

# PREEMERGENCE AND POSTEMERGENCE ALTERNATIVES FOR WEED CONTROL

By T. L. Watschke, Associate Professor of Turfgrass Science, The Pennsylvania State University

Turfgrass chemical weed control has evolved from a non-selective, spot treatment approach prior to 1944 to selective broad spectrum programs during the 1970's. With a few exceptions, almost all broadleaf weeds could be controlled selectively in turf until the Environmental Protection Agency (EPA) action against silvex in February, 1979. The loss of silvex has reduced the completeness of broadleaf weed control in turf, but hopefully the problems that have been created can be resolved with existing technology. Action by EPA against any other currently used selective broadleaf herbicides for turf would cause a significant reduction in weed control capability for turf managers. Successful weed control is the result of the following steps: 1) identification of the weed, 2) recognition and implementation of proper cultural control practices, and 3) selection and proper application of herbicide. The following is a review of some of the currently available pre- and post-emergence herbicides.

## Cultural Practices

Weeds are excellent indicators of soil conditions, use of an area, and its management. For example, compaction, pH, poor drainage, low fertility (particularly nitrogen), and poor structure are soil conditions that may be indicated by the presence of certain weeds. Inappropriate mowing and irrigation practices can make certain weed species more competitive than turfgrasses. The lack of good disease and insect control programs can result in weakened turf that is easily invaded by weeds. The objective of sound cultural weed control practices (in reality—good management) is to eliminate voids in the turf stand where weeds can get their start. Without space to grow the weeds cannot compete.

## Preemergence Control

The primary preemergence herbicides used on cool season turfgrasses are benefin, bensulide, DCPA, and siduron. The rate of control will vary depending on formulation, timing of application, soil type, rainfall, location, and other factors. Regardless of the material used, the most important factor is the timing of application. These materials must be applied prior to the germination of the weed species that is to be controlled. Ideally, application should be made 7-10 days prior to the anticipated germination of the weed.

Benefin is a 2.5 G granular product recommended for use at 2 pounds of active ingredient per acre (ai/A). This material provides excellent control and may cause minor injury to fine fescues. Benefin is labeled for multiple season application which allows for second applications (when needed) to eliminate late season germination. Benefin is not recommended for use on bentgrasses.

Bensulide is formulated in both granular and liquid forms. It is recommended for use at 7.5 pounds ai/A for the control of smooth crabgrass. Bensulide has good safety on all cool season grasses and provides excellent control. Bensulide also provides good preemer-

gence control of annual bluegrass.

DCPA is formulated in both wettable and granular forms. It is recommended for use at 10.5 pounds ai/A and provides excellent control. DCPA may cause minor injury to fine fescues, but the injury is not permanent. DCPA is not labeled for use on bentgrasses.

Siduron is most commonly marketed in the wettable powder form (50 W). It is recommended for use at 12 pounds ai/A. Siduron may be used in a seedbed at 6 pounds ai/A to control summer annual grasses without inhibiting the germination of the desired species. Siduron also has early postemergence activity, but is recommended for use preemergence. Due to solubility, siduron may not be as effective as the others for season-long control in wet years. Repeat applications may be required.

## Postemergence Control

Postemergence control of summer annual grassy weeds may be necessary and the best materials to use are the organic arsenicals (AMA, CMA, DSMA, MAMA, and MSMA). These materials require multiple applications and are generally not as effective as preemergence materials.

Selective postemergence broadleaf weed control is primarily accomplished through the use of 2,4-D, MCPP, dicamba, and various combinations. When the weed population consists of dandelions and plantains 2,4-D alone provides satisfactory control. The recommended rate of 2,4-D is 1 pound ai/A from liquid formulations and 2 pounds ai/A for granules. However, in most situations, the spectrum of weeds present usually includes those that 2,4-D alone will not sufficiently control. Fall applications are preferred for controlling dandelions because early spring flowering will be avoided. Spring applications are also successful and preferred over summer application. For the control of wild onion and wild garlic, the ester formulation of 2,4-D should be used in the spring at a rate of 1 pound ai/A.

Dicamba is recommended at the rate of 0.5 pound ai/A for the control of knotweed, spurge, clover, and other legume type weeds. However, if dandelion and plantain are part of the stand, 2,4-D and dicamba should be combined at the rates of 1 and 0.25 pound of ai/A, respectively. This combination controls a broader spectrum of weeds with a lower dicamba rate than when it is used alone due to a synergistic effect which results from the combination. Dicamba used alone should not be applied under the dripline of ornamentals.

