

temps and 70° F air temps. Trench, hill, and irrigate like potatoes. Harvest and sell as “new” or “baby” ginger in mid-late fall. Our season is not long enough (5 to 7 months) to produce large mature and cured rhizomes, which require 8 to 10 months.

Sweet potato (*Ipomoea batatas*): Sweet potato varieties of Asian origin are starchier than more commonly grown varieties, and often are white or purple fleshed, instead of orange. Varieties include Murasaki, Okinawa Purple, Molokai Purple, Red Japanese, and Stokes Purple. Murasaki has been adopted in the Mid-Atlantic region of the United States and is easier to get than the others. However, most of these varieties take 120 to 140 days to mature, unlike orange-fleshed varieties which take 90 to 110 days; Red Japanese is an exception at 110 days. The longer-maturing varieties can be grown in a hoop house.

Marketing

Growers who want to diversify their farming operations by including Asian vegetables need to be very cautious before beginning production. Marketing information for Asian crops is not widely published. Since many Asian crops are niche items, only specialized produce companies deal in them. Most of these buyers deal with restaurants, some chain stores, and specialty food stores. Growers who market directly to consumers or restaurants often have more opportunity to educate customers about how to use the crops. It is more and more common to see Asian crops included in salad mixes at farmers markets.

Do your homework. Establish markets and buyers before buying any seed. Calculate budgets and collect economic data on any crop to determine its profit potential. And remember that all of these crops are very labor intensive, so you will need a strong and dependable labor force for timely harvest and proper cultural management.

Resources

“Ethnic Vegetables: Asian,” University of Kentucky Extension, <https://uky.edu/ccd/content/ethnic-vegetables-asian>

“Asian Vegetables: Selected Fruit and Leafy Types,” Purdue University Center for New Crops and Plants Products, <http://hort.purdue.edu/newcrop/proceedings1996/v3-488.html>

“Asian Vegetables,” Purdue University Center for New Crops and Plants Products, <http://hort.purdue.edu/newcrop/proceedings1990/V1-387.html>

Specialty and Minor Crops Handbook, second edition, University of California Agriculture and Natural Resources publication 3346, available from ANRCatalog, <https://anrcatalog.ucanr.edu/>

Manual of Minor Vegetables, University of Florida IFAS publication SP 40, available from IFAS Extension Bookstore, <http://ifasbooks.ifas.ufl.edu/>

Asparagus - Horticulture

Reviewed by Ben Phillips, Liz Maynard – Oct 2020

Crop Description

Hybrid varieties of asparagus (*Asparagus officinalis*) have improved vigor, disease tolerance, and higher yields, and are grown from seeds or crowns. All-male hybrids have higher yields and do not produce seed. Absence of seed production is desirable because seeds develop into volunteer asparagus seedlings that are a weed problem. Order hybrids well in advance.

All-male hybrids (listed in order of performance): Jersey General, Jersey Giant (56X22-8),

Asparagus - Diseases

Millennium, Jersey Knight, Jersey King, Jersey Supreme.

Other hybrids: Atlas, Purple Passion (specialty markets only).

Non-hybrids: Viking KB3, Mary Washington.

Planting and Spacing

Crowns: Use only 1-year old crowns. Transplant April 15 to May 15. Use 4- to 5-foot rows with crowns 12 to 16 inches apart. Set the crowns in 8-inch furrows in light soils and 5- to 6-inch furrows in heavy soils. Cover with 2 to 3 inches of soil. Select deep, well-drained sandy loam soils. Hybrids should be planted slightly deeper. Start cultivating when spears begin to emerge and continue periodically until furrows are level at end of first season.

Seedling transplant: 10- to 14-week old seedling transplants can be mechanically transplanted. Transplant in either the spring or fall.

Fertilizing

pH: Maintain a soil pH of 6.7 to 7.0. If possible, apply lime the year before planting.

New plantings: Before planting new crowns, apply 50 pounds N per acre, 0 to 160 pounds P₂O₅ per acre, and 0 to 150 pounds K₂O per acre based on soil test results and recommendations from your state. Broadcast the fertilizer and plow it under when preparing the land for the planting furrows. In addition, apply 30 pounds P₂O₅ per acre in the bottom of the trench and cover with 1 inch of soil before setting crowns. For transplanted seedlings, apply 4 ounces of transplant solution (e.g. 2-3 lbs. of 10-52-17 or 9-45-15 in 50 gallons of water) to each transplant.

