plant Operation

Stage 1(sowing stage) - Approximately 10 days

Temperature: 19 - 22 °C

Sowing and Soil: Single sowing recommended and use a well drained and disease free medium.

pH and EC: pH 5.8 - 6.3, EC 0.75 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed for germination stage - cover seeds

Stage 2 - Approximately 2 weeks <cotyledon emergence>

Temperature: 18 - 20 °C

Light: 2,000 - 2,500 f.c. (22,000 - 27,000 lux)

Fertilizer: 100 ppm (N)

Soil Moisture: Normal - do not saturate young plants

Stage 3 - Approximately 2 weeks <True-leaf development>

Temperature: 18 - 20 °C

Light: 2,000 - 2,500 f.c. (22,000 - 27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly dry

Stage 4 - 1 to 2 weeks <Hardening stage>

Temperature: 15 - 18 °C

Light: 4,000 - 5,000 f.c. (43,000 - 27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly dry

NOTE:

- 200 to 288-cell trays are available but recommend 200 or similar size.
- Maintain pH of lower than 6.5 and EC between 0.7 and 1.2 from stage 2 thru 4..
- Do not use ammonium-form fertilizers

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 5.8 to 6.5. Young plants do not like dry stress especially in start-up time. Careful not to allow plugs to dry out immediately after transplant.

Planting Density

40 to 64 plants per sq. meters. – keep spacing 12 to 15 cm. Carefully do not damage the roots at transplanting.

Fertilizer

After rooted, apply 100 - 200 ppm of low ammonium fertilizer every other irrigation. Maintain the soil pH at 5.8 to 6.5 and EC lower than 1.0 mS/cm. Do not allow nutrient shortage to young plants, as it can seriously affect behavior of growth and then bud initiation.

Irrigation

Water plants consistently. Do not direct overhead watering as susceptible to aerial disease.

Light Level

In greenhouse operation, supplemental light works well for delphinium. When shorter than 12 hours (later than mid September around 35 °N of northernhemisphere), 4 hours of light extension(starting from 4:30 PM) will be effective to promote flowering earlier with uniformity. This is just an example, so grower must research the timing on the location.

Temperatures

Day temperature: 17 - 20 °C(autumn transplant)

Night temperature: 12 - 15 °C(autumn transplant)

Supporting Net

Support nets help the growing operation. Grower can choose single or multi-layer depending on traits of varieties.

Common Disease and Insects

Protections with fungicide and pesticide required. Disease issues on the whole happens along with stresses in growing management or surroundings, so keeping appropriate growing conditions leads to diminishing chance to be infected. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Culture Guideline

Dianthus *Dianthus japonica*

Summer Lavender

Young Plant Operation

Stage 1(germination stage) - 5 to 7 days

Temperature: 18 - 20 °C

Sowing and Soil: Single sowing recommended and use a well drained and disease free medium.

pH and EC: pH 5.8 - 6.2, EC: below 1.0 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed but beneficial for uniformity - cover seeds lightly to keep moisture

Stage 2 - approximately 2 weeks <cotyledon emergence>

Temperature: 18 °C

Light: Up to 2,500 f.c. (27,000 lux)

Fertilizer: 50 ppm (N)

Soil Moisture: Normal to slightly wet

Stage 3 - approximately 2 weeks <True-leaf development>

Temperature: 14 - 16 °C

Light: Up to 2,500 f.c. (27,000 lux)

Fertilizer: 50 - 100 ppm (N)

Soil Moisture: Normal to slightly wet

Stage 4 - 1 to 2 weeks <Hardening stage>

Temperature: 14 - 16 °C

Light: Up to 5,000 f.c. (54,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Normal to slightly wet

NOTE:

- 288 to 406-cell tray recommended.
- It is a typical cropping schedule to sow October to December, and transplant November to January. On this schedule, harvest time is planned late July to early August.
- As another schedule, it is possible to plan sowing in January and transplanting/pinching in February, then growing the plants under natural environment.
- Avoid high temperature during the young plant production and just after transplant stage, as it can induce rosetting, which will cause stunting after transplanted.

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 5.8 to 6.5. Careful not to allow seedlings to dry out immediately after transplant.

Transplant and Schedule

It is important to decide the appropriate cropping schedule. Best plan to recommend will be sowing in October to December and transplanting November to January in weather of northern hemisphere. This schedule has benefit of that plants have less stress with high temperature and then naturally grow under proper low temperature condition. The plants grow up well in appropriate temperature spring to early summer and initiate flowering buds under long day condition after late May

Planting Density

Recommend to transplant 15 x 15cm apart. With pinching, over 150 stems per sq. meter are expected to harvest at max when grown in the optimum conditions.

Irrigation

Plants must be adequately watered until rooted. Maintain moderate soil moisture after rooted. Do not too wet or too dry.

Fertilizer

After rooted confirmed, apply 150 to 200 ppm once a week. Maintain EC less than 1.2 mS/cm and pH between 5.8 and 6.5. Plants do not need fertilizer during winter season, so the application must be kept to a minimum. And, the plants desire fertilizer in spring with the cool season gone. Then carefully apply fertilizer enough, as nutrient deficiency may allow the plant height to be shorter.

Light Level

Keep light levels as high as possible while maintaining appropriate temperatures.

Photoperiod

Summer Lavender requires a 15-hour or longer daylength to flower in more uniform. Extension with supplemental light needs according to environmental conditions, so day-length is the restricting factor for bud initiation. But even if longer extension set it does not effectively work earlier to initiate buds.

Temperatures

Day temperature: 18 - 22 °C

Night temperature: 12 - 18 °C

Shades works effectively when sunlight is too strong during summer season.

