weed

a c k e r s

Weed control is a necessary part of maintaining any parcel of land. Healthy and well-maintained landscapes and turf will deter weed invasions but weeds still manage to find openings to establish and spread. Weeds can interfere with footing on athletic fields, and some weeds – like the spurges – contain harmful substances. Noxious weeds are problematic because of their nature to dominate plant communities, including landscapes and turf, and Colorado law requires their control.

a guide for identifying and managing weeds in schoolyards & landscapes

Colorado State University

USDA | NIFA

Introduction

Integrated Pest Management, or IPM, is a systems approach that uses physical, mechanical, cultural and biological methods first to control weed populations. Tactics include keeping weeds from going to seed, hand-weeding or pulling, use of mulches and biological agents such as insects. Aggressive weeds can crowd out grass and other desirable plants, so proper fertilization and irrigation is important.

Chemical control should be used in combination with other methods, when other methods have failed, and/or are cost prohibitive. Pesticide use around schools, buildings and homes is minimized using IPM. First, map out the landscape and turf areas on the property and think about how each area will be used. Consider using a zone management concept. High use and high visibility areas, such as the front entrance of a building or sports turf, will receive more attention than boundary areas or lawns.

Try non-herbicidal controls first. Before using any chemical product, correctly identify the weed and read the product label. When using herbicides, read the pesticide label prior to use. The label is the law; use according to label directions. Brand names of herbicides are used; no endorsement of products is intended, nor is criticism of unnamed products implied. Only general use pesticides with the signal word “caution” (slightly toxic) are named in this publication. Other products may be available. Pesticide recommendations or suggestions do not guarantee effectiveness. Pesticide use is undertaken at the risk of the user.

Non-herbicide methods for turf include:

- Mow as high as practical during the summer months for the particular grass species present in your turf.
- Mow often enough so that no more than one-third of the grass blade is removed in a single mowing.
- Irrigate properly to help reduce annual weed infestation.
- Fertilize according to the needs of your grass species.
- Core cultivate (aerate) the turf at least once a year to reduce compaction and to control thatch.
- Mulch with organic or inorganic materials to prevent annual weeds.
- Prune or remove flower heads or weeds to limit seed production in April for winter annuals and summer for summer annuals.
- Remove annual weeds by hand. Hand removal of perennials is seldom effective.

The content of pesticide labels can change from one year to the next. Read all label directions before using any pesticide. For more information about specific herbicides, see CSU Tufgrass (http://csuturf.colostate.edu/Pages/extensionfactsheets.htm) and Weed Management for Small Rural Acreages (http://www.ext.colostate.edu/pubs/natres/03106.html).

See the chart on page 40 to find the active ingredient in herbicides named in this publication.

Colorado Department of Agriculture (CDA) Noxious Weeds

List A — weed species designated for eradication, such as purple loosestrife, Japanese knotweed and yellow starthistle.

List B — weed species with management plans to stop their continued spread, including Canada thistle, Dalmatian toadflax, Russian knapweed, spotted knapweed, diffuse knapweed, leafy spurge, musk thistle and yellow toadflax.

List C — weed species with management plans to provide education, research and biological control resources, including cheatgrass, field bindweed, and Johnsongrass.

For more information and a complete list of Colorado noxious weeds, see: http://www.colorado.gov/ag/weeds

Definitions & Color Coding

Please note that different life cycles of plants are designated by the following colors:

Annual - Plants complete their entire life cycle, from seed to flower to seed, within a single growing season. All roots, stems and leaves of the plant die annually. Purslane and cheatgrass are annuals.

Perennial - Plants that live for many growing seasons. Usually the top portion of the plant dies back each winter and regrows the following spring from the same root system. Field bindweed and dandelions are perennials.

Biennial - Plants require two years to complete their life cycle. Mallow may grow as a biennial in our climate.

