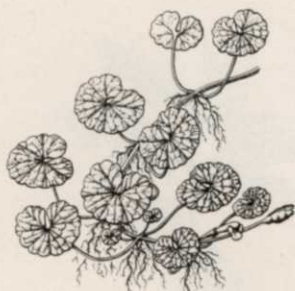
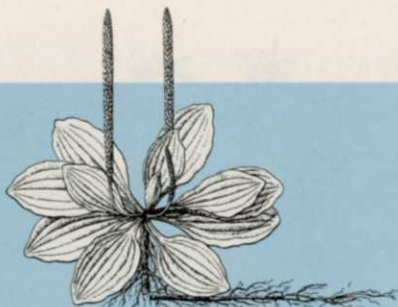


IDENTIFICATION OF SOME COMMON TURF WEEDS

O.M. Scott & Sons



Ground Ivy



Plantain



Dandelion



**Spotted
Spurge**



Corn Speedwell



Clover



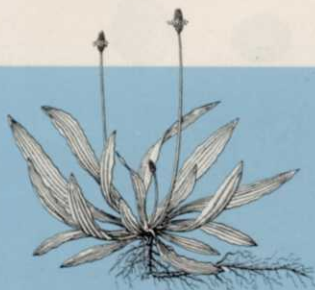
**Common
Chickweed**



Ragweed



Purslane



Buckhorn

INSECT CONTROL

WARM-SEASON INSECT CONTROL

by Pat Cobb, Auburn University

Insect Calendar

*MONTHS DURING WHICH DAMAGE IS MOST LIKELY TO OCCUR (————);
 MONTHS WHEN INSECTICIDE TREATMENTS MAY BE RECOMMENDED
 (———— = 1ST CHOICE, ———— = 2ND CHOICE)

Insect	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Chinch bugs												
Billbugs												
Grubs												
Sod webworms												
Cutworms												
Mole Crickets												
Spittle-Bugs												
Fall Armyworm												
Fire Ants (mound establishment)												

*Timing of treatments varies from one area to another, and is considerably different in south Florida. Check with Extension Agents in your area and monitor pest populations to determine exact timing of controls.

Use Summary of Some Common Turf Insecticides*

Common Name	Trade Name	Major Uses	Primary Use Site ***	Common Name	Trade Name	Major Uses	Primary Use Site ***
acephate	Orthene 75S	fire ants mole crickets	A, G, L, S	diazinon	Diazinon	billbugs chinch bugs fall armyworms fire ants grubs sod webworms spittlebugs	L
**bendiocarb	Turcam	grubs mole crickets	A, L	**ethoprop	Mocap 5G	grubs mole crickets	A, G, L, S
carbaryl	Sevin SL Sevinol	billbug (adults) cutworms fall armyworms green June beetle grubs grubs sod webworms	A, G, L, S	isofenphos	Oftanol	fire ants grubs mole crickets	A, G, L, S
chlorpyrifos	Dursban	billbug (adults) chinch bugs cutworms fall armyworms fire ants sod webworms spittlebugs	A, G, L, S	**isazofos	Triumph	chinch bugs mole crickets grubs	L (GAS in some states)
*Fire ant baits (Afirm, Amdro, Logic, Pro-Drone) are not included above, but may be used in non-crop areas. ***A - athletic turf L - lawns				trichlorfon	Dylox, Proxol	cutworms fall armyworms grubs sod webworms	A, G, L, S
**Restricted Use G - golf courses S - sod farms							

COOL-SEASON

by Harry Niemczyk, OARDC

Summary of Grub Control Tests in Ohio - 1971-1981¹

INSECTICIDE	LB AI/A	MEAN % CONTROL	(NO. OF TESTS) ²
ethoprop (Mocap)	5.0	83	(10)
isazofos (Triumph)	2.0	92	(20)
bendiocarb (Turcam)	2.0	83	(18)
isofenphos (Oftanol)	2.0	80	(37)
carbaryl (Sevin)	8.0	64	(14)
trichlorfon (Proxol)	8.0	81	(23)
diazinon	5.5	60	(16)
chlorpyrifos (Dursban)	4.0	43	(11)

1 Includes Japanese beetle, *Cyclocephala* spp., 2 Each test replicated 3 or 4x. Generally, treatments applied late summer or early spring. Irrigated (1/4-1/2 inch) after application, thatch - 1/2 inch, readings taken ca. 4-8 weeks after treatment.-H.D. Niemczyk & K.T. Power. Phyllophaga spp. only.

