

This is a section from the

2016

Mid-Atlantic

Commercial Vegetable Production Recommendations

The manual, which is published annually, is NOT for home gardener use.

The full manual, containing recommendations specific to New Jersey, can be found on the Rutgers NJAES website in the Publications section
njaes.rutgers.edu

The label is a legally-binding contract between the user and the manufacturer.

The user must follow all rates and restrictions as per label directions.

The use of any pesticide inconsistent with the label directions is a violation of Federal law.

CELERY

Varieties¹

PennCrisp (PA only) Utah 52-70 R	These varieties are recommended strains for PA and other areas where climatic conditions are favorable for celery production.
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¹ Varieties listed by maturity, earliest first.

Recommended Nutrients Based on Soil Tests

Before using the table below, refer to important notes in the Soil and Nutrient Management chapter in Section B and your soil test report. These notes and soil test reports provide additional suggestions to adjust rate, timing, and placement of nutrients. Your state’s soil test report recommendations and/or your farm’s nutrient management plan supercede recommendations found below.

Celery	Pounds N per Acre	Soil Phosphorus Level				Soil Potassium Level				Nutrient Timing and Method
		Low	Med	High		Low	Med	High		
				(Opt.)	High			(Opt.)	High	
		Pounds P ₂ O ₅ per Acre				Pounds K ₂ O per Acre				
	150-175	250	150	100	0	250	150	100	0	Total nutrient recommended.
	50-75	250	150	100	0	250	150	100	0	Broadcast and disk-in.
	25-50	0	0	0	0	0	0	0	0	Sidedress 2-3 weeks after planting.
	25-50	0	0	0	0	0	0	0	0	Sidedress 6-8 weeks after planting.

Apply 1.5 to 3.0 pounds of boron (B) per acre with broadcast fertilizer. See Table B-9 for more specific boron recommendations.

A physiological disorder called “brown check,” is characterized by russeting and cracking on the inner side of the petiole. There is evidence that brown check may be caused by excessive amounts of potassium in the soil, although boron nutrition may also be involved. Plant resistant varieties, particularly Utah 52-70. Brown check may appear if varieties other than Utah 52-70 or related lines are planted on soils with high potassium levels and if a heavy rate of potassium fertilizer is used.

Seed Treatment

Freshly harvested seed may exhibit dormancy leading to poor germination. Therefore seeds should either be stored at <40°F (4.44 °C) for six or more months or treated with phytohormones. For seed treatments pertaining to the eradication of pathogens see the Disease section.

Transplant Production

Because of the long growing season required, celery is usually treated as a transplant crop. Sow seed in the greenhouse 10 to 12 weeks before field planting. About 35,000 plants can be produced from 2½ ounces of seed. Temperatures between 70° to 75°F (21.1° to 23.9°C) should be maintained until the plants emerge, then 65° to 70°F (18.3° to 21.1°C) for steady growth. To reduce the production of “seeders,” night temperatures should not drop below 55°F (12.8°C). Plants for the early crop should not be set in the field until danger of a prolonged cold period or actual freeze is over.

If plants become too tall or spindly before field setting, they can be clipped back to a 5- or 6-inch height. Plants can be hardened by withholding water 7 to 10 days before setting in field. Never harden celery plants by lowering temperatures.

Planting

Celery is a cool-season crop that grows most rapidly,

yields best, and develops top quality at moderately cool temperatures (55° to 75°F [12.8° to 23.9°C]), good soil moisture, and relatively high humidity. It will withstand light freezes, but both young and old plants are damaged by moderate freezes. Celery, a biennial, initiates seed stalk (bolts) after being exposed to temperatures below 55°F (12.8°C) for a number of days.

Satisfactory crops can be produced on fertile, medium-textured mineral soils with irrigation. Since celery is expensive to grow, experience in both production and marketing is desirable before large-scale operations are attempted.

The usual planting period is May 1 to June 30. Transplants are grown in greenhouses or imported from Florida. Under satisfactory growing conditions, celery reaches usable size 85 to 100 days from transplanting. Special blanching practices can improve color and eating quality. High plant populations can promote blanching. For non self-blanching cultivars, blanching can be accomplished by trenching or other mechanical means.

Field Spacing

Rows: 16 to 32 inches apart; *plants:* 8 inches apart in row. Set from 30,000 to 45,000 plants per acre.

Harvest and Postharvest Considerations

Harvest when stalks are of sufficient size but before any pithiness has developed in the petioles. Celery should be cooled quickly to temperatures below 45°F (7.2°C) by hydrocooling, vacuum-cooling, icing, or other means of refrigeration. Stalks can be held for 5 to 7 weeks if storage is near 32°F (0°C) with 98% relative humidity.