Mecoprop (MCPP) is effective on many of the weeds controlled by dicamba, but is rarely used alone except for weed control in bentgrass. It may also be used alone in situations where ornamentals are involved, as applications of MCPP under the dripline can be safely accomplished.

Most frequently, broadleaf weed populations on home lawns consists of many different types of weeds. Consequently, 2,4-D, MCPP, and dicamba are com-

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# SPRAY UNITS ARE BECOMING MULTI-USE, MORE EFFICIENT

By Ruth Messinger, Contributing Editor

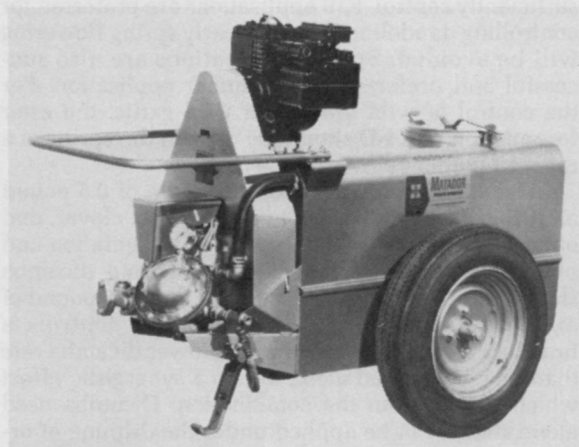
Spraying equipment for lawns, trees, and golf courses has become more versatile, according to a survey of the latest equipment manufacturers in the field. "The contract applicator that fertilizes lawns also takes care of shade trees and shrubs, either with a separate piece of equipment or in one unit that performs both functions," says Roger Cohill, president of Agrotec. Some new spraying equipment comes with tanks which have two compartments to hold different materials for varied applications. Other models contain larger-capacity tanks mounted on trucks and trailers that can cover large areas of foliage and turf.

Accessories such as hose reels, spray wands, and guns send streams of pesticides into the tallest trees. Improved pumps supply more power, allowing the use of a wide variety of materials—herbicides, fungicides, insecticides, fertilizers, and suspension mixes.

Besides keeping the capital investment down, this multi-purpose approach has the advantage of saving fuel costs. "People want more gallons per hour of herbicides, pesticides, and fertilizer," says one distributor.

An emphasis on quality rather than quantity is another trend reported by spraying manufacturers. Lawn care companies and arborists are demanding concentrated sprays that use less water, more exact coverage of spray areas, and pumps that can handle different types of chemicals.

Contract applicators are diversifying to provide more service to their customers," says Tom Seyward, vice president of Tuflex. "Not only will they come to treat the lawn, but they will spray the trees and shrubbery, and go inside the home to treat for ants, silverfish, German cockroaches, and any other pests."



**Hudson Matador Sprayer** has a tank capacity of 15-100 gallons. Its pump develops 250 or 300 pounds of pressure.

Among the versatile sprayers introduced recently is the Hudson Matador Power Sprayer, whose 15- to 100-gallon tank capacity fills the needs of almost any power-spraying job—from covering large turf areas to spraying high into trees. Its heavy steel tank with Endurall epoxy-coated liner resists corrosion, and the piston pumps develop up to 250 or 300 pounds of pressure. A power-jet agitator keeps materials mixed for

uniform discharge. Write **901** on reader service card.

E-Z Rake's Model 83 E-Z Spray for spraying herbicides, pesticides, and liquid fertilizer comes with a new remote wand for reaching shrubs and trees. The wand features a convenient on-off valve that changes quickly from boom to wand spray, and the wand spray stream can attain a height of 20 feet. This model can be used with most riding mowers or garden tractors equipped with 12-volt electrical systems. Write **902** on reader service card.

Minnesota Wanner has introduced a lawn care industry model, KW-C560-SLC, that meets the requirements of most commercial applicators and includes a 560-gallon capacity tank. The unit mounts on a heavy structural steel base frame and easily attaches to a flat-bed truck or a one-ton pickup.

The company's tandem trailer-mounted, mechanical invert sprayer, the KW-MC12ETTX5, is also equipped with a 560-gallon tank. The 500-gallon water compartment has a 16-inch manhole, and the 60-gallon chemical section is fitted with a two-inch pressure vacuum fill cap. Write **903** on reader service card.

