

NONSELECTIVE WEED CONTROL IS NOT JUST FOR SPECIALISTS



Just three of many uses of nonselective weed control in Green Industry occupations.

The task of eliminating all or most vegetation in a particular area is part of every Green Industry occupation. Whether the vegetation to be controlled is on a golf course, along a highway, underneath utility lines, a path through a park, drainage ditch banks, or beside cemetery markers, the job is similar.

Consequently, every Green Industry manager should have a basic knowledge of herbicides available for total control. This knowledge should include characteristics of the herbicides, precautions for guarding desirable vegetation and water supply, and plant factors which allow them to be controlled. Such knowledge helps assure efficient and safe control of unwanted vegetation.

Herbicides are designed to fill in where mechanical control is difficult or uneconomical. Although chemical weed control is not new, most advances have taken place since 1945 when the selective characteristics of 2,4-D attracted considerable attention from chemical manufacturers. As a result, the number of primary herbicides increased more than ten fold between 1950 and 1970.

Such growth in the herbicide and insecticide markets caused unease with environmental groups. The result was a vague law which has slowed product development for most of this decade. However, there are indications of growth in the total kill herbicide area recently. New combinations of existing products and new registrations for agricultural products are providing a larger selection. New products like Roundup (glyphosate) are restoring reliance on chemicals for vegetation clearance.



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Selectivity and plant susceptibility

Most total kill herbicides are selective at lower rates. The more susceptible a plant is to a herbicide, a lower rate of herbicide is needed to kill it. Certain factors cause some plants to be more susceptible than others. A few are:

- faster growing plants and plants in growing phases (young) are more susceptible to herbicides.
 - shallow-rooted plants are easier to control (no deeper than two inches).
 - how easily a plant adsorbs a herbicide.
 - exposure of growing points to herbicides.
- According to Klingman and Ashton in their book "Weed Science", the growing points of most broad-leaf plants are located at the tips of shoots and at leaf axils, whereas the growing points of grasses are located below ground and at the base of the plant.
- the sensitivity of a plant's chemistry to the particular herbicide.

Application precautions

Residual herbicides have half lives many months long. This quality is desirable in reducing the number of applications for weed control, however it also increases the persistence of these toxic substances in water sources. Application near wells, lakes and streams should be done with caution. The label will specifically list ditch banks if the herbicide can be used near water. Some brush and weed killers are also used for aquatic weed control, such as Diquat.

Drift can cause problems with herbicide sprays. Droplet size, wind conditions, and direction of spray must be watched carefully. Granular applications should also be made carefully to keep the herbicide away from desirable vegetation.

It is absolutely essential that the label be read thoroughly and its directions followed exactly. A herbicide must be respected, not feared.

Herbicides available

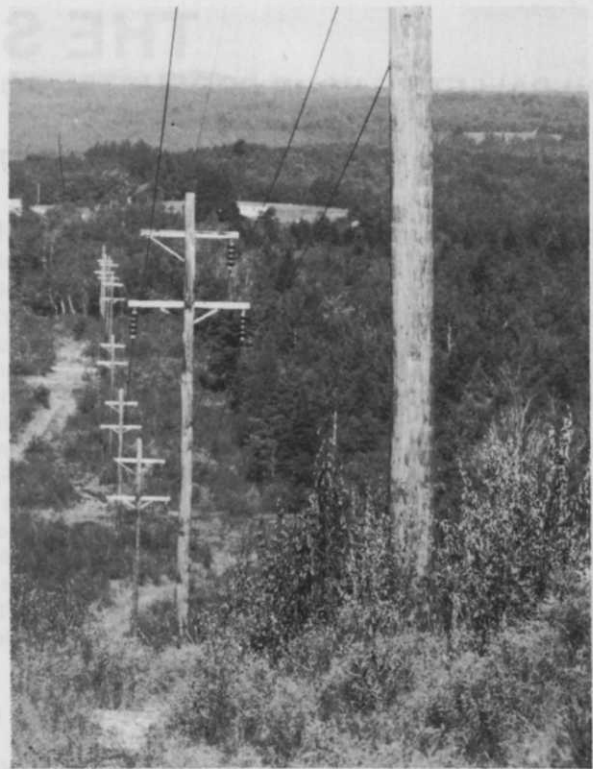
Many total kill herbicides are combinations of contact and soil products. The basic types of applications are:

- foliage spray
- soil treatment
- stump treatment
- bark treatment
- trunk injection

Foliage and soil application are the two primary types concerning Green Industry managers.

