

Specific Commodity Recommendations

ASPARAGUS

Varieties

Varieties ¹	
Jersey Giant* (RR,FT)	These varieties are recommended for DE, MD, NJ, PA, VA, WV
Jersey Knight* (RR,FT)	
Jersey Supreme* (RR, FT)	
Millennium*	
Purple Passion*	

¹Varieties listed alphabetically

*Indicates hybrid variety

Letters in parentheses indicate disease resistance possessed by varieties. See the "Abbreviations" section in front portion of this publication.

Recommended Nutrients Based on Soil Tests

Before using the table below, refer to important notes in Plant Nutrient Recommendations in Section B, Soil And Nutrient Information. These notes provide additional suggestions to adjust rate, timing and placement of nutrients depending on soil type cation exchange capacity and existing fertility levels.

	Pounds N per Acre	Soil Phosphorus Level			Soil Potassium Level		
		Low Pounds	Med P ₂ O ₅ per Acre	Opt. per	Low Pounds	Med K ₂ O per Acre	Opt. per
Asparagus							
Growing crowns	50 ¹ 50 ²	200 ¹ 200 ²	100 ¹ 100 ²	50 ¹ 50 ²	200 ¹ 200 ²	100 ¹ 100 ²	50 ¹ 50 ²
New plantings							
Crowns and transplants	75-100 ¹ 50 ³ 25-50 ⁴	200 ¹ 200 ³ 0	100 ¹ 100 ³ 0	50 ¹ 50 ³ 0	200 ¹ 200 ³ 0	100 ¹ 100 ³ 0	50 ¹ 50 ³ 0
Cutting beds							
	75-100 ¹ 75-100 ²	200 ¹ 200 ²	150 ¹ 150 ²	100 ¹ 100 ²	300 ¹ 300 ²	225 ¹ 225 ²	150 ¹ 150 ²

¹Total amount nutrient recommended; growers producing vegetables on soils with high clay contents should reduce the recommended nitrogen and potassium rates by 20% and increase the phosphorus rate by 25%.

²Broadcast and disk-in

³Broadcast and plow down

⁴Side dress 4 weeks after planting

Apply 1-2 pounds of boron (B) per acre every 3 years on most soils.

See Table B-10 for more specific boron recommendations.

Purity of Seed Lots

Male asparagus hybrid varieties are preferred over standard hybrids and open-pollinated populations because male plants are more vigorous and productive. The varieties listed in the table above are all male hybrids. Some seed lots may contain a significant percentage of female plants. Check with your seed supplier to determine the anticipated proportion of female and/or off-type plants in the lots you procure.

Seed Treatment

Check the tag or contact your seed supplier to determine if seed has been treated. See the Disease Section for more information.

Growing Crowns and Transplants

To grow crowns, sow seed 1½ inches deep at a rate of 6 to 8 pounds per acre (10 to 12 seeds per foot) in rows 24 to 30 inches apart. Field seed in mid-April in warmer, southern areas to mid-May in cooler areas. Crowns must be grown in an area where asparagus has never been grown.

Grow asparagus transplants in 72-100 cell trays containing artificial growing media formulated for pepper transplants. Grow seedlings for 8-10 weeks in the greenhouse, then harden-off in a protected out-door area for two weeks before transplanting. **Timely irrigation, cultivation and application of herbicides are essential** for successful use of seedling transplants. Contact your County Extension Agent for specific herbicide suggestions.

Planting and Spacing

Plant crowns and transplants April 1 to May 20 when soil conditions are favorable. Early plantings produce more vegetative growth and more vigorous crowns than late plantings. Space 1-year-old crowns and transplants 12 inches apart in rows 4½ to 5 feet apart. Make furrows 6 to 8 inches deep, plant crowns 5 to 7 inches deep. Cover crowns with 1 to 2 inches of soil. Cultivate and move soil to seedlings carefully to avoid covering foliage with soil. Gradually fill trenches during the growing season and form a 2-inch ridge over the plants after the fern turns brown in the fall.