Pinching

Summer Lavender can flower without pinch but produces more branching and numbers of stem per bed by pinching. Keep more potential stems with buds and then pinch another stem at every second node.

Supporting Net

Supporting nets will be helpful to manage harvesting. Two rows are better as 100 to 120 cm is expected in height.

Common Disease and Insects

Protections with fungicide and pesticide - particularly protection needs against Thrips, Aphids, Mites. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Culture Guideline

Echinops *ritro*

Young Plant Operation

Stage 1(sowing stage) - Approximately 5 days

Temperature: 19 - 21 °C

Sowing and Soil: Single sowing recommended and use a well drained and disease free medium.

pH and EC: pH 6.2 - 6.8, EC 0.75 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Do not cover seeds

Stage 2 - approximately 1 week <cotyledon emergence>

Temperature: 15 - 18 °C

Light: 1,000 - 2,500 f.c. (11,000 - 27,000 lux)

Fertilizer: 50 - 100 ppm (N)

Soil Moisture: Slightly wet (repeat a wet and dry cycle)

Stage 3 - approximately 1 week <True-leaf development>

Temperature: 15 - 18 °C

Light: 1,000 - 2,500 f.c. (11,000 - 27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly wet (repeat a wet and dry cycle)

Stage 4 - approximately 1 week <Hardening stage>

Temperature: 14 - 18 °C

Light: 2,500 - 5,000 f.c. (27,000 - 54,000 lux)

Fertilizer: 100 - 150 ppm (N) - When slow to grow apply more frequently

Soil Moisture: Normal

NOTE:

- 288 to 512-cell trays are available - recommend 405 or similar size.
- Miantain a soil pH of 6.2 to 6.8. Higher pH(6.0 or more) can induce iron and boron deficiency, so care fully and periodically check soil conditions.
- High EC ratio, excessive moisture or root-bound, accumulates stress on plants, and it results in physical issues like abortion.
- Do not use ammonium-form fertilizers

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 6.2 to 6.5. Young plants do not like dry stress especially in start-up time. Careful not to allow plugs to dry out immediately after transplant.

Planting Density

Keep space 35 to 40 cms each, as side stems grow up very wildely.

Fertilizer

After rooted, apply 150 - 200 ppm of low ammonium fertilizer every other irrigation. If low phosphorus and calcium in the soil(test needed) then they would be added before planting. Carefully control low fertilizer and irrigation to avoid excessive side shoots. Maintain the soil pH at 5.8 to 6.2 and EC at 1.5 to 2.0 mS/cm.

Temperatures

Day/Night temperature: 13 - 16 °C

Recommend soil temperature at 20 °C more or less to get better uniformity

Light Level

Higher is better as far as tepmerature is maintained in the proper range.

Supporting Net

Not required.

Common Disease and Insects

Protections with fungicide and pesticide required. Disease issues on the whole happens along with stresses in growing management or surroundings, so keeping appropriate growing conditions leads to diminishing chance to be infected. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Culture Guideline

Eustoma(Lisianthus) *Eustoma grandiflorum*

F1 Double Flowering Series and Varieties

Young Plant Operation

Stage 1(sowing stage) - Approximately 2 weeks

Temperature: 20 - 22 °C (lower than 24 °C)

Sowing and Soil: Single pellet sowing recommended and use a well drained and disease free medium.

pH and EC: pH 6.5 - 6.0, EC 0.7 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No seed cover - germination requires light of 100 - 300 f.c. (1,000 - 3,000 lux)

Stage 2 - 1 to 2 weeks <cotyledon emergence>

Once cotyledon emerges, seedlings must be moved to a location in appropriate air-circulation.

Temperature: 20 - 22 °C

Light: 1,000 - 2,500 f.c. (10,000 - 27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly wet - do not saturate young plants

Stage 3 - 4 to 5 weeks <True-leaf development>

Temperature: 15 - 20 °C

Light: 1,000 - 2,500 f.c. (10,000 - 27,000 lux)

Fertilizer: 150 ppm (N)

Soil Moisture: Slightly wet - do not saturate young plants

Stage 4 - Approximately 1 week <Hardening stage>

Temperature: 15 - 18 °C

Light: 2,500 - 5,000 f.c. (27,000 - 54,000 lux)

Fertilizer: 200 ppm (N)

Soil Moisture: Normal – keep drier than former stages

NOTE:

- 406-cell tray or similar size recommended.
- Maintain soil pH between 6.5 and 7.0 and EC at lower than 0.7 mmhos/cm.
- Adequate moisture needed to dissolve pelleted material in germination stage.
- Relative humidity must be reduced down to 70% in stage 2 and then maintained in the following stages.
- Do not allow high night temperature, exceeding 22°C (72°F), in the stage 2 to avoid induction of resetting.
- Eustoma young plants must be produced under optimal light levels. Low light conditions with high humid raise up chance for disease infection.
- Do not use ammonium-form fertilizers.
- Transplant needs to be done without delay at timing of 6 to 8 true leaves. Any plants with rootbound can not recover to normal growth.

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 6.5 to 7.2. Careful not to allow plugs to dry out immediately after transplant.

Planting Density

64 to 72 plants per sq. meters. - keep 12 to 15 cm. apart. Carefully do not damage the roots at transplanting. Plants must be within a moderate humid deficit(G/M3) range in the facility operation.

Fertilizer

Apply every other irrigation with calcium nitrate-based fertilizer at 100-200 ppm. Maintain EC between 1.0 and 1.5 mmhos/cm. Quit fertilizer applications as buds become visible.

