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EC83-1241 Turfgrass Weed Identification and Control ; A Common Sense Approach

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Nebraska Cooperative Extension Service EC 83-1241

Turfgrass Weed Identification and Control

A Common Sense Approach

Integrated Pest Management

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES

Turfgrass Weed Identification and Control

A Common Sense Approach

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INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES

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Pictures courtesy of the University of Nebraska; Paul Jacquemin, Chem Lawn Corp.; Dr. Ralph Engel, Rutgers University, B. J. Johnson, Georgia Agricultural Experiment Station; Dr. Ray Dickens, Auburn University; Nebraska Department of Agriculture, and the University of Georgia.

INTRODUCTION

Weeds are plants growing where they are not wanted. A white clover plant may be considered an integral part of a turf by some, but others view it as an undesirable weed. Weeds destroy aesthetic and functional aspects of turfs and, perhaps more importantly, compete with desirable turfgrass plants for water, nutrients, light, carbon dioxide, and space. Turf weeds may be grasses, grass-like, or broadleaved and may be annual, biennial, or perennial in life cycle.

Turfgrass managers should develop a thorough knowledge of weed characteristics, growth habit, sources, spread, and life cycles. These factors play an important role in weed identification, prevention, and control.

When weeds invade, turfgrass managers often seek a quick solution through herbicide use. Herbicides are only one tool used in weed prevention and control. Continued use of herbicides, with-

out correcting conditions leading to weed encroachment, can lead to weed problems that are even more persistent and difficult to control. Turfgrass managers need to implement management practices that minimize weed competition, as well as use herbicides to eliminate weed problems.

Selection of adapted grasses, proper cultural practices and careful management play an even more important role in minimizing turfgrass weed invasion than do herbicides. Cultural and management practices that enhance turfgrass growth and recuperative potential, generally minimize weed competition and encroachment. Weed control programs centered around selection of adapted grasses and proper cultural practices that favor turfgrass over weeds are considered integrated pest management (IPM) programs. This IPM guide is designed to help turfgrass managers identify common turf weeds, and to better understand their life cycles, growth habits, sources, spread, and control. IPM approaches to weed control are emphasized throughout the guide.

Adapted Grasses

Selection of adapted turfgrass species and cultivars helps prevent weed problems. Adapted turfgrasses are more tolerant of environmental stress and less likely to be damaged by pests than nonadapted grasses. Turfgrass selection should be based on species and cultivar evaluation conducted over a number of years and under varying conditions. University recommendations are largely based on such regional trials.

Use mixtures (two or more species) and blends (two or more cultivars) rather than a single cultivar. This helps ensure a broad genetic base and adaptation to a wide range of growing conditions. Mixtures and blends will maintain better stand density and compete more readily

against weed encroachment than unadapted grasses.

Mowing

Mowing height, frequency of mowing, and equipment are fundamental to turfgrass culture. Mowing height and frequency must be adjusted during the growing season based on growth rate and environmental conditions. For example, mow Kentucky bluegrass and fine fescue at 1.5 to 2.0 inches (3.8 to 5.0 cm) in spring and fall and at 2.5 to 3.0 inches (6.4 to 7.5 cm) in summer. Higher cutting height in summer maintains more vegetation, insulating the turfgrass growing point from high temperature stress. Change the mowing height gradually during transition in seasons. Avoid scalping or mowing lower than recommended height of cut. Mow according to turfgrass growth rate. As a general rule, remove no more than one-third of the leaf area with any mowing. Keep mowing equipment sharp and in good operating condition. Continuous mowing with a dull mower blade weakens turf, making it prone to stress injury and weed invasion.

Proper mowing height, adequate mowing frequency, and effective mowing equipment help develop and maintain a dense, vigorous turf less subject to weed competition.

Nutrition

Adequate nutrition is important for the maintenance of turfgrass quality. A properly fertilized turf may not be weed-free but it will be better suited to compete with weeds and recover from stress damage than an undernourished turf. Fertilizers with slow-release nitrogen sources or sources containing a combination of fast- and slow-release are preferred to those with fast-release alone. They are less likely to promote lush, succulent growth. Timing of fertilizer applications is also important. Avoid early spring (March and April) applications of fast-release nitrogen sources. Late fall (October and

November) is preferred to early spring application. Do not over fertilize. Fertilizer programs should meet the nutritional needs of the turfgrass plant and not induce a dark green, lush, vigorous growth prone to stress injury.

Irrigation

In most cases precipitation is inadequate to maintain desired turfgrass quality and supplemental irrigation is needed. Irrigate deeply and infrequently to encourage a deep turfgrass root system. Light, frequent watering encourages a shallow root system and turf that is more prone to stress. Since it is difficult to define deep, infrequent irrigation, irrigate when turfgrass needs water. Footprinting or wilting of turfgrass indicates a need for water.

Soil Cultivation

Soil coring or aeration can alleviate soil compaction, enhance rooting, increase water penetration, enhance nutrient uptake and minimize thatch build-up. Certain weeds, such as prostrate knotweed and annual bluegrass, are more competitive when soils are compacted. Soil aeration practiced when turfs are actively growing improves turfgrass growth and competitive ability.

Herbicides

Selection of adapted grasses and use of proper cultural practices are critical to weed prevention and control, but even though turf managers implement appropriate measures weeds may encroach by gaining a slight competitive advantage. In these cases herbicides are necessary for effective weed control.

Herbicides are classified by selectivity, mode of action, application point, and application timing. Selective herbicides kill target plants in a turf while nonselective herbicides destroy all plant material contacted. Degree of herbicide selectivity may be influenced by application timing,

application rate, plant characteristics, plant conditions, and environmental conditions. Herbicides may be foliar or soil applied.

