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WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

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Features:

Departments:

JAMES A. NELSON
Editor and Publisher

JOSEPH R. CORNER
Assistant Editor

D. BUNKIN
Circulation Supervisor

Advertising Representatives
National Headquarters
1900 Euclid Avenue
Cleveland, Ohio 44115
Phone: Area Code 216+771-4169

Chicago 60601
Peck & Billingslea, Inc.
185 North Wabash Ave., Suite 1809
Phone: 312+DEarborn 2-0292-93

New York City 10017
Billingslea & Ficke
420 Lexington Avenue
Phone: 212+532-1632

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Incident in Vermont

Pick up almost any magazine these days that is even remotely related to vegetation control, and you will find numerous admonitions for safe herbicide usage. Turn to page 22 of this issue, and you will find the following reminder: "Read the label. Observe all precautions and use herbicides wisely."

Almost every day, we receive quantities of news releases pertaining to chemicals and their application. Many, if not most, bear statements similar to the above. The few releases, which space limitations permit us to publish, usually have such precautions deleted in the process. Not because we don't believe in them, but because they're everywhere—and too often ignored. If repetition could assure their being followed, everyone who uses herbicides would be thoroughly indoctrinated by now.

We've all heard of the Mississippi fish kill and the dark forebodings of "Silent Spring." These constitute the more dramatic evidence of pesticide troubles. Frankly, we've heard too much of them, and have to admit to a preference for such "backwater" cases as the following, which recently came to our attention:

It happened in Vermont, where a dairy farmer sued a tree company for damages because the company had contaminated his waterhole by mixing herbicides uninvited. The farmer won a substantial judgment. And that is the substance of the entire case. Nevertheless, the suit made the *N. Y. Times,* which quoted this from Circuit Judge Harold R. Medina's appeal ruling:

"It seems to us to be just a bit silly to try to convince a jury of hard-headed Vermonters that it is perfectly all right to put a combination of chemical weed killer and No. 2 fuel oil into a farmer's water supply."

We think this summarizes the case quite well, and while hardly a dramatic occurrence, it does illustrate several very important points. One, it emphasizes the amount of publicity being given to chemical misuses. Two, it shows that people, whether sophisticated urbanites or Yankee dairymen, will not quietly tolerate such misuses. And, three, it underlines the adverse publicity and substantial damage claims that responsible parties leave themselves wide open for.

We offer no admonition. We only remind the few applicators who are tempted to employ unsafe chemical practices of this Vermont incident.

WEEDS TREES AND TURF is the national monthly magazine of urban/industrial vegetation maintenance, including turf management, weed and brush control, and tree care. Readers include "contract applicators," arborists, nurserymen, and supervisory personnel with highway departments, railways, utilities, golf courses, and similar areas where vegetation must be enhanced or controlled. While the editors welcome contributions by qualified freelance writers, unsolicited manuscripts, unaccompanied by stamped, self-addressed envelopes, cannot be returned.

— WTT Mailbox —

Approves of Sod Editorial

Your September editorial, Law Aids Sod Certification, was reviewed by this Department with sincere appreciation. It appears that your philosophy on how sod certification can assist the producer and consumer parallels our own thoughts. Sod certification programs will not be easy to establish. An entirely new group of purchasers will have to be educated in what certification means and how it will work in a marketing program.

It is gratifying that many other states feel certification can assist their sod industry and establish a grade of known quality. The one point we most strongly agree on is that sod certification will never succeed unless it is strictly enforced and relates a meaningful factor of quality to its product.

Your publication is most informative and well prepared, and is reviewed by many of my staff members.

Phillip Alampi

Secretary
State of New Jersey
Department of Agriculture

Boosts Penngift Crownvetch

Mr. Cott's excellent article on "Turfgrasses and Ground Covers" in your September issue was especially interesting to us because it mentioned crownvetch, which we have been studying since 1935, and which we were the first to produce in commercial quantities.

While Mr. Cott's loyalty to the Emerald variety developed at Iowa State University is quite understandable, you probably would like to mention to your readers that the Penngift variety is also performing well in Iowa and Nebraska, as well as in its native Pennsylvania and all across the country.