Harvest

Do not harvest asparagus the year of planting. Harvest for two weeks the second year after planting and increase to 6-8 weeks as the planting matures. Stop harvesting by June 15 if fern vigor was good the previous fall. Stop sooner if spear thickness drops. Prolonged cutting increases stress on the plant and can increase root and crown rot. If foliage diseases were severe or fern vigor was low the previous fall, stop harvesting 10 days sooner than normal. Leave soil unridged on young beds for the first 2 to 3 weeks of harvest. On old beds, and in fields where freezing of early emerged spears occurs frequently, begin ridging at start of harvest season. In areas where freeze damage to spears occurs frequently, mulch the beds with straw after herbicide application to delay spear emergence. Remove spears from field promptly after cutting to maintain freshness and a low fiber content.

Brush Removal

Burn brush during the winter to destroy fungi that cause diseases, such as rust and purple spot. (Be sure to obtain a permit in areas where required.) If burning is not done, then mow and disk brush and level ridges in February and March. Avoid damage to spear buds by shallow disking.

Weed Control

Identify the weeds in each field and select recommended herbicides that control those weeds. See Tables E-2 and E-3 .

Match preplant incorporated and preemergence herbicide rates to soil type and percent organic matter in each field.

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

Find the herbicides you plan to use in the Herbicide

Resistance Action Committee's (HRAC) **Herbicide Site of Action Table E-7** and follow the recommended good management practices to minimize the risk of herbicide resistance development by weeds in your fields.

Seedbeds, Seeded Fields and Newly Planted Crowns

Preplant or Preemergence

Glyphosate--Apply Glyphomax Plus, Roundup Ultra Max 4SC, or Touchdown prior to crop emergence for control of emerged annual and perennial weeds. Do not apply within a week before the first spears emerge. Rate of application depends upon weed species; see label.

Paraquat--0.6 lb/A. Apply 2.4 pints per acre Gramoxone Inteon 2SC. Band or broadcast prior to, during, or after planting but before emergence of crop. Add wetting agent as directed on label. Do not apply paraquat within 6 days before harvest.

Postemergence

Clethodim--0.094-0.125 lb/A. Apply 9 to 16 fluid ounces of Select Max 0.97EC with nonionic surfactant to be 0.25% of the spray solution (1 quart per 100 gallons of spray solution) postemergence to control many annual and certain perennial grasses, including annual bluegrass. Select will not consistently control goosegrass. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 1 day.

Fluazifop--0.125-0.188 lb/A. Apply 0.5 to 0.75 pints per acre Fusilade DX 2E plus oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or a nonionic surfactant to be 0.25 percent of the spray solution (1 quart per 100 gallons of spray solution) to control annual grasses and certain perennial grasses. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. It will not control yellow nutsedge, wild onion, or any broadleaf weed. Do not tank-mix with any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 365 days and apply no more than 6 pints per acre in one season. Do not plant corn, sorghum, cereals, or any other grass crop within 60 days of the last application.

Linuron--0.5-1 lb/A. Apply 1 to 2 pounds per acre Lorox 50DF when ferns are more than 6 inches tall for residual and postemergence control of many annual broadleaf weeds. Spray emerged weeds when they are less than 4 inches tall. Use the lower rate on coarse-textured (sandy) soils low in organic matter, and the higher rate on fine-textured (silt and clay) soils. A second application can be made 1 to 3 months after the initial application, but observe the following precautions: DO NOT exceed 4 pounds of product per acre per year. DO NOT add surfactants, tank-mix with other pesticides, and DO NOT use FLOWABLE (liquid) formulation, or crop injury may occur. LABELED FOR USE IN NEW JERSEY ONLY.