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Prostrate spurge flower

Toothed spurge with serrated leaf margins

Ridgeseed spurge flower

Spotted spurge adult flowering

ANNUAL SPURGES

Prostrate spurge *Chamaesyce prostrata or Euphorbia prostrata*

- Summer **annual** with many branches forming circular mats
- Young leaves and stems covered with soft hairs
- Small flowers that grow from leaf axils

Ridgeseed spurge *Chamaesyce glyptosperma*

- Similar to prostrate spurge, but the stems and leaves hairless
- Seeds with deep ridges

Toothed spurge *Euphorbia dentata*

- Summer **annual** up to 3 feet tall
- Leaves up to 3 inches long, ovate to linear, coarsely toothed, and hairy, often with maroon blotches on upper surfaces
- Stems with many branches and generally curve upwards
- Fruits are three-lobed capsules and occur on stem tips

Spotted spurge *Chamaesyce maculata*

- Prostrate summer **annual**; stems sometimes grow upwards when competing with other plants
- Leaves oblong to ovate about 1/6 to 2/3 inches long with a maroon central spot
- New foliage typically is hairy especially the stems and lower leaf surfaces
- Flower clusters occur in leaf axils and occur along the lengths of stems

ANNUAL SPURGES

Habitat: Spurges are generally found in gardens, pavement cracks, driveways, roadsides, turf, and similarly disturbed areas.

Prostrate and ridgeseed spurge are often found in thinning, less vigorous turfgrass. Prostrate and ridgeseed spurge are native to the continental U.S. (including Colorado); toothed spurge is native to central and southern Great Plains area.

Biology and spread: Annual spurges germinate at the beginning of summer, set seed, and die in the fall. They spread only from seed. Seeds of prostrate spurge survive in soil up to 5 years. Seeds of spotted spurge survive 50 years in the soil.

Significance: Spurges ooze a milky sap when damaged, which contains substances that can cause irritation and blistering of the eyes, mouth and skin.

IPM Recommendations

- **Cultural, physical and mechanical control:** Monitor infested areas. Mechanically till or pull new plants by hand before they produce seed. Use organic mulches (bark, compost, straw) in landscapes to prevent seedlings from emerging. Maintain a competitive stand of grass with proper fertilization and irrigation.
- **Chemical control:** Pre-emergence herbicides, such as Prowl H_2O , Pendulum or Dachthal will control most annual spurges if applied before these weeds germinate (May in Colorado). Spurges are very difficult to control with post-emergence herbicides.

Additional information:
http://csuturf.colostate.edu/

CANADA THISTLE

Flowers

Early spring rosettes

Flower close-up showing bracts

CANADA THISTLE

Cirsium arvense

Colorado Noxious List B

Canada thistle is a creeping **perennial**, 2 to 5 feet tall, with alternate, dark green leaves. The leaves are oblong, deeply lobed, with spiny toothed edges. Stems are branched, often slightly hairy, and ridged. The flowers are purple to light lavender or even white, in clusters of 1 to 5 per branch at the tops of branches.

Habitat: Native to Eurasia and found from 4,000 to 10,000 feet elevation. It can survive dry conditions once established and is somewhat shade intolerant. It is found along edges of forested areas but not within forests.

Biology and spread: Canada thistle produces 40 to 60 seeds per flower head; seed is long-lived (20 years or more) and dispersed by wind or in contaminated seed or forage. It has an extensive underground root system and regenerates from root fragments.

Significance: **Colorado Noxious List B**. One plant can colonize an area 3 to 6 feet in diameter in 1 to 2 years. May form monocultures and prevent the coexistence of other plant species.

IPM Recommendations

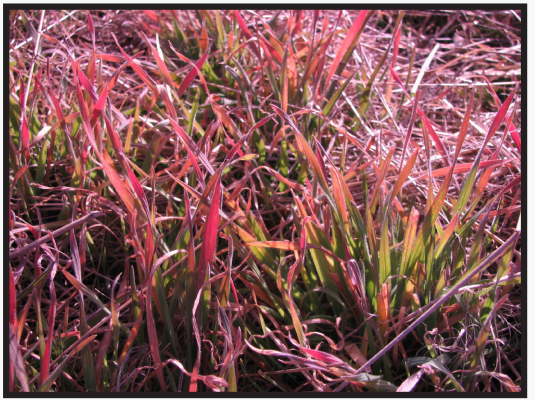
- **Cultural, physical and mechanical control:** Repeatedly cut or remove the plant.
- **Biocontrol:** The weevil, *Ceutorhynchus litura,* is available from the Colorado Department of Agriculture, but may not be effective as a sole control method.
- **Chemical control:** Products such as Transline and Milestone can be used in rangeland or permanent grass pastures, but are **NOT** labeled in turf.

