

Navigating Fungicide Active Ingredients

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Over time I have assimilated this blog post in my mind. However, it was not until this past weekend that I was able to sit down and start typing. I could have titled this “all fungicides are not created equal”, but there is more to this blog post. Confusion continues to surround the currently available fungicide formulations as well as the general classes of the active ingredients included in fungicide products. The information as outlined below tends to best fit a corn and soybean system as an example for the purposes of presentation.



Fungicide selection, and fungicide placement on certain varieties has been a topic of discussion for the better part of four years. When strobilurin-resistant frogeye leaf spot was initially identified in MS, the suggestion for fungicide placement at the automatic timing (the R3/R4 fungicide application) was altered so that varieties that were resistant to frogeye were sprayed with stand-alone strobilurins. Frogeye leaf spot-susceptible varieties were believed to more likely to benefit from a pre-mix or tank mix formulation of at least two modes of action at the automatic timing to account for fungicide resistant populations of frogeye leaf spot.

Below, find additional information on each of the fungicide classes commonly marketed in soybean. Some, but not all of this information could also apply to the other row crop systems in MS. The associated table should help guide fungicide selections when considering automatic fungicide applications or applications made to protect plants when disease has been observed in a given field. All fungicides provide the best possible protection when applied prior to disease initiation; however, this statement should not be considered to be an endorsement of automatic fungicide applications with all fungicide active ingredients. Be mindful that only one class of fungicides has been reported to provide a “plant health” benefit in the absence of disease. The fungicide resistance action committee (FRAC code) is also included for each of the classes as outlined below. FRAC codes can be located on the fungicide label. For additional information regarding fungicides see:

[The Fungicides](#)

Strobilurin or quinone outside inhibitor (QoI) fungicides (FRAC Code 11)

Put most simply, as stand-alone fungicide products these are most readily recognized as Headline (pyraclostrobin) or Quadris (azoxystrobin). However, over time, some additional products have come to market that are also broadly defined as QoIs. The additional fungicides broadly sold as stand-alone QoIs (and NOT including the generic formulations of azoxystrobin that came to market about two years ago) include Aproach, Equation, Evito, and Gem. Some of the additional stand-alone QoI fungicides were brought to market after Headline and Quadris and are therefore not as recognizable in name. Following the introduction of generic azoxystrobin it has been difficult to keep up with new QoI generics because numerous companies have them and not every fungicide website stays up-to-date.

Most commonly available fungicide products available in this class: Equation, Evito, Headline, Quadris (Aframe)

Some generic stand-alone QoI fungicides: Azoxy 2SC, Azoxylene, Satori, Trevo (ALL contain azoxystrobin)

Demethylation inhibitors (DMI; or triazole) fungicides (FRAC Code 3)

For the most part, and since soybean rust was first identified in the continental U.S. in 2004, DMIs (or triazoles as they are more regularly referred to) have been considered “rust products”. In general, the fungicide class is considered to have some “curative” ability and many recognize the fungicides as having the ability to be applied following the identification of a disease in a field. However, with that in mind, they are not effective products for the purposes of application in situations when foliar disease does not occur.

Most commonly available fungicide products available in this class: Domark, Monsoon (tebuconazole; the old Folicur), Tilt, Topguard

Some generic stand-alone DMI fungicides: generic propiconazole = Fitness, Propicure 3.6F, Topaz, Vigil

generic tebuconazole = Muscle 3.6F, Onset 3.6 L, Orius 3.6F, Tebu-Crop 3.6F, Toledo 3.6F

Succinate dehydrogenase inhibitors (SDHI) fungicides (FRAC Code 7)

At present, only two fungicide products are commercially available that contain an SDHI. Priaxor, which is a formulation of Headline and fluoxapyroxad (the SDHI component most commonly marketed as Sercadis for managing sheath blight in rice), and Trivapro, a three-way product that contains Quilt Xcel and benzovindiflupyr (an SDHI that in some systems is called Solatenol). Presently, a stand-alone fungicide is not commercially available for application in corn or soybean that is formulated as an SDHI. In the future, I suspect that additional fungicide offerings will include SDHI-based fungicides simply based on some of the experimental products that are currently being tested in efficacy programs.

Most commonly available fungicide products that contain an SDHI: Priaxor D (sold as a co-pack of Priaxor + Domark), Trivapro (which may be sold as Component A (=Quilt Xcel/Aframe Plus) + Component B (=SDHI product) in one case to be added together to form Trivapro)

Methyl benzimidazole carbamates (MBC) fungicides (FRAC Code 1)

The most recognized fungicide within this particular class of chemistries is Topsin (thiophanate-methyl). However, over the past several years’ fungicides that contain an MBC have become more widely available. Products in this particular class are more “curative” in nature and are not generally considered to have “plant health”-type properties. Since 2013, I have looked at MBC-containing stand-alone applications as well as tank mixing an MBC with another mode of action for the purposes of managing diseases such as frog-eye leaf spot.

Most commonly available fungicide products that contain an MBC: Topsin (a stand-alone MBC)

Less commonly available fungicide products that may gain some attention and contain an MBC: Acropolis (Domark + Topsin), Froghorn (Topsin + tebuconazole), Topsin XTR (Topsin + tebuconazole)

Not all fungicides provide the same response if applied into the same environment. Base fungicide decisions on the desired outcome based on the crop planted and the specific field situation. The below table may be used to aid in navigating fungicide decisions .

Table of the scenarios to be considered when applying a specific fungicide active ingredient or group of active ingredients.

| Product class as stand-alone or pre-mix formulation | Benefit of application | | | | |
|---|-------------------------|------------------------|-----------------------------|------------------------------|----------------------------|
| | Corresponding FRAC code | “Plant health” benefit | Disease absent (preventive) | Disease present (“curative”) | Prior to disease occurring |
| QoI | 11 | Yes | Yes | NO | Yes |
| DMI | 3 | NO | - | Yes | Yes |
| MBC | 1 | NO | - | Yes | Yes |
| QoI + DMI | 11 + 3 | Yes | Yes | Yes | Yes |
| QoI + SDHI | 11 + 7 | Yes | Yes | Yes | Yes |
| QoI + DMI + SDHI | 11 + 3 + 7 | Yes | Yes | Yes | Yes |
| DMI + MBC | 3 + 1 | NO | - | Yes | Yes |

-The table does not consider the numerous tank mix alternatives that could be formulated with generic products depending on local availability.

-The “plant health” column is only included because many consider there to be a yield benefit from applying the specific active ingredient to either corn or soybean in the absence of disease.