Sethoxydim--0.2-0.5 lb/A. Apply 1 to 2.5 pints per acre Poast 1.5EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) to control certain annual or perennial grass weeds. **The use of oil concentrate may increase the risk of crop injury when hot or humid conditions prevail.** Use the lower rate to control seedling annual grasses with less than four leaves and no tillers. Use the higher rate to control established annual grasses with tillers; grasses under stress from heat or drought; or to control perennial grasses including Bermuda grass, quackgrass, or johnsongrass. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, or weed control may be reduced. Observe a minimum preharvest interval of 1 day before harvest. Do not exceed 5 pints of Poast per acre in one year.

Cutting Bed

Use a combination of grass and broadleaf weed herbicides to obtain control of a wide spectrum of weeds. Identify the weeds in your field and choose herbicides that control those weeds. Split the herbicide application. Spray part of your grass herbicide before harvest and the remainder after harvest, or switch to another grass herbicide after harvest. Rotate the use of Lexone/Sencor with Karmex or Sinbar to avoid repeated use of chemically related products. Choose Lexone/Sencor or Sinbar when weeds have emerged, unless another effective postemergence herbicide is used.

Before Spear Emergence and/or after Harvest Season

Mesotrione--0.094 -0.24 lb/A. Apply 3 to 7.7 fluid ounces per acre Callisto 4SC prior to spear emergence in the spring, after final harvest, or both, to control many winter and summer annual broadleaf weeds. Till the field or tank-mix with Gramoxone Inteon to eliminate emerged spears when Callisto is applied after harvest, or crop injury may be observed as white or white streaks in the stems and fern when treated spears grow. Callisto provides excellent control of horseweed (also called maretail or stickweed), including glyphosate tolerant strains, and common lambsquarters. Use the lower rate on coarse-textured (sandy) soils low in organic matter, and the higher rate on fine-textured (silt and clay) soils. Callisto does not control annual grasses. Tank-mix Callisto with a residual annual grass herbicide to control annual grasses. Add oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or a nonionic surfactant to be 0.25 percent of the spray solution (1 quart per 100 gallons of spray solution) if target weeds are emerged at the time of application. Do NOT apply more than 7.7 fluid ounces of Callisto per acre per year, and do NOT make more than two Callisto applications per year.

Paraquat--0.6-1 lb/A. Apply 2.4 to 4.0 pints per acre Gramoxone Inteon 2SC or OLF prior to crop emergence or immediately after the last cutting to control emerged annual weeds. Add wetting agent as directed on the label. Emerged spears sprayed after the last harvest will be killed but new growth from the crown will not be affected. Tank-mix with residual herbicides for full season control. DO NOT apply within 6 days of harvest.

Diuron--0.75-2 lb/A. Apply 1 to 2.5 pounds per acre Karmex 80DF before spear emergence or after harvest when the soil is disked and free of weeds. Karmex primarily

controls broadleaf weeds. Tank-mix with Devrinol to control annual grasses. Use Sinbar or Sencor/Lexone after harvest when Karmex is used in early spring before spear emergence.

Linuron--1-2 lb/A. Apply 2 to 4 pounds per acre Lorox 50DF prior to spear emergence or after harvest for residual and postemergence control of many annual broadleaf weeds. Spray emerged weeds when they are less than 4 inches tall. Use the lower rate on coarse-textured (sandy) soils low in organic matter, and the higher rate on fine-textured (silt and clay) soils. Additional applications can be made immediately after cutting, or as a post-directed spray at the base of the fern, but observe the following precautions: DO NOT exceed 4 pounds of product per acre per year. DO NOT apply within 1 day of harvest. DO NOT add surfactants, tank-mix other pesticides, and DO NOT use FLOWABLE (liquid) formulation, or crop injury may occur. LABELED FOR USE IN NEW JERSEY ONLY.