Established plantings: Each year before emergence, apply 20 to 40 pounds N per acre by broadcasting and incorporate by lightly tilling. After

harvests conclude, apply 40 to 60 pounds N per acre. The total amount of N from fertilizer should be 80 pounds N per acre. No P₂O₅ is necessary if adequate fertilization was achieved prior to planting. Every second year apply up to 60 pounds K₂O per acre if a soil test recommends it.

Harvesting

Harvest only 2 or 3 times in spring 1 year after transplanting. Thereafter, harvest for about 2 months in the spring. Harvest asparagus early in the morning for best quality. Allow the ferns to grow vigorously after this period to accumulate food reserves for the next season. As much care should be put into maintaining a healthy fern as into harvest.

Asparagus - Diseases

Reviewed by Dan Egel, Mary Hausbeck – Nov 2020

Recommended Controls

Crown and Root Rot of Asparagus - Fusarium Fungus

The Fusarium pathogen can be seed borne. Try to source material for new plantings from fields fumigated with chloropicrin.

Non-Pesticide

The disease is promoted by acidic (low pH) and poorly drained soil. Establish production fields with blemish-free crowns produced in virgin soil. Avoid fields with a history of crown and root rot. Use tolerant, vigorous varieties if available, and avoid long harvest periods to maintain vigor in the plant over years.

Pesticide

Cannonball (50WP) (fludioxonil) | 0.5 oz. per 100 gals. of water. *Michigan only (MI 24c exp. 12/31/22)*. Submerge and soak crowns for 10 minutes and allow to drain before planting. REI: 12-hour. PHI: 365-day. FRAC 12.

Crown and Spear Rot of Asparagus - Phytophthora Oomycete

Non-Pesticide

Avoid excessive irrigation. Choose well-drained planting sites. Establish production fields from blemish-free crowns obtained from virgin soil. Avoid long harvest periods to maintain vigor in the plant over years.

Pesticide

Ridomil Gold SL (4SC) (mefenoxam) | 1 pt. per acre. REI: 48-hour. PHI: 1-day. FRAC 4.

Purple Spot of Asparagus - Stemphylium Fungus

Weather forecasting tools, such as TOM-CAST, can help asparagus farmers schedule their fungicide applications for control of purple spot. NOTE: Products labeled for rust may be helpful for purple spot control.

Non-Pesticide

Reduce crop residues by removing or mowing senescent and dried fern in the fall/winter.

Pesticide

azoxystrobin products (azoxystrobin) | Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-9.7 fl. oz. per acre. REI: 4-hour. PHI: 100-day. FRAC 11.

chlorothalonil products (chlorothalonil) | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 190-day. FRAC M5.

Dexter Max (DG) (mancozeb, azoxystrobin) | 2-2.2 lbs. per acre. REI: 24-hour. PHI: 180-day. FRAC M3, FRAC 11.

Flint Extra (4.05) (trifloxystrobin) | 3-3.8 fl. oz. per acre. Apply on a 14-day interval as needed. Make applications to the fern stage only. Mow down the asparagus ferns (or allow the ferns to senesce) between the last fungicide application and harvest. REI: 12-hour. PHI: 180-day. FRAC 11.

Rust of Multiple Crops - Puccinia Fungus

Non-Pesticide

Reduce crop residues that may harbor the pathogen by removing or mowing senescent and dried ferns in the fall/winter. Scout for the early appearing bright orange aecial pustules in the spring, especially on new or young plantings that are not harvested the full season. Remove volunteer plants on field edges and ditchbanks. Plant crop rows with ample spacing and in the direction of the prevailing winds to increase air movement and minimize periods of prolonged leaf wetness. Reduce crop residues by removing or mowing senescent and dried fern in the fall/winter.

Pesticide

chlorothalonil products (chlorothalonil) | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 190-day. FRAC M5.

Dexter Max (DG) (mancozeb, azoxystrobin) | 2-2.2 lbs. per acre. REI: 24-hour. PHI: 180-day. FRAC M3, FRAC 11.

mancozeb products (mancozeb) | Several formulations of mancozeb products (Dithane,

Asparagus - Insects

Manzate, Penncozeb) are labeled at various rates. See label for directions. REI: 24-hour. PHI: 180-day. FRAC M3.

