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Weed Control Strategies for Centipedegrass and St. Augustinegrass Sod Production

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INTRODUCTION

Weed control in sod production is the major pest challenge for most commercial growers. Sod harvesting practices leave all or part of the soil open (or bare) for a portion of the growing season. Open fields provide little competition against weed encroachment and also allow sunlight to reach the soil surface where weed seeds lay, encouraging them to germinate. Light also allows bare soil to warm-up earlier in spring, therefore, weed seeds germinate sooner. Sod fields also are usually maintained under accelerated growth conditions meaning high moisture and fertility programs are implemented which also encourage weed establishment and growth. The harvesting process also physically scarifies (or abrades) weed seed coats, allowing germination that normally would not occur with undisturbed soils. Fields located in the coastal plains and Florida also fight the insect mole crickets which physically dig through fields, disrupting rooting and causing soil dessication. These weaken the sod and can actually cause sod mortality. Finally, many traditional preemergence herbicides are not used due to rooting concerns and postemergence options are limited, especially in St. Augustinegrass. These reasons demonstrate why weeds are a continued problem in sod production.

PROPER MANAGEMENT FIRST

An integrated approach to weed control is never truer than in sod production. If growers rely strictly on herbicides, production costs easily surpass profits. Proper mowing, drainage, fertility, watering, and control of other pests are critical to encourage sod growth at the expense of weeds. For detailed information on sod management practices, producers are encouraged to obtain the recent joint publication from Clemson, Auburn and the University of Georgia entitled, *Sod Production in the Southern United States* available for $9.50 each. Call the Clemson University Extension Bulletin room at 864-656-3261 for ordering information. Ask for publication EC 702. The turfgrass weed identification guide, *Weeds of Southern Turfgrasses*, is also available from Clemson at the same phone number for $10 per copy.

PREPLANT WEED CONTROL

A critical decision every serious sod producer will face is preplant weed control, in particularly for common or coastal bermudagrass control. Growers are highly discouraged using prior coastal or common bermudagrass pastures and hay fields as sod production fields. Trying to economically control bermudagrass prior to or after other sod grasses are established becomes a never-ending challenge. This is especially true

if the intended sod production grasses are either St. Augustinegrass or one of the high quality hybrid bermudagrasses such as Tifway (or 419) or TifEagle.

Fumigation/Non-selective Herbicide Options

If growers do attempt to convert prior coastal or common bermudagrass fields to St. Augustinegrass or one of the hybrid bermudagrass, two options are available to control the previous bermudagrass present. The best (but most costly) is preplant fumigation. Several materials are available for this (**Table 1**). Currently, the most effective is using methyl bromide followed by tarping. However, this is the most expensive (about $1200 per acre) and methyl bromide is slated to be canceled by the USEPA in January, 2005. Many growers, therefore, are using metham (also called metam sodium) which does not require tarping (although it is best to do so) but does require specific soil preparation (**Table 1**). Many larger growers customize their own application rigs and have worked out costs using metham for about one-third as methyl bromide. A follow-up application of glyphosate may be necessary to control any escaped bermudagrass and hard-seeded legumes and purple nutsedge which metham does not always completely control.

The other control option of the bermudagrass and other difficult to control weeds such as purple nutsedge is three properly timed applications of glyphosate (Roundup Pro). Applications should be spaced 3 or 4 weeks apart when the bermudagrass is actively growing (**Table 1**). One application will control about 90% of the bermudagrass, two will control about 95% while three are required to control 98 to 100%. Remember, however, common bermudagrass produces viable seed and this repeat application of glyphosate will not control non-germinated seed or seed introduced after application. Adjacent fields, fence lines, irrigation ponds, etc., often contain viable common bermudagrass seed and these are easily transferred to production fields. Again, it is worth repeating, if St. Augustinegrass or hybrid bermudagrass is the grass to be grown, do everything possible to control any common or coastal bermudagrass prior to planting.

Centipedegrass

Centipedegrass, by nature, is a slow-growing, low maintenance grass. Growers should not push nitrogen fertilizer on centipedegrass like St. Augustinegrass or bermudagrass. This will eventually stimulate centipedegrass decline, a phenomenon characterized by early spring green-up followed by yellowing and eventual die-back The best herbicide following atrazine use at the time of seeding for the first 4 to 6 months of centipedegrass grow-in is proper mowing. Proper mowing eventually eliminates many of the broadleaf weeds without the need of additional herbicides. **Table 2** lists a suggested weed control schedule for centipedegrass sod production.

