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Managing Crop Diseases with Fungicides

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This guide contains a list of fungicides labeled for use in South Dakota at the time of publication. The list is dynamic and prone to frequent changes. It therefore should not be considered as a substitute for label information. Always read and follow label directions for approved uses of these products, and check with the South Dakota Department of Agriculture for up-to-date product registration information.

According to the USDA 2007 Census of Agriculture, acreage in South Dakota treated with disease management chemicals has grown from around 41,000 acres in 2002 to nearly 800,000 acres in 2007, representing a nearly 2,000% increase in usage over just five years. For our major crops, fungicides are most effective as part of an integrated disease management strategy. Foliar fungicides alone are not the most effective means of preserving healthy plants. Well-adapted, disease-resistant varieties should always be used where possible and be combined with good cultural practices, such as crop rotation, disease-free seed, and optimal planting dates. Additionally, good crop scouting methods will help producers make sound decisions about when and where to apply fungicides as the need arises.

It is important to remember that fungicides are active only against fungi and do not directly protect against bacterial or viral diseases, nematodes, or abiotic stresses. And while there are many fungal diseases that can and do attack our crops, there are just a few that are routinely responsible for major economic losses. In corn and small-grain cereals, the residue-borne leaf spot fungi can be a problem during wet weather. For cereals, these diseases include mainly **tan spot** (caused by *Pyrenophora tritici-repentis*) and the **Septoria/Stagonospora leaf spot** complex. Another regularly occurring disease of wheat and barley is **Fusarium head blight** or scab (*Fusarium graminearum*), which can significantly affect both yield and grain quality. In corn, **gray leaf spot** (*Cercospora zeae-maydis*) can occur on susceptible hybrids; however, gray leaf spot has not been a major problem most years in South Dakota. Other corn leaf blights (**northern corn leaf blight**, **eyespot**, or others) may also occur sporadically. **Wheat leaf rust** (*Puccinia triticina*) is a potential problem each year for small grain production; however, varieties with excellent resistance to the disease are available, which should reduce the need for fungicides in many cases. Various rusts (**sunflower rust**, **common rust of corn**, **southern rust of corn**, and others) may attack other South

Expected yield (bu/A)	×	Expected yield increase (10–20%)	×	Expected selling price (\$/bu)	=	Expected Gross Return (\$/A)
Expected Gross Return (\$/A)	—	Fungicide and Application Costs (\$/A)	=	Expected Net Return (\$/A)		

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Dakota crops. **Soybean rust** (*Phakopsora pachyrizi*), which is a potentially destructive disease in some states, has not been detected in South Dakota (as of 2010). In general, soybeans have relatively minor foliar fungal problems in South Dakota; these fungal problems include **brown spot** (*Septoria glycines*), **Cercospora leaf spot** (*Cercospora kikuchii*), and **frogeye leaf spot** (*Cercospora sojina*).

The cost of fungicide management varies widely, depending on product and application method. Assuming ground-based application costs of around \$5 per acre, the most commonly used products can be applied at recommended rates for around \$15 to \$30 per acre in most crops. Aerial application is generally a bit more costly. Prices may vary depending on the dealer and the local market conditions.

A WORD ABOUT RESISTANCE MANAGEMENT...

Resistance to fungicides can develop in pathogen populations under certain conditions. When selection pressure is placed on fungi through repeated application of a single product or class of products, the population may develop reduced sensitivity to those chemicals. This can happen very quickly if repeated applications are made in a single season. Strobilurin fungicides (see list below) seem to be especially prone to this effect, while triazoles have somewhat less risk of inducing resistance. The carbamate and organochlorine protectant fungicides have multi-site modes of action and much lower risk of resistance development. To reduce the risk of developing fungicide resistant pathogens, adopt a fungicide resistance management strategy, which may include the following practices:

- Apply fungicides only when necessary to prevent or treat fungal disease.
- Apply only at recommended rates.
- Use integrated management to reduce the number of applications necessary.
- Avoid repeated applications of the same product or mode-of-action to a single site.
- Use strobilurins only as preventatives.
- Strobilurins should represent no more than 30–50% of total number of applications to a site.

COMMONLY USED FUNGICIDES:

Strobilurins (mode of action: respiration (QoI) inhibitors, FRAC Code 11):

azoxystrobin (**Quadris**; also a component of **Quilt, Quilt Xcel, Quadris Xtra, Amistar**)
fluoxastrobin (**Evito**)
pyraclostrobin (**Headline**; also a component of **TwinLine, Headline AMP**)
trifloxystrobin (a component of **Stratego, Stratego YLD**)

Triazoles (mode of action: sterol biosynthesis inhibitors, FRAC Code 3):

propiconazole (**Tilt, PropiMax EC, Bumper**; also a component of **Stratego, Quilt, Quilt Xcel**)
prothioconazole (**Proline**, also a component of **Prosaro, Stratego YLD**)
tebuconazole (**Folicur, Orius, TebuStar**, and others; a component of **Prosaro**)
metconazole (**Caramba**; also a component of **TwinLine, Headline AMP**)
myclobutanil (**Laredo**)
tetraconazole (**Domark**)
cyproconazole (**Alto 100SC**; component of **Quadris Xtra**)

Other fungicide groups (multi-site mode of action; FRAC codes M3, M5)

mancozeb (**Dithane, Penncozeb**)
chlorothalonil (**Bravo**)

GENERAL RECOMMENDATIONS FOR WHEAT AND OTHER SMALL GRAINS:

Standard flag-leaf applications: The flag leaf (or uppermost leaf) of small-grain cereals is very important to achieving maximum production and grain quality, and we strive to protect the leaf with our standard fungicide applications to those crops. Diseases such as leaf rust and leaf spots can affect the productive leaf area if resistant varieties are not used and the weather favors pathogen infection and spread. This stage is reached when the ligule of the last (flag) leaf has emerged from the whorl. The triazoles and strobilurins as well as the pre-mixed fungicide products are generally effective at managing these diseases. Refer to the most recent recommendation information from SDSU for more specific guidelines.

Flowering application for scab control: Fusarium head blight, or scab, occurs frequently in South Dakota, especially on spring grains in the more humid parts of the state. The pathogen infects the plant during and shortly after anthesis, or flowering period. When weather has been especially warm and wet during and prior to heading, scab can be a major problem. The triazole fungicides can be effective at limiting the disease impact if properly timed. For greatest efficacy, application should occur as the plant is actively flowering (when the anthers are yellow). For optimal control, producers should combine fungicides with scab-resistant varieties and should utilize a disease-forecasting tool such as the SDSU Wheat and Barley Scab Risk Advisory (found at <http://plantsci.sdstate.edu/planthealth>).

Early applications: In continuous wheat with standing stubble, an early application of fungicide is sometimes tank-mixed with post-emergent herbicides to prevent build-up of leaf diseases such as tan spot. These applications typically cost less than standard-timing applications (flag leaf or flowering) because they are generally applied at half the recommended rates and don't require a separate pass through the field. These applications may not be economical unless the above conditions (continuous crop, stubble, reduced rate, and tank-mixed with herbicide) are met; however, the reduced rates of early applications increase the risk of fungicide resistance in the pathogen population. Early applications of strobilurins fungicides should not be followed by flag-leaf applications containing the same mode of action.

Also see: SDSU Fact Sheet FS952 "South Dakota Wheat Fungicide Recommendations"

GENERAL RECOMMENDATIONS FOR ROW/PULSE CROPS:

Corn: Corn fungicide applications are often used to protect the plants during the stages from VT (tasseling) to R1 (silking). The major foliar diseases of corn are somewhat sporadic or less severe in South Dakota than in some neighboring states, and therefore fungicides should only be used when disease risk is high. High humidity or frequent rainfall

situations are generally favorable for leaf diseases; however, many hybrids possess strong resistance to some of the major pathogens. To maximize the economic benefits of fungicides in corn, fungicides should be used when disease is present and at labeled rates at the proper timing. Use particular caution when considering application of fungicide during late vegetative stages prior to tasseling (V12-V14). Evidence suggests that certain tank-mix partners and some adjuvants have the potential to damage developing ears when applied at these stages.

Soybeans: Applications to soybeans are usually made in the early reproductive stages of the crop (R1-R5). Soybean fungicides are relatively new to South Dakota growers, having emerged largely in response to the threat of soybean rust. Apart from soybean rust, which has not been detected in South Dakota, there are relatively few foliar disease of soybean that are considered to be major production threats in this state. However, a number of very effective soybean fungicides are now labeled for use in South Dakota.

Oilseed crops: Fewer fungicide products are registered for sunflowers and safflower than for our other major crops; however, these crops occasionally experience severe disease outbreaks. Rust of sunflower is an emerging disease threat in the Northern Great Plains and can be controlled through resistance or a well-timed (early flowering) fungicide application. Safflower can be susceptible to *Alternaria* leaf blight in wet years, or under irrigation, though the disease can be effectively controlled with fungicide application at the first signs of infection.

Field Pea/Chickpea: Fungicides in these crops primarily target *Ascochyta*, a seed- and soil-borne fungus that can cause very damaging leaf and/or pod blights during wet years. Sound cultural practices should be used in combination with fungicides and include the following: resistant cultivars, delayed planting, disease-free seed, appropriate residue management, and extended crop rotations.



FOLIAR FUNGICIDES FOR WHEAT

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust diseases Leaf rust (<i>Puccinia triticina</i>) Stem rust (<i>Puccinia graminis f.sp. Tritici</i>) Stripe rust (<i>Puccinia striiformis</i>)	azoxystrobin Quadris Flowable Fungicide	4–12 fl oz/A Apply prior to disease development up to late head emergence (Feekes growth stage 10.5).	Do not apply within 14 days of harvest for forage and hay. Do not apply within 45 days of harvest for grain and straw.	Pathogen resistance management: Do not apply more than 24.5 fl oz of product/A per season. Do not make more than two applications of strobilurin fungicides in one year to minimize resistance issues. A crop oil concentrate adjuvant may be added at 1.0% V/V to optimize efficacy.
	copper *Various copper products	See individual product labels. Typically applied at 7–10 day intervals beginning at early boot stage.	No limitations.	More effective on Septoria diseases, spot blotch and net blotch than on rusts.
	mancozeb Dithane M-45 Manzate Flowable Penncozeb 4FL Penncozeb 75 DF Penncozeb 80 WP	2 lbs/A 1.6 qts/A 0.8–1.6 qts/A 1–2 lbs/A 1–2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest. Do not apply more than 4.8 qts (Manzate Flowable), 6 lbs (Penncozeb 80WP), or 6.4 lbs (Penncozeb 75DF) of product per acre per season.	Use Latron CS-7 surfactant to improve product performance. Mancozeb products are not specifically labeled for stripe rust or stem rust, only for leaf rust. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	mancozeb + surfactant Dithane DF Rainshield Dithane F-45 Rainshield Manzate Pro-Stick	2 lbs/A 1.6 qts/A 2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.als	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest.	Use Latron CS-7 surfactant to improve product performance. Mancozeb products are not specifically labeled for stripe rust or stem rust, only for leaf rust. Do not apply more than 6 lbs (Dithane DF and Manzate Pro-Stick) of product per acre per season.
	metconazole Caramba	10–14 fl oz/A Apply prior to disease development. Apply immediately after flag leaf emergence (Feekes growth stage 9) for optimum results.	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC Bumper	4 fl oz/A Apply up to Feekes growth stage 10.5 (heading).	Do not apply within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay (PropiMax). Do not apply within 30 days of harvest for forage or hay (Tilt and Bumper). Do not apply Tilt and Bumper after Feekes growth stage 10.5 to avoid possible illegal residues.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season if forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season.
	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A Apply through full head emergence (Feekes growth stage 10.5).	Do not apply more than 2 applications in a single growing season. Allow at least 14 days between applications. Do not apply after Feekes growth stage 10.5 to avoid possible illegal residues.	Quilt and Quilt Xcel may be applied by ground, air, or chemigation. Do not harvest within 30 days for forage or hay. Do not apply more than 28.0 fl oz/A of Quilt, Quilt Xcel/year.

FOLIAR FUNGICIDES FOR WHEAT

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust diseases Leaf rust (<i>Puccinia triticina</i>) Stem rust (<i>Puccinia graminis f.sp. Tritic</i>) Stripe rust (<i>Puccinia striiformis</i>) (CONTINUED)	propiconazole + trifloxystrobin Stratego	10 fl oz/A Begin preventative applications when conditions favor disease development. Reapply in 14 days if disease persists or if weather conditions favor continued disease. For early season disease suppression of rusts use 4–8 fl oz/A.	If 20 fl oz/A are applied (two applications), do not graze and do not cut for forage or hay. If one application (10 fl oz/A), do not graze or feed livestock treated forage for 30 days or harvest for hay 45 days after application.	Do not apply after full head emergence (Feekes growth stage 10.5). Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply within 35 days of harvest. Do not apply more than 20 fl oz of product per acre per season.
	prothioconazole Proline	4.3–5 fl oz/A Start applications at disease onset and repeat at a 14 day interval if conditions remain favorable for disease development.	Apply up to 2 applications per year. Do not apply more than 9.37 fl oz/A/season. Do not apply within 30 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to early flowering or 5 gal/A by air if applied at the early flower growth stage (Feekes Growth Stage 10.51) or 10 gal/A ground.
	prothioconazole + tebuconazole Prosar 421 SC	6.5–8.2 fl oz/A Start applications at disease onset.	Do not apply more than 8.2 fl oz/A/season. Do not allow livestock to graze or feed green forage to livestock until 6 days after treatment. Straw cut after harvest may be fed or used for bedding. Do not apply within 30 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to early flowering or 5 gal/A by air if applied at the early flower growth stage (Feekes Growth Stage 10.51) or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.
	pyraclostrobin Headline	6–9 fl oz/A	Maximum of two applications. Do not harvest wheat hay or feed green chopped wheat within 14 days after application.	Apply no later than the beginning of flowering (Feekes growth stage 10.5). Do not apply more than 18 fl oz/A per season.
	pyraclostrobin + metconazole TwinLine	7–9 fl oz/A Use the higher rate and shorter interval when disease pressure is high.	Maximum of two applications. The minimum retreatment interval is 6–8 days after the first application.	Apply no later than the beginning of flowering (Feekes 10.5). Do not apply more than 18 fl oz/A per season.
	tebuconazole AmTide Tebu 3.6F Embrace Folicur Monsoon Onset 3.6L Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	4 fl oz/A Begin application when disease first appears.	Do not apply more than 4 fl oz/A/season. Do not apply within 30 days of harvest. Do not allow livestock to graze or feed green forage to live-stock until 6 days after treatment.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate. Straw cut after harvest may be fed or used for bedding.