Rally 40WSP (myclobutanil) | 5 oz. per acre. REI: 24-hour. PHI: 180-day. FRAC 3.

Sonoma 40WSP (myclobutanil) | 5 oz. per acre. REI: 24-hour. PHI: 180-day. FRAC 3.

tebuconazole products (tebuconazole) | 4-6 fl. oz. per acre. There are many brand names (Monsoon, Onset, Vibe) with 3.6 lbs. a.i. per gallon that use the same rate. REI: 12-hour to 18-day. PHI: 180-day. FRAC 3.

Unicorn DF (WDG) (tebuconazole, sulfur) | 2-3.75 lbs. per acre. REI: 12 to 24-hour. PHI: 180-day. FRAC 3, FRAC M2, IRAC UN.

Asparagus - Insects

Reviewed by Laura Ingwell, Zsofia Szendrei – Nov 2020

Recommended Controls

Aphids

Treat when less than 5% of ferns have aphids present.

Pesticide

Assail 30SG (acetamiprid) | Use 30SG formulations at 2.5-5.3 oz. per acre and do not exceed 10.7 oz. per acre per season. Use 70WP formulations at 1.1-2.3 oz. per acre and do not exceed 4.6 oz. per acre per season. For control on spears during harvest, to prevent egg laying and feeding injury. Allow 10 days between applications. REI: 12-hour. PHI: 1-day. IRAC 4A.

Fulfill (50WDG) (pymetrozine) | 2.75 oz. per acre. Apply to fern only after harvest has been

completed. Allow a minimum of 30 days between applications. Do not exceed 16.5 oz. per acre per season. REI: 12-hour. PHI: 170-day. IRAC 9B.

Lorsban 4E (chlorpyrifos) | Use 4E formulations at 2 pts. per acre. Use 75WG formulations at 1.33 lbs. per acre. Do not make more than one preharvest application. Do not make more than 2 postharvest applications during the fern stage. Broadcast with ground equipment. REI: 24-hour to 3-day. PHI: 1-day. IRAC 1B. *RUP*.

Asparagus Beetles

At Harvest: Treat when 5-10% of plants are infested, or 2% of spears have eggs.

At Fern: Treat when 10% of plants are defoliated, or 50% of plants have larvae.

Pesticide

Assail 30SG (acetamiprid) | Use 30SG formulations at 2.5-5.3 oz. per acre and do not exceed 10.7 oz. per acre per season. Use 70WP formulations at 1.1-2.3 oz. per acre and do not exceed 4.6 oz. per acre per season. For control on spears during harvest, to prevent egg laying and feeding injury. Allow 10 days between applications. REI: 12-hour. PHI: 1-day. IRAC 4A.

Dimethoate 4EC (dimethoate) | 1 pt. per acre. Use 4EC, LV-4 and 400 EC formulations at 1 pt. per acre and do not exceed 2 pts. per acre per season. REI: 48-hour. PHI: 180-day. IRAC 1B.

Entrust SC (2) (spinosad) | Use 2SC formulations at 4-6 fl. oz. per acre and do not exceed 18 fl. oz. per acre per season. Use 80WP formulations at 1.25-2.0 oz. per acre and do not exceed 5.6 oz. per acre per season. REI: 4-hour. PHI: 60-day. IRAC 5. *OMRI-listed*.

Lannate LV (2.4L) (methomyl) | 1.5 - 3.0 pts. per acre. Do not exceed 15 pts. per acre per season. REI: 48-hour. PHI: 1-day. IRAC 1A. *RUP*.

Lorsban 4E (chlorpyrifos) | Use 4E formulations at 2 pts. per acre. Use 75WG formulations at 1.33 lbs. per acre. Do not make more than one preharvest application. Do not make more than 2 postharvest applications during the fern stage. Broadcast with ground equipment. REI: 24-hour to 3-day. PHI: 1-day. IRAC 1B. *RUP*.

Perm-Up 25DF (permethrin) | Use 25W, 25WP or 25DF formulations at 3.2-6.4 oz. per acre and do not exceed 25.6 oz. per acre per season. Use 3.2EC formulations at 2-4 fl. oz. per acre and do not exceed 16 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Radiant 1SC (spinetoram) | 4-8 fl. oz. per acre. Postharvest protection of ferns only. Do not exceed 24 fl. oz. per acre per season. REI: 4-hour. PHI: 60-day. IRAC 5.