Whatever variety is used, crownvetch is serving well to hold soil in place; to revitalize unproductive land, to beautify roadsides, medians, rocky banks, slopes, and many other problem areas. It is gratifying to see our project come of age, and to find crownvetch named among other useful plants.

Mrs. Fred V. Grau
Secretary-Treasurer
Grasslyn, Inc.
College Park, Md.

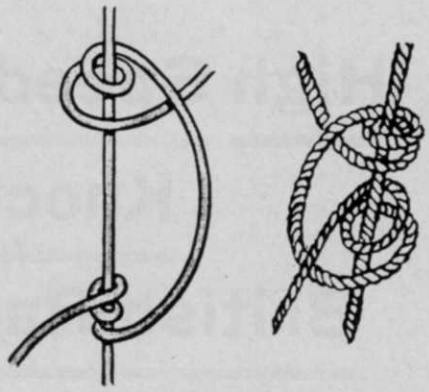
A Knotty Problem

In your October issue, Mr. James W. Taylor brought out the fact that Mr. Bryan's climbing knot was tied wrong in the picture in your August issue. Mr. Taylor's knot is just as wrong. Attached is a picture of the correct way to tie a taut-line hitch. (*Left in illustration below*).

Noah J. Green
Green's Tree Service
Savannah, Ga.

* * *

Reading through your October "Mailbox," the picture of the taut-line hitch caught my eye because, instead of showing the correct method of tying this hitch, it illustrates clearly the results of improper tying. Enclosed is a copy of the taut-line hitch as published by the National Arborist Assn. in its safety booklet. (*Right in illustration above*).



Ellis N. Allen
President
Massachusetts Arborists Assn.

We asked the advice of Dr. Paul Tilford, veteran tree expert, on this knotty problem. He replied:

I refer you to "Rope, Knots and Climbing," Tree Preservation Bulletin No. 7, National Park Service, for information on the taut-line hitch or tree climber's knot:

"The short end of rope protruding from the bowline-on-a-bight is then tied into a taut-line hitch around the ground rope . . . as follows: About 6 in. from the bowline knot, wrap the short end counterclockwise twice around the ground rope, making the secondary wrap below the first. Then, continuing in the same direction around the rope, make 2 turns above the first 2, feeding the end under the short cross rope. When completed, the wraps should be—with reference to the time of wrapping—No. 3 on top, No. 4 next, No. 1 next, and No. 2 at the bottom. With the knot tied and tightened, the sling should be tested before swinging free. Always tie a figure-of-eight knot in the ground end of the safety rope to prevent the end from being pulled accidentally through the taut-line hitch."

The taut-line hitch illustrated in the National Arborist Association booklet, "Safe Practices for Arborists" is tied in this manner, and I am sure this is the generally accepted method.

Organizing New Spray Group

In your October issue, I read with interest reports concerning activities of spraymen's associations.