Friend Mfg. Co. offers multi-purpose, high-pressure sprayers—the Comander C and D series—with 100- to 300-gallon capacity and piston or diaphragm pumps capable of 7 gpm or 14 gpm up to 450 psi. The trailer and skid models are corrosion-resistant.

Friend has also redesigned its 200-gallon PTO air-sprayer, the AK-II. New distribution piping at the fan housing makes this sprayer useful for orchards with trees up to 16 feet high, as well as for vineyards and dwarf plantings. Another improvement is a diaphragm pump that delivers over 13 gpm at 400 psi, making AK-II effective for gun-spraying. Write **904** on reader service card.

Hahn's self-propelled sprayer, called "Spray Pro," applies fungicide, herbicide, insecticide, and liquid fertilizer to golf greens, grounds, and lawns. It is



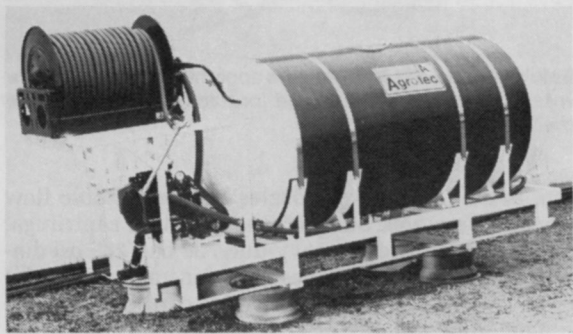
**Hahn's Spray-Pro** is self-propelled. It has a 160-gallon poly tank, centrifugal pump, and 15-foot boom.

equipped with a 15-foot, three-section folding boom. The 19 boom outlets provide precision application not possible with a handgun. Other features are a 160-gallon polytank with jet agitation and a centrifugal pump (100 psi maximum, 55 gpm maximum). An op-

tional spreader for sand, seeds, fertilizer, or lime—or a utility bed—replaces the tank in minutes. Write **905** on reader service card.

Another new self-propelled sprayer for multiple use is available in several models from Maruyama. The operator can manage both traveling and spraying from the driver's seat. The fiberglass-reinforced plastic tanks are corrosion-resistant, and liquids are automatically agitated. A spray gun and 20-in. spray hose are optional. Write **906** on reader service card.

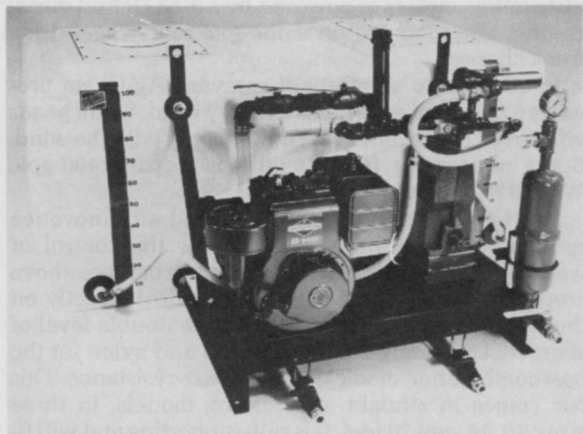
For the applicator who needs a tall tree sprayer, Agrotec offers the ES4705, equipped with a four-piston, cast-iron Hypro pump powered by an industrial 16-hp Briggs & Stratton engine with a 12-volt electric starter. An electric rewind hose reel is standard, with 100 feet of 3/4-inch high pressure hose.



**Agrotec's ES 4905 skid sprayer** comes with a 55- to 500-gallon tank and a wide range of pressures and volumes.

Agrotec's ES4903 and ES4905, which feature hydraulic agitation, can mix fertilizer. The high-pressure centrifugal pump has enough volume to cover large areas of lawn quickly and accurately, and the necessary pressure to spray shrubbery and trees up to 30 feet in height. Write **907** on reader service card.

A single-cylinder, medium-pressure Dobbins sprayer by Master Manufacturing Co. can spray all types of pesticides, herbicides, soluble fertilizers, and disinfectants. This sprayer has a trailer hitch with parking stand for attachment to riding tractors. It comes with a four-nozzle, five-foot boom that provides 6½ feet of spray coverage. The non-corrosive, polyethylene tank holds 30 gallons, and the piston pump delivers up to 2.5 gpm at 300 psi. An 18-inch orchard



**With a tank divided** into two 100-gallon compartments, the Tufflex 200 can apply two chemicals to a lawn at one time.

gun can hand spray a solid stream or a fine mist. Write **908** on reader service card.

