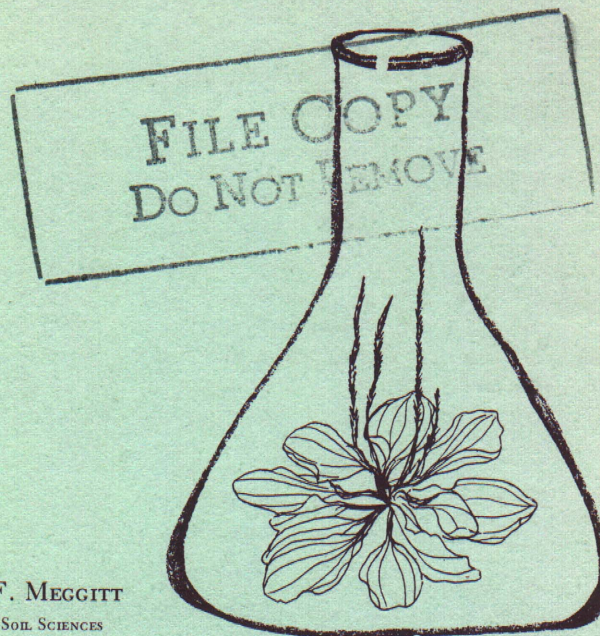


LAWN WEED CONTROL

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Turfgrass management has developed into a highly sophisticated technology with improved management techniques and new, more effective materials. Among these materials are the modern herbicides that control most turf weeds. A wide variety of these chemical weed killers are available to homeowners and professional turf managers alike.

HERBICIDES

Herbicides may be classified into one of three types depending upon their effect on plants: contact, systemic and soil sterilants.

Contact herbicides kill plant parts covered by the chemical. Paraquat is a contact herbicide that causes a chemical burning of all plant tissue. These materials are useful in renovating lawns infested with a high proportion of crabgrass and other annual weeds. The areas may be reseeded soon after chemical application.

Systemic herbicides are absorbed by plant roots or above-ground parts and are translocated throughout the plant. They are either selective (kill weeds without harming desirable grasses) or non-selective (kill all plants). Silvex and 2,4-D are selective systemic herbicides useful in controlling many broadleaved weeds that invade turf.

Soil sterilants are chemicals that render the soil toxic to all plant life. The period of soil toxicity varies depending upon the material used. Amitrol persists in the soil for four to five weeks after application, while dalapon may last for up to two months. Other soil sterilants may prevent plant growth for several years. Dalapon and amitrole are useful in eradicating quackgrass, tall fescue and other weeds that cannot be controlled selectively.

TREATMENTS

Herbicides may be applied to prevent weeds from infesting a lawn, or to kill weeds already present. DCPA is a **pre-emergence** herbicide that is applied in spring to prevent

germination of crabgrass. Once the weed has germinated, however, DSMA may be used, as a **post-emergence** treatment, to selectively kill the crabgrass invader.

FORMULATIONS

Some herbicides are applied at rates as low as $\frac{1}{4}$ pound (or less) of active ingredient per acre. Uniform application of the chemical is essential in order to kill a small weed seedling. Therefore, the chemical must be "formulated" so that small quantities can be applied evenly. Herbicide formulations for use on turf, include: solutions, emulsions, wettable powders and granules. The granular formulations may be applied using a conventional fertilizer spreader, while the liquid forms must be applied with a spray applicator. Great care should be exercised in calibrating the spreader or sprayer to ensure the proper rate of herbicide application.

CALIBRATIONS of Compressed Air Sprayers

1. Measure 1,000 square feet of turf (a block 20 x 50 feet or equivalent), using twine to outline the block. (Most dosage recommendations are made for 1,000 square feet of area.)
2. Pour into the sprayer a measured amount of water (for example, 3 gallons).
3. Pump the sprayer up to a reasonable pressure. (On a 2- or 3-gallon sprayer, 40 to 50 full strokes of the pump are suggested.)
4. Open the cut-off valve and walk at a reasonable pace over the measured area until all the surface is covered.
5. Release the air pressure and measure the amount of water left in the tank.
6. Subtract the amount left in the tank (step 5) from the amount placed in the sprayer to find the amount used in spraying 1,000 square feet.

