Turf pesticides are designed to protect fine grasses from insect pests, plant pathogens and weeds, but could now be in need of protection from themselves and the clutches of increasingly ‘dynamic’ EU directives issued by Brussels. Given the short time frame in which apparently safe turf pesticides with long pedigrees of effective use are being withdrawn from the market, or having their wings severely clipped, the greenkeeper might well ask exactly what pesticides are ‘safe’ and secure in the marketplace.

The short straight answer is that no single chemical pesticide is absolutely secure with an assured future use in professional turf because those issuing the directives are the ones making (or making up) the rules. As such they decide on the nature and height of the hurdles and position of the goal posts presented to the manufacturer who develops and markets pesticides with long pedigrees of effective use are being withdrawn from the market, or having their wings severely clipped, the greenkeeper who applies the pesticide product and so on. The answer to pesticide protection is in product ‘stewardship’, an ethic and concept embodying the responsible planning and management of pesticide resources in relation to the environment and public health.

Product stewardship operates at two levels, first with the manufacturer who develops and markets the pesticide product and secondly the greenkeeper who applies the pesticide product according to label recommendations and within a broader best practice turf management programme.

Bio-inspired pesticides
Manufacturers are designing and developing ‘new-age’ active ingredients based on naturally occurring bio-chemicals produced and deployed by soil based microorganisms. There is an obvious environmental bonus when using a pesticide derived from a substance that is naturally occurring and operational in the soil and clearly presenting much less of a risk.

This is the logical place to look for the up and coming generations of bio-founded and bio-foundation pesticides. For instance, the antagonistic fungus Trichoderma with an ability to suppress or kill pathogenic microbes, and used commercially as a bio-control agent, does so not by magic, but through an integrated process of competitive invasion, direct control by synthesis of fungicidal and fungi-static chemicals and the induction of anti-fungal responses in host plants.

A classic example of a contemporary turf fungicide with microbial origins is anamostrobin discovered during research on Oudemansiella mucida and Strobilurus tenacellus. These small white or brown coloured mushrooms commonly found in Czech forests first attracted scientists’ attention due to their remarkable ability to defend themselves by releasing two substances – strobilarin A and oudemansin A – which kept competitor fungi at bay and even destroyed them when in range.

This pioneering work paved the way for the development of a whole range of new fungicides now called the strobilurins, several of which are at the forefront of turf management for control of Fusarium patch and other diseases of turf grasses.

A much more recent entry into the turf fungicide market from this avenue of research is fludioxonil, which Syngenta describes as bio-inspired.

Fludioxonil is a fungicide from the phenylpyrrole group of chemicals derived from the natural antifungal substance pyrrolnitrin produced by Pseudomonas pyrocinia soil bacteria. Greenkeepers will recognise fludioxonil as the active ingredient of Syngenta’s Medallo TL, a brand new contact turf fungicide providing targeted control of pathogens responsible for key diseases of turf such as Fusarium patch, anthracnose and leaf spot. Among its many novel and innovative features fludioxonil takes effect not only on the green leaf but also on the thatch and soil surface to pre-emptively hit the fungus Microdochium nivale (Fusarium patch) when in saprophytic mode and before it has a chance to infect living grass leaves and damage the turf with symptoms of Fusarium patch disease.

Opportunity for the discovery, design and development of new age pesticides along these avenues and pathways is limitless.
Protecting turf pesticides in the marketplace

By Dr Terry Mabbett

Turf pesticides are designed to protect fine grasses from insect pests, plant pathogens and weeds, but could now be in need of protection from themselves and the clusters of increasingly ‘dynamic’ EU directives issued by Brussels.

Given the short time frame in which apparently safe turf pesticides with long pedigrees of effective use are being withdrawn from the market, or having their wings severely clipped, the greenkeeper might well ask exactly what pesticides are ‘safe’ and secure in the marketplace.

The short straight answer is that no single chemical pesticide is absolutely secure with an assured future use in professional turf because those issuing the directives are ‘safe’ and secure in the marketplace.

A classic example of a contemporary pesticide that is naturally occurring and operational in the soil and clearly presenting much less of a risk is the fungus Trichoderma with an ability to suppress or kill pathogenic microbes, and used commercially as a bio-control agent, does so not by magic, but through an integrated management of pesticide resources in relation to the environment and public health.