Sevin XLR Plus (4SC) (carbaryl) | 1-2 qts. per acre. Use low rate for control on seedlings and or spears during harvest, to prevent egg laying and feeding injury. Use high rate for control on fern growth after harvest is over. Do not exceed more than 5 applications to spears and ferns combined. Do not exceed 5 qts. per acre per year. Do not treat more than once every 3 days. REI: 12-hour. PHI: 1-day. IRAC 1A.

Caterpillars

For cutworm caterpillars: Treat when 5% of crowns are infested at harvest. Treat in the fall when there is 1 larvae per 20 plants.

Pesticide

Coragen (1.67SC) (chlorantraniliprole) | 3.5-5.5 fl. oz. per acre. For armyworms. Do not exceed 4 applications per season. Do not exceed 15.4 fl. oz. per season. Minimum interval between treatments is 3 days. REI: 4-hour. PHI: 1-day. IRAC 28.

Lannate LV (2.4L) (methomyl) | 1.5 - 3.0 pts. per acre. For armyworms, and cutworms. Do not exceed 15 pts. per acre per season. REI: 48-hour. PHI: 1-day. IRAC 1A. *RUP*.

Lorsban 4E (chlorpyrifos) | For armyworms and cutworms to prevent egg laying and feeding injury during. Use 4E formulations at 2 pts. per acre. Use 75WG formulations at 1.33 lbs. per acre. Do not make more than one preharvest application. Do not make more than 2 postharvest applications during the fern stage. Broadcast with ground equipment. REI: 24-hour to 3-day. PHI: 1-day. IRAC 1B. *RUP*.

Perm-Up 25DF (permethrin) | For cutworms. Use 25W, 25WP or 25DF formulations at 3.2-6.4 oz. per acre and do not exceed 25.6 oz. per acre per season. Use 3.2EC formulations at 2-4 fl. oz. per acre and do not exceed 16 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Sevin 5B (carbaryl) | 20 lbs. per acre. For cutworm control on spears during harvest, to prevent egg laying and feeding injury. Do not exceed more than 3 applications to spears. Do not exceed 2 applications to ferns. Do not exceed 60 lbs. per acre per season on spears, and 80 lbs. per acre per season on ferns (100 lbs per acre per season total). Minimum days between treatment is 3 days. REI: 12-hour. PHI: 1-day. IRAC 1A.

Sevin XLR Plus (4SC) (carbaryl) | For cutworms. Use low rate for control on seedlings and or spears during harvest, to prevent egg laying and feeding injury. Use high rate for control on fern growth after harvest is over. Do not exceed more than 5 applications to spears and ferns combined. Do not exceed 5 qts. per acre per year. Do not treat more than once every 3 days. REI: 12-hour. PHI: 1-day. IRAC 1A.

Japanese Beetle

Pesticide

Assail 30SG (acetamiprid) | Use 30SG formulations at 5.3 oz. per acre and do not exceed 10.7 oz. per acre per season. Use 70WP formulations at 2.3 oz. per acre and do not exceed 4.6 oz. per acre per season. Apply to fern only after harvest has been completed. Allow 10 days between applications REI: 12-hour. PHI: 1-day. IRAC 4A.

Perm-Up 25DF (permethrin) | Use 25W, 25WP or 25DF formulations at 3.2-6.4 oz. per acre and do not exceed 25.6 oz. per acre per season. Use 3.2EC formulations at 2-4 fl. oz. per acre and do not exceed 16 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Tarnished Plant Bug

Pesticide

Assail 30SG (acetamiprid) | Use 30SG formulations at 5.3 oz. per acre and do not exceed 10.7 oz. per acre per season. Use 70WP formulations at 2.3 oz. per acre and do not exceed 4.6 oz. per acre per season. Apply to fern only after harvest has been completed. Allow 10 days between applications REI: 12-hour. PHI: 1-day. IRAC 4A.

Perm-Up 25DF (permethrin) | Use 25W, 25WP or 25DF formulations at 3.2-6.4 oz. per acre and do not exceed 25.6 oz. per acre per season. Use 3.2EC formulations at 2-4 fl. oz. per acre and do not exceed 16 fl. oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 1-day. IRAC 3A. *RUP*.