Note: high salt levels will delay flowering and can induce to rosetting.

Irrigation

Begin with overhead irrigation, then switch to drip irrigation 2 to 3 weeks gone after transplanted. Keep the media moist but not too wet; allow drying slightly between strokes of watering. Eustoma grows slowly at first, so requires little water. Do not allow the soil to completely dry when plants are in flower.

Light Level

4,000 - 6,000 fc (40,000 - 60,000 lux) is optimal. Higher light promotes high bud count and good flower development. During winter operation, when daylength is shorter than 12 hrs. supplemental light can available work.

Temperatures

Day temperature: 20 - 24 °C Night temperature: 16 - 18 °C

Cooler temperature in growing will enhance stem length and caliper but require longer production time, while higher temperature during the first four weeks after transplant can induce rosetting.

Supporting Net

Support wires of one or two layers 10 x 15 cm. are recommended.

Common Disease and Insects

Protections with fungicide and pesticide; Carefully sprayed - aphids, thrips, leaf miners, whitefly, and then Botrytis, Fusarium, Rhizoctonia, Tospo Viruses required. Disease issues on the whole happens along with stresses in growing management or surroundings, so keeping appropriate growing conditions leads to diminishing chance to be infected. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Post Harvest

After harvested, place cutflowers in fresh water . Using the preservative is recommended. Do not ship flowers until their field heat removed.

NOTE:

- In summer production plants should be appropriately shaded.
- General habit for each variety can be referred to page 17 - 18, or see the international catalog about the details.

Culture Guideline

Lilium *Lilium formolongo*

Raizan Series, Linca Series and F1 Collection

Young Plant Operation

Stage 1(germination stage) - Approximately 4 weeks

Temperature: 20 °C (Keep below 25 °C, as high temperature significantly inhibites germination)

Optimum temperature varies by variety as below

- Raizan Herald: 18 to 20°C - Raizan #1, #2, #2 Select and #3: 15 to 20°C

- F1 Julius, F1 Augusta and F1 Vega: 20°C

Sowing and Soil: Single sowing recommended and use a well drained and disease free medium.

pH and EC: pH 6.0 - 6.5, EC 0.5 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed for germination stage - cover seeds lightly to keep moisture

Stage 2 - 3 to 4 weeks <cotyledon emergence>

Temperature: Day = 18 - 21 °C Night = 15 °C

Light: Up to 2,500 f.c. (27,000 lux)

Fertilizer: 50 ppm (N)

Soil Moisture: Slightly wet

Stage 3 - 2 to 3 weeks <True-leaf development>

Temperature: Day = 18 - 21 °C Night = 15 °C

Light: Up to 5,400 f.c. (27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly wet

Stage 4 - 2 to 3 weeks <Hardening stage>

Temperature: Day = 18 - 21 °C Night = 15 °C

Light: Up to 10,000 f.c. (108,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Normal to slightly wet

NOTE:

- 200 to 288-cell tray recommended - do not use smaller sized tray.
- When sow in warm season such as early summer, cool treatment will help germination better - after sowing place the trays into a condition of 5 to 10 °C with high relative humid for three weeks.
- Seedlings are very susceptible to botrytis, so fungicide treatment must be applied 2 weeks after germination.
- Rizan Series and F1 Collection, lilium formolongo, are suitable for the cropping schedule to sow late December to January, and to harvest early or mid August (in similar climate zone to Japan).

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 6.0 to 6.5. Careful not to allow seedlings to dry out immediately after transplant.

Transplant

Careful not to allow seedlings to dry out after transplant and not damage the roots at transplanting. Avoid planting seedlings too deep as it causes delay to grow or disease like damping-off. Keep top surface of the rhizome bulb at the same level as the soil surface. Once planted, quickly water the seedlings enough.

Planting Density

Recommended to plant 12 x 12 cm or 15 x 15cm apart depending on stem caliper or plant structure - F1 varieties tend to be thinner.

Irrigation

Plants must be adequately watered until rooted well. When drying occasionally irrigate the soil. Water required with plant growth and bud initiation, so control the soil in the condition water shortage doesn't occur. On the other hand, carefully monitor drainage in the soil, especially in rainy season. Grower needs to build fungicide program before rainy season, as plants may be more susceptible to botrytis under high temperature, humid and cloudy.

Fertilizer

After rooted, apply 150 to 200 ppm once a week or every other irrigation. Maintain EC at about 1.0 to 1.5 mS/cm. Plants grow well as far as organized in the proper temperature range and enough light level. If slow to grow under cloudy weather in the monsoon the fertilization must be kept from applying, or taken longer intervals. Continue fertilizing until harvest.

Light Level

10,000 f.c. (108,000 lux) or more will be optimum. When sunburn occurs on leaves or flowers, simple shade-canopy may be helpful during the mid summer.

Temperatures

Day temperature: 20 - 25 °C

Night temperature: 15 - 18 °C

Avoid extremely high temperature as this could cause non-bolting.

Supporting Net

Supporting nets will be helpful to manage harvesting. Two rows are better but even one row may work enough as liliium has hard stem.