S-metolachlor--1.26-1.9 lb/A. **A Special Local-Needs Label 24(c) has been approved for the use of Dual Magnum 7.62E to control weeds in asparagus in New Jersey. The use of this product is legal ONLY if a waiver of liability provided by the local growers association has been signed by the grower, all fees have been paid, and a label has been provided by the association.** Apply 1.33 to 2 pints per acre Dual Magnum 7.62E to control annual grasses, yellow nutsedge, galinsoga, and certain other broadleaf weeds. Use as a surface-applied spray prior to spear emergence. Make only one application during the growing season. DO NOT apply within 16 days of harvest. **Other generic versions of metolachlor and s-metolachlor may be available, and may or may not be labeled for use in the crop. Labeled for use in NJ ONLY!**

Terbacil--1.2 lb/A. Apply 1.5 pounds per acre Sinbar 80W prior to spear emergence or after harvest. Sinbar controls annual grasses and many broadleaf weeds but does not control pigweed sp. and certain other broadleaf weeds. Tank-mix with Karmex for broader spectrum of weed control. This is not recommended for use at time of planting. **Do not use on soils containing less than 1 percent organic matter.**

Metribuzin--1 lb/A. Apply 1.33 pounds per acre Sencor 75DF or Lexone 75DF (or OLF) before spear emergence or after harvest. Sencor/Lexone primarily controls broadleaf weeds. Tank-mix with Devrinol to control annual grasses. Use Sinbar or Karmex after harvest when Sencor/Lexone is used in early spring before spear emergence.

Napropamide--4 lb/A. Apply 8 pounds per acre Devrinol 50DF per year to established asparagus. Apply before weeds emerge immediately after ridging in the spring. Split the application if ridges are leveled after harvest. Make the second application immediately after leveling the ridge following the harvest season. Incorporation may improve weed control if rainfall does not occur within 24 hours of application. Devrinol controls primarily annual grasses. Combine with Sinbar, Lexone/Sencor, or Karmex at the lower labeled rates for better broadleaf weed control.

Norflurazon--2-4 lb/A. Apply 2.5 to 5 pounds per acre Solicam 80DF at the end of the cutting season. Spray immediately after the field is cultivated to level the ridges, or use postemergence herbicides to control emerged weeds. Primarily controls grasses and suppresses yellow nutsedge. Use in combination with Karmex or Lexone/Sencor to

improve the spectrum of weeds controlled. Solicam is a long lasting herbicide in the soil. Do not plant sensitive crops (see label) for 2 years after application.

Sethoxydim--0.2-0.5 lb/A. (See the preceding "Sethoxydim" paragraph.)

Postemergence

Clethodim--0.094-0.125 lb/A. Apply 12 to 16 fluid ounces of Select Max 0.97EC with nonionic surfactant to be 0.25% of the spray solution (1 quart per 100 gallons of spray solution) postemergence to control many annual and certain perennial grasses, including annual bluegrass. Select will not consistently control goosegrass. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 1 day.

Fluazifop--0.125-0.188 lb/A. Apply 0.5 to 0.75 pints per acre Fusilade DX 2E plus oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or a nonionic surfactant to be 0.25 percent of the spray solution (1 quart per 100 gallons of spray solution) to control annual grasses and certain perennial grasses. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. It will not control yellow nutsedge, wild onion, or any broadleaf weed. Do not tank-mix with any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe the minimum preharvest interval and apply no more than 6 pints per acre in one season. Do not plant corn, sorghum, cereals, or any other grass crop within 60 days of the last application. Labeled in Maryland and New Jersey with a 1-day preharvest interval. Labeled in Delaware and Virginia with a 7-month preharvest interval and in Pennsylvania with a 12-month preharvest interval.

Dicamba--0.25-0.5 lb/A. **A Special Local-Needs Label 24(c) has been approved for the use of Banvel in New Jersey.** Apply 0.5 to 1 pint per acre Banvel 4SC to control many annual broadleaf weeds and to suppress or control many perennial broadleaf weeds. Multiple applications can be made during the growing season, provided the total applied in 1 year does not exceed 1 pint per acre. Some crooking or twisting of emerging spears contacted by the spray may occur. Discard crooked or twisted spears. Observe a minimum preharvest interval of 1 day (24 hours).

