Reference

OCTOBER, 2010

Fungicide combination products

Active ingredient levels in single ai fungicides vs. combination products. To assess the levels of active ingredient (ai) in pre-packaged fungicide combination products, locate the ai of interest in the left hand column, and compare the labeled rates of ai for the original "Single AI Product" vs. the labeled rates in the "Combination Product" of interest.

Active ingredient (AI)	SINGLE A.I. PRODUCT		COMBINATION PRODUCT(S)	
	Product name	oz AI/1000 sq ft	Product name	oz AI/1000 sq ft
azoxystrobin	Heritage	0.1 - 0.4	Headway	0.05 - 0.34
boscalid	Emerald	0.09 – 0.13	Honor	0.06 – 0.12
chlorothalonil	Daconil	0.8 - 4.1	Concert Disarm C Instrata Reserve Spectro	0.8 - 4.3 0.8 - 3.0 1.0 - 4.1 1.7 - 2.9 2.2 - 4.1
fludioxonil	Medallion	0.1 - 0.3	Instrata	0.04 - 0.17
fluoxastrobin	Disarm	0.09 - 0.18	Disarm C	0.05 - 0.18
flutolanil	Prostar	1.1 - 3.2	Systar	1.0 - 3.1
iprodione	26GT	0.75 - 2.00	26/36 Interface	0.5 - 1.9 0.8 - 1.9
propiconazole	Banner	0.08 - 0.65	Headway Concert Instrata	0.08 – 0.57 0.6 – 0.3 0.16 – 0.65
pyraclostrobin	Insignia	0.10 – 0.18	Honor	0.09 – 0.18
thiophanate-methyl	3336	1.0 - 3.0	Spectro Systar 26/36	0.5 - 1.0 0.6 - 1.7 0.5 – 1.9
triadimefon	Bayleton	0.13 - 1.00	Tartan	0.25 - 0.50
trifloxystrobin	Compass	0.05 - 0.13	Tartan, Interface	0.05 - 0.10
triticonazole	Triton, Trinity	0.11 - 0.42	Reserve	0.22 - 0.37

Commonly available pre-packaged fungicide combination products

Active ingredient 1	Active ingredient 2	Active ingredient 3	Some common brand name(s)
azoxystrobin	propiconazole	– –	Headway
chloroneb	thiophanate-methyl	– –	Fungicide IX
chlorothalonil	propiconazole	– –	Concert
chlorothalonil	propiconazole	fludioxonil	Instrata
chlorothalonil	thiophanate-methyl	– –	ConSyst, Peregrine, Spectro
copper hydroxide	mancozeb	– –	Junction
fluoxastrobin	chlorothalonil		Disarm C
fluopicolide	propamocarb	– –	Stellar
flutolanil	thiophanate-methyl	– –	Systar
iprodione	thiophanate-methyl	– –	26/36, Dovetail, Fluid Fungicide,Twosome
pyraclostrobin	boscalid		Honor
triadimefon	trifloxystrobin	– –	Armada, Tartan
trifloxystrobin	iprodione		Interface
triticonazole	chlorothalonil		Reserve

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Fungicide Combination Products: How to Decide?

Are they a gimmick by manufacturers, or a great new tool for turf managers? A prescription for fungicide overuse, or a more effective approach that takes advantage of fungicide synergies? These are just some of the questions raised as superintendents try to decide whether a fungicide combination product is the best choice for them.

Convenience rules

Convenience is the most compelling reason to use a combination product. They allow you to avoid physical or chemical incompatibility problems, and even more importantly, to target multiple diseases simultaneously. For example, say you want to target a foliar disease, such as anthracnose, as well as a root disease, such as summer patch. Rather than worrying about compatibility issues and taking the time to separately measure out and apply chlorothalonil (Daconil) and propiconazole (Banner), it might be more convenient to apply a single product, such as Concert. A listing of some of the most commonly used combination products appears on the reverse side of this publication.

Except when it doesn't

But whether or not a pre-packaged product is right for you depends on which diseases you are targeting vs. the concentrations of each ingredient in the product. If the component fungicides have been packaged in the right concentrations and ratios for the pests you want to control, then you are in luck. If not, then you run the risk of either poor control (if there isn't enough of one or more fungicides) or of overuse and unnecessary expense (if one or more of the fungicides is at a higher concentration than you need). For some materials that have restrictions on the amount that can be used per year (such as chlorothalonil), it is even more important to know how much is being applied in each application. To help you make these determinations, we have supplied a few useful reference tools on the reverse side.

Tools for simplifying your decision

Use the chart on the reverse side of this publication to determine how much active ingredient is present in some of the most popular combination products.

To get an even more specific idea of how much of each fungicide active ingredient (a.i.) is being delivered in a combination product, we have developed a "Product active ingredient calculation spreadsheet" that automatically calculates the a.i. delivered to the turf in any product of interest, at any use rate, and in both metric and English units (it is available on the PACE Turf website at http://www.paceturf.org/PTRI/Documents/0907_ref.pdf

Are there other reasons for using pre-packaged combination products?

Several additional benefits of pre-packaged combination fungicides have been proposed, but in most cases, these are not supported by the data. Avoiding development of fungicide resistance through the use of fungicide combinations is theoretically possible, but we have no evidence that the products now available will address this need. Increasing efficacy through synergy —a phenomenon that occurs when the effect of a combination is better than would have been predicted— is another attractive idea that keeps surfacing. However, studies recently conducted by Dr. Lee Burpee and Dr. Rich Latin indicate that at least for diseases such as dollar spot, synergy cannot be documented.

The bottom line

The best reason to use a pre-packaged combination product is convenience. These products can save you some time by targeting multiple diseases in one fell swoop. They can also remove some of the guesswork associated with fungicide compatibility, since pre-packaged products should be both physically and chemically compatible. But before using a pre-packaged product, use the tools above to make sure that you will be delivering the proper rates of each fungicide active ingredient for the diseases that you are dealing with.

Updated 9/10