Insect Control

COOL SEASON*	LATE WINTER	SPRING (April-May)	SUMMER (June-Aug.)	FALL (Sept.-Oct.)
CHINCH BUGS	When summer damage is expected preventative application of liquid or granular Dursban (1 lb. A/acre) Triumph ¹ (1 lb. A/acre) or Othanol (2 lbs. A/acre) may be used as soon as the insects become active.	Preventative applications of insecticides should be completed by the first week in May.	Treat before injury is severe with Dursban (1 lb. A/acre), diazinon** (2.5-5.5 lbs. A/acre), or other labeled insecticides.	Treat if necessary, but generally infestation levels are not high enough to warrant using insecticides.
BILLBUGS	Same as for chinch bugs.	Same as for chinch bugs.	Treat infestations at same rates as grubs with Triumph ¹ diazinon**, Turcam, Proxol or Sevin. Irrigate following application.	Treatment is usually not appropriate at this time.
GRUBS	Application of Othanol (2 lbs. A/acre) during March may provide control of overwintered grubs. This may not provide control into late summer.	A single application of Othanol (2 lb. A/acre) made in April may control overwintered grubs. Can also be controlled in May by spot or general treatment with Triumph ¹ (2 lb. A/acre) Turcam (4 lb. A/acre) or Sevin (8 lb. A/acre). Golf course superintendents can use Mocap (5 lb. A/acre) or Sevin (6-8 lb. A/acre) to control green June beetle. Irrigate with application.	Existing infestations found in July or Aug. may be treated with Triumph ¹ , Proxol, Turcam, Othanol, Sevin or Mocap (commercial turf only) at rates used in spring. Treat green June beetle with Sevin (6-8 lb. A/acre).	Treatment can be made as late as Mid-September. Irrigate first if thatch or soil is dry.
SOD WEBWORMS	Treatment is not appropriate at this time.	When necessary, apply diazinon** (5 lb. A/acre) Triumph ¹ (1 lb. A/acre) Dylax or Proxol (6-8 lb. A/acre), Orthene (1-3 lb. A/acre).	Make application when larvae are present or two weeks after peak moth flight. Use Dursban (1 lb. A/acre), Triumph ¹ (1 lb. A/acre), diazinon** (5 lbs. A/acre), Sevin (6-8 lbs. A/acre) or Proxol (6-8 lbs. A/acre).	Larvae are small and cause little damage at this time. Treatment in September reduces population for next spring.
GREENBUGS	Treatment is not appropriate at this time.	Aphid numbers are too low to detect.	Use Orthene (1 lb. A/acre) or Dursban (1 lb. A/acre) or diazinon** (2.5 lbs. A/acre).	Severe infestations may occur as late as December. Use the same insecticides as in the summer.
BLACK TURFGRASS ATAENIUS	An application of Othanol (2 lb. A/acre) in March may prevent summer infestations of larvae, but it's best to wait until April.	Application of Othanol (2 lbs. A/acre) during April or May can prevent larval infestations during summer. Dursban (1-2 lbs. A/acre) applied to fairways in April also prevents infestations. Retreatment after 2 weeks may be necessary.	If preventative applications were not made, spot or generally treat with Triumph ¹ (2 lbs. A/acre), Proxol (8 lbs. A/acre), Turcam (2-4 lbs. A/acre), Sevin (8 lbs. A/acre) or Mocap (5 lbs. A/acre), as needed.	Undeveloped larvae die with frost.
CUTWORMS	Treatment is not appropriate at this time.	The insecticides effective against sod webworm are also effective against cutworms. Apply late in the afternoon. Do not irrigate following liquid applications unless specified on label.	Use Orthene (1-3 lb. A/acre), Dursban (1 lb. A/acre), Triumph ¹ (1 lb. A/acre), Proxol (8 lbs. A/acre) or Sevin (6-8 lbs. A/acre). Do not irrigate following liquid applications unless specified on label.	Same as for summer.
CLOVER MITES	Treatment is not appropriate at this time.	Liquid diazinon** (2.5 lbs. A/acre) or Dursban (1 lb. A/acre) may be used.	Treatment usually is not necessary.	Treat as needed with liquid diazinon** (2.5 lbs. A/acre) or Dursban (1 lb. A/acre).
WINTER GRAIN MITE	If needed, use spring treatment.	If treatment is necessary, use liquid diazinon** (2-3 lbs. A/acre) or Dursban (1 lb. A/acre). Avoid repeated use of Sevin.	Treatment is not appropriate, since mite is in egg stage.	Treatment is not appropriate since mite is in egg stage.

* For use only by commercial lawn pest control personnel except in states where Special Local Needs labeling permits use on golf course tees, greens and aprons, and on sod farms. A maximum of one application per year is permitted for the 2 lbs. A/acre rate. A maximum of two applications per year at least 60 days apart is permitted for the 1 lb. A/acre rate.

