

Cole Crops and Brassica Leafy Greens

Spacing

Broccoli: Rows 3 feet apart. Plants 12 to 18 inches apart in row.

Brussels sprouts: Rows 3 feet apart. Plants 18 to 24 inches apart in row.

Cabbage for Market: Rows 2 to 3 feet apart. Plants 12 to 15 inches apart in row.

Cabbage for Kraut: Rows 3 feet apart. Plants 18 inches apart in row.

Cauliflower: Rows 3 feet apart. Plants 15 to 18 inches apart in row.

Collards: Rows 3 to 3.5 feet apart. Plants 18 to 24 inches apart in row. Seed 1 to 2 pounds per acre.

Kale: Rows 2 to 3 feet apart. Plants 8 to 16 inches apart in row. Seed 2 to 4 pounds per acre. Use denser plantings if harvesting small leaves for salad or braising mixes.

Mustard: Rows 1 to 1.5 feet apart. Plants 10 to 12 inches apart in row. Seed 3 to 5 pounds per acre. Use denser plantings if harvesting small leaves for salad or braising mixes.

Turnip greens: Rows 6 to 12 inches apart. Plants 1 to 4 inches apart in row.

Raised beds (6 inches high, 40 inches wide, with 2 rows 11 inches apart on beds) may be desirable under certain conditions.

Fertilizing

Lime: To maintain a soil pH of 6.0 to 6.5.

Preplant

Cole crops (broccoli, cabbage, cauliflower, and Brussels sprouts)

N: 120 pounds per acre if soil organic matter less than 3 percent, and 80 pounds per acre if soil organic matter greater than 3 percent. **P₂O₅:** 25 to 200 pounds per acre. **K₂O:** 0 to 250 pounds per acre. Cole crops, particularly cauliflower, are responsive to B on low organic matter soils, sandy soils, or where the pH is greater than 7.0. If B is needed, apply 1 to 2 pounds B per acre broadcast. Soil test and/or perform plant analysis on the previous crop to be sure B is needed. High soil B can be detrimental to rotational crops such as sweet corn, peas, or beans.

Greens (collards, kale, and mustard)

N: 60 pounds per acre. **P₂O₅:** 0 to 150 pounds per acre. **K₂O:** 0 to 200 pounds per acre.

All crops

Adjust recommendations according to soil type, previous management, and soil test results for your state. For transplants, set each plant with 1 cup (8 ounces) of starter solution. If the transplant flat receives a heavy fertilizer feeding just prior to setting, the starter solution can be eliminated.

Sidedress N

Cole Crops

60 pounds N per acre, two to three weeks after setting the transplants and when rapid growth has begun. Eliminate sidedressing if following soybeans. If leaching is likely on sandy soils, apply an additional 30 pounds N as a sidedress. Avoid excessive N fertilization with broccoli as it can cause too rapid growth and a hollow flower stalk.

Greens

30 pounds N per acre on soils with more than 3 percent organic matter and following soybeans, alfalfa, or a grass-legume hay crop. For greens on soils with less than 3 percent organic matter and following those crops, apply 45 pounds N per acre. For greens following corn, small grains, or a vegetable crop, apply 60 pounds N per acre.

Harvesting

Broccoli: Harvesting is done by hand while the head is still compact and before the flowers open. The central heads should be dark blue or green and 4 to 6 inches across when mature. If harvesting too late or when the heads are over mature, woodiness in the stems will develop. Depending on your marketing requirements, the main head is cut with 8 to 10 inches of stem. Sometimes a second harvest of side shoots can be obtained. Broccoli for processing should be cut with less attached stem (6 to 7 inches) and with few or no leaves. Fresh market broccoli should be cut longer, with little trimming. Broccoli quality is based on the degree of compactness, leafiness, head trimness, damage, and freedom from insects and extraneous debris.

Cauliflower: When ready to harvest, the heads should be compact and clear white. The heads become discolored and develop an undesirable flavor when exposed to sunlight. The longest leaves are normally tied loosely

together over the head to “blanch” and prevent the head from being exposed to the sun. The desirable harvest size is a diameter of approximately 6 inches. Delaying harvest usually will not result in obtaining larger heads. Instead, consider proper cultivar selection and plant spacing. Cauliflower should be hand-harvested and cut with 1 to 2 whorls of leaves to protect the head.

Pesticide Use in Greenhouses

Before using any pesticide, always read the product label for mention of greenhouse restrictions. See Selected Information About Recommended Fungicides (page 79), Selected Information About Recommended Herbicides (page 69), and Selected Information About Recommended Insecticides (page 54).

Disease Control

Recommended Controls

Black Leg of Brassicas - *Phoma Fungus*

Black leg is an important disease of broccoli, Brussels sprouts, cauliflower and turnip. Since oilseed rape is particularly susceptible to black leg, avoid planting crucifer crops close to oilseed rape. Hot water treatment may help to reduce seedborne pathogens.

Crop rotation *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Use a 3-4 year crop rotation to non-cruciferous crops.

Tillage *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Till in early spring or fall to destroy crop residue.

Rovral 4F® (iprodione) *Broccoli* Flowable formulations at 2 pts. per acre; dry formulations at 1.3 lbs. per acre. REI: 24-hour. PHI: 0-day.

Black Rot of Brassicas - *Xanthomonas Bacteria*

Hot water seed treatments help to eliminate the seedborne pathogen.

Crop rotation *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Use a 3-4 year crop rotation to non-cruciferous crops.

Use healthy, disease-free seed *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens*

Variety selection *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Use varieties with partial resistance.

Tillage *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Till in early spring or fall to destroy crop residue.

Actigard® (acibenzolar-s-methyl) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 0.5-1.0 oz. per acre. Suppression only. Do not apply to stressed plants. REI: 12-hour. PHI: 7-day.

copper formulations (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Various fixed copper products may slow the spread of black rot. REI: see label. PHI: see labels.

Blight of Brassicas - *Rhizoctonia Fungus*

Blocker 10G® (pentachloronitrobenzene (PCNB)) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* 5.15 lbs. per 1,000 feet of linear row. See label for other application methods and rates.

