AN INDEPENDENT NEWSLETTER FOR TURF MANAGERS

Turf Grass TRENDS

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Using IPM to manage weeds in turfgrass

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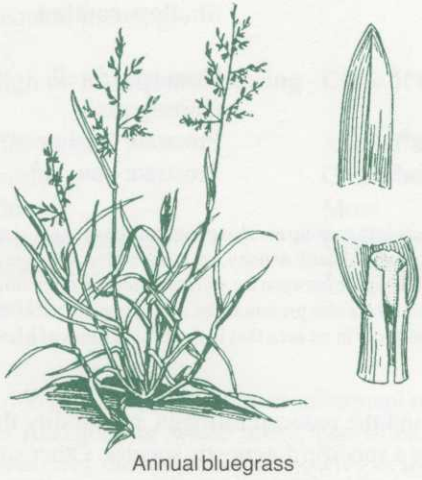
Integrated Pest Management (IPM) can keep weed infestations below a predetermined treatment threshold by using all suitable techniques and methods appropriate for a site. That may be as simple as a change in cultural practices or site usage, or as complex as the use of best management practices for control of other pests such as diseases or insects. Using IPM to control weeds does not preclude the use of traditional chemical herbicides, rather chemicals can be one weapon in an arsenal that can be used at a given site to accomplish the task.



Annual bluegrass

The first task: identifying weeds

To develop an effective IPM weed control strategy, you must first identify the weed species present. This means the systematic scouting of the site to determine which species are present, an estimation of their populations, some measure of their condition, and a way to record their distribution. A good scout can also often estimate the so-called confounding factors, such as compact soils or turf thinned by insect or disease damage.

Identifying each dicot and monocot weed species can be a simple matter of visual identification for scouts with considerable experience, but it can be bewildering to someone who lacks first-hand knowledge. For beginning scouts or others whose chief duties do not necessitate exact weed identification, see table on page 3. It gives a selected list of weed identification references that can be helpful.

Identifying some weed species in the field can be a daunting task even with the help of guide books. Carefully take a sample and store it in a plastic bag with an identifying label. When taking a dicot weed sample, include any flower, as flowers are an easily identifiable part of dicot weeds. If the sample is a monocot weed, include any seed heads that are present. Many monocots can only be properly identified by their inflorescence.

Once you have identified a weed, mark its distribution on the site map with some estimate of the population density, such as light, moderate, or heavy. (See scouting story, map and key on pages 4 and 5.) If one person scouts, then a scale to represent population, i.e. 0-10% of the area infested equals light, 10-20% equals moderate and >20% equals heavy, may not be necessary. But, if scouting chores are shared, then a defined population scale and its uniform application are important for data consistency.

Next, document the growth stage of the weed. Phrases like "newly emerged", "immature", "mature" or "in decline" can be helpful in making control decisions. For ease of recording, both the population density and the growth stage, information could be coded as part of the identification key.

Finally, note any confounding factors, cultural practices or patterns that may contribute to the observed weed infestation or may help in the control decisions. Note such things as:

- thin turf areas caused by disease or insect damage

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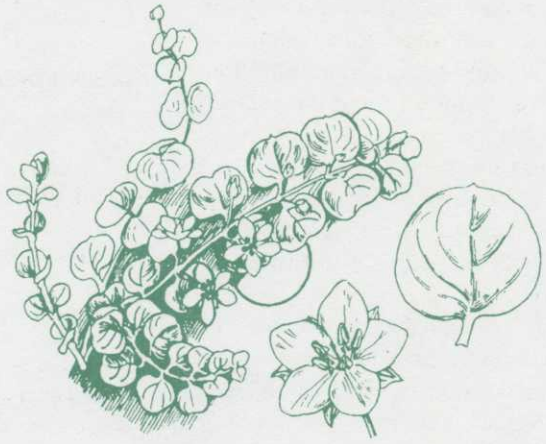
- traffic patterns
- mechanical damage from equipment
- shade
- drainage
- poor or inconsistent irrigation practice
- past control history

Are your weeds trying to tell you something?