St. Augustinegrass

St. Augustinegrass has the greatest weed control challenge of any sod grown grass. Serious growers must have a well planned and a timed herbicide and cultural management program to stay ahead of them. Preplant fumigation is highly recommended for all St. Augustinegrass fields due to the persistent problems with common bermudagrass and purple nutsedge. If not, 3 applications of glyphosate will be needed to control these (**Table 1**). Prior to planting, a combination of metolachor (Pennant) plus atrazine is also recommended to suppress crabgrass and other grasses as well as many broadleaf weeds and nutsedges (**Table 3**). Once the grass begins to grow-in, use atrazine or Prompt (a tank mix of atrazine and Basagran) for broadleaf weed control. Discontinue in hot weather due to encouragement of gray leaf spot and chinch bugs. Also, curtail nitrogen applications during hot weather for similar reasons.

Postemergence grass weed control is very limited in St. Augustinegrass, thus, the strong recommendation of using preplant fumigation and the metolachor plus atrazine tank mix at planting. Asulox has traditionally been the only selective postemergence herbicide used for selective grassy weed control in St.

Augustinegrass (**Table 3**). Its future availability, however, is uncertain as the manufacturer is considering dropping the commercial turf label. MSMA at 1 lb ai/a is available for St. Augustinegrass sod production, but this will result in temporary phytotoxicity, thus, should not be performed within 6 weeks of harvest.

In recent years, a number of *Paspalum* and *Brachiaria* (signalgrass) species have become problematic in St. Augustinegrass sod production. Asulox has limited success in controlling these. Growers may consider using a preemergence herbicide after the sod is harvested and ribbons prepped. Oxadiazon (Ronstar) is the best preemergence herbicide candidate due to its minimum effects on turf rooting and regrowth but expense usually prohibits its use. Traditional dinitroaniline (DNA) herbicides such as Surflan, pendimethalin, Barricade, or Dimension are more economical candidates. These materials will initially slow regrowth due to reduced rooting (or pegging) by recovering stolons. However, as sod maturity commences, the stolons eventually root and the production cycle is not adversely extended. Growers should experiment on an acre or so of sod with this procedure before going wall-to-wall across all production fields.

Postemergence control of common bermudagrass is by two options. The traditional one is spot spraying with glyphosate (Roundup Pro) tank mixed with a spray indicator (or dye). Most growers customize a 4-wheel ATV with a sprayer and ride the fields spot spraying. This is very labor intensive and it is difficult to catch all of the bermudagrass patches. The other appropriately timed option is 2 or 3 applications of Prograss (ethofumesate) tank mixed with atrazine. Two gallons of Prograss 1.5L is applied with 2 qts of atrazine 4L. Timing is very critical. Applications should begin in spring approximately 2 to 3 weeks after regrowth of the bermudagrass. Bermudagrass often loses much of its root system in early spring, thus, the 2 to 3 week delay to allow some root regrowth. In most areas of the mid to upper South, the first application is usually timed in mid-March with at least one additional application 30 days later. Applications in south Florida should begin in late February and in central Florida, early March with repeat applications in 30 days. Temporary stunting of treated St. Augustinegrass normally occurs following treatment. Significant turf damage will occur if spray overlap occurs. Growers are highly encouraged to use a foam marking system or spray indicator to minimize overlap potential.

An excellent combination of herbicides for postemergence broadleaf weed control with minimum turf damage include atrazine 4L at 1 qt. product per acre + 0.5 oz product per acre of Manor 60DF + 0.2 lbs ai/a dicamba. Applications should be made when air temperatures are $\leq$80F and good soil moisture is present.

Prompt 5L also provides good postemergence broadleaf and sedge control. Prompt is a pre-packaged tank mix of atrazine plus Basagran. Lontrel (clopyralid) is a recent herbicide introduction that provides good control of leguminous weeds such as clovers, kudzu, lespedeza, beggarweed, matchweed, vetch, and medic.

Nutsedges

Nutsedges are common weeds in sod fields due to the open (bare) ground associated with production and continued moisture needed for sod regrowth. As with other weeds, nutsedges (especially purple nutsedge) quickly established themselves early in the sod production cycle. Appropriate mowing practices and waiting until the ribbons have met (covered the bare soil) before herbicide treatment often is the most economical approach of managing purple nutsedge as many sedges are not able to compete long-term with an aggressively growing turf. Due to the extensive network of underground tubers (or nutlets), repeat applications for several seasons may be necessary for long-term control of most sedges. **Table 4** and **5** list current herbicide options for nutsedge control.