** See accompanying text for details; always follow label directions.

** Diazinon may not be used on golf courses or sod farms.

DISEASE CONTROL**WARM-SEASON**

by Don Blasingame, Mississippi St. Univ.

Fungicide Directory

Common Name	Some Trade Names**	Brown Patch	Dollar Spot	Gray Leaf Spot	Melting Out	Pythium Blight	Ruists	Spring Dead Spot
Anilazine	Dyrene, ProTurf fungicide III		•		•		•	
Benomyl	Benlate, Tersan 1991	•	•					•*
Chloroneb	Terraneb SP, ProTurf Fungicide II					•		
Chlorothalonil	Daconil 2787 ProTurf 101V	•	•	•	•		•	
Ethazole	Koban 30, Terrazole					•		
Fenarimol	Rubigan	•	•					•
Iprodione	Chipco 28019 ProTurf, Fungicide VI	•	•		•			
Mancozeb	Fore, Tersan LSR Many Others	•			•		•	
Metalaxyl	Subdue					•		
PCNB (quintozene)	Terraclor Turfcide	•	•		•		•	
Propamocarb	Banol					•		
Propiconazole	Banner	•	•				•	•*
Thiophanate-ethyl	Cleary 3336	•	•		•			
Thiophanate-methyl	Fungo 50, Proturf Systemic Fungicide	•	•					
Thiophanate-methyl + Mancozeb	Duosan	•	•		•		•	
Thiram	Thiram, Tersan 75	•	•					
Triadimefon	Bayleton, ProTurf Fungicide 7	•	•				•	
Vinclozolin	Vorlan		•		•			

* Label approved only in selected states. ** Combination of fungicide + fertilizer are not included. No endorsement of named products by author is intended, nor is criticism implied for products not mentioned.

COOL-SEASON

by Bill Shane, Ohio State Univ.

Cool-Season Turf Diseases,
Turf Disease and Controls

DISEASE	SEASON AND/OR SUSCEPTIBLE TURFGRASS ²	CULTURAL	FUNGICIDE/NEMATOCIDE ACTIVE INGREDIENT ⁴
Algae	All turfgrasses	Reduce shade. Avoid excessive fertilization. Improve soil drainage.	Mancozeb
Anthraxnose (<i>Colletotrichum graminicola</i>)	July-August; ANNUAL BLUEGRASS, BENTGRASS, Fine Fescue	Fertilize and water to maintain vigor. Syringing may help to prevent stress.	Benomyl ¹ , Triadimefon Thiophanate-Methyl ³ Propiconizol, Fenarimol, Chlorothalonil
Brown Patch	See Rhizoctonia blight		
Dollar Spot (<i>Lanzia</i> and <i>Moellerodiscus</i> spp., formerly <i>Sclerotinia homeocarpa</i>)	Late June-Oct. BENTGRASSES BLUEGRASSES Fescues Ryegrasses	Avoid nitrogen deficiency. Remove dew from greens by mowing, dragging with a hose or pole. Choose more resistant grass varieties.	Chlorothalonil, Cadmium ³ , Benomyl ¹ , Anilazine ³ , Fenarimol, Iprodione ³ , Propiconizol, Thiophanate-ethyl ³ , Thiophanate-methyl ³ , Thiram, Triadimefon, Vinclozolin ³
Fairy Rings (Basidiomycete soil fungi)	April-October All turfgrasses	Remove infested sod and soil, replace with clean soil and reseed or sod. Improve water penetration. Increase N fertilization.	Methyl bromide or Formaldehyde fumigation will eradicate fungus but will also kill turf
Fusarium Blight ⁵ (<i>Fusarium poae</i> , <i>F. vulvorum</i> , <i>F. crookwellense</i>)	July-August Bluegrasses Bentgrasses Fescues	Reduce heat stress during dry periods by light, frequent watering. Do not cut Kentucky bluegrass or fescues under 2 inches. Reduce excessive thatch (over 3/8 inch).	Triadimefon, Fenarimol Benomyl ¹ , Iprodione, Thiophanate-methyl ³ , Thiophanate-ethyl ³
Fusarium Patch (Pink Snow Mold) (<i>Fusarium nivale</i>)	Nov.-April Bluegrasses Bentgrasses Fescues Ryegrasses	Avoid late fall fertilizing. Rake leaves and cut short. Control drifting snow.	Triadimefon, Benomyl ¹ , Fenarimol, Iprodione ³ , Mancozeb, Mercury chlorides, Pentachloronitrobenzene, Thiram, Thiophanate-methyl ³ , Vinclozolin
Grey Snow Mold	see Typhula blight		
Leafspot/Blight/Melting out (<i>Drechslera</i> & <i>Bipolaris</i> spp.)	Leafspot: Spring & fall; Blight & Melting out: June-Aug. KENTUCKY BLUEGRASS BENTGRASSES FINE FESCUE, ryegrasses, tall fescue	Remove clippings. Raise cutting height. Avoid excessive nitrogen. Avoid light, frequent watering.	Cycloheximide, Iprodione, Chlorothalonil, Mameb, Nancozeb, Vinclozolin, Pentachloronitrobenzene
Nematodes	All turfgrasses		Fenamiphos, Ethoprop

