If you are using fungicides or advising others on their use to control turf disease, you will understand the need to keep abreast of this rapidly changing market place. Advances in chemistry and technology may cause us to change our thinking on how to choose fungicides to combat the ever present threat of disease on sports and amenity turf. The simple choice of contact fungicides in the winter and systemic products in periods of strong growth now has to be tempered by the fact that the modern fungicides, brought in to replace those withdrawn on environmental or toxicological grounds, do not always behave in the manner we are accustomed to. This article reviews the introduction of a new group of fungicides to the turf market and how they are best used for maximum effect.

In 1977 a group of German scientists discovered two anti-fungal antibiotics which they named ‘strobilurin A’ and ‘strobilurin B’ because they were isolated from the pine cone fungus Strobilurus tenacellus. This organism produces these natural fungicides to restrict other species of fungi that are competing for its main food source. As a result of this research we now have a whole new family of fungicides based on these natural products.

Strobilurins were found to be very effective against a wide range of species, from all of the four families of fungi but were easily broken down by UV light. Strong sunlight is not an issue to the pine cone fungus living on the heavily shaded forest floor but out in the open it’s a different matter, so UV stable synthetic strobilurins were produced to gain greater durability.

Today we have three strobilurin molecules registered for use on turf in the UK. The first of these was azoxystrobin, launched under the brand name ‘Heritage’ in 1997 followed soon after by ‘Scorpio’ (trifloxystrobin) and ‘Insignia’ (pyraclostrobin). Since the initial introductions there have been several ‘me too’ products formulated from straight strobilurins and two mixtures with other fungicides; ‘Headway’ (oxazystrobin and propiconazole) and ‘Dedicate’ (pyraclostrobin and tebuconazole).

All members of the strobilurin family have the same mode of action. They interfere with energy production in the fungal cells, bringing all activity to a halt – like tripping a circuit breaker! To be more specific, they all have a ‘single site’ mode of system enabling it to be distributed through the plant. Such movement is sometimes referred to as ‘accelerated systemic activity’ to differentiate it from true systemic action, which involves both upward and downward distribution.

Trifloxystrobin (‘Scorpio’) and pyraclostrobin (Masco Ellaro) are not systemic or contact fungicides but they are strongly lipophilic and become firmly embedded in the waxy cuticle cells of the leaf surface. This makes them very rain-fast and during periods of slow growth, they will persist for longer than the upwardly mobile ‘Headway’.

Bayer’s product ‘Dedicate’ differs from the others in that it has the ability to move a short distance in action, targeting energy conversion in the cell – a process which is known to biochemically专著 the fungal respiration. The strobilurins are classified under the group name QoI which stands for ‘Quinone outside inhibits’ the specific binding site where they disrupt energy production). Without energy conversion the fungus cannot grow or reproduce and death follows.

However, despite the common mode of action, the three active ingredients are used in turf under different conditions. In the UK, azoxystrobin was introduced for use in the very early stages of disease. However, they cannot be relied upon to work overnight. Fortunately we now have watching groups like FRAC who routinely follow up and monitor suspected cases of acquired resistance and more importantly advise manufacturers and users on the best way to minimise resistance risk.

The following guidelines for use of QoI fungicides may help to prolong their usefulness –

• They should be treated as preventative fungicides and applied before or at the earliest moment after the onset of visible symptoms.
• Fungicide programs must delay disease emergence and development. Apply QoI fungicides to turf-grass diseases in the USA – notably Anthracnose, Gray Leaf Spot and Pythium Blight – the latter two being of no importance to UK turf. However, the area which also reports isolated cases of resistance to Microdochium nivale in wheat grass. In the same fungus is the cause of the UK’s most important turf disease formerly known as Fusarium Patch.
• Where a group of fungicides has the same ‘multi-site’ mode of action, resistant strains of fungi will demonstrate cross resistance to all members of the same group. Rotation of fungicides must therefore be to the outside of the QoI family with substances having different mode of action.

In the following guidelines for use of QoI fungicides may help to prolong their usefulness –

• They should be treated as preventative fungicides and applied before or at the earliest moment after the onset of visible symptoms.
• Fungicide programs must delay disease emergence and development. Apply QoI fungicides to turf-grass diseases in the USA – notably Anthracnose, Gray Leaf Spot and Pythium Blight – the latter two being of no importance to UK turf. However, the area which also reports isolated cases of resistance to Microdochium nivale in wheat grass. In the same fungus is the cause of the UK’s most important turf disease formerly known as Fusarium Patch.
• Where a group of fungicides has the same ‘multi-site’ mode of action, resistant strains of fungi will demonstrate cross resistance to all members of the same group. Rotation of fungicides must therefore be to the outside of the QoI family with substances having different mode of action.

In the following guidelines for use of QoI fungicides may help to prolong their usefulness –

• They should be treated as preventative fungicides and applied before or at the earliest moment after the onset of visible symptoms.
• Fungicide programs must delay disease emergence and development. Apply QoI fungicides to turf-grass diseases in the USA – notably Anthracnose, Gray Leaf Spot and Pythium Blight – the latter two being of no importance to UK turf. However, the area which also reports isolated cases of resistance to Microdochium nivale in wheat grass. In the same fungus is the cause of the UK’s most important turf disease formerly known as Fusarium Patch.