Tufflex's PC 300 offers greater diversification in a single unit. It is divided into two 150-gallon compartments and designed to mount behind the cab of a standard pickup truck. By using the separate compartments, a lawn-care company can apply two chemicals to a lawn at a time without mixing them, thereby saving time and money. The divided tank also eliminates the need for separate pieces of equipment for pesticides and fertilizer. A smaller model, the PC 200, is composed of two 100-gallon compartments.

"We are also developing a PC 500 sprayer on the same design as our PC 800 and the 1200, but with a scaled-down tank because of the industry's demand for smaller trucks that take less fuel to run," says Tom Seyward. Write **909** on reader service card.

To satisfy the demand for exact spray coverage, The Broyhill Company has introduced MicroMax spray nozzles, which apply low volumes of herbicide yet obtain adequate weed control. These applicators maintain a consistent droplet size and uniform pattern width through the use of rotary atomization. Droplets are large enough not to drift, but small enough to give thorough coverage without waste and dangerous runoff. Due to the low volume, at 12 mph a 200-gallon tank will cover 130 acres, saving water, water-support equipment, and fill-up time. The amount of water re-



**A Broyhill sprayer** with MicroMax Rotary Spray Nozzle applies chemicals to a lawn in controlled droplet sizes.

quired is as low as 1½ gallons per acre," says Craig Broyhill, the company's sales manager. Write **910** on reader service card.

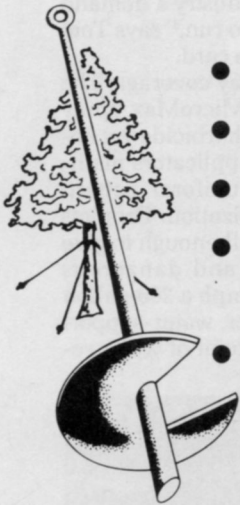
Micro-Gen Equipment Corp. embodies the principle of ultra low dosage through controlled droplet size in its Model G-9 sprayer. The pickup-truck-mounted unit sprays insecticide into the air in the form of fog, which remains in suspension for a long time and destroys flying insects. It may be sprayed on a golf course early in the morning before play begins, or the preceding evening. Another feature of the G-9, digital flow control, delivers greater accuracy in insecticide flow and shows the actual flow rate to a tenth of an ounce per minute. Write **911** on reader service card.

Solo's 451 and 452 PTO Mistblowers also offer a saving through high-concentrate, low-volume applica-

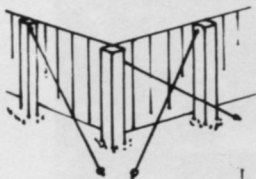
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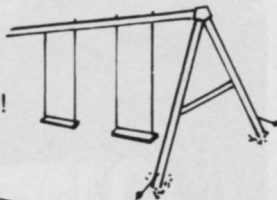


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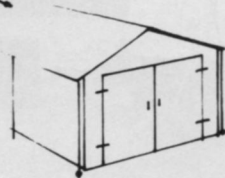


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## Spray Units from page 23



Solo's 451 and 452 Mistblowers apply high-concentrate, low-volume spray and are designed for tractors with horsepower over 18.

tion. Individual blower nozzles have adjustable flow rate and direction. Solo 451 comes with a centrifugal pump, and 452 uses a heavy-duty, 20 bar/285 psi diaphragm pump. Both are designed for tractors of 18 hp and up. Write **912** on reader service card.

"Low-volume spraying is a comparatively recent development," says Bill Plymat, advertising manager of Ag-Chem Equipment Co. "Most sprayers are old-fashioned dilute, but more and more growers are turning to this technique." Nurserymen and Christmas tree growers use his company's Ag-Tec equipment. The line of six low-volume sprayers applies fungicides, pesticides, and nutrients.

Specifically designed for the large citrus grower and commercial applicator, the Ag-Tec self-propelled Model 6013-500 Double Citrus Head uses high-air velocity and low-volume spray heads for spraying. It has a 500-gallon tank of stainless steel and is permanently mounted on a one-ton, four-wheel-drive truck chassis that accommodates a 350-cubic inch GMC engine with dual rear wheels.