Example:

Three gallons put in sprayer—2 gallons left = 1 gallon used to cover 1,000 square feet.

The amount found in step 6 is the base for figuring how much chemical to use in each gallon of water when you actually spray. The actual amount of water used is not important, but whatever the amount, it must be a known quantity. Thus, if the suggested rate of chemical is 2 ounces per 1,000 square feet and your sprayer applies 1 gallon per 1,000 square feet, you mix 2 ounces for each gallon of water the sprayer will hold. For instance, a 3-gallon sprayer will take 6 ounces of chemical. (Ounces per 1,000 square feet can be converted to pounds per acre by the factor 2.72; $2 \text{ oz}/1,000 \text{ sq. ft.} \times 2.72 = 5.44 \text{ lb./acre.}$)

CALIBRATION of Dry Spreaders

1. Measure 1,000 square feet of turf (20 x 50 feet).
2. Choose a setting on the feed-regulating device (based on manufacturer's recommendations, if available.)
3. Weigh out about 5 to 10 pounds of the dry chemical and place it in the hopper.
4. Open the feed and walk over the area until it has been fully covered.
5. Weigh the material left in the spreader.
6. Subtract the remainder from the original amount placed in the hopper to find how much you applied to the 1,000 square feet of turf.
7. Since most dry herbicides are sold in a ready-to-apply form, you may have to change the feed setting and repeat the process on a different area until you find a setting which is correct for the amount suggested on the product label.

These calibrations apply as much to the person using the equipment as to the sprayer or spreader. For that reason, keep your walking speed and the pressure in the tank as constant as possible.

ACTIVE INGREDIENT

The active ingredient (a.i.) is the part of a chemical formulation that produces herbicidal effects. For example, a 50% granular formulation (50G) contains 50% active ingredients of the herbicide. If a 100-lb. bag of granular herbicide contains 50% active ingredients, 2 pounds of material are required to yield 1 pound of active ingredient. Treatment of one acre with a 50% granular herbicide, at the rate of 12 lbs./acre, requires 24 pounds of granular material per acre, or approximately $\frac{1}{2}$ pound of granular material per 1,000 square feet (1 acre = 43,560 sq. ft.)

Liquid formulations generally give active ingredients as pounds per gallon (lbs. a.i./gal.) rather than as a percent of the formulation. For example, 2,4-D is generally formulated as 4 lbs. a.i./gal.; therefore, an application of 1 lb./acre of this formulation requires 1 quart of liquid for each acre covered.

All herbicide recommendations are based on active ingredients, not the actual weight of the formulated material.

PRECAUTIONS

Most lawn herbicides are intended for use on turf areas only. The indiscriminate use of 2,4-D in the vicinity of flower beds, ornamental shrubs and home gardens may cause considerable damage. It is for this reason that only the amine and other suitable low-volatile formulations of 2,4-D and related herbicides be used on home lawns. Furthermore, these compounds should be sprayed at low pressure and during periods of little or no wind velocity. Dicamba should not be used under desirable trees and shrubs, as root absorption by these plants may result in injury.

Some herbicides should be applied only by competent professionals. For example, inhalation of methyl bromide, a soil fumigant, can be fatal unless proper precautions are taken. The best way to avoid problems with herbicides is to read the label on the container and follow the directions carefully. Chemicals should be stored in their original containers and out of reach of children and pets.

CHEMICAL CONTROL OF LAWN WEEDS*

Most broadleaf weeds can be effectively controlled by fall application of 2,4-D (1 lb./acre) mixed with silvex at $\frac{3}{4}$ lb./acre. For specific weed problems, use the control measures indicated below. All liquid formulations are 4 lbs. a.i. (active ingredient) per gallon unless otherwise indicated.