Celery Disorders

Blackheart

Internal leaves develop a brown discoloration which eventually becomes deep black. The cause is similar to tip-burn of lettuce or blossom-end rot of tomato. Although

many predisposing factors may be involved, water-stress results in a calcium deficiency disorder causing cell death. Symptom development is much more severe as plants approach maturity. Environmental conditions that favor rapid growth such as heavy rain or irrigation before drought favor blackheart development. High nitrogen, potassium, and sodium levels may also play a role. Blackheart is prevented by ensuring steady plant growth and avoiding wide fluctuations in moisture and nutrients. Drench applications of soluble calcium can lessen or prevent the development of blackheart. Drip irrigation, which provides more even moisture levels can help reduce risk.

Brown Check

A physiological disorder called “brown check,” is characterized by russeting and cracking on the inner side of the petiole. There is evidence that brown check may be caused by excessive amounts of potassium in the soil, although boron nutrition may also be involved. Plant resistant varieties, particularly Utah 52-70. Brown check may appear if varieties other than Utah 52-70 or related lines are planted on soils with high potassium levels and if a heavy rate of potassium fertilizer is used (see earlier celery nutrition table).

Weed Control

Identify the weeds in each field and select recommended herbicides that control those weeds. See Tables E-3 and E-4.

Apply postemergence herbicides when crop and weeds are within the recommended size and/or leaf stage.

Determine the preharvest interval (PHI) for the crop. See Table E-4 and consult the herbicide label.

Find the herbicides you plan to use in the Herbicide Resistance Action Committee’s (HRAC) **Herbicide Site of Action Table E-8** and follow the recommended good management practices to minimize the risk of herbicide resistance development by weeds in your fields.

Preplant Incorporated or Preemergence

Bensulide--5.0 to 6.0 lb/A. Apply 5.0 to 6.0 quarts per acre Prefar 4E before planting and incorporate 1 to 2 inches deep with power-driven rotary cultivators, or apply preemergence and activate with one-half inch of sprinkler irrigation within 36 hours to control most annual grasses. Use the maximum recommended rate preemergence followed by irrigation to suppress certain annual broadleaf weeds including common lambsquarters, smooth pigweed, and common purslane.

Preemergence

Prometryn--1.2 to 1.6 lb/A. Apply 2.4 to 3.3 pints per acre Caparol 4L after seeding, but before crop emergence. Use lower rate on lighter coarse-textured sandy soils and the higher rate on heavier fine-textured soils. Follow with overhead irrigation if rainfall does not occur. Primarily controls annual broadleaf weeds. Annual grasses may only be suppressed. Do NOT use on sand or loamy sand soils, or crop injury may occur.

Postemergence

Linuron--0.75 to 1.50 lb/A. Apply 1.5 to 3.0 pounds per acre Lorox 50DF. Make a single application after celery trans-plants are established, but before celery is 8 inches tall to control most broadleaf weeds. Spray before target weeds reach 6 inches in height. DO NOT exceed 40 psi or apply when temperatures exceed 85°F. DO NOT add surfactants,

oil concentrate, or liquid fertilizer. Use only the Lorox 50DF formulation of linuron. **For use on celery grown on muck soils only!**

Prometryn--1.6 to 3.2 lb/A. Apply 2.4 to 3.2 pints per acre Caparol 4L after the crop has 3-5 true leaves. Primarily controls many seedling annual broadleaf weeds less than 2 inches tall. Annual grasses may only be suppressed. Use lower rate when the crop and weeds are small, or when cloudy, humid growing conditions prevail and the higher rate when the crop and weeds are more mature and hot dry growing conditions prevail. Do NOT use on sand or loamy sand soils, or crop injury may occur. DO NOT tank-mix Caparol with any other pesticide. DO NOT use spray additives such as nonionic surfactant or oil concentrate. DO NOT apply within two weeks of any herbicidal oil such as “carrot oil” or Stoddard Solvent. Make either one preemergence application or one postemergence application, but not both. Observe a minimum preharvest interval of 40 days.

Clethodim--0.094 to 0.125 lb/A. Apply 6.0 to 8.0 fluid ounces per acre Select 2EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or 12.0 to 16.0 fluid ounces of Select Max 0.97 EC with nonionic surfactant to be 0.25% of the spray solution (1.0 quart per 100 gallons of spray solution) postemergence to control many annual and certain perennial grasses, including annual bluegrass. Select will not consistently control goosegrass. The use of oil concentrate with Select 2EC may increase the risk of crop injury when hot or humid conditions prevail. To reduce the risk of crop injury, omit additives or switch to nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 30 days.

