

Tim R. Murphy, University of Georgia

## Tolerance of Warm-Season Turfgrasses and Tall Fescue to Pre-Emergence Herbicides

| Herbicide             | Turfgrasses |         |           |               |             |        |
|-----------------------|-------------|---------|-----------|---------------|-------------|--------|
|                       | Bahia       | Bermuda | Centipede | St. Augustine | Tall Fescue | Zoysia |
| Atrazine              | NR          | I       | T         | T             | NR          | I      |
| Benefin               | T           | T       | T         | T             | T           | T      |
| Benefin + Oryzalin    | T           | T       | T         | T             | T           | T      |
| Benefin + Trifluralin | T           | T       | T         | T             | T           | T      |
| Bensulide             | T           | T       | T         | T             | T           | T      |
| Bensulide + Oxadiazon | NR          | T       | NR        | NR            | T           | T      |
| DCPA                  | T           | T       | T         | T             | T           | T      |
| Ethofumesate          | NR          | I       | NR        | NR            | NR          | NR     |
| Napropamide           | T           | T       | T         | T             | T           | NR     |
| Oryzalin              | T           | T       | T         | T             | T           | T      |
| Oxadiazon             | NR          | T       | NR        | T             | T           | T      |
| Pendimethalin         | T           | T       | T         | T             | T           | T      |
| Pronamide             | NR          | T       | NR        | NR            | NR          | NR     |
| Siduron               | NR          | NR      | NR        | NR            | T           | NR     |
| Simazine              | NR          | T       | T         | T             | NR          | T      |

T = Tolerant; I = Intermediate tolerance, apply to dormant grass;  
NR = Not Registered for use.

## Summer Annual Weed Control Ratings for Pre-Emergence Herbicides

| Herbicide             | Crabgrass spp. | Goosegrass | Sandbur | Prostrate Spurge | Prostrate Knotweed |
|-----------------------|----------------|------------|---------|------------------|--------------------|
| Atrazine              | P              | P          | P       | E                | E                  |
| Benfen                | E              | F          | F       | P                | P                  |
| Benfen + Oryzalin     | E              | F-G        | G       | L                | L                  |
| Benfen + Trifluralin  | L              | L          | —       | —                | —                  |
| Bensulide             | E              | P          | G       | P                | G                  |
| Bensulide + Oxadiazon | E              | G          | —       | —                | —                  |
| DCPA                  | E              | F          | F       | P                | G                  |
| Napropamide           | E              | G          | G       | —                | L                  |
| Oryzalin              | E              | F-G        | G       | L                | L                  |
| Oxadiazon             | G              | E          | F       | P                | G                  |
| Pendimethalin         | E              | F-G        | G       | L                | —                  |
| Siduron               | G              | P          | —       | P                | P                  |
| Simazine              | G              | P          | —       | G                | G                  |

E = Excellent,  $\geq 90\%$  control. G = Good, 80 to 89% control. F = Fair, 70 to 79% control. P = Poor,  $<70\%$  control. L = Weed species is listed on the herbicide label, but has not been evaluated by the University of Georgia. — = Weed response is not known.

## Winter Annual Weed Control Ratings for Pre-Emergence Herbicides

| Herbicide            | Annual Bluegrass | Common Chickweed | Henbit | Parsley-Piert | Spurweed | Corn Speedwell |
|----------------------|------------------|------------------|--------|---------------|----------|----------------|
| Atrazine             | E                | E                | E      | E             | E        | E              |
| Benfen               | E                | G                | G      | P             | P        | E              |
| Benfen + Oryzalin    | E                | L                | L      | —             | —        | —              |
| Benfen + Trifluralin | L                | —                | —      | —             | —        | —              |
| Bensulide            | F                | P                | P      | E             | P        | P              |
| DCPA                 | G                | E                | F      | P             | P        | E              |
| Ethofumesate         | G                | L                | —      | —             | —        | —              |
| Fenarimol            | G                | —                | —      | —             | —        | —              |
| Napropamide          | G                | E                | P      | P             | E        | E              |
| Oryzalin             | G                | L                | L      | —             | —        | —              |
| Oxadiazon            | G                | P                | P      | E             | P        | G              |
| Pronamide            | E                | E                | P      | P             | P        | E              |
| Pendimethalin        | G                | L                | L      | —             | —        | —              |
| Simazine             | E                | E                | E      | G             | E        | E              |

E = Excellent,  $\geq 90\%$  control. G = Good, 80 to 89% control. F = Fair, 70 to 79% control. P = Poor,  $<70\%$  control. L = Weed species is listed on the herbicide label, but has not been evaluated by the University of Georgia. — = Weed response is not known.