Additional information:
http://www.ext.colostate.edu/pubs/natres/03108.html

CHEATGRASS

Seedheads

Plants



Typical reddish color in winter

CHEATGRASS

Bromus tectorum

Colorado Noxious List C

Cheatgrass (downy brome) is a winter annual grass that germinates in fall or in late winter. Plants are 20 to 24 inches high. It turns rusty-red to purple at maturity. Leaves and sheaths are often hairy.

Habitat: Native to Eurasia and found from 2,500 to 13,000 feet elevation, cheatgrass invades heavily grazed rangeland, roadsides, waste places, burned areas and disturbed sites.

Biology and spread: Reproduces only by seed and spreads by seeds adhering to clothing and animals and somewhat by wind and water. Seeds survive in soil up to 5 years.

Significance: **Colorado Noxious List C**. Cheatgrass has invaded disturbed and undisturbed grassland communities in the intermountain west, altering native plant communities and impacting wildlife. Stands are highly flammable. Densely growing populations provide fine-textured fuels that increase fire intensity and often decrease the time between fires.

IPM Recommendations

- **Cultural, physical and mechanical control:** Remove grass before it produces seed by hand pulling or by tillage. Replace cheatgrass with a perennial plant cover.
- **Chemical control:** Plateau can be applied to rights-of-way, but **CANNOT** be used in turf. Fusilade II can be applied in landscaped areas, flower beds and other non-turf areas.

Additional information:

http://www.fs.fed.us/database/feis/plants/graminoid/brotec/introductory.html
http://www.invasive.org/weedcd/pdfs/tncweeds/bromtec.pdf
http://mining.state.co.us/pdfFiles/DownyBromeandJapanesebrometechnicalbulletinGBeckCSUDec092.pdf

COMMON MALLOW

Flowering plant

Fruit

Plant

COMMON MALLOW/CHEESEWEED *Malva neglecta*

Mallow is a spreading **annual, biennal** or **perennial**, 4 to 24 inches tall on slightly hairy stems. The leaves are alternate, shallow palmate-lobed (e.g. somewhat heart to kidney shaped). Flowers are pale pink to nearly white, in clusters of 1 to 3.

Habitat: Originally from Eurasia, common mallow is found in fields, gardens, newly seeded lawns and disturbed areas, from 4,500 to 7,000 feet in Colorado.

Biology and spread: Seeds germinate throughout the growing season.

Significance: May serve as a reservoir for a number of plant viruses.

IPM Recommendations

- **Cultural, physical and mechanical control:** Prevent infestations with weekly mowing. Lawns should be mowed at a 3 inch height. Increase turf density with proper mowing, fertilization, watering and other cultural practices.
- **Chemical control:** Roundup has not been sufficiently effective to control this weed.

Additional information:
http://csuturf.colostate.edu/
http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74127.html

COMMON PURSLANE

Seedling

Foilage & stems

Flowers

COMMON PURSLANE

Portulaca oleracea

Purslane is a summer **annual** that forms a dense mat. The reddish stems (up to 12 inches long) originate from a central rooting point; stems tend to be succulent. Leaves are stalkless, oval, smooth, succulent, shiny, from 1/2 to 2 inches long; opposite or alternate. Flowers are small and yellow with 5 petals.

Habitat: Introduced from Europe and found throughout state up to 8,500 feet, it is common in vegetable gardens, bare areas, low-maintenance lawns and ornamental plantings.

Biology and spread: A single plant may produce 240,000 seeds.

Significance: While sometimes used as a leaf vegetable, purslane can be invasive in vegetable gardens, ornamental plantings, and non-vigorous lawns, especially around edges and corners where turf is thin or worn due to foot traffic.

