



INTEGRATED PEST MANAGEMENT

Leatherjackets & Chafers



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Problem Overview

Chafer grubs and leatherjackets are the soil-dwelling larvae of chafer beetles and crane flies. The larvae of these species feed on turf roots weakening and, when high numbers are present, killing the plant. Secondary damage occurs as areas of turf are ripped up by predator species; such as crows, badgers and foxes; in search of the larvae.

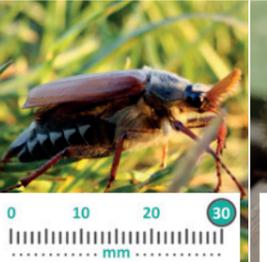
A suitable Integrated Pest Management Plan for these soil-dwelling pests will involve: identification of the pest, establishment of action thresholds and treatment priorities, monitoring and appropriate action. Undertaking these steps will help to reduce the threat of damage caused by chafer grubs and leatherjackets.

Planning

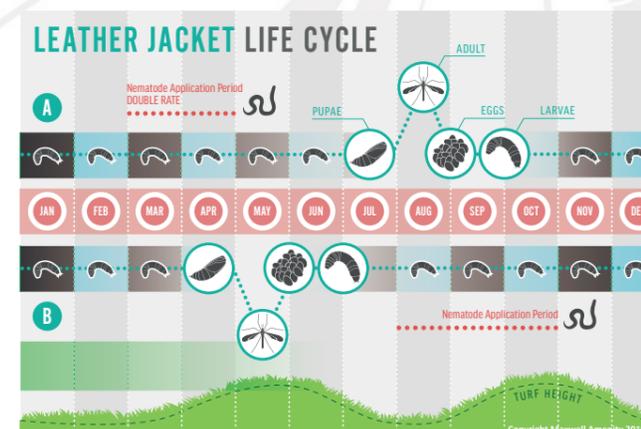
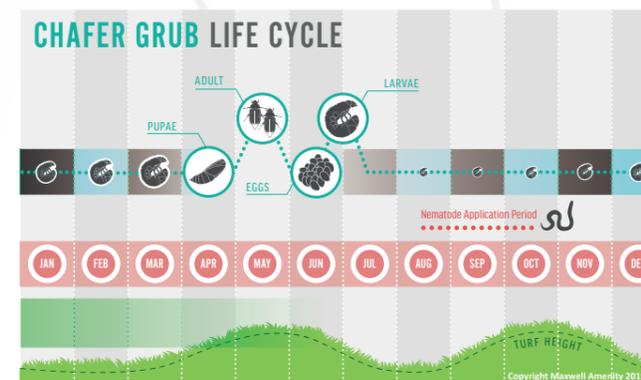


Identify Pest

Use the guide below to help identify the leatherjacket (crane fly larvae) and three of the most common UK chafers. There are six chafer species in total in the UK with the garden chafer being the most likely to cause damage to turf. Nematode species which can control both leatherjackets and chafer grubs alongside appropriate treatment times are also stated. Nematodes give some level of control of all chafer species but are most effective against the garden chafer.

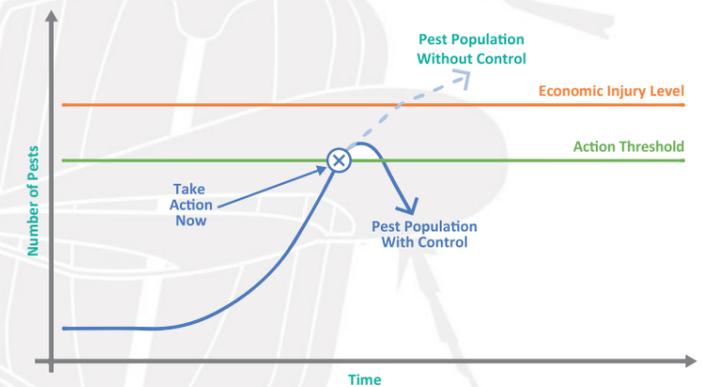
	Leatherjacket <i>Tipula spp.</i>	Garden Chafer <i>Phyllopertha horticola</i>	Cockchafer <i>Melolontha melolontha</i>	Welsh Chafer <i>Amphimallon solstitialis</i>
Adult	 0 10 20 25 30 mm	 0 10 20 30 mm	 0 10 20 30 mm	 0 10 15 20 30 mm
	Active: May – June & August – September	Active: May – June	Active: April – July	Active: June – August
Larvae			It is difficult to differentiate chafer grubs. Identification is best undertaken when the adults are active.	
Main treatment	<i>Steinernema carpocapsae</i> August – October	<i>Heterorhabditis bacteriophora</i> July – October	<i>Heterorhabditis bacteriophora</i> August – October	<i>Heterorhabditis bacteriophora</i> August – October
Secondary treatment	<i>Steinernema feltiae</i> March – April	Treatment of chafer grubs is only possible in the late summer/early autumn.		

