

## Celery - Horticulture

**Sandea (75) (halosulfuron)** | 0.5-1.5 oz. per acre. Apply before, during, or after harvest. Drop nozzles and using COC or NIS are recommended for applications after harvest. For first year transplants do not apply sooner than 6 weeks after fern emergence. Do not exceed 2 applications per crop cycle, or 2 oz. per acre per 12-month period. Has residual soil activity. Effective on nutsedge. REI: 12-hour. PHI: 1-day. WSSA 2.

### Grass Weeds Only - Postemergence

#### Pesticide

**clethodim products (clethodim)** | Use 2EC formulations at 6-8 fl. oz. per acre with 1 qt. of COC per 25 gals. of spray solution (1% v/v). Use Select Max at 9-16 fl. oz. per acre with 8 fl. oz. of NIS per 25 gals. of spray solution (0.25% v/v). Spray on actively growing grass. Wait at least 14 days between applications. Do not exceed 32 fl. oz. of 2EC formulations or 64 fl. oz. of Select Max per acre per season. REI: 24-hour. PHI: 1-day. WSSA 1.

**Fusilade DX (2EC) (fluazifop-P)** | 8-12 fl. oz. per acre. Include 1-2 pts. of COC or 0.5-1 pt. of NIS per 25 gals. of spray solution. Spray on actively growing grass. Rates may be doubled if asparagus will not be harvested for 12 months. Wait at least 14 days between applications. Do not exceed 48 fl. oz. per acre per season on bearing asparagus. REI: 12-hour. PHI: 1-day. WSSA 1.

**Poast (1.5EC) (sethoxydim)** | 1-1.5 pts. per acre. Include 1 qt. COC per acre. Spray on actively growing grass. Use high rate on quackgrass. Do not exceed 5 pts. per acre per season. REI: 12-hour. PHI: 1-day. WSSA 1.

## Celery - Horticulture

Reviewed by Ben Phillips, Liz Maynard, Ben Werling – Oct 2020

### Crop Description

Commercial celery (*Apium graveolens*) production in the United States began in Michigan in the 1800s. Numbered commercial varieties are maintained by a small breeding effort supported directly by the largest growers of the commodity. Other seed sources are available for smaller-scale growers, and include bushier thin-stalked types, and taller thick-stalked types. The standard green varieties can be blanched to maintain a lighter white color of the inner stalks through soil-hilling or by dense plant spacing. There are also red varieties. Seeds are produced in the second year of production if plants are overwintered under mulch.

### Planting and Spacing

Celery seed is small and difficult to germinate, thus all commercial celery is planted from greenhouse-grown transplants produced in plug trays using peat-based media. Allow 8 to 10 weeks for transplant production.

In early February, seeds are sown in greenhouses and are ready for transplanting to the field in about eight weeks. Transplanting begins 6 to 8 weeks before last frost, and ends 6 to 8 weeks after last frost. Schedule planting so that a uniform quantity of celery is ready to harvest every week. Using transplants as opposed to direct seeding ensures uniform stands and faster maturing crops. Often, succession plantings are started every three weeks.

Harden off transplants by reducing water, not temperatures. Celery is a cool-season crop that produces best at temperatures of 60° to 80° F. Plants can withstand light frosts, but prolonged frosts below 28° F will cause damage. Plants may

form seed stalks (bolt) if exposed to temperatures below 55° F for 7 days or longer.

Traditionally, celery has been grown on muck soils, but it can be grown on coarse-textured mineral soils. Regardless of soil type, high fertility and moisture are necessary for tender succulent stalks.

Rotate celery with crops such as onions or corn whenever possible to avoid building up pests in the soil. At the end of the season, consider planting a winter cover crop of barley or rye to reduce erosion and add active organic matter to the soil.

Typical spacing for celery is rows 2 feet apart with plants 6 inches apart in row. One plant per square foot.

### ***Fertilizing***

**pH:** Maintain the soil pH above 5.5 in muck soils and 6.5 in mineral soils.

Before planting, apply 40 pounds N per acre, 0 to 230 pounds P<sub>2</sub>O<sub>5</sub> per acre, and 0 to 500 pounds K<sub>2</sub>O per acre based on soil test results and recommendations from your state. Celery is responsive to B. Apply 2 to 4 pounds of B per acre in banded or broadcast fertilizer to avoid stem cracking.

Banding fertilizer at transplanting can help when soil is less than 55° F. In these cases, band up to 40 pounds N per acre, up to 100 pounds P<sub>2</sub>O<sub>5</sub> per acre, and up to 40 pounds K<sub>2</sub>O per acre, and subtract those amounts from the preplant application.

Sidedress with 40 to 50 pounds N per acre two or three times, three or four weeks apart, starting six weeks after transplanting, or apply equivalent amount of N through fertigation. Reduce the amount of fertilizer N applied by the value of N credits from green manures, legume crops grown in the previous year, compost and animal manures, and soils with more than 3 percent organic matter. The total amount of N from fertilizer (including

starter) and other credits should be 200 pounds per acre on mineral soils and 150 pounds per acre on muck soils

Use overhead sprinkler or drip irrigation to apply water frequently to the shallow-rooted crop. If the soil gets too dry, physiological disorders such as blackheart (a calcium deficiency), will develop.

### ***Harvesting***

Once celery reaches marketable size, there is a narrow harvest window (about six to eight days) before quality significantly reduces. Fresh market and processing celery can be both handpicked or harvested mechanically. Time from transplanting to harvest ranges between 100 and 130 days.

Harvest celery by pulling the entire plant. Cut off the roots and trim the tops. Wash if necessary and cool quickly with water or forced air. Maintain a cold chain to market for best quality. Ideal storage conditions are near freezing and high humidity.

## **Celery - Diseases**

Reviewed by Dan Egel – Nov 2020

### ***Recommended Controls***

#### **Anthracnose of Celery - Colletotrichum Fungus**

Disease and symptom development are favored by periods of warm temperatures (>68 F) combined with high humidity. Symptoms include curled/cupped leaves, sporadic leaf margin discoloration, twisted petioles and small, oval lesions on petioles. Symptoms of anthracnose can be confused with those associated with aster yellows except that the affected foliage remains green.