The answer is: "yes"! Your job in using IPM is to make sure that you know what they are telling you.

Weeds occur in turf for several reasons. A weed may be well adapted to persist in a closely mowed plant community such as annual bluegrass on golf courses. It may exploit a unique niche created by specific management practices, such as pearlwort on heavily watered golf greens. Weeds may also persist when turfgrasses have been weakened by environmental or management factor that produce conditions that favor weed growth over the more desirable turfgrasses. Many weed infestations can be minimized by altering the site or management practices to tip the competitive balance in favor of the turfgrass species.



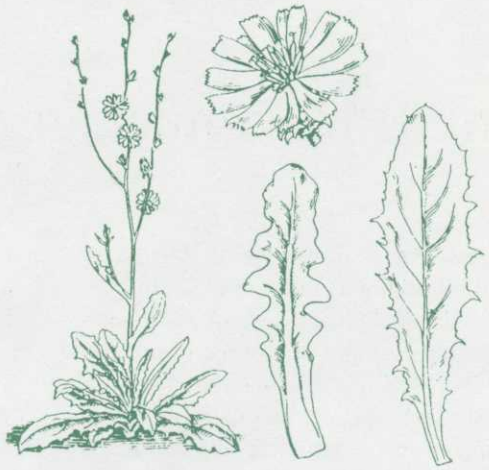
Moneywort

How do you identify such situations?

One way is to take your clues from the diagnostic weed species that grow as indicators on many sites. The following two groups of diagnostic weed species are well adapted to either extremely dry conditions or to excessively wet site:

Drought Prone Sites	**Wet Sites**
Prostrate spurge	Moneywort
Black medic	Annual sedge
Yellow woodsorrel	Annual bluegrass
Goosegrass	Alligatorweed
Annual lespedeza	Pearlwort
Birdsfoot trefoil	Moss
Prostrate knotweed	Liverwort
Bracted plantain	Rushes

One or more of these weed species as the predominant weed species on a site indicates that the site suffers from moisture extremes contrary to optimum turfgrass growth. Their presence does not prove that extreme moisture exists, since they will also grow on sites with less moisture. But, the dominance of these species indicates that there may be too much moisture at the site.



Chicory

Compacted soil and shallow rooting that accompany this site problem have their own group of diagnostic weed species. They are:

Compacted soil	**Shallow rooting**
Annual bluegrass**	Corn speedwell
Annual sedge**	Goosegrass*
Annual lespedeza*	Prostrate knotweed*
Broadleaf plantain*	Prostrate spurge*

* Many of the weeds in this group are also present in the drought-prone group. Areas that have high soil bulk density, i.e. compaction, are drought prone because there is less space between the soil solids for water retention.

** These weed species are also present in the wet-prone site list as they are shallow rooted and grow in an area that is the first to drain of excess moisture.

Low soil pH and the reduced nitrogen availability that comes with it have a specific diagnostic species. Other sites with high nitrogen levels, from mineralizing organic matter or high supplemental fertilizer applications, have a different group of diagnostic weeds.

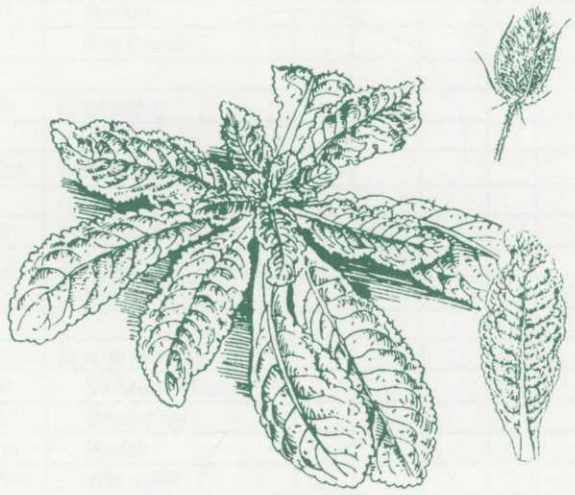
Low nitrogen levels	**High nitrogen levels**
Birdsfoot trefoil*	Annual bluegrass
Black medic*	Chickweed
Broomsedge	Moss**
Clovers	Ryegrass
Common speedwell	
Hawkweed	
Moss**	

* These species also appear on the drought-prone list. Low nitrogen sites often have very poor calcium and magnesium levels that cause

desirable granulated or flocculated soil structure to deteriorate into tightly bound plate-type, compacted soils.