FOLIAR FUNGICIDES FOR WHEAT

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Leaf spotting diseases Septoria leaf diseases <i>(S. nodorum, S. tritici, and S. avenae f.sp. triticea)</i> Septoria glume blotch <i>(S. nodorum)</i> Tan spot <i>(Pyrenophora tritici-repentis)</i> Spot blotch <i>(Helminthosporium sativum)</i>	azoxystrobin Quadris Flowable Fungicide	4–12 fl oz/A Apply prior to disease development up to late head emergence (Feekes growth stage 10.5).	Do not apply within 14 days of harvest for forage and hay. Do not apply within 45 days of harvest for grain and straw. Quadris is not specifically registered for spot blotch.	Pathogen resistance management: Do not apply more than 24.5 fl oz of product/A per season. Do not make more than two applications of strobilurin fungicides in one year to minimize resistance issues. A crop oil concentrate adjuvant may be added at 1.0% V/V to optimize efficacy.
	copper *Various copper products	See individual product labels. Typically applied at 7–10 day intervals beginning at early boot stage.	No limitations	Coppers are most effective on Septoria diseases, spot blotch, and net blotch.
	mancozeb Dithane M-45 Manzate Flowable Penncozeb 4FL Penncozeb 75 DF Penncozeb 80 WP	2 lbs/A 1.6 qts/A 0.8–1.6 qts/A 1–2 lbs/A 1–2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest. Do not apply more than 4.8 qts (Manzate Flowable), 6 lbs (Penncozeb 80WP), or 6.4 lbs (Penncozeb 75DF) of product per acre per season.	Use Latron CS-7 surfactant to improve product performance. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	mancozeb + surfactant Dithane DF Rainshield Dithane F-45 Rainshield Manzate Pro-Stick	2 lbs/A 1.6 qts/A 2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest.	Use Latron CS-7 surfactant to improve product performance. Do not apply more than 6 lbs (Dithane DF and Manzate Pro-Stick) of product per acre per season.
	metconazole Caramba	10–14 fl oz/A Apply prior to disease development. Apply immediately after flag leaf emergence (Feekes growth stage 9) for optimum results.	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC Bumper	2–4 fl oz/A Apply up to Feekes growth stage 10.5 (heading).	Do not apply within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay (PropiMax). Do not apply within 30 days of harvest for forage or hay (Tilt and Bumper). Do not apply Tilt and Bumper after Feekes growth stage 10.5 to avoid possible illegal residues.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season if forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season. 2 fl oz/A rate is for early season tan spot control.

FOLIAR FUNGICIDES FOR WHEAT

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Leaf spotting diseases Septoria leaf diseases <i>(S. nodorum, S. tritici, and S. avenae f.sp. triticea)</i> Septoria glume blotch <i>(S. nodorum)</i> Tan spot <i>(Pyrenophora tritici-repentis)</i> Spot blotch <i>(Helminthosporium sativum)</i> (CONTINUED)	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A Apply through full head emergence (Feekes growth stage 10.5). Use the 7–14 fl oz/A rate for early season disease suppression.	Do not apply more than 2 applications in a single growing season. Allow at least 14 days between applications. Do not apply after Feekes growth stage 10.5 to avoid possible illegal residues. Do not apply more than 28.0 fl oz/A of Quilt, Quilt Xcel/year.	Quilt, Quilt Xcel may be applied by ground, air, or chemigation. Do not harvest within 30 days for forage or hay. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	propiconazole + trifloxystrobin Stratego	10 fl oz/A For early season disease control of tan spot and Septoria use 4-8 fl oz/A. Begin preventative applications when conditions favor disease development. A second application may be made at least 14 days following the first.	If 20 fl oz/A are applied (two applications), do not graze and do not cut for forage or hay. If one application is/or a total of 10 fl oz/A, do not graze or feed livestock treated forage for 30 days or harvest for hay 45 days after application.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply within 35 days of harvest. Do not apply more than 20 fl oz of product per acre per season. Do not apply after full head emergence (Feekes growth stage 10.5)
	prothioconazole Proline	4.3–5 fl oz/A Start applications at disease onset and repeat at a 14 day interval if conditions remain favorable for disease development.	Apply up to 2 applications per year. Do not apply more than 9.37 fl oz/A/season. Do not apply within 30 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to early flowering or 5 gal/A by air if applied at the early flower growth stage (Feekes Growth Stage 10.51) or 10 gal/A ground.
	prothioconazole + tebuconazole Prostaro 421 SC	6.5–8.2 fl oz/A Start applications at disease onset.	Do not apply more than 8.2 fl oz/A/season. Do not allow livestock to graze or feed green forage to livestock until 6 days after treatment. Straw cut after harvest may be fed or used for bedding. Do not apply within 30 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to early flowering or 5 gal/A by air if applied at the early flower growth stage (Feekes Growth Stage 10.51) or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.
	pyraclostrobin Headline	3–9 fl oz/A 3–6 fl oz/A applied early season with herbicide. 6–9 fl oz/A applied up to Feekes growth stage 10.5 If conditions favor disease, apply the higher rate.	Maximum of two applications. Do not apply more than 18 fl oz/A per season. Do not harvest wheat hay or feed green chopped wheat within 14 days after application.	Apply no later than the beginning of flowering (Feekes growth stage 10.5).
	pyraclostrobin + metconazole TwinLine	7–9 fl oz/A Use the higher rate and shorter interval when disease pressure is high.	Maximum of two applications. The minimum retreatment interval is 6–8 days after the first application.	Apply no later than the beginning of flowering (Feekes 10.5). Do not apply more than 18 fl oz/A per season.
Powdery mildew <i>(Blumeria graminis f.sp. tritici)</i>	azoxystrobin Quadris Flowable Fungicide	7.5–11 fl oz/A Apply prior to disease development up to late head emergence (Feekes growth stage 10.5).	Do not apply within 14 days of harvest for forage and hay. Do not apply within 45 days of harvest for grain and straw.	Pathogen resistance management: Do not apply more than 24.5 fl oz of product/A per season. Do not make more than two applications of strobilurin fungicides in one year. A crop oil concentrate adjuvant may be added at 1.0% V/V to optimize efficacy.

FOLIAR FUNGICIDES FOR WHEAT

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Powdery mildew <i>(Blumeria graminis f.sp. tritici)</i> (CONTINUED)	metconazole Caramba	10–14 fl oz/A Apply prior to disease development. Apply immediately after flag leaf emergence (Feekes growth stage 9) for optimum results.	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC Bumper	2–4 fl oz/A Apply up to Feekes growth stage 10.5 (heading).	Do not apply within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay (PropiMax). Do not apply within 30 days of harvest for forage or hay (Tilt and Bumper). Do not apply Tilt and Bumper after Feekes growth stage 10.5 to avoid possible illegal residues.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season if forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A Apply through full head emergence (Feekes growth stage 10.5). Use the 7–14 fl oz/A rate for early season disease suppression.	Do not apply more than 2 applications in a single growing season. Allow at least 14 days between applications. Do not apply after Feekes growth stage 10.5 to avoid possible illegal residues.	Quilt, Quilt Xcel may be applied by ground, air, or chemigation. Do not harvest within 30 days for forage or hay. Do not apply more than 28.0 fl oz/A of Quilt, Quilt Xcel/year.
	propiconazole + trifloxystrobin Stratego	10 fl oz/A Begin preventative applications when conditions favor disease development. A second application may be made at least 14 days following the first. For early season disease control of powdery mildew use 4–8 fl oz/A.	If 20 fl oz/A are applied (two applications), do not graze and do not cut for forage or hay. If one application (10 fl oz/A), do not graze or feed livestock treated forage for 30 days or harvest for hay 45 days after application.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply within 35 days of harvest. Do not apply more than 20 fl oz of product per acre per season. Do not apply after full head emergence (Feekes growth stage 10.5).
	prothioconazole Proline	4.3–5 fl oz/A Start applications at disease onset and repeat at a 14 day interval if conditions remain favorable for disease development.	Apply up to 2 applications per year. Do not apply more than 9.37 fl oz/A/season. Do not apply within 30 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to early flowering or 5 gal/A by air if applied at the early flower growth stage (Feekes Growth Stage 10.51) or 10 gal/A ground.
	prothioconazole + tebuconazole Prosaro 421 SC	6.5–8.2 fl oz/A Start applications at disease onset.	Do not apply more than 8.2 fl oz/A/season. Do not allow livestock to graze or feed green forage to livestock until 6 days after treatment. Straw cut after harvest may be fed or used for bedding. Do not apply within 30 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to early flowering or 5 gal/A by air if applied at the early flower growth stage (Feekes Growth Stage 10.51) or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.
	pyraclostrobin Headline	6–9 fl oz/A	Maximum of two applications. Do not apply more than 18 fl oz/A per season. Do not harvest wheat hay or feed green chopped wheat within 14 days after application.	Apply no later than the beginning of flowering (Feekes growth stage 10.5).

FOLIAR FUNGICIDES FOR WHEAT

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Powdery mildew <i>(Blumeria graminis f.sp. tritici)</i> (CONTINUED)	pyraclostrobin + metconazole TwinLine	7–9 fl oz/A Use the higher rate and shorter interval when disease pressure is high.	Maximum of two applications. The minimum retreatment interval is 6–8 days after the first application.	Apply no later than the beginning of flowering (Feekes 10.5). Do not apply more than 18 fl oz/A per season.
	sulfur *Various sulfur products are available.	See individual product labels.	No PHI listed.	Elemental sulfur is used primarily for powdery mildew control. Avoid application during periods of high temperature or plant injury may occur.
Head Blight/Scab <i>(Fusarium graminearum and others)</i>	metconazole Caramba	13.5–17 fl oz/A Apply at the beginning of anthesis (Feekes growth stage 10.51).	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC Bumper	4 fl oz/A Apply at approximately 50% flowering.	Do not apply within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay (PropiMax). Do not apply within 30 days of harvest for forage or hay (Tilt, Bumper).	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season if forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season.
	prothioconazole Proline	5.0–5.7 fl oz/A Apply at early flowering (Feekes growth stage 10.51).	Do not apply more than 9.37 fl oz/A/season. Do not apply within 30 days of harvest.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. Do not apply within 30 days of harvest.
	prothioconazole + tebuconazole Prosaro 421 SC	6.5–8.2 fl oz/A Apply at the beginning of anthesis (Feekes growth stage 10.51).	Do not apply more than 8.2 fl oz/A /season. Do not allow livestock to graze or feed green forage to livestock until 6 days after treatment. Straw cut after harvest may be fed or used for bedding.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.
	tebuconazole Amtide Tebu 3.6F Embrace Folicur Monsoon Onset 3.6L Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	4 fl oz/A Apply at the beginning of anthesis (Feekes growth stage 10.51).	Do not apply more than 4 fl oz/A/season. Do not apply within 30 days of harvest. Do not allow livestock to graze or feed green forage to live-stock until 6 days after treatment.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate. Straw cut after harvest may be fed or used for bedding.

*Copper and sulfur products are acceptable for organic production.