Weeds	Herbicide	How Used	Large Area Rate Lbs./Acre	Small Area Rate. Tsp. 1,000 sq. ft.	Remarks
BROADLEAVED WEEDS					
Black medic	silvex	Post-emergence	$\frac{3}{4}$	3	Apply in fall or in spring before mid-May.
Burdock (a biennial)	2,4-D	Post-emergence	1	4	Spray in fall or early spring.

*The chemicals are sold in various concentrations. Read the label, follow directions given and *keep out of the reach of children.*

Weeds	Herbicide	How Used	Large Area Rate Lbs./Acre	Small Area Rate. Tsp. 1,000 sq. ft.	Remarks
Common Chickweed	MCP	Post-emergence	1	4	May be used in summer and on bent-grasses.
	silvex	Post-emergence	3/4	3	Apply in fall, or in spring before mid-May. Turf injury may result at temperatures above 70°F.
Dandelion	2,4-D	Post-emergence	1	4	Fall treatment best. Spring treatment should be done before flowering.
Dog fennel	dicamba	Post-emergence	1/4	1	Do not use within root zone of trees and shrubs.
Ground ivy	MCP	Post-emergence	1	4	May be used in summer and on bent-grasses.
	silvex	Post-emergence	3/4	3	Repeat applications at 2-week intervals. Apply in fall or in spring before mid-May. Turf injury may result at temperatures above 70°F.
Henbit	silvex	Post-emergence	3/4	3	Repeat application in 2 weeks. Apply in fall or spring before mid-May.
Hoary alyssum	2,4-D	Post-emergence	2	8	Spray in fall when in rosette stage.
Knotweed	dicamba	Post-emergence	3/8	1 1/2	Do not use within root zone of trees and shrubs.
	MCP	Post-emergence	1	4	May be used in summer and on bent-grasses.
Mossy stonecrop	2,4-D (Ester)	Post-emergence	2	8	Use spring or fall treatment. May require a second application the following season.
Mouse-eared chickweed	MCP	Post-emergence	1	4	May be used in summer and on bent-grasses.
	silvex	Post-emergence	3/4	3	Apply in fall or spring before mid-May. Turf injury may result at temperatures above 70°F.
Oxeye daisy	silvex	Post-emergence	3/4	3	Apply in fall or early spring. Repeated applications may be necessary.
Plantains: Broadleaved Buckhorn	2,4-D	Post-emergence	1	4	Apply in fall or in spring before formation of flower spikes.
Prostrate spurge	dicamba	Post-emergence	3/8	1 1/2	Do not use within root zone of trees and shrubs.
	silvex	Post-emergence	3/4	3	Repeated applications may be necessary for complete eradication.
Purslane	MCP	Post-emergence	1	4	May be used in summer and on bent-grasses.
	silvex	Post-emergence	3/4	3	Apply in fall or early spring.
Red sorrel	dicamba	Post-emergence	3/8	1 1/2	Do not use within root zone of trees and shrubs.
Roundleaved mallow	silvex	Post-emergence	3		Do not use on newly seeded lawns.
Sandbur	AMA	Post-emergence	3		Repeat once or twice at 7-day interval. May cause some discoloration of turf. Apply when 2 inches tall.
Shepherd's Purse	2,4-D	Post-emergence	1	4	Apply in mid-fall.
Speedwell	endothall (1.46 lb./gal.)	Post-emergence	1 1/2	11	Apply in early spring or fall. May require a second application.
Thistles	2,4-D	Post-emergence	1	4	Spray in fall. Canada thistle will require several applications.
White clover	MCP	Post-emergence	1	4	May be used in summer and on bent-grasses.
	silvex	Post-emergence	3/4	3	Repeat applications at 2-week intervals; apply in fall or in spring before mid-May; turf injury may result at temperatures above 70°F.