## Pesticide

**Cabrio EG (20) (pyraclostrobin)** | 12-16 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

**Merivon (fluxapyroxad, pyraclostrobin)** | 4-11 fl. oz. per acre. REI: 12-hour. PHI: 1-day. FRAC 7, FRAC 11.

**Pristine 38WG (boscalid, pyraclostrobin)** | 10-15 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

## Aster Yellows (Purple-Top Wilt) of Multiple Crops - *Phytoplasma Mollicutes*

### Pesticide

**Insecticides** | Use an insecticide to control leafhoppers that transmit the disease. Leafhoppers must be controlled before they feed. See Insect section.

## Bacterial Blight of Celery - *Pseudomonas Bacteria*

Symptoms include leaf blight and extensive leaf death that requires additional trimming at harvest, resulting in yield loss. May be seedborne.

### Non-Pesticide

Use disease-free seed. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 118 F for 30 minutes for celery. Rotate to non-host crops for 2 years. Varieties with partial resistance are available. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

### Pesticide

**copper products (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous**

**oxide)** | Several formulations of copper (Badge, Champ, Kocide) are labelled for use and may slow the spread of bacterial blight. See label for directions. REI: 4 to 48-hour. PHI: 0-day. FRAC M1.

## Crater Rot of Celery - *Rhizoctonia Fungus*

### Non-Pesticide

Clean and sanitize transplant trays, benches, and tools. Rogue infected transplants. Avoid working field under wet conditions. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

### Pesticide

**azoxystrobin products (azoxystrobin)** | Use 2 lb. a.i. per gallon formulations (Quadris) at 0.4-0.8 fl. oz. per 1,000 row feet. Use 3.3 lb. per gallon formulations (Azteroid) at 0.24-0.48 fl. oz. per 1,000 row feet, REI: 4-hour. PHI: 0-day. FRAC 11.

**Catamaran (potassium phosphite, chlorothalonil)** | 4-5 pts. per acre. REI: 12-hour. PHI: 7-day. FRAC P7, FRAC M5.

**chlorothalonil products (chlorothalonil)** | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 7-day. FRAC M5.

**Quadris Opti (SC) (azoxystrobin, chlorothalonil)** | 2.4-3.7 pts. per acre. REI: 12-hour. PHI: 7-day. FRAC 11, FRAC M5.

## Damping-Off Seed and Seedling Rots of Multiple Crops - Multiple Pathogens

Michigan State University research has found *Pythium* spp. causing damping-off of celery in greenhouses can result in poor field establishment.

## Non-Pesticide

Practice good greenhouse sanitation of equipment, tools propagation trays/pots, and surfaces. Avoid excess moisture to the transplants in the greenhouse by monitoring irrigation frequency. Plant in warm field soils. The fungi responsible for damping-off in field soils cause more loss when the seedling is slow to emerge.

## Pesticide

**Ridomil Gold SL (4SC) (mefenoxam)** | 1-2 pts. per acre Apply preplant for greenhouse production. REI: 48-hour. PHI: 7-day. FRAC 4.

**Uniform (L) (mefenoxam, azoxystrobin)** | 0.34 fl. oz. per 1,000 ft. of row. Make one application per crop per season. REI: 0-hour. PHI: 0-day. FRAC 4, FRAC 11.

## Early Blight of Celery - Cercospora Fungus

Early blight (*Cercospora* leaf blight) symptoms include small, yellow spots that rapidly enlarge to tan or gray lesions. All above ground tissues of celery can become infected, resulting in losses of 50% or more when blighted stalks or leaves have to be removed at harvest. May be seedborne.

## Non-Pesticide

Use disease-free seed. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 118 F for 30 minutes for celery. Rotate to non-host crops for 2 years. Varieties with partial resistance are available. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

## Pesticide

**azoxystrobin products (azoxystrobin)** | Use 2 lb. a.i. per gallon formulations (Quadris) at 9.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations

(Azteroid) at 5.8-9.7 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.11-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

**Cabrio EG (20) (pyraclostrobin)** | 12-16 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

**Catamaran (potassium phosphite, chlorothalonil)** | 4-5 pts. per acre. REI: 12-hour. PHI: 7-day. FRAC P7, FRAC M5.

**chlorothalonil products (chlorothalonil)** | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 7-day. FRAC M5.

**Flint Extra (4.05) (trifloxystrobin)** | 2.5-2.9 fl. oz. per acre. Maximum application volume: 30-gallons per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

**Fontelis (1.67SC) (penthiopyrad)** | 14-24 fl. oz. per acre. REI: 12-hour. PHI: 3-day. FRAC 7.

**Luna Sensation (fluopyram, trifloxystrobin)** | 4-5.8 fl. oz. per acre REI: 12-hour. PHI: 7-day. FRAC 7, FRAC 11.

**Merivon (fluxapyroxad, pyraclostrobin)** | 4-11 fl. oz. per acre. REI: 12-hour. PHI: 1-day. FRAC 7, FRAC 11.

**Pristine 38WG (boscalid, pyraclostrobin)** | 10-15 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

**propiconazole products (propiconazole)** | 4 fl. oz. per acre. PropiMax EC and Tilt are labeled. REI: 12-hour. PHI: 14-day. FRAC 3.

**Quadris Opti (SC) (azoxystrobin, chlorothalonil)** | 2.4-3.7 pts. per acre. REI: 12-hour. PHI: 7-day. FRAC 11, FRAC M5.

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**Quilt (SE) (azoxystrobin, propiconazole)** | 14 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC 3.

### Late Blight of Celery - Septoria Fungus

Late blight (Septoria leaf blight) include irregularly-shaped brown spots on leaves with pycnidia similar in appearance to grains of ground black pepper. Over time, these leaf spots expand and cause the entire leaf to die. May be seedborne.