FOLIAR FUNGICIDES FOR BARLEY

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Leaf rust (<i>Puccinia hordei</i>) Septoria blotch (<i>S. passerinii</i> and <i>S. avenae f.sp. triticea</i>) Spot blotch (<i>Helminthosporium sativum</i>) Net blotch (<i>Pyrenophora teres</i>) Scald (<i>Rhynchosporium secalis</i>)	azoxystrobin Quadris Flowable Fungicide	6–12 fl oz/A (Leaf rust) 9–12 fl oz/A (Net blotch) Apply prior to disease development up to until late head emergence (Feekes growth stage 10.5).	Do not apply within 14 days of harvest for forage and hay. Do not apply within 45 days of harvest for grain and straw.	Pathogen resistance management: Do not apply more than 24.5 fl oz of product/A per season. Do not make more than two applications of strobilurin fungicides in one year. A crop oil concentrate adjuvant may be added at 1.0% V/V to optimize efficacy.
	copper *Various copper products	See individual product labels. Typically applied at 7–10 day intervals beginning at early boot stage.	No PHI listed.	
	mancozeb Dithane M-45 Manzate Flowable Penncozeb 4FL Penncozeb 75 DF Penncozeb 80 WP	2 lbs/A 1.6 qts/A 0.8–1.6 qts/A 1–2 lbs/A 1–2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest. Do not apply more than 4.8 qts (Manzate Flowable), 6 lbs (Penncozeb 80WP), or 6.4 lbs (Penncozeb 75DF) of product per acre per season.	Use Latron CS-7 surfactant to improve product performance. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	mancozeb + surfactant Dithane DF Rainshield Dithane F-45 Rainshield Manzate Pro-Stick	2 lbs/A 1.6 qts/A 2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest.	Use Latron CS-7 surfactant to improve product performance. Do not apply more than 6 lbs (Dithane DF and Manzate Pro-Stick) of product per acre per season.
	metconazole Caramba	10–14 fl oz/A Apply prior to disease development. Apply immediately after flag leaf emergence (Feekes growth stage 9) for optimum results.	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC Bumper	4 fl oz/A Apply up to Feekes growth stage 10.5 (heading).	Do not apply PropiMax and Bumper within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay. Do not apply Tilt within 30 days of harvest for forage or hay. Do not apply Tilt within 45 days of harvest.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season if forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season.
	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A	Do not apply more than 2 applications in a single growing season. Allow at least 14 days between applications. Do not apply within 45 days of harvest.	Quilt, Quilt Xcel may be applied by ground, air, or chemigation. Do not harvest within 30 days for forage or hay. Do not apply more than 28.0 fl oz/A of Quilt, Quilt Xcel/year.

FOLIAR FUNGICIDES FOR BARLEY

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Leaf rust (<i>Puccinia hordei</i>) Septoria blotch (<i>S. passerinii</i> and <i>S. avenae</i> f.sp. <i>triticea</i>) Spot blotch (<i>Helminothosporium sativum</i>) Net blotch (<i>Pyrenophora teres</i>) Scald (<i>Rhynchosporium secalis</i>) (CONTINUED)	propiconazole + trifloxystrobin Stratego	7 fl oz/A Apply until the ligule of the flag leaf emerges (Feekes growth stage 9). For early season control of net and spot blotch use 4–5 fl oz/A.	Do not apply more than 2 applications (14 fl oz/A) in a single growing season. Allow at least 14 days between applications. If one application (7 fl oz/A) is applied, do not allow livestock to graze or feed for 30 days or harvest hay for 45 days after application.	Do not apply within 40 days of harvest. If 2 applications (14 fl oz/A) are applied, do not allow livestock to graze or harvest for forage or hay.
	prothioconazole Proline	2.8–4.3 fl oz/A Start applications at disease onset and repeat at a 14 day interval if conditions remain favorable for disease development.	Apply up to 2 applications per year. Do not apply more than 9.37 fl oz/A/season. Do not apply within 32 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to heading or 5 gal/A by air if applied at the heading growth stage (Feekes growth stage 10.5) or 10 gal/A ground.
	prothioconazole + tebuconazole Prostaro 421 SC	6.5–8.2 fl oz/A Start applications at disease onset.	Do not apply more than 8.2 fl oz/A/season. Do not allow livestock to graze or feed green forage to livestock until 6 days after treatment. Straw cut after harvest may be fed or used for bedding.	Do not apply within 30 days of harvest. Apply a minimum of 2 gal/A by air if applied prior to heading or 5 gal/A by air if applied at the heading growth stage (Feekes growth stage 10.5) or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.
	pyraclostrobin Headline	6–9 fl oz/A 3- 6 fl oz/A for early season control of Septoria leaf and glume blotch, Net blotch and Spot blotch.	Maximum of two applications. Do not apply more than 18 fl oz/A per season. 14 day PHI for barley hay and feeding green-chopped barley.	Do not apply after 50% head emergence (Feekes growth stage 10.3).
	pyraclostrobin + metconazole TwinLine	7–9 fl oz/A Use the higher rate and shorter interval when disease pressure is high.	Maximum of two applications. The minimum retreatment interval is 6–8 days after the first application. Do not harvest barley hay within 14 days after the last application.	Apply no later than the beginning of flowering (Feekes 10.5). Do not apply more than 18 fl oz/A per season.
	tebuconazole AmTide Tebu 3.6F Embrace Folicur Monsoon Onset 3.6F Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzole 3.6F Toledo	4 fl oz/A (Rusts) Begin application when disease first appears.	Do not apply more than 4 fl oz/A/season. Do not apply within 30 days of harvest. Do not allow livestock to graze or feed green forage to live-stock until 6 days after treatment.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate. Straw cut after harvest may be fed or used for bedding.

FOLIAR FUNGICIDES FOR BARLEY

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Powdery mildew <i>(Blumeria graminis f.sp. hordei)</i>	azoxystrobin Quadris Flowable Fungicide	12 fl oz/A Apply prior to disease development up to until late head emergence (Feekes growth stage 10.5).	Do not apply within 14 days of harvest for forage and hay. Do not apply within 45 days of harvest for grain and straw.	Pathogen resistance management: Do not apply more than 24.5 fl oz of product/A per season. Do not make more than two applications of strobilurin fungicides in one year. A crop oil concentrate adjuvant may be added at 1.0% V/V to optimize efficacy.
	metconazole Caramba	10–14 fl oz/A Apply prior to disease development. Apply immediately after flag leaf emergence (Feekes growth stage 9) for optimum results.	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC Bumper	2–4 fl oz/A Apply up to Feekes growth stage 10.5 (heading).	Do not apply PropiMax EC and Bumper within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay. Do not apply Tilt within 30 days of harvest for forage or hay. Do not apply Tilt within 45 days of harvest.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season of forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A Use the 7–14 fl oz/A rate for early season disease suppression.	Do not apply more than 2 applications in a single growing season. Allow at least 14 days between applications. Do not apply within 45 days of harvest.	Quilt, Quilt Xcel may be applied by ground, air, or chemigation. Do not harvest within 30 days for forage or hay. Do not apply more than 28.0 fl oz/A of Quilt, Quilt Xcel/year.
	propiconazole + trifloxystrobin Stratego	7 fl oz/A Apply until the ligule of the flag leaf emerges (Feekes growth stage 9).	Do not apply more than 2 applications (14 fl oz/A) in a single growing season. Allow at least 14 days between applications. If one application (7 fl oz/A) is applied, do not allow livestock to graze or feed for 30 days or harvest hay for 45 days after application.	Do not apply within 40 days of harvest. If 2 applications (14 fl oz/A) are applied, do not allow livestock to graze or harvest for forage or hay.
	prothioconazole Proline	2.8–4.3 fl oz/A Start applications at disease onset and repeat at a 14 day interval if conditions remain favorable for disease development.	Apply up to 2 applications per year. Do not apply more than 9.37 fl oz/A/season. Do not apply within 32 days of harvest.	Apply a minimum of 2 gal/A by air if applied prior to heading or 5 gal/A by air if applied at the heading growth stage (Feekes Growth Stage 10.5) or 10 gal/A ground.
	prothioconazole + tebuconazole Prosaro 421 SC	6.5–8.2 fl oz/A Start applications at disease onset.	Do not apply more than 8.2 fl oz/A/season. Do not allow livestock to graze or feed green forage to livestock until 6 days after treatment. Straw cut after harvest may be fed or used for bedding.	Do not apply within 30 days of harvest. Apply a minimum of 2 gal/A by air if applied prior to heading or 5 gal/A by air if applied at the heading growth stage (Feekes growth stage 10.5) or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.

FOLIAR FUNGICIDES FOR BARLEY

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Powdery mildew <i>(Blumeria graminis f.sp. hordei)</i> (CONTINUED)	pyraclostrobin Headline	6–9 fl oz/A	Maximum of two applications. Do not apply more than 18 fl oz/A per season. 14 day PHI for barley hay and feeding green-chopped barley.	Do not apply after 50% head emergence (Feekes growth stage 10.3).
	pyraclostrobin + metconazole TwinLine	7–9 fl oz/A Use the higher rate and shorter interval when disease pressure is high.	Maximum of two applications. The minimum retreatment interval is 6–8 days after the first application. Do not harvest barley hay within 14 days after the last application.	Apply no later than the beginning of flowering (Feekes 10.5). Do not apply more than 18 fl oz/A per season.
	sulfur *Various sulfur products are available.	See individual product labels.	No PHI listed.	Elemental sulfur is used primarily for powdery mildew control. Avoid application during periods of high temperature or plant injury may occur.
Head Blight/Scab <i>(Fusarium graminearum and others)</i>	metconazole Caramba	13.5–17 fl oz/A Apply at the beginning of anthesis (Feekes growth stage 10.51).	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC	4 fl oz/A Apply at approximately 50% flowering.	Do not apply PropiMax EC within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay. Do not apply Tilt within 30 days of harvest for forage or hay. Do not apply Tilt within 45 days of harvest.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season if forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season.
	prothioconazole Proline	5.0–5.7 fl oz/A Apply when the heads on the main stem are fully emerged (Feekes growth stage 10.5).	Do not apply more than 9.37 fl oz/A/season. Do not apply within 32 days of harvest.	Apply a minimum of 5 gal/A by air or 10 gal/A ground.
	prothioconazole + tebuconazole Prostaro 421 SC	6.5–8.2 fl oz/A Apply when the heads on the main stem are fully emerged (Feekes growth stages 10.5).	Do not apply more than 8.2 fl oz/A/season. Do not allow livestock to graze or feed green forage to livestock until 6 days after treatment. Do not apply within 30 days of harvest.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate. Straw cut after harvest may be fed or used for bedding.
	tebuconazole Embrace Folicur Monsoon Onset 3.6L Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	4 fl oz/A Apply when 50% of the heads on the main stem are emerged (Feekes growth stage 10.5).	Do not apply more than 4 fl oz/A/season. Do not apply within 30 days of harvest. Do not allow livestock to graze or feed green forage to live-stock until 6 days after treatment.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate. Straw cut after harvest may be fed or used for bedding.

*Copper and sulfur products are acceptable for organic production.

FOLIAR FUNGICIDES FOR OATS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Septoria leaf diseases <i>(S. avenae f.sp. avenae)</i> Crown (leaf) rust <i>(Puccinia coronata)</i> Stem rust <i>(Puccinia graminis f.sp. avenae)</i> Powdery mildew <i>(Erysiphe graminis f.sp. avenae)</i>	mancozeb Dithane M-45 Manzate Flowable Penncozeb 4FL Penncozeb 75 DF Penncozeb 80 WP	2 lbs/A 1.6 qts/A 0.8–1.6 qts/A 1–2 lbs/A 1–2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest. Do not apply more than 4.8 qts (Manzate Flowable), 6 lbs (Penncozeb 80WP), or 6.4 lbs (Penncozeb 75DF) of product per acre per season.	Use Latron CS-7 surfactant to improve product performance. Mancozeb products are not specifically labeled for stem rust, only for leaf rust. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	mancozeb + surfactant Dithane DF Rainshield Dithane F-45 Rainshield Manzate Pro-Stick	2 lbs/A 1.6 qts/A 2 lbs/A Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	Do not make more than three applications during the season. Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest. Do not graze livestock in treated areas prior to harvest.	Use Latron CS-7 surfactant to improve product performance. Mancozeb products are not specifically labeled for stem rust, only for leaf rust. Do not apply more than 6 lbs (Dithane DF and Manzate Pro-Stick) of product per acre per season.
	metconazole Caramba	10–14 fl oz/A Apply prior to disease development. Apply immediately after flag leaf emergence (Feekes growth stage 9) for optimum results.	Maximum of two applications. Do not apply within 30 days of harvest.	Do not apply more than 34 fl oz/A/Season.
	propiconazole Tilt PropiMax EC Bumper	2–4 fl oz/A Apply up to Feekes growth stage 10.5 (heading) (PropiMax EC and Bumper).	Do not apply PropiMax EC and Bumper within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay. Do not apply Tilt within 30 days of harvest for forage or hay. Do not apply Tilt within 45 days of harvest.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 4 fl oz/A per season if forage or hay will be harvested. Do not apply more than 8 fl oz of product/A per season. Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	propiconazole + trifloxystrobin Stratego	7 fl oz/A Apply until the ligule of the flag leaf emerges (Feekes growth stage 9).	Do not apply more than 2 applications (14 fl oz/A) in a single growing season. Allow at least 14 days between applications. If one application (7 fl oz/A) is applied, do not allow livestock to graze or feed for 30 days or harvest hay for 45 days after application.	Do not apply within 40 days of harvest. If 2 applications (14 fl oz/A) are applied, do not allow livestock to graze or harvest for forage or hay.
	pyraclostrobin Headline	6–9 fl oz/A 3-6 fl oz/A for early season control of Leaf blotch and Septoria blotch.	Maximum of two applications. Do not apply more than 18 fl oz/A per season. Do not harvest oat or feed green-chopped oats within 14 days of last application.	Apply no later than the beginning of flowering (Feekes 10.5).
	pyraclostrobin + metconazole TwinLine	7–9 fl oz/A Use the higher rate and shorter interval when disease pressure is high.	Maximum of two applications. The minimum retreatment interval is 6–8 days after the first application.	Apply no later than the beginning of flowering (Feekes 10.5). Do not apply more than 18 fl oz/A per season.