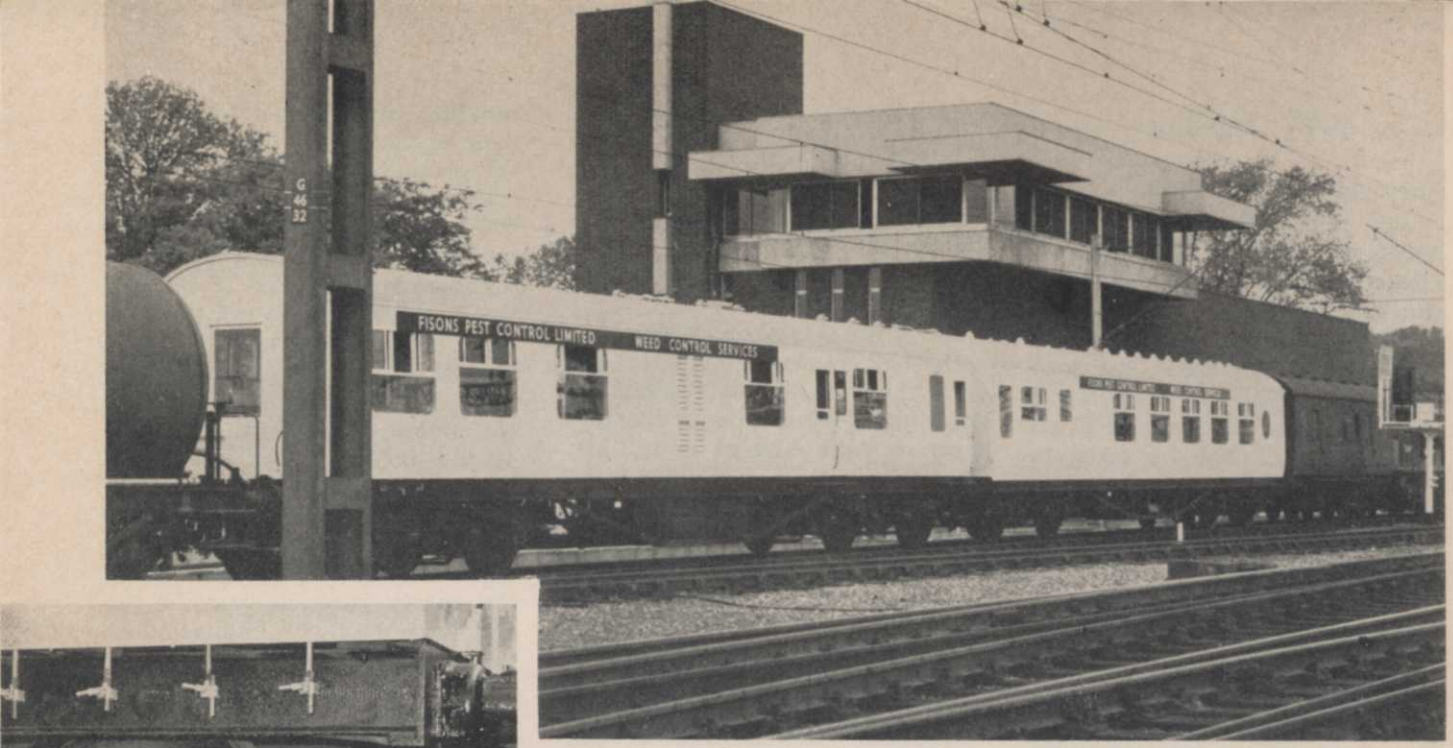
Several professional spraymen, including myself, have been working for the past three years to set up a local association here in Cincinnati. We feel there is finally sufficient interest to start things actively moving, and will soon be calling a meeting to organize.

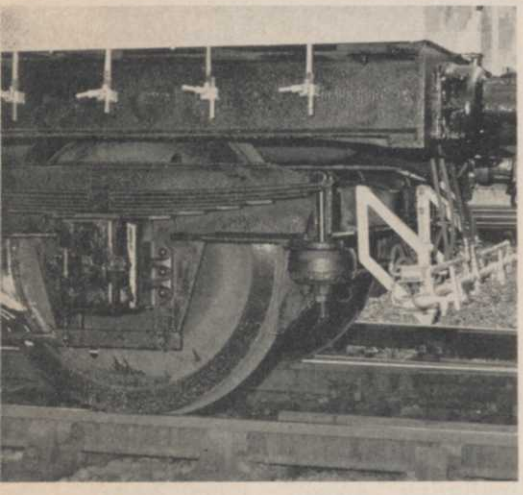
I am happy to see that progressive individuals and groups within our field are starting educational programs so that spraymen become fully aware of the importance of exercising rigid safety precautions when mixing and applying chemicals, and the need for keeping up-to-date on new methods and safer chemicals.

Congratulations on the excellence of your highly informative magazine.

Ted M. Daalhuyzen
The Gro-Green Spraying Co.
Cincinnati, Ohio

Weeds Trees and Turf welcomes expressions of opinions from its readers. Send ideas and comments briefly as possible to James A. Nelson, Editor, Weeds Trees and Turf, 1900 Euclid Ave., Cleveland, Ohio 44115.





Top photo shows general view of spray coach (left), and living coach (right). Underslung spray boom and adjustable side nozzles are seen in cutout detail.