IPM Recommendations

- **Cultural, physical and mechanical control:** Prevent establishment by using weed-free planting stock and seed and by cleaning mowers, planters and cultivation equipment. Hand weed and mulch; hand pulled plants may re-root but turning upside down after pulling prevents this habit.
- **Chemical control:** Herbicides are generally not necessary if a vigorous turf is maintained.

Additional information:
http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7461.html

DALMATIAN TOADFLAX

Flowers

Infestation

Fruits in winter

Stem & broad waxy leaves

DALMATIAN TOADFLAX *Linaria genistifolia or L. dalmatica*

Colorado Noxious List B

This short-lived **perennial** can grow over 3 feet tall. The blue-green leaves are alternate along the stem, heart or spade-shaped, and clasping the stem which is also blue-green in color. Stems and leaves are hairless with thick waxy coating — distinguishing it from yellow toadflax. Flowers are bright yellow, usually with an orange center, similar to the blossoms on snapdragon, and have a distinct spur at the base.

Habitat: Dalmatian toadflax is most problematic in dry, open grassland and forest sites, along roadsides, and on disturbed sites with coarse, well-draining soils.

Biology and spread: Seeds spread by birds and other wildlife and with wind on snow-covered ground. Root fragments may cling to farm implements.

Significance: **Colorado Noxious list B.** Once established, it is very competitive with both grasses and forbs and difficult to eradicate.

IPM Recommendations

- **Cultural, physical and mechanical control:** Grazing with sheep or goats during spring, coupled with biological control has shown to be effective.
- **Biocontrol:** with the insect *Mecinus janthiniformis* (available from the Colorado Department of Agriculture).
- **Chemical control:** There are no herbicides registered for a turf or ornamental setting.

Additional information:
http://www.ext.colostate.edu/pubs/natres/03114.html

DANDELION

Seed dispersal

Leaf shape & flowering stalks

Infestation

DANDELION

Taraxacum officinale

Dandelion is a deep-rooted **perennial** with a tap root up to 1/2 inch in diameter. Leaves cluster in a rosette at the base of the plants; margins of leaves are deeply serrated and emit a bitter, milky latex substance when squeezed or torn. The flowering stalks are hollow, 6 to 24 inches in length and end in a branched arrangement of flowers.

Habitat: Dandelion is from Eurasia and has naturalized throughout the U.S. It is found from 4,500 to 13,500 feet elevation in Colorado, and grows best in full sun.

Biology and spread: This plant reproduces mainly from seed; seed can be windborne for several miles.

Significance: Dandelion forms dense circular mats of leaves that crowd out desirable species and forms clumps in turf that cause poor footing for athletic fields and golf courses.

IPM Recommendations

- **Cultural, physical and mechanical control:** Inhibit seed germination with thick mulch. Hand hoe individual plants when young. Control plants before they set seed. Keep turf healthy with proper fertilization and watering.
- **Chemical control:** Products that contain 2,4-D and dicamba can be used. Roundup can be spot-sprayed but should **NOT** be used in turf.

Additional information:
http://csuturf.colostate.edu/

FIELD BINDWEED

Flowers

Fruits

Infestation

FIELD BINDWEED

Convolvulus arvensis

Colorado Noxious List C

Field bindweed (often confused with morning glory) is a long-lived **perennial** with twining stems 1 to 6 feet long or more. The leaves are 1 to 2 inches long, smooth and shaped like an arrowhead. Flowers are funnel-shaped, 1 inch in diameter, white or pink.

Habitat: This drought tolerant plant is originally from Eurasia and found as high as 10,000 feet.

Biology and spread: The average plant produces about 550 seeds; seeds can remain dormant in soil for up to 60 years. The root systems spread 20 to 30 feet laterally.

Significance: Colorado Noxious List C. The extensive root system makes it difficult to control and its twining growth habit causes it to climb fences, buildings, and desirable plants. Field bindweed is highly competitive, especially for soil moisture.