Weeds	Herbicide	How Used	Large Area Rate Lbs./Acre	Small Area Rate. Tsp. 1,000 sq. ft.	Remarks
Wild carrot	2,4-D	Post-emergence	1	4	Apply in fall or spring before mid-May.
Yellow rocket	2,4-D	Post-emergence	1	4	Spray in fall, use spring treatment for fall seeded turf.
Yellow woodsorrel	silvex	Post-emergence	3/4	3	Apply in fall or spring before mid-May.

ANNUAL GRASSES

Annual bluegrass	arsenate, lead and calcium	Pre-emergence	260	6 lbs.	Apply in early fall and again in early spring. After the second year, apply only in late summer and at one-half recommended rate to maintain arsenic toxicity in soil. High soil phosphorus levels can reduce herbicidal effectiveness.
	bensulide	Pre-emergence	12		Two applications per year, as with arsenate.
Crabgrass	arsenates, lead and calcium	Pre-emergence	260	6 lbs.	Control is often achieved when an arsenate program is used against annual bluegrasses.
	azak	Pre-emergence	15		Variable results.
	benefin	Pre-emergence	2		Not recommended for use on bentgrass turf.
	bensulide	Pre-emergence	12		Safe on mature sod of all turfgrass species.
	D CPA	Pre-emergence	10		Safe for use on established bluegrass; may injure bentgrasses and fine fescues.
	siduron	Pre-emergence	10		Can be used simultaneously with seeding of lawn grasses.
	DSMA	Post-emergence	6		Apply when crabgrass is 2 to 3 inches tall. Repeat twice at 7-day intervals; may cause some discoloration of the turf.

Foxtail, barnyard grass and other annual grasses—see crabgrass

Silver crabgrass (Goose grass)—see crabgrass

Germinates 2-4 weeks after crabgrass. Very difficult to control when mature.

PERENNIAL GRASSES

Bentgrasses	amitrol-T	Post-emergence	4	12/gal. water	Spot treat when actively growing, wait 4-5 weeks, then reseed.
	dalapon	Post-emergence	10	30/gal. water	Spot treat when actively growing, wait 8 weeks, then reseed.

NOTE: Dig out by hand and ensure removal of all underground plant parts.

Nimblewill—NOTE: No satisfactory selective chemical control (see bentgrasses).

Nutsedge	DSMA	Post-emergence	6		Requires 2 or more applications at weekly intervals. Must treat within 2 months after emergence before nutlets form.
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Quackgrass and tall fescue—see bentgrasses

MISCELLANEOUS

Seedling broad-leaved weeds	bromoxynil	Post-emergence	3/8	1 1/2	May be used safely in seedling turf.
Wild onion Wild garlic	2,4-D	Post-emergence	2	8	Will require several years to eradicate. Use spot treatment of isolated clumps.
	or dicamba	Post-emergence	3/8	1 1/2	Do not use within root zone of trees and shrubs.
Yarrow	dicamba	Post-emergence	3/4	3	Apply in fall. Repeated applications may be necessary.
Vegetative dessicants	paraquat	Post-emergence	1/2		Use for chemical burn-off of annual grasses and broadleaved weeds.

IDENTIFICATION

Comparison of a weed plant with a picture is the easiest way to identify it. Several common weeds are shown on these pages with their distinguishing characteristics detailed below. Consult your county agricultural agent for aid in identifying weeds not shown.

For purposes of control, most weeds are grouped as shown in the drawings—broadleaved weeds, annual grasses and perennial grasses.

BUCKHORN—a cool season perennial with lance-like leaves one inch across and seed heads one to two inches long.

CHICKWEED, COMMON—a winter annual with small, delicate, oval-shaped leaves. Flowers are white and star-like.

CHICKWEED, MOUSE-EARED—a perennial with creeping stems and dark, hairy leaves. Also has white flowers.

CRABGRASS—a common warm season annual grass with prostrate growing stems. Seedhead is divided into several finger-like projections. Germinates in early May with the approach of warm weather.

DANDELION—a cool season perennial with yellow flowers from March to late November.