High Speed Spray Train Knocks Out British Railway Weeds

By
GORDON FISHER
Fisons Pest Control Limited
Cambridge, England

BRITAIN has an intensive railway system, intensively managed. About one-sixth of the mileage of railroads in the U.S.A. is squeezed into an area less than that of the State of Illinois, and every mile has an average of 27 trains a day passing over it.

Sometimes in industrial areas traffic is so dense, and track maintenance so continuous, that weeds will fail to get a foothold, but this is exceptional. Generally, the moist climate and long growing season encourage a generous cover of weeds across the ballast and adjoining "cess" on either side—unless something is done about it.

The cess (like the berm on American railroads) is at a lower level than the stone ballast on one side and the grass edge on the other, and collects and holds weed seeds, soil particles, and moisture. Not surprisingly, it favors a wide variety of weeds. Fortunately, the stone ballast beneath the track itself has much less moisture and organic matter, and is less of a weed problem.

Broadleaf Perennials Pose Biggest Problem

Regular use of modern residual herbicides on British Railways has greatly shortened the list of offending weeds, which are now mainly broadleaf perennials, often with roots that penetrate beyond the range of surface applied chemicals, or with a creeping habit that allows them to readily invade the cess from the grass edge.

Horsetail, mainly *Equisetum arvense*, is probably the most troublesome of all, with roots several feet below the surface and a high degree of resistance to residual herbicides. Other deep-rooted problem perennials are hogweed cowparsnip (*Heracleum sphondylium*), dandelion (*Taraxacum officinale*), coltsfoot (*Tussilago farfara*), and such creeping weeds as cinquefoil (*Potentilla* spp.), brambles (*Rubus* spp.), and especially field bindweed (*Convolvulus arvensis*). Grasses are seldom a problem, with the possible exception of couchgrass (quackgrass, *Agropyron repens*).

The range of weed species found and their susceptibility to herbicides is only part of the problem of railway weed control, which is as much concerned with application equipment, chemical supply, and above all with the varying daily and seasonal demands of railway traffic.

On the busy lines surrounding London, a very early start is needed to avoid rush hour traffic. We are typically on the job around 1:30 a.m. and finished with these lines by 5:30 a.m. There is a somewhat different, but no less urgent, traffic problem on Britain's newly electrified trunk route from London to the North via the west coast. One hundred and forty trains a day, most of them travelling at nearly 100 m.p.h., do not leave much time for a leisurely spray train, even though we have increased the speed of spraying up to 50 m.p.h. when necessary.

Mechanization, Long-Term Contracts Replace Hand Work

Chemical weed spraying trains have been used in Britain for nearly 40 years, but until recently weedkillers have usually been supplemented with some hand weeding by maintenance gangs. High labor rates and improved herbicides have made hand weeding increasingly unprofitable, and it is now disappearing completely. Mechanized track maintenance and the rapid spread of long-term weed control contracts relieve the railway engineer of most of his previous responsibilities for a specialized technique, which is, after all, little akin to track engineering.

Fisons Pest Control entered into weed control spraying on British Railways ten years ago, coinciding with the introduction of such residual herbicides as the substituted ureas and triazines. Spray trains existing at that time could deal only with solutions and new equipment was needed to suspend wettable powder formulations of the new herbicides.

Until a few years ago, spray trains were hired by British Rail solely to put down specified dosages of furnished chemicals. But, in 1964, the first two long-term weed control contracts on a "supply and apply" basis were introduced.

Once started, these contracts spread rapidly. The miles under contract speak for themselves: 2,000 in 1964, nearly 4,000 in 1965, over 8,000 in 1966, and a further substantial increase expected in 1967. Mechanization of track maintenance and the proven ability of herbicides to control weeds throughout the year from one application have been the main factors causing this change.

Most of the contracts so far let cover between 500 and 1,500 miles of track, each for a period of three, four, or five years. On main lines, they require 98% weed control in the stone ballasted track, and 95% in the cess. British Rail's contribution is limited to programming spray trains once a year over all lines and to providing motive power.

