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Use of entomopathogenic nematodes as biological control agents against pests of turfgrass.

With tighter restrictions on the use of chemical control products being experienced by many countries on both sports and amenity turf, the potential for biological control products to enter the turf market is greater than ever (Chandler and Grant, 2006). Some of the newer products to be brought to the markets utilize entomopathogenic nematodes (EPN). Beneficial nematodes are natural parasites of a number of different insect species (Gaugler, 2002; Grewal et. al., 2005). They have a symbiotic relationship with very specific bacteria. Once the nematode has infected an insect it releases the bacteria and the pest insect dies within 24-48 hours. Beneficial nematodes are very specific to the insects they kill, for example *Heterorhabditis bacteriophora* (Rhabditidae: Heterorhabditidae) for the control of turf grubs and *Steinernema feltiae* (Rhabditidae: Steinernematidae) for the control of leatherjackets (*Tipula* spp.). Beneficial nematodes offer several advantages over traditionally relied upon systemic or contact insecticides, such as the ability of the nematode to move through the soil to locate, infect and kill an insect (Gaugler and Bilgrami, 2004). Other advantages include no mammalian toxicity, no reentry interval and negligible non-target effects (Georgis et. al., 1991). Products based on the EPN *Heterorhabditis bacteriophora* are applied as autumn soil drenches to target the young chafer larvae. Applications are made early in the autumn to kill the grub larvae before they cause damage to the turf roots or predators start to feed on them which causes secondary damage. This secondary damage is often more extensive than the direct damage from grub feeding. There are two species of EPN commercially available for grub control *Heterorhabditis bacteriophora* and *H. megidis*. Both of these have been shown to give high levels of control against a range of pest grub species from different territories including the Garden chafer (*Phyllopertha horticola*) the most important pest species in Europe and the European chafer (*Rhizotrogus majalis*) and Oriental beetle (*Exomala orientalis*) two of the most important pest species in North America.

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