

College of Agriculture & Life Sciences
Department of Horticultural Science

COMMERCIAL CELERY PRODUCTION IN EASTERN NORTH CAROLINA

William H. McCarthy, Research Assistant
Douglas C. Sanders, Extension Horticultural Specialist

Celery (*Apium graveolens* L. var. *dulce*) could be a very profitable crop in North Carolina. A harvest period in late June or early July, and one in October, would fill market voids when other major celery-producing areas are not harvesting. Celery, however, is not an easy crop to grow. Although it is a cool-season crop, exposure of juvenile plants to temperatures below 40 to 50°F for more than 5 to 10 days can cause premature bolting, making the crop unsalable. Special attention must be given to maintaining a steady water supply and providing the proper amount of nutrients to allow for constant growth. To realize a profit, N.C. growers should do the following:

- Use varieties that will compete successfully with the market standard
- Adopt recommended management practices
- Offer an attractive pack

Varieties — Varieties that are more resistant to premature bolting should be used for spring crops in North Carolina. Although a small demand currently exists for blanched or processing celery, green celery (sometimes called pascal) is the most common type of celery grown in the U.S.

Transplanting — It is best to grow your own transplants (see *Vegetable Transplant Bulletin* AG-337). Three to 4 oz of seed will produce the 35,000 to 40,000 plants required per acre depending on plant and row spacing. Transplant flats having cavities $\frac{3}{4}$ to 1 inch

square can be used effectively. Smaller cells require more careful water and nutrient management. Rigorous grading of the transplants to eliminate the weak and planting the very vigorous seedlings separately from the rest, increases uniformity of stalk size at harvest and total yield. Whether the soil is dry or moist, transplanting must always be immediately followed by sprinkler irrigation. Additional irrigations should be applied to keep the soil moist for the first 3 weeks after transplanting.

Spacing — Plants should be spaced about 7 inches apart in single rows with 24-inch centers. Double-row plantings should be made on 14-inch beds with 40-inch centers, with the plants spaced 7 to 10 inches apart.

Soils — The best soil for celery is fertile muck or soils with high levels of organic matter. However, celery can be grown on most fertile, medium-textured mineral soils with irrigation.

Fertilization — Optimal pH range for celery production on mineral soils is 6.0 to 6.5. On organic soils apply lime if soil pH is below 5.5.

Macronutrients — Celery uses large quantities of fertilizer. Apply P and K according to soil test recommendations, in general 200 to 250 lb of P_2O_5 , and 600 lb of K per acre should be broadcast and incorporated before planting. N should be applied at 75 to 100 lb per acre with the above fertilizer.

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Table 1. Varieties and seed sources for celery.

| Variety | Seed Source¹ | Brief Description |
|----------------------------|--------------------------------|---|
| Bishop | 3 | A tender-crisp type, with longer petioles than traditional tall Utah types, some tolerance to fusarium yellows, harvest 90 to 100 days after transplanting (D.A.T.). |
| Deacon | 3 | Tight, wide petioles, few suckers, adapted for East coast areas, main season, tolerance to fusarium yellows, harvest 90 to 100 D.A.T. |
| *Fla 683 | 1,2,3,6 | Medium tall plants (shorter than 52 to 70 type), tight, few suckers, main season, tolerance to cracking and boron deficiency, susceptible to bolting, harvest 100 to 120 D.A.T. |
| Florimart | 8 | Slow bolting, resistance to early and bacterial blight, harvest 110 D.A.T. |
| Golden Self Blanching | 2,6 | Relatively tall plants, self blanching, early season, local market, harvest 80 to 90 D.A.T. |
| Golden Spartan | 5,6 | Tall, self blanching, slow bolting, early season, harvest 80 to 90 D.A.T. |
| June-Belle | 6 | Some tolerance to late blight and western celery mosaic, some resistance to early blight and CMV, harvest 80 to 90 D.A.T. |
| Starlet(664-B) | 1 | Tall plants, slow bolting, resistance to fusarium yellows race 1 and 2, harvest 120 D.A.T. |
| Summet | 7 | Slow bolting, heavy yielding, early season, harvest 110 D.A.T. |
| Tall Utah 52-70HK | 6 | Medium tall plants, tight, uniform stalks, few suckers, main season, resistance to fusarium yellows, harvest 90 to 100 D.A.T. |
| *Tall Utah 52-70R | 1,3,5 | Tall, heavy yielding, main season, resistant to boron deficiency and western celery mosaic, harvest 100 to 120 D.A.T. |
| *Tall Utah 52-75R Improved | 2,3,6,7 | Medium tall, tight, few suckers, good for muck and mineral soils, slow bolting, main season, tolerance to western celery mosaic, resistant to brown check and adaxial crackstem, harvest 90 to 100 D.A.T. |
| Tall Utah 52-75 | 6,7 | Main season, tolerant to boron and magnesium deficiency, harvest 100 to 110 D.A.T. |
| Vicar | 3 | Tolerance to fusarium yellows race 2, harvest 120 D.A.T. |
| Ventura | 4,7 | Medium tall, medium tight, few suckers, early season, some tolerance to fusarium yellows, harvest 100 to 110 D.A.T. |

* These varieties have performed well in North Carolina trials.

¹ See Table 2. Seed sources for celery.