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For instance, the antagonistic fungus Trichoderma with an ability to suppress or kill pathogenic microbes, and used commercially as a bio-control agent, does so not by magic, but through an integrated process of competitive invasion, direct control by synthesis of fungidal and fungistatic chemicals and the induction of anti-fungal responses in host plants.

A classic example of a contemporary turf fungicide with microbial origins is azoxystrobin discovered in Czech forests first called the strebolumins, several of which are at the forefront of turf fungicides today. Several of Syngenta’s Medallion TL, a brand new contact turf fungicide providing targeted control of pathogens responsible for key diseases of turf such as Fusarium patch, anthracnose and leaf spot.

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Recent developments in turf fungicides have seen a focus on fungicide-resistant organisms. For example, the Mycosaprophysical mode in which Fusarium nivale (Fusarium patch) when in range. In this pioneering work, the fungus Microdochium nivale (Fusarium patch) when in range. This pioneering work paved the way for the development of a whole range of new fungicides now called the strobilurins, several of which are at the forefront of turf management for control of Fusarium patch and other diseases of turf grasses.

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Bio-inspired, bio-based active ingredients are more likely to automatically fulfill these requirements compared to traditional chemical pesticides created in the crucible. The original natural biochemical having evolved in natural soil-dwelling microbes will, by its very nature, be highly potent and targeted and, therefore active at a comparatively low [?] loading against a narrow range of competitors. Similarly it must be inherently resistant to leaching in order to carry out its defensive function in the uppermost soil profile including on the thatch. The eventual active ingredient is not the original natural biochemical, but having the same basic chemistry the foundations for these benefits are in place.

Stewardship on the golf course

Greenkeepers have their role to play by adhering to the instructions and recommendations on the product label and by following best practice around the entire pesticide application process and also in its wider context. This will include avoidance of drift by not spraying in windy conditions and not placing spray closer than stipulated to water courses, lakes and ponds and by increasingly adopting low drift hydraulic spray nozzles and controlled droplet application (CDA) sprayers that use shielded rotary atomisers to virtually eliminate spray drift. Although current scrutiny is on its role in agriculture where the tonnage used is large and the application is much more broadly based than on turf. Use and application as a spray on managed turf is vital but must include compared to what goes on with chlorpyrifos in agriculture where it is used on vast areas for control of various pests such as orange wheat blossom midge. Agriculture is fighting back with a programme of enhanced product stewardship and a new set of guidelines under the banner ‘Say NO to DDT’.

This includes adhering to an extended no-spray buffer zone of 20 metres adjacent to water courses and the use of LERAP three star rated low-drift nozzles for all chlorpyrifos applications. Any loss of chlorpyrifos for use on turf would almost certainly be collateral to its situation and status at the time in agriculture.

Wanting to use glyphosate will be left with heavy horses and manual methods to lay, flail, roll, beat and bruise bracken into submission. Anamul is available for use in 2012 under use-up provisions and most likely for re-certification to secure its future for the long term. This may take five years but there is now the possibility of obtaining a series of Emergency Authorisations for 2013, 2014, 2015 and probably 2016.

Carbendazim

Carbendazim is the last in a long line of chemicals used by greenkeepers to control surface casting earthworms and the mess they make on greens and tees. The situation with carbendazim is becoming something of a saga and many are claiming that the pesticide will go sooner or later, although nobody seems to know when. If it does go, and there is no certainty that it will, carbendazim will essentially have been ‘twisted by its own petard’ as a highly effective, and essential fungicide (worumide). You couldn’t make this one up if you tried because if carbendazim does fall it will be at the hurdle erected to trap pesticides which have negative effects on earthworms.

You can almost imagine the factual situation some years down the line when the custodian of carbendazim is up in front of the ‘beaks’ in Brussels and the question is asked: “Does your candidate wormicide have any effect on earthworms?” The real irony is that carbendazim goes and has nothing chemical to replace it, then any benefit seen by the ‘burgers in Brussels’ will almost certainly be lost in the fall-out.

