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have limited use for woody plant control as foliar sprays.

DSMA and MSMA are used for postemergence weed control in tolerant lawn grasses and noncrop areas. Cacodylic acid is used as a general desiccant and defoliant (contact) spray on many crop and non-crop areas.

The organic arsenicals can be used for quick dieback of woody species, but plants tend to recover. They can be injected into the trunk to kill unwanted trees. As foliar sprays, they are applied in water. Complete coverage by spray is required for best results. They are inactivated by soil contact.

Organic arsenicals may injure desirable plants. By directed spraying, desirable plants can be avoided. Organic arsenicals have a moderate to low mammalian toxicity but are highly toxic to insects such as honey bees. They are mildly corrosive to spray equipment.

Bipyridyliums. Diquat and paraquat are desiccant (drying agents) and defoliant herbicides used for general contact activity against weeds and brush. In some situations, they are used as selective herbicides.

Paraquat is water soluble and is inactivated by soil contact. Woody species will usually resprout from foliar sprays of diquat and paraquat. Paraquat may be more effective as an injection treatment against some undesirable trees.

Paraquat is highly toxic when ingested. Extreme care must be taken to avoid breathing the spray mist or getting the concentrate on the skin. Use

of protective clothing and respirators are recommended when making applications.

Get immediate medical care in the event of ingestion. If treated within 12 hours, chances of survival are excellent.

Benzoics. Dicamba is a selective translocated herbicide. It controls many broadleaf weeds in pasture crops and turf and some woody plants.

Dicamba is similar to the phenoxy herbicides in activity and use. It is absorbed through roots, as well as foliage. It may be applied by either ground or aerial sprays or as granules, depending upon the weeds to be controlled and their proximity to susceptible crops.

Dicamba may be applied in mixtures with 2,4-D to broaden the spectrum of weed species controlled. It has a low order of toxicity to wildlife, fish, livestock, and humans. It rapidly degrades and does not accumulate in the environment. Dicamba has a low corrosion hazard to spray equipment.

It is formulated as a liquid as the dimethylamine or sodium salt and is sprayed in water carrier. It is also formulated in granular form as the acid.

Dicamba is highly water soluble. Care must be taken to prevent its movement into water sources. Spray drift of dicamba to sensitive crops, conifers, and certain woody plants should be prevented. Granular formulation may be preferred where drift of sprays would present a hazard to crops.

Dichlobenil is also a benzoic. It is a selective herbicide for control of an-

nual and perennial grasses and weeds in non-crop areas. Dichlobenil inhibits weed seed germination and plant cell division at the growing points.

Because of its relatively high volatility, application when the temperature exceeds 70 F. must be followed by a quarter-inch irrigation or rainfall soon after. Downward movement of active ingredient does not exceed two inches, so deeper-rooted woody ornamentals will not be effected. The control is achieved from a chemical barrier in the top one to two inches of soil.

Ureas and uracils. These compounds include bromacil, diuron, fenuron, fenuron-TCA, monuron, monuron-TCA, tebuthiuron, and hexazinone.

Ureas and uracil-type herbicides can be selective at low rates and non-selective at high rates. They are usually formulated as wettable powders for water sprays or as granules or pellets for dry application.

Bromacil (a uracil) will control a wide variety of woody species. If rates above 5 pounds per acre are used, it will also kill many desirable grasses and forbs on grazing lands.

Fenuron is no longer produced commercially, but a fenuron-TCA combination is available and is used to control certain woody plants and weeds on non-crop areas. Monuron and monuron-TCA combinations are commercially available, but have limited use for brush control since high rates are required for effectiveness. The monuron-TCA or fenuron-TCA combinations are generally used for non-selective, temporary sterilization in non-crop areas.