Preemergence herbicides form a chemical barrier at the soil surface, controlling weeds during germination and before they emerge. Postemergence herbicides are applied to target weeds that have already emerged from the soil. Postemergence herbicides may be selective or nonselective and act as systemic or nonsystemic (contact) types.

Systemic herbicides are absorbed and moved within the plant system. They are commonly used for control of perennial weeds, since they are translocated to underground plant parts and eliminate regrowth from these structures. Contact herbicides kill only plant parts sprayed and are not translocated within the plant. They are most effective on annual weeds. Uniform coverage is essential for effective weed control using a contact herbicide. A herbicide may fall into one or more classifications. The herbicide, 2,4-D, can be classified as foliar, selective, translocated (systemic) or postemergence.

Dacthal could be classified as soil applied, selective, and preemergence. If chemical control is necessary, select the appropriate herbicide, read and follow label directions. Limit herbicide applications to infested areas and apply them when target plants are most susceptible. These are both cost effective and environmentally sound management practices.

Use all available preventive and curative methods to deal with weeds. Plant adapted grasses, employ appropriate cultural practices and apply chemical control as warranted. Maintenance of a weed-free turf is not a necessity. Function and use of the site influences demand for weed-free maintenance practices. For example, quality of a low maintenance turf may not be hindered by minor weed infestations, while uniformity and playability of golf greens and athletic field turfs may be adversely affected by weeds.

If a relatively weed-free turf is the maintenance goal, the turf manager must have a good management plan. This plan must include a thorough understanding of weeds that may be a problem. This guide is designed to help turf managers identify turfgrass weeds and implement IPM practices for their control.

ANNUAL GRASSES

Weedy annual grasses are generally classified as warm-season (summer) and cool-season (winter) annuals. They complete their life cycle in one season by flowering, maturing numerous seeds, and dying. Their high seed production serves as a ready source for reinfestation when conditions are favorable. Crabgrass, goosegrass, foxtail, barnyardgrass, stinkgrass, and sandbur are troublesome warm-season annuals that infest cool season turfs. Annual bluegrass and downy bromegrass are examples of cool-season annual, weedy grasses.

Pest Management Practices

Selection of adapted turfgrass species and cultivars and use of appropriate cultural practices are important in minimizing annual, weedy grass encroachment and competition. Some prevention and control practices are specific to warm-season and cool-season annuals and to species within these categories. Following is a breakdown of pest management practices for warm- and cool-season annuals. Specific comments relating to species differences are included in descriptive information for that species.

Warm Season

1. Mow at recommended height and frequency and remove clippings when seedheads are present.
2. Water when turf shows signs of wilt or footprinting.
3. Avoid summer fertilization.
4. Aerate in early spring, fall or both to minimize soil compaction.
5. Avoid power raking and soil coring

after preemergence herbicides have been applied, or in late spring and summer.

6. Apply preemergence herbicides before weeds germinate in late spring, using soil temperatures as a guide.

Cool Season

1. Avoid excessive nitrogen fertilization.
2. Practice infrequent irrigation with application based on turfgrass need.
3. Increase mowing height and frequency and remove clippings when seedheads are present.

CRABGRASS

Scientific Name

Digitaria ischaemum Schreb. (Smooth crabgrass)

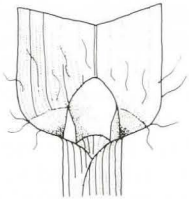
Digitaria sanguinalis L. (Scop) (Large or hairy crabgrass)

Description

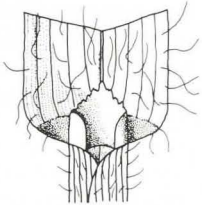
Smooth and large crabgrass are warm-season annuals reproducing by seed. They are light green and have prostrate growth habit. Smooth tends to be smaller and less hairy than large crabgrass. Crabgrass leaf blades are short, pointed, hairy to sparsely hairy, and rolled in the bud. The leaf sheaths are split, compressed and sparsely hairy. Auricles are present. The collar is broad with hairs along the margin. Ligule is large, membranous, toothed for large and smooth for smooth crabgrass. Seedheads consist of 3 to 9 spikes atop the main stem.

P. Jacquemin

Crabgrass



Smooth Crabgrass, leaf sheath and blade junction, front view



Large Crabgrass, leaf sheath and blade junction, front view

Factors Favoring Crabgrass

Crabgrass begins germination in late April and early May when soil temperatures reach 55 to 60°F (13 to 16 C). It germinates and grows best when adequate light and moisture are present. Crabgrass competition is enhanced by thin, open turfgrass stands, improper mowing, summer fertilization and light, frequent irrigation.

Pest Management Practices

Practice procedures outlined to maintain a dense, actively growing turf. In areas with a crabgrass history apply preemergence herbicides in late spring when soil temperatures approach 55°F (13 C).

GOOSEGRASS

Scientific Name

Eleusine indica (L.) Gaertn.
(Silver crabgrass, Crow's foot)

Description

Goosegrass is a warm-season summer annual, germinating in late spring and early summer when soil temperatures reach 60 to 65°F (16 to 18 C). It requires moisture and light for germination and is very competitive in compacted soils. Goosegrass has a prostrate growth habit, but unlike crabgrass it does not root at the nodes. Growth appears as a rosette of tough thick stems with a white basal area.