For very tall trees with dense foliage, Ag-Chem presents Model 6013-500 Orchard Head. A single orchard head gives extra top reach and thorough coverage. The distribution system is powered by a 3-53 Detroit diesel engine, also mounted on a one-ton, four-wheel-drive truck chassis.

In addition to a variety of sprayers, Ag-Chem provides a choice of nine types of spray head. Some heads will cover 180° at one time; others spray with the wind. Spray rates range from as little as 6 gpa to 100 gpa. Write **913** on reader service card.

Hustler Corporation has introduced an innovative sprayer—an aluminum wick bar for the control of weeds in skip rows and those six inches or more above crop height. The wick bar rubs chemical directly on the weeds, not on the ground. It has a double level of short wicks, loosely woven of cotton and nylon for the best combination of wicking and wear-resistance. This bar comes in straight and folding models, in three sizes: 10, 14, and 20 feet. It is self-supporting and will fit a variety of tractors. Write **914** on reader service card.

*Continues on page 26*



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Westheffer has a newly designed 320-gallon lawn and tree care spray unit. An electric start 8-hp gasoline engine drives the Myers pump, mechanical agitation system, and belt drive reel. The sprayer features an



A 320-gallon lawn and tree care spray system by Westheffer has an electric start 8-hp gasoline engine.

easy-to-clean strainer system for use with crushed fertilizers and wettable powders. The stainless steel tank is vented with a 16-inch manway which has a 10-inch opening lid. The same unit is available with a 520-gallon tank. Write **916** on reader service card.

FMC offers recently upgraded DO35 sprayers in four tank sizes—300, 500, 900, and 1,000 gallons—and a psi of 700. These sprayers are specifically designed to be truck-mounted for shade tree spraying. The engine controls, including starter, choke, and throttle, are ac-

cessible to the operator from a curbside location. Each stainless steel tank is fitted with a full-length mechanical paddle blade agitator which is easily engaged or disengaged. An optional spray gun, the Model 785, is equipped with an on/off trigger and an adjustable spray pattern control. Write **917** on reader service card.

A 50-gallon fiberglass tank sprayer from Myers comes in three models. The 6-50E has a Briggs & Stratton gasoline engine that runs on 5 hp and a piston pump that operates at 300 pounds pressure. The 6-50PT, which is PTO-driven, is a trailer-mounted sprayer with 13-inch wheels. Model 6-50TM, also PTO-driven, has a 6-gallon piston pump and is designed for tractor-mounting. A trailer is available, complete with 15-inch wheels and jack stand, as well as 15-foot stainless steel booms, and a hose reel mounting kit and spray gun. Write **918** on reader service card.

As a result of the development of new chemicals and more sophisticated spraying techniques, the demand for skilled professional applicators grows greater. Homeowners, who now travel less and spend more time at home and in the green spaces near their homes, are closely scrutinizing the maintenance of turf, trees, and ornamentals. In this environment and with lawn care specialists and others diversifying their work, modern, high technology spraying equipment will be needed more than ever. **WTT**

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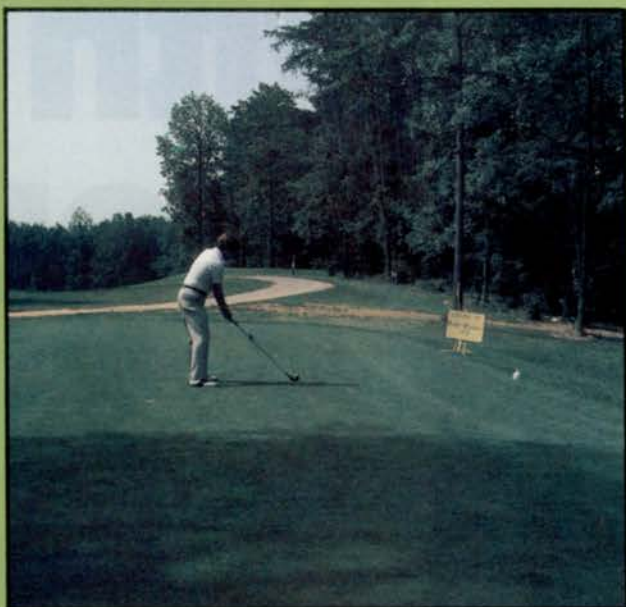