IPM Recommendations

- **Cultural, physical and mechanical control:** Use intense cultivation to control new infestations when they are small. Hand-weeding or hoeing is usually not effective due to its extensive root system. Purchase and plant clean seed and ornamental stock. In turfgrass, mow frequently and introduce new turf seed in fall or spring (every two to three years) to promote intense competition. Maintain a healthy cover of perennial plants to discourage establishment. Multiple treatments will be needed over multiple seasons.
- **Chemical control:** Drive can be used post-emergence in residential and nonresidential turf or Paramount can be used around parking lots or roads.

Additional information:
http://csuturf.colostate.edu/

Russian knapweed flowers

Diffuse knapweed
whole plant - single stem

Spotted knapweed rosette

Diffuse knapweed flower

KNAPWEEDS

Colorado Noxious List B

Russian Knapweed *Acroptilon repens*

- Colorado Noxious List B
- Creeping, herbaceous **perennial**
- Shoots, or stems, are erect, 18 to 36 inches tall with many branches
- Lower leaves are 2 to 4 inches long and deeply lobed
- A key vegetative characteristic is the black to brown papery or scaly appearance around the crown that is visible 12 months of the year

Spotted Knapweed *Centaurea stoebe*

- Colorado Noxious List B
- Short-lived, non-creeping **perennial**
- It forms a new shoot each year from a taproot and produces one or more shoots that are branched and 1 to 3 feet tall

Diffuse Knapweed *Centaurea diffusa*

- Colorado Noxious List B
- Short-lived **perennial**, a **biennial**, or occassionally, an **annual**
- It develops a single shoot (stem), 1 to 2 feet tall or more, that is branched toward the top

KNAPWEEDS

Colorado Noxious List B

Habitat: Knapweeds are native to Ukraine, southern and central Europe.

- Russian knapweed grows in a variety of sites, including rocky prairies, sunny meadows, shores of lakes and rivers and bottomlands.
- Spotted knapweed grows in dry meadows, pastureland, stony hills, roadsides, and the sandy or gravelly floodplains of streams and rivers. It prefers light, porous, fertile, well-drained and often calcareous soils in warm areas.
- Diffuse knapweed is found on dry, light, porous soils.

Biology and spread: Diffuse and spotted knapweed spread only from seed. Russian knapweed is a creeping perennial that reproduces from seed and vegetative root buds. It also spreads by tillage equipment or if infested soil is moved.

Significance: Colorado Noxious List B. Russian knapweed is toxic to horses.

IPM Recommendations

- **Cultural, mechanical and physical control:** Prevent infestations by purchasing hay or mulch that is certified weed-seed free by the Colorado Department of Agriculture. Report new infestations to the local county noxious weed supervisor. Keep grasses, especially those that form sods, growing vigorously. Hand pull diffuse and spotted knapweeds from moist soil.

KNAPWEEDS

Colorado Noxious List B

IPM Recommendations

- **Cultural, mechanical and physical control continued:** Be sure to remove the entire tap root from the soil. Russian knapweed is not susceptible to hand pulling and even a small infestation may increase in response to hand pulling or mowing.

- **Biocontrols:** *Cyphocleonus achates* is a weevil that bores into the roots of both diffuse and spotted knapweeds. *Larinus minutus* is another weevil that feeds on the developing seeds of diffuse knapweed; the adults also consume the foliage. Both insects are available from the Colorado Department of Agriculture.

- **Chemical control:** In rangelands and pastures, but **NOT** in turf, apply Milestone to control all knapweed species.

Additional information:
http://www.ext.colostate.edu/pubs/natres/03110.html
http://www.ext.colostate.edu/pubs/natres/03111.html

Flowers in leaf axils

Seedlings

Spring vegetative growth

KOCHIA

Kochia scoparia

Kochia is a summer **annual**. The bushy plants, 1 to 6 feet tall, are usually branched from on the stems. The small green flowers occur from July through October. Older plants are reddish in color. It is also known as fireweed, burning bush or summer cypress.

Habitat: Kochia was introduced from Eurasia and is naturalized in the Great Plains and western states. It is found in fields, gardens, roadsides, ditch banks and other uncultivated or disturbed sites, up to 8,500 feet and survives well in dry areas, and on saline and/or alkaline soils.

Biology and spread: One plant can produce more than 50,000 seeds/year.