Sethoxydim--0.2 to 0.3 lb/A. Apply 1.0 to 1.5 pints per acre Poast 1.5EC with oil concentrate to be 1 percent of the spray solution (1.0 gallon per 100 gallons of spray solution) postemergence to control annual grasses and certain perennial grasses. **The use of oil concentrate may increase the risk of crop injury when hot or humid conditions prevail.** To reduce the risk of crop injury, omit additives or switch to nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 30 days and apply no more than 3 pints per acre in one season.

Postharvest

Paraquat--0.6 lb/A. **A Special Local-Needs 24(c) label has been approved for the use of Gramoxone SL 2.0 or OLF for postharvest desiccation of the crop in Delaware, New Jersey and Virginia.** Apply 2.4 pints per acre Gramoxone SL 2.0 or OLF as a broadcast spray after the last harvest. Add nonionic surfactant according to the labeled instructions. See the label for additional information and warnings.

Insect Control

THE LABEL IS THE LAW. PLEASE REFER TO THE LABEL FOR UP TO DATE RATES AND RESTRICTIONS.

NOTE: Copies of specific insecticide product labels can be downloaded by visiting the websites www.CDMS.net or www.greenbook.net. Also, specific labels can be obtained via web search engines.

Aphids

Apply one of the following formulations:

acephate (**green peach aphid only**)--0.5 to 1.0 lb/A
Acephate 97UP (or OLF)
acetamiprid--2.0 to 4.0 oz/A Assail 30SG (or OLF)
clothianidin--**soil** 9.0 to 12.0 fl oz/A Belay 2.13SC, **foliar** 3.0 to 4.0 fl oz/A Belay 2.13SC
flonicamid--2.0 to 2.8 oz/A Beleaf 50SG
imidacloprid--**soil only** 4.4 to 10.5 fl oz/A Admire Pro (or OLF)
malathion--1.5 pts/A Malathion 57EC (or OLF)
pymetrozine--2.75 oz/A Fulfill 50WDG
spirotetromat--4.0 to 5.0 fl oz/A Movento
thiamethoxam--1.5 to 3.0 oz/A Actara 25WDG

Beet Armyworm (BAW), Fall Armyworm (FAW)

Apply one of the following formulations:

acephate (**FAW only**)--1.0 lb/A Acephate 97UP (or OLF)
chlorantraniliprole (**BAW only**)--3.5 to 5.0 fl oz/A Coragen 1.67SC
cyantraniliprole--(**soil BAW only**) 5.0 to 10.0 oz/A Verimark, (**foliar BAW, FAW**) 7.0 to 13.5 fl oz/A Exirel
emamectin benzoate--2.4 to 4.8 oz/A Proclaim 5SG
flubendiamide--1.5 fl oz/A Belt SC (or other labeled mixtures containing flubendiamide like Vetica)
indoxacarb (**BAW only**)--3.5 oz/A Avaunt 30WDG
methomyl--1.5 to 3.0 fl oz/A Lannate LV
spinetoram--5.0 to 10.0 fl oz/A Radiant SC
spinosad--4.0 to 8.0 fl oz/A Entrust SC **OMRI-listed**

Cabbage Looper

Apply one of the following formulations:

acephate--1.0 lb/A Acephate 97UP (or OLF)
Bacillus thuringiensis--0.5 to 1.5 lb/A Dipel DF (or OLF)
OMRI-listed
chlorantraniliprole--3.5 to 5.0 fl oz/A Coragen 1.67SC
cyantraniliprole--(soil) 6.75 to 13.5 fl oz/A Verimark, (foliar) 10 to 17 fl oz/A Exirel
cyfluthrin--1.6 to 2.4 fl oz/A Tombstone (or OLF)
emamectin benzoate--3.2 to 4.8 oz/A Proclaim 5SG
flubendiamide--1.5 fl oz/A Belt SC
flubendiamide + buprofezin--12.0 to 17.0 fl oz/A Vetica
indoxacarb--3.5 oz/A Avaunt 30WDG
methomyl--3.0 fl oz/A Lannate LV

permethrin--2.0 to 8.0 oz/A Perm-Up 3.2 EC (or OLF)
spinetoram--5.0 to 10.0 fl oz/A Radiant SC
spinosad--3.0 to 6.0 fl oz/A Entrust SC **OMRI-listed**