FOXTAIL—a warm season annual that often grows in association with crabgrass. Yellow foxtail has flattened stems, while the stems of Green foxtail are round.

GOOSEGRASS (SILVER CRABGRASS)—a warm season annual that germinates 2-4 weeks after crabgrass. Has flattened stems that are whitish near the base. Seedheads are zipper-like and thicker than crabgrass. The extensive fibrous root system makes pulling difficult.

GROUND IVY (CREEPING CHARLIE)—a cool season perennial that produces many lavender to bluish funnel-form flowers in early spring.

KNOTWEED, PROSTRATE—an annual that thrives from early spring to late fall. Grows flat from a long white tap root, with individual plants having a spread of up to two feet or more.

PLANTAIN—a cool season perennial with oval leaves 1-3 inches across and rat-tail like seed heads several inches long.

QUACKGRASS—a cool season perennial that spreads extensively by underground stems. A serious pest in lawns, since it cannot be selectively controlled with herbicides.

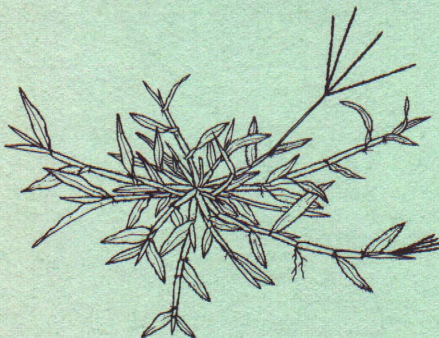
SPEEDWELL, COMMON—a low-growing winter annual with numerous small leaves having scalloped edges. Flowers are light blue with a white throat. Seed pods are divided and almost heart-shaped.

TALL FESCUE—a cool season perennial bunch grass with relatively wide coarse leaves. Does not blend well with desirable turf-grasses. As with quackgrass, this is a serious lawn problem.

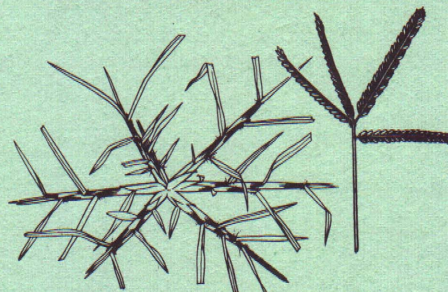
WHITE CLOVER—a perennial that infests lawns by its creeping growth habit.

YELLOW NUTSEDGE (NUTGRASS)—a warm season perennial sedge with triangular stems. Roots often terminate in small "nutlets" that produce new plants. A difficult-to-control weed in lawns.