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| Company | Location/Address | Phone Number |
|----------------------------|--|---------------------|
| 1. Abbott & Cobb Seed Co. | Feasterville, PA 19047 | 800/345-7333 |
| 2. Asgrow Seed Co. | P.O. Box 48503 Doraville, GA 30362 | 800/334-6572 |
| 3. Ferry Morse Seed Co. | 5904 Adamo Dr. Tampa, FL 33605 | 813/626-3197 |
| 4. Harris/Moran Seed Co. | 3670 Buffalo Rd. Rochester, NY 14624 | 716/549-9411 |
| 5. Johnny's Selected Seeds | Foss Hill Rd. Albion, ME 04910 | 207/437-9294 |
| 6. Nunhems Seed Corp. | P.O. Box 18, 221 E. Main St. Lewisville, ID 83431 | 208/754-8666 |
| 7. Sun Seeds | 2320 Technology Parkway Hollister, CA 95023 | 408/636-9505 |
| 8. Local Sources | | |

Micronutrients — Apply $\frac{1}{2}$ to 1 lb of manganese as a foliar spray for organic and dark-colored sandy loams if pH is above 6.5. Boron should be applied at the rate of 1 lb per acre.

- **Starter Fertilizer** — A starter fertilizer such as 0-45-0 (triple super phosphate) may be added to the transplant solution at 100 lbs per acre.
- **Supplemental Applications** — Approximately 2 to 3 sidedress applications of 50 lbs N per acre are usually needed during the growing season. Growers will often sidedress 4 to 6 weeks after transplanting and 3 to 4 weeks before harvest. The color of the foliage and plant tissue tests will help determine the N needs and when sidedressing should be done.

Irrigation — Successful production of celery requires continuous growth. To achieve this, irrigation immediately after transplanting is required. Frequent irrigation of 1 to 1.5 inches of water per week during the growing season is needed. Irrigation during the 6 weeks prior to harvest is especially important due to rapid plant growth. Adequate irrigation can help prevent blackheart, a physiological disorder. This disorder occurs when young leaves in the center of the plant do not get enough water and calcium to

stay alive. The resulting dead tissue turns black and often decays.

Insect Control — Major insect pests of celery include aphids, leafhoppers, carrot weevils, flea beetles, leafminers, armyworms and loopers. It is important to control leafhoppers, a common carrier of viruses. See the current *North Carolina Commercial Vegetable Recommendations* (AG-586) or your county extension agent for the latest recommendations.

Weed Control — Celery is a poor competitor with weeds; therefore, effective weed control is necessary. Several effective herbicides are available for preemergence and post-emergence weed control. Shallow cultivation (less than 2 inches) will be needed. See the current *N. C. Agricultural Chemicals Manual* or your county Extension agent for the latest recommendations.

Disease Control — Major diseases of celery include damping-off, root rot, pink rot (*Sclerotinia sclerotiorum*), basal stalk lesions (*Rhizoctonia*), early blight (*Cercospora apii*), late blight (*Septoria apiicola*), bacterial blight (*Pseudomonas cichorii*), western celery mosaic virus, cucumber mosaic virus (CMV), aster yellows, fusarium yellows (*Fusarium oxysporum*), and nematodes. Soil

samples should be taken to determine if nematode control is necessary. Nematodes can be controlled by fumigation. See the current *N. C. Agricultural Chemicals Manual* or your county extension agent for the latest disease control recommendations.

Harvesting — Celery should be harvested when the petioles (stalks) from the soil line to the first node are at least 6 inches long. Plants must be compact and tight without excessive open space in the center of the stalk. The crop should be ready for harvest 85 to 120 days after transplanting, depending on the variety. A block of celery with a single maturity date should be no larger than can be harvested at one time so the celery can be harvested at peak quality. Quality of the crop will decline with time due to increased amount of pithiness, yellow leaves and seed stalks. Average yields are 25 to 35 tons per acre.

Grading — The three grades provided for celery are U.S. extra No. 1, U.S. No. 1, and U.S. No. 2. Factors considered in grading are petiole and stalk length; color; stalk development; shape; compactness; trimming; pithiness; seed stem; growth cracks; wilting; cleanness; blackheart; number of stalks per container; and mechanical, disease and insect damage. Sizing is based on the number of stalks that fit in a carton, with 2 to 2 1/2 dozen stalks per carton most preferred.

Post Harvest — Celery should be precooked to remove field heat as soon as possible after harvesting. Celery can be precooked by refrigerated forced air, hydrocooling, or vacuum cooling. Celery should be precooked to near 32 °F before shipping. If celery is to be stored, the humidity should be near 95 %, and the temperature between 31 ° and 32 °F. Celery should be shipped butts upward to prevent water accumulation and butt discoloration.

10 Tips for Successful Celery Production

1. Find a market before planting transplants.
2. Test soil for nutrients and nematodes and follow recommendations.
3. Use your own or certified transplants.
4. Irrigate immediately after transplanting.
5. Never let the crop stop growing; maintain adequate moisture and nutrient levels at all times.
6. Sidedress after transplanting and when necessary to maintain good foliage color and growth.
7. Maintain an effective weed control program as celery is a poor competitor.
8. Maintain crop quality by controlling diseases and insects.
9. Increase crop surveillance during last 6 weeks before harvest.
10. Handle harvested celery gently and precool to 32 °F immediately after harvest.