Cutworms

Apply one of the following formulations:

beta-cyfluthrin--0.8 to 1.6 fl oz/A Baythroid XL
cyfluthrin--0.8 to 1.6 fl oz/A Tombstone (or OLF)
flubendiamide--1.5 fl oz/A Belt SC
methomyl--1.5 fl oz/A Lannate LV (or OLF)
permethrin--4.0 to 8.0 oz/A Perm-Up 3.2 EC (or OLF)

Leafhopper

Apply one of the following formulations:

beta-cyfluthrin--2.4 to 3.2 fl oz/A Baythroid XL
buprofezin--9.0 to 13.6 fl oz/A Courier 3.6SC
carbaryl--(aster leafhopper) 1.0 to 2.0 qt/A Sevin XLR Plus (or OLF)
clothianidin--**soil** 9.0 to 12.0 fl oz/A Belay 2.13SC, **foliar** 3.0 to 4.0 fl oz/A Belay 2.13SC
cyfluthrin--(potato leafhopper) 0.8 to 1.6 fl oz/A (other leafhoppers) 2.4 to 3.2 fl oz/A Tombstone (or OLF)
dinotefuran--**soil** 5.0 to 6.0 oz/A, **foliar** 1.0 to 3.0 oz/A Venom 70SG (or OLF), or **soil** 9.0 to 10.5 fl oz/A, **foliar** 2.0 to 5.25 fl oz/A Scorpion 35SL (or OLF)
imidacloprid--**soil only** 4.4 to 10.5 fl oz/A , Admire PRO (or OLF)
methomyl--1.5 to 3.0 fl oz/A Lannate LV
thiamethoxam--1.5 to 3.0 oz/A Actara 25WDG

Leafminer

Apply one of the following formulations:

abamectin--1.75 to 3.5 fl oz/A Agri-Mek 0.7SC (or OLF)
chlorantraniliprole--5.0 to 7.5 fl oz/A Coragen 1.67SC
cyantraniliprole--(**soil**) 6.75 to 13.75 fl oz/A Verimark, (**foliar**) 13.5 to 20.5 fl oz/A Exirel
cyromazine--2.66 oz/A Trigard 75WSP
dinotefuran--**soil** 5.0 to 6.0 oz/A, **foliar** 1.0 to 3.0 oz/A Venom 70SG (or OLF), or **soil** 9.0 to 10.5 fl oz/A, **foliar** 2.0 to 5.25 fl oz/A Scorpion 35SL (or OLF)
spinetoram--6.0 to 10.0 fl oz/A Radiant SC
spinosad--6.0 to 10.0 fl oz/A Entrust SC **OMRI-listed**

Mites

Apply one of the following formulations:

abamectin--1.75 to 3.5 fl oz Agri-Mek 0.7SC

Tarnished Plant Bug (*Lygus*)

Look for bugs on leaves shortly after transplanting and when nearby alfalfa or grain is cut. Apply one of the following formulations:

beta-cyfluthrin--2.4 to 3.2 fl oz/A Baythroid XL
carbaryl--1.0 to 2.0 qts/A Sevin XLR Plus (or OLF)
cyfluthrin--2.4 to 3.2 fl oz/A Tombstone (or OLF)
flonicamid--2.0 to 2.8 oz/A Beleaf 50SG

Disease Control**Seed Treatment**

Use seed that is at least 2 years old. Soak newer seed in hot water at 118°F (47.8°C) for 30 minutes. Use seed treated with Maxim 4F (0.08 to 0.16 fl oz/100 lb) for *Rhizoctonia* and *Fusarium* management and Apron XL (0.085 to 0.64 fl oz/100 lb seed) for *Pythium* damping-off protection.

Damping-Off (*Pythium*)

Damping off is favored by excessive soil moisture. Avoid over-saturation of seedbeds and do not transplant diseased plants in the field. Apply one of the following:

mefenoxam--Ridomil Gold--1.0 to 2.0 pt 4SL/A or Ultra Flourish 2.0 to 4.0 2E/A preplant incorporated broadcast or in a 7-inch band (not for use in a greenhouse)
Uniform--0.34 fl oz 3.66SE/1000 ft of row in-furrow (see label for specific details) for *Pythium* and/or *Rhizoctonia*

Crater and Petiole Rot or Basal Stalk Rot (*Rhizoctonia*)

Rotate out of celery for at least 3 years to insure crop residue is thoroughly decomposed. Avoid planting transplants too deep and in poorly drained soils. Where problems occur regularly apply fungicides.

azoxystrobin--0.40 to 0.80 fl oz 2.08F/1000 row feet or OLF applied in a 7-in band in-furrow or shortly after emergence directed at the stem.

