

Integrated weed management for turf and ornamentals

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Grassy

Weeds

- Plant out of Place (Undesired)
- 3 types
- 3 life cycles



Broadleaf



Sedge
(Grass-like)

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Grassy Weeds

- Crabgrass
- Foxtail
- Goosegrass
- **Quackgrass**
- **Bromegrass**
- **Nimblewill**
- **Bentgrass***



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Broadleaf Weeds

- **Dandelion**
- **Plantain**
- Prostrate spurge
- Henbit
- **Ground Ivy**
- Prostrate Knotweed



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Sedges

- Parallel veins
- Triangular stems, solid, without nodes
- Three ranked leaves – arising from each side of the stem



Examples: Yellow nutsedge



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Weeds: Life Cycle

- Important to know for management strategy

Weeds are classified as:

1. Annuals
 - Summer annuals
 - Winter annuals
2. Perennials
3. Biennials

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Use Weeds as “Indicators”

- Legumes (white clover, black medic, birdsfoot trefoil), grassy sandbur, and ground ivy may indicate low nitrogen levels



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“Indicators”

- Algae and moss may indicate excess surface moisture
- Crabgrass and annual bluegrass may indicate low mowing heights



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“Indicators”

- Knotweed, goosegrass, and crabgrass may indicate compacted soil
- Ground ivy and violet may indicate excessive shade



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Reasons for Weed Problems



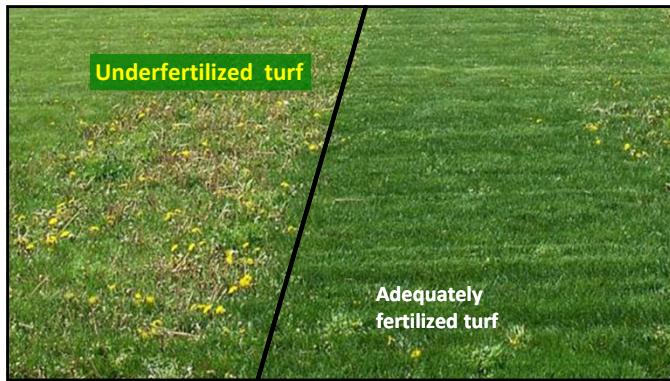
- Fundamentals(cultural)
- Species selection
- Neglect
- Expectations
- Budget
- Utilize turf where it can be competitive

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Cultural Practices for Healthy Turf

- Highest mowing height
- Frequent mowing
- Reduced Irrigation (~~overwatering~~)
- Fertilize as needed
- Manage traffic and compaction

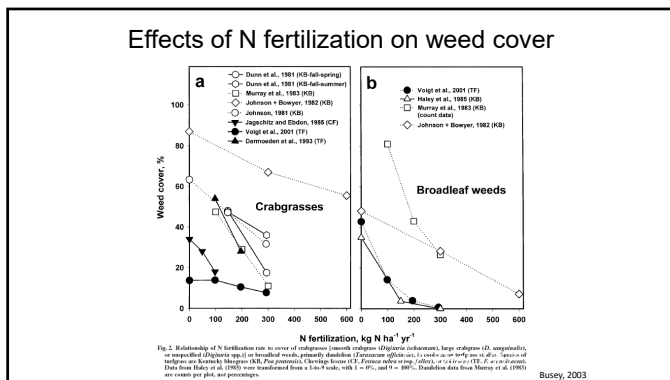
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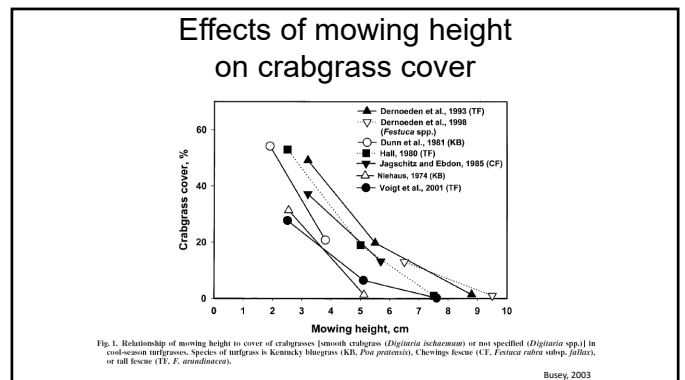
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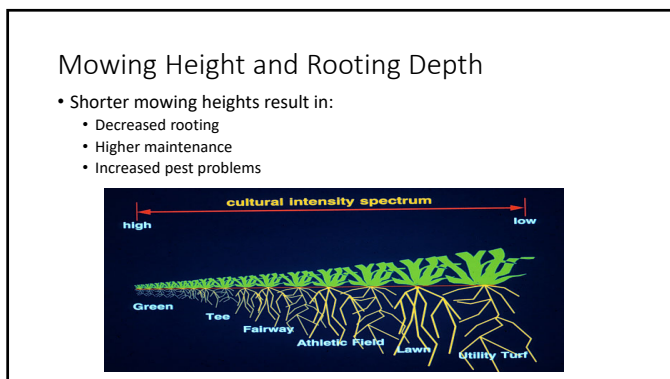
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Chemical Control