Common Disease and Insects

Protections with fungicide and pesticide; particularly Botrytis and Damping-off, are required. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Culture Guideline

Limonium (Statice) *Limonium bonduelli*

Sunny Showers

Young Plant Operation

Stage 1(sowing stage): 7 to 10 days

Temperature: 19 - 21 °C

Sowing and Soil: Single sowing recommended and use a well drained and disease free medium.

pH and EC: pH 5.5 - 5.8, EC 0.75 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed for germination stage - cover seeds lightly

Stage 2: 1 to 2 weeks

Temperature: 16 - 19 °C

Light: Up to 2,500 f.c. (27,000 lux) as far as temperature is in proper range

Fertilizer: 100 ppm (N)

Soil Moisture: Slightly reduce

Stage 3: 2 weeks

Temperature: 16 - 19 °C

Light: Up to 2,500 f.c. (27,000 lux) as far as temperature is in proper range

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Keep the same level at stage 2

Stage 4: 7 to 10 days

Temperature: 13 - 16 °C

Light: Up to 5,000 f.c. (54,000 lux) as far as temperature is in proper range

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Normal to slightly dry

NOTE:

- 288 size tray is recommended, as seed is large.
- Miantain a soil pH of 5.8 to 6.2 and EC in lower than 0.75 mmhos/cm throuout the young plant production.
- Keeping the temperature range above, for full period on young plant production, will help to initiate buds earlier and more uniform..
- Apply a nitrate form fertilizer with low phosphorus - do not use ammonium form.

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 5.8 to 6.2 (EC 1.5 to 2.0 mmhos/cm).

Planting Density

Recommended to plant 30 cm. apart. Most of limonium varieties has stiff stems, including limonium bonduelli Sunny Showers, and does not require netting even in field. Note: removing early buds in daily management is important to make plants better and higher yield.

Irrigation

Control wet and dry by phase. Plants need water very much to establish themselves in early stage but it must be reduced gradually in latter stage. It must be careful that watering too much brings plants inter-node stretching and skinny-weak stems.

Fertilizer

After rooted, apply 150 to 200 ppm of nitrate form fertilizer with low phosphorus every other irrigation. Maintain EC at about 1.0 to 1.5 mmhos/cm (1:2 extraction) and pH at 5.8 to 6.2. Continue fertilizing until harvest. Avoid excessive fertilization as well as too much watering; it may result in tall stretching plants with weak stems, or flower abortion.

Light Level and photoperiodic management

A facultative long day variety.

Temperatures

Day temperature: 13 to 16 °C

Night temperature: 10 - 13 °C

Limonium bonduelli is a susceptible crop to cold temperature. Therefore, do not plant outdoors until the danger of frost completely goes away.

Supporting Net

Not needed but suitable size must be selected as plants require 30-cm space, when use supporting net.

Pinch

No pinching needed.

Common Disease and Insects

Disease: Anthracnose, Botrytis blight, Cercospora leafspot, Crown Rots, Rhizoctonia.

Insects: Aphids, Lepidopterous, Mealybugs, Spidermites, Thrips.

Culture Guideline

Snapdragon *Antirrhinum majus*

Smile Series, Memorial Series

Young Plant Operation

Stage 1(sowing stage) - Approximately 5 days

Temperature: 18 - 20 °C

Sowing and Soil: Single sowing recommended and use a well drained and disease free medium.

pH and EC: pH 5.5 - 5.8, EC 0.75 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed for germination stage - cover seeds lightly

Stage 2 - 1 to 2 weeks <cotyledon emergence>

Temperature: 15 - 20 °C

Light: 1,000 - 2,500 f.c. (11,000 - 27,000 lux)

Fertilizer: 50 - 100 ppm (N)

Soil Moisture: Slightly wet (repeat a wet and dry cycle)

Stage 3 - 1 to 2 weeks <True-leaf development>

Temperature: 15 - 20 °C

Light: 1,000 - 2,500 f.c. (11,000 - 27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly wet (repeat a wet and dry cycle)

Stage 4 - 1 to 2 weeks <Hardening stage>

Temperature: 14 - 18 °C

Light: 2,500 - 5,000 f.c. (27,000 - 54,000 lux)

Fertilizer: 100 - 150 ppm (N) - When slow to grow apply more frequently

Soil Moisture: Normal

NOTE:

- 288 to 512-cell trays are available but recommend 405 or similar size.
- Miantain a soil pH of 5.5 to 6.0. Higher pH(6.0 or more) can induce iron and boron deficiency, so care fully and periodically check soil conditions.
- High EC ratio, excessive moisture or root-bound, accumulates stress on plants, and it results in physical issues like abortion.
- Do not use ammonium-form fertilizers

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 5.5 to 6.0. Young plants do not like dry stress especially in start-up time. Careful not to allow plugs to dry out immediately after transplant.

Planting Density

64 to 96 plants per sq. meters. Carefully do not damage the roots at transplanting. Smile Series and Memorial Series are open to flower in low temperature and short daylength conditions. Growers must organize cropping schedule per the trait.

Fertilizer

After rooted, apply 150 - 200 ppm of low ammonium fertilizer every other irrigation. If low phosphorus and calcium in the soil(test needed) then they would be added before planting. Carefully control low fertilizer and irrigation to avoid excessive side shoots. Maintain the soil pH at 5.8 to 6.2 and EC at 1.5 to 2.0 mS/cm.

Light Level

Plants must be under 3,000 f.c. (33,000 lux) as optimum.

Temperatures

Day temperature: 13 - 22 °C

Night temperature: 10 - 13 °C

Supporting Net

Support nets are necessary. Those mesh sizes like 10 x 10 (cm) or 15 x 15 (cm) are commonly used. Snapdragon plants grows up to 1 meter above in height, so recommend multi-layers of net depends on occasion.