Significance: Kochia can suppress the growth of other plants growing nearby by releasing chemicals into the soil. Kochia will break off at the soil surface and become a "tumbleweed", creating hazards for automobiles and fences. It may also be toxic to animals, if eaten.

IPM Recommendations

- **Cultural, physical and mechanical control:** Dig, hoe or pull young seedlings. Use thick mulches to prevent establishment of seedlings. Mow to decrease seed production.
- **Chemical control:** Apply Roundup or products containing dicamba in spring while kochia is less than 8 to 12 inches tall. Mature plants are difficult to kill with herbicides and herbicide-resistant plants have been documented.

Additional information:

http://www.fs.fed.us/database/feis/plants/forb/kocsco/all.html
http://www.ipm.ucdavis.edu/PMG/WEEDS/kochia.html

LEAFY SPURGE

Seedlings - close up

Plant - early spring

Plant full bloom

Late flower to seedset

LEAFY SPURGE

Euphorbia esula

Colorado Noxious List B

Leafy spurge is a creeping **perennial** that grows 1 to 3 feet tall. Leaves are bluish-green with smooth margins and 1 to 4 inches long. Flowers occur in April and May with showy yellow bracts and flower parts in 3's.

Habitat: Leafy spurge occurs throughout the state; most aggressive under dry conditions but readily establishes adjacent to water.

Biology and spread: Seed capsules open explosively and disperse seed up to 15 feet. It also can spread vegetatively several feet per year.

Significance: **Colorado Noxious List B**. This plant displaces native plants in prairie habitats and fields. The white milky sap can be toxic.

IPM Recommendations

- **Cultural, physical and mechanical control:** Maintain a vigorous turf. Grazing with sheep or goats may effectively control leafy spurge.
- **Biocontrol:** Four species of flea beetle are available from Colorado Department of Agriculture insectary.
- **Chemical control:** Apply herbicides such as Paramount sprayed in spring at flowering or during fall; or Plateau in fall. These products are **NOT** labelled in turf.

Additional information:

http://www.ext.colostate.edu/pubs/natres/03107.html
http://www.nps.gov/plants/alien/fact/eues1.htm

MUSK THISTLE

Flower

Rosette - note frosted appearance of leaf margins

Plant - early bloom

Infestation

MUSK THISTLE

Carduus nutans

Colorado Noxious List B

Musk thistle is a biennial plant with deep rose, violet, purple, occasionally white flowers. The flowering heads are terminal, solitary and usually nodding and 2 to 3 inches in diameter. Broad, spine-tipped bracts are located under the flower. Leaves are alternate, dark green, deeply lobed, with spiny margins. Rosette leaf margins are white or appear frosted. Leaves extend onto the stem giving a winged appearance. There are many native thistle species, but they generally do not have leaves clasping the stem all the way from node to node. Mature plants are as tall as 6 feet or more.

Habitat: Musk thistle is found up to 10,000 feet in elevation and in areas with as little as 10 inches of annual precipitation. Disturbance favors establishment.

Biology and spread: This plant reproduces only from seed with up to 20,000 seeds per plant. Seeds are spread by wind, water, wildlife and livestock.

Significance: **Colorado Noxious List B.**

IPM Recommendations

- **Cultural, physical and mechanical control:** Prevent seed production. Remove individual plants by cutting its root below ground with a shovel or hoe, and bag and remove the plant to prevent flowers from forming viable seed.
- **Biocontrol:** *Trichosirocalus horridus,* also known as the musk thistle rosette weevil, is available from the Colorado Department of Agriculture Insectary.
- **Chemical control:** Transline is very effective and can be used in non-crop areas; it is **NOT** labelled in turf.

Additional information:
http://www.ext.colostate.edu/pubs/natres/03102.html

PROSTRATE KNOTWEED

Fowers, leaf shape & swollen nodes

Typical habitat

Single plant

PROSTRATE KNOTWEED *Polygonum aviculare*

Knotweed is a matting summer annual with branches 4 to 24 inches long. The leaves are small and elliptic. It has small and inconspicuous, white to pinkish white flowers, in clusters of 1 to 5 that grow in leaf axils.