They will see withdrawal of carbendazim as further reduction in pesticide loading on the environment, but this will be more than made up for by herbicide applications to control the broadleaf weeds getting a quick and easy start and secure foothold on worn casts deposited all over greens and tees. Furthermore, it can only add to mole activity and require greenkeepers to go for zero starts to do more unspeakable things to these wild mammals which are protected in some other European countries.

Chlorpyrifos

Chlorpyrifos, the only sprayable insecticide for control of leatherjackets in turf, is the latest pesticide to stand in the spotlight. Insecticides in the spotlight...
Bio-inspired, bio-based active ingredients are more likely to automatically fulfill these requirements compared with traditional chemical pesticides created in the crucible. The original natural bio-chemical having evolved in natural soil-dwelling microbes will, by its very nature, be highly potent and targeted and, therefore active at a comparatively low [?] loading against a narrow range of competitors. Similarly it must be inherently resistant to leaching in order to carry out its defensive function in the uppermost soil profile including the thatch. The eventual active ingredient is not the original natural biochemical, but having the same basic chemistry the foundations for these benefits are in place.

Stewardship on the golf course

Greenkeepers have their role to play by adhering to the instructions and recommendations on the product label and by following best practice around the entire pesticide application process and also in its wider context.

This will include avoidance of drift by not spraying in windy conditions and not placing spray closer than 5 m from watercourses, lakes and ponds and by increasingly adopting low drift hydraulic spray nozzles and controlled droplet application (CDA) sprayers that use shielded rotary atomiser nozzles to virtually eliminate spray drift.

However, in these times of increasing official scrutiny, that might not be enough, meaning that the course manager should always be thinking laterally and one step ahead. Soil compaction is a fact of life on golf courses and its effect on grass growth and general turf condition is well known. However, there are additional dimensions with strong implications for pesticide use and environmental protection. For instance, compacted turf is prone to ‘puddling’ and run-off of surface water is thus created. Timely aeration may, therefore, become an important, albeit more tenuous, factor in pesticide product stewardship.

Thinking ahead means casting a watchful eye beyond the sports and amenity turf ‘best’ and into other dimensions of pesticide use such as agriculture and horticulture. A classic case in point is the current concern expressed by apiarists (beekeepers) and some environmentalists who claim that the use of neonicotinoid insecticides on oilseed rape, is harming bee populations. At first glance such concerns could be at risk is generally not a good idea and probably a case of tempting fate. However, there are several important pesticides sufficiently in the spotlight and known to be at risk to a greater or lesser extent.

Asulam

Greenkeepers might not even be aware of this highly specialist herbicide unless they have a problem with bracken on their course. If they do they will undoubtedly be concerned because as the situation currently stands is asulam could be on the way out forever as asulam can no longer be purchased and all stocks made in December 2012. Any loss of asulam on turf will go sooner or later, although current scrutiny is on its role in agriculture where the usage is large and the application is much more broadly based than on turf.

Use and application as a spray on managed turf is vital but insecure compared with what goes on with chlorpyrifos in agriculture where it is used on vast areas for leaffojets and to control other important pests such as orange wheat blossom midge. Agriculture is fighting back with a programme of enhanced product stewardship and a new set of guidelines under the banner ‘Say NO to DRIFT’. This includes adhering to an extended no-spray buffer zone of 20 meters adjacent to water courses and the use of LERAP three star rated low-drift nozzles for all chlorpyrifos applications. Any loss of chlorpyrifos for use on turf would almost certainly be collateral to its situation and status at the time in agriculture.

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If it does go, and there is no certainty that it will, carbendazim will essentially have been ‘twisted by its own petard’ as a highly effective, and essential lumbricide (wormicide). You couldn’t make this one up if you tried because if carbendazim does fall it will be at the hurdle erected to trap pesticides which have negative effects on earthworms.

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Furthermore, it can only add to mole activity and require greenkeepers to call in more pest control operators to do more unspeakable things to these wild mammals which are protected in some other European countries.

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Chlorpyrifos, the only sprayable insecticide for control of leaffojets in turf, is the latest pesticide to stand in the spotlight, although current scrutiny is on its role in agriculture where the usage is large and the application is much more broadly based than on turf.