Common Disease and Insects

Protections with fungicide and pesticide required. Disease issues on the whole happens along with stresses in growing management or surroundings, so keeping appropriate growing conditions leads to diminishing chance to be infected. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Culture Guideline

Stock/Matthiola *Matthiola incaca* Standard Type Series and Varieties

Young Plant Operation

Stage 1(sowing stage) - 3 to 4 days

Temperature: 20 - 22 °C

Sowing and Soil: Multiple sowing(3 to 4 seeds) recommended and use a well drained and disease free medium.

pH and EC: pH 5.5 - 6.5, EC 0.75 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed for germination stage - cover seeds lightly

Stage 2 - cotyledon emergence

Temperature: 15 - 21 °C

Light: 2,500 f.c. (27,000 lux)

Fertilizer: 100 ppm (N)

Soil Moisture: Slightly wet

Stage 3 - True-leaf development

Temperature: 15 - 21 °C

Light: 2,500 f.c. (27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly wet

Stage 4 - 1 to 2 weeks <Hardening stage>

Temperature: 15 - 21 °C

Light: 5,400 f.c. (54,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Normal - must be drier and milder moist than earlier stages

<< Tips to Select Double-Flowering Plants >>

Generally recommend the two processes to select double-flowering plants in cotyledon stage.

1st Action - throw away relatively slower germination plants by 30%.

2nd Action - remove the plants suspected as single-flowering with the following signs in the 70% plants.

	Size	To Grow	Leaf Form	Color
Double	Larger	Faster	Oval-like	Light Green
Single	Smaller	Slower	Round	Dark Green



Typical comparison between single(L) and double(R)

NOTE:

- 405-cell or larger sized trays are recommended.
- Miantain a soil pH in lower than 6.5 and EC between 0.7 - 1.2 mmhos/cm.
- Approximately scheduled 4 weeks for young plant production but it will be depending on environmental conditions.
- Do not use ammonium-form fertilizers

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 5.8 to 6.5. Young plants do not like dry stress especially in start-up time. Careful not to allow plugs to dry out immediately after transplant.

Planting Density

30 to 50 plants per sq. meters. Carefully do not damage the roots at transplanting.

Fertilizer

After rooted, apply 150 - 200 ppm of nitrate-form fertilizer with low phosphorus every other irrigation. If low phosphorus and calcium in the soil(test needed) then they would be added before planting. Carefully control low fertilizer and irrigation to avoid excessive side shoots. Maintain the soil pH at 5.8 to 6.5 and EC at 1.5 to 2.0 mS/cm.

Irrigation

Recommend overhead-irrigation after transplant, then switch to drip-irrigation 2 to 3 weeks later. Keep the soil moist. Allow the soil to dry slightly between watering strokes.

Light Level

No supplemental light needed but must be scheduled in the best daylight season when grown in greenhouse. Matthiola initiates buds and flowers under the condition of shorter than 12 hours in daylength but longer hours will help quicker to harvest.

Temperatures

Day temperature: 15 - 22 °C

Night temperature: 8 - 15 °C

A humid deficit (G/M3) must be within moderate range in proportion as actual temperature.

Supporting Net

Support nets may be necessary. Size and layer will can be in view of bedding width, efficiency to pinch and other physical parameters.

Common Disease and Insects

Crown Rot, Botrytis, Downy Mildew, Thrips, Aphids... must be controlled in the first level attention. Protections with fungicide and pesticide required. Disease issues on the whole happens along with stresses in growing management or surroundings, so keeping appropriate growing conditions leads to diminishing chance to be infected. Each grower must check with best advisor to control diseases and insects with appropriate measures.

Culture Guideline

Stock/Matthiola *Matthiola incaca*

Spray Type Series and Varieties

Young Plant Operation

Stage 1(sowing stage) - 3 to 4 days

Temperature: 20 - 22 °C

Sowing and Soil: Multiple sowing(3 to 4 seeds) recommended and use a well drained and disease free medium.

pH and EC: pH 5.5 - 6.2, EC 0.75 mmhos/cm

Humidity and Soil Moisture: RH 95%+. Adequately moist soil but do not saturate.

Light: No needed for germination stage - cover seeds lightly

Stage 2 - cotyledon emergence

Temperature: 15 - 21 °C

Light: 2,500 f.c. (27,000 lux)

Fertilizer: 100 ppm (N)

Soil Moisture: Slightly wet

Stage 3 - True-leaf development

Temperature: 15 - 21 °C

Light: 2,500 f.c. (27,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Slightly wet

Stage 4 - 1 to 2 weeks <Hardening stage>

Temperature: 15 - 21 °C

Light: 5,400 f.c. (54,000 lux)

Fertilizer: 100 - 150 ppm (N)

Soil Moisture: Normal - must be drier and milder moist than earlier stages

<< Tips to Select Double-Flowering Plants >>

Generally recommend the two processes to select double-flowering plants in cotyledon stage.

1st Action - throw away relatively slower germination plants by 30%.

2nd Action - remove the plants suspected as single-flowering with the following signs in the 70% plants.

	Size	To Grow	Leaf Form	Color
Double	Larger	Faster	Oval-like	Light Green
Single	Smaller	Slower	Round	Dark Green



Typical comparison between single(L) and double(R)

NOTE:

- 405-cell or larger sized trays are recommended.
- Miantain a soil pH in lower than 6.2 and EC between 0.7 - 1.2 mmhos/cm.
- Approximately scheduled 4 weeks for young plant production but it will be depending on environmental conditions.
- Do not use ammonium-form fertilizers

Growing Management

Soil

Prepare a well drained and disease free medium. A moderate initial nutrient suggested with pH range 5.8 to 6.5. Young plants do not like dry stress especially in start-up time. Careful not to allow plugs to dry out immediately after transplant.

Planting Density

30 to 50 plants per sq. meters. Carefully do not damage the roots at transplanting.