FOLIAR FUNGICIDES FOR RYE

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Leaf rust <i>(Puccinia rubigo-vera f.sp. secalis)</i> Septoria leaf diseases <i>(S. nodorum and S. tritici)</i> Glume blotch <i>(S. nodorum)</i> Powdery mildew <i>(Erysiphe graminis f.sp. secalis)</i> Spot blotch <i>(Helminthosporium sativum)</i> Tan spot <i>(Pyrenophora tritici-repentis)</i>	mancozeb			
	Dithane M-45	2 lbs/A	Do not make more than three applications during the season.	Use Latron CS-7 surfactant to improve product performance.
	Manzate Flowable	1.6 qts/A	Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest.	Mancozeb products are not specifically labeled for stripe rust or stem rust, only for leaf rust.
	Penncozeb 4FL	0.8–1.6 qts/A		
	Penncozeb 75 DF	1–2 lbs/A	Do not graze livestock in treated areas prior to harvest.	Low rates are intended for use at the tillering stage when the crop canopy volume is relatively small.
	Penncozeb 80 WP	1–2 lbs/A	Do not apply more than 4.8 qts (Manzate Flowable), 6 lbs (Penncozeb 80WP), or 6.4 lbs (Penncozeb 75DF) of product per acre per season.	
			Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.	
	mancozeb + surfactant			
	Dithane DF Rainshield	2 lbs/A	Do not make more than three applications during the season.	Use Latron CS-7 surfactant to improve product performance.
	Dithane F-45 Rainshield	1.6 qts/A	Do not apply after Feekes growth stage 10.5 or heading, and not less than 26 days before harvest.	Mancozeb products are not specifically labeled for stripe rust or stem rust, only for leaf rust.
	Manzate Pro-Stick	2 lbs/A	Do not graze livestock in treated areas prior to harvest.	Do not apply more than 6 lbs of (Dithane DF and Manzate Pro-Stick) of product per acre per season.
		Start applications at disease onset or when crop is in the tillering to jointing stage and repeat at 7–10 day intervals.		
	metconazole	10–14 fl oz/A	Maximum of two applications.	Do not apply more than 34 fl oz/A/Season.
	Caramba	Apply prior to disease development. Apply immediately after flag leaf emergence (Feekes growth stage 9) for optimum results.	Do not apply within 30 days of harvest.	
	propiconazole	2-4 fl oz/A		
	Tilt	Apply up to Feekes growth stage 10.5 (heading) (PropiMax EC and Bumper).	Do not apply PropiMax EC and Bumper within 30 days of harvest for forage, 40 days before harvest for grain and straw and 45 days before harvest for hay.	Apply a minimum of 2 gal/A by air or 10 gal/A ground.
	PropiMax EC			Do not apply more than 4 fl oz/A per season if forage or hay will be harvested.
	Bumper		Do not apply Tilt within 30 days of harvest for forage or hay. Do not apply Tilt within 45 days of harvest.	Do not apply more than 8 fl oz of product/A per season.
	pyraclostrobin	6–9 fl oz/A	Maximum of two applications.	Apply no later than 50% head emergence (Feekes growth stage 10.3).
	Headline	3-6 fl oz/A for early season control of Septoria leaf and glume blotch.	Do not apply more than 18 fl oz/A per season.	
	pyraclostrobin + metconazole	7–9 fl oz/A	Maximum of two applications.	Apply no later than the beginning of flowering (Feekes 10.5).
	TwinLine	Use the higher rate and shorter interval when disease pressure is high.	The minimum retreatment interval is 6–8 days after the first application.	Do not apply more than 18 fl oz/A per season.

SMALL GRAINS GROWTH STAGE CHART	
Feekes Scale	Description
1	First leaf through coleoptile
2	Main shoot and 1 tiller
3	Main shoot and 6 tillers
4-5	Pseudo stem erection
6	1st node detectable
7	2nd node detectable
8	Flag leaf just visible
9	Flag leaf collar just visible
10	Boots just swollen
10.1	First awns visible

SMALL GRAINS GROWTH STAGE CHART	
Feekes Scale	Description
10.2	1/4 of inflorescence emerged
10.3	1/2 of inflorescence emerged
10.4	3/4 of inflorescence emerged
10.5	Emergence of inflorescence completed
10.51	Beginning of anthesis
10.54	Kernel is watery ripe
11.1	Medium milk
11.2	Soft dough
11.3	Kernel is hard (difficult to divide by thumbnail)
11.4	Kernel is hard (can no longer be dented by thumbnail)

FOLIAR FUNGICIDES FOR GRASSES GROWN for SEED				
Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust <i>(Puccinia graminis Puccinia triticina)</i> Powdery mildew <i>(Erysiphe graminis)</i>	azoxystrobin Abound	6.2-15.4 fl oz/A Begin applications prior to disease development and repeat every 10-14 days.	Do not apply within 8 days of harvest. Do not apply more than two sequential applications without alternating with another fungicide chemistry. Do not apply more than 49 fl oz of product per acre per season.	Abound may be applied by ground, air or chemigation. An adjuvant may be added at specific rates.
	pyraclostrobin Headline	6-12 fl oz/A Begin applications prior to disease development and reapply in 14-21 days.	Maximum of two applications. Do not apply more than 24 fl oz/A per season.	27 day PHI for hay or grazing. 14 day PHI for harvest.
	tebuconazole AmTide Tebu 3.6F Folicur Embrace Monsoon Onset 3.6L Orius 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo Orius 20AQ Solera Tebuconazole 3.6F	4-8 fl oz/A Begin applications for rust when conditions are favorable or when the first pustules are present and repeat every 14-16 days. Begin applications when powdery mildew first appears and repeat every 14-16 days. Under heavy disease pressure use 6-8 fl oz/A and shorter intervals. 8.6-17.2 fl oz/A. Under heavy pressure use 12.9-17.2 fl oz/A and shorter intervals. 4-8 fl oz/A	4 day preharvest interval. Do not forage, cut green chop or use seed for feed purposes.	Use 20 gal/A for ground or 10 gal/A for air application (Folicur, Embrace, Monsoon, Onset, Orius 3.6F, Orius 20AQ, Solera Tebuconazole 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F and Toledo) or 10 gal/A ground or 20 gal/A air (AmTide Tebu 3.6F). Do not apply more than 16 fl oz (AmTide Tebu 3.6F, Folicur, Embrace, Monsoon, Onset, Orius 3.6F, Solera Tebuconazole 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F and Toledo) or 34.4 fl oz (Orius 20AQ) of product per acre per season. A spray surfactant at the lowest minimum rate may be added to optimize efficacy.

FOLIAR FUNGICIDES FOR GRASSES GROWN for SEED

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes	
Leaf rust	chlorothalonil		Do not apply within 14 days of harvest.	Apply by ground, air or through chemigation.	
Stripe rust	Bravo Ultrex	0.9–1.4 lbs/A			
Stem rust	Bravo Weather Stik	1–1.5 pints/A	Do not graze livestock in treated areas.	Use sufficient water to obtain adequate coverage, 5-10 gal/A for concentrated ground and aerial application.	
Septoria leaf spot	Echo 720	1–1.5 pints/A	Do not feed treated plant parts to livestock (Bravo Ultrex, Echo 720, Echo 90DF, Echo ZN).		
Glume blotch	Echo 90DF	0.88–1.25 lbs/A		Do not apply more than 6 pints (Bravo Weather Stik, Equus 720 SST), 5.4 lbs. (Bravo Ultrex, Equus DF), 8.5 pints (Equus 500 ZN), 4.5 lbs a.i. (Echo 90DF, Echo 720, Echo ZN) of product per acre per season.	
Bipolaris and Drechslera leaf spots (various fungal species)	Echo ZN	1.5-2 pints	Feeding of treated plant parts after harvest of seed is allowed for Bravo Weather Stik, Equus 500 ZN, Equus 720 SST and Equus DF.		
	Equus 500 ZN	1.5-2.25 pints/A			
	Equus 720 SST	1.0–1.5 pints/A			
	Equus DF	0.9–1.4 lbs/A			
			Begin applications at stem elongation and reapply at flag leaf emergence and repeat every 14 days thereafter.		
	tebuconazole	4–8 fl oz/A		4 day preharvest interval.	Use 20 gal/A for ground or 10 gal/A for air application (Folicur, Embrace, Monsoon, Onset, Orius 3.6F, Solera Tebuconazole 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F and Toledo) or 10 gal/A ground or 20 gal/A air (AmTide Tebu 3.6F).
	AmTide Tebu 3.6F	Begin applications when conditions are favorable for disease and repeat every 14–16 days.	Do not forage, cut green chop or use seed for feed purposes.		
Folicur					
Embrace	Under heavy disease pressure use 6–8 fl oz/A and shorter intervals.				
Monsoon					
Onset 3.6L					
Orius 3.6F					
Tebusha 3.6FL					
TebuStar 3.6L					
Tebuzol 3.6F					
Toledo					
Solera Tebuconazole 3.6F	4-8 fl oz/A			Do not apply more than 16 oz of product per acre per season. A spray surfactant at the lowest minimum rate may be added to optimize efficacy.	

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Gray leaf spot (<i>Cercospora zeae maydis</i>)	azoxystrobin		Do not apply within 7 days of harvest.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation.
	Quadris	6.2–9 fl oz/A	Do not apply more than two sequential applications without alternating with another fungicide chemistry.	Quadris and Amistar may be applied by ground, air or through chemigation.
	Amistar	3–5 oz/A	Do not apply more than 2 applications of Quadris, or Amistar, or other strobilurin fungicides per year.	Do not apply more than 123 fl oz of product/A (Quadris) or 2.0 lbs a.i./A (Amistar) per season.
		Apply at the first sign of gray leaf spot symptoms. A second application may be required 14 days later.		
	fluoxastrobin	2.0-5.7 fl oz/A	Do not apply more than 2 applications.	Do not apply more than 11.4 fl oz/A per season.
	Evito 480SC	Apply before disease occurs and at a 7 day interval.	Do not apply within 30 days of harvest.	Evito 480SC may be applied by ground, air or chemigation.
			Do not apply after the R4 growth stage.	

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Gray leaf spot <i>(Cercospora zeae maydis)</i> (CONTINUED)	fluoxastrobin + tebuconazole Evito T	4-9 fl oz/A Apply before disease occurs and at a 7 day interval.	Do not apply more than 2 applications. Do not apply after the R4 growth stage. Do not apply more than 18 fl oz/A per season.	Evito T may be applied by ground, air or chemigation. Apply a minimum of 3 gal/A by air or 10 gal/A ground. Evito T may be applied up to 36 days before harvest of grain or fodder.
	mancozeb Manzate Flowable Penncozeb 4FL Penncozeb 75 DF Penncozeb 80 WP	1.2 qts/A 0.8–1.2 qts/A 1–1.5 lbs/A (repeat as needed) 1–1.5 lbs/A (repeat as needed) Start applications at disease onset and repeat at 4–7 day intervals.	Do not apply more than 12 qts (Manzate Flowable and Penncozeb 4FL), 15 lbs (Penncozeb 80WP), or 16 lbs (Penncozeb 75 DF) of product per acre per season. Do not feed treated forage to livestock.	Do not apply within 40 days of harvest. Use Latron CS-7 surfactant to improve product performance.
	mancozeb + surfactant Manzate Pro-Stick	1.5 lbs/A Start applications at disease onset and repeat at 4–7 day intervals.	Do not apply more than 15 lbs of product per acre per season. Do not feed treated forage to livestock.	Do not apply within 40 days of harvest.
	propiconazole Tilt PropiMax EC Bumper	4 fl oz/A Apply when disease first appears. If conditions favorable for disease persist, reapply every 7–14 days.	Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 16 fl oz/A/season.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 8 fl oz/A/season on field corn harvested for forage.
	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A Apply when disease first appears. If conditions favorable for disease persists, reapply every 14 days.	Do not apply more than 2 applications of Quilt, Quilt Xcel or other strobilurin fungicides per year. Do not apply more than 28 fl oz/A for field corn harvested for forage.	Quilt, Quilt Xcel may be applied by ground, air or chemigation. Do not apply more than 56 fl oz/A per season. Do not apply within 30 days of harvest for forage, grain or stover.
	propiconazole + trifloxystrobin Stratego	10–12 fl oz/A Apply when disease first appears and at 7–14 day intervals, thereafter if conditions continue to favor disease.	Do not apply more than 24 fl oz/A of Stratego/year. Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 2 sequential applications of Stratego. Do not apply more than 2 total applications of Stratego or other strobilurin fungicides.	Use higher rates and shorter intervals when disease pressure is high.
	prothioconazole + trifloxystrobin Stratego YLD	4-5 fl oz/A Apply when disease first appears and at 7-14 day intervals, if conditions continue to favor disease. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply more than 10 fl oz/A/season. Do not apply within 14 days of harvest for grain or fodder. Forage may be harvested the same day as the application.	An adjuvant may be added at the lowest recommended rate to enhance disease control.
	pyraclostrobin Headline	6–12 fl oz/A Apply before diseases occur. If conditions favorable for disease persist, reapply every 7–14 days. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 7 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 72 fl oz/A per season. Do not apply more than two sequential applications of Headline. Do not make more than 2 applications per year.