Habitat: This plant, native to Europe or Eurasia, is found from 5,000 to 9,500 feet elevation in Colorado, in compacted areas of turfgrass such as pathways and sport fields. Knotweed is salt tolerant, but not shade tolerant.

Biology and spread: A single plant may produce up to 6,400 seeds, which are spread by birds, mammals, water, livestock and by vehicles.

Significance: Knotweed may invade open areas in turf caused by heavy wear, resulting in unsafe playing conditions.

IPM Recommendations

- **Cultural, physical and mechanical control:** Prevent soil compaction. Design landscapes so that soil is less likely to become compacted. Spread out foot and vehicle traffic over a broader area. Core aerate soil in lawns to provide better aeration and drainage. Manually remove plants. Mulch to decrease successful seedling establishment. Due to its low stature, mowing is ineffective.
- **Chemical control:** Herbicides that contain MCPP or dicamba can be used in turf.

Additional information:
http://www.tennesseeturfgrassweeds.org/mobile/weeds.aspx?WID=35
http://www.fs.fed.us/database/feis/plants/forb/polavi/all.html

PUNCTUREVINE

Spiny burred fruit

Seedling

5 petal yellow flower and leaves divided into leaflets

Spreading along ground

PUNCTUREVINE

Tribulus terrestris

Colorado Noxious List C

Puncturevine forms dense mats 2 to 5 feet in diameter, with green to reddish-brown stems radiating out from a central point. The hairy leaves are opposite and divided into leaflets. The flowers are yellow, with five petals. Fruits consist of five wedge shaped segments or burrs, each with two short spines and many smaller prickles.

Habitat: This summer **annual**, also known as "goathead", is native to southern Europe; plants canot tolerate freezing temperatures. It can be found in pastures, turf, and along roadsides and in playgrounds.

Biology and spread: One plant will produce 200 to 5,000 seeds in one growing season; the seeds remain viable in the soil for up to five years. Individual burrs stick to passing animals, shoes and clothing of people, and car tires, thus dispersing the seeds.

Significance: **Colorado Noxious List C.** The seeds are enclosed in a hard case that can injure livestock, people and pets when stepped on. Leaves contain saponins, which can be toxic to livestock (especially sheep).

IPM Recommendations

- **Cultural, physical and mechanical control:** Hoeing or hand-weeding is effective because the plant has a single taproot. Mowing is not effective because the plant grows low to the ground. Organic mulches at least 3 inches thick can be used.
- **Biocontrol:** *Microlarinus lareynii,* a seed weevil, and *Microlarinus lypriformis*, a stem weevil, may be availabe from the Colorado Department of Agriculture.
- **Chemical control:** In turf or lawns, apply dicamba to young plants. Pre-emergent herbicides such as Surflan or Treflan will provide partial control in heavy infestations.

Additional information:

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74128.html

Seedling

Flower in leaf axil

Bolted plant showing leaf shape

Whole plant & habitat

RUSSIAN THISTLE

Salsola tragus or S. collina

Russian thistle is a bushy summer annual with numerous stems (8 to 36 inches in length), alternate leaves, and single, inconspicuous yellow flowers. The mature plants grow 0.5 to 3 feet tall; overall shape of plant becomes oval to round.

Habitat: This plant is native to Eurasia and widespread in Colorado, at elevations up to 8,500 feet. It is found where the soil has been disturbed, in vacant lots, in poorly tended landscapes, and wheat fields after harvest. The plant tolerates alkaline soil conditions and drought and is shade tolerant.

Biology and spread: At maturity, plants break off at the base, become tumbleweeds, and scatter seeds for long distances. One plant may produce up to 250,000 seeds.

Significance: Plants may accumulate along tree rows and fence lines, posing a fire hazard. Large plants can reduce highway safety by obstructing views and causing drivers to swerve their cars in an attempt to avoid colliding with windblown plants. People exposed to the plant may develop skin rashes or other allergic reactions.