Fertilizer

After rooted, apply 150 - 200 ppm of nitrate-form fertilizer with low phosphorus every other irrigation. If low phosphorus and calcium in the soil(test needed) then they would be added before planting. Carefully control low fertilizer and irrigation to avoid excessive side shoots. Maintain the soil pH at 5.8 to 6.5 and EC at 1.5 to 2.0 mS/cm.

Irrigation

Recommend overhead-irrigation after transplant, then switch to drip-irrigation 2 to 3 weeks later. Keep the soil moist. Allow the soil to dry slightly between watering strokes.

Light Level

No supplemental light needed but must be scheduled in the best daylight season when grown in greenhouse. Matthiola initiates buds and flowers under the condition of shorter than 12 hours in daylength but longer hours will help quicker to harvest.

Temperatures

Day temperature: 15 - 22 °C

Night temperature: 8 - 15 °C

A humid deficit (G/M3) must be within moderate range in proportion as actual temperature.

Supporting Net

Support nets may be necessary. Size and layer will can be in view of bedding width, efficiency to pinch and other physical parameters.

Pinching

Pinch the top flower when starting to tone up it color, while a few buds are opening on basal stems. When pinching, one flower in the lowest must be remained to keep further yield.

Common Disease and Insects

Crown Rot, Botrytis, Downy Mildew, Thrips, Aphids... must be controlled in the first level attention. Protections with fungicide and pesticide required. Disease issues on the whole happens along with stresses in growing management or surroundings, so keeping appropriate growing conditions leads to diminishing chance to be infected. Each grower must check with best advisor to control diseases and insects with appropriate measures.

NOTE:

- In summer production plants should be appropriately shaded.
- General habit for each variety can be referred to page 15 - 16, or see the international catalog about the details.

Characteristics - Matthiola incana Varieties

VARIETY	COLOR REFERENCE	TIMING TO FLOWER	FLOWER SIZE	SPIKE VOLUME	SPIKE LENGTH	STEM QUALITY	PLANT HEIGHT
← slower faster →							
ALL DOUBLE VARIETIES							
INFINITY SNOW	WHITE	●	Mid/Large	Medium	Mid/Short	Strong	Average
WHITE SURF	WHITE	●	Mid/Large	Medium	Long	Medium	Average
VENUS AD YELLOW	YELLOW	●	Mid/Large	-	-	Strong	Average
WHITE BEACH	WHITE	●	Large	Rich	Long	Strong	Tall
CHANTER AD WHITE (SPRAY)	WHITE	●	Mid/Large	-	-	Strong	Average
COLUMN SERIES AND VARIETIES - SELECTABLE							
MAI SERIES							
MURASAKI NO MAI	PURPLE	●	Large	Rich	Medium	Strong	Average
NAMI NO MAI	BLUE	●	Large	Rich	Medium	Strong	Average
AO NO MAI	PURPLISH BLUE	●	Large	Rich	Long	Medium	Tall
YUKI NO MAI	PURE WHITE	●	Large	Rich	Long	Medium	Tall
HARU NO MAI	ROSE	●	Large	Rich	Medium	Medium	Tall
YUME NO MAI	PINK	●	Large	Rich	Medium	Medium	Tall
KOI NO MAI	DEEP PINK	●	Large	Rich	Medium	Strong	Average
SUKURA NO MAI	LIGHT PINK	●	Large	Rich	Medium	Strong	Average
KAZE NO MAI	LIGHT BLUE	●	Large	Rich	Long	Medium	Tall
KI NO MAI	DEEP YELLOW	●	Mid/Large	Rich	Long	Medium	Average
ASA NO MAI	APRICOT	●	Mid/Large	Rich	Long	Medium	Average