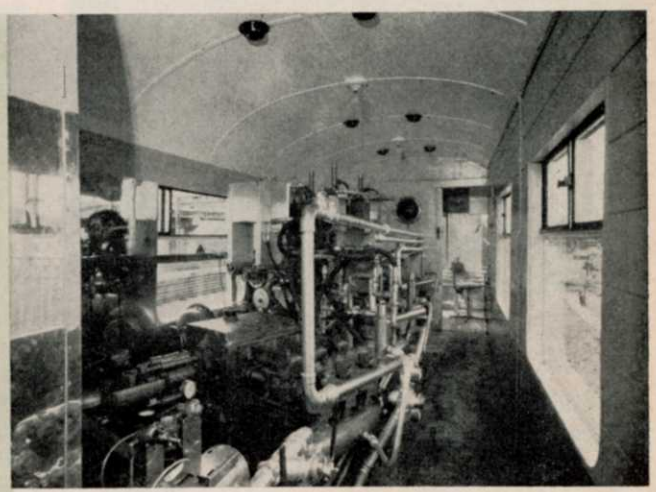
For the chemical supplier, these changes have emphasized two major requirements. First, the contractor must use the most efficient and economical mixtures of chemicals. And, second, he must have equipment to apply chemicals in the right place at correct dosage rates, and at all practicable speeds.

Chemicals we use are mainly atrazine plus amino triazole, with other additives when weed conditions demand them. Rates of atrazine application vary widely from as little as 3 lbs. active ingredient per acre for purely preventive control in stone ballast, up to 14 lbs. or more per acre when spraying heavy stands of weed in the cess, or berm. Rates are designed to give a full year's control to avoid being called back for expensive touchup treatment with hand sprayers.

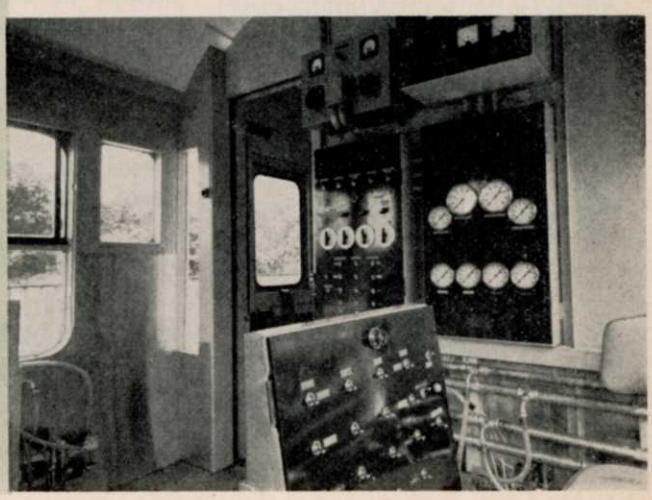
Spraying Delayed Until Midsummer

Weed growth in Britain's erratic climate starts any time from early March to mid-April, but we prefer to spray in June or July when even latecoming species have emerged and can take up the foliar-acting part of

Inside the Spray Coach:



Metering pumps, shown right, measure out precise amounts of chemicals chosen to do the job. Pump output is automatically linked to train speed.



Control room (right) is adjacent to pump room. Electronic operator's panel is shown in foreground. Vertical window spys on trackside ahead.

chemical mixtures in such cases.

No pesticide is fully effective unless applied properly and seldom is this more true than with railway weed control. Aggravating the problem is the frequent conflict with railway requirements for minimum interference with traffic operations. Spraying usually involves a set daily program of 10 or 12 hours at varying speeds with limited stops for replenishing water and chemicals.

Mark IV Train Offers Latest Spray Advances

Successive spray trains developed by Fisons over the last 10 years have culminated in the Mark IV, recently built at a cost of over $56,000. Comprising two 60-ft. coaches and three 40-ton water tankers, the locomotive, two cabooses, and chemical storage cars are supplied by British Rail.

Mark IV has a three-man spray crew and can spray at speeds up to 50 m.p.h. Water capacity is 23,417 U.S. gals., giving a range of 250 miles at an average speed of 30 m.p.h. At the business end of the coach, there is an underslung spray boom plus four long-throw nozzles set at floor level on each side. These can cover up to 10 ft. beyond the coach.

