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Fusarium Head Blight (Wheat Scab): A Short Synopsis

Fusarium head blight (FHB), scab, and head blight are all names given to one of the most economically significant wheat disease in the US and Canada. *Fusarium graminearum* is the fungal species that typically causes scab issues in wheat production, although other *Fusarium* species can cause scab or head blight, such as *Fusarium culmorum*. FHB can also affect other small grains such as barley, oats, and rye. *Fusarium graminearum* causes Gibberella stalk and ear rot in corn, so a year between raising a corn crop and a wheat crop is a good cultural practice that can allow breakdown of infested residue and lead to reductions of inoculum in the field, especially when high levels of disease incidence and severity have been present.

However, reduction of the fungus in the field will not completely rid the producer of FHB worries, because FHB produces spores that can be moved by wind in addition to its ability to colonize cereal grains via splashing from the soil surface during rainfall. Fusarium head blight infection occurs from the beginning of flowering (anthesis, Feekes 10.5.1, Figure 1) through early grain fill. Frequent rains, high humidity, mid 70-to-80-degree days, overcast skies, and long periods of dew coverage favor infection. Only 48 to 72 hours of these climatic conditions are needed to drive infection. Characteristics of FHB infection in wheat include:

- premature bleaching of individual spikelets, or part or all of the seedhead (spike)
- empty (sterile) spikelets
- shriveled or discolored seed
- orange to pink superficial mold growth at the base of diseased spikelets.

Figure 1. Wheat seed head at start of anthesis. White arrows pint to anthers, part of the male plant reproductive structure responsible for release of pollen.

Infected kernels are shriveled and chalky in appearance and can be discolored white-pink as well.

Yield loss estimates of 50 percent have been reported in severe cases; however, grain quality and human and livestock health is the most common and greater concern when dealing with this disease. Fusarium head blight is known to produce mycotoxins, namely deoxynivalenol (DON), also known as vomitoxin (VOM). This mycotoxin can cause immune system suppression, vomiting, and feed refusal. Young animals and swine are particularly affected by DON. Fusarium head blight also produces the mycotoxin zearalenone. Zearalenone can lead to reproductive related issues in animals due to its estrogenic effects, especially in swine and ruminants. Mycotoxins such as DON are commonly found in moldy grain. A good rule of thumb is to not feed any grain with greater than five percent moldy kernels.

Testing for mycotoxins should be conducted at harvest or at grain maturity, but keep in mind, grain stored in less-than-ideal conditions can lead to further development of mycotoxin compounds. Since infested kernels will typically be lighter than healthy

kernels, running the combine blower fan higher or cleaning seed post-harvest can help remove infested material and make for better feed and seed. It is important when utilizing seed from a field that harbored infected wheat, to clean the source seed, perform a germ test, and treat the seed with a fungicide seed treatment to prevent fusarium seedling blight.

When planting in areas where FHB has been prevalent, it is important to select resistant varieties, rotate to non-host crops such as soybean or alfalfa, consider residue management (tillage), and scout for FHB (Scouting is not intended for determining the need for a fungicide application, it is intended for grain quality monitoring and management, i.e., FHB scouting will occur two to three weeks after anthesis (flowering) is completed or two to three weeks after an application of fungicide).

The U.S. Wheat and Barley Scab Initiative has developed a free tool that indicates risk of FHB outbreak across the United States (wheatscab.psu.edu). If conditions are favorable for FHB infection, ideally, spraying will occur at the start of anthesis (middle third of spike showing anthers). Weather conditions do not always favor fungicide application during the start of anthesis, but it has been shown applications up to a week after completion of anthesis can still prove effective. Triazole and HDMI fungicides work best against FHB. Example products include Prosaro® Pro, Prosaro®, Miravis® Ace, Saphaerex®, Proline® and Caramba®. Do not apply group 11 Qol fungicides such as Approach®, Headline®, or Quadris® after heading, as these group 11 products can drive increases in DON production in the grain. Always follow pre-harvest intervals for whichever fungicide products are chosen for utilization.

Source: *Nick Wesslak, field specialist in agronomy*

Insect Pests of Alfalfa

Alfalfa is a high-quality forage crop with excellent yield potential. To maximize yield and quality, alfalfa must be managed, including providing adequate fertility, harvesting at the optimum time, and controlling disease outbreaks and insect infestations. Several insects can be of concern in alfalfa fields during the summer months.

Blister beetles are so named because when smashed against the skin, a toxin, called cantharidin is released and leaves a blister. Economic damage to the plants is rare but when the beetle is consumed by some livestock it can be lethal.