Cabrio EG® (pyraclostrobin) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* 12-16 oz. per acre. REI: 12-hour. PHI: 3-day for collard, kale and mustard; 0-day for all other brassicas.

Cabrio EG® (pyraclostrobin) *Turnip greens* 8-12 oz. per acre. REI: 12-hour. PHI: 0-day.

Bottom Rot of Cabbage - *Rhizoctonia Fungus*

Bottom rot of cabbage is caused by *Rhizoctonia* species.

Sanitation *Cabbage* Clean and sanitize transplant trays, benches. Remove infected plants, leaves, and supports. Remove trash frequently. Disinfect tools frequently. Avoid working field under wet conditions.

Endura® (boscalid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* 6-9 oz. per acre. Suppression only for bottom rot and powdery mildew. REI: 12-hour. PHI: 14-day for collard, kale and mustard; 0-day for broccoli, Brussels sprouts, cabbage and cauliflower.

Club Root of Brassicas - *Plasmodiophora Fungus*

Avoid poorly drained soils with a history of club root. Serious losses can be avoided by raising the pH to 7.2-7.3.

Crop rotation *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Use crop rotations of 5 years or more with a non-cruciferous crops.

Use healthy, disease-free seed *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Use disease-free seed and transplants.

Blocker 4F® (pentachloronitrobenzene (PCNB))
Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 3 pts. per acre. Use in transplant solution or banded application. REI: 12-hour.

Blocker 10G® (pentachloronitrobenzene (PCNB))
Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 5.15 lbs. per 1,000 feet of linear row. See label for other application methods and rates.

Omega 500F® (fluazinam) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* 6.45 fl. oz. per 100 gals. of water. Apply 3.4 fl. oz. of solution to each plant applied as a transplant soil drench. REI: see label. PHI: 50-day for heading vegetables.

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

Sanitation *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Clean and sanitize equipment, propagation trays/pots and greenhouse surfaces.

phosphite and phosphorous acid formulations (phosphorous acid, potassium phosphite, mono-dipotassium salts of phosphorous acid, mono- and dibasic sodium, potassium, and ammonium phosphites, fosetyl-aluminum) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* REI: see label. PHI: 0-day.

Downy Mildew of Brassicas - *Hyaloperonospora Oomycete*

Variety selection *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Select crop varieties for competitiveness, disease resistance, and regional adaptability.

Actigard® (acibenzolar-s-methyl) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 0.5-1.0 oz. per acre. Suppression only. Do not apply to stressed plants. REI: 12-hour. PHI: 7-day.

azoxystrobin formulations (azoxystrobin) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 6.2-15.4 fl. oz. per acre. Trade names include Quadris® and Satori®. REI: 4-hour. PHI: 0-day.

chlorothalonil formulations (chlorothalonil) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi* REI: 12-hour. PHI: 7-day.

Forum 4.18SC® (dimethomorph) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 6 fl. oz. per acre. REI: 12-hour. PHI: 0-day.

Orondis Opti Premix® (oxathiapiprolin, chlorothalonil) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi* 1.75-2.5 pts. per acre. REI: 12-hour. PHI: 7-day.

Orondis Ultra Premix® (oxathiapiprolin, mandipropamid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi* 5.5-8.0 fl. oz. per acre. REI: 4-hour. PHI: 1-day.

phosphite and phosphorous acid formulations (phosphorous acid, potassium phosphite, mono-dipotassium salts of phosphorous acid, mono- and dibasic sodium, potassium, and ammonium phosphites, fosetyl-aluminum) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* REI: see label. PHI: 0-day.

Presidio® (fluopicolide) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* 3-4 oz. per acre. REI: 12-hour. PHI: 2-day.

Ranman 400SC® (cyazofamid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 2.75 fl. oz. per acre. REI: 12-hour. PHI: 0-day.

Reason 500SC® (fenamidone) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 5.5-8.2 fl. oz. per acre. REI: 12-hour. PHI: 2-day.

Revus® (mandipropamid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* 8 fl. oz. per acre. REI: 4-hour. PHI: 1-day.

Ridomil Gold Bravo SC® (mefenoxam, chlorothalonil) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 1.5 lbs. per acre. REI: 48-hour. PHI: 7-day.

Zapro® (ametoctradin, dimethomorph) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 14 fl. oz. per acre. REI: 12-hour. PHI: 0-day.

Leaf Spot of Brassicas - *Alternaria Fungus*

Crop rotation Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Use a 3-4 year crop rotation to non-cruciferous crops.

Use healthy, disease-free seed Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens

Tillage Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Till in early spring or fall to destroy crop residue.

azoxystrobin formulations (azoxystrobin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 6.2-15.4 fl. oz. per acre. Trade names include Quadris® and Satori®. REI: 4-hour. PHI: 0-day.

Cabrio EG® (pyraclostrobin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 12-16 oz. per acre. REI: 12-hour. PHI: 3-day for collard, kale, and mustard; 0-day for all other cole crops.

Cabrio EG® (pyraclostrobin) Turnip greens 8-12 oz. per acre. REI: 12-hour. PHI: 0-day.

chlorothalonil formulations (chlorothalonil) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi REI: 12-hour. PHI: 7-day.

Endura® (boscalid) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 6-9 oz. per acre. Suppression only for bottom rot and powdery mildew. REI: 12-hour. PHI: 14-day for collard, kale and mustard; 0-day for broccoli, Brussels sprouts, cabbage and cauliflower.

Fontelis® (penthiopyrad) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 14-30 fl. oz. per acre. REI: 12-hour. PHI: 0-day.

Inspire Super® (difenoconazole, cyprodinil) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 16-20 fl. oz. per acre. REI: 12-hour. PHI: 7-day.

Orondis Opti Premix® (oxathiapiprolin, chlorothalonil) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 1.75-2.5 pts. per acre. REI: 12-hour. PHI: 7-day.

Quadris Top® (azoxystrobin, difenoconazole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 12-14 fl. oz. per acre. REI: 12-hour. PHI: 1-day.