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Gray leaf spot <i>(Cercospora zeae maydis)</i> (CONTINUED)	pyraclostrobin + metconazole Headline AMP	10-14.4 fl oz/A Apply before diseases occur. If conditions favorable for disease persist, reapply every 7–14 days. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 7 days of harvest for field corn forage/silage. Do not apply within 20 days of harvest for grain. Do not apply more than two applications of Headline AMP without alternating with a fungicide that has a different mode of action for at least one application.	Do not apply more than 57.6 fl oz/A per season. Do not apply more than two sequential applications of Headline AMP. Do not make more than 4 applications per year.
	tebuconazole AmTide Tebu 3.6F Folicur Monsoon Onset 3.6L Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	4–6 fl oz/A Begin preventative applications when conditions favor disease development and repeat at a 7–14 day interval if conditions remain favorable for disease development.	Do not apply more than 24 fl oz/A/season. Do not apply within 36 days (AmTide Tebu 3.6F, Folicur, Monsoon, Onset 3.6L, Orius 3.6F, Solera Tebuconazole 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F) or 49 days (Toledo) of harvest of grain or fodder.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.
Northern corn leaf blight Northern corn leaf spot Helminthosporium diseases Helminthosporium leaf blights <i>(Helminthosporium maydis, H. carbonum, and H. turcicum)</i>	azoxystrobin Quadris Amistar	6.2–9 fl oz/A 3–5 oz/A Apply before diseases appear. Repeat applications may be required on a 7–14 days schedule.	Do not apply within 7 days of harvest. Do not apply more than two sequential applications without alternating with another fungicide chemistry. Do not apply more than 2 applications of Quadris, or Amistar, or other strobilurin fungicides per year.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Quadris and Amistar may be applied by ground, air or chemigation. Do not apply more than 123 fl oz of product/A (Quadris) or 2.0 lbs a.i./A (Amistar) per season.
	chlorothalonil Bravo Ultrex Echo 720 Echo 90DF Echo ZN Equus 500 ZN Equus 720 SST Equus DF	0.7–1.8 lbs/A 1.5-2.0 pints/A 1 1/4- 1 5/8 lbs/A 1 1/8- 2 3/4 pints/A 1.125-2.75 pints/A 0.75-2 pints/A 0.7-1.8 lbs/A Begin applications when conditions favor disease and repeat every 7 days. Under severe disease conditions, use 1.4–1.8 lbs/A (Bravo Ultrex, Equus DF), 2.125-2.75 pints/A (Equus 500 ZN), 1.5-2 pints/A (Equus 720SST).	Do not apply within 14 days of harvest. Do not apply to sweet corn to be processed. Do not allow livestock to graze treated fields. Do not ensile treated corn or use as livestock forage.	Apply by ground, air or chemigation. Use sufficient water to obtain adequate coverage, 5–10 gal/A for concentrated ground and aerial application. Do not apply more than 10.9 lbs (Bravo Ultrex, Equus DF), 9.0 lbs a.i. (Echo 720, Echo 90DF, Echo ZN), 17 pints (Equus 500 ZN), 12 pints (Equus 720 SST) of product per acre per season.

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Northern corn leaf blight Northern corn leaf spot Helminthosporium diseases Helminthosporium leaf blights <i>(Helminthosporium maydis, H. carbonum, and H. turcicum)</i> (CONTINUED)	chlorothalonil + surfactant Bravo Weather Stik	0.75–2 pints/A Begin applications when conditions favor disease and repeat every 7 days. Under severe disease conditions use 1.5–2 pints/A.	Do not apply within 14 days of harvest. Do not apply to sweet corn to be processed. Do not allow livestock to graze treated fields. Do not ensile treated corn or use as livestock forage.	Bravo Weather Stik may be applied by ground, air or through chemigation. Use sufficient water to obtain adequate coverage, 5–10 gal/A for concentrated ground and aerial application. Do not apply more than 12 pints of product/A per season.
	flouxastrobin Evito 480SC	2.0-5.7 fl oz/A Apply before disease occurs and at a 7 day interval.	Do not apply more than 2 applications. Do not apply within 30 days of harvest. Do not apply after the R4 growth stage.	Do not apply more than 11.4 fl oz/A per season. Evito 480SC may be applied by ground, air or chemigation.
	flouxastrobin + tebuconazole Evito T	4-9 fl oz/A Apply before disease occurs and at a 7 day interval.	Do not apply more than 2 applications. Do not apply after the R4 growth stage. Do not apply more than 18 fl oz/A per season.	Evito T may be applied by ground, air or chemigation. Apply a minimum of 3 gal/A by air or 10 gal/A ground. Evito T may be applied up to 36 days before harvest of grain or fodder.
	mancozeb Dithane M-45 Manzate Flowable Penncozeb 4FL Penncozeb 75 DF Penncozeb 80 WP	1.5 lbs/A (repeat at 4–14 days) 1.2 qts/A 0.8–1.2 qts/A 1–1.5 lbs/A (repeat as needed) 1–1.5 lbs/A (repeat as needed) Start applications at disease onset and repeat at 4–7 day intervals.	Do not apply more than 12 qts (Manzate Flowable and Penncozeb 4FL), 15 lbs (Penncozeb 80WP), or 16 lbs (Penncozeb 75 DF, Dithane M-45) of product per acre per season. Do not apply within 40 days of harvest. Do not feed treated forage to livestock.	Use Latron CS-7 surfactant to improve product performance.
	mancozeb + surfactant Dithane DF Rainshield Dithane F-45 Rainshield Manzate Pro-Stick	1.5 lbs/A 1.2 qts/A 1.5 lbs/A Start applications at disease onset and repeat at 4–14 day intervals for Dithane F-45 Rainshield or 4–7 day intervals for Dithane DF Rainshield and Manzate Pro-Stick.	Do not apply within 40 days of harvest. Do not feed treated forage to livestock.	Do not apply more than 15 lbs of Dithane DF Rainshield, 12 qts/A of Dithane F-45 Rainshield or 15 lbs of Manzate Pro-Stick during the season. Use Latron CS-7 surfactant to improve product performance.
	propiconazole Tilt PropiMax EC Bumper	2–4 fl oz/A Apply when disease first appears. If conditions favorable for disease persist, reapply every 7–14 days.	Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 16 fl oz/A/season.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 8 fl oz/A/season on field corn harvested for forage.

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Northern corn leaf blight Northern corn leaf spot Helminthosporium diseases Helminthosporium leaf blights <i>(Helminthosporium maydis, H. carbonum, and H. turcicum)</i> (CONTINUED)	propiconazole + azoxystrobin Quilt Quilt Xcel	7–14 fl oz/A 10.5-14 fl oz/A Apply when disease first appears. If conditions favorable for disease persists, reapply every 7–14 days. Increase rate as disease pressure increases.	Do not apply more than two applications of Quilt, Quilt Xcel or other strobilurin fungicides per year. Do not apply more than 28 fl oz/A for field corn harvested for forage.	Quilt, Quilt Xcel may be applied by ground, air or chemigation. Do not apply more than 56 fl oz/A per season. Do not apply within 30 days of harvest for forage, grain or stover.
	propiconazole + trifloxystrobin Stratego	10–12 fl oz/A Apply when disease first appears and at 7–14 day intervals, thereafter if conditions continue to favor disease.	Do not apply more than 24 fl oz/A of Stratego/year. Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 2 sequential applications of Stratego. Do not apply more than 2 total applications of Stratego or other strobilurin fungicides.	Use higher rates and shorter intervals when disease pressure is high.
	prothioconazole + trifloxystrobin Stratego YLD	4-5 fl oz/A Apply when disease first appears and at 7-14 day intervals, if conditions continue to favor disease. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply more than 10 fl oz/A/season. Do not apply within 14 days of harvest for grain or fodder. Forage may be harvested the same day as the application.	An adjuvant may be added at the lowest recommended rate to enhance disease control.
	pyraclostrobin Headline	6–12 fl oz/A Apply prior to disease development and at 7–14 day intervals, thereafter if conditions continue to favor disease. Use higher rates (9–12 fl oz/A) and shorter intervals when disease pressure is high.	Do not apply more than 72 fl oz/A per season. Do not apply more than two sequential applications of Headline. Do not apply within 7 days of harvest.	Adjuvants may be used with Headline. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of application for at least one application.
	pyraclostrobin + metconazole Headline AMP	10-14.4 fl oz/A Apply before diseases occur. If conditions favorable for disease persist, reapply every 7–14 days. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 7 days of harvest for field corn forage/silage. Do not apply within 20 days of harvest for grain. Do not apply more than two applications of Headline AMP without alternating with a fungicide that has a different mode of action for at least one application.	Do not apply more than 57.6 fl oz/A per season. Do not apply more than two sequential applications of Headline AMP. Do not make more than 4 applications per year.

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Northern corn leaf blight Northern corn leaf spot Helminthosporium diseases Helminthosporium leaf blights <i>(Helminthosporium maydis, H. carbonum, and H. turcicum)</i> (CONTINUED)	tebuconazole	4–6 fl oz/A	Do not apply more than 24 fl oz/A/season.	Apply a minimum of 5 gal/A by air or 10 gal/A ground.
	AmTide Tebu 3.6F	Begin preventative applications when conditions favor disease development and repeat at a 7–14 day interval if conditions remain favorable for disease development.	Do not apply within 36 days (AmTide Tebu 3.6F, Folicur, Monsoon, Onset 3.6L, Orius 3.6F, Solera Tebuconazole 3.6F, TebuStar 3.6 L, Tebuzol 3.6F) or 49 days (Toledo) of harvest of grain or fodder.	For optimum disease control, use a spray surfactant at the lowest specified rate.
	Folicur			
	Monsoon			
	Onset 3.6L			
	Orius 3.6F			
	Solera Tebuconazole 3.6F			
Tebusha 3.6FL				
TebuStar 3.6L				
Tebuzol 3.6F				
Toledo				
Rust <i>(Puccinia sorghi)</i>	azoxystrobin	6.2–9 fl oz/A	Do not apply within 7 days of harvest.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Quadris and Amistar may be applied by ground, air or chemigation.
	Quadris	2–3 oz/A	Do not apply more than two sequential applications without alternating with another fungicide chemistry.	
	Amistar	Apply before diseases appear. Repeat applications may be required on a 7–14 days schedule.	Do not apply more than 2 applications of Quadris, or Amistar, or other strobilurin fungicides per year.	Do not apply more than 123 fl oz of product/A (Quadris) or 2.0 lbs a.i./A (Amistar) per season.
	chlorothalonil	0.7–1.8 lbs/A	Do not apply within 14 days of harvest.	Apply by ground, air or chemigation. Use sufficient water to obtain adequate coverage, 5–10 gal/A for concentrated ground and aerial application. Do not apply more than 10.9 lbs (Bravo Ultrex, Equus DF), 9.0 lbs a.i. (Echo 720, Echo 90DF, Echo ZN), 17 pints (Equus 500 ZN), 12 pints (Equus 720 SST) of product per acre per season.
	Bravo Ultrex	1.5–2.0 pints/A	Do not apply to sweet corn to be processed.	
	Echo 720	1 1/4- 1 5/8 lbs/A	Do not allow livestock to graze treated fields.	
	Echo 90DF	1 1/8- 2 3/4 pints/A	Do not ensile treated corn or use as livestock forage.	
	Echo ZN	1.125–2.75 pints/A		
	Equus 500 ZN	0.75–2 pints/A		
	Equus 720 SST	0.7–1.8 lbs/A		
Equus DF	Begin applications when conditions favor disease and repeat every 7 days. Under severe disease conditions, use 1.4–1.8 lbs/A (Bravo Ultrex, Equus DF), 2.125–2.75 pints/A (Equus 500 ZN), 1.5–2 pints/A (Equus 720SST).			
chlorothalonil + surfactant	0.75–2 pints/A	Do not apply within 14 days of harvest.	Bravo Weather Stik may be applied by ground, air or through chemigation. Use sufficient water to obtain adequate coverage, 5–10 gal/A for concentrated ground and aerial application. Do not apply more than 12 pints/A per season.	
Bravo Weather Stik	Begin applications when conditions favor disease and repeat every 7 days. Under severe disease conditions use 1.5–2 pints/A.	Do not apply to sweet corn to be processed. Do not allow livestock to graze treated fields. Do not ensile treated corn or use as livestock feed.		
fluoxastrobin	2.0–5.7 fl oz/A	2.0–5.7 fl oz/A	Do not apply more than 2 applications.	Do not apply more than 11.4 fl oz/A per season. Evito 480SC may be applied by ground, air or chemigation.
Evito 480SC	Apply before disease occurs and at a 7 day interval.	Do not apply within 30 days of harvest. Do not apply after the R4 growth stage.		