## Handle your grub situation fast, before things get really ugly.


At the very first sign of grub damage, apply DYLOX® insecticide. Nothing kills all species of white grubs faster. Within hours, the grubs are dying and the turf is recovering. When grubs threaten, act fast.

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# POST-EMERGENCE WEED CONTROL

(COOL-SEASON)

*Bill Lewis, Ph.D., North Carolina State University*

## Susceptibility of Broadleaf Weeds to Turf Herbicides

| Weed                    | Response of Weeds to Herbicides |        |                    |                  |
|-------------------------|---------------------------------|--------|--------------------|------------------|
|                         | Classification of Weed          | 2, 4-D | Mecoprop (or MCPP) | Dicamba (Banvel) |
| Bittercress, Hairy      | WA                              | S      | I                  | S                |
| Black Medic             | A                               | R      | I                  | S                |
| Buttercups              | WA, B & P                       | S-I    | I                  | I-R              |
| Carolina Geranium       | WA                              | S      | S-I                | S                |
| Carpetweed              | SA                              | S      | I                  | S                |
| Catsear                 | P                               | S-I    | I                  | S                |
| Chicory                 | P                               | S      | S                  | S                |
| Chickweed, Common       | WA                              | R      | S-I                | S                |
| Chickweed, Mousear      | WA, P                           | I-R    | S-I                | S                |
| Clover, Hop             | WA                              | I      | S                  | S                |
| Clover, White           | P                               | I      | S                  | S                |
| Dandelion               | P                               | S      | S                  | S                |
| Dichondra               | P                               | S      | I                  | S-I              |
| Dock, Broadleaf & Curly | P                               | I      | I-R                | S                |
| Garlic, Wild            | P                               | S-I    | R                  | S-I              |

A = annual; B = biennial; P = perennial; SA = summer annual; WA = winter annual; S = susceptible; I = intermediately susceptible, good control sometimes with high rates, however a repeat treatment 3 to 4 weeks later each at the standard or reduced rate is usually more effective; R = resistant in most cases.

continued

## Susceptibility of Broadleaf Weeds to Turf Herbicides (Cont.)

## Response of Weeds to Herbicides

| Weed                    | Classification of Weed | 2, 4-D | Mecoprop (or MCPP) | Dicamba (Banvel) |
|-------------------------|------------------------|--------|--------------------|------------------|
| Ground Ivy              | P                      | I-R    | I                  | S-I              |
| Hawkweed                | P                      | S-I    | R                  | S-I              |
| Healall                 | P                      | S      | R                  | S-I              |
| Henbit                  | WA                     | I-R    | I                  | S                |
| Knawel                  | WA                     | R      | I                  | S                |
| Knotweed, Prostrate     | SA                     | R      | I                  | S                |
| Lespedeza               | SA                     | I-R    | S                  | S                |
| Mallow                  | SA                     | I-R    | I                  | S-I              |
| Mugwort                 | P                      | I      | I-R                | S-I              |
| Parsley-piert           | WA                     | R      | S-I                | S-I              |
| Pennywort, lawn         | P                      | S-I    | S-I                | S-I              |
| Plantains               | P                      | S      | I-R                | R                |
| Purslane, Common        | SA                     | I      | R                  | S                |
| Red Sorrel              | P                      | R      | S                  | S                |
| Speedwell, Corn         | WA                     | I-R    | I-R                | I-R              |
| Spurge, Prostrate       | SA                     | I      | I                  | S                |
| Spurge, Spotted         | SA                     | I-R    | S-I                | S-I              |
| Spurweed                | WA                     | I      | S-I                | S                |
| Strawberry, India Mock  | P                      | R      | I                  | S-I              |
| Violet, Johnnyjumpup    | WA                     | I-R    | I-R                | S-I              |
| Violet, Wild            | P                      | I-R    | I-R                | S-I              |
| Woodsorrel, Common Yel. | P                      | R      | R                  | I                |
| Yarrow                  | P                      | I      | I-R                | S                |

A = annual; B = biennial; P = perennial; SA = summer annual; WA = winter annual; S = susceptible; I = intermediately susceptible, good control sometimes with high rates, however a repeat treatment 3 to 4 weeks later each at the standard or reduced rate is usually more effective; R = resistant in most cases.