- Preemergence
 - Apply before weeds germinate
 - Very effective on annual weeds
- Postemergence
 - Apply to actively growing weeds
 - Contact
 - Systemic

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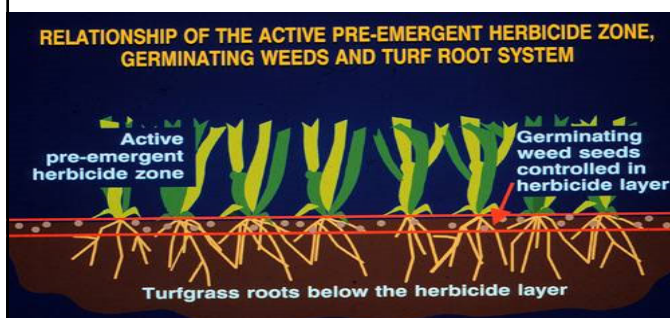
When to apply preemergence herbicides



- Soil temperatures exceed 50 °F
- Occurs first:
 - In landscape beds
 - Thinned turfgrass
 - Near sidewalks
- Better to apply early than late

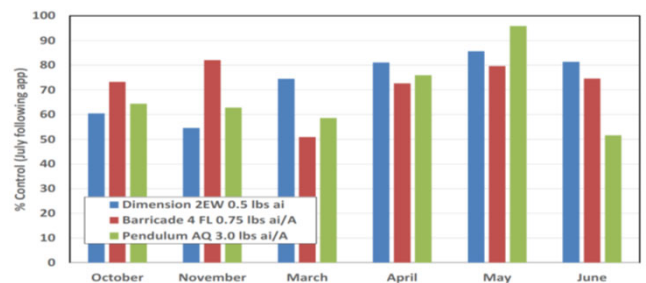
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Managing Annual Weeds



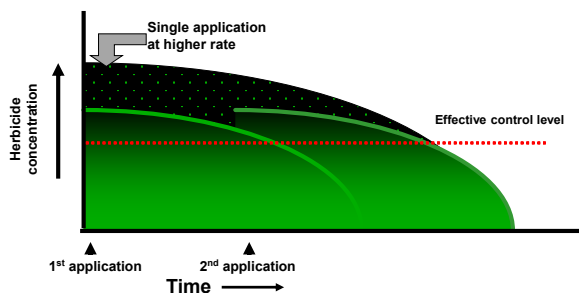
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Crabgrass control on July 15 from PRE's applied on 6 different dates in fall/spring. (Averaged over three years, UNL 2013)



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Split preemergence herbicide applications