** Some species of moss are better adapted to low nitrogen soils, while others are adapted to high nitrogen soils.

Mowing height and frequency can also influence weeds at a given site. Some of the more upright or rapidly growing



Teasel

weed species cannot tolerate low or frequent mowing because substantial portions of the plant are removed with each cutting. On the other hand, predominantly prostrate species do well at low heights and can tolerate close or frequent mowings.

High or infrequent mowing	Close or frequent mowing
Bull thistle	Annual bluegrass
Burdock	Chickweed
Chicory	Moss
Smooth bedstraw	Pearlwort
Sweet clover	Thymeleaf speedwell
Teasel	
Wild carrot	

Weeds adapted to high or infrequent mowings, common on roadsides or waste areas, can often be controlled by increasing the frequency of mowing or lowering the cutting height when mowing. Weeds adapted to close or frequent mowing will often lose their competitive advantage if the cutting height is raised or the frequency of cut is reduced.

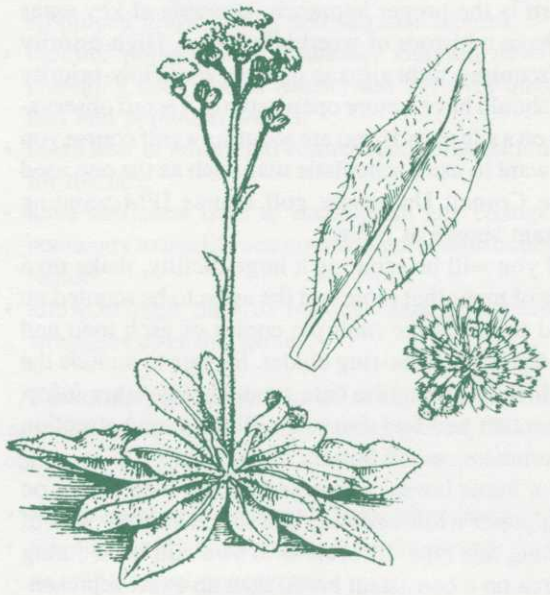
As we have said, some of these diagnostic weed species can be found in several of the identified groups, i.e. annual bluegrass. Their presence alone does not indicate a complex interaction of various confounding factors, but the wise turfgrass manager would eliminate these conditions. The failure to deal with the underlying conditions that these groups "speak to" will frustrate even the most complex control strategies.

Turf health and density is the best IPM strategy

The best strategy for IPM weed control is to maximize conditions that will lead to turf health and density. Healthy, dense turfgrass has a competitive advantage over weed populations for these reasons:

- dense turfgrass can successfully compete for limited nutrients and water,

-continued on page 6

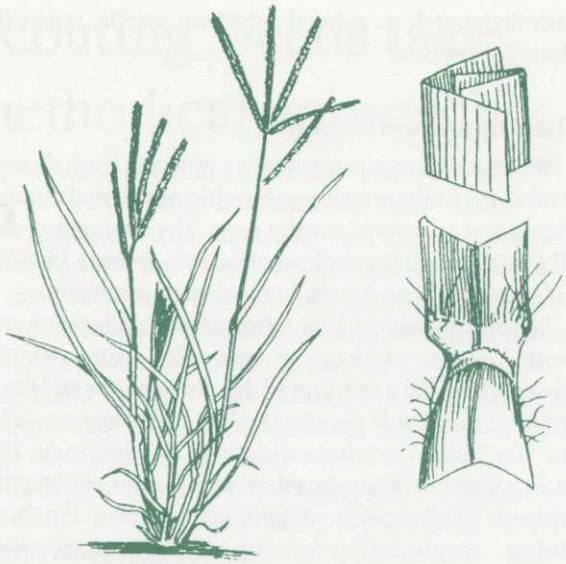


Hawkweed, paintbrush

Weed identification references

Title	Source
Common Weeds of the US.	US. Dept. of Agriculture
Guide to the Identification of Dicot Weeds*	O.M. Scott and Sons, Marysville, OH
Guide to the Identification of Monocot Weeds*	O.M. Scott and Sons, Marysville, OH
Identifying Seedling & Mature Weeds in the S.E.	Stucky, et. al.; N.C. State Ag. Res. Serv. AG-208
Weeds of the North Central States	University of IL, Ag. Exp. Sta. Bldg. 772
Weeds of Southern Turfgrasses	Murphy. et. al.: U. of GA, Coop. Ext. Serv.

* pocket sized



Goosegrass, silver crabgrass

Using IPM continued from page 3

- mature healthy turfgrass plants have an advantage over newly emerging or immature weed species,
- some weed species grow better in conditions that do not favor turfgrass species,
- higher leaf densities of healthy turf produce lower soil temperatures which discourage weed species that germinate at high soil temperatures.

When to use chemicals

It is true that dense and healthy turf is the best, first line of defense to weed infestations. Maximum beneficial cultural practices, fertilization practices, site varietal selections, site construction, and site utilization practices will produce a turf with little or no weed infestation problems.

Sometimes when funds for maximum beneficial practices are limited, it will be necessary to use chemical herbicides to achieve the desired results. Selecting the right herbicide and formulation from among the many that are available can be challenging. Listed below are guidelines in determining the choice of a herbicide:

- **Efficacy of control of the target weed species.** Will the herbicide work?
- **Longevity of residual control.** How long does the control last if the herbicide is a pre-emergent? Does it require multiple applications and will its use interfere with later plans to reseed?
- **Phytotoxicity.** Will it cause damage to the existing turfgrass species and if it does, can the turfgrass tolerate such damage?
- **Weed growth stage.** Will the herbicide work as a post-emergent if it is designed to be a pre-emergent? Should a post-emergent be used instead?
- **Weed control spectrum.** How many other weeds besides the target species will it control?

Legislative Watch

Herbicide, pesticide bills

The 1994 federal legislative calendar has several new bills and legislative reauthorizations pending that will may have effects on the turfgrass management industry. They are:

WPS: The Worker Protection Standards become effective in April. The WPS require new labeling of all affected pesticides as well as new training, protective clothing and the establishment of reentry periods for worker safety.

CERCLA: The Comprehensive Environmental Response, Compensation and Liability Act of 1980, the enabling legislation known as the Superfund Law is up for reauthorization in the fall. The reauthorization is expected to loosen the cleanup requirements so that sites can be cleaned up to a level that is appropriate for their probable uses, not the current standard that requires maximum cleanup of all sites regardless of their intended uses. To date the number of actual cleanups has been limited by massive legal wrangling over the high costs of reclaiming sites to the high standards of the existing legislation.

RCRA: The Resources Conservation and Recovery Act has several proposed regulatory changes pending that would reduce business regulatory requirements that would save almost a billion dollars a year.

HR 2543: Is new legislation that would extend certain provisions of the existing "Coastal Zone Management Act" to the whole country and would limit fertilizer applications to no higher than university recommendations.

HR 2199: The Polluter Pays Clean Water Act which is a funding mechanism for enforcing the provisions of the "Clean Water Act" would raise $4 billion from taxes on fertilizer, pesticides and other chemicals.

Broad-leaved plaintain

up in Congress in 1994

S 1114: Water Pollution Prevention and Control Act contains amendments regarding point and non-point source pollution control by mandating site management plans in many areas.