1 Before using any pesticide, read and follow label instructions.

2 Grass types listed in capital letters have been observed to be especially susceptible to the pathogen.

3 Continued or sole use of these materials may favor build-up or resistant fungal population.

4 Products containing these active ingredients are listed in the following table. Read the product label to see if it is labeled for the disease of concern. Follow all label instructions.

5 Necrotic ring spot and summer patch are known to cause symptoms once attributed solely to *Fusarium* blight.

6 Pink patch disease was recently found to be a disease distinct from red thread. Thus, there are few fungicides specifically registered for control of this disease at this time.

7 Another fungus, *Rhizoctonia zeae*, is also capable of causing brown patch-like symptoms on bluegrass and bentgrass. Benzimidazole type (Tersan 1991, Benomyl, Fungo 50, Cleary 3336) are not effective against this pathogen.

continued . . .

Cool-Season Turf Diseases,
Turf Disease and Controls (cont.)

DISEASE	SEASON AND/OR SUSCEPTIBLE TURFGRASS ²	CULTURAL	FUNGICIDE/NEMATICIDE ACTIVE INGREDIENT ⁴
Necrotic Ring Spot⁵ (<i>Leptosphaeria korrae</i>)	Spring & fall KENTUCKY BLUEGRASS, annual bluegrass ryegrasses	Avoid low mowing heights (below 2 inches). Reduce excessive thatch (over 3/4 inch). Use Kentucky bluegrass and perennial ryegrass mixtures.	Fenarimol, Propiconazole
Pink Patch⁶ (<i>Limonomyces roseipellis</i>)	Spring & fall bentgrass, FINE FESCUE, PERENNIAL RYEGRASS	Follow balanced fertilization program.	Cadmium, Mancozeb
Pink Snow Mold	see Fusarium patch		
Powdery Mildew (<i>Erysiphe graminis</i>)	July-Oct. KENTUCKY BLUEGRASS, fine fescue	Reduce shade. Increase air circulation by removing surrounding vegetation.	Triadimefon, Fenarimol, Propiconazole
Pythium Blight (<i>Pythium aphanidermatum</i> , <i>P. graminicola</i>)	June-Sept. BENTGRASSES, ANNUAL BLUEGRASS, PERENNIAL RYEGRASS, Kentucky bluegrass	Improve soil drainage. Increase air circulation by removing surrounding vegetation. Avoid mowing wet grass. Avoid excess watering.	Chloroneb, Etridiazole, Propamocarb, Metalaxyl, Fosetyl-AI, Mancozeb
Red Leaf Spot (<i>Drechslera erythrospila</i>)	June-Sept. BENTGRASSES	Remove clippings. Fertilize to maintain vigor.	Iprodione, Anilazine
Red Thread (<i>Laetisaria luciformis</i>)	All seasons PERENNIAL RYEGRASS, FINE FESCUE, bentgrass, annual bluegrass, Kentucky bluegrass	Follow balanced fertilization program.	Vinclozolin, Cadmium, Chlorothalonil, Thiophanate-ethyl, Thiophanate-methyl, Mancozeb, Triadimefon, Propiconazole
Rhizoctonia Blight (Brown patch) (<i>Rhizoctonia solani</i> - <i>Thanatephorus cucumeris</i> ⁷)	July-August BENTGRASS, ANNUAL BLUEGRASS, TALL FESCUE, Kentucky bluegrass, fine fescue	Avoid excess nitrogen fertilization. Increase air circulation by removing surrounding vegetation. Avoid excessive watering.	Anilazine, Chlorothalonil, Mancozeb, Benomyl ⁸ , Maneb, Propiconazole, Pentachloronitrobenzene, Triadimefon, Thiophanate-methyl ⁹ , Thiophanate-ethyl ⁹ , Iprodione
Rust (Puccinia spp.)	August-Oct. PERENNIAL RYEGRASS, KENTUCKY BLUEGRASS	Avoid nitrogen deficiency. Use resistant varieties of Kentucky bluegrass and perennial ryegrass.	Mancozeb, Propiconazole, Cycloheximide, Chlorothalonil, Triadimefon, Fenarimol
Slime Molds (<i>Myxomycete</i> ⁹)	August-Sept. All Turfgrasses	Removing mechanically by mowing or raking.	Zineb, Mancozeb
Snow Mold	see Fusarium Patch and Typhula Blight		

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continued ...