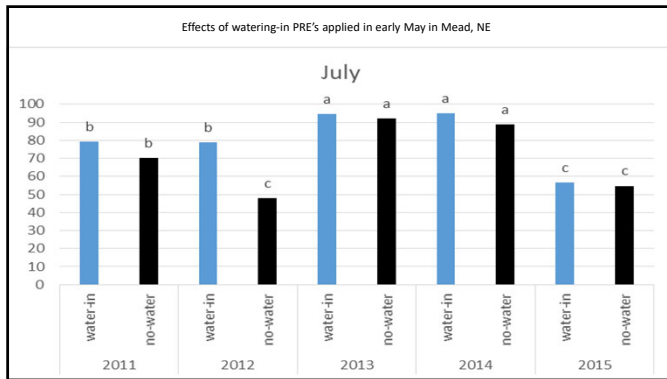
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Preemergence Herbicide "efficacy"



- Less than adequate control
- Timing and application rates are correct, so...?
- Reasons for "failure"
 - Poor turf conditions
 - Tough weeds/lots of them
 - High rainfall/irrigation
 - Non-Uniform application
 - Insufficient early irrigation/rainfall

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Effective Use of Preemergence Herbicides

- Better to apply too early
- App timing is flexible within reason (earlier/split apps)
- Water in
- Uniform application is essential
- Label rates
- Split applications can provide extended season control

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Postemergence Weed Control

- Perennials are hardy and difficult to control
- Herbicide uptake and translocation vary
- Death of the weed may be slow with some herbicides
- Mature weeds may not be controlled completely
- Control annuals when young
 - Hit them hard early



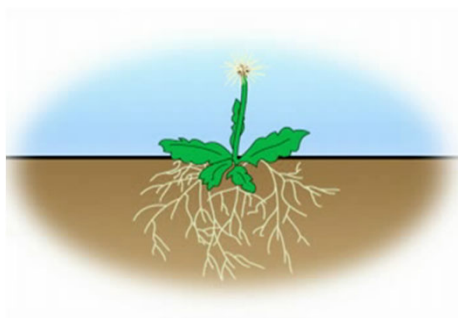
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When to control broadleaf weeds

- Fall is BEST
 - Controls most life cycles
 - Herbicides are more readily translocated to roots
 - Less risk for ornamental damage
 - Turf is in ideal growing conditions to allow it to fill voids
- Spring Control
 - Ester formulations work better in cool weather but can cause damage to nearby ornamentals
 - Combination products with multiple AI's
 - Best to time a few weeks before or after flowering

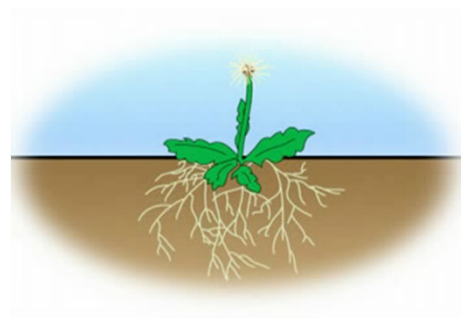
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Spring application to perennial weeds



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Fall application to perennial weeds



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Postemergence Herbicide “Failure”

- Weeds wilt and die back but regrow
- Why?
 - Application timing
 - Weed species
 - Weed health
 - Weed age
 - Post-application management of lawn
 - Weather
 - Adjuvants



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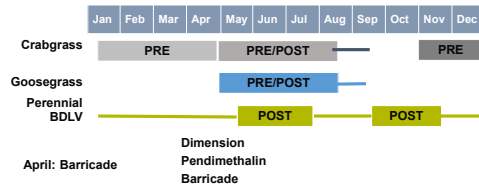
Effective Use of Postemergence Herbicides

- Start with healthy turf
- Apply to actively growing weeds
- Multiple ai products (we have many options)
- Fall applications



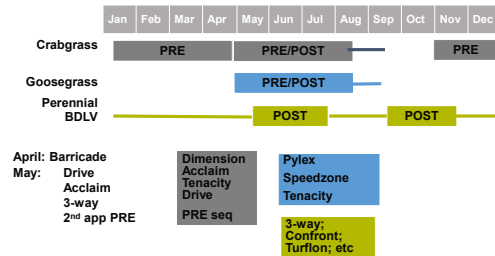
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Typical cool-season grass weeds