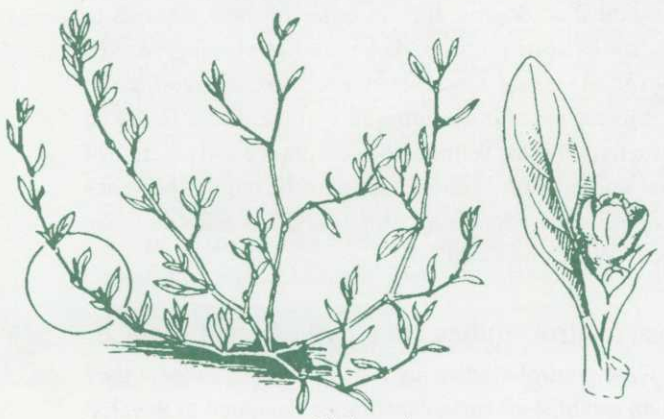
S 1547: Safe Water Drinking Act reauthorizing legislation that extends the provisions of that legislation to cover all surface and groundwater drinking water supplies.

HR 1360/ S 389: Would establish new containment standards on above ground storage tanks by establishing standards.

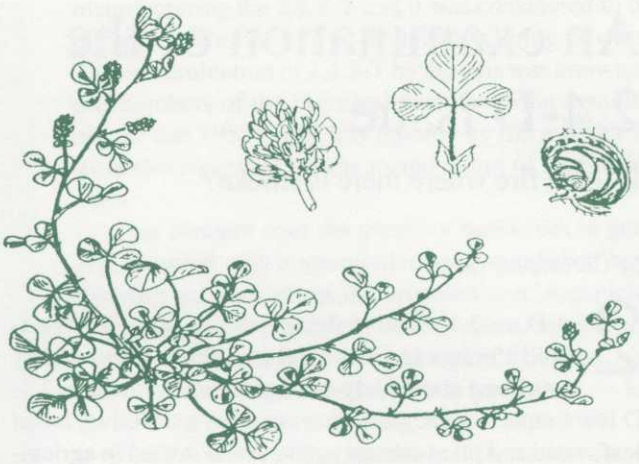
HR 1627/S 1478: Would replace the Delaney clause that prohibits any residues of pesticides that are potential carcinogens with a risk threshold of residues that may cause cancer in one in one million people exposed. Additional provisions would target agriculture to have 75% of all acreage under integrated pest management by the year 2000 and streamline the Environmental Protection Agency's (EPA) ability to remove suspect materials from the market place.

HR 967/S 985: The Minor Crop Pesticide Act would amend current standards of the legislation authorizing pesticide registrations, to allow or preserve pesticide registrations of minor-use pesticides whose registration is not being renewed for economic reasons.

HR 2910: The Risk Communication Act would require the EPA to conduct risk assessment studies on all matters regarding public health, safety and environment hazards and discuss information on the data, the methodology of the study, and use scientifically objective information when evaluating these risks.



Knotweed



Black medic

- **Application equipment requirements.** Do you have the proper equipment to make the application?
- **Environment at the time of applications.** Does the label preclude the herbicides use at your site because of minimum weather standards, location of bodies of water, site usage, or site topography?
- **Proximity of susceptible non-target species.** Are there landscape plants or trees that would be adversely affected by its use?
- **Environmental and mammalian toxicity.** Does the herbicide pose a safety problem to humans, animals or the environment?
- **Economics.** What will the use of the herbicide cost? What are the total labor, equipment and product costs?

Once you have made your preliminary selection, take two more steps. First, contact your local cooperative extension office, the state department of environmental control or the licensing agency to make sure that the herbicide is registered for use in your state. If it is a restricted-use pesticide, make sure that you know about the circumstances for the use of the product in your state. Second, contact the facility or site manager for approval of the herbicides. It may be required or you may just do it as a courtesy. You may be required to notify your client with the details of any restricted-use pesticide within 30 days before the use of it. If a nonrestricted-use pesticide has been applied, make sure that the application does not pose a hazard to people or pets. Post the area with signs or barricades, whether your state requires such action or not.

IPM is the future

The adoption of IPM weed control strategies will maximize the health and density of the turfgrass and minimize your weed pest infestations while dramatically reducing the potential for adverse effects to people, animals and the environment. ■