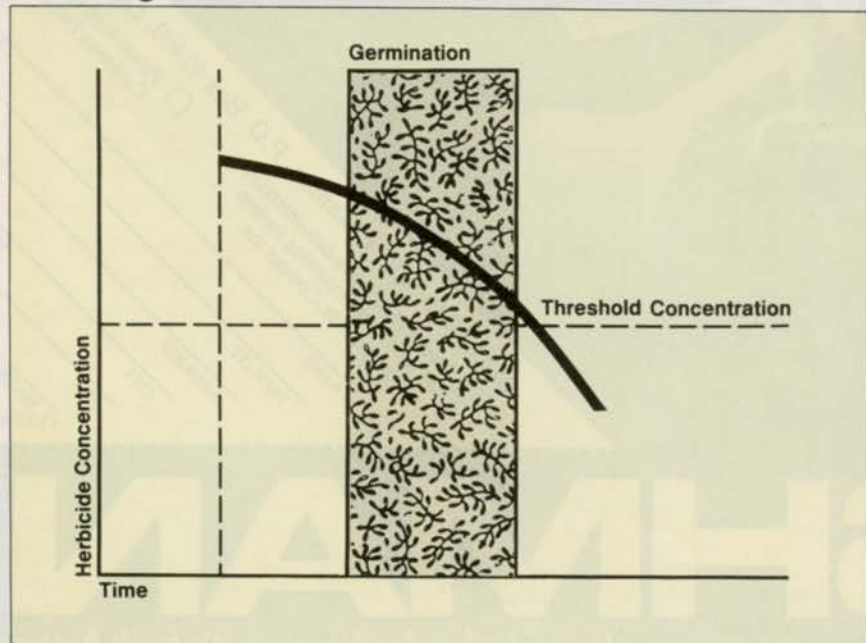
Tebuthiuron provides excellent control of a variety of undesirable woody plants. This herbicide is formulated as pellets and contains 20 or 40 percent active ingredient. A new "brush bullet" containing 13.8% active ingredient is also available. Tebuthiuron is commercially available for grazing lands and weed control on non-crop areas.

Hexazinone is a relatively new compound showing promise for woody plant control and use on non-crop areas. Hexazinone is recommended for forestry site preparation and pine release where loblolly, long leaf and short leaf, slash, and Virginia pines are grown.

The pelletized product can be spread in a grid pattern for hardwood brush control. It also shows promise for total vegetation control including perennial grasses. It is highly water soluble.

The ureas and uracils mentioned

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Circle No. 159 on Reader Inquiry Card



Herbicide Directory

Herbicide	Brand Name(s)	Company	Uses
amitrole	Amitrole-T	Union Carbide	Non-selective grass and broadleaf control in non-crop areas including ditches, roadsides, industrial areas and marshes.
arsenal	Arsenal	American Cyanamid	Non-selective grass and broad leaf control in non-crop areas.
ammonium sulphamate	Ammate	DuPont	Non-selective rights of way herbicide
asulam	Asulox	Rhone Poulenc	Postemergence grassy weed control for turf and ornamentals
atrazine	atrazine	Ciba Geigy	Non-selective control in non-crop areas.
benefin	Balan	Elanco	Preemergence control of annual grasses and broadleaf weeds in established turf.
bensulide	Betasan Pre-San Lescosan Betamec-4	Stauffer Mallinckrodt Lesco PBI Gordon	Preemergence control of annual grasses and broadleaf weeds in established turf and established flower gardens. Safe near tulip and daffodil bulbs.
bentazon	Basagran	BASF	Selective postemergence control of nutsedge in warm-season turf.
bromacil	Hyvar	duPont	Nonselective control of weeds and grasses in non-crop areas. usually mixed with diuron for roadsides and rights-of-way.
bromoxynil	Brominal Buctril	Union Carbide Rhone Poulenc	Postemergence control of broadleaf weeds in seedling turf, established turf and non-crop areas.
cacodylic acid	Phytar Rad-E-Cate	Vertac Vineland	Nonselective control for turf renovation, edging and in plant beds.
chloramben	Amiben	Union Carbide	Preemergence control in ornamentals.
chlorfurecol	Maintain	Uniroyal	Growth regulator. Also controls broadleaf weeds and vines.
copper	Citrine-Plus	Applied Biochemists	Control algae, chara and hydrilla in potable water.
dalapon	Dalapon 85 Dowpon M	SDS Biotech Dow	Selective control of perennial and annual grasses in non-crop areas and ditchbanks.
dazomet	Mylone	Hopkins Ag.	Preplant sterilant for turf and ornamental beds.

continued on page 78

are absorbed primarily through the roots of plants. They may be applied in spring or fall when weeds and brush are actively growing and when adequate rainfall leaches them into the soil.