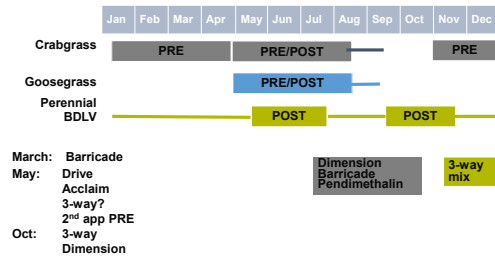
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Typical cool-season grass weeds



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Typical cool-season grass weeds



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Yellow nutsedge

- A perennial weed found in both cool- and warm-season turfgrasses
- Tolerates close mowing and competes for water and nutrients



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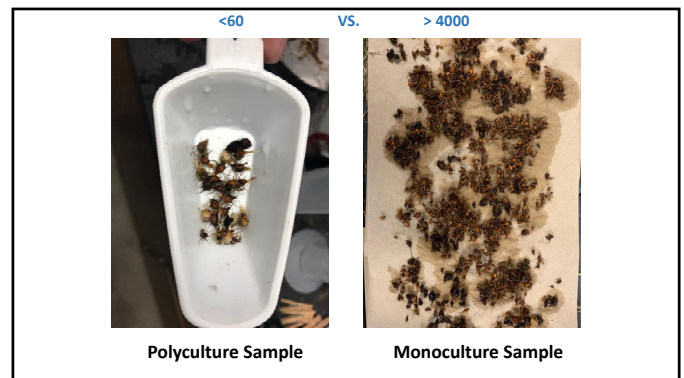
Tubers

- Difficulty to control it is a result of its intensive system of underground tubers, and its tolerance to most herbicides
- Tuber production in yellow nutsedge is highly prolific

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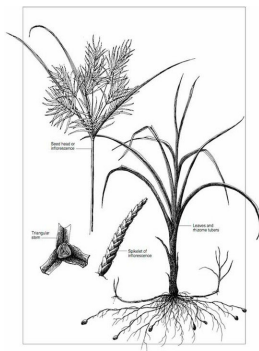


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- Viable tubers may remain dormant in the soil for multiple years and may sprout repeatedly
- Results of herbicide control of yellow nutsedge are inconsistent

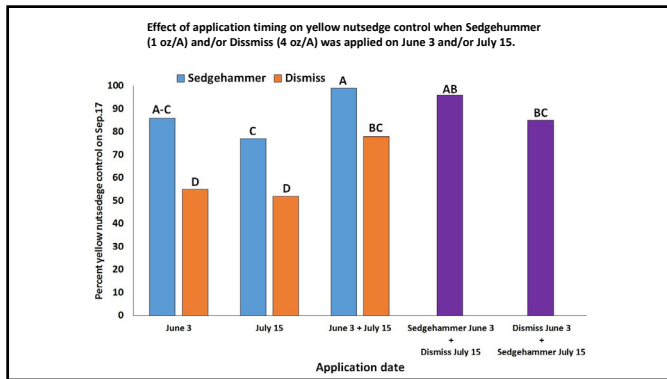


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When to control yellow nutsedge

- As early as it was first identifiable – early June
 - Tubers are immature
 - Control tubers that start forming
 - Herbicides are more readily translocated to roots, rhizomes and tubers
- Sequential application
 - Make a second application 3 or 6 weeks after the initial application
 - Sequential application works better than single app

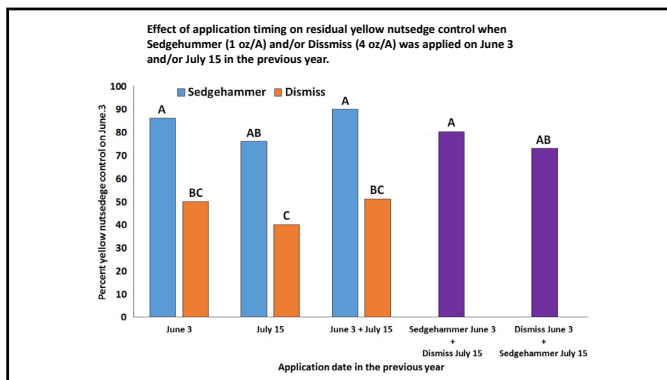
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Yellow nutsedge control