Blister beetles are ½ to 1 inch long with a narrow, cylindrical body and a "neck like appearance" when viewed from above. There are several species found in Missouri, with the striped blister beetle being most common. Color ranges from black to gray to brown and some species may have orange stripes. The larva feed on grasshopper eggs, so are often found in large numbers in small areas near the edges of the field the year after a large grasshopper infestation. This can result in a large number of beetles in a single bale of hay.

Blister beetles can be crushed during the mowing or baling process which will leave a toxic substance on the hay. The lining of the horse's digestive tract is sensitive to the alkaloid present in the blistering agent and can slough off resulting in death. Blister beetles are not generally present until later in the growing season when second and third cuttings are made. Therefore, feed only first cutting alfalfa hay to horses. Pasture chickens are also sensitive to blister beetles. Ruminant animals like cattle, sheep and goats seem to be much less affected when consuming hay with blister beetles. If blister beetle poisoning is suspected, contact a veterinarian immediately to begin treatment.

Adult potato leaf hoppers are small, lime green, triangular shaped insects about ⅛ inch long with a broad head, large white eyes and clear wings. Immature potato leafhoppers do not have wings, are yellow to pale green in color and smaller than adults. Leafhoppers pierce the leaf and suck out the plant sap when feeding on an alfalfa leaf. This leaves a yellow V shaped mark on the tip of the leaf often called "hopper burn". The injured leaves fall off resulting in lower yield and reduced hay quality.

Potato leafhoppers drop to the ground when disturbed; therefore, the best way to scout is with a sweep net. Take 10 pendulum sweeps in five locations in the field and count the number of potato leafhoppers collected. The determination to treat with an insecticide is based on the number of hoppers present, the height of the alfalfa and whether it is a leaf hopper resistant variety. Established stands can tolerate more insect pressure than new seedings.

Fall armyworms will feed on over 60 different host plants, especially tall fescue, smooth bromegrass and alfalfa. Fall armyworms do not overwinter in Missouri, the moths migrate into the area with storms from the south. Several generations occur each year. Damage ranges from defoliation, to stunting or possibly killing the plants. Newly seeded alfalfa or grasses are at the greatest risk of being totally lost. Established stands can be stressed reducing the vigor of the plants which will allow weeds to encroach.

Heavy fall armyworm infestations march across a field, defoliating plants and consuming all leaves in a short length of time. Small larvae will chew the green tissue from the leaf's surface. Large larvae will strip entire leaves from plants. Because the larvae consume such a large amount of leaf tissue in the last few stages, it can appear a field will be completely wiped out overnight.

The larvae are usually dark brown or black in color with stripes running the length of the body. There are four

bumps on each segment of the body and the bumps form a square on the last segment. A distinguishing mark on the head looks like an inverted Y. The larvae go through six larval (worm) stages and grow to about 1 ½ inches in length.

Insecticides are most effective when the larvae are ½ inch or less in length. Scout in the late evening or early morning, when small larvae are most active. Search in the lower leaves and in plant debris on the ground to increase the chances of finding the insects before serious losses occur.

The most economical and effective way to control alfalfa insect pests is to scout regularly and treat when infestations reach economic thresholds. Follow all label directions when applying pesticides. Some insecticides have grazing or harvest intervals which require a specific length of time to pass after application before the forage can be grazed or harvested for hay. Read the label for specific information.

For more alfalfa insect information see:
Alfalfa https://extension.missouri.edu/publications/g4550
Blister Beetle Management in Alfalfa https://extension.missouri.edu/publications/g4569
Potato Leafhopper (Iowa State) https://crops.extension.iastate.edu/encyclopedia/potato-leafhopper
Managing the Armyworm Complex in Missouri Field Crops https://extension.missouri.edu/publications/g7115

Source: *Valerie Tate, field specialist in agronomy*

Planting and Caring for Garden Crops

There is a lot going on in the garden during the month of May. Cool-season vegetables like spinach, lettuce, kale and broccoli will be ready for harvest by the latter half of the month. To extend the harvest of broccoli, do not remove the plant from the garden after harvesting the center head. Side shoots will develop and can be harvested all summer.

Asparagus, rhubarb and strawberries are perennial crops harvested throughout May until mid-June. Snap asparagus off at ground level. When the spears become thin, stop harvesting and allow ferns to grow. Ferns must develop and remain on the plant until turning completely brown in the fall, in order to build up enough energy reserves in the roots for next year's crop. Harvest rhubarb when stalks are 12-18 inches long. Stop harvesting when stalks get short and thin. If flower stalks form, cut off at the base. Energy needs to be stored and used to produce next year's stalks, not seed production. There are green varieties of rhubarb. Plants that do not produce red stalks, are likely a green variety, and are edible.

