

# fairway weed-no-more<sup>®</sup>

# No more weeds.

A single application of trimec<sup>®</sup>-based "Fairway weed-no-more<sup>®</sup>," when young weeds are growing vigorously, will normally control the entire spectrum of those broadleaf pests the remainder of the summer.

"Fairway weed-no-more<sup>®</sup>" is our new name for "Fairway broadleaf herbicide." The product is the same. So is the way it works. Ask almost any turf professional.

Our patented trimec<sup>®</sup> formulation of 2, 4-D, MCPP and dicamba combine to make "weed-no-more" the most effective *single* broadleaf herbicide you can use. Single. One application. No more multiple sprayings with different products to control different weeds.



U.S. Patent 3,284,186

# trimec

TURF HERBICIDES<sup>®</sup>

"Fairway weed-no-more<sup>®</sup>" is safe. The exclusive trimec<sup>®</sup> formula greatly increases the *effect* of the component herbicides on hard to kill weeds. This allows a significant reduction in the *amount* of each chemical required, while still providing excellent control.

Damage to ornamentals, shrubs, flowers and grass is virtually impossible when label directions are followed. This includes bent, bermuda and other sensitive grasses.

**"Fairway weed-no-more<sup>®</sup>."**

It saves you time with single application control;

It saves your budget because a smaller amount of Fairway weed-no-more<sup>®</sup> controls the widest-known spectrum of weeds;

It saves your grass...by eliminating the competition.

No common broadleaf turf weed yet has been able to withstand proper "Fairway weed-no-more<sup>®</sup>" applications.

That's a fact.

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Please bring a sample of "fairway weed-no-more"	

# Sewage Sludge Composting

## From Waste to Resource

WAYS MUST BE found to dispose of vast quantities of sewage sludge. Disposal alternatives include

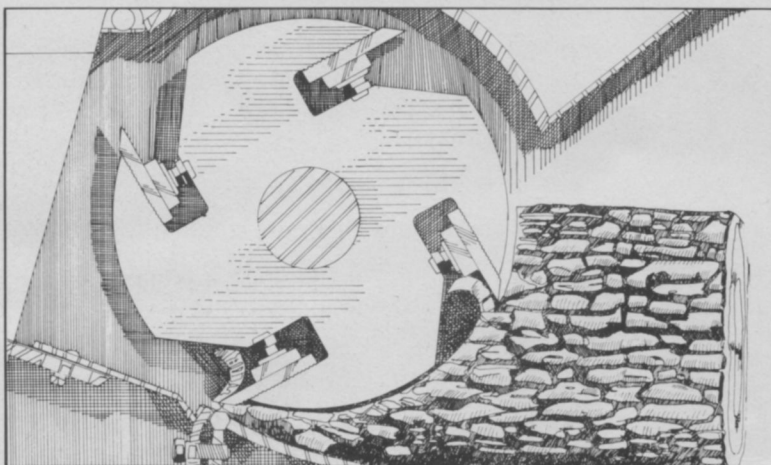
dumping it in waterways, incineration, landfilling and landspreading. Landspreading is the only alter-

native which does not waste a potential soil-building material. Moreover, it is the only alternative possible for disposing of the 550 tons of sludge generated daily at the Blue Plains Wastewater Treatment Plant, Washington, D.C. Other communities face similar problems.

The research demonstration project at Beltsville, Md., is being conducted to show that composting can solve three major sewage sludge problems involved with landspreading: it can stabilize excessive quantities of nitrogen that might get into streams or underground drinking water, it can kill disease-causing organisms, and it can eliminate objectionable odors associated with conventional anaerobic digestion of sludge.

The demonstration project also shows that costs for composting 550 tons of sewage sludge per day will be less than for incineration. In addition, the studies established that composted sludge is safer to dispose of than is raw or digested sludge. In short, composting transforms sewage sludge into a product acceptable to the public.

## There's a neat angle to our chipper story.



The secret's in the rotor. Being a steel forging, rather than a vulnerable casting, it has the structural strength to permit the blades to be positioned at the precise angle for slicing. No more chopping and mangling wood. Or spending an hour or two adjusting rotor blades. Our positive V-lock design reduces adjustment time to a matter of minutes.

When you feed our new Wayne brush chipper, you get neat, uniform, commercially usable chips. Without excess vibration, friction and fuel consumption.