### Non-Pesticide

Use disease-free seed. Hot water seed treatment may reduce this seedborne disease. Use temperatures and times of 118 F for 30 minutes for celery. Rotate to non-host crops for 2 years. Varieties with partial resistance are available. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

### Pesticide

**azoxystrobin products (azoxystrobin)** | Use 2 lb. a.i. per gallon formulations (Quadris) at 9.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 5.8-9.7 fl. oz. per acre. Use 0.5 lb. per gallon formulations (Heritage) on greenhouse transplants only at 0.11-0.18 oz. per 1,000 sq. ft. REI: 4-hour. PHI: 0-day. FRAC 11.

**Cabrio EG (20) (pyraclostrobin)** | 12-16 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

**Catamaran (potassium phosphite, chlorothalonil)** | 4-5 pts. per acre. REI: 12-hour. PHI: 7-day. FRAC P7, FRAC M5.

**chlorothalonil products (chlorothalonil)** | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 7-day. FRAC M5.

**Flint Extra (4.05) (trifloxystrobin)** | 2.5-2.9 fl. oz. per acre. Maximum application volume: 30-gallons per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

**Fontelis (1.67SC) (penthioopyrad)** | 14-24 fl. oz. per acre. REI: 12-hour. PHI: 3-day. FRAC 7.

**Luna Sensation (fluopyram, trifloxystrobin)** | 4-5.8 fl. oz. per acre REI: 12-hour. PHI: 7-day. FRAC 7, FRAC 11.

**Merivon (fluxapyroxad, pyraclostrobin)** | 4-11 fl. oz. per acre. REI: 12-hour. PHI: 1-day. FRAC 7, FRAC 11.

**Pristine 38WG (boscalid, pyraclostrobin)** | 10-15 oz. per acre. REI: 12-hour. PHI: 0-day. FRAC 7, FRAC 11.

**propiconazole products (propiconazole)** | 4 fl. oz. per acre. PropiMax EC and Tilt are labeled. REI: 12-hour. PHI: 14-day. FRAC 3.

**Quadris Opti (SC) (azoxystrobin, chlorothalonil)** | 2.4-3.7 pts. per acre. REI: 12-hour. PHI: 7-day. FRAC 11, FRAC M5.

**Quilt (SE) (azoxystrobin, propiconazole)** | 14 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC 3.

**Reason 500SC (4.13) (fenamidone)** | 5.5-8.2 fl. oz. per acre. REI: 12-hour. PHI: 2-day. FRAC 11.

**Reason 500SC (4.13) (fenamidone)** | 8.2 fl. oz. per acre. REI: 12-hour. PHI: 2-day. FRAC 11.

### Nematodes

### Pesticide

**Nimitz (4EC) (fluensulfone)** | 3.5-7 pts. per acre. Do not use on direct-seeded plants. May be broadcast, banded, or drip-applied in the spring up to 7 days before planting at a depth of 8 inches.

Effectiveness is reduced on muck and clay soils. REI: 12-hour. IRAC UN.

**Sectagon K42 (4.2L) (metam sodium)** | 37.5-75 gals. per acre. Use high rates on muck, and lower rates on sands. In the fall, when soil at 6 inches is above 50 F and moist, place Sectagon K42 or VAPAM HL about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, it can be applied through drip irrigation under unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP.*

**Sectagon K54 (5.63L) (metam potassium)** | 30-62 gals. per acre. Use high rates on muck, and lower rates on sands. In the fall, when soil at 6 inches is above 50 F and moist, place Sectagon K54 or K-PAM HL about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, it can be applied through drip irrigation under unperforated plastic beds. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC 8F, FRAC M3, WSSA 17. *RUP.*

**Telone C-17 (L) (1,3-dichloropropene, chloropicrin)** | *Muck soils:* Use C-17 formulation at 27.4-30 gals. per acre, and C-35 formulation at 33-36 gals. per acre. *Mineral soils:* Use C-17 formulation at 10.8-17.1 gals. per acre, and C-35 formulation at 13-20.5 gals per acre. In the fall, when soil at 6 inches is above 50 F and moist, place Telone C-17 or C-35 about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing, irrigation, or plastic. Or, in the spring, InLine may be applied through drip irrigation under unperforated plastic beds at 13-20.5 gals. per acre on mineral soils only. Before planting, allow product to dissipate for 1 week for every 10

gals. per acre plus 1 more week. REI: 3-5-day. IRAC UN, FRAC NC, IRAC 8B. *RUP.*

**Telone II (9.85L) (1,3-dichloropropene)** | *Muck soils:* Use at 25 gals. per acre. *Mineral soils:* Use at 9-12 gals. per acre. In the spring or fall, when soil at 6 inches is above 50 F and moist, place Telone II about 8 inches beneath the surface through shank-injectors, or broadcast sprayers directly in front of tillage tools to bury it. Seal with soil packing or irrigation. Or, in the spring, Telone EC may be applied through drip irrigation under unperforated plastic beds at 9-18 gals. per acre on mineral soils only. Before planting, allow product to dissipate for 1 week for every 10 gals. per acre plus 1 more week. REI: 5-day. IRAC UN, FRAC NC. *RUP.*

**Vydate L (2WSL) (oxamyl)** | 0.5-2 pts. per acre. *MI, and OH only.* Apply as a banded or shank-injected pre-plant, at-plant in-furrow or directed post-plant soil treatment with at least 20 gals. water per acre incorporated 2-4 inches deep by water or mechanical means. Start post-plant applications 3 weeks after transplanting. Allow 14 days between applications. Do not exceed 5 total applications, or 24 pts. per acre per season. REI: 48-hour. PHI: 21-day. IRAC 1A. *RUP.*

## Rust of Multiple Crops - Puccinia Fungus

### Pesticide

**Flint Extra (4.05) (trifloxystrobin)** | 2.5-2.9 fl. oz. per acre. Maximum application volume: 30-gallons per acre. REI: 12-hour. PHI: 0-day. FRAC 11.

**Luna Sensation (fluopyram, trifloxystrobin)** | 4-5.8 fl. oz. per acre REI: 12-hour. PHI: 7-day. FRAC 7, FRAC 11.

# Celery - Insects

Reviewed by Laura Ingwell, Zsafia Szendrei – Nov 2020

## Recommended Controls

### Aphids

Over-treatment with permethrin may increase aphid problems.

Treat when more than 3% of plants are infested or there are more than 6 aphids per 100 sweeps.