In the following guidelines for use of QoI fungicides may help to prolong their usefulness –

• They should be treated as preventative fungicides and applied before or at the earliest moment after the onset of visible symptoms.
• Fungicide programs must delay disease emergence and development. Apply QoI fungicides to turf-grass diseases in the USA – notably Anthracnose, Gray Leaf Spot and Pythium Blight – the latter two being of no importance to UK turf. However, the area which also reports isolated cases of resistance to Microdochium nivale in wheat grass. In the same fungus is the cause of the UK’s most important turf disease formerly known as Fusarium Patch.

In the following guidelines for use of QoI fungicides may help to prolong their usefulness –

• They should be treated as preventative fungicides and applied before or at the earliest moment after the onset of visible symptoms.
• Fungicide programs must delay disease emergence and development. Apply QoI fungicides to turf-grass diseases in the USA – notably Anthracnose, Gray Leaf Spot and Pythium Blight – the latter two being of no importance to UK turf. However, the area which also reports isolated cases of resistance to Microdochium nivale in wheat grass. In the same fungus is the cause of the UK’s most important turf disease formerly known as Fusarium Patch.
Nature’s cure

Graham Paul offers some useful fungicide advice, which can also go towards building your BASIS Points

If you are using fungicides or advising others on their use to control turf disease, you will understand the need to keep abreast of this rapidly changing market place.

Advances in chemistry and technology may cause us to change our thinking on how to choose fungicides to combat the ever present threat of disease on sports and amenity turf. The simple choice of contact fungicides in the winter and systemic products in periods of strong growth now has to be tempered by the fact that the modern fungicides brought in to replace those withdrawn on environmental or toxicological grounds, do not always behave in the manner we are accustomed. This article reviews the introduction of a new group of fungicides to the turf market and how they are best used for maximum effect.

In 1973 a group of German scientists discovered two anti-fungal antibiotics which they named ‘strobilurin A’ and ‘strobilurin B’ because they were isolated from the pine borer Strobilurus tenacellus. This organism produces these natural fungicides for its main food source. We now have a whole new family of fungicides based on these natural products.

**"This organism produces these natural fungicides to restrict other species of fungi that are competing for its main food source.**

Graham Paul

Strobilurins were found to be very effective against a wide range of species, from all of the four families of fungi but were easily broken down by UV light. Strong sunlight is not an issue to the pine cone fungus Strobilurus tenacellus. This organism produces these natural fungicides for its main food source. We now have a whole new family of fungicides based on these natural products.

Strobilurins were found to be very effective against a wide range of species, from all of the four families of fungi but were easily broken down by UV light. Strong sunlight is not an issue to the pine cone fungus Strobilurus tenacellus. This organism produces these natural fungicides for its main food source. We now have a whole new family of fungicides based on these natural products.

**Fungicide Research into Turf Grains 1979**

**Fungicide Resistance Action Committee (FRAC)**

**Waxy cuticle cells of the leaf surface.**

**Systemic fungicides in periods of strong growth now have to be tempered by the fact that the modern fungicides brought in to replace those withdrawn on environmental or toxicological grounds, do not always behave in the manner we are accustomed.**

**The advantage of ‘single-site’ mode of action is that it offers a much greater potential for resistant strains to develop till in the case with fungicides having a multi-site mode of action.**

**They interfere with energy production in the fungal cells, bringing all activity to a halt – like tripping out the circuit breaker!**

**They interfere with energy production in the fungal cells, bringing all activity to a halt – like tripping out the circuit breaker!**

**This organism produces these natural fungicides to restrict other species of fungi that are competing for its main food source.**

**Graham Paul**

**If you are using fungicides or advising others on their use to control turf disease, you will understand the need to keep abreast of this rapidly changing market place.**

**Advances in chemistry and technology may cause us to change our thinking on how to choose fungicides to combat the ever present threat of disease on sports and amenity turf. The simple choice of contact fungicides in the winter and systemic products in periods of strong growth now has to be tempered by the fact that the modern fungicides brought in to replace those withdrawn on environmental or toxicological grounds, do not always behave in the manner we are accustomed.**

**This article reviews the introduction of a new group of fungicides to the turf market and how they are best used for maximum effect.**

In 1973 a group of German scientists discovered two anti-fungal antibiotics which they named ‘strobilurin A’ and ‘strobilurin B’ because they were isolated from the pine borer Strobilurus tenacellus. This organism produces these natural fungicides for its main food source. We now have a whole new family of fungicides based on these natural products.

**Strobilurins were found to be very effective against a wide range of species, from all of the four families of fungi but were easily broken down by UV light. Strong sunlight is not an issue to the pine cone fungus Strobilurus tenacellus. This organism produces these natural fungicides for its main food source. We now have a whole new family of fungicides based on these natural products.**

**Strobilurins were found to be very effective against a wide range of species, from all of the four families of fungi but were easily broken down by UV light. Strong sunlight is not an issue to the pine cone fungus Strobilurus tenacellus. This organism produces these natural fungicides for its main food source. We now have a whole new family of fungicides based on these natural products.**