Warning: Banvel spray or vapor drift may injure sensitive crops growing adjacent to treated fields. Do not apply to fields adjacent to sensitive horticultural, fruit, or vegetable crops. Do not apply on days when the temperature is expected to exceed 85 degrees Fahrenheit. Spray residue is difficult to completely remove from sprayers used to apply Banvel. Do not apply Banvel with sprayers which will be used to apply pesticides to sensitive crops.

Glyphosate--Apply Glyphomax Plus, Roundup products or Touchdown products, or OLF (Other Labeled Formulations) as a spot treatment using a directed spray or

shielded equipment immediately after the last harvest of the season when all spears have been removed or after ferns have developed. Do **NOT** allow spray to contact emerged spears or ferns, or severe crop injury may result. Rates and optimum application period depend on weed species (see label).

Halosulfuron 0.024-0.047 lb/A.--Apply 0.5 to 1.0 dry ounces of Sandea 75DF plus nonionic surfactant to be 0.25 percent of the spray solution (1 quart per 100 gallons of spray solution) postemergence, during or after the cutting season, to control yellow nutsedge and certain annual broadleaf weeds. Emerged common lambsquarters will not be controlled. Use the lower rate on coarse-textured (sandy) soils low in organic matter, and the higher rate on fine-textured (silt and clay) soils. Observe a one (1) day preharvest interval (PHI) when applying Sandea during harvest. Application of Sandea to the fern after harvest may cause temporary yellowing. Use drop nozzles after harvest to direct the spray under the fern to avoid risk of crop injury and improve coverage of target weeds. Do NOT apply Sandea to crops treated with a soil applied organophosphate insecticide, or use a foliar applied organophosphate insecticide within 21 days before or 7 days after a Sandea application.

Linuron--0.5-1 lb/A. Apply 1 to 2 pounds per acre Lorox 50DF for residual and postemergence control of many annual broadleaf weeds. Spray emerged weeds when they are less than 4 inches tall before the cutting season, immediately after cutting, or as a directed spray toward the base of the fern. Use the lower rate on coarse-textured (sandy) soils low in organic matter, and the higher rate on fine-textured (silt and clay) soils. Additional applications can be made prior to spear emergence or after harvest, but observe the following precautions: DO NOT exceed 4 pounds of product per acre per year. DO NOT apply within 1 day of harvest. DO NOT add surfactants, tank-mix with other pesticides, and DO NOT use the FLOWABLE (liquid) formulation, or crop injury may occur. LABELED FOR USE IN NEW JERSEY ONLY.

2,4-D--1-2 lb/A. Use 1 to 2 quarts per acre Formula 40. Apply after a close harvest of asparagus when weeds have considerable foliage. Use no more than two applications spaced 1 month apart. If used after harvest, avoid spraying brush. Use low pressure; spray on calm days to avoid drift damage to surrounding plants.

Insect Control

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

Cutworms

carbaryl (Sevin Bait, Sevin 80S or OLF)
methomyl (Lannate LV or OLF)
permethrin (Perm-UP, Pounce 3.2EC or OLF)

Note. Early spears are the most heavily damaged because they are the first to appear and grow the slowest. Dig up to ½ inch deep around crowns and use bait if you find 1 cutworm larva or 1 severely damaged spear per 20 plants.

Asparagus Aphid

Watch for tiny (1/16 inch long), bluish green aphids building up on brush. Protection may be important in newly seeded plantings and young cutting beds.

malathion (Malathion 57EC or OLF)
pymetrozine (**ferns only**) (Fulfill 50WDG)

Asparagus Beetles

Apply insecticide when needed during cutting season and late summer.

carbaryl (Sevin 80S or OLF)
malathion (Malathion 57EC or OLF)
methomyl (Lannate LV or OLF)
permethrin (Perm-UP, Pounce 3.2EC or OLF)
spinetoram (**post harvest only**) (Radiant 2SC)
spinosad (**postharvest only**) (Entrust 80W, SpinTor 2SC or OLF)

Prevent large numbers of beetles from overwintering and laying eggs on spears in spring by spraying brush in early fall. Daily harvest will minimize exposure to these pests and reduce damage.