During operation the combined output of water and chemical from each nozzle is constant, giving the same spray pattern and droplet size at all speeds. Low pressures are used to produce large-droplet sprays, and all nozzles point backwards to reduce shearing action of the wind on droplets at higher speeds. Varying wind pressures due to speed, change of direction, etc., can be compensated for at once by manual adjustment of the side nozzles. This design produces a very stable spray pattern that keeps drift to a negligible minimum.

Inside the spray coach, up to three different chemical concentrations are prepared in paired mixing tanks, each tank being used alternately. Any desired combination of chemical concentrations can be selected for various parts of the track and cess.

Chemicals are drawn from the mixing tanks by four metering pumps, which are driven from the coach axle so that chemical output is automatically linked with speed. Though total liquid output of each nozzle remains constant, chemical concentration varies widely with speed to ensure desired spray pattern and chemical volume per acre. All other pumps are driven by a diesel engine housed in a soundproof compartment.

Control Room Operates On Electrical Circuits

The main control room contains nearly all remote controls for operating the train and spraying systems. There is an almost complete absence of levers and valves, all controls and systems being actuated by electrical circuits. Special windows and cutaway portions allow operators controlling the side nozzles to have a clear view of the cess ahead. Any variation in weeds can be met by almost instant changes in chemical type or dosage.

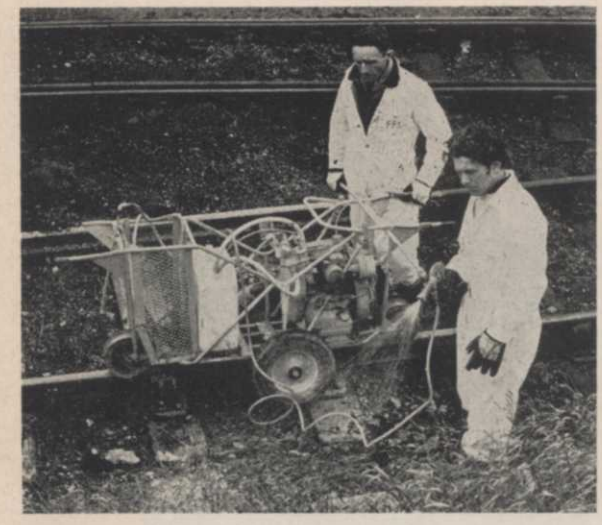
During a seasonal program, the spray crew can be virtually cut off, with "nowhere to go" even though they may cover 5,000 miles in the process. The 60-ft. living coach is designed to provide reasonable comfort for long trips, and contains a well-equipped kitchen, living room, and four separate bedrooms.

Contract Work Extends To Yards and Sidings

The trend towards long-term contracts on British Railways has not been confined to running lines. Weed control on many rail yards and sidings is now dealt with in this way. Here the problem is entirely different. Weeds are similar, but they often grow more strongly in a ballast fouled by soil and rubbish. In yard treatments, we usually use Kagolin, a one-pack mixture of atrazine, TBA, and MCPA, which gives foliar knockdown as well as residual effect.

Access for wheeled vehicles is a major problem in yards. Track centers are only 12 ft. apart, and some or all may be occupied by rail cars, leaving just enough space between for a man to walk. For treating these yards, we have developed a new self-powered barrow sprayer, which carries two 5-gal. cans with enough spray to cover ½ acre.

Output is from a single flood-jet nozzle on the front, which covers a 16-ft. swath and can penetrate between wheels of cars, etc. Alternatively, output can be from a hand spray gun with or without an extension tube. When working between occupied tracks, the barrow sprayer runs on rubber-tired wheels, but if tracks are clear these can be retracted and the sprayer steered along a single rail using the double-flanged wheels in front and back. Carts of the same type are used to take additional cans of spray mix from supply vehicles to sprayers.



Barrow sprayer, here shown in action, was specially designed to meet problem of heavy weed growths in yards and sidings. Operable on ground or track, the highly maneuverable cart shuns obstacles to get at weeds.

Survey '67:

New Herbicides for Noncrop Areas

Dr. F. L. Timmons, noted weed authority, discusses herbicides recently made available for noncrop applications, and offers some suggestions for their use.