Reason 500SC® (fenamidone) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 8.2 fl. oz. per acre. REI: 12-hour. PHI: 2-day.

Ridomil Gold Bravo SC® (mefenoxam, chlorothalonil) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 1.5 lbs. per acre. REI: 48-hour. PHI: 7-day.

Switch 62.5WG® (cyprodinil, fludioxonil) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 11-14 oz. per acre. REI: 12-hour. PHI: 7-day.

Powdery Mildew of Brassicas - *Erysiphe Fungus*

Variety selection Brussels sprouts, Cabbage Select crop varieties for competitiveness, disease resistance, and regional adaptability.

azoxystrobin formulations (azoxystrobin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 6.2-15.4 fl. oz. per acre. Trade names include Quadris® and Satori®. REI: 4-hour. PHI: 0-day.

Endura® (boscalid) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 6-9 oz. per acre. Suppression only for bottom rot and powdery mildew. REI: 12-hour. PHI: 14-day for collard, kale and mustard; 0-day for broccoli, Brussels sprouts, cabbage and cauliflower.

Fontelis® (penthiopyrad) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 14-30 fl. oz. per acre. REI: 12-hour. PHI: 0-day.

Inspire Super® (difenoconazole, cyprodinil) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 16-20 fl. oz. per acre. REI: 12-hour. PHI: 7-day.

Microthiol Disperss® (sulfur) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 3-10 lbs. per acre. REI: 24-hour. PHI: 0-day. OMRI-listed.

Procure 480SC® (triflumizole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 6-8 fl. oz. per acre. REI: 12-hour. PHI: 1-day.

Quadris Top® (azoxystrobin, difenoconazole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 12-14 fl. oz. per acre. REI: 12-hour. PHI: 1-day.

Stem Rot of Cole Crops - Sclerotinia Fungus

Cabrio EG® (pyraclostrobin) Collards, Kale, Mustard greens 12-16 oz. per acre. Suppression only. REI: 12-hour. PHI: 3-day.

Endura® (boscalid) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 6-9 oz. per acre. Suppression only for bottom rot and powdery mildew. REI: 12-hour. PHI: 14-day for collard, kale and mustard; 0-day for broccoli, Brussels sprouts, cabbage and cauliflower.

Fontelis® (penthiopyrad) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards 16 to 30 fl. oz. REI: 12-hour. PHI: 0-day.

White Rust of Brassicas - Albugo Fungus

azoxystrobin formulations (azoxystrobin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 6.2-15.4 fl. oz. per acre. Trade names include Quadris® and Satori®. REI: 4-hour. PHI: 0-day.

Cabrio EG® (pyraclostrobin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Mustard greens 12-16 oz. per acre. REI: 12-hour. PHI: 3-day for collard, kale, and mustard; 0-day for all other brassicas.

Cabrio EG® (pyraclostrobin) Turnip greens 8-16 oz. per acre. REI: 12-hour. PHI: 0-day.

Reason 500SC® (fenamidone) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 8.2 fl. oz. per acre. REI: 12-hour. PHI: 2-day.

Yellows of Multiple Crops - Fusarium Fungus

Use healthy, disease-free seed Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens

Variety selection Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Use varieties with partial resistance.

Weed Control

Recommended Controls

Burndown or Directed/Shielded Application

Broadleaves and Grasses

Gramoxone SL 2.0® (paraquat) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard 2-4 pts. per acre. Not for Turnip greens. Include 1 qt. of COC or 4-8 fl. oz. of NIS per 25 gallons of spray solution. Apply before seeding or transplanting, or after seeding but before crop emergence. REI: see label. RUP.

glyphosate formulations (glyphosate) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens. Not for Turnip greens. See product labels for rates, application volume, and adjuvants. Broadcast before seeding or transplanting, after seeding but before crop emergence, or apply between crop rows with hooded or shielded sprayers. Use low rate for annuals and higher rates for perennials. REI: 4-hour. PHI: 14-day.

Preemergence Broadleaf and Grass Weeds

Command 3ME® (clomazone) 0.67-1.3 pts. per acre. Cabbage only. Apply before seeding or transplanting or after seeding before crop emerges. Use low rate for seeded cabbage. May cause early stunting or discoloration of cabbage. REI: 12-hour. PHI: 45-day.

Devrinol DF-XT® (napropamide) 2 lbs. per acre. Broccoli, Brussels sprouts, Cabbage, Cauliflower. Not for collards, kale, kohlrabi, Mustard greens, or Turnip greens. Apply and incorporate 1-2 inches before seeding or transplanting or apply after seeding and irrigate to wet soil 2-4 inches deep. After harvest or prior to planting succeeding crops, deep moldboard or disk plow. Do not seed alfalfa, small grains, sorghum, corn, or lettuce for 12 months after application. Most effective when combined with Goal®. REI: 24-hour.

Dual Magnum® (s-metolachlor) *Indiana, Michigan and Ohio only.* Uses vary by state. Applicator must have 24c label.

Cabbage transplants in Indiana, Michigan, and Ohio only: 0.5-1.3 pts. per acre. Apply before transplanting and do not incorporate, or apply within 48 hours after transplanting. Reduce risk of crop injury by applying after transplanting and by using a directed spray rather than spraying over the top of transplants. Do not exceed 1.3 pts. per acre or 1 application per crop per season. 60-day PHI.

Broccoli, Brussels sprouts, and Cauliflower transplants in Indiana and Michigan only: 0.5-1.3 pts. per acre. Apply to soil surface before transplanting or within 48 hours of transplanting. Do not tank-mix with Goal® for post-transplant application. 60-day PHI.

Broccoli raab, Chinese cabbage (bok choy), Collards, Kale, Mizuna, Mustard greens, Mustard spinach, Rape greens, and Turnip greens in Indiana, Michigan, and Ohio only: 0.67-1.3 pts. per acre. Apply after seeding before weeds or crop emerge, or apply broadcast after crops have 1-2 true leaves. Do not exceed 1.3 pts. per acre or 1 application per crop per season. 30-day PHI

REI: 24-hour.