Over-treatment with pyrethroids (IRAC 3A) may cause increased aphid problems.

### Pesticide

**Actara (25WDG) (thiamethoxam)** | 1.5-3.0 oz. per acre. Apply as a foliar treatment. Allow 7 days between applications. Do not exceed 11 oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 4A.

**Admire Pro (4.6SC) (imidacloprid)** | 4.4-10.5 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per season. REI: 12-hour. PHI: 45-day. IRAC 4A.

**Assail 30SG (acetamiprid)** | Use 30SG formulations at 2-4 oz. per acre and do not exceed 20 oz. per acre per season. Use 70WP formulations at 0.8-1.7 oz. per acre and do not exceed 8.5 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

**Belay (2.13SC) (clothianidin)** | *Soil applications:* 9-12 fl. oz. per acre. *Foliar applications:* 3-4 fl. oz. per acre. Do not exceed 12 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 4A.

**Beleaf (50SG) (flonicamid)** | 2-2.8 oz. per acre. Allow 7 days between applications. Do not exceed 8.4 oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 29.

**Brigade 2EC (bifenthrin)** | Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Use 10DF, 10WP, or 10WSB formulations at 5.3-16 oz. per acre and do not exceed 80 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP.*

**Closer SC (2) (sulfoxaflor)** | 1.5-2 fl. oz. per acre. Use high rate when pest pressure is heavy. Do not exceed 17 fl. oz. per acre per year. Allow 7 days between applications. REI: 12-hour. PHI: 3-day. IRAC 4C.

**Durivo (SC) (thiamethoxam, chlorantraniliprole)** | 10-13 fl. oz. per acre. Apply as a soil treatment. Do not exceed 13 fl. oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A, IRAC 28.

**Exirel (0.83SE) (cyantraniliprole)** | 13.5-20.5 fl. oz. per acre. Use an effective adjuvant. Allow 5 days between applications. Do not exceed 61.7 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 28.

**Fulfill (50WDG) (pymetrozine)** | 2.75 oz. per acre. May require 5-7 days for aphid mortality. Allow 7 days between applications. Do not exceed 5.5 oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 9B.

**Malathion 5EC (malathion)** | Use 5EC and 57EC formulations at 1.5-2.4 pts. per acre. Do not exceed 2 applications per season. Allow 7 days between applications. REI: 12 to 24-hour. PHI: 7-day. IRAC 1B.

**Movento (2SC) (spirotetramat)** | 4-5 fl. oz. per acre. Must be tank-mixed with an adjuvant with spreading and penetrating properties. Allow 7 days between applications. Do not exceed 10.0 fl. oz. per acre per season. REI: 24-hour. PHI: 3-day. IRAC 23.

**Mustang Maxx (0.8) (zeta-cypermethrin)** | 2.24-4.0 fl. oz. per acre. Allow 7 days between

applications. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

**Nuprid 2SC (imidacloprid)** | 10-24 fl. oz. per acre. Apply as a soil treatment. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 45-day. IRAC 4A.

**Orthene 97 (S) (acephate)** | 8-16 oz. per acre. Allow 3 days between applications of 8 oz. per acre, and 7 days between applications of over 16 oz per acre. Do not exceed 34 oz. per acre per season. REI: 24-hour. PHI: 21-day. IRAC 1B.

**Perm-Up 25DF (permethrin)** | Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 64 oz. per acre per season. Use 3.2EC formulations at 2-8 fl. oz. per acre and do not exceed 40 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

**Sivanto 200 (1.67SL) (flupyradifurone)** | 10.5-12.0 fl. oz. per acre. Can be applied as a foliar spray or soil treatment. See label for application methods. REI: 4-hour. PHI: 1-day. IRAC 4D.

**Torac (1.29SC) (tolfenpyrad)** | 17-21 fl. oz. per acre. Do not apply until 14 days after transplanting. Do not exceed 42 fl. oz. per crop cycle. REI: 12-hour. PHI: 1-day. IRAC 21A, FRAC 39.

**Verimark (1.67SC) (cyantraniliprole)** | 6.75-13.5 fl. oz. per acre. Apply as a soil treatment. Do not exceed 30.6 fl. oz. per acre per season. REI: 4-hour. PHI: 0-day. IRAC 28.

**Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole)** | 4-7 oz. per acre. Do not exceed a total of 14 oz. per acre per growing season. Minimum interval between applications is 7 days. REI: 12-hour. PHI: 7-day. IRAC 4A, IRAC 28.

## Carrot Weevil Beetle

### Pesticide

**Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole)** | 4-7 oz. per acre. Do not exceed a total of 14 oz. per acre per growing season. Minimum interval between applications is 7 days. REI: 12-hour. PHI: 7-day. IRAC 4A, IRAC 28.

**Vydate L (2WSL) (oxamyl)** | 4 pts. per acre. *Michigan and Ohio only.* Apply as a soil-directed spray with at least 20 gals. water per acre, incorporated 2-4 inches deep by water or mechanical means. Start when eggs or larvae are first seen and repeat in 2 to 3 weeks. Allow 14 days between applications. Do not exceed 5 total applications, or 24 pts. per acre per season. REI: 48-hour. PHI: 21-day. IRAC 1A. *RUP*.

### Caterpillars

There are many caterpillar pests of celery, including cabbageworms, diamond back moth caterpillars, earworms, corn borers, cutworms, loopers, and armyworms. Always check the label for the specific list of caterpillars that the product can be used on.

Apply preventative treatments within 4 weeks of harvest. Treat as needed before that.

### Pesticide

**Avaunt (30WDG) (indoxacarb)** | 3.5 oz. per acre. For armyworms, and loopers. Allow 3 days between applications. Do not exceed 56 oz. per acre per season. REI: 12-hour. PHI: 3-day. IRAC 22.

**Bacillus thuringiensis products for caterpillars (Bacillus thuringiensis aizawai strain ABTS-1857, Bacillus thuringiensis aizawai strain GC-91, Bacillus thuringiensis kurstaki strain ABTS-351, Bacillus thuringiensis kurstaki strain EVB-113-19, Bacillus thuringiensis kurstaki strain SA-11)** | For armyworms, cutworms, and loopers. Various Bt products are available for control of young caterpillars (Agree, Biobit, Dipel, Javelin,

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etc.) Different Bt subspecies have different control properties. Check labels for rates, timing of application and required safety equipment. REI: 4-hour. PHI: 0-day. IRAC 11A.