Herbicides have been designed to act quickly, slowly (over the winter), for long periods of time or for less than three days. Manufacturers also offer combinations of herbicides which provide quick kill and long term results.

All residual qualities are based upon persistence and continued toxicity of a herbicide in the soil. They may be affected by the amount of rainfall after application, the amount of clay and organic matter in the soil, and temperature. Most manufacturers have improved herbicide formulations to reduce leaching to a minimum.



Utility line clearance is the biggest use of industrial brush herbicides. Substations require bare ground treatment where mechanical control is impractical at current labor costs.



Addition of surfactants to contact sprays may improve their effectiveness. Oil (No. 2 diesel) can be used with some herbicides to improve sticking and penetration through tree bark.

Most herbicides are in the form of wettable powders, emulsifiable concentrates, solutions and granules. Granules are designed for soil application, although some granular products can be mixed with water. Water is by far the most common carrier of herbicides.

Application rates are based upon pounds per acre, or in some cases per 100 sq. ft. (an acre is 43,560 sq. ft.). Liquid applications are usually made with 40 to 100 gallons of water per acre. Aerial spray mixtures contain less water. Mixing instructions are on each label. Wettable powders and

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emulsifiable concentrates may require continuous agitation for even herbicide distribution.

Following is a list of products available for total control and brush control along with the suggested retail price, application rate, and residual period.

**Amchem Products Inc., Brookside Ave.,
Ambler, PA 19002**

Amitrole T

Liquid contact spray of 2 lb. of amitrole per gal. Apply at 1-10 gal. per acre (depending upon plant species) mixed in 50-100 gal. water. Recommended especially for deep-rooted plants such as poison ivy. Price \$16.20 per gal. for 1 gal. can or \$15.45 for 5 gal. can.

Amizine (wetable powder)

Combination of amitrole and simazine for season-long control. Mix 20 lbs. in 100 gal. water for one acre spray. Very little leaching. Can be used near larger shrubs and on ditch banks. Price \$4.77 per lb. in 5 lb. can and \$4.55 per lb. in 50 lb. drum.

Amizine (liquid)

Same as Amizine w.p. but liquid applied at 8 gal. per acre in 40 gal. water. Price \$11.61 per gal. in 1 gal. can and \$10.88 per gal. in 5 gal. can.

Fenamite

Liquid formulation of amitrole, fenac and atrazine with both contact and soil action. Single application per season. Rate is 4 gal. per acre in 100 gal. water. Major uses include ditch banks and under paving. Price \$18.00 per gal. in 1 gal. can and \$17.30 per gal. in 5 gal. can.

Fenavar (granular)

Soil residual herbicide containing fenac and bromacil. Apply at 75 to 150 lbs. per acre. Price is \$49.25 for 25 lb. drum.

Fenavar (liquid)

Contact and residual liquid containing fenac, bromacil and amitrole. Application rate is 5 to 10 gal. per acre in 50 to 100 gal. water. Price \$17.15 for 1 gal. can and \$16.30 per gal. for 5 gal. jug.

Weedone IBK

Liquid containing 2,4,5-T and 2,4-D for brush control. Apply 1 to 4 gal. per acre in 40 to 100 gal. water. Check state regulations for use of 2,4,5-T. Price ranges from \$18.98 per gal. for 1 gal. can to \$17.76 for 55 gal. drum.

