Matthiola Culture

Stock Plug and Culture

Stock Quartet

- Stock is an old favorite that is gaining new respect in the cut flower world.
- Wide color range and pleasing fragrance.
- Easy to produce in cool areas.
- High double varieties are making Stock more economical to grow under cover.

Stage One: Days 1-10

- Single sow seed into a well drained media with a pH of 5.8 to 6.2 and lightly cover with vermiculite.
- Maintain even moisture and a temperature between 65-68ºF/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 60°F/16°C and night to 50°F/10°C.
- Adequate 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 strong light (4,000 f.c./ and good air circulation.

Stage Four: Days 26-30

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

Early Flowering low cool requirement Stock culture varieties.

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

Crop Schedule for Stock Cheerful

Stock Cheerful

Plug Stage	Transplant	Production	Crop Time*
4 weeks	Week 5	Week 5 - Harvest	11-13 weeks
65-68°F/18-20ºC	< 70°F/21°C day / 50-60°F/10-16°C night		

Stock Mid Cheerful

Plug Stage	Transplant	Production	Crop Time**
4 weeks	Week 5	Week 5 - harvest	12-14 weeks
65-68°F/18-20ºC	< 70°F/21°C day / 50-60°F/10-16°C night		

*Stock Cheerful is a facultative long day plant and its development is greatly affected by temperature. A longer photoperiod and higher temperatures will accelerate development.

**Stock Mid Cheerful matures 1-3 weeks later than Cheerful depending on the temperature. Stock Mid Cheerful delays more under warmer temperatures than does Cheerful.

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Crop Schedule for Quartet

Plug Stage	Transplant	Production	Pinch*	Crop Time**
4 weeks	Week 5	Week 5 - Harvest	At first color	15-16 weeks
65-68°F/18-20ºC	< 70°F/21°C day / 50-60°F/10-16°C night			

Pinched

Not Pinched

*Pinched plants require 2 to 3 additional weeks to produce compared to unpinched plants. Increase spacing for pinched plants by 25% to allow for greater floral expansion.

**Stock Quartet is a facultative long day plant and its development is greatly affected by temperature. A longer photoperiod and higher temperatures will accelerate development.

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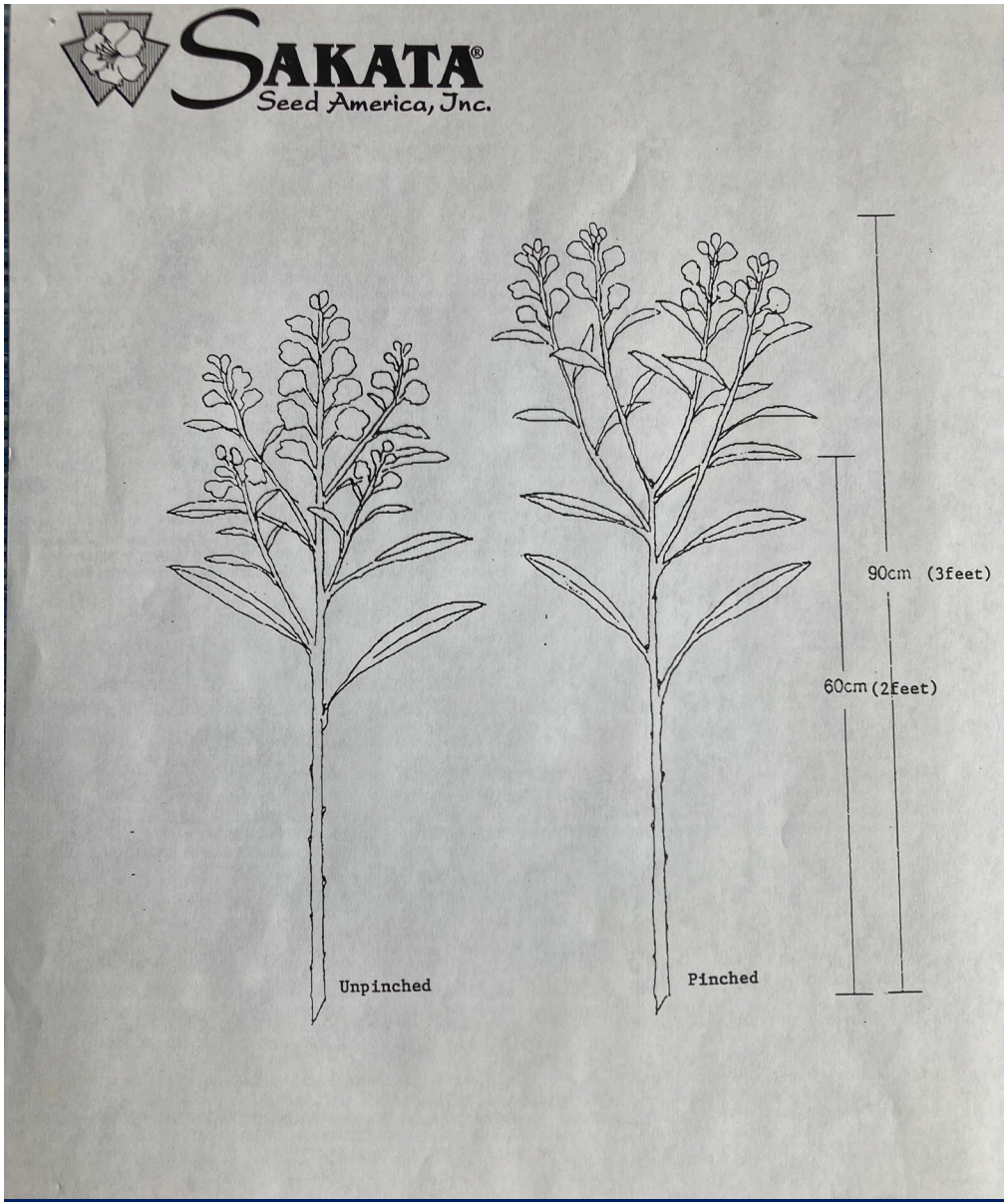
Matthiola Quartet