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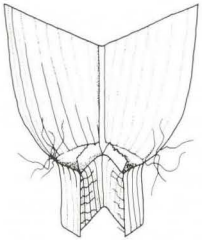
Goosegrass

This white or silvery stem base gives rise to the common name, silver crabgrass.

Goosegrass plants are dark to medium green in appearance. Leaves are folded in the bud and are not hairy. Leaf sheaths are compressed or flattened, loosely overlapping and white at the base. The collar is broad and hairy at the margin. Auricles are absent. Ligule is membranous, toothed, split in the center and not as large as that found in crabgrass. Seedheads are comprised of 3 to 7 spikes that radiate from the top of the stem. Seedheads with 3 spikes are common, and appear like a crowfoot.

Conditions Favoring Goosegrass

Goosegrass is a warm-season annual, growing best during summer months when cool season grasses are stressed. It requires light and adequate moisture for germination and growth, and is most competitive in thin open turfs or turfs subject to intense traffic or use. Close mowing, summer fertilization, and light, frequent watering enhance goosegrass competition. Goosegrass is particularly



Goosegrass, leaf sheath and blade junction, front view

troublesome in golf course tee and fairway turfs that are mowed close and exposed to divot injury.

Pest Management Practices

Aerate (core) soils in early spring and fall to minimize soil compaction. Apply preemergence herbicides in late spring when soil temperatures reach 60°F (16 C) on sites with goosegrass history.

FOXTAIL

Scientific Name

Setaria glauca (L.) Beauv. (Yelow foxtail)
Setaria viridis (L.) Beauv. (Green foxtail)

Description

Yellow and green foxtail are bunch-like, semi-erect warm-season annual grasses often mistaken for crabgrass. Green foxtail infests turfs but is less persistent than yellow foxtail. Foxtail germinates when soil temperatures reach or exceed 65°F (18.3 C)

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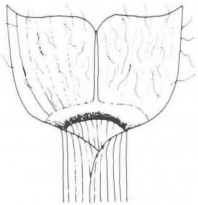
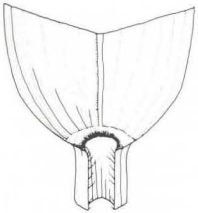
Yellow Foxtail

and adequate soil moisture is present. Foxtail leaves are rolled in the bud, lack auricles and have ligules comprised of a fringe of short hairs. The sheath of yellow foxtail is smooth, keeled, with sparse long hairs at the base. The sheath of green foxtail is hairy along margins and smooth on the surface. The base of yellow foxtail sheaths often appear reddish. Seedheads appear as dense, cylindrical, bristly spikes (i.e., foxtails) but are really compressed panicles. Numerous seeds are produced



Yellow Foxtail, leaf sheath and blade junction, front view



Green Foxtail, leaf sheath and blade junction, front view

and mature in the fall. Yellow foxtail seeds are larger than those of green foxtail.

Conditions Favoring Foxtail

Foxtails are summer annuals that grow best in summer and die with the first killing frost. They begin germination in late spring and early summer when soil temperatures reach 65°F (18.3 C). Foxtails germinate best with light and adequate moisture. The light requirement does not seem to be as critical as it is for crabgrass, since foxtail will infest thick, dense turfgrass stands. Foxtails are most troublesome in thin turfs that are closely mowed. Their competition with cool-season grasses, like Kentucky bluegrass, is enhanced by light, frequent watering and summer applications of fertilizer.

Pest Management Practices

Prevention and control recommendations are the same as those indicated for other warm season annuals.

ANNUAL BLUEGRASS

Scientific Name

Poa annua var. *annua* L. Timm, (annual type)

Poa annua var. *reptans* (Hauskins) Timm, (perennial type)

Description

Annual bluegrass is a light green, bunch-type to slightly spreading, cool-season annual grass. Subspecies do exist that are classified as short-lived peren-

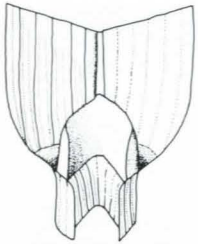
R. Dickens

Annual bluegrass

nials. Annual bluegrass is folded in the bud with a distinctly compressed sheath. The leaf blades are V-shaped, auricles absent, and ligule large and membranous. Seedheads are a pyramidal-shaped panicle about 1.5 to 3.0 (3.5 to 7.0 cm) long, and are often present even at golf green heights of cut.

Conditions Favoring Annual Bluegrass

Annual bluegrass is a cool-season species that acts like a winter annual in warm climates. It grows best in soil tempera-



Annual bluegrass, leaf sheath and blade junction, front view

tures of 60-70°F (16 to 21 C). It is particularly susceptible to heat, cold, and drought stress. It has a strong light requirement for germination. Dense stands of turf that shade light from soil surfaces are capable of minimizing annual bluegrass seed germination. Any factor, such as divoting, ball marking, or scuffing, that exposes soil to light will enhance annual bluegrass germination.

Annual bluegrass can be found in

heavily trafficked areas and grows well under compacted soil conditions. Its competitiveness is enhanced by light, frequent irrigation and moist soil conditions. In Kentucky bluegrass turfs, annual bluegrass competition is enhanced by low mowing, frequent watering, heavy fertilization, and soil compaction.

Pest Management Practices

Reduce soil compaction with coring. Increase mowing height and frequency, and remove clippings when seedheads are present. Maintain soil phosphorus at low to medium levels for established turfs. Use preemergence herbicides to prevent invasion when feasible.