Weedone 170

Replaces Weedone IBK where 2,4,5-T use illegal. Contains 2,4-D and 2,4-DP. Applied at same rates as Weedone IBK. Contact herbicide for use on ditch banks, utility rights-of-way and highways. Price ranges from \$17.83 for 1 gal. can to \$16.61 for 55 gal. drum.

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**American Cyanamid, Box 400,
Princeton, NJ 08540**

Cytrol

Combination of amitrole and ammonium thiocyanate. Liquid is applied at 2 to 4 gal. per acre mixed in 30 to 60 gal. water. Apply during active growth to annual and perennial weeds and grass. Contact action only. Keep away from water and livestock. Price based upon distributor.

Weed Killer 90

Same as Cytrol but in wettable powder formulation. Apply 2 to 4 lbs. per acre in 30 to 60 gal. water.

**Ciba Geigy, P.O. Box 11422,
Greensboro, NC 27409**

Princep 80 W

Wettable powder containing simazine. Long term control through root adsorption. Often used to control weeds under pavement. Rate is 20 to 50 lbs. per acre in an equal number of gallons. Water. Price is \$2.65 to \$3.15 per lb.

Princep 4L

Liquid formulation of simazine for long term control of vegetation. 5 to 10 gal. per acre of mix containing 1 qt. Princep per gal. water.

**W.A. Cleary Corp., P.O. Box 10,
Somerset, NJ 08873**

Diuron 4L

Emulsifiable concentrate applied at 4 to 8 gal. per acre in water for vegetation control on golf course paths, fence rows, and around buildings. Price set by distributor.

**Crystal Chemical Co., 1525 N. Post Oak Rd.,
Houston, TX 77055**

Broadside

Liquid containing cacodylic acid and MSMA for contact spray of brush and grassy weeds. Rate is 1 to 2 gal. of concentrate in 100 gal. water per acre. Price \$11.90 per gal. in 1 and 5 gal. jugs.



Herbicides are used before asphalt is laid to prevent deterioration by vigorous weed species.

Phytar 560

Liquid formulation of cacodylic acid for contact spray on rights-of-way, ditch banks, sidewalks, fences, etc. Rate is 1 to 2 gal. concentrate in 100 gal. water per acre. Price \$13.35 per gal. in 1 and 5 gal. jugs.

**Diamond Shamrock, 1100 Superior Ave.,
Cleveland, OH 44144**

Dalapon 85

Soluble dalapon salt which has contact and soil action with 1 month residual. Good control of foxtail and established perennial weeds in non-crop areas. Mix 15 lbs. of salt in at least 40 gal. water for one acre. Repeat spray after two to four weeks. Bulk price is roughly \$1.25 per lb.

**Dow Chemical, P.O. Box 1706,
Midland, MI 48640**

Dowpon C

Combination of dalapon and sodium TCA. Surfactant required. Dalapon has systemic action on plants. Apply 15 to 45 lbs. per acre in 100 gal. water. Price is \$1.72 per lb. in 15 lb. quantity and \$1.57 per lb. in 45 lbs. quantity.

Esteron 245

Liquid 2,4,5-T for control of woody plants. Not for use on turf or near water. Apply 1 to 3 gal. per acre in 100 gal. water. Prices range from \$24.83 to \$23.80 per gal. Also available for an oil mixture for basal bark treatment and dormant spray.

Esteron Brush Killer

Liquid combination of 2,4-D and 2,4,5-T for control of mixed growths of woody plants and herbaceous weeds. Rate is 1 to 4 gal. concentrate mixed with 100 gal. water per acre spray. Price ranges from \$18.90 to \$17.88 per gal.

Kuron

Liquid silvex (2,4,5-TP) for control of woody plants and weeds (not stoloniferous grasses). Rate 1 to 3 gal. concentrate in 100 gal. water or oil per acre. Also acts as aquatic herbicide. Can be used as dormant and basal bark spray. Price ranges from \$27.22 to \$25.38 per gal.