## Tolerance of Cool-Season Turfgrasses to Post-Emergence Herbicides for Broadleaf and/or Grass Weed Control

| Turfgrass          | 2,4-D | Mecoprop | Dicamba | Bromoxynil | Dichlorprop | Triclopyr | DSMA, MSMA, CNA | Benzon | Ethofumesate | Fenoxaprop |
|--------------------|-------|----------|---------|------------|-------------|-----------|-----------------|--------|--------------|------------|
| Bentgrass          | S-I*  | T        | I       | T          | I           | S-I       | I               | T      | S            | S          |
| Kentucky Bluegrass | T     | T        | T       | T          | T           | T         | I               | T      | S            | T          |
| Tall Fescue        | T     | T        | T       | T          | T           | T         | I               | T      | S            | T          |
| Fine Fescue        | T     | T        | T       | T          | T           | I         | I               | T      | S            | T          |
| Perennial Ryegrass | T     | T        | T       | T          | T           | T         | T               | T      | T            | T          |

\*I = Intermediately tolerant, use with caution, use at reduced label rates, or minimum label rates; S = sensitive, do not use this herbicide; T = tolerant.

## Post-Emergence Herbicides and Package Combinations for Selective Control of Broadleaf Weeds in Cool-Season Turfgrasses

| Common Name of Herbicide       | Examples of Commercial Products for Professional Applicators |
|--------------------------------|--|
| 2,4-D                          | Various  |
| mecoprop                       | Lescopex, Mecomec  |
| dicamba                        | Banvel   |
| bromoxynil                     | Buctril  |
| 2,4-D + dicamba                | Lesco Eight-One  |
| 2,4-D + dichlorprop (2,4-DP)   | Weedone DPC, Weedone DPC Amine                               |
| 2,4-D + mecoprop (MCP)         | Turk Kleen, Lescopar, 2 Plus 2                               |
| triclopyr + 2,4-D              | Turflon D, Turflon II amine                                  |
| 2,4-D + dichlorprop + dicamba  | Super Trimec   |
| 2,4-D + mecoprop + dicamba     | Trimec Classic, Trex-San, Lesco Three-Way                    |
| 2,4-D + mecoprop + dichlorprop | Weedestroy Triamine, Weedestroy Tri-ester                    |
| MCPA + mecoprop + dicamba      | Trimec Encore, Weedestroy Triamine II                        |

“Someone put a cart in the 7th fairway pond. My next-door neighbor bought his kid a set of drums. And I just found out my mother-in-law is moving in. But what really concerns me is Pythium.”



There's one sure way to avoid worrying about Pythium. Use Subdue® fungicide. Subdue stops Pythium on contact. Once absorbed by grass roots, Subdue protects your turf against further attack for up to three weeks. So don't let Pythium get you down. Get Subdue. Because you've got other things to worry about. **CIBA-GEIGY**