Pink Rot (*Sclerotinia*)

Few products are available for pink rot control. Avoid planting in shaded or poorly drained areas and areas with a history of pink rot. Rotate fields for at least 2 or 3 years. Maximize air movement through the plant canopy. Apply Contans 3 to 4 months prior to the onset of disease to allow the mycoparasite to reduce sclerotial inoculum levels in the soil. Following application, incorporate to a depth of 1 to 2 inches; however, to avoid the chance of infesting the upper soil layer with untreated sclerotia from the lower soil layer, **do not plow** between treatment and planting times.

Contans--2.0 to 4.0 lb 5.3WG/A

During the season apply:

chlorothalonil--3.0 pt 6F/A or OLF, shortly after plants emerge and repeat on a 7-day schedule (suppression only)

Cannonball--7.0 oz 50WP/A

Switch--11.0 to 14.0 oz 62.5WG/A

Leaf Blights (*Cercospora* and *Septoria*)

Use certified, disease-free seed or treat seed with hot water or fungicides. Practice careful sanitation in transplant production or rotate ground seedbeds. Use 3 or 4 year crop rotations. Apply one of the following:

Alternate:

azoxystrobin--9.0 to 15.5 fl oz 2.08F/A or OLF

Quadris Opti--2.4 to 3.7 pt 5.5SC /A

Cabrio--12.0 to 16.0 oz EG/A

Merivon--4.0 to 11.0 fl oz 2.09SC/A

With one of the following:

chlorothalonil--2.0 to 3.0 pt 6F/A or OLF

copper, fixed--at labeled rates

Fontelis--14.0 to 24.0 fl oz 1.67 EC/A

Tilt--4.0 fl oz 3.6EC/A

Fusarium Yellows

Do not obtain plants from areas of known infestation. There are no means of chemical management. Avoid seeding or transplanting into infested soil or use resistant varieties.

Celery Leaf Curl/Anthracnose (*Colletotrichum*)

This relatively new disease is characterized by curled, cupped and twisted leaves and petioles and dark, brownish necrotic lesions near the base of the petioles. It is suspected to

be seedborne so planting high quality seeds is recommended. For resistance management, *alternate* chlorothalonil 2.0 pt 6F/A or OLF with one of the following FRAC 11 fungicides: azoxystrobin--6.0 to 15.5 fl oz 2.08F/A or OLF
Cabrio--12.0 to 16.0 oz EG/A

Pesticide	Use Category ¹	Hours to Reentry	Days to Harvest
INSECTICIDE			
abamectin	R	12	7
acephate	G	24	21
acetamiprid	G	12	7
<i>Bacillus thuringiensis</i>	G	4	0
beta-cyfluthrin	R	12	0
buprofezin	R	12	7
beta-cyfluthrin	R	12	0
carbaryl	G	12	14
chlorantraniliprole	G	4	1
clothianidin (soil/foliar)	G	12	21/7
cyantraniliprole (soil/foliar)	G	4/12	AP/1
cyfluthrin	R	12	0
cyromazine	G	12	7
dinotefuran (soil/foliar)	G	12	21/7
emamectin benzoate	R	12	7
flonicamid	G	12	0
flubendiamide	G	12	1
flubendiamide + buprofezin	G	12	7
imidacloprid (soil only)	G	12	45
indoxacarb	G	12	3
malathion	G	24	7
methomyl	R	48	7
permethrin	R	12	1
pymetrozine	G	12	7
spinetoram	G	4	1
spinosad	G	4	1
spirotetromat	G	24	3
thiamethoxam	G	12	7
FUNGICIDE (FRAC code)			
azoxystrobin (Group 11)	G	4	0
Cabrio (Group 11)	G	12	0
chlorothalonil (Group M5)	G	12	7
Contans WG (biological)	G	4	0
Cannonball (Group 12)	G	12	0
copper, fixed (Group M1)	G	see label	0
Fontelis (Group 7)	G	12	3
Merivon (Groups 7 + 11)	G	12	1
Quadris Opti (Groups 11+M5)	G	12	7
Ridomil Gold (Group 4)	G	48	0
Switch (Groups 9 + 12)	G	12	0
Tilt (Group 3)	G	12	14
Ultra Flourish (Group 4)	G	48	7
Uniform (Groups 4 + 11)	G	0	AP

See Table D-6.

¹ G = general, R = restricted,

AP = At planting