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## **Leatherjacket control chemicals banned**

Golf Clubs need to be aware, if you don't know already, that the chemicals used up to now for the control of leatherjacket and chafer grub infestations are banned as from the end of October. Any subsequent use of them is illegal and renders the club liable to prosecution which is likely to result in a significant fine. As a result, there will be no legal pesticides available for use in the UK which can be used to control leatherjackets and chafers, and the only remedies available will be cultural or biological control methods. It is likely that your greens staff will have become aware of this through information from organisations such as BIGGA, or their agronomic advisors, but in order to safeguard the club against potential legal action it would be wise to check this.

But how much does this matter? Well, I'm sure that you've seen or heard of the damage that can be caused to golf courses by the effects of turf being ripped up by badgers, or rolled back by the actions of crows, jackdaws and starlings, in their search for the nutritious larvae which are eating the roots of the grasses. It can be extensive and extremely unsightly, and deeply frustrating to greenkeepers and golfers. Crane flies and chafer beetles lay their eggs in turf, and these hatch into larvae ("grubs") which grow over the winter to become several centimetres long, before eventually metamorphosing into their adult stages, as crane flies (Daddy long-legs) or chafer beetles. It's these nutritious grubs which are sought by badgers, foxes and birds in the spring.

Leatherjackets (the larvae of crane flies) and chafer grubs (the larvae of chafer beetles) can lead to significant damage on golf courses, both through direct damage to the roots of turf grass plants (which they feed on, and thereby weaken) and through collateral damage caused by the activities of birds and animals which tear up the turf in order to feed on the larvae. This is disruptive and unsightly, and costly to repair. Previously, pesticide products containing the active ingredients chlorpyrifos for leatherjacket control) and imidacloprid (against chafer grubs) have been widely used on golf courses, but the accumulation of evidence of their wider impact on the environment has led to them being banned by the EU and the UK governments. Imidacloprid (used in the product Merit Turf, amongst others) is a neonicotinoid, one of the chemicals identified as having had widespread damaging impacts on bee populations. Products containing imidacloprid are no longer on sale, and all existing stocks held must be used or disposed of by 31 October this year. Products containing chlorpyrifos were banned from sale, distribution or use from 31 March 2016, and all stocks held must be disposed of by 30 September this year. So it's a good idea to check that stocks of either do not remain in the chemicals store after those dates.

This means that chemical remedies for the control of leatherjackets and chafer grubs are now effectively unavailable, as there are no other chemicals which are licensed for such use. Consequently, cultural and biological control are the only methods which clubs can use to deal with these pests. The good news is that there is growing experience across the UK golf industry of these approaches, and agronomic consultancies are becoming more engaged with providing advice on this.

## **Look for early warning signs of infestation**

Whatever form of control is ultimately used, keeping an eye open for the early warning signs of an infestation is good practice, since you then have a chance to catch an infestation before it becomes a serious problem. If you see birds such as crows and starlings taking a close interest in your turf it's generally a good indication that something is going on below the surface. You may also notice some yellowing of the turf as the grass becomes weakened through its roots being attacked. Lift some of these turf areas to see if you can see leatherjackets or chafer grubs, and if so you can start to do something about it. You'll generally find the highest concentration of larvae at the edges of an infected area, as they have eaten out the centre area already.

## **Cultural control**

Both leatherjackets and chafer grubs do best on turf that is rich in thatch, as this provides them with larger volumes of food. So a programme of thatch reduction is a good preventative measure, and has the added benefit that it also tends to reduce retained moisture levels in the rootzone. The larvae are susceptible to drought, so improving drainage to prevent excessive moistness during the period of egg-laying and hatching in the late summer will help to reduce populations. But action into the autumn, before the larvae spend the winter feeding, is also wise.

## **Biological control**

Sward improvement programmes will take time to achieve the necessary changes in the physical conditions which encourage these pests, so biological control methods, using nematode worms, have become the main way of dealing with them. This approach has been used at some golf courses for a number of years, and is also well established in the gardening and horticultural sector.

The approach is based on the use of nematode worms which predate on soil pests through infecting them with a pathogenic bacterium which kills the larvae and allows the nematodes to then feed on them. The nematodes are host-specific, meaning that they will only predate on one species, so two different nematodes need to be used to deal with both leatherjackets and chafer grubs. They can be applied at the same time, do not disrupt each other, and are native to the UK, so that there is no issue with the introduction of alien species. They don't require the use of any personal protective equipment when being applied, and they persist in the soil and create free-living populations which provide some longer term protection against their prey pests. They are also environmentally safe. They are supplied in a kind of powder form and need to be mixed with water for application. It is then important that they are washed in with the irrigation system. Proprietary products are available for both of the nematodes, and will contain the species *Steinernema feltiae* (against leatherjackets) or *Heterorhabditis bacteriophora* (against chafer grubs). The best time to apply nematodes against leatherjackets is in the autumn, whilst treatment against chafers should be a little earlier, between July and October. A preventative approach such as this will provide far better protection than treatment when the symptoms appear in the spring.

It may be that effective control takes a little time, as initial use of nematodes may not deliver a quick and complete kill, reducing the population rather than eradicating it. It can also be impacted by soil and environmental conditions, so it would be wise to combine use of nematodes with cultural programmes aimed at improving sward condition.

### **Future good practice**

Given the area covered by a golf course, some way of prioritising areas for action is wise. You should consider whether there are areas that have historically been problematic, and perhaps focus initially on these, to reduce the source of future infestations. Areas such as greens, banking around greens, tees and bunker surrounds will likely be the areas which you will want to ensure remain in good condition, and you may want to focus your preventative applications in these areas. It would be helpful to monitor populations of chafer grubs and leatherjackets over a longer period, to see if you can identify trigger points at which their impacts become significant, thereby giving you a way of deciding when you need to take action. You may also want to identify specific areas where a thatch reduction programme could help.

Like it or not, the playing field for control of these two major pests on golf courses has been changed, and with the loss of the chemical solution clubs will have to change the emphasis of their control programmes for them. If you're not already speaking with your greens staff and agronomic advisors on this issue it would be a good idea to start thinking about it, especially if leatherjackets and chafer grubs are an issue on your golf course.