



Stobilurins: Who Has Them, Where Do They Come From, and How Do They Work?

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As you know the Turfgrass Disease Diagnostic Lab is involved in fungicide evaluation trials. One of the benefits of performing this work is the opportunity to see what is new in the way of plant pathogen control products. I have been involved in such trials since 1992 and have seen many chemicals years before they were released and also ones that have never made it that far. One of the chemistries that has been tested extensively in recent years has been those belonging to the Stobilurin Family. Currently there is only one member of this family available to the public, but in the next couple of months and years there should be at least four to five members.

By this time most of you are already familiar with one of the members, Azoxystrobin or better known in the turf and ornamental market as Heritage. Produced by Zeneca, this product has proven to be very effective against many diseases and probably the premier control of basal rot anthracnose. But, do you know how it works, where the original chemistry was derived from, or what other available chemicals are in this family that will be available in the future?

In the remainder of this article I will update you on the background of this family and what we should be seeing from the major players in turfgrass disease control in the next couple of years.

History

You may or may not know that this family has some very simple beginnings and is actually modeled after naturally occurring compounds. The original compound was first extracted from *Stobillurus tenacellus*, a basidiomycete that was found living on *Pinus sylvestris* (Scotch Pine) pine cones in Europe. Yes, even fungi find other fungi objectionable and use fungicides to ensure their survival. Several companies have taken on to this example and have fashioned many compounds based on the original compound.

The first company to do work on this chemistry was ICI or better known as Zeneca today. They were shortly followed by BASF and the race to market began. It should also be noted that the original work on these products was initiated in 1982, showing how long it takes to get new chemicals to the market place. Now just about every major

agricultural chemical company is pursuing some derivative of the stobilurin chemistry. At time of press, at least four companies had stobilurins in their experimental evaluation program or already being marketed.

Mode of Action

Mode of action can be a vague term meaning the specific site of action (i. e. biochemical pathway) or more generally as the either systemic or contact transportation in the plant. For this article, specific site mode of action is not that important and will only be mentioned that this class of chemical affects the bc1 complex of the mitochondrial respiratory chain. More focus will be put toward explaining how the chemicals are translocated through the plant. Three chemicals will be explained: azoxystrobin (Heritage, Zeneca), kresoxim-methyl (unnamed at print, BASF), and trifloxystrobin (Compass, Novartis).

Azoxystrobin

Azoxystrobin is slowly absorbed into the leaf and within 24 hours about 10% of the chemical is absorbed. Once in the leaf it moves acropetally through the xylem (transported outward and upward from site of penetration). Additionally, azoxystrobin has translaminar movement or movement from the top of the leaf to the bottom of leaf. This provides protection to the entire leaf even if only chemical is applied to the top surface. Root absorption is also possible and due to the acropetal movement it is translocated through the xylem to vegetative parts of the plant.

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Kresoxim-methyl

This chemical being investigated by BASF has shown to have similar uptake by the plant as azoxystrobin. Also, like azoxystrobin it has to have some translaminar movement from the upper to lower surface of the plant. Additionally through radioactively labeled studies, movement of the product has been observed through the waxy layers (surface systemic). This type of movement in combination with the translaminar movement has been termed quasi-systemic transport. Currently this product is labeled in Europe on several crops; however it is not know when or if it will be labeled on turf in the United States.

Trifloxystrobin

Trifloxystrobin is a new chemical that may be on the market this

summer for use on turf under the trade name Compass. Unlike the last two chemicals it has very little absorption into the plant, with about 2% after 24 hours. But its major mode of transport is similar to that of kresoxim-methyl. Novartis has termed this movement as mesostemic. To simply define mesostemic, it is transported through the waxy layer via superficial vapor movement. It additionally has translaminar movement, but has no movement through the vascular system of the plant.

Resistance

Like any single site fungicide there is a high possibility for resistance. Care should be taken with their use and excessive use should be avoided. Standard management practices should be employed such as rotation. This will ensure that we

are able to use this chemistry for many years to come.

In summary, we are at a very important crossroad in turfgrass disease control. This is the first step to new and improved chemistries that have greatly reduced use-rates and are derivatives of naturally occurring chemicals, providing much less impact to the environment and the people who use them.

References:

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