- Unpinched plants flower 2-3 weeks earlier than unpinched plants.
- Pinched plants require 25% more space to allow for additional floral expansion.
- Pinch the main/central flower stem when flower color is first seen.



Unpinched vs. pinched

Matthiola Quartet

pinching process

Crop Schedule for Stock Iron *(mid season)*

Plant Stage	Transplant	Production	Initiation*	Crop Time**
4 weeks	Week 5	*See note below on initiation**	2 + leaf pairs	13-17 weeks
65-68ºF/18-20°C		< 70°F/21°C day / 50-60°F/10-16°C night	< 68°F/20°C at night *Minimum of 10 consecutive nights*	

Provide sufficient moisture until flower buds become visible, then continue supplying uniform moisture until harvest. Owing to the fact that Stock Iron has a strong stem, it can tolerate higher levels of moisture compared to other series. Many stock growers reduce watering and maintain the greenhouse drier in order to produce a strong stem and tighter flower spike. This is not critical for Stock Iron, so growers often target a slightly higher temperature and a higher moisture level to promote a taller flower spike.

*Stock becomes receptive to flower bud initiation at the 2 true leaf stage. For initiation to occur, maintain the night temparture below 68ºF/20ºC for a mínimum of 10 consecutive days. For taller stems, maintain the night temperature above 70ºF/21ºC until the desired number of nodes have formed. Applying long days (>14 hours) at the time of initiation makes the plants more sensitive to temperature and ensures a uniform initiation.

**Photoperiod and temperature will impact time to flower. In general, finishing under longer days and higher temperature reduces crop time.

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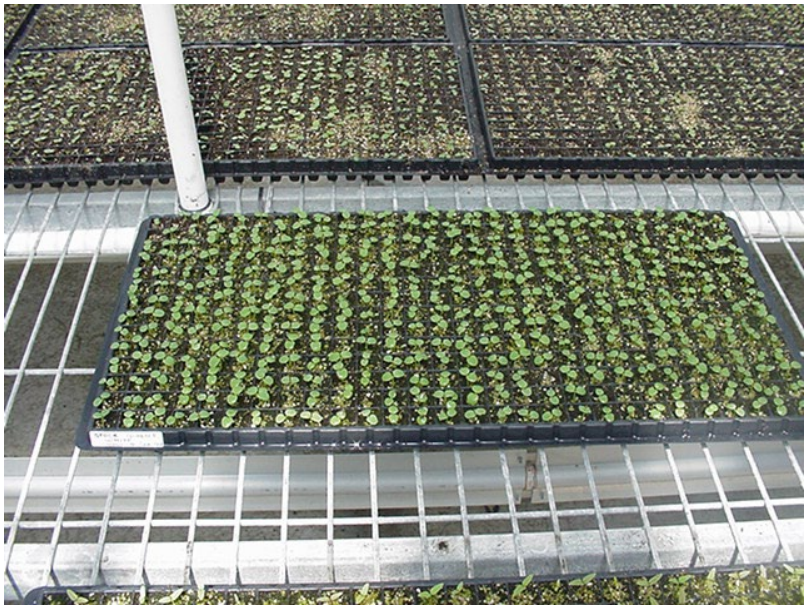
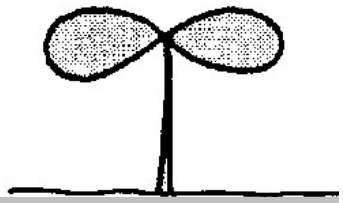
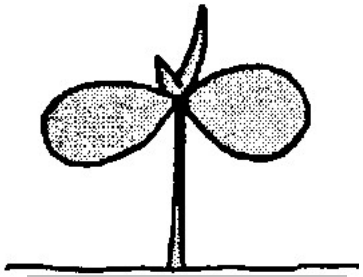
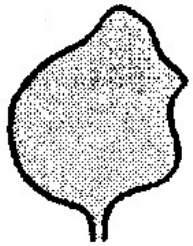
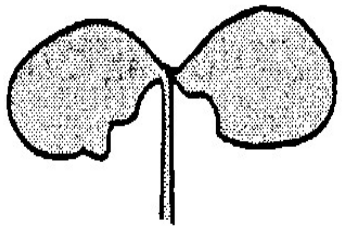
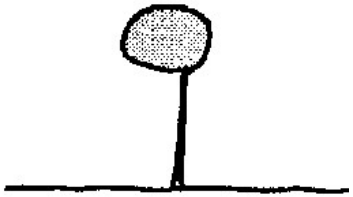
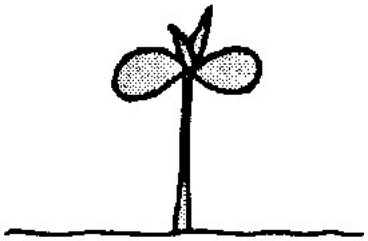
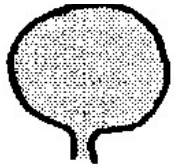
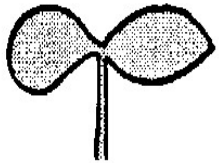
Single vs. Double Flowers