Cool-Season Turf Diseases, Turf Disease and Controls (cont.)

DISEASE	SEASON AND/OR SUSCEPTIBLE TURFGRASS ²	CULTURAL	FUNGICIDE/NEMATOCIDE ACTIVE INGREDIENT ⁴
Strip Smut (<i>Ustilago striiformis</i>)	Spring & fall KENTUCKY BLUEGRASS, Bentgrasses	Avoid drought stress. Avoid excess nitrogen.	Propiconazole, Triadimefon, Benomyl, Thiophanate-ethyl Notes: Apply extra water for crown penetration. Apply in late fall or early spring
Summer Patch ⁵ (<i>Magnaporthe</i> spp., formerly <i>Phialophora graminicola</i>)	June-August ANNUAL BLUEGRASS, ⁶ KENTUCKY BLUEGRASS	Avoid low mowing height. Reduce excessive thatch. Light, frequent watering during dry periods to reduce heat stress. Use slow-release nitrogen to avoid nutrient depletion. Use Kentucky bluegrass and perennial ryegrass mix.	Fenarimol, Triadimefon. Materials must be applied preventatively.
Take-all Patch (<i>Ophiobolus patchi</i>) (<i>Gaeumannomyces graminis</i> var <i>avenae</i>)	Spring & fall BENTGRASS	Avoid topdressing soil with pH greater than 6.0 Avoid use of lime, especially small particle type, where take-all is a problem. Use ammonium chloride, or second best, ammonium sulfate fertilizers.	PMA (not labelled for this disease, but may be effective)
Typhula Blight (Grey Snow Mold) (<i>Typhula</i> spp.)	Nov.-April fine fescue, BENTGRASS, ANNUAL BLUEGRASS, Kentucky bluegrass, tall fescue, perennial ryegrass	Avoid heavy fall nitrogen promoting late lush growth. Rake leaves and cut short. Control drifting snow.	Triadimefon, Cadmium, Chloronob, Anilazine, Pentachloronitrobenzene, Mercury Chlorides, Thiram
Yellow Patch (<i>Rhizoctonia cerealis</i>)	Spring & fall Bentgrasses Bluegrasses	Reduce excessive thatch. Avoid excessive watering	None
Yellow Tuft (Downy mildew) (<i>Sclerophthora</i> spp.)	Spring & fall Bentgrass		Metalaxyl

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FERTILIZER

TURF FERTILIZATION

by William Daniel, Purdue University

Formulations of Turf Fertilizers

Nitrogen	No Phosphorous	High N, Low P Medium K	Similar P and K	Other
6-4-0	16-0-30	12-4- 8	12-12-12	8- 4- 4
21-0-0-24S	20-0-10	19-5- 9	14- 3- 3	8-22-16
30-0-0	20-0-16	20-3- 8	16- 8- 8	9- 6-18
31-0-0	28-0- 9	24-2- 9	20- 8- 8	10-15-30
32-0-0-30S	28-0-12	24-4-12	20-20-20	13-25-12
33-0-0	30-0-10	28-7-14	24- 3- 3	16-21- 3
38-0-0	33-0- 5	32-3-10		19-26- 3
41-0-0	33-0-10	34-3- 7		
45-0-0		34-5-10		
55-0-0				
66-0-0				

* More than 100 formulations available in Indiana-1986

Nitrogen Requirements

Species	Growing Months	Nitrogen per seasons lbs/1000 sq. ft.	Variation in Management
Cool season:			
sheeps & hard fescue	4-8	0-3	low maintenance, roughs
red fescues	4-8	1-3	low maintenance to good care
bentgrasses	4-8	1-4	medium care, lawn, fairways
bentgrass, greens	5-12	2-10	clippings removed, forced growth
Kentucky bluegrasses	5-12	2-4	clippings remain, coastal area
Warm season:			
bermudagrass, greens	8-12	8-20	may rest over winter
bermudagrass, overseeded	10-12	12-20	nurtured all season
bermudagrass, fairways & tees	5-12	4-9	good management
common bermuda	7-12	2-8	most variable
zoysia	6-10	1-6	adequate cover
St. Augustine, bahia	10-12	2-8	warm area, lawns