OTHER ANNUAL GRASSES

Barnyardgrass [*Echinochloa crusgalli* (L.) Beauv.] is a robust, prostrate, annual grass infesting turfs, during summer months. It may have a red to purple

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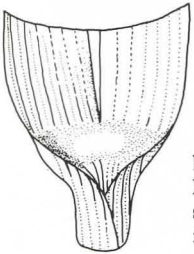
Barnyardgrass

appearance. Pest management practices are similar to those outlined for crabgrass and goosegrass.



Barnyardgrass, leaf blade and sheath junction, front view

Stinkgrass [*Eragrostis cilianesis* (All.) Lulati] is a low-growing, bunch-type summer annual. It has a disagreeable odor. Stinkgrass is particularly troublesome in newly seeded turfs established in mid to late summer. Pest management practices are similar to those outlined for other warm-season, annual-weedy grasses.

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Stinkgrass

Witchgrass (*Panicum capillare* L.) is a coarse, bunch-type summer annual with hairy leaf sheaths and blades. It is troublesome in newly seeded turfs.

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Witchgrass

Sandbur (*Cenchrus pauciflorus* Benth.) is a low growing, annual grass producing seeds that are enclosed in a spiny bur about 0.3 to 0.5 inch (6 mm-12 mm) in dia-

meter. Spiny burs are sharp and may puncture skin or bicycle tires. Sandbur is particularly competitive on dry, sandy sites. Practices that enhance turfgrass stand density minimize its competitiveness.

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Sandbur

Downy Brome (*Bromus tectorum* L.) is a slender, erect, bunch-type winter annual. It often invades fall seedings, or thin, neglected turfgrass stands. Small infested areas can be hand weeded.

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Downy Brome

PERENNIAL GRASSES

Perennial, weedy-grasses are particularly difficult to prevent and control, since they are often quite similar to desirable species in their physiological responses. In fact, many perennial, weedy-grasses (i.e., tall fescue, creeping bentgrass, zoysiagrass and bermudagrass) are also desirable turfgrasses. Like annual

grasses, perennial grasses can be classified as warm- or cool-season species. They usually have aggressive growth patterns due to structures such as stolons or rhizomes that aid in their spread. Identification is important in their prevention and control.

Pest Management Practices

1. Eliminate weed grasses before establishment by fallowing and using non-selective herbicides when needed.
2. Use clean seed or vegetative sources for establishment.
3. Seed sources should be free of other crops and weeds.
4. Use adapted turfgrass species and cultivars.
5. Use proper mowing, watering and fertilizing techniques to maintain a dense actively growing turf.
6. Spot treat infested areas with an appropriate non-selective herbicide.

TALL FESCUE

Scientific Name

Festuca arundinacea Schreb.

Description

Tall fescue is a desirable turfgrass species, but when it encroaches into a Kentucky bluegrass lawn it becomes an undesirable weed. Tall fescue has rudimentary rhizomes, but is essentially a bunch-type grass. It is rolled in the bud. It has a broad, continuous collar with rudi-

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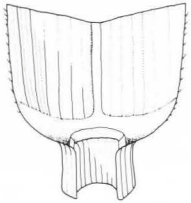
Tall Fescue

mentary auricles. Tall fescue has wide leaves, 0.3 to 0.5 inch (6 mm to 12 mm), that are flat and pointed. Leaf blade upper surfaces are strongly veined and have rough margins. The under surface is smooth.

Conditions Favoring Tall Fescue

Tall fescue is a cool-season perennial. It has good heat, drought, and wear tolerance. As a weed, it usually infests turfs by being present on the site before establishment. Turf sites established on old fields or pastures are likely to be infested. Low maintenance, droughty turf sites favor tall fescue competition.



Tall fescue, leaf blade and sheath junction, front view

Pest Management Practices

Remove clumps of tall fescue with spade, refill with soil, and reseed or sod area. Spot treat with an appropriate nonselective herbicide.

SMOOTH BROMEGRASS

Scientific Name

Bromus inermis Leyss

Description

Smooth bromegrass is a gray-green to blue-green perennial grass that spreads by rhizomes. Its leaves are rolled in the bud. Sheaths are not compressed and are closed nearly to the top. Auricles are absent. The ligule is short, membranous and smooth. Leaf blades are wide, 0.3 to 0.5 inch (6 - 13 mm), with a constricted area appearing like an "M" or "W" on the upper leaf blade surface. Lower sheath is pubescent.

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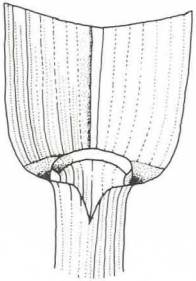
Smooth Bromegrass

Conditions Favoring Smooth Bromegrass

Smooth bromegrass is a cool-season perennial that starts growth in very early spring, slows growth considerably during summer, and reinitiates active growth in fall. It is a persistent and difficult weed to control and is common on turf sites that once were old fields or pastures. Smooth bromegrass is particularly competitive in thin, open turfs that are undernourished and mowed infrequently.

Pest Management Practices

Elimination of smooth bromegrass is best achieved through renovation using an appropriate, non-selective herbicide and reseeding or sodding treated areas. When renovation is not feasible, the competitive advantage of smooth bromegrass can be minimized by mowing closely, within the optimal range for the desired species, mowing frequently, fertilizing regularly, and watering to prevent visual drought stress.



Smooth bromegrass, leaf blade and sheath junction, front view

NIMBLEWILL

Scientific Name

Muhlenbergia schreberi Gmel.

Description

Nimblewill is a warm-season perennial of blue-green to light-green color that closely resembles creeping bentgrass. It is slow to green in the spring, leaving straw colored patches in infested Kentucky bluegrass turfs until they greenup late in the spring. Nimblewill is rolled in the bud, has no auricles, and a short, membranous and toothed ligule. The collar is medium with long hairs along the margins. Leaf blades are short, flat and pointed. Nimblewill spreads by short stolons. Seedheads appear spike-like but are compressed panicles and are present in late summer.