Prowl H2O® (pendimethalin) 1-2.1 pts. per acre.

Broccoli, Brussels sprouts, Cabbage, and Cauliflower only. Apply to soil between rows 1-3 days after transplanting, or at 2-4 leaf stage after direct seeding. Spray contact with plants may cause crop stunting. REI: 24-hour. PHI: 60-day for broccoli; 70-day for Brussels sprouts, cabbage, and cauliflower.

Satellite Hydrocap® (pendimethalin) 1-2.1 pts. per acre.

Broccoli, Brussels sprouts, Cabbage, and Cauliflower. Apply pre- or posttransplanting broadcast, or directed between rows at the 2-4 leaf stage. Apply at 2-4 leaf stage of direct seeded plants. REI: 24-hour. PHI: 60-day for broccoli; 70-day for Brussels sprouts, cabbage, and cauliflower.

Broccoli raab, Bok choy, Collards, Kale, Mizuna, Mustard greens, Mustard spinach, Rape greens, Turnip greens. Apply as a broadcast spray at the 4-5 leaf stage of direct seeded or transplanted plants. Do not use roots from treated turnips for feed or food. REI: 24-hour. PHI: 21-day.

trifluralin formulations (trifluralin) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard, Turnip greens* 0.5-0.75 lb. a.i. per acre. Use 4EC formulations at 1-1.5 pts. per acre for seeded crops, up to 2 pts. per acre for transplanted crops. Use 10G formulations at 5-7.5 lbs. per acre for seeded crops, up to 10 lbs. per acre for transplanted crops. Apply before planting and incorporate 2-3 inches immediately. Use low rate on coarse soils with less than 2% organic matter. Not effective on muck or high organic matter soils. REI: 12-hour.

Preemergence Broadleaf Weeds

Goal 2XL® or GoalTender® (oxyfluorfen) *Broccoli, Cabbage, Cauliflower. Transplants only,* not for direct-seeded crops. Use 1-2 pts. per acre of Goal 2XL® or 0.5-1 pt. per acre of GoalTender®. Use lower rate on coarse-textured soils. Apply after preparing soil but before transplanting. Transplant within 7 days of application. REI: see label.

Spartan 4F® (sulfentrazone) 2.25-12 fl. oz. per acre. Transplanted cabbage for processing only. Do not use on cabbage for fresh market or on direct seeded cabbage. Apply preemergence before transplanting as a broadcast or banded spray or band to row middles within 72 hours after transplanting. May be incorporated no deeper than 2 inches before transplanting. Do not use on soils classified as sand, with less than 1% organic matter. Controls pigweeds. REI: 12-hour.

Spartan Charge® (carfentrazone, sulfentrazone) 2.9-15.2 fl. oz. per acre. Transplanted cabbage only. Apply before transplanting, or band between rows within 72 hours after transplanting. May be incorporated no deeper than 2 inches before transplanting. Do not use on sandy soils with less than 1% organic matter. Has not been tested on all varieties. Refer to label for additional precautions. Maximum 15.2 fl. oz. per acre. REI: 12-hour.

Preemergence Grass Weeds

Dacthal Flowable® or Dacthal W75® (DCPA) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard, Turnip greens.* Use 6-14 pts. per acre of flowable formulation or 6-14 lbs. per acre of 75W formulation. Apply at seeding or transplanting. May be incorporated. May be applied over top of transplants. REI: 12-hour.

OMRI-listed indicates that the product is listed by the Organic Materials Review Institute (OMRI.org) and therefore may be acceptable for use in organic production. Check with your certifier before use.

Herbicides for Cole Crops and Leafy Greens¹

| Product (REI/PHI) | Common Name | Timing and Application Location Relative to Crop | | | | | Incorporated | Timing Relative to Weeds | | Weed Groups Controlled | | | Crops | | | | |
|-------------------------------------|-------------------------------------|---|-----------------------------------|----------------------|--------------------------------------|---------------|--------------|--------------------------------|---------------|---------------------------|-----------------------------|-------------|----------|------------------|---------|-------------|-----------------|
| | | Before seeding | After seeding before emergence | Before transplanting | Postemergence — between rows only | Postemergence | | Preemergence | Postemergence | Annual grasses | Small-seeded broadleaves | Broadleaves | Broccoli | Brussels sprouts | Cabbage | Cauliflower | Brassica greens |
| Aim EC® (12h/-) | carfentrazone | | | | X | | | | X | | X | X | X | X | X | X | X |
| Command 3ME® (12h/45d) | clomazone | X | X | X | | | | X | | X | | | X | X | | | |
| Dacthal® (12h/-) | DCPA | X | X | X | | X | | X | | | | X | X | X | X | X | X |
| Devrinol 50DF® (12h/-) | napropamide | X | X | X | | | Yes | X | X | X | X | X | X | X | X | | |
| Dual Magnum® (24h/21d) | s-metolachlor | | X | | | X | | X | | | | X | | X | | X | X |
| Goal Tender® 4 SC (12h/-) | oxyfluorfen | | | X | | | | X | X | X | | | X | X | | | |
| Gramoxone® (12h to 24h/-) | paraquat | X | X | X | | | | | X | X | X | X | X | X | X | X | |
| Poast® (12h/14-30d) | sethoxydim | X | X | X | | X | | | X | | | X | X | X | X | X | X |
| Prefar 4E® (12h/-) | bensulide | X | X | X | | | | X | | | | X | X | X | X | X | X |
| Roundup®, others (12h/14d) | glyphosate | X | X | X | | | | | X | X | X | X | X | X | X | X | |
| Satellite® Hydrocap 3.8 CS | pendimethalin | | | X | X | X | No | X | | | | X | X | X | X | X | X |
| Select Max®, others (12h/14-30d) | clethodim | X | X | X | | X | | | X | X | | | X | X | X | X | X |
| Spartan DF® (12h/1d) | sulfentrazone | | | X | X | | | X | | | | | | X | | | |
| Spartan Charge® (12h/-) | sulfentrazone plus carfentrazone | | | X | X | | | X | X | | | | | X | | | |
| Stinger® | clopyralid | X | X | X | X | X | | | X | | X | X | X | X | X | X | |
| Treflan®, others (12h/-) | trifluralin | X | | X | | | Yes | X | | X | X | X | X | X | X | X | X |

¹For effectiveness against specific weeds, see Relative Effectiveness of Herbicides for Vegetable Crops (page 68), and read label. This table does not include all label information. Be sure to read and follow all instructions and precautions on the herbicide label. Herbicides can cause serious crop injury and yield loss if not used properly.