Tordon 101R Forest Herbicide

Ready-to-use liquid herbicide containing picloram and 2,4-D. Applied full strength to stumps and cut brush to prevent regrowth. One gal. jug cost \$9.60. Only picloram product not restricted use.

**E.I. Du Pont De Nemours Co.,
Biochemicals Div., Brandywine Bldg.,
Wilmington, DE 19898**

Amate

Soluble powder of ammonium sulfamate for control of woody plants and short term weed control. Two or three applications per year. Mix 60 lbs. powder in 100 gal. water per acre. Non-volatile and non-flammable. Comes in 50 lb. drums.

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Hyvar X

Wettable powder containing bromacil for season-long weed and brush control. Very effective on perennial grasses. Mix 15 to 30 lbs. in 100 gal. water for handgun spraying an acre. Available in 4 and 50 lb. quantities.

Hyvar XL

Liquid formulation of bromacil for use diluted 6 to 12 gal. concentrate in 40 gal. water per acre or undiluted as basal spray for brush. Comes 1 to 30 gal.

Karmex

Wettable powder containing diuron for season-long control of weeds and as a soil sterilant. Rate is 20 to 60 lbs. of Karmex in 40 to 100 gal. of water per acre. Available in 4 lb. bags and 50 lb. drums.

Krenite Brush Control Agent

Contact herbicide liquid containing fosamine ammonium. Rate of 1½ to 3 gal. concentrate in 50 to 300 gal. water per acre. Apply in late summer or early fall for slow defoliation during winter. Can be used near water. Comes in 1.5, and 30 gal. amounts.

Krovar

Wettable powder containing bromacil and diuron for season long control of weeds. Rainfall needed for most effective use following application. Rate is 19-40 lbs. per acre in 40 to 100 gal. water. Comes in 5 and 50 lbs. quantities.

Velpar

Contact and residual herbicide containing hexazinone. Powder is dissolved in water and applied at 6 to 12 lbs. per acre for season-long control. Rainfall aids soil activation. Available in 4 lb. bags and 50 lb. drums.

**Elanco Products Co., P.O. Box 1750,
Indianapolis, IN 46206**

Spike

Total vegetation control herbicide containing tebuthiuron. Available in wettable powder and granular formulation. Soil residual of 12 to 15 months. Rate is 5 lb. acre and maintenance rate of 1½ to 2 lb. acre. Apply prior to heavy rainfall. Price suggested 50 lbs. box wettable powder \$536, 4 lb. box wettable powder \$43.75, 50 lb. of 1 percent granular \$29, 50 lb. 5 percent granular \$82.

Surflan

Wettable powder containing oryzalin applied prior to emergence of weeds around established ornamental plants. Rate 5 lb. acre applied as spray. Five lb. bag costs \$35.

**PBI Gordon, 300 S. Third St., P.O. Box 2276,
Kansas City, KS 66110.**

Vegemec

Emulsifiable concentrate containing prometon and 2,4-D acid. Season long control of most annual and perennial broadleaf weeds and

grasses. Mix 1 part Vegemec with 8 parts water and use large droplet spray. One gal. concentrate will control vegetation in a 900 sq. ft. area. Available in 1 and 5 gal. quantities. Price \$8.70 for single gal. and \$8.15 per gal. in 5 gal. size.

**Monsanto Agric. Products Co.,
800 N. Lindberg Blvd., St. Louis, MO 63166**

Roundup

Liquid contact herbicide of glyphosate with no residual activity. Application should be made at proper time which varies among plants. There must be enough green foliage and metabolism should be on a down turn. Mix 2 to 5 qt. in 20 to 60 gal. water for one acre spray. Available in 1 and 5 gal. containers. Price is \$66 for single gal. and \$64 per gal. for 5 gal.

**Occidental Chemical Co., P.O. Box 1185,
Houston, TX 7701**

Borocil IV

Water soluble granule containing sodium metaborate tetrahydrate and bromacil. Provides season long control of annual and perennial broadleaf weeds and grasses. Spread ¼ to 1 lb. per 100 sq. ft. Fifty lb. bag costs \$40.