Table 1. Pre-plant Nonselective Weed Control (***Refer to Herbicide Label for Specific Use Listing***)

COMMON NAME	TRADE NAME	WEEDS CONTROLLED	COMMENTS
Methyl bromide	Dowfume MC-2 Brom-o-gas Profume Terr-o-gas (1 to 2 lb/100 ft^2)	Non-selective, including bermudagrass, nutsedge, and soil pathogens & nematodes	Methyl bromide is formulated as liquid gas under pressure that forms a vapor when released. One to 1½ lb material is used per 100 sq.ft. treated soils. Use the higher rate when soils are heavy in texture, wet, or soil temperatures are below 60 F. Fumigation will not be effective if soil temperature is below 50 F. Soil should be moist but not saturated when treated. Before use, the soil should be in a condition suitable for planting including seedbed preparation by plowing soil 8 to 10 inches in depth, free of clods and undecomposed organic matter, then releasing the chemical under a gasproof (plastic) cover with the edges sealed and leaving it for 24 to 48 hours. Control will be only as deep as the soil is adequately tilled. Most other soil pests are also controlled. Grass can be planted 2 to 3 days after cover removal but do not disturb soil below 2 inches when planting. Methyl bromide is a toxic material used by professional applicators only. Some methyl bromide formulations are Restricted Use Pesticides. Chloropicrin is added as a warning agent and will irritate eyes and lungs. Weed seeds with hard, water-impermeable seed coats such as mallow, sicklepod, Carolina geranium, dichondra, bindweed, prickly sida, white clover, redstem filaree, and morningglory are not controlled by fumigants. If soil is too wet or dry, nutsedge control may be erratic.
Metam-sodium (metham) Dazomet	Vapam 33% (50 to 100 gal/A) Vapam HL 42% (30 to 75 gal/A) Basamid 99 Granular (255 to 450 lb/A)	Non-selective	A plastic or polyethylene cover is not required but increased control usually results with one. When a cover is not used, a water soil-seal method should be followed. Cultivate the soil to the desired depth of fumigant penetration being careful to eliminate all soil clogs. Soil temperatures should be above 50F before use. Moisten the soil and use 1 to 2 pints of metham product per 100 sq.ft. in 2 to 5 gallons of water or 8 to 10 oz of Dazomet per 100 sq.ft. of prepared soil surface. The soil should then immediately be incorporated with a rotary tiller 4 to 8 inches deep and sealed with water at 15 gals. per 100 sq.ft. Light rolling will improve soil/water seal. If a cover is available, treat the soil in front of a rotary tiller. Cover the soil for 2 days. Planting may take place 2 to 3 weeks after treatment. Aeration may be required by rototilling before planting. Read and follow all label directions. Metham is a restricted-use-pesticide while Dazomet is not. Control of legumes, sedges from seed, and morninglories with dazomet may be erratic. Spot treat with glyphosate following fumigation to control any escaped bermudagrass.
glyphosate (4 lbs ai/A)	Roundup 4S/Pro (1 gal/A)	Torpedograss, bermudagrass, other perennial weeds. Non-selective.	Glyphosate is applied only to unwanted vegetation and will not control non-germinated seeds, diseases, nematodes, or other pests. Use 4 to 5 quarts per acre glyphosate (4 lb/gal) for broadcast bermudagrass control. Apply to actively growing green vegetation that is at least 4 to 5 inches tall. Wait 2 to 3 weeks after application for regrowth and re-apply. A minimum of 3 applications will be required to control bermudagrass or torpedograss. Do not apply to desirable plants.

Table 2. Weed control schedule for centipedegrass sod production (*Refer to Herbicide Label for Specific Turf Species and Use Listing*).