**Baythroid XL (1EC) (beta-cyfluthrin)** | 0.8-3.2 fl. oz. per acre. For armyworms, cutworms, and loopers. Use high rate for armyworms and target 1st and 2nd instar caterpillars. Allow 7 days between applications. Do not exceed 12.8 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP*.

**Brigade 2EC (bifenthrin)** | For armyworms, cutworms, and loopers. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Use 10DF, 10WP, or 10WSB formulations at 5.3-16 oz. per acre and do not exceed 80 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP*.

**Confirm 2F (tebufenozide)** | 6-8 fl. oz. per acre. For armyworms, and loopers. Do not exceed 40 fl. oz. per acre per crop. REI: 4-hour. PHI: 7-day. IRAC 18.

**Coragen (1.67SC) (chlorantraniliprole)** | 3.5-7.5 fl. oz. per acre. For armyworms, and loopers. Can be applied as a foliar spray or soil treatment. Allow 3 days between foliar applications and 10 days between soil applications. Do not exceed 15.4 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 28.

**Durivo (SC) (thiamethoxam, chlorantraniliprole)** | 10-13 fl. oz. per acre. For armyworms, and loopers. Apply as a soil treatment. Do not exceed 13 fl. oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A, IRAC 28.

**Entrust SC (2) (spinosad)** | For armyworms, and loopers. Use 2SC formulations at 1.5-8.0 fl. oz. per acre and do not exceed 29 fl. oz. per acre per season. Use 80WP formulations at 0.5-2.5 oz. per acre and do not exceed 9 oz. per acre per season.

Allow 4 days between applications. REI: 4-hour. PHI: 1-day. IRAC 5. *OMRI-listed*.

**Exirel (0.83SE) (cyantraniliprole)** | 7.0-17.0 oz. per acre. For armyworms, and loopers. Allow 5 days between applications. Do not exceed 61.7 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 28.

**Intrepid 2F (methoxyfenozide)** | 4-10 oz. per acre. For armyworms, and loopers. Use 4-8 fl. oz. per acre in early season, and 8-10 fl. oz. per acre on mid and late season. Do not exceed 64 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 18.

**Lannate LV (2.4L) (methomyl)** | 1.5 - 3.0 pts. per acre. For armyworms, cutworms, and loopers. Do not exceed 21 pts. per acre per season. REI: 48-hour. PHI: 7-day. IRAC 1A. *RUP*.

**Mustang Maxx (0.8) (zeta-cypermethrin)** | 2.24-4.0 fl. oz. per acre. For armyworms, cutworms, and loopers. Allow 7 days between applications. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

**Perm-Up 25DF (permethrin)** | For armyworms, and loopers. Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 64 oz. per acre per season. Use 3.2EC formulations at 2-8 fl. oz. per acre and do not exceed 40 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

**Proclaim (5SG) (emamectin benzoate)** | 2.4-4.8 oz. per acre. For armyworms, and loopers. Allow 7 days between applications. Do not exceed 28.8 oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 6. *RUP*.

**Radiant 1SC (spinetoram)** | 5-10 fl. oz. per acre. For armyworms, and loopers. Allow 4 days between applications. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 5.

**Sevin XLR Plus (4SC) (carbaryl)** | 1-2 qts. per acre. For armyworms. Do not exceed 6 qts. per acre per season. REI: 12-hour. PHI: 14-day. IRAC 1A.

**Verimark (1.67SC) (cyantraniliprole)** | 5.0-13.5 fl. oz. per acre. For armyworms, and loopers. Apply as a soil treatment at-plant. Do not exceed 30.6 fl. oz. per acre per season. REI: 4-hour. PHI: 0-day. IRAC 28.

## Leafhoppers

Treat when there are more than 14 leafhoppers per 100 sweeps.

Repeat as needed, depending on number of leafhoppers.

## Pesticide

**Actara (25WDG) (thiamethoxam)** | 1.5-3.0 oz. per acre. Apply as a foliar treatment. Allow 7 days between applications. Do not exceed 11 oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 4A.

**Admire Pro (4.6SC) (imidacloprid)** | 4.4-10.5 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per season. REI: 12-hour. PHI: 45-day. IRAC 4A.

**Belay (2.13SC) (clothianidin)** | *Soil applications:* 9-12 fl. oz. per acre. *Foliar applications:* 3-4 fl. oz. per acre. Do not exceed 12 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 4A.

**Brigade 2EC (bifenthrin)** | Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 32 fl. oz. per acre per season. Use 10DF, 10WP, or 10WSB formulations at 5.3-16 oz. per acre and do not exceed 80 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 3A. *RUP.*

**Durivo (SC) (thiamethoxam, chlorantraniliprole)** | 10-13 fl. oz. per acre. Apply as a soil treatment. Do not exceed 13 fl. oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A, IRAC 28.

**Lannate LV (2.4L) (methomyl)** | 1.5 - 3.0 pts. per acre. Do not exceed 21 pts. per acre per season REI: 48-hour. PHI: 7-day. IRAC 1A. *RUP.*

**Mustang Maxx (0.8) (zeta-cypermethrin)** | 2.24-4.0 fl. oz. per acre. Allow 7 days between applications. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP.*

**Nuprid 2SC (imidacloprid)** | 10-24 fl. oz. per acre. Apply as a soil treatment. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 45-day. IRAC 4A.

**Perm-Up 25DF (permethrin)** | Use 25W, 25WP or 25DF formulations at 6.4-12.8 oz. per acre and do not exceed 64 oz. per acre per season. Use 3.2EC formulations at 2-8 fl. oz. per acre and do not exceed 40 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP.*

**Platinum 2SC (thiamethoxam)** | Use 2SC formulations as a soil treatment at 5-11 fl. oz. per acre and do not exceed 11 fl. oz. per acre per season. Use 75SG formulations as a soil treatment at 1.66-3.67 oz. per acre and do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A.