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 form.

Double Seedling Selection

	Germination	Vigour	Color and shape of cotyledon	Shape of the cotyledon
Double Seedling	 Germinate more rapidly than singles	 More vigorous than singles	 Lighter color and more oval shaped than singles	 Longer and wider cotyledon than singles
Single Seedling	 Germinate more slowly than doubles	 Weaker than doubles	 Deeper color and more rounded shape than doubles	 Shorter and narrower than doubles

Double Seedling Selection

- A well-trained employee with a keen eye can be successful in the selection of double seedlings (up to 98%).
- At right the technician segregated single segrégate and double seedlings that were transplanted to verify her accuracy.
- She achieved a 98% accuracy.

Double Seedling Selection

Matthiola Iron and Quartet can be selected for double flowers starting on day 10 using the following procedure (3 seeds per cell).

1. 8 days after sowing, remove the last seedling to germinate. If only two germinate, do not remove and continue to the next step.

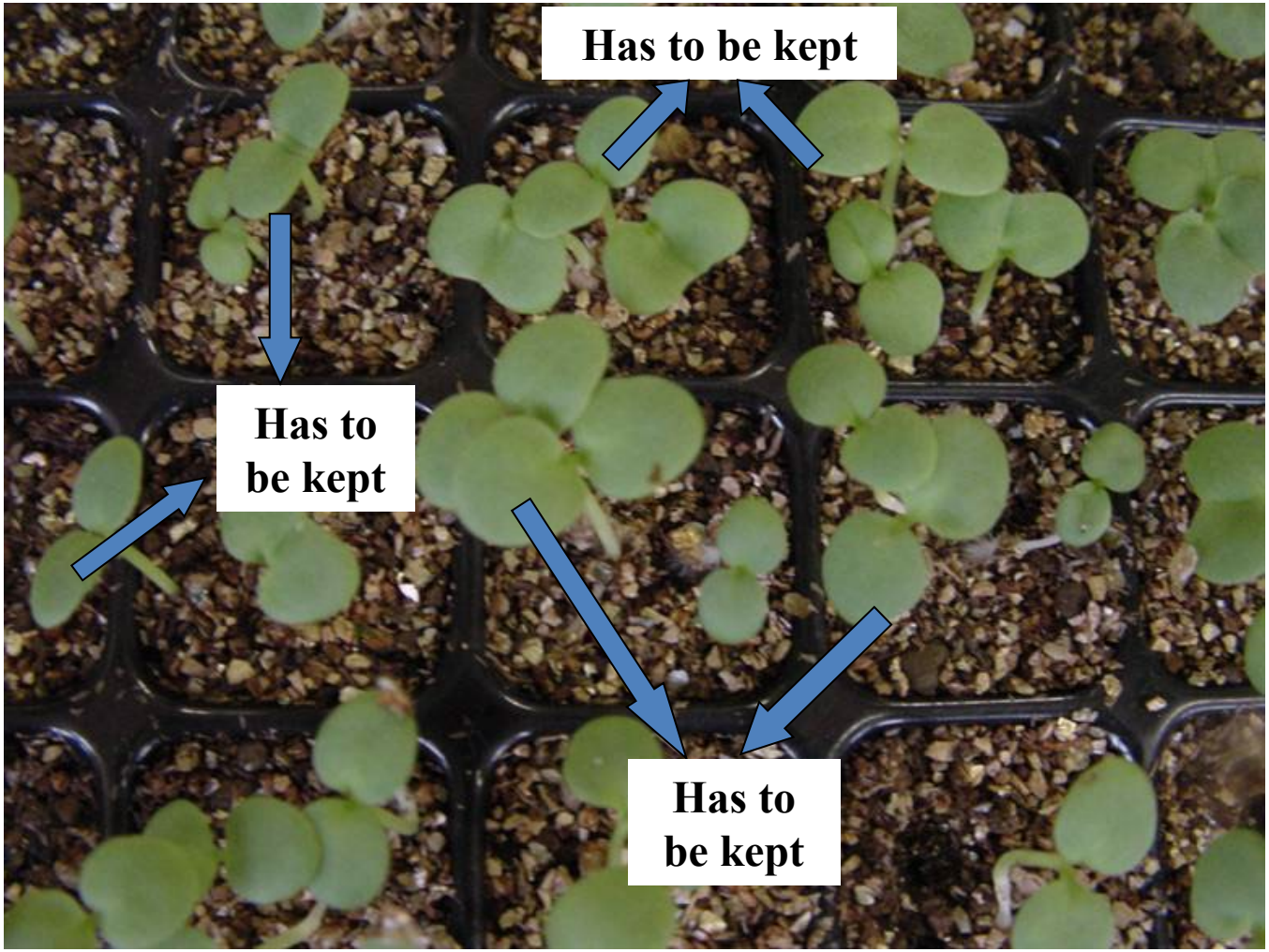
2. 3 days before the selection process, (around day 10 after sowing), allow the substrate to dry slightly. This will improve the selection process.