Strawberries ripen in late May and should be harvested in the morning when it is cool. June-bearing varieties are the most productive and recommended for gardeners. Place harvested berries in a refrigerator and wait until just before use to rinse in cool water. Botrytis blight also known as gray mold, is a fungal disease of strawberries in years with prolonged rain and cloudy periods during bloom or harvest. It is most severe in areas of the planting where humidity is high and air circulation is poor. Strawberry fruits turn brown and mushy. Cull out all diseased berries but do not leave in the bed. In August, renovate an overgrown bed, and thin out plants for better air circulation. Holes in strawberries are often caused from slugs, birds or voles. Deformed berries called nubbins, are caused by insufficient pollination caused by frost damage to the flower or lack of bee activity because of cool, windy or wet weather at the time pollination should be taking place.

All three of these perennial crops, asparagus, rhubarb and strawberries, like soils high in organic matter. Add decomposed manure or compost in the spring and work it into the soil. These perennial crops can be frozen for later use. Asparagus must be blanched prior to freezing. Avoid mushy asparagus by not over-blanching it, and when ready to use, do not thaw it and avoid over-cooking. The key is to warm it, not cook it.

By mid-May fruit trees are done blooming, and it is safe to follow a spray schedule. Organic gardeners are often more willing to tolerate insect damage for the benefit of pesticide-free produce. Peach Leaf Curl is a fruit disease often making an appearance in late spring after a period of rainy weather. Leaves may turn red, curl or pucker. There is no control at this time. This fungal disease must be treated during the dormant season. A product containing 'Chlorothalonil' can be used for control.

Fireblight is common on apple and pear trees in a rainy spring, as is Cedar-apple Rust which is common on apple and crabapple trees. Black rot in grapes starts early in the season, so gardeners with grapevines, should monitor closely for brown spots, and treat with a fungicide containing the active ingredient 'myclobutanil' found at most garden centers. Products containing 'myclobutanil' can be used on most fruit trees, grapevines and even roses. It is a good multi-purpose fungicide.

By early to mid-May, start planting warm-season flowers and vegetables in Missouri. A late spring frost or freeze can happen, so always be prepared to cover plants. There is a large selection of bedding plants at garden centers and nurseries to choose from. Dwarf, patio and container type varieties of many vegetables are available and recommended for containers or small garden spaces. When selecting tomato plants, paste varieties are best for making salsa and sauces, while slicing tomatoes are best for fresh eating.

Flea beetles are a major insect pest of eggplant. When planted in containers away from the garden, and placed

on a deck, carport or other hard surface area, flea beetles have a harder time seeking out the plants, and damage is minimal compared to plants in the garden. Consider planting companion plants such as basil next to tomatoes and marigolds and nasturtiums around squash plants for insect control.

Nationwide there is significant decline of bee colonies this year. This is due to several factors including the use of neonicotinoid insecticides, weather, and mites. Plant native perennial plants and annual flowers that attract bees and other pollinators.

If growing shiitake mushrooms on logs, keep moist to avoid drying out during the summer. Logs will put on a flush of mushrooms in the spring, and often again in the fall if kept moist and out of sunlight.

Keep garden beds weeded and maintained. Weeds attract insects, so keeping gardens weeded will help with insect control. Keep the borders of gardens mowed. Use pre-emergent herbicide such as Preen® in flower beds, and in asparagus and strawberry beds after harvest. Preen® is good for controlling annual weeds that germinate by seed such as foxtail that is a common problem in iris, strawberry and asparagus beds. It will not kill existing weeds in the beds. Preen® comes in an organic formulation for use in vegetable gardens or around any edible crops. Mulching also helps with weed control. Existing weeds are best hand-pulled, as most herbicides will kill or damage desirable plants.

Farmers' markets typically start in April and May. For high quality and a good selection of bedding plants and hanging baskets, check with the local producers at a market. For those not growing vegetables, producers will also have high quality asparagus, strawberries, lettuce and other greens for sale in May.

Source: *Jennifer Schutter, field specialist in horticulture*

Farmland Opinion Survey - Deadline May 18

The MU annual survey to capture the value of farm and recreational land. Participation is anonymous. Online muext.us/landvaluesurvey25 or request paper copy at your county Extension Center.

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