Fall, winter, and early spring applications of tebuthiuron and hexazinone can be timed to reduce injury to forage plants and eliminate hazards of drift. These compounds may kill trees at a considerable distance from the point of application, depending upon the size of the root system and whether it extends into the treated areas. Therefore, extreme care should be taken near desirable trees.

Ureas and uracils are non-volatile and do not corrode equipment. Most of the urea and uracil herbicides can be injurious to some forage and turf species when applied broadcast, especially as sprays. Applying herbicides as pellets or balls to confine the herbicide to a few spots in the treated area reduces exposure to desirable forage or turf plants. Also, application of granules, pellets, or sprays to the soil surface or sprays applied subsurface in rows or bands spaced 6 to 10 feet apart may reduce injury to forage or turf and may increase kill of some woody plants.

Most of the ureas and uracils persist in the soil for several months at rates used for brush control. They are low in toxicity to warm-blooded animals.

Other Organic Herbicides

Arsenal (AC 252,925) is a new broad spectrum herbicide with activity against herbaceous and woody plants. It will control sedges, grasses and broadleaved weeds applied either preemergence or postemergence.

Arsenal is readily absorbed through foliage and roots. Complete kill may take several weeks.

Most herbaceous weeds are susceptible to *Arsenal* at rates of 0.4 to 1 pound per acre whereas woody species may require higher rates of 0.75 to 3 pounds per acre depending upon species to be controlled.

Arsenal is being tried experimentally for conifer release and weed control in bermudagrass. *Arsenal* should be applied postemergence to perennial weeds when they are actively growing and the herbicide is readily translocated.

It has a low order of toxicity to warm-blooded animals. It persists for 3 to 12 months in the soil depending upon rate applied and soil moisture content.

Picloram is a selective, translocated herbicide that effectively controls many weed and brush species in

continued on page 78

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B7200	17	3	
B8200	19	3	
PTO HP*			
L245 HC	21	3	Standard
L2250	21	3	Mechanical shuttle-shift (8x7)
L2550	23.5	3	Mechanical shuttle-shift (8x7)
L2850	27	4	Mechanical shuttle-shift (8x7)
L345	29	4	Standard
L355 SS	29	4	Hydraulic shuttle-shift
L3750	36	5	8x8 or Hydraulic shuttle-shift
L4150	40	5	

*Manufacturer's estimate

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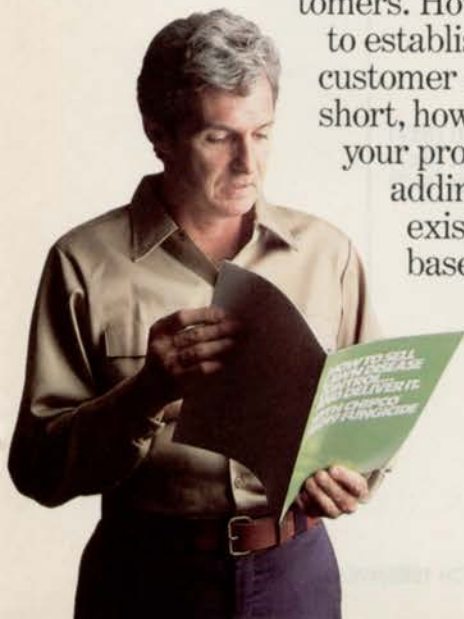
2 THE RIGHT TACTICS.

Coming up with an effective disease control sales strategy is one thing. Carrying it out is something else. Our *Healthy Business Package* shows you how.

It includes not only advice on how to communicate with customers and prospects, but materials you can use.

Materials for newspaper, direct mail and bill stuffers. Doorknob hangers. In-home sales presentations.

One reason lawn disease treatment is an excellent business opportunity is that many homeowners don't even know that turf diseases exist. If you make them aware of the problem—and offer the solution—in your advertising, promotions and sales calls, you'll capture more than your share of this growing market. We can help.



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Before you start offering disease control to your customers, you have to be sure your employees know how to handle the job.

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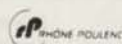
It controls the major turf diseases, including Leaf Spot, Red Thread Dollar Spot, Fusarium Blight and Brown Patch. So it's the only fungicide you need.