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**FMC** Environmental  
Equipment

### Composting: What and How?

Composting is the natural, biological decomposition of solid organic matter. The method of composting being used at Beltsville is the windrow process. Heat produced by aerobic microorganisms warms air within the windrow. Convective forces move air through the windrow, supplying oxygen to the microorganisms.

Improper management of the composting process will result in an improper oxygen supply. For example, if the windrow is too dense, there will be no air movement. Anaerobic organisms would then take over the process, producing obnoxious odors. On the other hand, if the windrow is too porous, the air will remove heat as fast as it is produced by the microorganisms so

that the compost will stay near air temperature slowing the process.

In the demonstration project, the rate of air exchange is regulated by controlling the porosity and the size of the windrow. Wood chips are used as a bulking material to increase air flow. The chips are needed because the sludge produced at Blue Plains is in a semi-fluid state (75 to 80 percent moisture). A semi-fluid sludge would not permit air movement needed for effective composting.

### Composting Procedure

Wood chips are placed in a strip 12 inches deep by 15 feet wide. Sludge is distributed over the chips to an average depth of four inches. The chips and sludge are mechanically blended and formed into a windrow, which is turned over daily for 10 days. Then it is spread out to a uniform depth 20 feet wide and cultivated to air dry it for two or three days. When the moisture content has decreased to about 35 percent, fresh sludge is added and windrowed for another two weeks. The windrow is then dried again and screened to remove the chips for reuse. The screened sludge is stockpiled for an additional 30 days before it is ready for use as a soil conditioner and low grade fertilizer.

### Compost as a Soil Conditioner

Organic matter improves the physical properties of the soil. Compost, which is a stabilized, partly decomposed organic matter, improves the soil structure. Like a sponge, compost will hold more water than does soil. Adding compost to a light, sandy soil increases the water holding capacity of the soil. Plants grown on these soils are better able to survive drought.

Heavy soils are generally compact, and thus have inadequate air space available for good root growth. Moreover, the compacted soil does not allow water to infiltrate, resulting in runoff and less water available for plant growth. Compost can make a heavy soil friable and loose. Water and air can move into the soil, and undesirable gases, such as carbon dioxide;

move out. The loose, friable soil does not restrict root movement as compared with a compacted soil.

Thus composted sewage sludge improves soil conditions, providing a desirable environment for plant growth.

### Compost as a Fertilizer

Composted sewage sludge has a fertilizer rating of about 0.9 percent nitrogen, 2.3 percent phosphoric acid and 0.2 percent potash. This means that it will take five to 10 times as much composted sludge to supply the same plant nutrients as an ordinary 5-10-5 chemical fertilizer. Because the potash level in composted sludge is very low, supplemental potash fertilization will probably be necessary. Beltsville studies show that nitrogen in composted sludge will likely be unavailable to plants unless the sludge is completely cured — that is, unless organic cellulose is screened out or decomposed.

### Heavy Metals in Compost

Adding composted sludge to soil simultaneously adds appreciable amounts of heavy metals, such as zinc, copper, nickel, cadmium and lead. These metals fertilize lawns, gardens and farms.

Zinc is one of the essential trace elements needed in diets, and useful amounts of this metal are taken up by plants. Because many people would benefit from increased dietary zinc, adding composted sludge to soils would be a significant benefit.

The sludges from some cities are polluted with certain industrial metals that are toxic to crops. Crops differ widely in sensitivity to metal toxicity; vegetables are sensitive, while grasses are quite tolerant of excess amounts of zinc, copper and nitrogen.

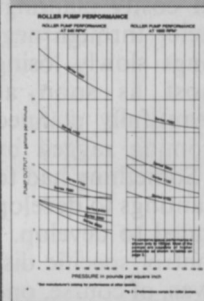
Further, if cadmium content is high in the sludge, crops may contain enough of this metal to be hazardous for use as food or animal feed.

The Blue Plains composted sludge contains approximately 1,000 parts per million (ppm) zinc, 250 ppm copper, 9 ppm cadmium and  
(continued on page 65)

# Sprayer Pump Handbook... yours free.

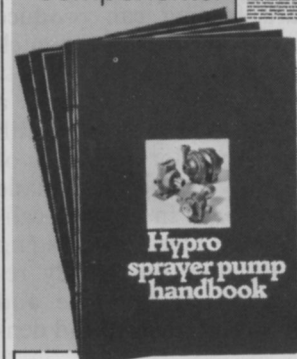
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Hook up diagrams for roller, centrifugal and piston pumps.