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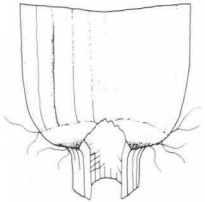
Nimblewill



Nimblewill, leaf blade and sheath junction, front view

Conditions Favoring Nimblewill

Nimblewill is a troublesome weed in lawns. It is a warm-season perennial, competing effectively with cool-season turfs during high temperature stress periods. It is particularly competitive in thin, undernourished, cool-season turfs subject to drought stress.

Pest Management Practices

To minimize the competition of nimblewill in cool-season turfs avoid summer fertilization. Elimination of nimblewill is best achieved through renovation and reestablishment, using appropriate herbicides and adapted turfgrasses.

TIMOTHY

Scientific Name

Phleum pratense L.

Description

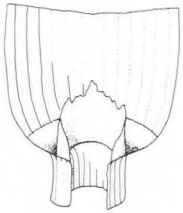
Timothy is a bunch-type blue-green perennial. It is a cool-season species, growing best in spring and fall. Timothy is rolled in the bud with smooth, compressed sheaths. Leaf blades are 0.25 inch (6 mm) wide and sharply pointed. The ligule is membranous, medium length and toothed. The base of the plant is swollen or bulb-like. Seedheads are a dense spike about 2 to 4 inches (5 to 10 cm) long.

P. Jacquemin

Timothy

Conditions Favoring Timothy

Old field and pasture sites that have been converted to housing tracts are ideal situations for Timothy encroachment in lawns. Timothy spreads primarily by seed. It is a cool-season, bunch-type plant that is most competitive in spring and fall. Timothy encroachment occurs more readily in thin, undernourished than dense, actively growing turfs.



Timothy, leaf blade and sheath junction, front view

Pest Management Practices

Remove clumps of Timothy with spade or shovel, fill areas with soil, and reseed or sod. Spot treat infested areas with an appropriate nonselective herbicide and reseed or sod treated areas.

QUACKGRASS

Scientific Name

Agropyron repens L.

Description

Quackgrass is a light-green to blue-green cool-season perennial. It spreads vigorously from large, white rhizomes. It

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Quackgrass

is rolled in the bud and has long, clasping auricles. Leaf blades are rough on the upper surface, flat and pointed. Leaf sheaths are round, hairy at the base, and smooth at the upper part. Seedheads are spikes with spikelets facing the stem.

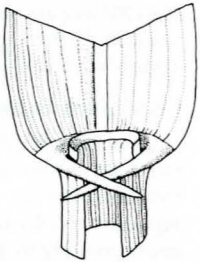
Conditions Favoring Quackgrass

Quackgrass can spread into a turf by seed or rhizomes. It is particularly troublesome in turfs established on or adjacent to old fields. Quackgrass grows most actively in spring and fall. It is stres-

sed by high summer temperatures. Quackgrass spreads most rapidly in thin, undernourished turfs subject to periodic drought stress, but can infest intensively managed turf sites as well.

Pest Management Practices

Quackgrass competition can be minimized by mowing at the low end of the optimal mowing height range for the desired species, and by maintaining a dense actively growing turf. Elimination of quackgrass is difficult, best achieved by renovation and reestablishment, using an appropriate non-selective herbicide and adapted turfgrass species.



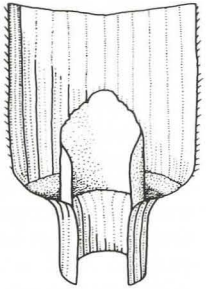
Quackgrass, leaf sheath and blade junction, front view

OTHER PERENNIAL GRASSES

Creeping bentgrass (*agrostis palustris* Huds.) is a desirable turfgrass species, but becomes an undesirable weed when it infests Kentucky bluegrass lawns. It spreads by stolons. It is rolled in the bud, has a large membranous ligule, and no auricles. Bentgrass has narrow leaves that are flat and pointed. Pest management practices are the same as those described for other spreading, perennial grasses.

P. Jacquemin

Creeping Bentgrass



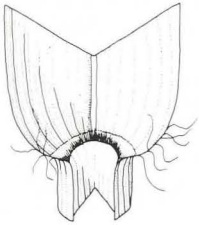
Creeping Bentgrass, leaf blade and sheath junction, front view

B. J. Johnson

Bermudagrass

Bermudagrass (*Cynadon dactylon* L.) is a warm-season species that occasionally encroaches into cool-season lawns. It spreads by rhizomes and stolons and is extremely competitive during summer months. It is folded in the bud. The ligule is a fringe of hairs with long hairs located in region of auricles. Leaf blades are short, flat and pointed.

Zoysiagrass (*Zoysia japonica* L.) is a warm-season turfgrass species that occasionally invades cool season lawns. It spreads by stolons and short rhizomes.

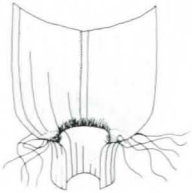


Bermudagrass, leaf sheath and blade junction, front view

B. J. Johnson

Zoysiagrass

Zoysia is rolled in the bud. Its auricles appear as tufts of hairs and its ligule is a fringe of hairs. Leaf blades are medium width, short and pointed. It grows best in warm, dry conditions.