NEW KABUKI SERIES							
NEW KABUKI WHITE	WHITE	●	Large	Rich	Long	Strong	Tall
NEW KABUKI YELLOW	LYELLOW	●	Large	Rich	Long	Strong	Tall
NEW KABUKI PINK	PINK	●	Large	Rich	Long	Strong	Tall
NEW KABUKI RED	RED	●	Large	Rich	Long	Strong	Tall
NEW KABUKI LAVENDER	LAVENDER	●	Large	Rich	Long	Strong	Tall
NEW KABUKI DARK LAVENDER	DARK LAVENDER	●	Large	Rich	Long	Strong	Tall
NEW KABUKI DARK PURPLE	DARK LAVENDER	●	Large	Rich	Long	Strong	Tall
VENUS SERIES							
VENUS PURPLE	PURPLE	●	Large	Medium	Long	Very Strong	Average
VENUS WHITE	WHITE	●	Large	Medium	Long	Very Strong	Average
VENUS CHERRY	LIGHT PINK	●	Large	Medium	Long	Very Strong	Average
VENUS PINK	PINK	●	Large	Rich	Long	Very Strong	Average
BEAUTY SERIES							
BEAUTY REDDISH PURPLE	REDDISH PURPLE	●	Large	Rich	Medium	Strong	Average
BEAUTY SALMON PINK	SALMON PINK	●	Large	Rich	Long	Strong	Mid/Short
BEAUTY WINE RED	WINE RED	●	Large	Rich	Long	Strong	Mid/Short
UTA SERIES							
BENI NO UTA	RED	●	Large	Rich	Medium	Strong	Tall
KI NO UTA	DEEP YELLOW	●	Large	Medium	Medium	Strong	Tall
YUME NO UTA	LIGHT PINK	●	Large	Rich	Medium	Strong	Mid/Short
AO NO UTA	PURPLISH BLUE	●	Large	Rich	Long	Strong	Mid/Short
MURASAKI NO UTA	PURPLE	●	Large	Rich	Long	Strong	Mid/Short
KAZE NO UTA	LIGHT BLUE	●	Large	Medium	Medium	Strong	Average
HANA NO UTA	ROSE RED	●	Large	Rich	Medium	Strong	Average
SINJU NO UTA	PEARL WHITE	●	Large	Rich	Medium	Strong	Tall
ASA NO UTA	APRICOT	●	Large	Rich	Medium	Strong	Tall
SAKURA NO UTA	LIGHT PINK	●	Large	Rich	Medium	Strong	Tall
YUKI NO UTA	WHITE	●	Large	Rich	Medium	Strong	Average
KAGAYAKI SERIES							
ASA NO KAGAYAKI	APRICOT	●	Mid/Large	Medium	Medium	Strong	Average
HARU NO KAGAYAKI	ROSE	●	Mid/Large	Medium	Medium	Strong	Average
YUKI NO KAGAYAKI	WHITE	●	Large	Rich	Medium	Strong	Mid/Short
HANA NO KAGAYAKI	ROSE RED	●	Large	Rich	Medium	Strong	Average
TSUKI NO KAGAYAKI	DEEP YELLOW	●	Mid/Large	Medium	Long	Medium	Tall
BENI NO KAGAYAKI	RED	●	Large	Rich	Medium	Strong	Tall
SAKURA NO KAGAYAKI	LIGHT PINK	●	Large	Rich	Medium	Strong	Mid/Short
OTHER COLUMN VARIETIES							
VINTAGE BROWN	BROWNISH PINK	●	Large	Medium	Medium	Very Strong	Average
ANTIQUE PINK	LIGHT PINK/PINK	●	Large	Rich	Medium	Very Strong	Average
SPRAY SERIES AND VARIETIES - SELECTABLE							
CHANTER SERIES							
CHANTER ALTO RED	RED	●	Large	-	-	Strong	Tall
CHANTER ALTO LIGHT PINK	LIGHT PINK	●	Large	-	-	Strong	Tall
CHANTER CEDO WHITE	WHITE	●	Large	-	-	Strong	Tall
CHANTER CEDO APRICOT	APRICOT	●	Large	-	-	Strong	Tall
CHANTER BLUE	PURPLISH BLUE	●	Large	-	-	Strong	Average
CHANTER CHERRY	LIGHT PINK	●	Large	-	-	Strong	Tall
CHANTER PINK	ROSE	●	Large	-	-	Strong	Tall
CHANTER PURE WHITE	WHITE	●	Large	-	-	Strong	Average
CHANTER YELLOW	LIGHT YELLOW	●	Large	-	-	Strong	Tall
CHANTER LAVENDER	LAVENDER	●	Large	-	-	Strong	Average
CHANTER APRICOT	APRICOT	●	Large	-	-	Strong	Tall
CHANTER RED	RED	●	Large	-	-	Strong	Tall
CHANTER WHITE	WHITE	●	Large	-	-	Strong	Tall
CHANTER GRAPE	REDDISH PURPLE	●	Large	-	-	Strong	Tall
OTHER SPRAY VARIETIY							
SPRAY ANTIQUE PINK	LIGHT PINK/PINK	●	Large	-	-	Very Strong	Tall
VARIETY	COLOR REFERENCE	TIMING TO FLOWER	FLOWER SIZE	SPIKE VOLUME	SPIKE LENGTH	STEM QUALITY	PLANT HEIGHT