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes	
Rust <i>(Puccinia sorghi)</i> (CONTINUED)	fluoxastrobin + tebuconazole Evito T	4-9 fl oz/A Apply before disease occurs and at a 7 day interval.	Do not apply more than 2 applications. Do not apply after the R4 growth stage. Do not apply more than 18 fl oz/A per season.	Evito T may be applied by ground, air or chemigation. Apply a minimum of 3 gal/A by air or 10 gal/A ground. Evito T may be applied up to 36 days before harvest of grain or fodder.	
	mancozeb Dithane M-45 Manzate Flowable Penncozeb 4FL Penncozeb 75 DF Penncozeb 80 WP	1.5 lbs/A (repeat at 4–14 days) 1.2 qts/A 0.8–1.2 qts/A 1–1.5 lbs/A (repeat as needed) 1–1.5 lbs/A (repeat as needed)	Start applications at disease onset and repeat at 4–7 day intervals.	Do not apply more than 12 qts (Manzate Flowable and Penncozeb 4FL), 15 lbs (Penncozeb 80WP), or 16 lbs (Penncozeb 75 DF, Dithane M-45) of product per acre per season. Do not apply within 40 days of harvest. Do not feed treated forage to livestock.	Use Latron CS-7 surfactant to improve product performance.
	mancozeb + surfactant Dithane DF Rainshield Dithane F-45 Rainshield Manzate Pro-Stick	1.5 lbs/A 1.2 qts/A 1.5 lbs/A	Start applications at disease onset and repeat at 4–14 day intervals for Dithane F-45 Rainshield or 4–7 day intervals for Dithane DF Rainshield and Manzate Pro-Stick.	Do not apply within 40 days of harvest. Do not feed treated forage to livestock.	Do not apply more than 15 pounds of Dithane Rainshield, 12 qts/A of Dithane F-45 Rainshield or 15 lbs of Manzate Pro-Stick during the season. Use Latron CS-7 surfactant to improve product performance.
	propiconazole Tilt PropiMax EC Bumper	4 fl oz/A Apply when disease first appears. If conditions favorable for disease persist, reapply every 7–14 days.		Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 16 fl oz/A/season.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 8 fl oz/A/season on field corn harvested for forage.
	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A Apply when disease first appears. If conditions favorable for disease persists, reapply every 14 days.		Do not apply more than two applications of Quilt, Quilt Xcel or other strobilurin fungicides per year. Do not apply more than 28 fl oz/A for field corn harvested for forage.	Quilt, Quilt Xcel may be applied by ground, air or chemigation. Do not apply more than 56 fl oz/A per season. Do not apply within 30 days of harvest for forage, grain or stover.
	propiconazole + trifloxystrobin Stratego	10-12 fl oz/A Apply when disease first appears and at 7–14 day intervals, thereafter if conditions continue to favor disease. Use higher rates and shorter intervals when disease pressure is high.		Do not apply more than 24 fl oz/A of Stratego/year. Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 2 sequential applications of Stratego.	Do not apply more than 2 total applications of Stratego or other strobilurin fungicides.
	prothioconazole + trifloxystrobin Stratego YLD	4-5 fl oz/A Apply when disease first appears and at 7-14 day intervals, if conditions continue to favor disease. Use higher rates and shorter intervals when disease pressure is severe.		Do not apply more than 10 fl oz/A/season. Do not apply within 14 days of harvest for grain or fodder. Forage may be harvested the same day as the application.	An adjuvant may be added at the lowest recommended rate to enhance disease control.

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust <i>(Puccinia sorghi)</i> (CONTINUED)	pyraclostrobin Headline	6–12 fl oz/A Apply before disease occur. If conditions favorable for disease persist, reapply every 7–14 days. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 7 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 72 fl oz/A per season. Do not apply more than two sequential applications of Headline.
	pyraclostrobin + metconazole Headline AMP	10-14.4 fl oz/A Apply before diseases occur. If conditions favorable for disease persist, reapply every 7–14 days. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 7 days of harvest for field corn forage/silage. Do not apply within 20 days of harvest for grain. Do not apply more than two applications of Headline AMP without alternating with a fungicide that has a different mode of action for at least one application.	Do not apply more than 57.6 fl oz/A per season. Do not apply more than two sequential applications of Headline AMP. Do not make more than 4 applications per year.
	tebuconazole AmTide Tebu 3.6F Folicur Monsoon Onset 3.6L Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	4–6 fl oz/A Begin preventative applications when conditions favor disease development and repeat at a 7–14 day interval if conditions remain favorable for disease development.	Do not apply more than 24 fl oz/A/season. Do not apply within 36 days (AmTide Tebu 3.6F, Folicur, Monsoon, Onset 3.6L, Orius 3.6F, Solera Tebuconazole 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F) or 49 days (Toledo) of harvest of grain or fodder.	Apply a minimum of 5 gal/A by air or 10 gal/A ground. For optimum disease control, use a spray surfactant at the lowest specified rate.
Eyespot <i>(Aureobasidium zeae)</i>	azoxystrobin Quadris Amistar	6.2-9 fl oz/A 3–5 oz/A Apply prior to disease development and at 7–14 day intervals, thereafter if conditions continue to favor disease.	Do not apply within 7 days of harvest. Do not apply more than two applications of strobilurin fungicides per year without alternating with a fungicide that has a different mode of action.	Quadris and Amistar may be applied by ground, air or chemigation. Do not apply more than 123 fl oz of product/A (Quadris) or 2.0 lbs a.i./A (Amistar) per season. Do not apply more than 2 total applications of Quadris, or Amistar, or other strobilurin fungicides.
	flouxastrobin Evito 480SC	2.0-5.7 fl oz/A Apply before disease occurs and at a 7 day interval.	Do not apply more than 2 applications. Do not apply within 30 days of harvest. Do not apply after the R4 growth stage.	Do not apply more than 11.4 fl oz/A per season. Evito 480SC may be applied by ground, air or chemigation.
	flouxastrobin + tebuconazole Evito T	4-9 fl oz/A Apply before disease occurs and at a 7 day interval.	Do not apply more than 2 applications. Do not apply after the R4 growth stage. Do not apply more than 18 fl oz/A per season.	Evito T may be applied by ground, air or chemigation. Apply a minimum of 3 gal/A by air or 10 gal/A ground. Evito T may be applied up to 36 days before harvest of grain or fodder.

FOLIAR FUNGICIDES FOR CORN

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Eyespot <i>(Aureobasidium zeae)</i> (CONTINUED)	propiconazole Tilt PropiMax EC Bumper	4 fl oz/A Apply when disease first appears. If conditions favorable for disease persist, reapply every 7-14 days.	Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 16 fl oz/A/season.	Apply a minimum of 2 gal/A by air or 10 gal/A ground. Do not apply more than 8 fl oz/A/season on field corn harvested for forage.
	propiconazole + azoxystrobin Quilt Quilt Xcel	10.5–14 fl oz/A Apply when disease first appears. If conditions favorable for disease persists, reapply every 14 days.	Do not apply more than two applications of Quilt, Quilt Xcel or other strobilurin fungicides per year. Do not apply more than 28 fl oz/A for field corn harvested for forage.	Quilt, Quilt Xcel may be applied by ground, air or chemigation. Do not apply more than 56 fl oz/A per season. Do not apply within 30 days of harvest for forage, grain or stover.
	propiconazole + trifloxystrobin Stratego	10–12 fl oz/A Apply when disease first appears and at 7–14 day intervals, thereafter if conditions continue to favor disease. 5-10 fl oz/A rate applied for early season disease control at growth stages V4-V6.	Do not apply more than 24 fl oz/A of Stratego/year. Do not apply within 30 days of harvest for forage, grain and stover. Do not apply more than 2 sequential applications of Stratego. Do not apply more than 2 total applications of Stratego or other strobilurin fungicides.	Use higher rates and shorter intervals when disease pressure is high.
	prothioconazole + trifloxystrobin Stratego YLD	4-5 fl oz/A Apply when disease first appears and at 7-14 day intervals, if conditions continue to favor disease. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply more than 10 fl oz/A/season. Do not apply within 14 days of harvest for grain or fodder. Forage may be harvested the same day as the application.	An adjuvant may be added at the lowest recommended rate to enhance disease control.
	pyraclostrobin + metconazole Headline AMP	10-14.4 fl oz/A Apply before diseases occur. If conditions favorable for disease persist, reapply every 7–14 days. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 7 days of harvest for field corn forage/silage. Do not apply within 20 days of harvest for grain. Do not apply more than two applications of Headline AMP without alternating with a fungicide that has a different mode of action for at least one application.	Do not apply more than 57.6 fl oz/A per season. Do not apply more than two sequential applications of Headline AMP. Do not make more than 4 applications per year.

CORN GROWTH STAGE CHART	
Growth Stage	Description
VE	Emergence
V1	One leaf with collar visible
V2	Two leaves with collar visible
V(n)	(n) leaves with collar visible
VT	Tasseling
R1	Silking
R2	Blister
R3	Milk
R4	Dough
R5	Dent
R6	Maturity

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Brown Spot <i>(Septoria glycines)</i> Pod and stem blight <i>(Diaporthe phaseolorum)</i>	azoxystrobin Quadris	6.2-15.4 fl oz/A Apply prior to disease development. Use the high rates under conditions favorable for severe disease pressure or dense plant canopies.	Do not apply within 14 days of harvest. Do not apply more than two sequential applications of Quadris without alternating with another fungicide chemistry. Do not apply more than 92.3 fl oz of product/A per season.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Quadris may be applied by ground, air or through chemigation. An adjuvant may be added at recommended rates.
	azoxystrobin + cyproconazole Quadris Xtra	5.0–6.8 fl oz/A Apply prior to disease development. Use the high rates under conditions favorable for severe disease pressure or dense plant canopies or when disease is present.	Do not apply within 30 days of harvest. Do not apply more than two strobilurin applications per season. Do not apply more than 13.6 fl oz of product/A per season.	Quadris Xtra may be applied by ground, air or through chemigation. An adjuvant may be added at recommended rates. Do not use soybean forage or hay as livestock feed if more than one application at 6.8 fl oz/A has been applied.
	azoxystrobin + propiconazole Quilt Quilt Xcel	20.5 fl oz/A 14-21 fl oz/A Apply at R3 (early pod set when pods are 1/8–1/4 inch long) and 14–21 days later at R5 (pod fill).	Do not apply within 21 days of harvest for seed and 0 days for forage and hay(Quilt). Quilt Xcel can be applied up to R6 (full seed).	Quilt, Quilt Xcel may be applied by ground, air or through chemigation. Do not apply more than 42 fl oz of product/A per season.
	boscalid Endura	5.5 oz/A (Suppression only) Apply prior to disease development or when conditions are favorable for disease development. Repeat applications on a 7–14 day interval if conditions are favorable. Use shorter intervals when disease pressure is high.	Do not apply within 21 days of harvest. Do not apply more than 22 oz of product/A per season.	Do not apply more than two applications per season.
	chlorothalonil Bravo Ultrex Bravo Weather Stik Echo 720 Echo 90DF Echo ZN Equus 500 ZN Equus 720 SST Equus DF	1.4–2.2 lbs/A 1.5–2.25 pints/A 1.5–2.5 pints/A 1.25–2 lbs/A 2-3.5 pints/A 2.25-3.25 pints/A 1.5–2.5 pints/A 1.4–2.1 lbs/A Make the first application when the largest pods are 1–1 1/4 inches in length. Make the second application 14 days later.	Do not apply within 6 weeks of harvest. Do not apply more than 5.4 lbs (Bravo Ultrex, Equus DF), 4.5 lbs a.i. (Echo 720, Echo 90DF, Echo ZN), 8.5 pints (Equus 500 ZN), 6 pints (Bravo Weather Stik, Equus 720 SST) of product per acre per season.	Use sufficient water to obtain adequate coverage, 5–10 gal/A for concentrated ground and aerial application. Do not feed soybean hay or threshings from treated fields to livestock.
	cyproconazole Alto 100SL	4.0–5.5 fl oz/A Apply prior to disease development. Use the high rates under conditions favorable for severe disease pressure or dense plant canopies.	Do not apply within 30 days of harvest. Do not apply more than 11 fl oz/A per season.	Alto may be applied by ground, air or through chemigation. A spreading/penetrator type adjuvant is recommended for enhanced coverage and efficacy. Do not use soybean forage or hay as livestock feed if more than one application at 5.5 fl oz/A has been applied.

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Brown Spot <i>(Septoria glycines)</i> Pod and stem blight <i>(Diaporthe phaseolorum)</i> (CONTINUED)	fluoxastrobin Evito 480SC	2.0-5.7 fl oz/A Apply prior to disease development and repeat on a 14-21 day interval if conditions are favorable.	Do not apply more than 2 applications. Do not apply within 3 days of forage harvest or 30 days of seed harvest. Do not apply after the R5 growth stage.	Do not apply more than 11.4 fl oz/A per season. Evito 480SC may be applied by ground, air or chemigation.
	fluoxastrobin + tebuconazole Evito T	4-6 fl oz/A Apply prior to disease development and repeat on a 14-21 day interval if conditions are favorable.	For optimum disease control, apply at the R3 growth stage. Do not apply more than 2 applications. Do not apply within 21 days of forage harvest or 30 days of seed harvest.	Do not apply more than 12 fl oz/A per season. Evito T may be applied by ground, air or chemigation. Apply a minimum of 3 gal/A by air or 10 gal/A ground.
	propiconazole Tilt Bumper	6 fl oz/A Apply at growth stage R3 (early pod set when pods are 1/8–1/4 inch long) and 14–21 days later at growth stage R5 (pod fill).	Apply up to growth stage R6 (full seed). Do not apply more than 12 fl oz/A per season.	Tilt and Bumper may be applied by ground or aerial application. Apply a minimum of 2 gal/A by air or 10 gal/A ground.
	propiconazole + trifloxystrobin Stratego	10 fl oz/A Apply at early flowering or prior to disease development whichever is earlier. Repeat applications on a 10–21 day interval if conditions are favorable. Use shorter spray intervals when disease pressure is severe.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 30 fl oz/A per season.	Stratego may be applied by ground, air or chemigation. Do not apply more than 2 sequential applications of Stratego. An adjuvant may be added at the lowest recommended rate to enhance disease control.
	prothioconazole + trifloxystrobin Stratego YLD	4-4.65 fl oz/A Apply at early flowering or prior to disease development, whichever is earlier. Repeat applications on a 10-21 day interval, if conditions are favorable. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 13.95 fl oz/A/season.	Do not graze or feed soybean forage or hay.
	pyraclostrobin Headline	6–12 fl oz/A Apply before diseases occur. If conditions favorable for disease persist, reapply every 7–14 days. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 21 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Stratego may be applied by ground, air or chemigation. Do not apply more than 2 sequential applications of Headline. An adjuvant may be added at the lowest recommended rate to enhance disease control.
	tetraconazole Domark	4–5 fl oz/A (Brown Spot) Apply at growth stage R3 (early pod stage) or when conditions are favorable for disease. Repeat applications on a 15–21 day interval if disease pressure is severe. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply after growth stage R5 (beginning seed). Do not make more than 2 applications per season. Do not apply more than 10 fl oz/A per season.	Use as a part of an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Apply a minimum of 5 gal/A by air or 10–25 gal/A ground. Do not graze or feed soybean forage or hay to livestock.