These infographics are designed to inform the user about the life stage of the organism throughout the year. Application periods coincide with the larvae being at a young and susceptible life stage and soil temperatures above 12°C to ensure nematodes will be active.



Action Thresholds

The Economic Injury Level indicates the number of pests that an environment can sustain before economic or aesthetic damage will be caused. Alongside this value, the Action Threshold indicates the point at which action should be taken to prevent the pest population reaching the Economic Injury Level.



The Economic Injury Level and Action Threshold are both pest and location specific. The table below can be used as a guide to appropriate Action Thresholds but should be reviewed for individual circumstances as ultimately the decision will depend upon the situation, budget and priority.

Priority level	Description	Number of pests per m ²	
		Leatherjackets	Chafer Grubs
1	Area of high importance. Damage is not acceptable.	50	30
2	Small amount of damage acceptable.	100	50
3	Treatment not necessary unless severe damage is likely.	200	90

Monitoring

Adults

Monitoring and recording when adults of each pest species are active will help to show the severity and distribution of the pests and when to begin monitoring for the larvae.

Chafer beetles can be monitored using a chafer pheromone trap.

Use a sweep net or visual monitoring to estimate numbers and establish distribution of crane fly (adult leatherjackets).

In subsequent years the amount of adult activity could be used as a reference for likely larval levels.



Pheromone Trap

Larvae



Hole Cutter

Monitoring of larval numbers and distribution can be used to determine when action thresholds have been reached and economic or aesthetic damage is likely if appropriate action is not taken.

Using a hole cutter, remove soil samples from several locations within each area that is being monitored. To ensure that a representative view of the area is obtained, use a standardised methodology such as walking a W-shaped transect or use a grid system to sample at regular distances. The distance between sample points will depend on the size of the area being monitored and the level of accuracy of distribution that is required.

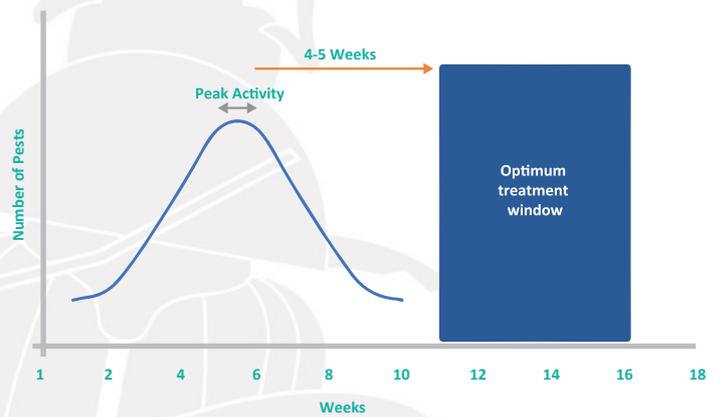


W-shaped Transect



Grid Sampling

Treatment



Apply the relevant entomopathogenic nematode for the pest problem 4-5 weeks after the peak adult flying time has been recorded ensuring that:

- The number of larvae in the soil has reached the action threshold.
- The soil temperature is within the tolerance limits for the nematode.
- The soil is moist and has been aerated.
- Further rain is forecast or you can apply irrigation.
- It is early in the morning, in the evening, or it is a cloudy day as the nematodes will be killed by UV light.

Immediately after application irrigate well using at least 2-5 litres per m² to wash the nematodes into the soil.

Continue to keep the area well-watered for at least two weeks.

Review

Repeat the monitoring process to ensure the nematodes have been effective.

If the pest levels have not fallen below action threshold levels reapply 21-28 days after the first application. This may occur if:

- Conditions were not appropriate for nematode activity.
- The infestation was particularly large.

Review the monitoring method, action thresholds and treatment method.