**Scorpion 35SL (3.24) (dinotefuran)** | *Soil treatment:* Use Scorpion 35SL at 9.0-10.5 oz. per acre, or Venom 70SG at 5.0-5.5 oz. per acre. *Foliar treatment:* Use Scorpion 25SL at 2.0-5.25 oz. per acre, or Venom 70SG at 1-3 oz. per acre. Allow 7 days between applications. REI: 12-hour. PHI: 21-day as soil application, 7-day as foliar application IRAC 4A.

**Sevin XLR Plus (4SC) (carbaryl)** | 1-2 qts. per acre. Do not exceed 6 qts. per acre per season. REI: 12-hour. PHI: 14-day. IRAC 1A.

**Sivanto 200 (1.67SL) (flupyradifurone)** | 7.0-10.5 fl. oz. per acre. Can be applied as a foliar spray or

## Celery - Insects

soil treatment. See label for application methods. REI: 4-hour. PHI: 1-day. IRAC 4D.

**Torac (1.29SC) (tolfenpyrad)** | 14-21 fl. oz. per acre. Do not apply until 14 days after transplanting. Do not exceed 42 fl. oz. per crop cycle. REI: 12-hour. PHI: 1-day. IRAC 21A, FRAC 39.

**Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole)** | 4-7 oz. per acre. Do not exceed a total of 14 oz. per acre per growing season. Minimum interval between applications is 7 days. REI: 12-hour. PHI: 7-day. IRAC 4A, IRAC 28.

## Leafminers

Treat as soon as visible mines appear and repeat every 7 days as needed.

## Pesticide

**Actara (25WDG) (thiamethoxam)** | 1.5-3.0 oz. per acre. Apply as a foliar treatment. Allow 7 days between applications. Do not exceed 11 oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 4A.

**Admire Pro (4.6SC) (imidacloprid)** | 4.4-10.5 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per season. REI: 12-hour. PHI: 45-day. IRAC 4A.

**Agri-Mek SC (0.7) (abamectin)** | 1.75-3.5 fl. oz. per acre. Use with a nonionic surfactant. Allow 7 days between applications. Do not exceed 10.5 fl. oz. per acre. REI: 12-hour. PHI: 7-day. IRAC 6. *RUP.*

**Baythroid XL (1EC) (beta-cyfluthrin)** | 0.8-3.2 fl. oz. per acre. Allow 7 days between applications. Do not exceed 12.8 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP.*

**Coragen (1.67SC) (chlorantraniliprole)** | 5.0-7.5 fl. oz. per acre. Can be applied as a foliar spray or soil treatment. See label for application methods. Allow 3 days between foliar applications. Do not

exceed 15.4 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 28.

**Dimethoate 4EC (dimethoate)** | Use 4EC, LV-4, and 400 EC formulations at 1 pt. per acre and do not exceed 3 pts. per acre per season. REI: 48-hour. PHI: 7-day. IRAC 1B.

**Durivo (SC) (thiamethoxam, chlorantraniliprole)** | 10-13 fl. oz. per acre. Apply as a soil treatment. Do not exceed 13 fl. oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A, IRAC 28.

**Entrust SC (2) (spinosad)** | Use 2SC formulations at 6-10 fl. oz. per acre and do not exceed 29 fl. oz. per acre per season. Use 80WP formulations at 2-3 oz. per acre and do not exceed 9 oz. per acre per season. Allow 4 days between applications. REI: 4-hour. PHI: 1-day. IRAC 5. *OMRI-listed.*

**Exirel (0.83SE) (cyantraniliprole)** | 13.5-20.5 fl. oz. per acre. Use an effective adjuvant. Allow 5 days between applications. Do not exceed 61.7 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 28.

**Platinum 2SC (thiamethoxam)** | Use 2SC formulations as a soil treatment at 5-11 fl. oz. per acre and do not exceed 11 fl. oz. per acre per season. Use 75SG formulations as a soil treatment at 1.66-3.67 oz. per acre and do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 30-day. IRAC 4A.

**Radiant 1SC (spinetoram)** | 6-10 fl. oz. per acre. Allow 4 days between applications. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 5.

**Scorpion 35SL (3.24) (dinotefuran)** | *Soil treatment:* Use Scorpion 35SL at 9.0-10.5 oz. per acre, or Venom 70SG at 5.0-5.5 oz. per acre. *Foliar treatment:* Use Scorpion 25SL at 2.0-5.25 oz. per acre, or Venom 70SG at 1-3 oz. per acre. Allow 7 days between applications. REI: 12-hour. PHI: 21-

day as soil application, 7-day as foliar application IRAC 4A.

**Trigard (75WP) (cyromazine)** | 2.66 oz. per acre. Allow 7 days between applications. Do not exceed 6 applications per crop. REI: 12-hour. PHI: 7-day. IRAC 17.

**Verimark (1.67SC) (cyantraniliprole)** | 6.75-13.5 fl. oz. per acre. Apply as a soil treatment. Do not exceed 30.6 fl. oz. per acre per season. REI: 4-hour. PHI: 0-day. IRAC 28.

## Mites

### Pesticide

**Admire Pro (4.6SC) (imidacloprid)** | 4.4-10.5 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per season. REI: 12-hour. PHI: 45-day. IRAC 4A.

**Agri-Mek SC (0.7) (abamectin)** | 1.75-3.5 fl. oz. per acre. Use with a nonionic surfactant. Allow 7 days between applications. Do not exceed 10.5 fl. oz. per acre. REI: 12-hour. PHI: 7-day. IRAC 6. *RUP.*

**Dimethoate 4EC (dimethoate)** | Use 4EC, LV-4, and 400 EC formulations at 1 pt. per acre and do not exceed 3 pts. per acre per season. REI: 48-hour. PHI: 7-day. IRAC 1B.

**Malathion 5EC (malathion)** | Use 5EC and 57EC formulations at 1.5-2.4 pts. per acre. Do not exceed 2 applications per season. Allow 7 days between applications. REI: 12 to 24-hour. PHI: 7-day. IRAC 1B.

