



**SAKATA**®

Matthiola Culture Tips

# Stock Plug and Culture



Stock Quartet

- Stock is a beautiful flower that is gaining in popularity.
- Wide color range and pleasing fragrance.
- Easy to produce in cool temperature areas.
- Varieties with a high percentage of double flowers are making Stock more economical to grow indoor under cover.

# Stage One: Days 1-10



- Sow seed into a well drained substrate with a pH of 5.8 to 6.2 and lightly cover with vermiculite.
- Maintain even moisture and a temperature between 64-68°F / 18-20°C.

# Stage Two: Days 11-17



- After germination is complete, move seedling trays to a bright and cool location with good ventilation.
- Fertilize lightly with 100 ppm N and reduce day temperature to 59°F / 15°C and nights to 50°F / 10°C.
- Potassium is important for strong stems and leaves.

# Stage Three: Days 18-25



- Maintain an EC level between 0.4 and 0.8 mmhos/cm. (1:2 dilution) and provide plenty of light (3,500 foot candles/38,000 lux) and good air circulation.

# Stage Four: Days 26-30



- When seedlings have 4 true leaves, they are ready to transplant into cut flower beds.
- Delayed transplanting will produce shorter flower stems, especially on early flowering varieties.

# Early Flowering Stock varieties that require less cold



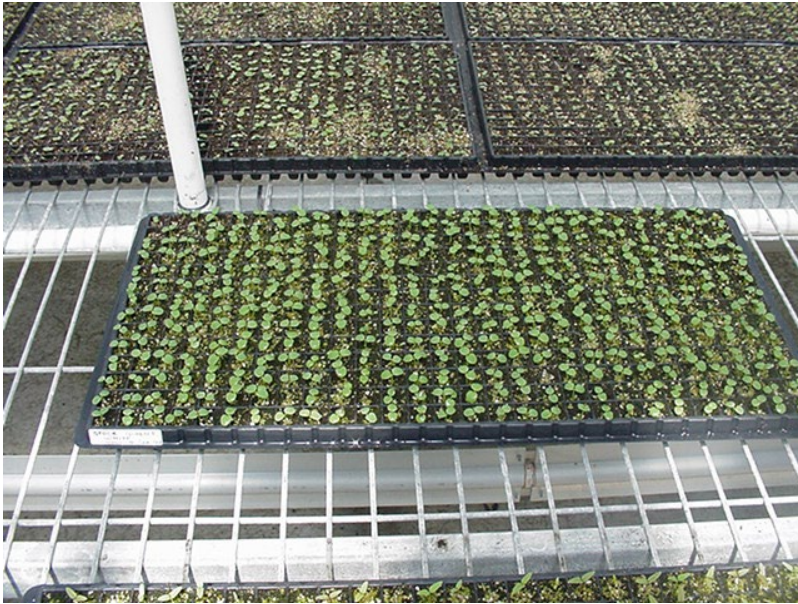
- **Cheerful Series**  
(90% double without selection)
- **Stock Quartet Series**
- **Stock Iron Series**

# Single vs. Double Flowers





# Double Seedling Selection



- 3 days before selecting (around day 10), keep somewhat dry soil conditions.
- Double seedlings are more vigorous and taller.
- Double seedlings have larger and longer cotyledons with a lighter green color and a more oval shape.

## Double Seedling Selection

- A well-trained person with a good eye can be successful at double seedling selection (up to 98%).
- At right the technician at Jardines de Colombia segregated single and double seedlings which were grown out to verify her accuracy.
- She achieved a score of 98%.




# 3 seeds per cell selection method for doubles

- 3 seeds per cell.
- Sow seed at the same depth for easier double seedling selection.

*It is indispensable to sow 3 seeds in same depth in each cell to have a uniform germination!*

# Selection for doubles

Stock Iron and Quartet can be selected for double flowers at day 10 by using the following procedure, (3 seeds per cell).

1. 8 days after sowing remove the last-to-germinate seedling. If only two seedlings germinate, do not remove and proceed to the next step.
  2. 3 days before selecting, (around day 10 after sowing), allow the growing media to dry out somewhat. This will make selection easier.
  3. The double seedlings are more vigorous and will grow more rapidly and be taller.
  4. Double seedlings will have larger and longer cotyledons, and cotyledons will be a lighter green color.
  5. Single-flowered seedlings will be shorter, with smaller and darker green cotyledons.
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# Selection for doubles