Prefar 4E® (bensulide) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard, Turnip greens* 5-6 qts. per acre. Use low rate on soils with less than 1% organic matter. Apply before planting and incorporate 1-2 inches or apply after seeding before crop emerges and irrigate within 24 hours. REI: 12-hour.

Postemergence Broadleaf Weeds

Aim EC® (carfentrazone) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard, Turnip greens* Apply with hooded sprayers as a directed application between crop rows. Use COC or NIS. Weeds must be actively growing and less than 4 inches tall. Do not allow spray to contact crop. Do not exceed 6.1 fl. oz. per acre per season. REI: 12-hour.

GoalTender® (oxyfluorfen) *Broccoli, Cabbage, Cauliflower. Michigan only.* 4-8 fl. oz. per acre. Applicator must have 24c label (Michigan label expires April 16, 2024). Apply to well-established transplants at least 2 weeks in the field, or to direct-seeded plants with at least 4 true leaves. Do not add adjuvant. Do not exceed 16 fl. oz. pre- and postemergence. REI: see label. PHI: 35-day.

Stinger® (clopyralid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard, Turnip greens* 4-8 fl. oz. per acre. Apply at any crop stage. Kills composite weeds, legumes, and nightshade. Do not exceed 2 applications and 8 fl. oz. per acre per year. REI: 12-hour. PHI: 30-day.

Postemergence Grass Weeds

clethodim formulations (clethodim) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi, Collards, Kale, Mustard, and Turnip greens.* 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. PHI: 14-day for Collards, Kale, Mustard, Turnip greens; 30-day for Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi.

Poast® (sethoxydim) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard, Turnip greens* 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 2.5 pts. per acre per season for Turnip greens, or 3 pts. per acre per season for other crops. REI: 12-hour. PHI: 14-day for Turnip greens. 30-day for all others.

Insect Control

Recommended Controls

Aphids

M-Pede® (potassium salts of fatty acids) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 1-2% volume. Must contact aphids to be effective. Works best in tank mix with other insecticide. REI: 12-hour. PHI: 0-day. OMRI-listed.

Actara® (thiamethoxam) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 1.5-3.0 oz. per acre. Do not exceed 11 oz. per acre per season. REI: 12-hour. PHI: 0-day PHI for broccoli, Brussels sprouts, cabbage, and cauliflower, 7-day PHI for leafy greens.

Admire Pro® (imidacloprid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Soil Application: 4.4-10.5 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per crop. Foliar Application: 1.3 fl. oz. per acre. Do not exceed 6.5 fl. oz. per acre per crop. REI: 12-hour. PHI: 21-day for soil application, 7-day for foliar application.

Assail 30SG® (acetamiprid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 2.0-5.3 oz. per acre. Do not exceed 20 oz. per acre per season. REI: 12-hour. PHI: 7-day.

Beleaf 50SG® (flonicamid) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 2.0-2.8 oz. per acre. Do not exceed 8.4 oz. per acre per season. REI: 12-hour. PHI: 0-day PHI.

chlorpyrifos formulations (chlorpyrifos) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* Use 4E formulations at 1-2 pts. per acre. Use 75WG formulations at 0.67-1.33 lbs. per acre. Cabbage aphid only. REI: see label. PHI: 21-day. RUP.

OMRI-listed indicates that the product is listed by the Organic Materials Review Institute (OMRI.org) and therefore may be acceptable for use in organic production. Check with your certifier before use.

dimethoate formulations (dimethoate) *Broccoli, Cauliflower, Kale, Mustard greens* 0.5-1 pt. per acre. Use 0.5-1 pt. per acre for both 4E and 400 formulations. REI: see label. PHI: 7-day for heading cole crops, 14-day for leafy cole crops.

Fulfill® (pymetrozine) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 2.75 oz. per acre. Do not exceed 5.5 oz. per acre per crop per season. REI: 12-hour. PHI: 7-day PHI.

Harvanta® (cyclaniliprole) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 10.9-16.4 fl. oz. per acre. Use with adjuvant. Do not exceed 65.6 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

Movento® (spirotetramat) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens* 4-5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day.

Mustang Maxx® (zeta-cypermethrin) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 3.2-4.0 fl. oz. per acre. Do not exceed 24 oz. per acre per season. REI: 12-hour. PHI: 1-day. *RUP.*

Orthene 97® Soluble (acephate) *Brussels sprouts, Cauliflower* 0.5-1.0 lb. per acre. Do not exceed 4 1/8 lbs. per acre per season. REI: 24-hour. PHI: 14-day.

Platinum 75SG® (thiamethoxam) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 1.66-3.67 oz. per acre. Do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 30-day.

Sivanto Prime® (flupyradifurone) *Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens* 7-12 fl. oz. per acre. For foliar application. Do not exceed 28 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

Caterpillars

Cabbage

Transplant to cupping:

Diamondback Moth Caterpillars: 50% infested with \geq 5 larvae per plant.

Cabbageworm and Looper Caterpillars: 30% infested

Cupping to early head:

Diamondback Moth Caterpillars: 50% infested with \geq 5 larvae per plant.

Cabbageworm and Looper Caterpillars: 20% infested

Early head to harvest:

Diamondback Moth Caterpillars: 10% infested with \geq 1 larvae per plant.