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# RHODODENDRONS FLOURISH WITH COMPANION PLANTINGS IN ACID SOIL

By Douglas Chapman, Horticulturist, Dow Gardens, Midland, MI

Rhododendron is a low maintenance, broad-leaved, evergreen shrub (ericaceae) which can provide color from mid-April through July. This color can vary from deep red to clear white, with the most common color being magenta. Selection of the correct species and/or cultivar can result in a shrub 2 to 3 feet in height or one 10 to 15 feet in height. Many cultivars are hardy from Chicago to Michigan to Boston and south. These hardy specimens provide a gene pool for breeding colorful, disease-resistant, and hardy rhododendrons. Many nurseries have been instrumental in the development of new rhododendron cultivars, but Anthony Shammarello in South Euclid, Ohio and Ed Mezzitt in Hopkinton, Massachusetts have been leaders. Some of the hardy species for the northern Midwest and Northeast include *Rhododendron carolinianum*, *R. catawbiense*, *R. fortunei*, *R. X laetivirens*, *R. maximum*, *R. mucronulatum*, and *R. smirnowii*.

**Carolina Rhododendron** (*Rhododendron carolinianum*) is native to North America. It is the outstanding shrubby evergreen rhododendron with a maximum height of 6 to 8 feet, and becomes a broad upright oval at maturity. *R. carolinianum* is very adaptable from partial sun to shade. (Generally speaking, the smaller the rhododendron leaf, the more sun the plant will take.) The large-leaved rhododendrons must be planted in shade where smaller leaf forms will take at least 6 to 8 hours of sun. Carolina Rhododendron is extremely susceptible to Phytophthora; therefore, good soil drainage is important. This hardy rhododendron flowers early to mid-May. The normal species color ranges from magenta to pink, although there is an album form readily available in the trade. This outstanding evergreen is an annual flowerer with numerous flowers per terminal, making it probably the outstanding early spring flowering form. The most widely-known and adaptive hybrid of Carolina Rhododendron is PJM Rhododendron, named after its breeder, Peter James Mezzitt. This hybrid is outstanding throughout the Midwest in foundation, natural, or mass plantings as an understory. It requires little maintenance, responds fairly well to slightly alkaline (well-

watered) soils, and will thrive in full or partial sun. In addition to its annual display of magenta flowers, it does have a maroonish fall leaf color which is an extremely desirable characteristic for the otherwise drab winter months.

Catawba Rhododendron (*Rhododendron catawbiense*), another native North American rhododendron, provides the hardiness in the breeding of North American cultivars. This native grows 8 to 10 feet in height with a medium-sized leaf that ranges 3 to 6 inches in length and 1½ to 2 inches in width. Catawba Rhododendron flowers late in May with 14 to 20 trusses per flower. The flower buds are perfectly hardy to -30° F. It prefers a minimum of 50 percent to a maximum of 80 percent shade and is quite compatible in mass or naturalistic plantings under oak or pine. A few of the cultivars which are outstanding and flourish as far north as Midland, Michigan are as follows:

| CULTIVAR               | COLOR  |
|------------------------|--|
| 'Album Elegans'        | mauve, fading to white                           |
| 'America'              | dark red   |
| 'Blue Peter'           | dark red   |
| 'Boule de Neige'       | white  |
| 'Boule de Rose'        | rose-pink  |
| 'Caractacus'           | magenta-red                                      |
| 'Catawbiense Alba'     | white  |
| 'Catawbiense Boursalt' | crimson-red                                      |
| 'H.H. Hunnewell'       | lilac-red  |
| 'Henrietta Sargent'    | rose-pink  |
| 'Henry'                | red to deep purple                               |
| 'Ignatius Sargent'     | rose-crimson                                     |
| 'King Tut'             | bright red with white blotch, leaves dark purple |
| 'Lady Armstrong'       | carmine  |
| 'Mrs. C.S. Sargent'    | carmine-rose                                     |
| 'Parson's Grandiflora' | magenta  |
| 'Pinnacle'             | pink   |
| 'President Lincoln'    | mauve  |
| 'Purpureum Elegans'    | deep purple                                      |
| 'Roseum Elegans'       | magenta  |

Continues on page 32



The most widely known and adaptive hybrid of Carolina Rhododendron (*Rhododendron carolinianum*), PJM Rhododendron, makes an outstanding display in foundation, natural, and mass plantings. It was named after its breeder, Peter James Mezzitt.



One of the many fine cultivars of Catawba Rhododendron (*Rhododendron catawbiense*), is 'America', whose flower buds stay hardy in -30°. It fits well in mass or naturalistic plantings under oak or pine.