- Treat as early as it was first identifiable (seen) – early June
- Sequential application with 3 to 6 weeks interval
- Sedgehammer may work better when controlling yellow nutsedge within turf
- Herbicide Rotation
 - Prevent potential herbicide resistance
 - Apply Sedgehammer first when rotating with Dismiss

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Weed Control Options in New Seedings

Start Early Be Aggressive

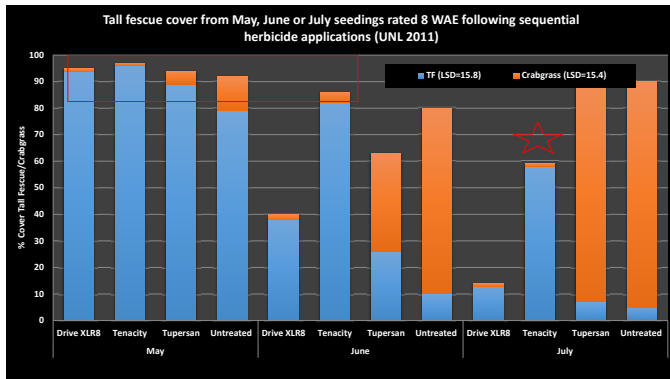
- Tenacity (Mesotrione)
 - PRE on bare soil
 - Post over turfed areas
 - Crab + Broadleaves + Nutsedge
- Drive (Quinclorac)
 - Anytime on TF
 - 7 days prior and Post 28 days after emergence on KBG
 - Crab + broadleaves
- SquareOne (Quinclorac+Carfentrazone)
 - Post 7 DAE
 - Crab + Broadleaves

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Weed Control Options in Seedings

- Pylex (Topramezone)
 - Anytime before seeding
 - Grassy and broadleaf weeds
 - Goosegrass
- Tupersan (Siduron)
 - Before seeding
- Quicksilver (Carfentrazone)
 - Post
 - Broadleaves

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Perennial Weedy Grass Control



- Tall fescue
- Quackgrass
- Windmillgrass
- Bromegrass
- Bentgrass
- Zoysiagrass
- Bermudagrass
- *Poa trivialis*

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Managing Perennial Grassy Weeds

- Difficult to selectively control
- Glyphosate, followed by reseeding or sodding
- Some herbicides can selectively perennial grasses (mesotrione, topramezone)
- Learn to tolerate the different grass species



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Set yourself up to be successful

- Proper Management
 - Reduces weeds
- Reduce the number of negative factors
 - Research (study)
 - Follow labels
 - Take advantage of new chemistry, when appropriate
- Proper Planning and Training

Make Educated Decisions

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Cultural Weed Management in the Landscape

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Landscape Mulching Benefits

- reduce the amount of water lost from evaporation;
- protect trees and other landscape plants from mechanical injury due to mowers and string trimmers;
- protect exposed roots from lawn mowers;
- reduce soil compaction caused by people and equipment by diverting traffic around landscape beds;
- reduce soil and wind erosion, especially on steep slopes;
- reduce incidence of disease by protecting above-ground plant parts from splashes that carry soil-borne inoculum;
- reduce fruit rot by eliminating contact between fruit and soil;
- reduce winter injury by minimizing temperature variation;
- maintain cooler soil temperatures during the summer; and

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Tree	Tree Root Density in Three Root Zone Treatments						
	Bare Soil Depth (in.)		Organic Mulch Depth (in.)			Turf Depth (in.)	
	0-3	3-6	Mulch	0-3	3-6	0-3	3-6
Norway maple	61.2	64.3	88.5	75.8	73.3	52.3	56.0
Sugar maple	13.2	14.5	17.7	15.5	11.1	4.4	8.6
Green ash	32.3	27.5	56.4	28.7	32.3	25.1	18.1
Pin oak	14.9	20.2	7.9	25.0	21.6	18.9	14.6
Red oak	4.8	6.5	1.0	7.2	5.0	4.2	8.0
Linden	24.4	17.7	42.2	21.4	19.8	12.7	18.3

Tree root densities were found by measuring the surface area (in centimeters) of roots in 300 cc (or about 1¼ cups) of soil or mulch, so the units are cm²/300 cc.

