

charcoal into the soil. Reseeding should occur no sooner than seven days after applying the charcoal.

Benefin (Balan) also may be used in overseeded ryegrass for preemergence annual bluegrass control. A minimum waiting period of 45 days must be observed between benefin application and ryegrass overseeding. This use of benefin is suggested only on larger areas such as golf course fairways and athletic fields and not on golf greens.

Due to costs and potential turf injury, it is recommended that preemergence annual bluegrass control on golf greens in Florida be attempted only with products containing fenarimol. Larger, less intensively maintained areas such as fairways and athletic fields, should have products containing pronamide, bensulide or benefin to control the annual bluegrass in overseeded ryegrass. All pre-cautionary statement on each product's label should be consulted before use.

POSTEMERGENCE HERBICIDES

Postemergence herbicides are generally effective only on those weeds which have germinated and are visible. Most postemergence herbicides are relatively ineffective as preemergence herbicides. Timing of application should be when weeds are young (two to four leaf stage) and actively growing. At this stage, herbicide uptake and translocation is favored, and turfgrasses are better able to fill in voids left by the dying weeds. Turfgrass species tolerance to postemergence herbicides are listed in Table 3.

Broadleaf Weed Control

Broadleaf weeds in turf have traditionally been controlled with members of the phenoxy herbicide family (e.g., 2,4-D, dichlorprop, MCPA and mecoprop) and benzoic acid herbicide family (e.g., dicamba). All are selective, systemic foliar-applied herbicides. Few broadleaf weeds, especially perennials, are controlled with just one of these materials. Usually, two or three-way combinations of these herbicides and possible repeat applications are necessary for satisfactory weed control. Sequential applications should be spaced ten to fourteen days apart.

Until recently, these various herbicide combinations were the main chemicals for broadleaf weed control. Chlorflurenol, chlorsulfuron, metsulfuron, clopyralid, and triclopyr have been

introduced as alternatives to phenoxy herbicides for broadleaf weed control. Chlorflurenol was previously used mainly as a plant growth regulator to retard growth of treated ornamentals and turf. It was noted to have some broadleaf activity but usually needs to be mixed with one of the traditional broadleaf herbicides to increase its activity on a wider range of weeds.

Triclopyr belongs to the Picolinic Acid herbicide family. Compounds in this family have been noted for their high degree of activity. These herbicides are up to ten times more potent than 2,4-D on some broadleaf weed species. They are rapidly absorbed by the roots and foliage of broadleaf plants, and are readily translocated throughout the plants via both xylem and phloem tissues. Problems with this herbicide family include its soil mobility and the extreme sensitivity to it by many desirable ornamentals. Clopyralid also is one of the newer members of this herbicide family. It is currently being evaluated as a potential broadleaf herbicide on cool-season turfgrass species.

Metsulfuron, a member of the sulfonyleurea herbicide family, has some success in controlling grass and broadleaf weeds. Its use rate is extremely low (0.25 to 1.0 oz product/acre) and is noted for its activity on controlling bahiagrass. Its full spectrum of control on broadleaf weeds is not known, but shows promise as a alternative to the phenoxy herbicides.

Chlorsulfuron, one of the first members of the sulfonyleurea herbicide family to reach the marketplace, is labelled for selective broadleaf and tall fescue control in certain cool-season turfgrasses. Bermudagrass is a warm-season grass tolerant to this material. Rates range from 1 to 5 oz product per acre, depending on the weed species present. Table 4 lists the effectiveness of commonly used postemergence herbicides for broadleaf weed control.

Grass Weed Control

Traditionally, for tolerant turfgrass species, postemergence grass weed control has been through single and repeat applications of the organic arsenicals (e.g., MSMA, DSMA, CMA). Two to four applications, spaced seven to ten days apart generally are required for complete control. The rate and number of applications necessary for weed control usually increases as weeds mature. On cool-season turfgrasses, organic arsenicals can be very phytotoxic, especially when used during high temperatures