3. The double seedlings are more vigorous, with faster and taller growth.

4. Double seedlings have larger and longer cotyledons with a lighter green color.

5. Single seedlings are smaller and shorter with a darker green color.

Double Seedling Selection



Double Seedling Selection

- For both convenience and economics, a grower may wish to simplify the process by sowing two seeds per cell. This also serves as a good training exercise for employees with the ultimate objective of sowing only one seed per cell in the future.
- This method increases the percentage of having two single flower seedlings per cell, but it is a good point of departure for those looking to econimize.

Transplant – *preselected*

- Select a sunny site with good drainage and a fertile soil with a pH between 6.0 – 7.0.
- Apply shade cloth to the plants for the first week until they become established.
- Space plants 5 x 5 inches/13 x 13 cm. apart for single stem production if preselected for double flowers.*
- Provide support netting when the plants measure 12 inches/30 cm. tall.

**see the note regarding pinched plants of Stock Quartet earlier in the presentation.*

Transplanting – *non selected*

Experienced grower learn to identify single flower plants which show color first on thinner plants with smaller flower buds.

- Select a sunny location with good drainage and fertile soil with a pH between 6.0 - 7.0.
- Reduce light intensity to plants for the first week until established.
- Space plants 5x5 inches/13x13 cm. apart for single stem production *.
- Provide support netting when plants are 12 inches/30 cm. tall.
- Pull out the single flower plants as soon as they begin to show color.

**see the note regarding pinched plants of Stock Quartet earlier in the presentation.*

Side Branching

- Low density plantings result in excess lateral branching.

Temperature

- Optimum growing temperature is 60-65°F/16-18°C during the day and 52-59ºF/11-15°C at night.

Fertilizer

- Fertilize at 150-200 ppm Nitrogen and maintain an EC level up to 1.0 mmhos for clay soils and up to 1.25 for sandy soils.
- Fertilize as necessary to maintain healthy plants.
- Stock has a greater need for potassium, therefore target a ratio of N:K at 1 : 1.5.
- Avoid high levels of ammonium as this promotes soft growth and weaker stems.
- Water sufficiently during the juvenile phase and then reduce moisture from visible bud to harvest to obtain stronger stems and tighter flower spikes*.

**see the note regarding Stock Iron earlier in the presentation.*

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*

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 cutting, place the flower spikes in a preservative solution that also contains a germicide.
- Pretreat the flowers with a commercial holding solution specific for Stock for a few hours or overnight at 36-37ºF/2-3°C.
- Stock is very sensitive to ethylene, so the use of STS or 1-MCP is recommended.
- Stems should be maintained in a vertical position at all times to avoid bending (geotropic effect) and kept in total darkness to avoid curvature of the growing point.
- The use of floral foam combined with a 2% sucrose solution and a germicide increases the 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