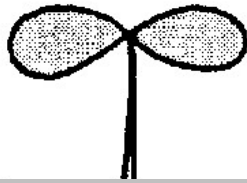
Germination

Vigour

Color and shape  
of cotyledon

Cotyledon display

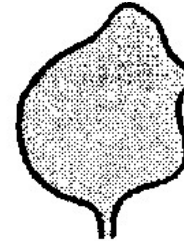
Double  
seedling



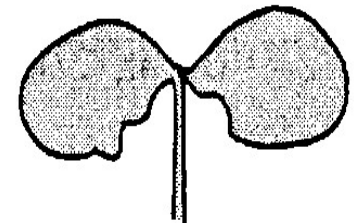
Germinate more rapidly than single types



More vigorous than single types

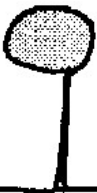


Lighter color and more oval shaped than single types



Longer and wider cotyledon than single types

Single  
seedling



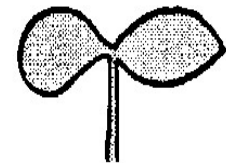
Germinate more slowly than double types



Weaker than double types

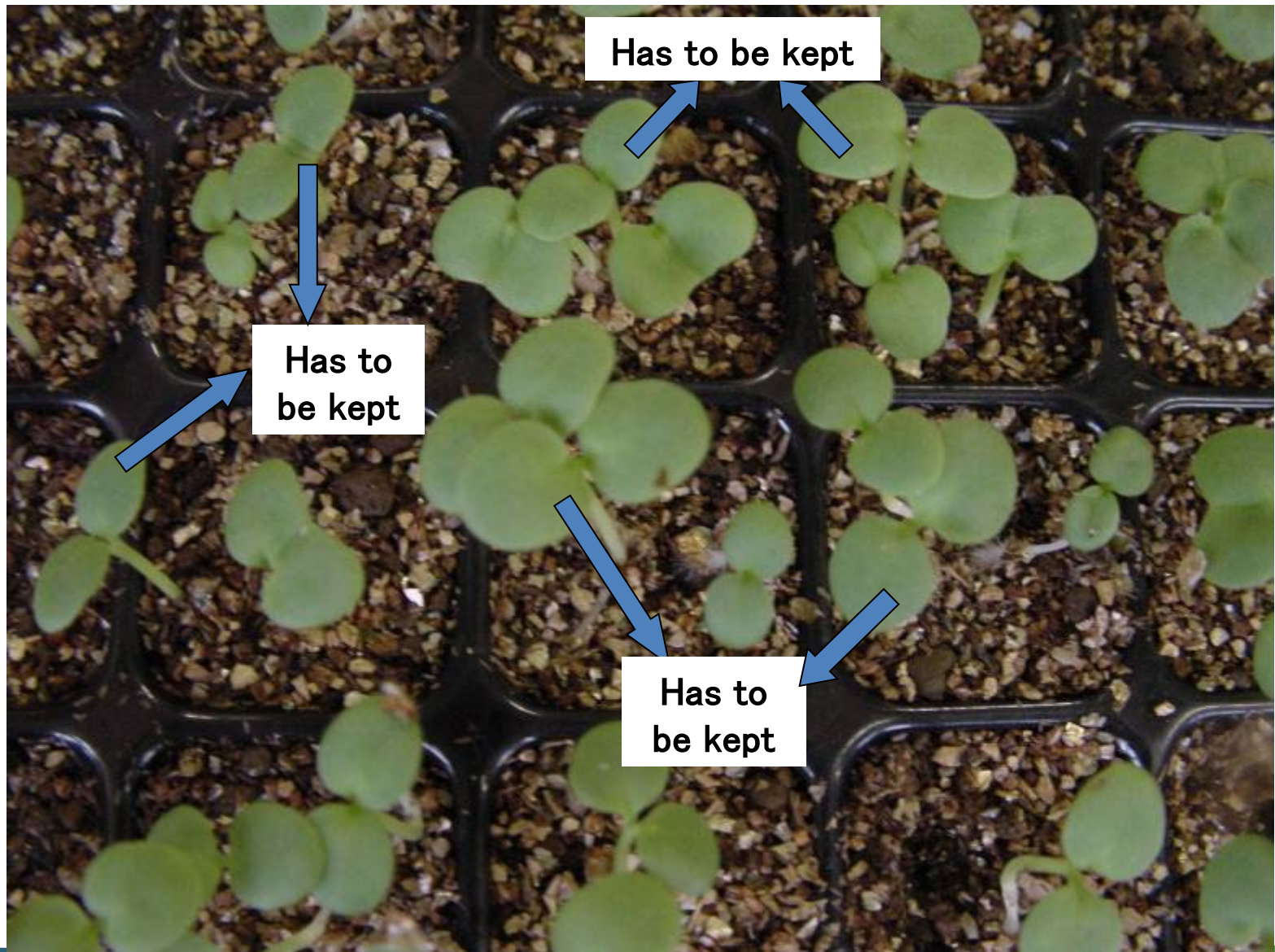


Deeper color and a more rounded shape than double types



Shorter and narrower than double types

# Selection for doubles



## Selection for Doubles

- For both convenience and economics, a grower might find it easier to sow two seeds per cell. This can also serve as a training exercise for employees with the goal of sowing only one seed in the trays in the future.
- This method increases the percentage of having two single seedlings per cell but is a good starting point for those looking to economize.