Thrips

malathion (Malathion 57EC or OLF)
methomyl (Lannate LV or OLF)

NOTE: Use of spinosad or spinetoram for asparagus beetle control will reduce thrips populations.

Asparagus Fern Caterpillar (Beet Armyworm)

chlorantraniliprole (Coragen 1.67SC)
methomyl (Lannate LV or OLF)

Note: Use of spinosad or spinetoram for asparagus beetle control will reduce beet armyworm population.

Japanese Beetles

Apply to foliage after the cutting season:
permethrin (Perm-UP, Pounce 3.2EC or OLF)

Pesticide	Use Category ¹	Hours to Reentry	Days to Harvest ²
INSECTICIDE			
carbaryl	G	12	1
chlorantraniliprole	G	4	1
malathion	G	12	1
methomyl	R	48	1
permethrin	R	12	1
pymetrozine	G	12	170
spinetoram	G	4	60
spinosad	G	4	60
FUNGICIDE (FRAC code)			
chlorothalonil (Group M5)	G	12	0
Folicur (Group 3)	G	12	180
mancozeb (Group M3)	G	24	120
MetaStar (Group 4)	G	48	AP
Rally (Group 3)	G	24	180
Ridomil Gold (Group 4)	G	48	AP
Quadris (Group 11)	G	4	100
Ultra Flourish (Group 4)	G	48	AP

See Table D-6.

¹G = general, R = restricted

²AP = At planting

Disease Control

Seed Treatment

For New Jersey Only. Dip seed in a solution containing 1 pint of Clorox per gallon of water for 1 to 2 minutes. Provide constant agitation. Use at the rate of 1 gallon of Clorox solution per 2 pounds of seed. Prepare a fresh solution for each batch of seed. Wash seed for 5 minutes in running water and dry thoroughly.

Fusarium Root Rot

For crown production, use treated seed and select a site where asparagus has never been grown.

For production fields, use disease-free crowns, transplants, or seed. Select well-drained fields where asparagus has never been grown. If this is not possible, select fields that have not been in asparagus for at least 8 years.

Phytophthora Crown and Spear Rot

In fields with poor drainage or extensive low areas, use 1.0 pt/A Ridomil Gold 4SL, 2.0 pt Ultra Flourish 2E/A, or 2.0 qt/A MetaStar 2E over the bed as follows:

Cutting fields: Apply 30 to 60 days before the first harvest and make a second application just prior to first cutting.

New plantings: Apply after planting seedlings or after covering crowns. This treatment will **not** control Fusarium root and crown rot.

Do not apply Ridomil Gold or MetaStar one day prior to harvest or illegal residues may result.

Purple Spot

Burn brush in winter to destroy overwintering sources of the fungus. Fungicide applications are not practical during the production season, because new spears emerge daily.

Once fernstalks are full size, scout on a weekly basis and apply the following and repeat every 2 to 4 weeks until frost:

Quadris--6.2-15.5 oz 2.08SC/A or
chlorothalonil--2.0-4.0 pt 6F/A or OLF

Rotate between fungicides if more than 2 applications are needed.

Asparagus Rust

Control is necessary in 1- and 2-year beds, even with the use of resistant varieties. Traditionally sprays begin in mid-August. However, scout fields particularly noncutting beds, for disease beginning in late June. Rotate between the following fungicides every 7 days at the first sign of disease:

chlorothalonil--2.0-4.0 pt 6F/A or OLF, or
Folicur--4.0-6.0 fl. oz 3.6F/A, or
mancozeb--2.0 lb 75DF/A or OLF, or
Rally--5.0 oz 40WSP/A plus an adjuvant (see label for specific details)

Use high rates under severe pressure from rust.

Rally and Folicur are FRAC code 3 fungicides and should not be used consecutively. Misuse of FRAC code 3 fungicides could lead to resistance development.