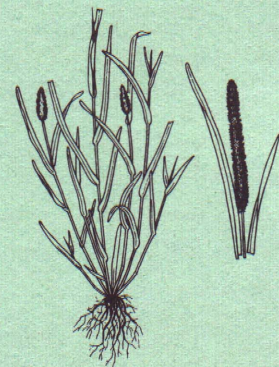
ANNUAL GRASSES



CRABGRASS

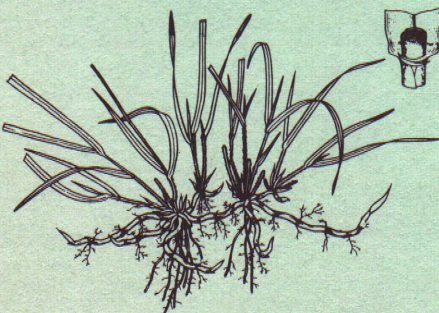


GOOSEGRASS

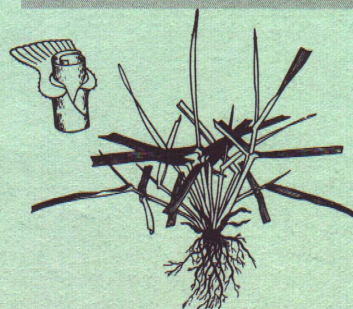


FOXTAIL

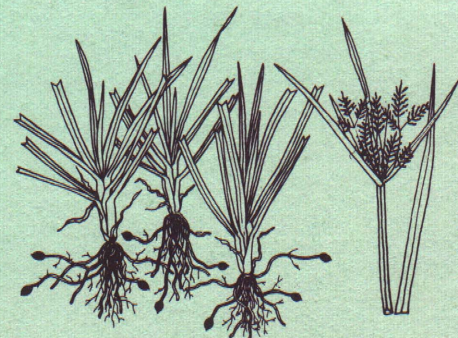
PERENNIAL GRASSES



QUACKGRASS

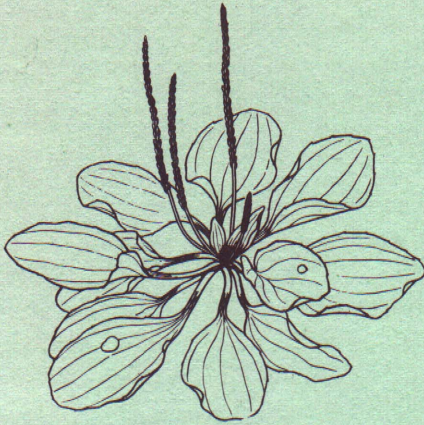


TALL FESCUE

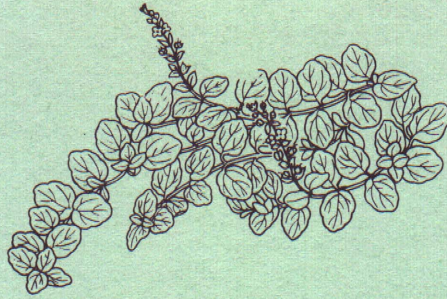


YELLOW NUTSEDGE

BROADLEAVED WEEDS



PLANTAIN



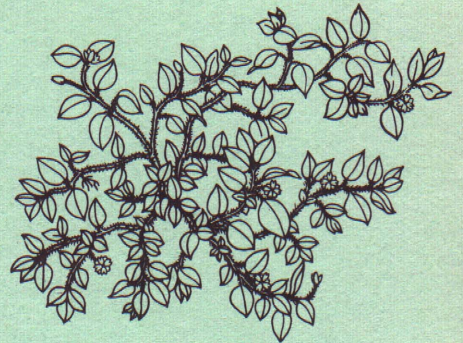
SPEEDWELL



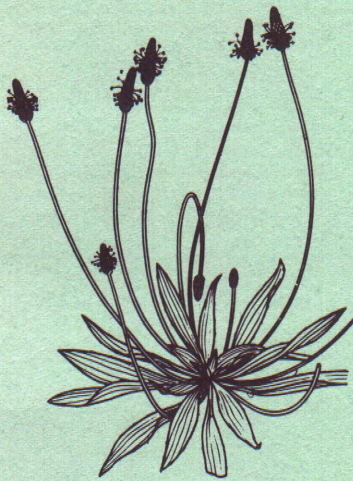
KNOTWEED (prostrate)



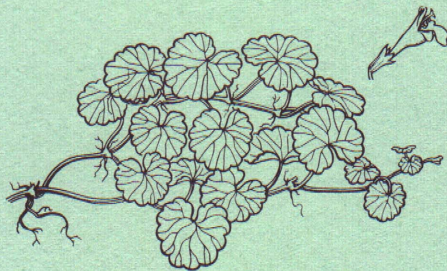
WHITE CLOVER



CHICKWEED (common)



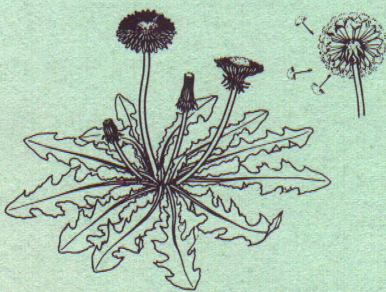
BUCKHORN



GROUND IVY



CHICKWEED (mouse-eared)



DANDELION