Zoysiagrass, leaf sheath and blade junction, front view

GRASSLIKE WEEDS

Yellow nutsedge (*Cyperus esculentus* L.) is a warm-season perennial sedge. It has leaves that are three-ranked and triangular stems. It is light green to yellow green and coarse textured. Yellow nutsedge spreads from seed, rhizomes and nutlets. It grows rapidly in summer and disappears with the first killing frost of fall.

Yellow nutsedge prefers wet moist conditions but can also thrive with limited moisture. Maintaining a vigorous turf

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Yellow Nutsedge

that doesn't undergo stress affords optimum competition for yellow nutsedge. High mowing is also helpful. Close mowing stimulates growth from basal areas and from tubers.

Wild garlic (*Allium vineale* L.) and **wild onion (*Allium canadense* L.)** are slender, smooth-leaved plants. Leaves are hollow and originate from bulbs or bulblets that are produced beneath the soil surface. They have a characteristic oinon or garlic odor.

R. Dickens

Wild Garlic

BROADLEAF WEEDS

Broadleaf weeds can be classified as annuals, biennials and perennials. Annual broadleafs can be further categorized as warm-season (summer) and cool-season (winter) annuals. Most broadleaf weeds are best controlled when they are young or when they are actively growing. Cool-season perennials, biennials, and annuals can be controlled effectively in the fall when they are actively growing. Dandelions and white clover are examples of weeds effectively controlled in the fall. Some annual broadleaf weeds, like prostrate spurge, can be effectively controlled with preemergent herbicides applied before seeds germinate. Other annuals like black medic and prostrate knotweed, are most effectively controlled while they are young, actively growing, and before they mature and set seed.

Most attempts to control broadleaf weeds in summer are ineffective and may result in encroachment of other more dif-

ficult to control weeds. It is best to control broadleaves in spring and fall when cool season turfgrasses can recover the areas previously occupied by weeds. Proper identification is critical to broadleaf weed prevention and control.

Pest Management Practices

1. Ensure a clean, weed-free seedbed by fallowing and using appropriate non-selective herbicides to control persistent weeds.
2. Use clean seed that is free of other crops and weeds.
3. Maintain a dense actively growing turf through proper mowing, fertilizing, and watering.
4. Use soil cultivation practices to minimize soil compaction.

PROSTRATE SPURGE AND SPOTTED SPURGE

Scientific Name

Prostrate spurge (*Euphorbia supina* Raf.)
Spotted spurge (*E. maculata* L.)

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Prostrate Spurge

Description

Prostrate spurge and spotted spurge are low growing warm-season annuals

Prostrate Spurge

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Spotted Spurge

found in cool-season lawns. They germinate when soil temperatures approach 60 to 65°F (16 to 18 C). Spurge plants appear in mid to late May, bloom from June to September, and set seed from July to October. Both prostrate and spotted spurge produce a rosette-type growth with stems radiating from a central taproot. Prostrate spurge produces a matlike growth. Its stems and underside of leaves are hairy. Leaves of spotted and prostrate spurge are oblong and may have a purple to red spot in the center of the upper surface.

Spotted Spurge

Pest Management Practices

Spurge occurs predominately in thin, undernourished turfs that are subject to periodic drought stress. Maintaining a dense, actively growing turf is effective in minimizing spurge competition. In areas with a history of spurge problems, appropriate preemergent herbicides should be applied in late spring when soil temperatures reach 60°F (16 C).

PROSTRATE KNOTWEED

Scientific Name

Polygonum aviculare L.

Description

Prostrate knotweed is a low growing annual that spreads by seed. It is very competitive in infertile and compacted soils and often invades turfs along driveways, sidewalks, and heavily trafficked areas. It has tough, wiry, slender stems that radiate from a central taproot and produce a matlike growth. Stems are leafy with membranous sheaths at joints. Leaves are dull, blue-green and oblong to eliptic in shape. Newly emerging seedlings appear in late winter and early spring and are often mistaken for grasses in very early stages of development.

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Prostrate Knotweed

Pest Management Practices

Prostrate knotweed competes most effectively in compacted soils. Soil coring and traffic control alleviates compaction and benefits desirable turfgrass competition.

Spray areas infested with knotweed with an appropriate postemergence herbicide when the weed is in a young development stage, usually 3 to 4 leaf stage.

COMMON CHICKWEED

Scientific Name

Stellaria media (L.) Cyrillo

Description

Common chickweed is a low spreading, cool-season annual that is often a problem in poorly drained and shady sites. It grows best in cool moist weather and may disappear under high temperature stress. It has a weak, shallow root system that supports numerous multibranched slender stems that root easily at nodes. A line of white hairs can be found along one side of each stem. Broadly oval, pointed leaves 0.25 to 0.50 inch (6 mm to 13 mm) long, are set on short stalks at the stem base. Further up the stem, stalks are absent. Flowers are star-shaped, white blossoms, consisting of five-notched petals. Numerous seeds are produced which germinate from late fall to early spring.

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Common Chickweed

Pest Management Practices

Maintaining dense vigorous turf is an excellent means of preventing chickweed encroachment. Infrequent watering oriented to turfgrass needs helps to minimize chickweed competition. Immature seed will continue to mature even when cut or pulled, so proper disposal is necessary. Infested areas may be controlled with appropriate postemergence herbicides.

BLACK MEDIC

Scientific Name

Medicago lupulina L.

Description

Black medic is an annual and sometimes short-lived perennial legume often confused with white clover. It has a trifoliate leaf like oxalis and clover. Leaves have prominent veins with a small spur at the tip of each wedge-shaped leaflet. The center leaflet is borne on a small stalk. Black medic is a low growing plant with hairy, trailing stems that radiate from a deep taproot. Flowers are borne in small bright yellow clusters and appear globeshaped. Seed pods turn black at maturity.