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All mulches are not created equal

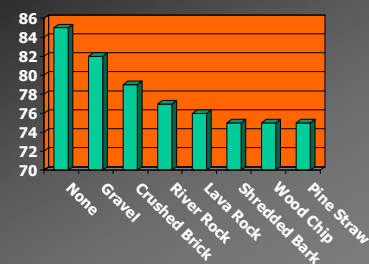
- Mulch Types
 - Organic
 - Inorganic

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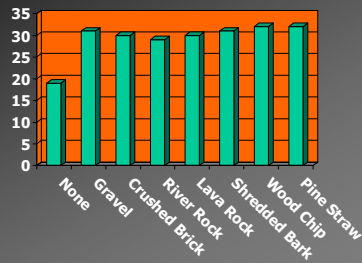
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Mulch/Soil Temperature Effects



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Mulch/Soil Moisture Effects



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Inorganic Mulches

- **Crumb Rubber**
 - recycled car tires
 - increases soil temperatures
 - unattractive
 - difficult to remove
 - not recommended



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Bottom Line

From: http://www.puyallup.wsu.edu/~Linda%20Chalker-Scott/Horticultural%20Myths_files/Myths/Rubber%20mulch.pdf

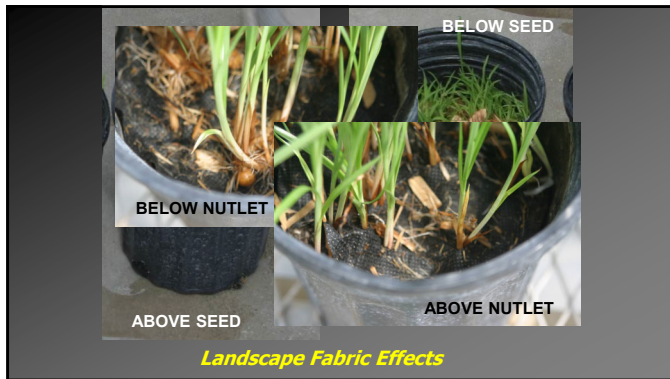
- Rubber mulch is not as effective as other organic mulch choices in controlling weeds
- Rubber mulch is highly flammable and difficult to extinguish once it is burning
- Rubber mulch is not permanent; like other organic substances, it decomposes
- Rubber mulch is not non-toxic; it contains a number of metal and organic contaminants with known environmental and/or human health effects

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Plastics and Landscape Fabric

- **Plastics**
 - restrict air, water, nutrient movement to and from soil
 - plastic colors
- **Landscape fabric**
 - weeds germinate through cloth
 - plant replacement difficult
 - As mulch decomposes "soil" develops
 - mulch slips on slopes

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Organic Mulches

- **Straw**
 - unattractive, used for seeding turfgrass areas and in vegetable gardens
 - some straw mulch contains high levels of weed seed
 - straw mulches can be used in vegetable gardens to keep fruit from touching the soil, where diseases can affect quality
 - inexpensive

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Organic Mulches

- **Others**
 - compost
 - grass clippings
 - leaves
 -

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Herbicide-Contaminated Grass Clippings and Compost

- postemergence products may persist through composting
- fresh grass clippings used for mulch can be toxic to desirable plants