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Brown Spot <i>(Septoria glycines)</i> Pod and stem blight <i>(Diaporthe phaseolorum)</i> (CONTINUED)	thiophanate-methyl		PHI- 21 days (Topsin 4.5 FL, T-Methyl 70W WSB)	Apply a minimum of 5 gal/A by air (Topsin 4.5 FL, Topsin M 70 WDG, Topsin M WSB).
	Topsin 4.5 FL	10–20 fl oz/A	Do not apply more than 40 fl oz (Topsin 4.5 FL), 2 lbs (Topsin M 70 WDG, Topsin M 70WP, Topsin M WSB, T-Methyl 70W WSB) of product/A/season.	Apply a minimum of 5 gal/A ground (T-Methyl 70W WSB) and increase the volume as crop canopies increase.
	Topsin M 70 WDG	1/2–1 lbs/A		
	Topsin M 70WP	1/2–1 lbs/A		
	Topsin M WSB	1/2–1 lbs/A		Do not graze or feed treated vines or hay to livestock.
	T-Methyl 70W WSB	1/2- 1 lbs/A		
		Apply from full bloom to when pods are 1/8–1/4 inch in length. Make a second application 14–21 days later. Do not make the second application after pods have reached 1/4" in length or when beans form in the pod. Use the high rate under severe disease pressure.		
Powdery Mildew <i>(Microspora diffusa)</i>	propiconazole + trifloxystrobin	10 fl oz/A	Do not apply within 21 days of harvest.	Stratego may be applied by ground, air or chemigation.
	Stratego	Apply at early flowering or prior to disease development whichever is earlier. Repeat applications on a 10–21 day interval if conditions are favorable. Use shorter spray intervals when disease pressure is severe.	Do not apply more than 3 applications per season. Do not apply more than 30 fl oz/A per season.	Do not apply more than 2 sequential applications of Stratego. An adjuvant may be added at the lowest recommended rate to enhance disease control.
	prothioconazole + trifloxystrobin	4-4.65 fl oz/A	Do not apply within 21 days of harvest.	Do not graze or feed soybean forage or hay.
	Stratego YLD	Apply at early flowering or prior to disease development, whichever is earlier. Repeat applications on a 10-21 day interval, if conditions are favorable. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply more than 3 applications per season. Do not apply more than 13.95 fl oz/A/season.	
	prothioconazole	2.5–3.0 fl oz/A	Do not apply within 21 days of harvest.	Apply a minimum of 2 gal/A by air or 10 gal/A by ground.
	Proline	Apply as a preventative spray or at the first signs of disease. Repeat applications on a 10–21 day interval if conditions are favorable. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply more than 3 applications per season. Do not apply more than 9 fl oz/A per season.	

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Powdery Mildew <i>(Microspheera diffusa)</i> (CONTINUED)	tebuconazole AmTide Tebu 3.6F Folicur Monsoon Onset 3.6L Orius 3.6 F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	3–4 fl oz/A Apply as a preventive spray or at first visible signs of disease. Repeat applications on a 10–14 day interval when disease pressure is severe.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 12 fl oz/A per season.	Apply a minimum of 5 gal/A by air or 10 gal/A by ground. The lowest label recommended rate of surfactant must be added.
	tetraconazole Domark	4–5 fl oz/A Apply at growth stage R3 (early pod stage) or when conditions are favorable for disease. Repeat applications on a 15–21 day interval if disease pressure is severe. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply after growth stage R5 (beginning seed). Do not make more than 2 applications per season. Do not apply more than 10 fl oz/A per season.	Use as a part of an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Apply a minimum of 5 gal/A by air or 10–25 gal/A ground. Do not graze or feed soybean forage or hay to livestock.
Rust <i>(Phakopsora spp.)</i>	azoxystrobin Quadris	6.2–15.4 fl oz/A Apply prior to disease development. Use the high rates under conditions favorable for severe disease pressure or dense plant canopies.	Do not apply within 14 days of harvest. Do not apply more than two sequential applications of Quadris without alternating with another fungicide chemistry. Do not apply more than 92.3 fl oz of product/A per season.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Quadris may be applied by ground, air or through chemigation. An adjuvant may be added at recommended rates.
	azoxystrobin + cyproconazole Quadris Xtra	4.0–6.8 fl oz/A Apply at R1 (beginning flowering) up to the R6 (seed development) stage but could be applied earlier if conditions warrant. Repeat at a 14–28 day interval if conditions persist for rust development.	Do not apply within 30 days of harvest. Do not apply more than two strobilurin applications per season. Do not apply more than 13.6 fl oz of product/A per season.	Quadris Xtra may be applied by ground, air or through chemigation. Addition of an additive with spreading and penetrating qualities will enhance coverage and efficacy. Do not use soybean forage or hay as livestock feed if more than one application at 6.8 fl oz/A has been applied.
	azoxystrobin + propiconazole Quilt Quilt Xcel	14–20.5 fl oz/A 14-21 fl oz/A Apply at first sign of disease in the area. Repeat at a 14–21 day interval. Use higher rate and shorter interval when disease is present in the field and incidence is less than 2%.	Do not apply within 21 days of harvest for seed and 0 days for forage and hay (Quilt). Quilt Xcel can be applied up to R6 (full seed). Do not apply more than 42 fl oz of product/A per season.	Quilt, Quilt Xcel may be applied by ground, air or through chemigation.

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust <i>(Phakopsora spp.)</i> (CONTINUED)	chlorothalonil Bravo Ultrex Bravo Weather Stik Echo 720 Echo 90DF Echo ZN Equus 500 ZN Equus 720 SST Equus DF	1.4–2.2 lbs/A 1.5–2.25 pints/A 1.5–2.5 pints/A 1.25–2 lbs/A 2–3.5 pints/A 2.25–3.25 pints/A 1.5–2.5 pints/A 1.4–2.1 lbs/A Make the first application when the largest pods are 1–1 1/4 inches in length. Make the second application 14 days later.	Do not apply within 6 weeks of harvest. Do not apply more than 5.4 lbs (Bravo Ultrex, Equus DF), 4.5 lbs a.i. (Echo 90DF, Echo 720, Echo ZN), 6 pints (Bravo Weather Stik, Equus 720 SST), 8.5 pints (Equus 500 ZN) of product per acre per season.	Use sufficient water to obtain adequate coverage, 5–10 gal/A for concentrated ground and aerial application. Do not feed soybean hay or threshings from treated fields to livestock.
	cyproconazole Alto 100SL	2.75–5.5 fl oz/A Apply at R1 (beginning flowering) up to the R6 (seed development) stage but could be applied earlier if conditions warrant. Use the 2.75 fl oz/A when disease is present in the vegetative state. Repeat at a 14–28 day interval if conditions persist for rust development.	Do not apply within 30 days of harvest. Do not apply more than 11 fl oz/A per season.	Alto may be applied by ground, air or through chemigation. A spreading/penetrator type adjuvant is recommended for enhanced coverage and efficacy. Do not use soybean forage or hay as livestock feed if more than one application at 5.5 fl oz/A has been applied.
	flouxastrobin Evito 480SC	2.0–5.7 fl oz/A Apply prior to disease development and repeat on a 14–21 day interval if conditions are favorable.	Do not apply more than 2 applications. Do not apply within 3 days of forage harvest or 30 days of seed harvest. Do not apply after the R5 growth stage.	Do not apply more than 11.4 fl oz/A per season. Evito 480SC may be applied by ground, air or chemigation. Evito 480SC may be used with a registered triazole fungicide to increase efficacy.
	flouxastrobin + tebuconazole Evito T	4–6 fl oz/A Apply prior to disease development and repeat on a 14–21 day interval if conditions are favorable.	For optimum disease control, apply at the R3 growth stage. Do not apply more than 2 applications. Do not apply within 21 days of forage harvest or 30 days of seed harvest.	Do not apply more than 12 fl oz/A per season. Evito T may be applied by ground, air or chemigation. Apply a minimum of 3 gal/A by air or 10 gal/A ground.
	myclobutanil Laredo EC Laredo EW	4–8 fl oz/A 4.8–9.6 fl oz/A Apply prior to or at first sign of disease and make repeat applications at a 10–14 day interval. Use the higher rate when disease is established.	Do not apply within 28 days of harvest. Do not apply more than 16 fl oz (Laredo EC), 19.2 fl oz (Laredo EW) of product per acre per season.	Do not make more than two applications per year. Apply a minimum of 5 gal/A by air. Use sufficient water to obtain adequate coverage for ground application.
	propiconazole Tilt Bumper	4–6 fl oz/A Apply at first sign of disease in the area. Repeat at a 14–21 day interval. Use higher rate and shorter interval when disease is present in the field and incidence is less than 2%.	Apply up to growth stage R6 (full seed). Do not apply more than 12 fl oz/A per season.	Tilt may be applied by ground or aerial application. Apply a minimum of 2 gal/A by air or 10 gal/A ground.

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust <i>(Phakopsora spp.)</i> (CONTINUED)	propiconazole + trifloxystrobin Stratego	7-10 fl oz/A Apply at early flowering or prior to disease development whichever is earlier. Repeat applications on a 10–21 day interval if conditions are favorable. Use higher rates and shorter spray intervals when disease pressure is severe.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 30 fl oz/A per season.	Stratego may be applied by ground, air or chemigation. Do not apply more than 2 sequential applications of Stratego.
	propiconazole + trifloxystrobin + prothioconazole Stratego + Proline	10 fl oz/A (Stratego) + 1 fl oz/A (Proline) Apply at early flowering or prior to disease development whichever is earlier. Repeat applications on a 10–21 day interval if conditions are favorable. Use shorter spray intervals when disease pressure is severe.	Do not apply within 21 days of harvest.	Stratego + Proline may be applied by ground or air.
	prothioconazole Proline	2.5–3.0 fl oz/A Apply as a preventative spray or at the first signs of disease. Repeat applications on a 10–21 day interval if conditions are favorable. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 9 fl oz/A per season.	Apply a minimum of 2 gal/A by air or 10 gal/A by ground.
	prothioconazole + trifloxystrobin Stratego YLD	4-4.65 fl oz/A Apply at early flowering or prior to disease development, whichever is earlier. Repeat applications on a 10-21 day interval, if conditions are favorable. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 13.95 fl oz/A/season.	Do not graze or feed soybean forage or hay.
	pyraclostrobin Headline	6–9 fl oz/A Apply soon after first sign of rust infection, preventively, or at growth stage R1 to R3. Reapply at 21 days after application or earlier (no sooner than 7 days) if monitoring shows active disease. Higher labeled rates provide longer residual control.	Do not apply within 21 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 24 fl oz/A per season.

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust <i>(Phakopsora spp.)</i> (CONTINUED)	tebuconazole AmTide Tebu 3.6F Folicur Monsoon Onset 3.6L Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	3–4 fl oz/A Apply as a preventive spray or at first visible signs of disease. Repeat applications on a 10–14 day interval when disease pressure is severe.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 12 fl oz/A per season.	Apply a minimum of 5 gal/A by air or 10 gal/A by ground. The lowest label recommended rate of surfactant must be added.
	tebuconazole + propiconazole + trifloxystrobin Folicur + Stratego	2 fl oz/A (Folicur) + 10 fl oz/A (Stratego) Apply as a preventive spray or at first visible signs of disease. Repeat applications on a 10–21 day interval if conditions are favorable.	Do not apply within 21 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 12 fl oz/A (Folicur) and 30 fl oz/A (Stratego) per season.	Folicur + Stratego may be applied by ground or air.
	tetraconazole Domark	4–5 fl oz/A Apply prior to disease development when rust infections are likely to occur. If necessary, repeat with a second application before growth stage R6.	Do not apply after growth stage R5 (beginning seed). Do not make more than 2 applications per season. Do not apply more than 10 fl oz/A per season.	Use as a part of an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Use sufficient water to obtain adequate coverage, a minimum of 5 gal/A for aerial and 10–25 gal/A for ground application. Do not graze or feed soybean forage or hay to livestock.
White Mold <i>(Sclerotinia sclerotiorum)</i>	boscalid Endura	5.5–11 oz/A (Suppression only) Apply prior to disease development or when conditions are favorable for disease. Repeat applications on a 7–14 day interval if conditions are favorable. Use shorter intervals when disease pressure is high.	Do not apply within 21 days of harvest. Do not apply more than 22 oz of product/A per season.	Do not apply more than two applications per season.
	tetraconazole Domark	4–5 fl oz/A Apply at growth stage R3 (early pod stage) or when conditions are favorable for disease. Repeat applications on a 15–21 day interval if disease pressure is severe. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply after growth stage R5 (beginning seed). Do not make more than 2 applications per season. Do not apply more than 10 fl oz/A per season.	Use as a part of an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Apply a minimum of 5 gal/A by air or 10–25 gal/A ground. Do not graze or feed soybean forage or hay to livestock.