Cabbageworm and Looper Caterpillars: 10% infested

Broccoli/Cauliflower

Seedbed:

Diamondback Moth Caterpillars: 10% infested

Cabbageworm and Looper Caterpillars: 10% infested

Transplant to first curd:

Diamondback Moth Caterpillars: 40% infested

Cabbageworm and Looper Caterpillars: 20% infested

First curd to harvest:

Diamondback Moth Caterpillars: 10% infested

Cabbageworm and Looper Caterpillars: 10% infested

Bacillus thuringiensis formulations for Lepidopterans

(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)

Broccoli, Brussels sprouts, Cabbage, Cauliflower,

Collards, Kale, Kohlrabi, Mustard greens, Turnip

greens See labels. Begin applications when worms are small. Using Bt will help conserve beneficial insects.

REI: 4-hour. PHI: 0-day.

Ambush® (permethrin) *Broccoli, Cauliflower, Collards, Mustard greens* 3.2-12.8 fl. oz. per acre for broccoli and cabbage, and 3.2-6.4 fl. oz. per acre for Brussels sprouts and cauliflower. Do not exceed 64 fl. oz. per acre per season on cabbage. Do not exceed 51 fl. oz. per acre per season for all others. For use on collards in Illinois only at 3.2-9.6 fl. oz. per acre. REI: 12-hour. PHI: 1-day. *RUP.*

Asana XL® (esfenvalerate) *Broccoli, Cabbage,*

Cauliflower, Collards, Mustard greens 2.9-9.6 fl. oz.

per acre. Heading crops: Do not exceed 77.5 fl. oz.

per acre per season. Collards and Mustard greens:

Do not exceed 38.7 fl. oz. per acre per season. REI:

12-hour. PHI: 7-day. *RUP.*

Avaunt 30WDG® (indoxacarb) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.5-3.5 fl. oz. per acre. Do not exceed 14 oz. per acre per season. REI: 12-hour. PHI: 3-day.

Baythroid XL® (beta-cyfluthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 0.8-3.2 fl. oz. per acre. Do not exceed 12.8 fl. oz. per acre per crop. REI: 12-hour. PHI: 0-day. *RUP*

Brigade 2EC® (bifenthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.1-6.4 fl. oz. per acre. Heading Crops: Do not exceed 32 fl. oz. per acre per season. Leafy Crops: Do not exceed 25.6 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. *RUP*

chlorpyrifos formulations (chlorpyrifos) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Use 4E formulations at 1-2 pts. per acre. Use 75WG formulations at 0.67-1.33 lbs. per acre. REI: 12-hour. PHI: 21-day.

Confirm 2F® (tebufenozide) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 6.0-8.0 fl. oz. per acre. Do not exceed 40 fl. oz. per season. REI: 4-hour. PHI: 7-day.

Coragen® (chlorantraniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 3.5-7.5 fl. oz. per acre. Do not exceed 15.4 fl. oz. per acre per season. REI: 4-hour. PHI: 3-day.

Entrust SC® (spinosad) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 1.5-6.0 fl. oz. per acre. Do not exceed 29 fl. oz. per acre per season. Observe resistance management restrictions. REI: 4-hour. PHI: 1-day. *OMRI-listed*.

Exirel® (cyantraniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 7-17 fl. oz. per acre. Do not exceed 61 fl. oz. per acre per crop. REI: 12-hour. PHI: 1-day.

Harvanta® (cyclaniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 10.9-16.4 fl. oz. per acre. Do not apply more than twice within a generation or two successive generations. Do not exceed 65.6 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

Intrepid 2F® (methoxyfenozide) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 4-10 fl. oz. per acre. Do not exceed 64 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

Mustang Maxx® (zeta-cypermethrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.24-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 14-day. *RUP*

Orthene 97® Soluble (acephate) Brussels sprouts, Cauliflower 1 lb. per acre. Do not exceed 4 1/8 lbs. per acre per season. REI: 24-hour. PHI: 14-day.

Permethrin 3.2EC® (permethrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kohlrabi, Turnip greens 2.8 fl. oz. per acre. 2-4 oz. per acre for broccoli, Brussels sprouts, cauliflower and kohlrabi. 2-8 oz. per acre for cabbage. 2-4 oz. per acre for collards in Indiana only. Do not exceed 32 fl. oz. per acre per season for broccoli, Brussels sprouts, cauliflower collards, kohlrabi, and Turnip greens, or 40 oz. per acre per season for cabbage. REI: 12-hour. PHI: 1-day. *RUP*

Proclaim® (emamectin benzoate) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.4-4.8 fl. oz. per acre. Do not exceed 28.8 oz. per acre per season. REI: 12-hour. PHI: 7-day for heading cole crops, 14-day for leafy cole crops. *RUP*

Radiant 1SC® (spinetoram) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 5-10 fl. oz. per acre. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

Rimon 0.83EC® (novaluron) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 6-12 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day.

Sevin XLR Plus® (carbaryl) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 1-2 qts. per acre. Do not exceed 6 qt. per acre per crop. REI: 12-hour. PHI: 3-day for heading cole crops, 14-day for leafy cole crops.

OMRI-listed indicates that the product is listed by the Organic Materials Review Institute (OMRI.org) and therefore may be acceptable for use in organic production. Check with your certifier before use.

Warrior II® (lambda-cyhalothrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 0.96-1.92 fl. oz. per acre. Do not exceed 15.36 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day. RUP.

Flea Beetles

Actara® (thiamethoxam) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 1.5-3 oz. per acre. Do not exceed 11 oz. per acre per season. REI: 12-hour. PHI: 0-day for broccoli, Brussels sprouts, cabbage, and cauliflower, 7-day for leafy greens.

Ambush® (permethrin) Cabbage 6.4-12.8 fl. oz. per acre. Do not exceed 64 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. RUP.

Asana XL® (esfenvalerate) Broccoli, Cabbage, Cauliflower, Collards, Mustard greens 5.8-9.6 fl. oz. per acre. Heading crops: Do not exceed 77.5 fl. oz. per acre per season. Collards and Mustard greens: Do not exceed 38.7 fl. oz. per acre per season. REI: 12-hour. PHI: 3-day for heading crops, 7-day for collards and Mustard greens. RUP.

