

UNDERSTANDING TURF MANAGEMENT

Pest Management

The 21st in a series by
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Pest management is an all inclusive term applied to the prevention and control of infestations of weeds, insects and diseases in turf. The materials used for their control are often grouped together under the generic name of pesticides. The material required for control of a weed, an insect or a disease, however, is most often a specific chemical, targeted at a specific pest. In addition the list of available chemicals for the control of a specific pest is ever changing as research brings new products to the market place. Therefore this article will not deal with specific recommendations, but rather, the broad principles of pest management.

Practices which tend to encourage vigorous turf growth are the turf managers first line of defence against pests, whether they be weeds, insects or diseases. These practices must include fertilization, irrigation, mowing, core cultivation and overseeding with the most appropriate turf species.

Insects and diseases are generally not common in athletic turf with the exception of bowling greens, but can occur from time to time. Good cultural practices such as adequate, but not excessive nitrogen and irrigation, will help to prevent infestations. Nevertheless, when they do occur the correct, early diagnosis and implementation of the necessary control strategies can eliminate most problems.

Specific descriptions of insect and diseases and current recommendations for control procedures are available from most provincial agricultural agencies, for example, O.M.A.F.R.A. Pub. #162, "Turfgrass Diseases and Insect Pests" and Pub. #364, "Recommendations for Turfgrass Management."

Most weeds cannot compete with healthy, dense turf. Thus those practices which encourage a dense turf will discourage weed infestation. Unfortunately intensive play on athletic fields, particularly during the slow growth periods of early spring and late fall, encourages the inva-

sion of weed species, necessitating control strategies.

Chemical control, however, may be required for broad leaf weeds such as dandelions, plantain, black medic, chickweed and knotweed. Chemical control is also available for crabgrass. The timing of application, rates and type of chemical to use are available on the product label and in the above mentioned publication.

A troublesome grass weed in older bluegrass stands is bent grass. At regular mowing heights for bluegrass, the bentgrass has minimal shear strength and is ripped out very easily by the running athlete. A degree of control may be obtained by vertical mowing followed by overseeding and topdressing.

One of the major problems in intensively managed, regularly irrigated turf under high nitrogen fertility for which there is no chemical control is annual bluegrass. This weed grass is found throughout North America.

The tear or shear resistance of the shallow rooting system is greatly inferior to the rhizomatous root system of Kentucky bluegrass. It suffers injury from low temperature, ice cover, freeze-thaw cycles, wind desiccation, and winter disease. High summer temperatures cause heat stress and it is prone to summer diseases.

Annual bluegrass is a prolific seed producer under most mowing heights. Since light promotes seed germination, initial invasion tends to occur in patches of turf that have opened up through injury. Once established, it is very competitive, producing new leaves, tillers and adventitious roots more rapidly than most competitive bluegrass cultivars.

The control of annual bluegrass is through competition from the more desirable species. Management is critical. Mow at the maximum height permitted for the sport involved. Avoid excessive nitrogen fertilization and irrigation. Maintain relatively low levels of phosphorus fertilization. Core aerate to minimize compaction and overseed with turfgrass



species which are competitive in nature.

The control of annual bluegrass, for which there is no simple chemical solution, is an excellent example of a relatively new concept of pest management. Since Rachel Carson wrote "The Silent Spring" there has been a movement to reduce, even restrict the use of chemicals for weed, insect and disease control. The concept of side-line to side-line chemical application on a rigid calendar date basis has given way to a "spray if needed, when needed, where needed" program.

The program has become known as *Integrated Pest Management (IPM)*. It might be suggested that IPM means Intelligent Pest Management. The goal of IPM is to generate a decision making approach for the suppression of pest, whether they are weeds, insects or diseases, in effective, economical and environmentally safe ways.

The key to a successful IPM program is monitoring (scouting) - identifying and recording the location and extent of the pest. The individuals who are responsible for the monitoring program must be familiar with the identification and life cycle of the pest(s) they are dealing with. They must take, preserve, analyze and review records taken on a regular timetable.

Some suggestions for a scouting program are:

- 1) Establish the key weeds, insects or diseases which may require control.
- 2) Set up a suitable recording sheet which includes a check list for all relevant information, including management factors such as mowing, aeration, fertilization, irrigation, and a map with an overlying location identifying grid.
- 3) Establish an action threshold value above which the pest becomes a prob-

lem for your particular turf situation.

- 4) Establish a scouting pattern for walking the field and follow the same pattern consistently.
- 5) Establish a frequency of scouting which requires a knowledge of the pest life cycle
- 6) Have consistency in personnel conducting the scouting program.
- 7) Evaluate the pest treatment selected to determine its degree of success and modify the scouting procedure or treatment as appropriate.

The action threshold is an important part of an IPM program. It is the frequency of occurrence of the pest in question which can be tolerated by a turf situation before control action by chemicals must be taken. The action threshold is a guideline which should take into consideration the type and use of the turf. One juvenile dandelion per square meter in a soccer field may be of no concern whereas ten knotweed plants per square meter in centre field should call for treatment.

The type of control may not necessarily suggest a chemical application. Healthy turf may be the appropriate and most economical solution. **Cultural Control** through mowing, fertilizer use, irrigation, thatch management, for example should be given first consideration. In the above case compaction may be the cause which may be alleviated in the long term by core cultivation and overseeding.

Biological Control is gaining importance and currently there is a great deal of research being directed toward developing control agents for turf pests. Biological control refers to the use of a predatory or pathogenic organism to control a pest. For many years the bacteria, *Baccillus thuringiensis*, (BT) has been used for the control of spruce budworm and gypsy moth. In the turf area, the research noted in GTI Hilites in this issue on endophytic fungi in perennial ryegrass may become a common control measure for chinch bug. While biological control is still in its infancy, the turf manager must be aware of these developments through the various educational programs which are available to him.

Chemical Control is still an important part of any pest control program. It should be used, however, only when a pest is present in sufficient level to cause turf damage. Nevertheless there are guidelines which can reduce the amount which needs to be applied. Some are:

- 1) Apply the treatment at that time in the life cycle of the pest when it is most susceptible.
- 2) Spot treatment when a pest is restricted to an isolated area.
- 3) Use a properly calibrated and adjusted sprayer.

- 4) Apply the chemical at the recommended rate under optimum weather conditions for its action.
- 5) Select a chemical with the lowest mobility in the soil and persistence in the environment.
- 6) Alternate chemicals to reduce the build up of pest resistance through mutations.

A IPM program for turf for any organization will evolve with time and experience. The management of the program must be committed on a long term basis to make the program work. All staff involved in turf management for an organization using IPM should be aware of the purpose of the program and continually be updated on its success and requirements. Senior administration and the public must be "on side" and realize that in extreme cases it may require such drastic action as reconstruction of a facility.

For assistance in establishing an IPM program the Ontario Ministry of Agriculture, Food and Rural Affairs has released a video called "Integrated Pest Management for Turf." The video may be purchased for \$18.00 through the Guelph Turfgrass Institute, 328 Victoria Rd. South, Guelph, ON. N1H 6H8.

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