FOLIAR FUNGICIDES FOR SOYBEANS

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
White Mold <i>(Sclerotinia sclerotiorum)</i> (CONTINUED)	thiophanate-methyl		PHI- 21 days (Topsin 4.5 FL, T-Methyl 70W WSB)	Thorough coverage of the flowers, stems and branches are essential for disease control. Apply a minimum of 5 gal/A by air (Topsin 4.5 FL, Topsin M 70 WDG, Topsin M WSB, T-Methyl 70W WSB).
	Topsin 4.5 FL	15–20 fl oz/A	Do not apply more than 40 fl oz (Topsin 4.5 FL), 2 lbs (Topsin M 70 WDG, Topsin M 70WP, Topsin M WSB, T-Methyl 70W WSB) of product/A/season.	
	Topsin M 70 WDG	3/4–1 lbs/A		
	Topsin M 70WP	3/4–1 lbs/A		
	Topsin M WSB	3/4–1 lbs/A		
	T-Methyl 70W WSB	3/4-1 lbs/A	Do not graze or feed treated vines or hay to livestock.	
		Make one application at early bloom (R1- R2 growth stage) followed by a second application 7-14 days later if conditions are favorable for continued disease pressure.		

SOYBEAN GROWTH STAGE CHART	
Growth Stage	Description
VE	Emergence
VC	Cotyledon
V1	First trifoliolate
V2	Second trifoliolate
V3	Third trifoliolate
V(n)	(n) trifoliolate
V6	Flowering will soon start
R1	Beginning bloom, first flower
R2	Full bloom, flower in top 2 nodes
R3	Beginning pod, 3/16" pod in top 4 nodes
R4	Full pod, 3/4" pod in top 4 nodes
R5	1/8" seed in top 4 nodes
R6	Full size seed in top 4 nodes
R7	Beginning maturity, one mature pod
R8	Full maturity, 95% of pods on plant are mature

FOLIAR FUNGICIDES FOR SUNFLOWER

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Rust (<i>Puccinia helianthi</i>)	pyraclostrobin Headline	6-12 fl oz/A Apply prior to disease development and continue on a 7-14 day interval if conditions are favorable for disease. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 21 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 24 fl oz/A per season.
	tebuconazole AmTide Tebu 3.6F Folicur Embrace 3.6L Monsoon Onset 3.6L Orius 3.6F Solera Tebuconazole 3.6F Tebusha 3.6FL TebuStar 3.6L Tebuzol 3.6F Toledo	4-6 fl oz/A Apply at first visible signs of disease or when conditions are favorable for disease. Apply higher rate to highly susceptible varieties and/or under severe disease conditions. Repeat applications on a 14 day interval if necessary to maintain control (AmTide Tebu 3.6F, Folicur, Monsoon, Orius 3.6F, Solera Tebuconazole 3.6F, Tebusha 3.6FL, Tebuzol 3.6F, Toledo) .	Do not apply within 50 days of harvest. Do not apply more than 16 fl oz/A per season.	Apply a minimum of 5 gal/A by air or 20 gal/A by ground. The lowest label recommended rate of surfactant must be added.

SUNFLOWER GROWTH STAGE CHART

Growth Stage	Description
VE	Emergence
V1	First true leaf
V2	Second true leaf
V3	Third leaf
V(n)	(n) leaf
R1	Terminal bud is forming a miniature floral head
R2	The immature bud elongates 0.5-2.0 cm
R3	The immature bud elongates more than 2.0 cm
R4	The inflorescence begins to open
R5	Beginning of flowering
R6	Flowering is complete and the ray flowers are wilting
R7	The back of the head has started to turn a pale yellow color
R8	The back of the head is yellow but the bracts remain green
R9	The bracts become yellow and brown. Physiological maturity

FOLIAR FUNGICIDES FOR SAFFLOWER

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Alternaria leaf spot (<i>Alternaria spp</i>)	azoxystrobin Quadris	6–15.5 fl oz/A Apply prior to disease development.	Do not apply within 30 days of harvest. Do not apply more than two sequential applications of Quadris without alternating with another fungicide chemistry. Do not apply more than 27 fl oz/A per season.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Quadris may be applied by ground, air or through chemigation. Use a minimum of 10 gal/A for ground applications.
	pyraclostrobin Headline	6–12 fl oz/A Apply prior to disease development and continue on a 7–14 day interval if conditions are favorable for disease.	Do not apply within 21 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 24 fl oz/A per season.

SAFFLOWER GROWTH STAGE CHART

Growth Stage
Emergence
Rosette
Stem Elongation
Branching
Flowering
Mature

FOLIAR FUNGICIDES FOR CHICKPEA

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Ascochyta (<i>Ascochyta spp</i>)	azoxystrobin Quadris Amistar	6.2–15.4 fl oz/A 2–5 oz/A Apply prior to disease development and continue on a 7–14 day following the resistance management guidelines. Use higher rates when disease pressure is severe.	Do not apply within 14 days of harvest. Do not apply more than two sequential applications without alternating with another fungicide chemistry. Do not apply more than 92.3 fl oz (Quadris) or 1.5 lbs a.i. (Amistar) of product/A per season.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Apply by ground, air or through chemigation. An adjuvant may be added at recommended rates.
	azoxystrobin + chlorothalonil Quadris Opti	1.6–2.4 pints/A Apply prior to disease development and continue on a 7–14 day following the resistance management guidelines.	Do not apply within 14 days of harvest. Do not apply more than two sequential applications without alternating with another fungicide chemistry. Do not apply more than 4 applications of Quadris Opti per acre per season.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Quadris Opti may be applied by ground, air or through chemigation.
	boscalid Endura	6 oz/A Apply at the beginning of flowering. Repeat applications on a 7–10 day interval if the disease persists or if conditions are favorable for disease.	Do not apply within 21 days of harvest. Do not apply more than 22 oz of product/A per season.	Do not apply more than two applications per season.
	chlorothalonil Bravo Ultrex Bravo Weather Stik Bravo ZN Echo 720 Echo 90DF Echo ZN Equus 500 ZN Equus 720 SST Equus DF	1.25–1.8 lbs/A (Apply at early bloom stage.) 1 3/8–2 pints/A (Begin applications at first onset of disease which may occur as early as 2–4 weeks before flowering.) 2–2 3/4 pints/A (Begin applications at first onset of disease which may occur as early as 2–4 weeks before flowering.) 1 3/8–2 pints/A (Apply at early bloom stage.) 1 1/8–1 5/8 lbs/A (Apply at early bloom stage.) 2-3 pints/A (Apply during early bloom stage.) 2.0-2.75 pints/A (Begin applications at first onset of disease which may occur as early as 2-4 weeks before flowering.) 1.37–2 pints/A (Begin applications at first onset of disease which may occur as early as 2–4 weeks before flowering.) 1.25–1.8 lbs/A (Begin applications at first onset of disease which may occur as early as 2–4 weeks before flowering.) Repeat at 7–10 day intervals.	Do not apply within 14 days of harvest. Do not apply more than 7.3 lbs (Bravo Ultrex), 8 pints (Bravo Weather Stik, Equus 720 SST), 11.5 pints (Bravo ZN, Equus 500 ZN), 6.0 lbs a.i. (Echo 720, Echo 90DF, Echo ZN), 7.2 lbs (Equus DF), per acre per season. Do not apply more than 4 times per growing season (Bravo Ultrex).	Apply by ground, air or chemigation. Use sufficient water to obtain adequate coverage, 5–10 gal/A for concentrated ground and aerial application.

FOLIAR FUNGICIDES FOR CHICKPEA

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Ascochyta <i>(Ascochyta spp)</i> (CONTINUED)	maneb Manex	1.2–1.6 quarts/A Apply at the first sign of disease. Repeat applications on a 5–7 day interval. Use higher rates and shorter intervals when disease pressure is severe.	Do not apply within 30 days of harvest. Do not apply more than 9.6 quarts of product/A per season.	Apply a minimum of 3 gal/A by air or 10 gal/A by ground.
	prothioconazole Proline	5–5.7 fl oz/A Apply at the first sign of disease. Repeat applications on a 10–14 day interval if conditions remain favorable for disease. Use the higher rate when conditions for disease pressure are high or if growing susceptible varieties.	Do not apply within 7 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 17.1 fl oz/A per season.	Apply a minimum of 5 gal/A by air or 10 gal/A by ground. A surfactant may be added at the lowest recommended rate to enhance disease control.
	pyraclostrobin Headline	6–9 fl oz/A Apply prior to disease development and continue on a 7–14 day interval if conditions are favorable for disease. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 21 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 18 fl oz/A per season. Pea vines and pea hay may be fed 14 days after the last application.
White Mold <i>(Sclerotinia sclerotiorum)</i>	thiophanate-methyl Topsin 4.5 FL Topsin M 70 WDG Topsin M 70WP Topsin M WSB T-Methyl 70W WSB	30-40 fl oz/A (20-30 fl oz/A for multiple applications) 1 1/2-2 lbs/A (1-1 1/2 lbs/A for multiple applications) 1 1/2-2 lbs/A (1-1 1/2 lbs/A for multiple applications) 1 1/2-2 lbs/A (1-1 1/2 lbs/A for multiple applications) 1-2 lbs/A For one application: Apply when 100% (50-70% for T-Methyl 70W WSB) of the plants have at least one open bloom or when conditions are favorable for disease development For multiple applications: Make the first application when 10-30% of plants have at least one open bloom and follow with sequential applications on a 4-7 day interval. Apply prior to disease development for best results.	PHI- 28 days Do not apply more than 80 fl oz (Topsin 4.5 FL), 4lbs (Topsin M 70 WDG, Topsin M 70WP, Topsin M WSB) of product/A/season.	Apply a minimum of 5 gal/A by air (Topsin 4.5 fl, Topsin M 70 WDG, Topsin M WSB).

CHICKPEA GROWTH STAGE CHART

Growth Stage	Description
2 branch stage	2 branches unfolded
4 branch stage	4 branches unfolded
8 branch stage	8 branches unfolded
Pre-flowering	
Full Flowering	
Podding Stage	

FOLIAR FUNGICIDES FOR FIELD PEA

Disease	Fungicide	Dosage and Interval	Limitations	Special Notes
Ascochyta (<i>Ascochyta spp</i>)	azoxystrobin Quadris Amistar	6.2-15.4 fl oz/A 2–5 oz/A Apply prior to disease development and continue on a 7–14 day following the resistance management guidelines. Use higher rates when disease pressure is severe.	Do not apply within 14 days of harvest. Do not apply more than two sequential applications without alternating with another fungicide chemistry. Do not apply more than 92.3 fl oz (Quadris) or 0.15 lb a.i. (Amistar) of product/A per season.	Use only in an integrated disease management approach with resistant hybrids, proper fertility, residue management and crop rotation. Quadris and Amistar may be applied by ground, air or through chemigation. An adjuvant may be added at recommended rates.
	pyraclostrobin Headline	6–9 fl oz/A Apply prior to disease development and continue on a 7–14 day interval if conditions are favorable for disease. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 21 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 18 fl oz/A per season. Pea vines and pea hay may be feed 14 days after the last application.
Powdery mildew (<i>Erysiphe polygoni</i>)	pyraclostrobin Headline	6–9 oz/A Apply prior to disease development and continue on a 7-14 day interval if conditions are favorable for disease. Use the higher rate and shorter intervals when disease pressure is high.	Do not apply within 21 days of harvest. Do not apply more than two applications of Headline without alternating with a fungicide that has a different mode of action for at least one application.	Adjuvants may be used with Headline. Do not apply more than 18 fl oz/A per season. Pea vines and pea hay may be feed 14 days after the last application.
White Mold (<i>Sclerotinia sclerotiorum</i>)	prothioconazole Proline	5.7 fl oz/A Apply at 25% flower. Repeat applications as needed on a 5–14 day interval if conditions remain favorable for continued or increasing disease development.	Do not apply within 7 days of harvest. Do not apply more than 3 applications per season. Do not apply more than 17.1 fl oz/A per season.	Apply a minimum of 5 gal/A by air or 10 gal/A by ground. A surfactant may be added at the lowest recommended rate to enhance disease control.

FIELD PEA GROWTH STAGE CHART

Growth Stage	Description
VE	The epicotyl emerges from the soil.
VS	Two small scale leaves appear on the stem.
V1	The true leaf (pair of leaflets) has unfolded at the first node above VS, no tendrils.
V2	The second true leaf (one or more pairs of leaflets) has unfolded at the second node, tendrils present.
V3	The third true leaf (one or more pairs of leaflets) has unfolded at the second node, tendrils present.
V(n)	The nth true leaf (one or more pairs of leaflets) has unfolded at the nth node, tendrils present.
R1	Flower bud present at one or more nodes.
R2	First open flower at one or more nodes.
R3	First flat pod present at one or more nodes.
R4	Green seeds fill the pod cavity at one or more nodes.
R5	Yellow or dry seeds fill the pod cavity at one or more nodes.
R6	The leaves start yellowing and lower pods have turned yellow to golden brown.
R7	Most pods on the plant are yellow to golden-brown.