COMMON NAME (lbs ai/acre)	TRADE NAME (product rate/acre)	WEEDS CONTROLLED	COMMENTS
Preplant Bermudagrass and Nutsedge Control			
Fumigation Multiple (3) applications of nonselective herbicide	Refer to Table 1	Most weeds except hard seeded legumes.	Refer to Table 1
At Seeding			
atrazine/simazine (1 lb)	Several Brands	Many broadleaf weeds including matchweed, oxalis, pennywort, Florida betony and some annual sedges.	Apply 1 qt/acre of a 4L formulation at or immediately following seeding. This will control most broadleaf weeds for 4 to 6 weeks with minimum delay of centipedegrass germination and establishment. Follow this with proper mowing for 3 to 4 months before using additional postemergence herbicides for broadleaf weeds.
Following Sod Harvesting and Ribbon Preparation			
metolachlor + atrazine (1.8 to 3.9 lbs + 1 lb)	Pennant 7.8L + atrazine 4L (2 to 4 pts + 1 qt)	Yellow nutsedge, annual sedge, sprangletop, some annual grass (e.g., crabgrass) suppression	The higher rate of metolachlor will be necessary for turf grown on high organic (i.e., muck) soils. For commercial St. Augustinegrass sod production, do not use more than once every 6 weeks and do not apply more than 8 pts./A/yr. Tank mixing with atrazine will increase the weed control spectrum. Irrigate within 7 days after application.
Postemergence Broadleaf Weed Control			
atrazine/simazine (1 to 2 lbs) atrazine + bentazon (c-¾ lbs)	Several Brands. Read the label for rates Prompt 5L (1.8 to 2.4 pts)	Many broadleaf weeds including matchweed, oxalis, pennywort, Florida betony and some annual sedges.	For hard to control weeds, follow the first application with another 4 to 6 weeks later. If weeds persist, follow atrazine applications with dicamba in 4 to 6 weeks. Some turf injury can be expected with this. Two applications of atrazine are allowed per year. Effectiveness will be reduced as weeds mature. Prompt 5L provides additional activity on hard-to-control weeds.

dicamba + 2,4-D, 2,4-DP, MCPA, and/or MCPP (c + ¼-½ lbs)	Several brands contain these mixtures	Many broadleaf weeds including matchweed, dandelion, pennywort, (dollarweed), wild garlic/onion, clover, plantains, buttonweed, spurges, woodsorrel, dichondra, wild onions, henbit, knotweed, lespedeza, docks + others	Refer to specific product label for exact application rates. A second application on centipedegrass 7-14 days later may be needed. A tank mix of atrazine at 1 lb ai/A + dicamba at 0.2 lb ai/A + Manor at 0.5 oz/a provides good control with minimum turf damage when temperatures are ≤80 F.
clopyralid (0.09 to 0.5 lbs)	Lontrel T&O 3L (¼ to 1 a pts)	Broadleaf weeds, especially legumes such as clovers, vetch, and medic. Also for dock, speedwell, ragweed, and plantain.	Safe on all warm- and cool-season turfgrasses. Legumes are especially susceptible.
metsulfuron (0.01-0.02 lb)	Manor 60DF (¼ to 1 **oz**)	Bahiagrass, foxtails, broadleaf weeds including chickweed, clover, dandelion, plantain, purslane, spurge, woodsorrel, wild onion/garlic	Note the low use rate. As weeds mature, the rate must be increased. A nonionic surfactant at 0.25 % by volume (1qt/100 gal) increases control. Manor is for fine turf including bermudagrass, St. Augustinegrass, zoysiagrass, centipedegrass, Ky. bluegrass and fine fescue. Some bahiagrass varieties ('Common,' 'Argentine,' & 'Paraguayan') are not completely susceptible.
Postemergence Grass Weed Control			
sethoxydim (0.19 to 0.28 lbs)	Vantage 1L (1½ to 2¼ pts)	Crabgrass, goosegrass and other annual grasses	Apply before weeds mature. Repeat applications are necessary to suppress bermudagrass or bahiagrass. Safe on centipedegrass seedlings after the third mowing. Vantage has oil concentrate pre-added.
clethodim (0.125 to 0.25 lbs)	Envoy 0.94 EC (17 to 34 fl.oz.)	Common bermudagrass, other grasses such as johnsongrass, barnyardgrass	This is a 24 (c) Special Local Need Label for centipedegrass sod production. Add non-ionic surfactant at 0.25% v/v (1 qt/100 gal). Apply only to actively growing, non-stressed turf. Repeat application may be necessary to suppress bermudagrass.
Postemergence Bahiagrass Control - refer to metsulfuron (Manor 60DF) above			
Nutsedge Control - refer to Tables 4 and 5.			

Table 3. Weed control schedule for St. Augustinegrass sod production (*Refer to Herbicide Label for Specific Turf Species and Use Listing*).