Asparagus - Weeds

Reviewed by Stephen Meyers, Ben Phillips – Nov 2020

Recommended Controls

All Weeds

Before establishing an asparagus planting, reduce perennial weeds in the area to be planted with systemic broad-spectrum herbicides. Herbicide options are limited in the planting year.

After the first year of establishment, a typical weed control program in asparagus includes a preemergence herbicide with a long residual applied before asparagus emerges. If needed, a preemergence herbicide may be applied again after harvest is finished and a clean mowing. It is important to use herbicides with different modes of action from year to year with this perennial crop to avoid buildup of weed species not controlled by a particular mode of action.

Postemergence herbicides may be applied either before asparagus emerges, or during or after the harvest season. Some require directed or shielded spray applications to avoid spraying asparagus. It is important use herbicides with different modes of action from year to year with this perennial crop to avoid buildup of weed species not controlled by a particular mode of action.

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

Good weed control in the planting year is especially important. Multivators, tines, rolling cultivators, flame weeders work well before emergence of

asparagus, but it is important to avoid damaging crowns when cultivating. Row-middle cultivate and hand hoe after emergence. Flame weeders can also be used after clean harvest or mowing. After established, straw mulch can be applied any time, but is easier for picking when applied after final harvest.

Broadleaf and Grass Weeds - Postemergence

Pesticide

Aim EC (2) (carfentrazone) | 0.5-1.92 gals. per acre. Include 0.5 pt. NIS or 0.25-0.5 gals. COC per 25 gals. of spray solution. Broadcast after spear harvest. Emerged asparagus will be injured. Do not exceed 3.8 fl. oz. per acre per season. Wait at least 20 days between applications. REI: 12-hour. PHI: 5-day. WSSA 14.

glyphosate products (glyphosate) | 0.75-3.75 lbs. acid equivalent (ae) per acre. Use formulations containing 3 lbs. ae per gal. (4 lbs. isopropylamine salt per gal.) at 1-5 qts. per acre, or formulations containing 4.5 lbs. ae per gal. (5 lbs. potassium salt per gal) at 0.66-3.3 qts. per acre. Apply to emerged weeds at least 7 days before spears emerge or immediately after last harvest. Use low rate for annuals and higher rates for perennials. See label for suggested application volume and adjuvants. If spears are allowed to regrow, delay application until ferns have developed and apply as a directed or shielded spray. Contact of the spray with asparagus fern may result in crop injury. REI: 4 to 12-hour. PHI: 14-day. WSSA 9.

metribuzin products (metribuzin) | *Established plantings only. Do not apply to young plants during first year.* Use 75DF formulations at 0.6-2.6 lbs. per acre. Use 4F formulations at 2-4 pts. per acre. See product label for split application rates. Use low rate if combined with diuron. 6-8 weeks residual activity. Two sprays necessary for seasonlong sandbur control. Do not exceed 2.6 lbs. or 4 pts. per acre per year. REI: 12-hour. PHI: 14-day. WSSA 5.

paraquat products (paraquat) | 2.5-4 pts. per acre. Include 1 qt. of COC, or 4-8 fl. oz. of NIS per 25 gallons of spray solution. Apply before crop emergence or after last harvest before fern regrows. REI: 12 to 24-hour. PHI: 6-day. WSSA 22. *RUP.*

QuinStar 4L (3.8) (quinclorac) | 12.6 fl. oz. per acre. Include 1 qt. of COC per 25 gallons of spray solution. Apply after final harvest for the year. Controls bindweed, Canada thistle, barnyardgrass, large crabgrass. Do not exceed 1 application per year. REI: 12-hour. WSSA 4.

Sinbar WDG (80) (terbacil) | 0.62-1.5 lbs. per acre. Established crowns or direct-seeded crops only. Do not use on sandy soil or on soil with less than 1% organic matter. *Established crowns:* Apply in spring after cutting fern and prior to spear emergence. May also be applied after a clean cutting. *Seeded crops:* At planting spray activated charcoal at 300 lbs. per acre of actual area treated in a 1-inch band over the row (equivalent to 15 lbs. per acre of crop with 20-inch row spacing), then apply Sinbar. Do not plant other crops within 2 years of application. 8-12 weeks residual activity. REI: 12-hour. PHI: 5-day. WSSA 5.