Its long-lasting residual action makes it cost-effective and lets you fit it into your existing treatment schedule... with virtually no call-backs.

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Please read label carefully and use only as directed.

Herbicide Directory *continued*

Herbicide	Brand Name(s)	Company	Uses
DCPA	Dacthal	SDS Biotech	Preemergence control of annual grasses and broadleaf weeds in turf and ornamental beds.
dicamba	Banvel	Velsicol	Selective postemergence control of broadleaf weeds in turf and for noncrop control of brush.
dichlobenil	Dyclomec	PBI Gordon	Selective weed control in ornamental beds and for total weed control on roadsides, fencerows, etc.
dichloprop	2,4-DP	SDS Biotech	Brush control and aquatic weed control.
diphenamid	Enide	TUCO, Upjohn	Selective control of annual grasses and broadleaf weeds in bermudagrass, dichondra and around ornamentals.
DSMA	Methar 30 Ansar DSMA Liquid DSMA 81% Weed-E-Rad	W.A. Cleary SDS Biotech Drexel Vertac Vineland	Selective postemergence control of sedges and grasses in turf and ditchbanks and storage yard.
diuron	Karmex Dynex Diuron 80WP Urox	du Pont Vertac Drexel Hopkins	Generally used at high rates for nonselective total weed control in industrial sites.
diquat	Diquat	Ortho, Chevron	Aquatic weed control.
endothall	Aquathol K Endothall	Pennwalt Pennwalt	Aquatic weed control and turf herbicide and dessicant.
EPTC	Eptam	Stauffer	Selective control of annual grassy weeds, nutgrass, and perennial weeds.
Ethofumesate	Prograss	Nor-Am	For control of <i>Poa annua</i> and white clover in fairways.
fenac	Fenac	Union Carbide	Preemergence long-term control of weeds, usually mixed with other herbicides.
fosamine	Krenite	du Pont	Brush control.
fluazifop-butyl	Fusilade	ICI Americas	Selective postemergence control of grassy weeds in ornamentals.
floridone	Sonar	Elanco	Broad spectrum herbicide for submersed and emersed aquatic weeds.
Glyphosate	Rodeo	Monsanto	For control of emerged aquatic weeds and broad leaf weeds in or near aquatic sites, such as ditchbanks.
glyphosate	Roundup	Monsanto	Nonselective, short-term herbicide for turf renovation and total weed control along fences and plant beds.

grasslands. It can be applied to the soil or foliage and is effective as injection/cut-surface treatments on many undesirable trees.

Picloram can be applied in liquid sprays and as pellets to brush in the spring and fall, depending upon the species to be controlled. It is absorbed by both foliage and roots. Most perennial grasses are resistant. Its high activity against many woody plants at moderate rates makes it desirable for brush control. Care must be taken to prevent drift of picloram to desirable plants.

Picloram is relatively persistent in soil, especially in cooler climates. Since it is water soluble, care must be taken to prevent its movement into water used for irrigation. It should not be applied where it can be leached or moved to sensitive plants by rainfall.

Picloram has a low mammalian toxicity and is only slightly corrosive to spray equipment.

Triclopyr (Garlon) is a relatively new selective postemergence herbicide for use of rights-of-way, industrial and forestry sites, and experimentally for rangeland brush control. It can also be used to kill trees and brush by injection/cut-surface treatments.

It is readily translocated in plants and is moderately toxic to warm-blooded animals. It degrades rapidly in the soil.

Ester formulations are available.

Glyphosate is a nonselective herbicide effective against both grasses and broadleaf plants.

Glyphosate is readily translocated from leaf and stem tissue to roots, resulting in a high degree of kill on many weeds. It is inactivated by contact with the soil and should not injure newly-seeded plants in treated soil.

Glyphosate is sprayed in water carrier. It is presently registered for use for noncrop and pre-till weed control and as a directed spray for orchards, plantations, Christmas trees, and many other crops. It is corrosive to some equipment.

Broadcast sprays over woody species will damage desirable forage plants. Applications should be made to individual plants on noncrop areas or areas to be renovated.

Glyphosate has a low order of mammalian toxicity.

Amitrole is effective against poison ivy and poison oak. If amitrole is accidentally sprayed on desirable plants, they are less likely to be severely injured than sprays of phenoxys, dicamba, or picloram.