By
F. L. TIMMONS
Research Agronomist
Crops Research Division
U. S. Department of Agriculture
Laramie, Wyoming

AT LEAST 16 new herbicides and herbicide uses have been registered for weed control on noncrop, turf, and aquatic areas in recent years. Also, at least six new spray surfactants and systems of increasing droplet size in spray applications have improved the effectiveness of herbicides, or reduced the hazards of spray drift onto desirable vegetation, in or adjacent to the treated noncrop areas.

A number of restrictions have been made on uses of herbicides in noncrop areas, especially with regard to contamination of water for irrigation or domestic use. Many labels have been clarified and made more complete with regard to method, rate, time of application, and precautions for use.

The new developments I shall discuss have all occurred during the 4 years since completion of the manuscript for Agricultural Handbook 269 "Herbicide Manual for Noncropland Areas," published in March 1965. It can be ordered from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20250. Information on earlier herbicide developments can be obtained from this handbook. More recent developments, discussed here, will be included in a new agricultural handbook now ready for press.

Revised by the author from a paper presented on program of Division A-2, Land Use and Management, of the American Society of Agronomy meeting, Stillwater, Oklahoma, August 21-26, 1966. A brief abstract was published in Agronomy Abstracts 1966.

Inverts Cut Spray Drift

At least four formulations of invert emulsions of 2,4-D, silvex, and other phenoxy herbicides are now available. These formulations provide a more viscous spray, having smaller percentage of fine droplets. Usually not more than 1% of them are less than 800 to 1000 microns in diameter, and few are less than 200 microns. This greatly reduces the amount of spray drift, consequently reducing the chances of harming desirable vegetation in neighboring areas.

Two of the invert emulsions are applied by patented bifluid nozzle systems, in which the water from one tank and the herbicide from another tank are mixed at the nozzle. Other invert formulations are premixed with water and applied with conventional aerial spraying equipment, or by special devices such as a whirling disc.

A water-swellable polymer has been developed as a particulating agent for greatly reducing the drift of water soluble herbicide sprays. Special instructions given on the label for mixing the compound with water containing herbicides must be followed for successful use. Spray applications of this material can be made by conventional equipment from which line and nozzle screens have been removed.

The chief advantage of invert emulsion (water-in-oil) and water-swellable polymer formulations is reduction of spray drift. Also, the large droplets dry less rapidly on the foliage and may aid absorption into plants. However, there have been no consistent increases in effectiveness as compared to standard (oil-in-water) emulsions of water sprays. There is a tendency for the more viscous emulsions and particulated sprays to give less complete or uniform coverage of sprayed vegetation. This sometimes results in less effective control.

New polyethylene glycol surfactants have been developed especially for use with wettable powder formulations. These surfactants also improve the effectiveness of some water soluble herbicides and some oil soluble herbicides applied in oil-water emulsions.

New Herbicides Offer Promise

At least eight new herbicides have been registered during the past 4 years for weed control in noncrop areas such as ditchbanks, rights-of-way, fence rows, industrial sites, and tank yards.

Bromacil (5-bromo-3-*sec*-butyl-6-methyluracil) is a highly effective nonselective herbicide for control of a broad spectrum of annual and perennial weeds, at rates ranging from 3 to 6 lb/A* for annuals, 7 to 12 lb/A for most perennials, and from 15 to 30 lb/A for resistant perennial grasses and broad-leaved species. These rates are considerably less than those required of most older nonselective herbicides.

Picloram (4-amino-3,5,6--trichloropicolinic acid) is an extremely potent and versatile new herbicide, available in liquid and pelleted formulations and in several mixtures with other herbicides. It controls such stubborn deep-rooted perennial weeds as Canada thistle, field bindweed, and Russian knapweed, at rates as low as 1 or 2 lb/A active ingredient (a.i.), applied on foliage in summer or on the soil in fall.

Picloram controls most broad-leaved annual weeds at rates as low as ½ lb/A a.i. or less. It is highly effective on many woody plants, but is no more effective on some herbaceous and woody species than are 2,4-D and other phenoxy herbicides. Picloram does not cause serious injury to grasses and grass-like plants except at high rates.