COMMON NAME (lbs ai/acre)	TRADE NAME (product rate/acre)	WEEDS CONTROLLED	COMMENTS
Preplant Bermudagrass and Nutsedge Control			
Fumigation Multiple (3) applications of nonselective herbicide	Refer to Table 1	Most weeds except hard seeded legumes.	Refer to Table 1
Herbicides at Planting (Sprigging) or After Sod Harvesting and Ribbon Preparation			
metolachlor + atrazine (1.8 to 3.9 lbs + 1 lb)	Pennant 7.8L + atrazine 4L (2 to 4 pts + 1 qt)	Yellow nutsedge, annual sedge, sprangletop, some annual grass (e.g., crabgrass) suppression	The higher rate of metolachlor will be necessary for turf grown on high organic (i.e., muck) soils. For commercial St. Augustinegrass sod production, do not use more than once every 6 weeks and do not apply more than 8 pts./A/yr. Tank mixing with atrazine will increase the weed control spectrum. Irrigate within 7 days after application.
Postemergence Broadleaf Weed Control			
bromoxynil (d to ½ lb)	Buctril 2L (1 to 2 pts)	Many young broadleaf weeds	Labeled only for non-residential turf, seed and sod production. Contact herbicide, therefore, thorough coverage is necessary. Safe on seedling or sprigged turf with less drift potential than phenoxy herbicides. Tank mixing with dicamba, &/or MCPP will provide increased control but should be used only on established turf. Not labeled for centipedegrass. Restricted Use Pesticide.
atrazine/simazine (1 to 2 lbs) atrazine + bentazon (c-¾ lbs)	Several Brands. Read the label for rates Prompt 5L (1.8 to 2.4 pts)	Many broadleaf weeds including matchweed, oxalis, pennywort, Florida betony and some annual sedges.	For hard to control weeds, follow the first application with another 4 to 6 weeks later. If weeds persist, follow atrazine applications with dicamba in 4 to 6 weeks. Some turf injury can be expected with this. Two applications of atrazine are allowed per year. Effectiveness will be reduced as weeds mature. Prompt 5L is a pre-mixture of atrazine plus Basagran that provides additional activity on hard-to-control weeds.

dicamba + MCPA, and/or MCPP (c + ¼-½ lbs)	Several brands contain these mixtures	Many broadleaf weeds including matchweed, dandelion, pennywort, (dollarweed), wild garlic/onion, clover, plantains, buttonweed, spurges, woodsorrel, dichondra, wild onions, henbit, knotweed, lespedeza, docks + others	Refer to specific product label for rates. Use low rates on St. Augustinegrass. A tank mix of atrazine at 1 lb ai/A + dicamba at 0.2 lb ai/A + Manor at 0.5 oz/a provides good control with minimum turf damage when temperatures are ≤80 F and good soil moisture present.
clopyralid (0.09 to 0.5 lbs)	Lontrel T&O 3L (¼ to 1 a pts)	Broadleaf weeds, especially legumes such as clovers, vetch, and medic. Also for dock, speedwell, ragweed, and plantain.	Safe on all warm- and cool-season turfgrasses. Legumes are especially susceptible.
Postemergence Grass Control			
asulam (2.0 lbs)	Asulox 3.34L (5 pts)	Crabgrass, goosegrass, sandspur, *Paspalum/Brachiaria* sp.	Do not apply to freshly mowed turf or turf under stress. Do not use a surfactant. Future availability of this herbicide is currently uncertain. DO NOT use on desirable centipedegrass.
MSMA (1.0 lb)	Daconate 6 (1.3 pts)	Weedy Grasses	USE ONLY ON ST. AUGUSTINEGRASS GROWN FOR SOD PRODUCTION. Temporary discoloration will follow application. Do not apply to freshly mowed St. Augustinegrass sod or within 5 weeks of harvest. Apply when temperatures are <90 F and good soil moisture present. Do not add a surfactant.
metsulfuron (0.01-0.02 lb)	Manor 60DF (¼ to 1 oz)	Bahiagrass, foxtails, broadleaf weeds including chickweed, clover, dandelion, plantain, purslane, spurge, woodsorrel, wild onion/garlic	Note the low use rate. As weeds mature, the rate must be increased. A nonionic surfactant at 0.25 % by volume (1qt/100 gal) increases control. Manor is for fine turf including bermudagrass, St. Augustinegrass, zoysiagrass, centipedegrass, Ky. bluegrass and fine fescue. Some bahiagrass varieties ('Common,' 'Argentine,' & 'Paraguayan') are not completely susceptible.
Postemergence Bermudagrass Control/Suppression			
ethofumesate (3.0 lb)	Prograss 1.5EC (2 gal)	Selective common bermudagrass control/suppression	Timing is critical. Spring applications should start in the Carolinas in mid March. Repeat in 30 days. Tank mixing with atrazine or simazine at 2 lb ai/A significantly increases activity and is highly recommended. Temporary St. Augustinegrass stunting may result. Do not overlap.