IPM Recommendations

- **Cultural, physical and mechanical control:** Mow or destroy young plants to prevent seed production. Plant competitive, more desirable species to prevent establishment.
- **Chemical control:** Use herbicides to target immature plants. Products containing MCPP, plus dicamba, and Roundup will control Russian thistle but should be used in spring before plants are 8 to 12 inches tall; Roundup is non-selective and will kill most vegetation it contacts.

Additional information:
http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7486.html

YELLOW TOADFLAX

Flower

Stem and leaves - close up

Mountain habitat

Flowering stem & vegetative stem

Dense stand

YELLOW TOADFLAX

Linaria vulgaris

Colorado Noxious List B

This **perennial** plant grows 1 to 3 feet tall. Leaves are narrow, pale green in color, 1 to 2 inches long, sessile (no leaf stem) but not clasping. Showy snapdragon-like flowers are bright yellow with a deep orange center and have a spur as long as the entire flower.

Habitat: Found on rangeland, high mountain meadows, on roadsides, vacant lots, and other disturbed sites, it is adapted to a variety of site conditions and soil types.

Biology and spread: Yellow toadflax reproduces from seed and extensive creeping roots. It displaces native plants, especially forbs, once populations reach about 60 stems per square yard.

Significance: Colorado Noxious List B. This plant displaces desirable plant communities; decreases forage for livestock and some big game species; and is mildly poisonous to cattle.

IPM Recommendations

- **Cultural, physical and mechanical control:** Early detection and rapid response is essential. Hand pulling or digging is not effective.
- **Biocontrol:** *Calophasia lunula* and *Mecinus janthiniformis* vary in their effectiveness at decreasing yellow toadflax populations.
- **Chemical control:** There are no registered herbicides to control yellow toadflax in a turf or ornamental setting. See **http://www.colorado.gov/cs/** for specific recommendations.

Additional information:

http://www.ext.colostate.edu/pubs/natres/03114.html

http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251684193902&ssbinary=true

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- **Plantwise.org:**
  http://www.plantwise.org/?dsid=54447&loadmodule=plantwisedatasheet&page=4270&site=234—32

- **Regina Schroeder** — Table of Contents

Herbicide Chart

The following products are mentioned in this publication. The pesticide label is the law, use according to label directions.

Aminopyralid (Milestone) – post-emergent control of noxious broadleaf species such as musk thistle, Canada thistle and knapweeds in rangelands and pastures; not labeled in turf.

Clopyralid (Transline) – controls noxious weeds such as musk thistle, spotted knapweed and Russian knapweed in rangelands, rights of way and industrial sites; not labeled in turf.

DCPA (Dacthal) – pre-emergence control of annual grasses.

Dicamba (found in several formulations of Weed & Feed) – used to control a wide spectrum of broadleaf weeds and woody plants, both pre- and post-emergence.

Fluazifop-P-butyl (Fusilade II) – post-emergence control of annual and perennial grass and broadleaf weeds in rangelands and right of way; not labeled in turf.

Glyphosate (Roundup) – a non-selective systemic herbicide that is applied directly to plant foliage, both grasses and broadleaf plants. Some crop plants have been genetically engineered to be resistant to glyphosate. Resistance to glyphosate has been found in some weeds such as kochia.

Imazapic (Plateau) – post-emergence control of annual and perennial grass and broadleaf weeds in rangelands and rights of way; not labeled in turf.

Herbicide Chart

The following products are mentioned in this publication.

MCPP (found in several formulations of Weed & Feed) – applied post-emergence and used on ornamentals and sports turf.

Oryzalin (Surflan) – pre-emergent control of annual grasses and many broadleaf weeds.

Pendimethalin (Pendulum, Prowl H_2O) – pre-emergence control of annual grasses and some broadleaf weeds in turf and landscapes.

Quinclorac (Drive) – post-emergence weed control in turf.

Quinclorac (Paramount) – selective control or suppression of annual grasses and broadleaf weeds, and some perennial weeds, in established pasture, rights of way and rangeland.

Rimsulfuron – pre-emergence control or suppression of annual grasses and broadleaf weeds, and some perennial weeds, in established pasture, rights of way and rangeland.

Trifuralin (Treflan) – pre-emergence herbicide which is incorporated into the soil to provide control of many annual grasses and broadleaved weeds.