

## Threshold levels

The key to any Integrated Pest Management program is the identification of threshold (or “action”) levels. There is no single magic number which will be appropriate for all turf situations. **Thresholds are given as first approximations only, and should be used only as guides.**

Several agronomic factors will have a direct effect on the number of insects a turf area can tolerate. Some of these factors include the species of turfgrass, the height of cut, availability of irrigation (and resulting soil moisture distribution), use patterns (including traffic and other sources of compaction), and the fertility program. The thresholds presented in Table 13 are for unirrigated turf and are provided as guidelines only. In most cases, irrigated turf can sustain higher insect populations without showing stress.

Actual response thresholds will depend on the overall vigor of the turf being managed, the use of the turf, and the quality expected.

**Table 13. Approximate threshold levels\* for turfgrass insect pests.**

INSECT	Approximate threshold per sq. ft.
Japanese beetle	8 to 15 larvae
Oriental beetle	8 to 15 larvae
Masked chafer	6 to 15 larvae
European chafer	3 to 8 larvae
Asiatic garden beetle	12 to 20 larvae
May beetle ( <i>Phyllophaga</i> )	2 to 4 larvae
Black turfgrass ataenius	15 to 80 larvae
Annual bluegrass weevil	10 to 80 larvae
Bluegrass billbug	No good estimate available
Chinch bug	30 to 50 nymphs
Sod webworm, cutworm	No good estimate available

\* Please note that actual threshold levels will vary based on site conditions and management practices.

## Biological management of turf insects

### *Bacillus popilliae*

Milky disease (sometimes called “milky spore”) is caused by a bacterium, *Bacillus popilliae*, which occurs naturally in soil and affects the digestive system of Japanese beetle grubs. According to tests conducted in New Jersey, there is no evidence that milky disease is effective against other species of grubs. It is relatively nontoxic to people and other “non-target” organisms.

Milky disease is somewhat inconsistent in the Northeast, perhaps because soil temperatures do not remain warm enough long enough in the summer. More turf managers have reported success with milky spore in the sandy soils of southeastern