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Organic Mulches

- **Wood Chips**
 - branches, bark or recycled wood pallets
 - pine, cedar, cypress, hardwood
 - fresh woodchips may contain seeds resulting in a potential weed problem
 - readily available
 - may be relative

currently, most of the cypress comes from standing groves

Be careful with cocoa shell mulches and dogs

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Landscape Mulching Benefits

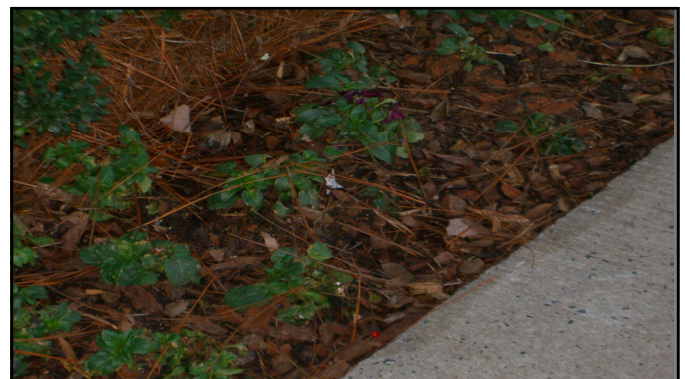
- reduce the amount of water lost from evaporation;
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- reduce soil compaction caused by people and equipment by diverting traffic around landscape beds;
- reduce soil and wind erosion, especially on steep slopes;
- reduce incidence of disease by protecting above-ground plant parts from splashes that carry soil-borne inoculum;
- reduce fruit rot by eliminating contact between fruit and soil;
- reduce winter injury by minimizing temperature variation;
- maintain cooler soil temperatures during the summer; and

• **Helps control weeds**

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Past (organic) Mulching Research

- Mulch is a no brainer
- In combination with herbicide control can be as much as 95%
- Type (cypress vs hardwood vs corn cob etc) is less important than depth
- Minimum of 2"; no more than 3"

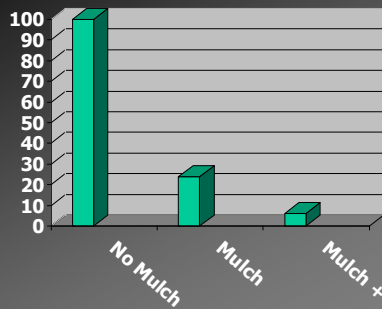
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Mulch & Herbicide Effects on Landscape Weed Control

Mead, NE

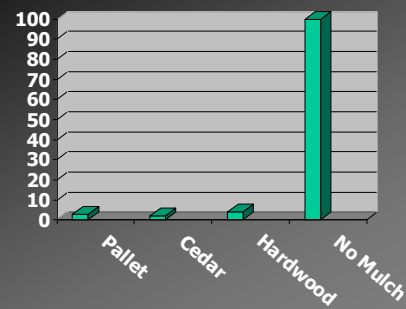
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Weed Population in Landscape Bed; non-mulched; mulched; mulch plus Dimension herbicide



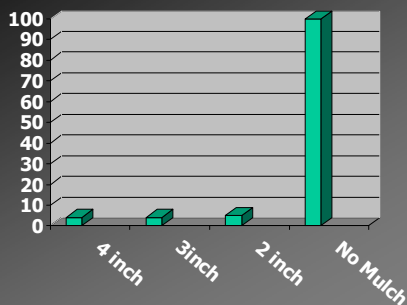
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Weed Population in Landscape Bed; Mulch Types: Pallet; Hardwood; Cedar (plus Dimension herbicide)



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Weed Population in Landscape Bed; Mulch Depth: 2 inches; 3 inches (plus Dimension herbicide)



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Turfgrass Weed Control for Professionals, Now Available

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Turfgrass Weed Control for Professionals

PRICE: \$29.00 Each

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DESCRIPTION

This guide provides weed identification and control information that turfgrass professionals can use to develop effective weed control programs for golf courses, athletic fields, and other turfgrass systems. The recommendations apply to the majority of the United States, with input from experts in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New York, Ohio, Pennsylvania, and Wisconsin.

Formerly Purdue Extension publication AY-336.

Format: Book.