**(WARM-SEASON)**

Tim R. Murphy, University of Georgia

**Common and Trade Names of Turfgrass Post-Emergence Herbicides**

| Common Name                   | Company                         | Trade Name and Formulations <sup>1</sup>  |
|-------------------------------|---------------------------------|---|
| asulam                        | Rhone-Poulenc                   | Asulox 3.34 lbs./gal.   |
| atrazine                      | Security                        | Purge 4 lbs./gal.   |
|                               | Ciba-Geigy                      | Aatrex 4L, 90DG, 80W  |
| bentazon                      | BASF                            | Basagram 4 lbs./gal.  |
| bromoxynil                    | Rhone-Poulenc                   | Buctril - 2 and 4 lbs./gal.,<br>Brominal - 2 and 4 lbs./gal.,<br>Brominal 2 lbs./gal. |
| 2,4-D                         | Lesco                           | Numerous trade names and formulations are available.                                  |
|                               | Vertac, Lesco, Fermenta, Others |   |
| 2,4-D + dicamba               | Rhone-Poulenc                   | Weedone SuperDPro Amine   |
|                               | Lesco                           | Eight-One Selective Herbicide   |
|                               | PBI/Gordon                      | Phenaban 801  |
| 2,4-D + dichlorprop           | Rhone-Poulenc                   | Weedone DPC Amine, Weedone DPC  |
| 2,4-D + MCPP                  | Lesco                           | Lescopar  |
|                               | Rhone-Poulenc                   | Turf Kleen  |
|                               | PBI/Gordon                      | Phenomec 2 + 1  |
| 2,4-D + MCPP + dicamba        | PBI/Gordon                      | Trimec Classic  |
|                               | Sierra                          | Trex-san  |
|                               | Lesco                           | Three-Way   |
| dicamba                       | Sandoz                          | Banvel 4 lbs./gal.  |
|                               | PBI/Gordon                      | Dicamba 4   |
| diquat <sup>2</sup>           | Valent                          | Diquat 2 lbs./gal.  |
| DSMA                          | Vertac, Vineland                | Numerous trade names and formulations are available.                                  |
|                               | Others                          |   |
| ethofumesate                  | Nor-Am                          | Progress 1.5EC  |
| glyphosate                    | Monsanto                        | Roundup 4 lbs./gal.   |
| imazaquin                     | Lesco, American Cyanamid        | Image 1.5 lbs./gal.   |
| MCPP                          | Rhone-Poulenc                   | Turf Herbicide MCPP 2 lbs./gal.   |
|                               | PBI/Gordon                      | Mecomec 4 4 lbs./gal.   |
|                               | Lesco                           | Lescopex 2.5 lbs./gal.  |
| metribuzin                    | Mobay                           | Sencor Turf 75W   |
| MSMA                          | Fermenta, Platte, Others        | Numerous trade names and formulations are available.                                  |
| MSMA + 2,4-D + MCPP + dicamba | PBI/Gordon                      | Quadmec   |
| MCPP + 2,4-D + dicamba        | PBI/Gordon                      | Southern Trimec   |
| pronamide                     | Rhom-Haas                       | Kerb 50W  |
| sethoxydim                    | BASF                            | Poast 1.5 lbs./gal.   |

<sup>1</sup>Numeral refers to percent or pounds of active ingredient.<sup>2</sup>Diquat has a state label in Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee and Texas for winter annual weed control in dormant bermudagrass.



## Warm-Season Turfgrass Tolerance to Post-Emergence Herbicides

| Herbicide                  | Turfgrass     |                 |                     |              |
|----------------------------|---------------|-----------------|---------------------|--------------|
|                            | Bermuda-grass | Centipede-grass | St. Augustine-grass | Zoysia-grass |
| asulam                     | T*            | NR-S            | T                   | NR-I         |
| atrazine                   | T (D)         | T               | T                   | I            |
| bentazon                   | T             | T               | T                   | T            |
| bromoxynil                 | T             | T               | T                   | T            |
| 2,4-D                      | T             | S-I             | S-I                 | T            |
| 2,4-D + dicamba            | T             | S-I             | S-I                 | T            |
| 2,4-D + dichlorprop        | T             | S-I             | S-I                 | T            |
| 2,4-D + mecoprop           | T             | S-I             | S-I                 | T            |
| 2,4-D + mecoprop + dicamba | T             | S-I             | S-I                 | T            |
| dicamba                    | T             | S-I             | S-I                 | T            |
| diquat                     | T (D)         | NR              | NR                  | NR           |
| DSMA, MSMA                 | T             | S               | S                   | I            |
| glyphosate                 | T (D)         | S               | S                   | S            |
| imazaquin                  | T             | T               | T                   | T            |
| MCPP                       | T             | S-I             | S-I                 | T            |
| metribuzin                 | T             | NR-S            | NR-S                | NR-S         |
| pronamide                  | T             | NR              | NR                  | NR-T         |
| sethoxydim                 | NR-S          | T               | NR-S                | NR-I         |

\*Asulam is labelled for use only on 'Tifway' bermudagrass (419).

T = Tolerant at labelled rates; I = Intermediate tolerance, use at reduced label rates; S = Sensitive, do not use this herbicide; NR = Not registered for use on this turfgrass; D = Dormant applications only.