Broadleaf and Grass Weeds - Preemergence

Pesticide

Chateau SW (51WDG) (flumioxazin) | 6 oz. per acre. *Established plantings only.* Apply to dormant asparagus at least 2 weeks before spears emerge. Crop injury may result if asparagus is not dormant. May be tank-mixed with paraquat to control emerged weeds. Or, apply after final harvest for the season before fern emerges. Do not exceed 6 oz. per acre per growing season. REI: 12-hour. WSSA 14.

Command 3ME (clomazone) | 2.6 pts. per acre. Apply prior to spear emergence or apply after a clean harvest. Cover exposed plants with soil before

Asparagus - Weeds

applying. Do not exceed 2.6 pts. per acre per year. REI: 12-hour. PHI: 14-day. WSSA 13.

diuron products (diuron) | *Established plantings only. Do not apply to young plants during the first year.* Use 80DF formulations at 1-4 lbs. per acre, and do not exceed 6 lbs. per acre per season. Use 4L formulations at 0.8-3.2 qts. per acre and do not exceed 4.8 qts. per acre per season. Use lower rates on light-colored soils with less than 2% organic matter. Apply after tillage or chopping fern in the spring and again after harvest, if necessary. See product label for split application rates. 6-8 weeks of residual activity. *RUP in Michigan only.* REI: 12-hour. WSSA 7. *RUP.*

Dual Magnum (7.62EC) (s-metolachlor) | 1.33-2.0 pts. per acre. *Illinois, Indiana, Michigan, and Minnesota only. IL 24c exp. 03/25/24. MI 24c exp. 12/31/21. MN 24c exp. 12/31/20.* Apply before asparagus and weeds emerge in spring or after the harvest season. Needs moisture for activation. Do not exceed 1 application per crop. REI: 24-hour. PHI: 16-day. WSSA 15.

metribuzin products (metribuzin) | *Established plantings only. Do not apply to young plants during first year.* Use 75DF formulations at 0.6-2.6 lbs. per acre. Use 4F formulations at 2-4 pts. per acre. See product label for split application rates. Use low rate if combined with diuron. 6-8 weeks residual activity. Two sprays necessary for seasonlong sandbur control. Do not exceed 2.6 lbs. or 4 pts. per acre per year. REI: 12-hour. PHI: 14-day. WSSA 5.

pendimethalin products (pendimethalin) | 2.4-8.2 pts. per acre. Use formulations with 3.8 lbs. active ingredient per gallon. Apply at least 14 days before first harvest and prior to spear emergence. If spears are present, remove before application. On sandy soil use no more than 2.4 pts. per acre. Do not apply to newly seeded asparagus during first year. REI: 24-hour. PHI: 14-day. WSSA 3.

Sinbar WDG (80) (terbacil) | 0.62-1.5 lbs. per acre. Established crowns or direct-seeded crops

only. Do not use on sandy soil or on soil with less than 1% organic matter. *Established crowns:* Apply in spring after cutting fern and prior to spear emergence. May also be applied after a clean cutting. *Seeded crops:* At planting spray activated charcoal at 300 lbs. per acre of actual area treated in a 1-inch band over the row (equivalent to 15 lbs. per acre of crop with 20-inch row spacing), then apply Sinbar. Do not plant other crops within 2 years of application. 8-12 weeks residual activity. REI: 12-hour. PHI: 5-day. WSSA 5.

Solicam DF (78.6) (norflurazon) | 2.5-5 lbs. per acre. *Established plantings only.* Do not apply within 12 months of planting. Apply preemergence to soil free of weeds and debris. REI: 12-hour. PHI: 14-day. WSSA 12.

Spartan 4F (sulfentrazone) | 4.5-12 fl. oz. per acre. *Michigan only - applicators must have a supplemental label.* Apply in spring before crop emerges. Use low rate on light soil. Do not use on soils with less than 1% organic matter. Do not exceed 1 application and 12 fl. oz. per acre per season. REI: 12-hour. PHI: 14-day. WSSA 14.

trifluralin products (trifluralin) | *Established plantings only.* Use 4EC formulations at 2-4 pts. per acre. Use 10G formulations at 10-20 lbs. per acre. Use lower rates on coarse soils. Apply and incorporate 1-2 inches early in the spring when spears are at least 4 inches below soil surface. See product label for split application instructions. 4-6 weeks of residual activity. REI: 12-hour. WSSA 3.