Baythroid XL® (beta-cyfluthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.4-3.2 fl. oz. per acre. Do not exceed 12.8 fl. oz. per acre per crop. REI: 12-hour. RUP.

Belay® (clothianidin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Soil Applications: 9-12 fl. oz. per acre. Foliar Applications: 3-4 fl. oz. per acre. REI: 12-hour. PHI: 21-day for soil application, 7-day for foliar application.

Brigade 2EC® (bifenthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.1-6.4 fl. oz. per acre. Do not exceed 32 fl. oz. per acre per season for heading crops. Do not exceed 25.6 fl. oz. per acre per season for leafy crops. REI: 12-hour. PHI: 7-day. RUP.

chlorpyrifos formulations (chlorpyrifos) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Use 4E formulations at 1-2 pts. per acre. Use 75WG formulations at 0.67-1.33 lbs. per acre. REI: see label. PHI: 21-day. RUP.

Exirel® (cyantraniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 13.5-20 fl. oz. per acre. Do not exceed 61 fl. oz. per acre per crop. REI: 12-hour. PHI: 1-day.

Harvanta® (cyclaniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 10.9-16.4 fl. oz. per acre. Do not exceed 65.6 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

Kryocide 96D® (cryolite) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards 8-16 lbs. per acre. Do not exceed 96 lbs. per acre per season. REI: 12-hour. PHI: 7-day for broccoli, Brussels sprouts, and cauliflower. 14-day for cabbage and collards.

Mustang Maxx® (zeta-cypermethrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.24-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. RUP.

Permethrin 3.2EC® (permethrin) Cabbage 4-8 fl. oz. per acre. Do not exceed 16 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. RUP.

Platinum 75SG® (thiamethoxam) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 1.66-3.67 oz. per acre as a soil application. Do not exceed 3.67 oz. per acre per season. REI: 12-hour. PHI: 1-day.

Prokil Cryolite 50D® (cryolite) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards 15-30.5 lbs. per acre. Do not exceed 184 lbs. per acre per season. REI: 12-hour. PHI: 7-day for broccoli, Brussels sprouts, and cauliflower, 14-day for cabbage and collards.

Sevin XLR Plus® (carbaryl) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 0.5-1 qt. per acre. Do not exceed 6 qts. per acre per crop. REI: 12-hour. PHI: 3-day for heading cole crops, 14-day for leafy cole crops.

Warrior II® (lambda-cyhalothrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 1.28-1.92 fl. oz. per acre. Do not exceed 15.36 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day. RUP.

Leafminers

M-Pede® (potassium salts of fatty acids) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 1-2% by volume. Works best in tank mix with other insecticide. REI: 12-hour. PHI: 0-day. OMRI-listed.

Entrust SC® (spinosad) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 4-10 fl. oz. per acre. Do not exceed 29 fl. oz. per acre per year. REI: 4-hour. PHI: 1-day. OMRI-listed.

Exirel® (cyantraniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 13.5-20 fl. oz. per acre. Do not exceed 61 fl. oz. per acre per crop. REI: 12-hour. PHI: 1-day.

Harvanta® (cyclaniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 10.9-16.4 fl. oz. per acre. Do not exceed 65.6 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

Mustang Maxx® (zeta-cypermethrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 3.2-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. RUP.

Radiant 1SC® (spinetoram) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 6-10 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 4-hour. PHI: 7-day.

Rimon 0.83EC® (novaluron) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 12 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day.

Trigard® (cyromazine) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.66 oz. per acre. Do not exceed 6 applications per season. REI: 12-hour. PHI: 7-day.

Venom 70SG® (dinotefuran) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Soil applications: 5-7.5 oz. per acre. Do not exceed 12 oz. per acre per season. Foliar applications: 1-4 oz. per acre. Do not exceed 6 oz. per acre per season. REI: 12-hour. PHI: 1-day.

Seed and Root Maggots

Capture LFR® (bifenthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Can be used banded at-plant, pre-plant, or incorporated shortly after planting. See label. REI: 12-hour. RUP.

chlorpyrifos formulations (chlorpyrifos) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Mustard greens Use 4E formulations at 1.6-2.75 fl. oz. per 1000 ft. of row (max rate 2.4 fl. oz. for Cauliflower). Use 75WG formulations at 1.1-1.8 fl. oz. per 1000 linear ft. of row (max rate 1.6 fl. oz. for Cauliflower). Apply as a water-based spray directed at the base of plants immediately after setting in the field. Use minimum of 40 gallons of total spray per acre. Do not apply as foliage application. Do not exceed one application per acre per season. REI: see label. PHI: 30-day. RUP.

Diazinon AG500® (diazinon) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 2-3 qts. per acre for pre-plant broadcast application using 200-300 gallons of spray mix per acre. 4-8 fl. oz. per acre in 50 gals. of water for drench application at planting. Make drench application at the rate of 0.5-1 cup per plants, either by hand or tractor mounted sprayer with drop nozzles to direct spray to base of plants. Water treatments may reduce stands due to plants stress at time of transplanting. Cabbage maggot exhibit resistance to diazinon. PHI: 4-day. RUP.

Slugs

Sluggo 1B® (iron phosphate) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 20-44 lbs. per acre, or at 0.5-1 lb. per square ft. Prevent infestation by scattering bait products to the soil surface around the perimeter of the planting. Make a rescue treatment by scattering the bait products on the soil as a band between rows. REI: 0-hour. PHI: 0-day. OMRI-listed.

Deadline M-Ps® (metaldehyde) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 25 lbs. per acre. REI: 12. PHI: 0-day.

Stink Bugs

Azera® (azadirachtin, pyrethrins) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 16-56 fl. oz. per acre. Use lower rates for nymphs. Use 48 fl. oz. per acre for adults. Use higher rates (56 fl. oz. per

acre) when pest pressure is extreme or plant canopy is dense. Do not exceed 10 applications per season. Do not reapply within 3 days except under extreme pest pressure. REI: 12-hour. PHI: 0-day. OMRI-listed.

Baythroid XL® (beta-cyfluthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.4-3.2 fl. oz. per acre. Do not exceed 12.8 fl. oz. per acre per crop. REI: 12-hour. PHI: 0-day. RUP.