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Black Medic

Pest Management Practices

A dense vigorous turf is the best means of prevention once the weed is no longer a problem. Maintaining low to medium soil phosphorus levels benefit established turfs and discourage black medic competition. Black medic infestations may be eliminated with appropriate postemergence herbicides applied when it is young and actively growing.

YELLOW WOODSORREL

Scientific Name

Oxalis stricta L.

Description

Yellow woodsorrel performs as a warm-season annual and sometimes short-lived perennial. It often appears where turf is thin or absent. The slender, sparsely hairy, branching stem is supported by a shallow taproot. Stems may root at the nodes but new plants are not formed. Leaves are pale green and clover-like, being composed of three heart-shaped leaflets. Flowers are small but surrounded by five conspicuous bright yellow petals. The cylindrical seed pod has five sides and is pointed. When seed pods dehisce, seed is thrown 20 or more inches. Plants contain soluble oxalates, giving them an acid or sour taste.

Pest Management Practices

Areas with only a few Oxalis plants can be easily cleaned by hand weeding. A dense vigorous turf is the best means of preventing reinfestation of an area, thus a good sound maintenance program should be followed. Effective control with herbicides is difficult to obtain.

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Yellow Woodsorrel

COMMON PURSLANE

Scientific Name

Portulaca oleracea L.

Description

Purslane is an annual with fleshy, smooth stems that exude clear juices when broken. Stems may appear reddish at the base and may root when they touch the soil. Leaves are oblong to egg-shaped, alternate, clustered and fleshy. Purslane is particularly troublesome in

R. Engel

Purslane

new seedlings established in late summer and early fall.

Pest Management Practices

Fallowing areas to be seeded helps reduce purslane competition in new seedings. Maintenance of a dense, actively growing turf minimizes purslane competition in established turfs.

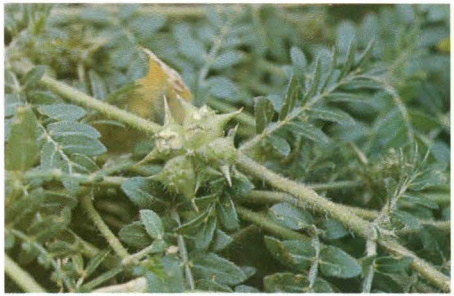
PUNCTURE VINE

Scientific Name

Tribulus terrestris L.

Description

Puncture vine is a prostrate, branching, warm-season annual. Stems branch from a central taproot and may spread from 1 to 5 feet (0.3 to 1.8 m). Leaves are opposite, 2 inches (5 cm) long, and pinnately divided into 5 to 7 pairs of leaflets. Leaflets are about 0.5 inch (13 mm) long, hairy and narrowly ovate. Flowers appear pale yellow and at maturity dry into seed pods



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Puncture Vine

with five sections. Each section has two sharp spines. Puncture vine blooms from July to September and sets seed from late July to October. It is commonly found in compacted soils of low fertility.

Pest Management Practices

Maintaining dense, actively growing turf minimizes puncture vine competition. Alleviate soil compaction with soil coring and traffic control to enhance turf growth. Puncture vine can be controlled with appropriate postemergence herbicides when applied when plants are young and actively growing.

HENBIT

Scientific Name

Lamium amplexicaule L.

Description

Henbit is a cool-season annual. Its roots are shallow and branched. The stems are smooth, four sided, slender,

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Henbit

and prostrate to ascending. Henbit leaves are opposite, nearly circular with rounded lobes, and hairy upper surfaces. Lower leaves are long petioled and upper leaves are sessile. Flowers are pink to purple. Henbit flowers in early spring and seeds mature from April to June.

Pest Management Practices

Henbit is a particularly troublesome weed in newly seeded turfs established in late summer and early fall. Fallowing before seeding can help minimize weed competition.

WHITE CLOVER

Scientific Name

Trifolium repens L.

Description

White Clover is a cool-season, perennial legume. Above and below ground stems that root at the node make clover an aggressive creeper, especially when

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White Clover

moisture is abundant and the turf thin and undernourished. Onset of winter results in an unsightly patch of low-growing leafless stems. The dark green trifoliate leaf is easily identified by the presence of parallel veination, white crescent shaped mark across each wedge-shaped leaflet, and the absence of a small stalk on the middle leaflet. Clover leaves are borne on large, hairy petioles that arise from the base of the plant. Flowers are conspicuous, globular and white with a pinkish hue.

Pest Management Practices

A dense vigorous turf is the best means of minimizing clover competition in lawns. Maintaining soil phosphorus levels at medium to low levels reduces the competitive ability of clover in turf. Clover is best eliminated by appropriate postemergence herbicides applied in the fall when plants are actively growing.

DANDELION

Scientific Name

Taraxacum offininale L.

Description

Dandelion is a cool-season perennial that reproduces by parachute-like seeds and shoots from root buds. It grows in a rosette composed of long, narrow, irregularly-lobed, lance-shaped leaves. The lobe tips are often opposite each other and point toward the crown. It possesses a large fleshy taproot, sometimes containing milky juice.

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Dandelion

Flowering occurs early April to late fall producing a large, deep golden yellow bloom on each long, hairy, hollow stalk. A white puff-ball composed of parachute-like seeds soon matures after flowering. Seeds are dispersed by wind. Seedlings can appear throughout the growing season.

Pest Management Practices

Dandelions thrive in weak, thin turf.