Picloram has a very low order of acute toxicity to animal life. However, because of its high potency on plants and its long persistence in soil, it must be used with extreme care to avoid spray drift onto desirable vegetation, contamination of water to be used for irrigation, or contamination of soil to be used for growing broad-leaved crops or ornamentals.

Prometone (2-methoxy-4,6-bis (isopropylamino)-*s*-triazine), a new industrial herbicide, is available in emulsifiable and pelleted formulations. Suggested rates are 10 to 15 lb/A for annuals and susceptible perennials, and 20 to 60 lb/A for resistant species.

DSMA and MSMA (disodium and monosodium methanearsonates) are recent additions to the arsenal of herbicides for control of perennial and annual weed grasses, nutsedge, cocklebur, and puncturevine at 4 to 9 lb/A.

Paraquat (1,1'dimethyl-4,4'-bipyridinium salt), at 1 to 2 qt/A, rapidly kills annual weeds and top growth of perennials. It is often used in combination with or preceding other herbicides that have a slower but more lasting effect on perennial weeds.

Ethylene glycol bis (trichloroacetate) is registered for use at 10 to 20 lb/A, to control annual and perennial grasses and certain broad-leaved weeds. Two,3,6-trichlorobenzyloxypropanol is registered for use at 4 to 9 lb/A for control of deep-rooted perennial weeds.

*Rates of application are of commercial formulations unless specified as active ingredient (a.i.).

Herbicides for Annual Weeds

Several new herbicides are available for control of crabgrass and other annual weeds in turf. One is siduron (1-(2-methylcyclohexyl)-3-phenylurea), at suggested rates of 4 to 12 lb/A, in new spring seedings, and 16 to 24 lb/A in new fall seedings and established turf. Another is terbutol (2,6-di-tert-butyl-p-tolylmethylcarbamate) for preemergence application at 12½ lb/A for control of crabgrass in established turf.

Bromoxynil (3,5-dibromo-4-hydroxy benzonitrile) has shown promise for control of annual broad-leaved weeds in seedling grasses, at ½ to 1 lb/A. One,1-dimethyl-4,6-diisopropyl-5-indanyl ethyl ketone has shown promise for control of crabgrass and goosegrass in established turf. Neither herbicide is registered for use at this time.

Neburon (1-butyl-3-(3,4-dichlorophenyl)-1-methylurea) at 8 lb/A, norea (3-(hexahydro-4,7-methanoindan-5-yl)-1,1-dimethylurea) at 4 to 6 lb/A, and dichlobenil (2,6-dichlorobenzonitrile) at 4 to 6 lb/A a.i. have recently been registered for preemergence control of annual weeds in woody ornamental, shelter-belt, and nursery plantings. Dichlobenil at 4 to 6 lb/A a.i. applied as a granule formulation in midwinter is also recommended for control of quackgrass, nutsedge, and mugwort in

EDITOR'S NOTE: The following list of trade names of herbicides and adjuvants mentioned in the accompanying article is presented for the convenience of readers who are more familiar with trade names than with common or chemical names.

Common or chemical name	Trade name
ammonium sulfamate	Ammate X-NI
bromacil	Hyvar X
bromoxynil	Brominil
dichlobenil	Casoron
dimethylamine salts of endothall	Hydrothol 191, 47
DSMA	Ansar 184
ethylene glycol bis(trichloroacetate)	Glytac
fenac	Fenac
invert emulsions (examples)	
applied with bifluid nozzles	Instemul, Visko-Rhap
applied with conventional nozzles	Envert, Verton
MSMA	Ansar 529, 170
neburon	Kloben
norea	Herban
1,1-dimethyl-4-6-diisopropyl-5-indanyl ethyl ketone	Sindone
paraquat	Paraquat
picloram	Tordon
polyethylene glycol surfactants (examples)	Plyac, WK Surfactant
prometone	Pramitol
siduron	Tupersan
terbutol	Azak
2,3,6-trichlorobenzyloxypropanol	Tritac
water-swellable polymer (example)	Norbak