New Vintage Brown Improved is under the trial at this moment (December 2020) and not included in the chart above. If the latest information needs, please directly contact Murakami Seed.

Characteristics - Double Flowering Varieties

VARIETY	FLOWER FORM	COLOR	STONE/PATTERN	CENTER COLOR	FLOWER SIZE	TIMING TO FLOWER	PETAL	PLANT HEIGHT	STEM QUALITY	
						← slower	faster →	thicker →	taller →	stronger →
F1 SORRIER SERIES										
F1 SORRIER WHITE EXE	DOUBLE	WHITE	SOLID	GREEN	L					
F1 SORRIER BLUE SOUNDS	DOUBLE	BLUE&WHITE	BICOLOR	GREEN	L					
F1 SORRIER ORANGE FLASH	DOUBLE	WHITE & ORANGE	BRUSH	GREEN	L					
F1 SORRIER WHITE	DOUBLE	WHITE	SOLID	GREEN	L					
NEW F1 SORRIER PINK	DOUBLE	PINK	SOLID	GREEN	L					
F1 SORRIER SKY	DOUBLE	WHITE & BLUE	BRUSH	GREEN	L					
F1 SORRIER HEART	DOUBLE	WHITE & PINK	BRUSH	GREEN	L					
F1 SORRIER PINK FLASH	DOUBLE	WHITE & PINK	BRUSH	GREEN	L					
F1 SORRIER YELLOW	DOUBLE	YELLOW	SOLID	GREEN	L					
F1 REVOLUTION SERIES										
F1 REVOLUTION SNOW	DOUBLE	WHITE	SOLID	GREEN	S-M					
F1 REVOLUTION BLUE SOUNDS	DOUBLE	WHITE & BLUE	BICOLOR	GREEN	S-M					
F1 REVOLUTION WHITE	DOUBLE	WHITE	SOLID	GREEN	M					
F1 REVOLUTION GREEN	DOUBLE	GREEN	SOLID	GREEN	S-M					
F1 BOUQUET SERIES										
F1 BOUQUET GREEN	DOUBLE	GREEN	SOLID	GREEN	M					
F1 BOUQUET WHITE	DOUBLE	WHITE	SOLID	GREEN	M-L					
F1 CEREMONY SERIES										
F1 CEREMONY SNOW	DOUBLE	WHITE	SOLID	GREEN	M-L					
F1 CEREMONY WHITE	DOUBLE	WHITE	SOLID	GREEN	L					
F1 CEREMONY BLUE FLASH	DOUBLE	WHITE & BLUE	BRUSH	GREEN	L					
F1 CEREMONY GREEN	DOUBLE	GREEN	SOLID	GREEN	L					
F1 CEREMONY ORANGE FLASH	DOUBLE	ORANGE	BRUSH	GREEN	M-L					
F1 CEREMONY ORANGE	DOUBLE	YELLOW & PINK	SOLID	GREEN	L					
F1 CEREMONY PEACH	DOUBLE	PINK	SOLID	GREEN	M-L					
F1 CEREMONY PINK FLASH	DOUBLE	WHITE & PINK	BRUSH	GREEN	M-L					
F1 CEREMONY KISS	DOUBLE	PINK	SOLID	GREEN	L					
F1 CEREMONY LIGHT PINK	DOUBLE	LIGHT PINK	SOLID	BLACK	L					
F1 CROWN SERIES										
NEW F1 CROWN BLUE FLASH	DOUBLE	LIGHT BLUE SHADES	BRUSH	GREEN	M-L					
F1 CROWN AZURE	DOUBLE	BLUE SHADES	BRUSH	GREEN	M-L					
F1 CROWN SNOW	DOUBLE	WHITE	SOLID	GREEN	M-L					
F1 CROWN BLUE SOUNDS	DOUBLE	WHITE & PURPLE	BICOLOR	BLACK	M-L					
F1 CROWN BLUE	DOUBLE	PURPLE	SOLID	GREEN	S-M					
F1 CROWN YELLOW	DOUBLE	YELLOW	SOLID	GREEN	S-M					
F1 JEWELRY SERIES										
F1 JEWELRY CHERRY FLASH	DOUBLE	WHITE & PINK	BRUSH	GREEN	L					
F1 JEWELRY PINK	DOUBLE	PINK	SOLID	WINE	L					
F1 JEWELRY SNOW	DOUBLE	WHITE	SOLID	GREEN	L					
F1 JEWELRY PINK FLASH	DOUBLE	WHITE & PINK	BRUSH	GREEN	L					
F1 JEWELRY BLUE SOUNDS	DOUBLE	WHITE & BLUE	BICOLOR	GREEN	L					

Double Flowering Varieties continued

VARIETY	FLOWER FORM	COLOR	STONE/PATTERN	CENTER COLOR	FLOWER SIZE	TIMING TO FLOWER	PETAL	PLANT HEIGHT	STEM QUALITY
← slower → faster → thicker → taller → stronger →									
F1 DOUBLE FLOWERING VARIETIES									
NEW F1 SUPER MOON	DOUBLE/FRINGED	YELLOW	SOLID	GREEN	M-L				
F1 LUCY WHITE	DOUBLE	WHITE	SOLID	GREEN	S-M				
F1 SILKY BRIGHTNESS	DOUBLE/FRINGED	WHITE	SOLID	GREEN	L				
F1 PARTY PINK	DOUBLE	PINK	SOLID	GREEN	L				
F1 PINK HELIOS	DOUBLE	PINK	SOLID	GREEN	S-M				
F1 PEARL LAVENDER	DOUBLE	LAVENDER	SOLID	GREEN	M				
F1 LIP STICK	DOUBLE	WHITE & ROSE	BICOLOR	GREEN	M-L				
F1 MEETAN PINK SOUNDS	DOUBLE	WHITE & PINK	BICOLOR	BLACK	L				
F1 QUEEN OF NIGHT	DOUBLE	PURPLE	SOLID	BLACK	M-L				
F1 PEARL WHITE	DOUBLE	WHITE	SOLID	GREEN	M				

Characteristics - Single Flowering Varieties

VARIETY	FLOWER FORM	COLOR	STONE/PATTERN	CENTER COLOR	FLOWER SIZE	TIMING TO FLOWER	PETAL	PLANT HEIGHT	STEM QUALITY
← slower → faster → thicker → taller → stronger →									
F1 SINGLE FLOWERING VARIETIES									
F1 LAPIS PURPLE RIM	SINGLE	WHITE & PURPLE	BICOLOR	GREEN	M				
F1 PRESTO SERIES									
F1 PRESTO LAVENDER	SINGLE	LAVENDER	SOLID	BLACK	M				
F1 PRESTO BLUE LINE 2	SINGLE	WHITE & PURPLE	BICOLOR	GREEN	M				
F1 MICKEY SERIES									
F1 MICKEY BICOLOR PINK	SINGLE	WHITE & PINK	BICOLOR	GREEN	M				
F1 MICKEY BICOLOR PURPLE	SINGLE	WHITE & PURPLE	BICOLOR	GREEN	M				
F1 ALOHA SERIES									
F1 ALOHA BLUE LINE	SINGLE	WHITE & PURPLE	BICOLOR	GREEN	M				
F1 ALOHA KISS	SINGLE	PINK	SOLID	GREEN	M-L				
F1 SUMMER SERIES									
F1 SUMMER ACE	SINGLE	DARK PINK	BICOLOR	GREEN	S-M				
F1 SUMMER KING	SINGLE	WHITE & PURPLE	BICOLOR	GREEN	M				
F1 SUMMER KISS	SINGLE	PINK	SOLID	GREEN	M				
F1 SUMMER SNOW	SINGLE	WHITE	SOLID	GREEN	M				
F1 SUMMER BICOLOR RED	SINGLE	WHITE & RED	BICOLOR	GREEN	M				