glyphosate (4 lbs ai/a)	Roundup 4S/Pro (1 gal/a)	Nonselective bermudagrass control	For spot treatment, use 2 oz. per gallon of water. Apply to actively growing green vegetation that is at least 4 to 5 inches tall. Wait 2 to 3 weeks after application for regrowth and re-apply. A minimum of 3 applications will be required to control bermudagrass or torpedograss. Do not apply to desirable plants.

Postemergence Bahiagrass Control - refer to metsulfuron (Manor 60DF) above

Nutsedge Control - refer to Tables 4 and 5.

Table 4. Relative Sedge Control and Turf Tolerance to Various Herbicides (*Refer to Herbicide Label for Specific Species Listing*).

	Sedge Control					**Turf Tolerance**	
Herbicide(s)*	**Annual Sedge**	**Purple Nutsedge**	**Yellow Nutsedge**	**Annual Kyllinga Species**	**Perennial Kyllinga Species**	**Centipedegrass**	**St. Augustinegrass**
Postemergence Control							
Bentazon (Basagran T&O)	G	P	G	F-G	F-G	S	S
Imazaquin (Image)	G	G	F	G	G	I	I
Halosulfuron (Manage)	G	G-E	G-E	G	F-G	S	S

*Repeat applications are necessary for complete control from all herbicides. This interval is from 10 to 14 days for Basagran up to 3 to 8 weeks for Manage or Image.
G=good; F=fair; NR=not registered for use on and/or damages this turf species.
S = safe at labeled rates on mature, healthy turf.
I = intermediate safety; use lower rates during stress periods.
These are relative rankings and depend on many factors such as environmental conditions, turfgrass vigor or health, application timing, etc., and are intended only as a guide.

Table 5. Postemergence Sedge Control in Centipedegrass and St. Augustinegrass (*Refer to Herbicide Label for Specific Turf Species and Use Listing*)[1]

COMMON NAME (lbs ai/acre)	TRADE NAME (product rate/acre)	WEEDS CONTROLLED	COMMENTS
bentazon (1 to 2 lb)	Basagran T&O 4L (2-4 pts) Lescogran 4L (2-4 pts)	Yellow nutsedge, globe sedge, annual sedge and many annual broadleaf weeds	Apply when yellow nutsedge is actively growing under good soil moisture conditions. Thorough spray coverage is necessary. Repeat applications in 10 to 14 days will probably be necessary. Will not satisfactory control purple nutsedge. A pre-packaged combination of bentazon and atrazine is available as Prompt 5L.
halosulfuron (0.03 to 0.06 lb)	Manage 75WP (b to 1 a oz)	Most nutsedges and kyllinga species; groundsel, purslane	Note the low use rate. Add 0.5% nonionic surfactant (½ gal/100 gal). Nutsedges should be actively growing when treated. Spot treat with 0.9 grams Manage 75WP + a fl oz surfactant per gallon of water. Repeat application(s) 3 to 4 weeks apart will be needed for complete control.
imazaquin (d -½ lb)	Image 1.5LC (2-2½ pts)	Purple nutsedge, kyllinga, sandspur, wild garlic, some broadleaves	Add a nonionic surfactant at 0.25% (1 qt/100 gal). Do not apply to newly seeded, sodded, or sprigged areas. Do not apply during spring transition. Repeat applications may be required as weeds mature. For wild garlic/onion control, apply at 2 pts/A during December followed with b to 1 a pt/A in early March. Add 0.25% nonionic surfactant. Treated turf may have a compacted growth habit and seedhead formation may be inhibited. Do not use on overseeded turf.

[1]Presence of a herbicide in this listing does not constitute a recommendation. Trade names are used with the understanding that no endorsement is intended or no criticism is implied of similar products not mentioned. All chemicals should be used in accordance with the manufacturer's instructions.
The following conversions may be useful. Gal/acre x 2.938 = oz/1000 ft^2; Qt/acre x 0.7346 = oz/1000 ft^2; Pint/acre x 0.3673 = oz/1000 ft^2; lbs/acre x 0.02296 = lb/1000 ft^2.