Hibor C

Granular nonselective weed and grass killer containing bromacil, sodium metaborate tetrahydrate, and sodium chlorate. Apply 1/5 to 1 lb. per 100 sq. ft. Single application per season. Price is \$47 for 50 lb. bag.

Monobor-Chlorate

Granule providing 3 to 4 month control of grasses and weeds. Apply ½ to 4 lb. per 100 sq. ft. Must be watered in. Fifty lb. bag cost \$18.50.

Monobor-Chlorate D

Same as monobor-chlorate with diuron. Same application lasts 8 or 9 months. Fifty lb. bag costs \$23.75.

Ureabor

Granule containing sodium chlorate, sodium metaborate tetrahydrate, and bromacil lasting for a complete season. Can be mixed with water (1-3 lb. per gal.) and used as spray. One gal. of solution will cover 100 sq. ft. Should be watered in. Fifty lb. bag costs \$27. Best applied prior to or just after emergence.

**Ortho Div., Chevron Chemical Co., 575 Market St.,
San Francisco, CA 94105**

Diquat

Contact herbicide and desiccant for industrial and aquatic weed control. Contains 2 lb. diquat per gal. Rate per acre is 1 qt. plus 4 oz. spreader in 50 gal. water. Label permits only use of Ortho Spreader X77 at \$12.55 per gal. For smaller jobs, 4 tspns. diquat plus ½ tspn. spreader in 1 gal. water. Price is \$50.50 per gal. in 1 to 54 gal. containers.

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Paraquat

Restricted use contact herbicide and desiccant. Applicators must be under the supervision of a certified applicator. Contains 2 lb. paraquat per gal. Rate per acre is 1 to 2 qt. plus 4 oz. spreader in 50 gal. water. Costs \$42.25 per gal. Doesn't stain sand or sidewalks. Used in sand traps. Diquat is replacing paraquat for many uses.

Rhone Poulenc, P.O. Box 125,
Monmouth Junction, NJ 08852

Chlorea Granular

Granular nonselective weed and grass killer containing sodium chlorate, sodium metaborate, and diuron. Rate of 1 to 2 lb. per 100 sq. ft. provides season long control. Will control deep rooted perennials. Rainfall helps effectiveness. Costs 75 cents per lb.

Velsicol Chemical Corp., 341 East Ohio St.,
Chicago, IL 60611

Banvel 4WS

Liquid dicamba formulation for control of brush and weeds. Contains 4 lb. banvel per gal. Used as ingredient for mixing with 2,4-D and 2,4,5-T. Costs \$36 per gal.

Banvel XP Pellets

Ten percent dicamba pellet for spot application brush control. Apply 50 to 100 lb. per acre. Cost \$1.85 per lb.

Banvel 3-20

Liquid containing dicamba, 2,4-D, and 2,4,5-T. Mix 1 gal. Banvel 3-20 with 100 gal. water per acre. Lasts 3 to 5 years for brush control. Costs \$16.25 per gal.

Banvel 5-10

Oil soluble liquid dicamba and 2,4,5-T. Apply 1 to 3 gal. Banvel 5-10 in 100 No. 2 diesel oil per acre. For dormant or year-round application. Costs \$20.50 per gal.

Banvel 5-20

Oil soluble liquid dicamba and 2,4-D. Can be used on drainage ditch banks where 2,4,5-T can't. Same rates as 5-10. Costs \$18.10 per gal.

Banvel 7-10

Water soluble liquid dicamba and 2,4,5-T. For brush control lasting 3 to 5 years. Mix 7 to 10 gal. Banvel 7-10 in 100 gal. water per acre. Spray to runoff. Cost \$18.50 per gal.

Banvel 7-20

Water soluble liquid dicamba and 2,4-D for general perennial broadleaf weed control along highways, railroads and rights-of-way. Same rate as 7-10. Costs \$13.50 per gal.

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