AGRICULTURE COMMUNITY ENVIRONMENT FAMILY FOOD & GARDEN YOUTH

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Sedge Control Herbicides

From - Turfgrass Weed Control for Professionals

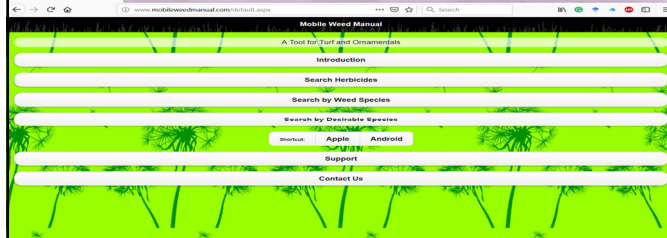
Sedge Control and Turfgrass Tolerance Ratings

Herbicide	Sedge Control				Turf Tolerance									
	Sedges and Kyllinga				Cool-season						Warm-season			
	annual edge	late-green hybrids	purple nuttall	yellow nuttall	annual bluegrass	creeping bentgrass	fine fescue	Kentucky bluegrass	perennial ryegrass	tall fescue	bermudagrass	buffalograss	zoysiagrass	
2,4-D + flumioxypyr + triclopyr + sulfentrazone (Monsanto 4-Scout)	P	P	P	F	S	S	S	S	S	S	NR	NR	NR	
2,4-D + MCPA + dicamba + sulfentrazone (Triad SFZ Soler)	P	P	P	F	S	S	S	S	S	S	S	S	S	
2,4-D + quinclorac + dicamba + sulfentrazone (Q4 Plus)	P	P	P	F	S	NR	S	S	S	S	S	NR	S	
2,4-D + triclopyr + dicamba + sulfentrazone (Frontalux) (Frontalux)	P	P	P	F	S	NR	S	S	S	S	NR	NR	NR	
bentazon (Basagran T/O)	G	F-G	P	F	S	S	S	S	S	S	S	S	S	
dimethenamid (Tower)	G	G	F	F-G	NR	NR	NR	NR	NR	NR	S	S	S	
dimethenamid + pendimethalin (Freehand)	G	G	F	F-G	NR	NR	NR	NR	NR	NR	S	S	S	
flazasulfuron (Katana)	G	G	G-E	G-E	NR	NR	NR	NR	NR	NR	S	S	S	
halosulfuron (Sedgehammer)	G	F	G	G-E	NR	S	S	S	S	S	S	S	S	
halosulfuron + dicamba (Yukon)	G	F	G	G-E	NR	S	S	S	S	S	S	S	S	
imazapic (Plateno)	F	F	F	F	NR	NR	NR	NR	NR	NR	S	S	NR	
imazaquin (Image 700G)	G	G-E	G	F	NR	NR	NR	NR	NR	NR	S	NR	S	
imazosulfuron (Celero)	G	E	G-E	G-E	NR	S	S	S	S	S	S	NR	S	
mesotrione (Tenacity)	P	P	P	G	NR	NR	S	S	S	S	NR	S	NR	
mesotrione (Biospect MACALIM)	F	F	F	F	NR	NR	NR	NR	NR	NR	S	NR	S	

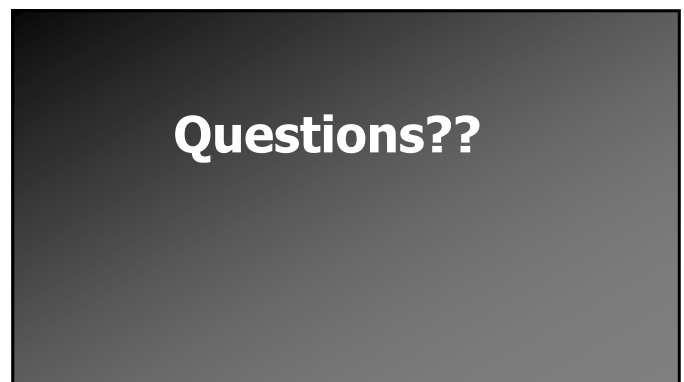
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Other resources:

- Turf iNfo – turf.unl.edu
- <http://www.mobileweedmanual.com/> Jim Brosnan, Ph.D.



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