# INSECT CONTROL

## (WARM-SEASON)

Patricia Cobb, Ph.D., Auburn University

| WARM-SEASON*                  | LATE WINTER (Mar.)  | SPRING (Apr.-May)  | SUMMER (June-Aug.)  | FALL (Sept.-Oct.)   |
|-------------------------------|---|--|---|---|
| <b>(SOUTHERN) CHINCH BUGS</b> | In southern Fla. where resistance is a problem, use Pydrin, Pounce or Baygon a labeled for Fla. Replace susceptible turf with resistant or non-host varieties to provide natural control. In other areas, overwintered adults can be treated if they become active in March with diazinon (4 lbs. Al/acre), Dursban (1 lb. Al/acre) or Oflatoil (2 lbs. Al/acre). | Application to prevent population build-up should be made by mid-April. Diazinon (4 lbs. Al/acre), Dursban (1 lb. Al/acre) or Oflatoil (1-2 lb. Al/acre) provide control.  | Control existing populations with Dursban (1 lb. Al/acre), diazinon (4 lbs. Al/acre) or Oflatoil (1-2 lb. Al/acre) when damage signs appear. Southern chinch bugs are not as severe a problem in well irrigated turf.   | Late summer applications usually make fall treatments unnecessary.  |
| <b>BILLBUGS</b>               | Treatment at this time can be done if adults are numerous and active. Use diazinon (4 lbs. Al/acre), Dursban (1 lb. Al/acre) or Oflatoil (1-2 lb. Al/acre).   | Treat when adults are active to prevent population buildup. Diazinon (4 lbs. Al/acre), Dursban (1 lb. Al/acre) provide control.  | Treat billbug grubs with Oflatoil (2 lbs. Al/acre) if not used in spring; diazinon (5 lbs. Al/acre), Turcam (2 lbs. Al/acre), Triumph 4E (restricted—home lawns only, not on sandy soils—2 lbs. Al/acre/season). Irrigate following application; also before if drought exists.   | If necessary, treat with diazinon, Turcam, Oflatoil or Dylox/Proxol as in summer.                           |
| <b>GRUBS</b>                  | Control with insecticides usually does not extend to new generation in July and August.   | Infestations can be controlled during early April by spot or general treatment with Turcam (2 lbs. Al/acre), Proxol/Dylox (8 lbs. Al/acre) or diazinon (5 lbs. Al/acre). Mocap granules (5 lbs. Al/acre) can be used on golf courses and sod farms. Triumph 4E on home lawns only, not on "sandy" soils (restricted use, up to 2 lbs. Al/acre/season). Sevin (1.5-2 lbs. Al/acre) or Orthene 755 (1.5-2 lbs. Al/acre, unirrigated after treatment) is effective on green June beetle grubs. Sevin (8 lbs. Al/acre) against other grubs. Irrigate after treatment. Milky spore can be applied in early April for Japanese beetle control in areas where the grubs are numerous. | New generation grubs present in late July or mid-August can be controlled with Proxol/Dylox (8 lbs. Al/acre), Turcam (2 lbs. Al/acre), Oflatoil (2 lbs. Al/acre), diazinon (5 lbs. Al/acre), or Mocap granules (commercial turf only at 5 lbs. Al/acre). Triumph 4E (restricted use, home lawns, not on "sandy" soils, up to 2 lbs. Al/acre/season). Sevin SL (8 lbs. Al/acre) is effective against most grubs; Sevin SL (1.5-2 lbs. Al/acre) or Orthene 755 (1.5-2 lbs. Al/acre, unirrigated after treatment) is effective against green June beetle grubs. Water immediately after treatment, also before treatment during dry summers. | Treatments are effective as late as mid-October. Irrigate first if soil is dry, then again after treatment. |
| <b>SOD WEBWORMS</b>           | Treatment is not appropriate at this time.  | Use diazinon (4 lbs. Al/acre), Dylox/Proxol (3.5 lbs. Al/acre), Dursban (1 lb. Al/acre) or Sevin (6-8 lbs. Al/acre) in April when larvae are present. Warm season grasses outgrow moderate damage, so treatments can be delayed until summer.  | Make application to infested turf when larvae are present or two weeks after peak moth flight. Use diazinon (4 lbs. Al/acre), Dursban (1 lb. Al/acre), Dylox/Proxol (3.5 lbs. Al/acre) or Sevin (6-8 lbs. Al/acre).   | Treatment in early September may reduce population for next season.   |
| <b>CUTWORMS</b>               | Treatment usually is not appropriate at this time.  | Use Dursban (1 lb. Al/acre), Dylox/Proxol (3-8 lbs. Al/acre) or Sevin (2-4 lbs. Al/acre). Apply late in the afternoon. Do not irrigate unless specified on label.  | Although cutworms in the South are usually a spring problem, if summer infestations occur, treat as directed for spring.  | Treatment usually is not necessary at this time.  |

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

continued