Broadleaf Weeds Only - Postemergence

Pesticide

2,4-D amine products (2,4-D) | Use 3-4 pts. per acre of liquid formulations with 3.8 lbs. per gal. acid equivalent, or 1.5-2.5 lbs. per acre of dry formulations with 78.9% acid equivalent. Apply before, during, or after the harvest season. During harvest season apply immediately after cutting. Discard deformed spears. Use drop nozzles for

treatments after harvest to avoid spraying fern. Wait at least 30 days between applications. REI: 48-hour. PHI: 3-day. WSSA 4.

Callisto (40SC) (mesotrione) | 3-7.7 fl. oz. per acre. Apply in spring before spears emerge after mowing, disking, or tilling; after final harvest; or both. For postharvest applications use drop nozzles or other equipment that will minimize contact with crop. Adding COC or NIS (alone or with UAN or AMS) will improve emerged weed control and increase crop injury risk in postharvest applications. Do not exceed 2 applications per year, or 7.7 fl. oz. per acre per year. REI: 12-hour. WSSA 27.

Clarity (4WS) (dicamba) | 0.5-1.0 pt. per acre. Apply in 40-60 gals. of water per acre immediately after cutting. Discard crooked spears at harvest. Clarity can injure nearby broadleaf crops and garden plants. Maximum 1 pt. per acre per year. REI: 24-hour. PHI: 1-day. WSSA 4.

Lorox DF (50) (linuron) | 2-4 lbs. per acre.
Established crowns: Apply before spears emerge, before cutting season or immediately after cutting, or as directed spray in ferns. *New planted crowns:* To control small emerged weeds apply 1-2 lbs. per acre, up to 2 applications when ferns are 6-18 inches tall. *Newly seeded crops:* Apply a 1-inch band of activated charcoal over the row at planting, then apply Lorox. Use charcoal at 300 lbs. per acre of actual area sprayed, which is equivalent to 15 lbs. per acre of crop with a 20-inch row-spacing. Or, use the low rate of Lorox when ferns are 6-18 inches tall and weeds are less than 4 inches tall. Do not use on sand, loamy sand, or soils with less than 1% organic matter. Maximum 4 lbs. or 3 applications per acre per year. REI: 24-hour to 8-day. PHI: 1-day. WSSA 7.

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.

Stinger (3) (clopyralid) | 8-10.7 fl. oz. per acre. Apply before or during harvest. May cause some crooking of spears. Controls Canada thistle, marehail, mayweed, nightshade, plantain, smartweeds. Do not exceed 10.7 fl. oz. per acre per year. Avoid application 2 years in succession. REI: 12-hour. PHI: 2-day. WSSA 4.

Broadleaf Weeds Only - Preemergence

Pesticide

Callisto (40SC) (mesotrione) | 3-7.7 fl. oz. per acre. Apply in spring before spears emerge after mowing, disking, or tilling; after final harvest; or both. For postharvest applications use drop nozzles or other equipment that will minimize contact with crop. Adding COC or NIS (alone or with UAN or AMS) will improve emerged weed control and increase crop injury risk in postharvest applications. Do not exceed 2 applications per year, or 7.7 fl. oz. per acre per year. REI: 12-hour. WSSA 27.

Lorox DF (50) (linuron) | 2-4 lbs. per acre.
Established crowns: Apply before spears emerge, before cutting season or immediately after cutting, or as directed spray in ferns. *New planted crowns:* To control small emerged weeds apply 1-2 lbs. per acre, up to 2 applications when ferns are 6-18 inches tall. *Newly seeded crops:* Apply a 1-inch band of activated charcoal over the row at planting, then apply Lorox. Use charcoal at 300 lbs. per acre of actual area sprayed, which is equivalent to 15 lbs. per acre of crop with a 20-inch row-spacing. Or, use the low rate of Lorox when ferns are 6-18 inches tall and weeds are less than 4 inches tall. Do not use on sand, loamy sand, or soils with less than 1% organic matter. Maximum 4 lbs. or 3 applications per acre per year. REI: 24-hour to 8-day. PHI: 1-day. WSSA 7.

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