**Oberon 2SC (spiromesifen)** | 7.0-8.5 fl. oz. per acre. *For the treatment of Two-Spotted Spider Mites in Michigan only. MI 24c exp. 08/23/22.* Allow 7 days between applications. Do not exceed 25.5 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. IRAC 23.

**Verimark (1.67SC) (cyantraniliprole)** | 6.75-13.5 fl. oz. per acre. Apply as a soil treatment. Do not exceed 30.6 fl. oz. per acre per season. REI: 4-hour. PHI: 0-day. IRAC 28.

## Slugs

### Pesticide

**Deadline M-Ps (4P) (metaldehyde)** | 25 lbs. per acre. Apply between rows. Avoid contact with edible product. Allow 21 days between applications. Do not exceed 100 lbs. per acre per season. REI: 12-hour. PHI: 1-day. IRAC UN.

## Tarnished Plant Bug

Treat if there are 2-4 tarnished plant bugs per 20 plants.

### Pesticide

**Baythroid XL (1EC) (beta-cyfluthrin)** | 0.8-3.2 fl. oz. per acre. Allow 7 days between applications. Do not exceed 12.8 fl. oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 3A. *RUP.*

**Beleaf (50SG) (flonicamid)** | 2-2.8 oz. per acre. Allow 7 days between applications. Do not exceed 8.4 oz. per acre per season. REI: 12-hour. PHI: 0-day. IRAC 29.

**Mustang Maxx (0.8) (zeta-cypermethrin)** | 2.24-4.0 fl. oz. per acre. Allow 7 days between applications. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP.*

**Sevin XLR Plus (4SC) (carbaryl)** | 1-2 qts. per acre. Do not exceed 6 qts. per acre per season. REI: 12-hour. PHI: 14-day. IRAC 1A.

**Torac (1.29SC) (tolfenpyrad)** | 17-21 fl. oz. per acre. Do not apply until 14 days after transplanting. Do not exceed 42 fl. oz. per crop cycle. REI: 12-hour. PHI: 1-day. IRAC 21A, FRAC 39.

## Thrips

### Pesticide

**Closer SC (2) (sulfoxaflor)** | 4.25-5.75 fl. oz. per acre. *Suppression only*. Use high rate when pest pressure is heavy. Do not exceed 17 fl. oz. per acre per year. Allow 7 days between applications. Do not apply within 3 days of harvest. REI: 12-hour. PHI: 3-day. IRAC 4C.

**Exirel (0.83SE) (cyantraniliprole)** | 13.5-20.5 fl. oz. per acre. Use an effective adjuvant. Allow 5 days between applications. Do not exceed 61.7 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 28.

**Radiant 1SC (spinetoram)** | 6-10 fl. oz. per acre. Allow 4 days between applications. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. IRAC 5.

**Torac (1.29SC) (tolfenpyrad)** | 21 fl. oz. per acre. Do not apply until 14 days after transplanting. Do not exceed 42 fl. oz. per crop cycle. REI: 12-hour. PHI: 1-day. IRAC 21A, FRAC 39.

## Whiteflies

### Pesticide

**Assail 30SG (acetamiprid)** | Use 30SG formulations at 2-4 oz. per acre and do not exceed 20 oz. per acre per season. Use 70WP formulations at 0.8-1.7 oz. per acre and do not exceed 8.5 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 4A.

**Closer SC (2) (sulfoxaflor)** | 5.75 fl. oz. per acre. *Suppression only*. Do not exceed 17 fl. oz. per acre per year. Allow 7 days between applications. REI: 12-hour. PHI: 3-day. IRAC 4C.

**Exirel (0.83SE) (cyantraniliprole)** | 13.5-20.5 fl. oz. per acre. Use an effective adjuvant. Allow 5 days between applications. Do not exceed 61.7 fl.

oz. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 28.

**Movento (2SC) (spirotetramat)** | 4-5 fl. oz. per acre. Must be tank-mixed with an adjuvant with spreading and penetrating properties. Allow 7 days between applications. Do not exceed 10.0 fl. oz. per acre per season. REI: 24-hour. PHI: 3-day. IRAC 23.

**Sivanto 200 (1.67SL) (flupyradifurone)** | 10.5-14.0 fl. oz. per acre. Can be applied as a foliar spray or soil treatment. See label for application methods. REI: 4-hour. PHI: 1-day. IRAC 4D.

**Voliam Flexi (WDG) (thiamethoxam, chlorantraniliprole)** | 4-7 oz. per acre. Do not exceed a total of 14 oz. per acre per growing season. Minimum interval between applications is 7 days. REI: 12-hour. PHI: 7-day. IRAC 4A, IRAC 28.

## Celery - Weeds

Reviewed by Stephen Meyers, Ben Phillips – Nov 2020

### Recommended Controls

#### All Weeds

Celery are nearly always started as transplants. Early season plantings are more at risk of herbicide stunting in cool soils. There are several herbicides labeled for the control of weeds preemergence, applied before celery is transplanted, or directed between the rows only after transplanting.

For specific weeds controlled by each herbicide, check Relative Effectiveness of Herbicides for Vegetable Crops table.

Rates provided in the recommendations below are given for overall coverage. For band treatment, reduce amounts according to the portion of acre treated.

## Non-Pesticide

Weed control in celery often relies heavily on cultivation and hand weeding for full season weed control. These operations are most efficient when planting arrangement is designed with weed control in mind and is designed to work with available weed control equipment. Specialized weeding equipment for leafy vegetables includes basket weeders, narrow-bladed hoes, finger weeders, and others. Prepare a stale seedbed prior to transplanting with flaming or very shallow cultivation, instead of herbicides.

## Broadleaf and Grass Weeds - Postemergence

### Pesticide

**Caparol 4L (prometryn)** | 1-2 qts. per acre. Make 1 or 2 applications 2-6 weeks after transplanting but before weeds are 2 inches tall. Do not exceed 2 qts. per acre per year. REI: 12-hour. WSSA 5.