Good turf maintenance is the best prevention practice. Handweeding only provides temporary control. Spot treatment with the appropriate postemergence herbicide applied in the fall is the most effective control measure. Removing clippings when seedheads are present may help reduce dandelion populations.

GROUND IVY

Scientific Name

Glechoma hederacea L.

Description

Ground ivy, a member of the mint family, is a cool-season perennial. It was originally introduced as a ground cover plant, but has become a troublesome lawn weed. It reproduces by seed or creeping stems which root at the nodes. Ground ivy will persist in either sun or shade, and in poorly-drained sites. It can be mistaken for violets or creeping bellflower. Round, bright, green, kidney-shaped leaves with scallop margins are borne opposite each other on square stems. Funnel-shape, lavender flowers, are found in clusters and occur in early spring.

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Ground Ivy

Pest Management Practices

Use of improved surface drainage, aerification, and infrequent watering will help reduce ground ivy encroachment. Spot treatment with postemergence herbicides in spring and fall can be used to successfully control ground ivy in turf.

MOUSEEAR CHICKWEED

Scientific Name

Cerastium vulgatum L.

Description

Mouseear chickweed is a cool-season perennial with creeping stems that root at nodes. It can tolerate close mowing and will persist even at green height of cut. It has opposite, sessile leaves that are long and narrow. Leaves are slightly fleshy and appear fuzzy with hairs. Mouseear chickweed produces small white flowers that appear in late spring and early summer with seeds maturing in mid-summer. It is very competitive in moist, poorly-drained and shaded areas.

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Mouseear Chickweed

Pest Management Practices

Improved surface drainage and airflow helps minimize mouseear chickweed encroachment and enhances turfgrass competitive ability. Selection of adapted species and cultivars for shaded sites is also important to maintain a dense, actively growing turf.

OTHER BROADLEAF WEEDS

Speedwell ***(Veronica spp.)*** consists of several species. Some are cool-season annuals, while others are perennials. Most are low growing creeping-types that can root at nodes located on stems. Leaf-shape varies with species but is generally small, lobed and numerous. Flowers are

R. Engel

Speedwell

blue to purple with white throats. Seed pods are divided and almost heart-shaped.

Creeping bellflower (*Campanula rapunculoides* L.) is a cool-season perennial often mistaken for violets. Bellflower produces fleshy roots and dense spreading patches whereas violets tend to clump. Heartshaped basal leaves originate from long stems while flower stalk leaves are long and narrow without

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Creeping Bellflower

stems. The purple bell-shaped nodding flowers are conspicuous and numerous.

Several thistles are troublesome in turf. **Musk thistle *(Carduus nutans L.)*, bull thistle [*Cirsium vulgare* (Savi) Tenore] and Canada thistle [*Cirsium arvense* (L.) Scop.]** are among the most common. Musk and bull thistles are biennials, existing in a rosette stage during their first season of growth. Canada thistle is a perennial that spreads readily by rhi-

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Musk Thistle

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Bull Thistle

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Canada Thistle

zomes. Thistles are most troublesome in thin, undernourished turfs.

Broadleaf Plantain (*Plantago rugelii* Dene.) and buckhorn plantain (*Plantago lanceolata* L.) are cool-season, perennial broadleaf weeds that infest weakened and poorly managed turfs. Both form rosette-type growth and can tolerate low mowing heights. Broadleaf plantain has large, oval-shaped leaves that are prominently veined. Buckhorn plantain has very narrow leaves and forms seedheads that are short and cylindrical.

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Broadleaf Plantain

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Buckhorn Plantain

Field bindweed (*Convolvulus arvensis* L.) is a deep rooted, vining perennial that is particularly troublesome in thin, slowly-growing turfs that receive no supplemental irrigation. It is one of the more difficult weeds to control. It has spade-shaped leaves of varying size, and light-pink to white flowers that appear horn or funnel shaped. It spreads both by rhizomes and seed. Maintaining dense, active turfgrass growth and avoiding severe drought stress helps reduce field bind-

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Field Bindweed

weed problems. Control of field bindweed is difficult, but can be achieved with appropriate postemergence herbicides applied when the weed is actively growing. Fall applications are more effective than spring or summer.

Common or roundleaved mallow (*Malva neglecta* Wallr.) is an annual or sometimes a biennial that spreads by seed. It develops a thick, deep taproot with stems radiating from it. Leaves are alternate, nearly round, hairy with obscure lobes. Flowers are white to lilac tinged and occur from May throughout the summer. It is a common weed in weakened or stressed turfs.

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Common Mallow

Violets (*Viola* spp.) are annuals or short-lived perennials that grow best in cool seasons. They have a dense fibrous root system. Plants are stemless with nearly round or heart-shaped leaves. Petioles are long, angular and have prominent leaf stipules. Flowers are borne on stocks and may be purple, yellow, or

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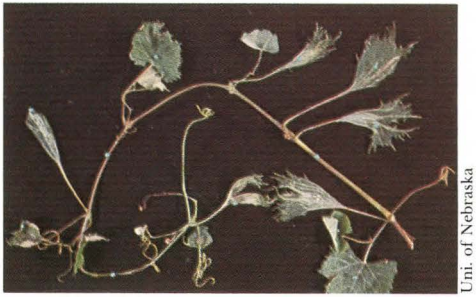
Violet

white depending on species. Seed capsules are round and contain several seeds. Violets prefer shade, and moist, fertile soil conditions. Reduced irrigation frequency, increased soil coring and improved surface drainage are means of minimizing violet encroachment in turf.



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Herbicide injury to ornamentals as a result of improper application.

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Healthy turf can ward off weed invasion.

NOTES

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