Belay® (clothianidin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Soil applications: 9-12 fl. oz. per acre. Foliar applications: 3-4 fl. oz. per acre. REI: 12-hour. PHI: 21-day for soil applications, 7-day for foliar applications.

Brigade 2EC® (bifenthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.1-6.4 fl. oz. per acre. Do not exceed 32 fl. oz. per acre per season for heading crops. Do not exceed 25.6 fl. oz. per acre per season for leafy crops. REI: 12-hour. PHI: 7-day. RUP.

Harvanta® (cyclaniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 10.9-16.4 fl. oz. per acre. For suppression of nymphs only. Do not exceed 65.6 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

malathion formulations (malathion) Collards 1.5 pts. per acre. Harlequin Bugs only. Use 5EC formulations at 1.5 pts. per acre. Use 57EC formulations at 1 pts. per acre. PHI: 7-day.

Mustang Maxx® (zeta-cypermethrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 3.2-4 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. RUP.

Rimon 0.83EC® (novaluron) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 12 fl. oz. per acre. Do not exceed 24 oz. or 2 applications per acre per season. REI: 12-hour. PHI: 7-day.

Sevin XLR Plus® (carbaryl) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 0.5-2 qts. per acre. Use low rates for Harlequin bugs. Use higher rates for other stink bugs. Do not exceed 6 qts. per acre per crop. REI: 12-hour. PHI: 3-day for heading cole crops, 14-day for leafy cole crops.

Venom 70SG® (dinotefuran) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 1-4 oz. per acre. Do not exceed 6 oz. per acre per season. REI: 12-hour. PHI: 1-day.

Warrior II® (lambda-cyhalothrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Kohlrabi 1.28-1.92 fl. oz. per acre. Do not exceed 15.36 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day. RUP.

Swede Midge

Swede midge is most attracted to heading cole crops (broccoli, cauliflower, cabbage, and Brussels sprouts). Leafy crops can become twisted and yield can be reduced. Some products that control flea beetles and caterpillars in cole crop work well on Swede midge, but may not have Swede midge explicitly on their label. Take advantage of this implied rotation to prevent resistance if your state does not require 2(ee) labels for specific pests. Products include Admire Pro (IRAC 4A), Coragen (IRAC 28), Exirel (IRAC 28), Lorsban (IRAC 1B), Orthene (IRAC 1B), Verimark (IRAC 28), and Warrior II (IRAC 3A).

Crop rotation Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Rotate away from cole crops for three years. Do not use brassica cover crops between cole crop plantings. Rotate between crop families to reduce pest and disease inoculum buildup and weeds favored by the management of certain crops.

Optimize weed control Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Control brassica weeds. Use to minimize shared pests and diseases

Sanitation Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Destroy postharvest trash promptly. Remove infected plants, leaves, and supports such as plant stakes that can harbor disease to reduce disease spread. Remove trash frequently. Disinfect tools frequently. Avoid working field under wet conditions.

Assail 30SG® (acetamiprid) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2-5.3 oz. per acre for leafy crops, 2-4 oz. per acre for heading crops. Do not exceed 20 oz. per acre per season. REI: 12-hour. PHI: 7-day.

Movento® (spirotetramat) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 4-5 fl. oz. per acre. Do not exceed 10 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day.

Thrips

Variety selection Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens Varieties tolerant of thrips include Bantly, Bravo, Brutus, King Cole, Little Rock, Manrico, Rio Granda, Rio Verde, Ruby Perfection, Starski, Stonar, SuperKraut, Titanic 90, Zerlina, and others. Select crop varieties for competitiveness, disease resistance, and regional adaptability.

Actara® (thiamethoxam) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 3-5.5 oz. per acre. Do not exceed 11 oz. per acre per season. REI: 12-hour. PHI: 0-day for broccoli, Brussels sprouts, cabbage, and cauliflower, 7-day for leafy greens.

Admire Pro® (imidacloprid) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 4.4-10.5 fl. oz. per acre. Soil application. Do not exceed 10.5 fl. oz. per acre per season. REI: 12-hour. PHI: 21-day.

Ambush® (permethrin) Broccoli, Brussels sprouts, Cauliflower 3.2-6.4 fl. oz. per acre. Do not exceed 51 fl. oz. per acre per season. REI: 12-hour. PHI: 7-day. RUP.

Assail 30SG® (acetamiprid) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 4-5.3 fl. oz. per acre for leafy crops, 4 oz. per acre for heading crops. Do not exceed 20 oz. per acre per season. REI: 12-hour. PHI: 7-day.

Baythroid XL® (beta-cyfluthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 0.8-1.6 fl. oz. per acre. Do not exceed 12.8 fl. oz. per acre per crop. REI: 12-hour. RUP.

Brigade 2EC® (bifenthrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 2.1-6.4 fl. oz. per acre. Do not exceed 32 fl. oz. per acre per season for heading crops. Do not exceed 25.6 fl. oz. per acre per season for leafy crops. REI: 12-hour. PHI: 7-day. RUP.

Entrust SC® (spinosad) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 4-10 fl. oz. per acre. Do not exceed 29 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day. OMRI-listed.

Exirel® (cyantraniliprole) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 13.5-20 fl. oz. per acre. Do not exceed 61 fl. oz. per acre. REI: 12-hour. PHI: 1-day.

Mustang Maxx® (zeta-cypermethrin) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 3.2-4.0 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day. RUP.

Platinum 75SG® (thiamethoxam) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens, Turnip greens 1.66-3.67 oz. per acre. Do not exceed 3.67 fl. oz. per acre. REI: 12-hour. PHI: 30-day.

Radiant 1SC® (spinetoram) Broccoli, Brussels sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard greens 6-10 fl. oz. per acre. Do not exceed 34 fl. oz. per acre per season. REI: 4-hour. PHI: 1-day.

OMRI-listed indicates that the product is listed by the Organic Materials Review Institute (OMRI.org) and therefore may be acceptable for use in organic production. Check with your certifier before use.