**glyphosate products (glyphosate)** | 1.5-2.25 lbs. acid equivalent (ae) per acre. Use formulations containing 3 lbs. ae per gal. (4 lbs. isopropylamine salt per gal.) at 2-3 qts. per acre. Use formulations containing 4.5 lbs. ae per gal. (5 lbs. potassium salt per gal.) at 1.3-2 qts. per acre. Apply to emerged perennials before planting, or after harvest in the fall. See label for suggested application volume and adjuvants and rates for specific weeds. REI: 4 to 12-hour. PHI: 14-day. WSSA 9.

**Lorox DF (50) (linuron)** | 1.5-2 lbs. per acre. Apply after transplants are established but before celery is 8 inches tall. Do not exceed 40 PSI pressure. Do not apply when temperatures exceed 85 F, and do not mix with wetting agents or other pesticides. REI: 24-hour to 8-day. PHI: 45-day. WSSA 7.

## Broadleaf and Grass Weeds - Preemergence

### Pesticide

**Caparol 4L (prometryn)** | 1-2 qts. per acre. Make 1 or 2 applications 2-6 weeks after transplanting but before weeds are 2 inches tall. Do not exceed 2 qts. per acre per year. REI: 12-hour. WSSA 5.

**Chateau SW (51WDG) (flumioxazin)** | 3 oz. per acre. Apply before transplanting or 3-7 days after transplanting for control of many annual broadleaf weeds and grasses. Do not tank mix with other pesticides. REI: 12-hour. WSSA 14.

**Dual Magnum (7.62EC) (s-metolachlor)** | 1-2 pts. per acre. *Indiana, Michigan, and Minnesota only (MI 24c exp. 12/31/21. MN 24c exp. 12/31/20):* apply before or immediately after transplanting. Will control annual grass and small-seeded broadleaf weeds and nutsedge. Use high rate on muck soils. Follow with 0.25-inch water within 7 days. REI: 24-hour. PHI: 62-day. WSSA 15.

**Lorox DF (50) (linuron)** | 1.5-2 lbs. per acre. Apply after transplants are established but before celery is 8 inches tall. Do not exceed 40 PSI pressure. Do not apply when temperatures exceed 85 F, and do not mix with wetting agents or other pesticides. REI: 24-hour to 8-day. PHI: 45-day. WSSA 7.

**trifluralin products (trifluralin)** | 0.5-1 lb. a.i. per acre. Use 4EC formulations at 1-2 pts. per acre. Use 10G formulations at 5-10 lbs. per acre. Apply and incorporate 1-2 inches before, during, or immediately after planting. Use low rate on coarse soils with less than 2% organic matter. Not effective on muck or high organic matter soils. REI: 12-hour. WSSA 3.

**Zidua (85WDG) (pyroxasulfone)** | 3.25 fl. oz. per acre of SC formulation. 2.0 oz. per acre of WG formulation. Use only on muck soil with greater than 20% organic matter. Apply to transplanted

Cole Crops and Brassica Leafy Greens - Horticulture  
celery 1-6 days after transplanting. REI: 12-hour.  
WSSA 15.

## Grass Weeds Only - Postemergence

### Pesticide

**clethodim products (clethodim)** | Use 2EC formulations at 6-8 fl. oz. per acre with 1 qt. of COC per 25 gals. of spray solution (1% v/v). Use Select Max at 9-16 fl. oz. per acre with 8 fl. oz. of NIS per 25 gals. of spray solution (0.25% v/v). Spray on actively growing grass. Wait at least 14 days between applications. Do not exceed 32 fl. oz. of 2EC formulations or 64 fl. oz. of Select Max per acre per season. REI: 24-hour. PHI: 30-day. WSSA 1.

**Poast (1.5EC) (sethoxydim)** | 1-1.5 pts. per acre. Apply to actively growing grasses. Include 1 qt. COC per acre. Do not exceed 3 pts. per acre per season. REI: 12-hour. PHI: 30-day. WSSA 1.

# Cole Crops and Brassica Leafy Greens - Horticulture

Reviewed by Ben Phillips, Liz Maynard – Oct 2020

## Crop Description

The term “cole crops” refers to leafy brassicas, with waxy leaves, of the species *Brassica oleracea*. Cabbage, cauliflower, broccoli, Brussels sprouts, kale, collards, and kohlrabi are hardy crops and well adapted to cool weather. Mustard and turnip greens, although not cole crops, are also frost-hardy and adapted to cool weather. Careful selection of the planting date and cultivars is crucial to a good harvest in the Midwest. Many cole crop varieties need 80 days or fewer to mature and can be sequentially planted in the spring through mid-summer for sequential harvests starting in the summer through late fall. Some Brussels sprouts,

cabbage, and cauliflower varieties need over 100 days mature, and require a full season. Plants maturing under cool weather conditions are the highest in quality.

**Broccoli:** There are heading-types of broccoli that form a distinct domed head, and sprouting “broccolini” types that produce smaller sprigs of flower buds for multiple harvests. There are purple varieties as well. Broccoli is relatively fast-maturing, and varieties can be planted in spring for summer harvest and summer for fall harvest.

**Brussels sprouts:** Brussels sprouts require the entire season from spring to fall to produce small cabbage-like buds in a spiral around the stalk of the plant at the base of each leaf.

**Cabbage:** Among the brassica crops, cabbage is the most widely grown. Small-headed varieties of cabbage (3 to 4 lbs.) are the most desired varieties for fresh market sales. Some varieties can be planted in spring for summer harvest, and in summer for fall harvest. Others require the entire season from spring to fall to mature.

**Cauliflower:** Cauliflower is relatively more difficult to grow. The most common problems associated with cauliflower production are failure to head properly and poor curd quality. Cauliflower buttoning is the premature formation of curd. When the curd is formed very early in the plant’s life, the leaves of the plant are not large enough to sustain its development to a marketable size. Cold temperatures during seedling production or at transplanting encourage buttoning. In order to produce a white curd, leaves are tied over the developing head when it is about the size of a baseball to block out sunlight and blanch it. Self-blanching varieties produce leaves that naturally shade the curd, but they need to be planted closer together to effectively self-blanch, resulting in smaller head sizes. Orange, green, and purple colored varieties, and greenish Romanesco-types do not require blanching. Some varieties can be planted in spring for summer harvest, and in summer for fall