Amitrole is available as a powder

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Herbicide Directory *continued*

Herbicide	Brand Name(s)	Company	Uses
imidazoline	Arsenal	American Cyanamid	Broad spectrum systemic industrial herbicide
linuron	Lorox	du Pont	Short-term control of annual weeds in roadsides and fence rows.
mefluidide	Embark	3M	Growth regulator that suppresses <i>Poa annua</i> .
methyl bromide	Dowfume	Dow	Fumigant for pre-plant control. Also kills weed seed.
metham	Vepam	Stauffer	Preplant soil fumigant killing weeds, weed seed, insects and fungi.
metribuzen	Sencor	MoBay	Postemergence control of goosegrass in warm-season turf.
MCP	MCP Mecomec MCP Chipco Turf Herbicide	SDS Biotech PBI Gordon WA Cleary Rhone Poulenc	Selective broadleaf weed control in turf. Often combined with other herbicides.
MSMA	Ansar Broadside Ansar Weed-Hoe	SDS Biotech Vertac Drexel Vineland	Postemergence selective control of crabgrass and broadleaf weeds in turf. Also, grassy weed control in ditchbanks, roadsides, industrial areas.
napropamide	Devinol	Stauffer	Selective control of weeds in ornamental beds and containers. Experimental combination with Betasan for season-long crabgrass control in turf.
oryzalin	Surflan	Elanco	Preemergence control of weeds in established ornamentals.
oxadiazon	Ronstar	Rhone Poulenc	Preemergence control of weeds in ornamentals and turf.
oxyfluofen	Goal	Rohm & Haas	Selective control of weeds in ornamentals.
paraquat	Paraquat	Ortho, Chevron	Nonselective control of weeds in rights-of-way, industrial areas and fencerows.
pendamethalin	Proturf Weedgrass Control	Scotts	Preemergence turf herbicide for control of grassy and broadleaf weeds.
picloram	Tordon	Dow	Systemic, long-term killer of woody plants and broadleaf weeds.
prometon	Pramitol	Ciba Geigy	Nonselective herbicide with long residual for industrial weed control.

continued on page 86

containing 50% active ingredient or as a liquid formulation. Another formulation, Amitrole-T, contains 2 pounds per gallon of ammonium thio-cyanate in addition to 2 pounds per gallon of amitrole.

Amitrole is effective through the roots and tops of plants. Amitrole cannot be used where there is any possibility of residues on food or feed crops.

Fosamine (Krenite) applied as foliar spray will kill or suppress several different woody species on non-crop land. If it is applied to trees or brush in late summer or early fall, susceptible species will fail to leaf out the following spring and subsequently die.

Rates of 1-1/2 to 3 gallons of fosamine are applied per acre during the two month period before fall leaf coloration. If rainfall occurs within 24 hours of application, effectiveness may be decreased. Use only in accordance with recommendations on the label. Fosamine cannot be used on cultivated land or in pastures.

Inorganic Herbicides

Ammonium sulfamate (AMS, Am-mate) is a nonselective herbicide. It is used extensively to kill all plants growing on rights-of-way.

AMS kills trees. It can be used as a foliage spray or in cuts through the bark. When applied to stumps, it prevents sprouting. AMS kills or suppresses herbaceous plants as readily as woody plants.

It is corrosive. Spray equipment should be cleaned immediately and coated with diesel oil or similar light oils after use.

Oils Diesel oil and kerosene are commonly used to control honey mesquite and huisache. One cup to 1 gallon of oil is used per tree, depending upon its size. The oil is applied around the base of the tree during dry weather when the soil is pulled away from the trunk. Application at this time enables the oil to penetrate to the lower buds on the stem.

Oils alone are not very effective herbicides when applied to the foliage of woody plants. However, diesel fuel is commonly used as a diluent and carrier for some oil soluble herbicides.

It is also used as a carrier in aircraft spraying, usually as a 1:4 oil-in-water emulsion. The oil reduces evaporation of the herbicide in arid areas and aids in penetrating stems and foliage of some woody plants. Water carrier, however, is equally as effective as oil carriers in some situations, such as use of 2,4-D on sagebrush.

continued on page 82