# Transplanting – *selected*



- Select a sunny location with good drainage and a fertile soil with a pH between 6.0 - 7.0.
- Apply shade cloth to plants for the first week until established.
- Space plants 5 x 5 inches / 13 x 13 cm. apart for single stem production if pre-selected for double types.\*
- Provide support netting when plants are 12 inches / 30 cm. tall.

\* see note on pinched plants of Quartet later in the presentation.



# Transplanting – *non-selected*



*Experienced growers learn to identify single-flowered plants which show color earlier on thinner plants with smaller flower buds.*

- Select a sunny location with good drainage and a fertile soil with a pH between 6.0 - 7.0.
- Apply shade cloth to plants for the first week until established.
- Space plants 2.5 x 2.5 inches 7 x 7 cm. apart for single stem production if plants are not pre-selected for double seedlings.\*
- **Rogue out single flowering plants as they begin to show color.**
- Provide support netting when plants are 12 inches / 30 cm. tall.

\*see note on pinched plants of Quartet later in the presentation.

## Side Branching

- Low density plantings result in excess lateral branching.



# Temperature



- Optimum growing temperature is 61-64°F / 16-18°C days and 52 – 59°F / 11-15°C nights.

# Fertilizer



- Maintain an EC level around 1.0 mmhos/cm. in clay soil and 1.25 mmhos/cm. in sandy soil (1:2 dilution).
- Fertilize as needed to maintain healthy plants.
- Stock has a higher need for potassium so target the N:K ratio at 1: 1.5.
- Avoid high rates of ammonium as it promotes softer growth and thinner stems.
- Water sufficiently during production and then keep drier from visible bud to harvest for stronger stems and tighter flower stems.\*

*\*see note on Stock Iron later in the presentation*

# Stock Cheerful Scheduling

## Stock Cheerful

Plug Stage	Transplant	Forcing	Crop Time*
4 weeks	Week 5	Week 5 - harvest	11-13 weeks
64-68°F 18-20°C	< 70°F day / 50-59°F night < 21°C day / 10-15°C night		

## Stock Mid Cheerful

Plug Stage	Transplant	Forcing	Crop Time**
4 weeks	Week 5	Week 5 - harvest	12-14 weeks
64-68°F 18-20°C	< 70°F day / 50-59°F night < 21°C day / 10-15°C night		

\*Stock Cheerful is a facultative long day plant and development is highly impacted by temperature. A longer photoperiod and warmer temperatures accelerate development.

\*\*Stock Mid Cheerful matures 1-3 weeks later than Cheerful depending on temperature. Stock Mid Cheerful is more delayed in warmer temperatures than is Cheerful.

# Stock Quartet Scheduling

Plug Stage	Transplant	Forcing	Pinch*	Crop Time**
4 weeks	Week 5	Week 5 - harvest	First Color	15-16 weeks
64-68°F 18-20°C		< 70°F day / 50-59°F night < 21°C day / 10-15°C night		



*Pinched*



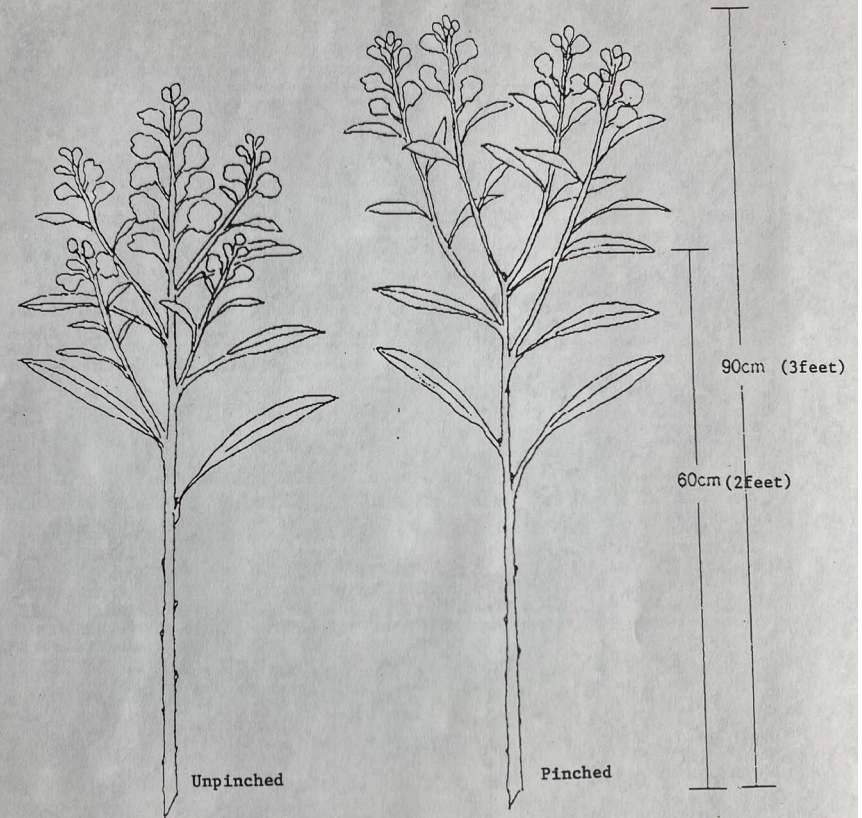
*Non-Pinched*

\*Pinched plants require an additional 2-3 weeks of production compared to non-pinched plants. Increase spacing for pinched plants by 25% to allow for additional floral expansion.

\*\*Stock Quartet is a facultative long day plant and development is highly impacted by temperature. A longer photoperiod and warmer temperatures accelerate development.

## Stock Quartet

- Unpinched plants flower 2-3 weeks earlier than pinched plants.
- Pinched plants require 25% more space to allow for additional flower spray expansion.
- Pinch out the main / center flower stem when color first shows on it.



*Unpinched vs. Pinched*

# Stock Iron Scheduling (*mid season*)

Plug Stage	Transplant	Forcing	Initiation*	Crop Time**
4 weeks	Week 5	Week 5 – 10 leaf pairs	10 + leaf pairs	13-17 weeks
18-20°C	< 70°F day / 59-64°F night < 21°C day / 15-18°C night		< 64°F day / 50°F night < 18°C day / 10°C night <i>minimum of 21 days</i>	

*Provide adequate water until flower buds become visible and continue providing even moisture until harvest. Because Stock Iron has such a strong stem, it can tolerate higher moisture conditions than other series. Many stock growers reduce water and keep the greenhouse dry to produce a strong stem and tight flower spike. This is not critical for Stock Iron, so growers often target a slightly warmer temperature and higher moisture level to achieve greater stem length.*

\*If a maximum day temperature of 64°F / 18°C cannot always be guaranteed, apply long days (> 14 hours) to ensure flower bud initiation. After initiation, maintaining warmer night temperatures > 64°F / 18°C promotes taller flower stems.

\*\*Stock Quartet is a facultative long day plant and development is highly impacted by temperature. A longer photoperiod and warmer temperatures accelerate development.



## Boron Deficiency

- Adequate levels of boron are needed to maintain healthy growth of both leaves and flowers.
- Boron is necessary to maintain calcium in a soluble form, so a deficiency results in malformed leaves and flower petals.



# Color Break due to CMV\* and TuMV\*



*\*cucumber mosaic virus and turnip mosaic virus*

# Harvesting



Cheerful Yellow

- Cut the stems when 6-10 lower florets have opened.
- Stems harvested with at least six open flowers perform better than those harvested with fewer open flowers.
- Remove lower woody portion of the stem to improve water uptake.
- Avoid crushing stem ends as this does not improve water uptake.

## Export Market

- Stems are cut tighter for exporting and once cut the new flowers open paler, especially darker flower colors.
- Production for local markets have the advantage of cutting stems with more open flowers for greater consumer appeal.



# Post Harvest



- Immediately after harvest, place the flower spikes in a preservative solution containing a germicide.
- Pretreat flowers with a commercial holding solution specific for stock for a couple of hours or overnight at 36-37°F / 2-3°C.
- Stock is quite sensitive to ethylene so both STS and 1-MCP are recommended.
- Stems should be kept vertical at all times to prevent stem bending (geotropic effect) and kept in the dark to prevent curvature of the growing tips.
- The use of floral foam combined with a 2% sugar solution and a germicide increases vase life, up to 20 days, and deepens the flower color.

# Thank you for your support!

- We thank you for your support and interest in our cut flower seed genetics.
- Sakata Seed America