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For More Details Circle (107) on Reply Card

# To Design a Better Sprayer

By RAYMOND G. HILL

THE FIRST in a chain of needs became apparent in 1954, when as a "Born-into-the-industry" landscape nurseryman, I felt the hopelessness of current horticultural care. I entered a new field, new in 1954 and still new twenty-one years later. The field of selling no plants but growing them — the field of professional horticulture.

Something had to be done about well designed and costly plantings losing their character through neglect, about plantings slowly losing their value almost as soon as planted, about beautifully planned plant masses becoming ragged by disease or insects. Something had to be done to help plantings to develop as they were intended to develop.

Spraying to control specific diseases and insects was, of course, one of the things that had to be done. And fertilizing with pressure injected liquids for quick response was another. This was a very satisfying profession.

It is a very gratifying business. And one of the gratifications is the new knowledge that pressure injected liquid feeding can produce long lasting effects as well as quick response.

Trees and shrubs examined a year following liquid feeding still showed the deep color and vigor of well fed plants. Young trees made strong growth both in top and caliper; and mature trees, even aging trees, showed slow but steady response in terms of leaf size and thickness, in color, and in head density.

Once in a while a vivid piece of evidence shows itself. With our pressure injected liquid feeding we treated a weak and chlorotic section of some thirty feet in a long hedge of wax leaf ligustrum. Soon the weak section was no longer weak but had caught up in size with the remainder of the hedge. The chlorosis was gone. A year later the treated section was the best part of the hedge, and three years later was

still richer, thicker, taller and better in every way.

Our pressure liquid feeding was done heavily. From the beginning we have used water as a carrier for fertilizer — a device to put the fertilizer where we want it. It is the chemicals used that fill plant deficiencies. Dissolving the chemicals in water and pumping the solution into the root zone is a sure way of getting the chemicals into place so they can feed the treated plant. The amount of fertilizer used is about the same used in applying it dry. The amount of water used is sufficient to dilute it to a safe application point and to carry the dissolved elements into saturation of a substantial part of the soil mass. Even phosphorous applied in this ideal way is hugely effective. Effectiveness is partially due to placement and dispersion, and partially due to a favorable pH adjustment, possible only in liquid application.

Diagnosing plant ills, treating and achieving success is a fascinating new field. But there are problems too. It becomes very difficult to treat plants as individuals, as we

know them to be, when you have one mixing tank and many separate ills to treat. It is frustrating to need many formula variations when it is impractical to change. It is costly to find a need for acidifying chemicals in treating the universal alkaline chlorosis of the Southwest. It is costly because these chemicals are corrosive to metal tanks and metal pumps. Alkaline soils like acid but metal does not! Agricultural or farm fertilizers used for economy and used in our massive amounts for effectiveness are corrosive too. Ordinary pumps were found to be short lived and ordinary tanks and unprotected trucks were soon masses of rust.

Another in the chain of needs became apparent. A machine was needed. A machine designed especially for varied horticultural work. A machine designed from the ground up to possess all the capabilities needed with problems designed out or minimized. It must have multiple tanks and a means of switching between tanks. It must be capable of spraying, or feeding or

*(continued on page 62)*



This ten-year-old fiberglass prototype tank mounted on a one ton truck is the result of many years of dreams, ideas and planning.

# no good GYPSY.



The Gypsy Moth, an insect, which is capable of defoliating millions of acres of forest, parklands and wooded residential areas annually, can be stopped. A very effective biological agent, *Bacillus thuringiensis*, (B.t.) was discovered in the course of a search for new solutions to the defoliation problem. B.t. is specific for *Lepidoptera*, like gypsy moth, tent caterpillar and elm span worm, due to the alkaline nature of their digestive systems. Almost immediately after ingestion these target pests lose their desire to eat. In other words, defoliation ceases.

B.t. is sold commercially under the trade name THURICIDE® and is available in liquid and wettable powder. THURICIDE HPC, our high potency liquid concentrate, disperses instantly in water. Easy-to-mix THURICIDE HPSC wettable powder is free flowing and non-caking, won't clog your sprayer's nozzles or screens, provides outstanding suspension

characteristics. Both formulations are ideal for ground application by hydraulic spray or mist blower.

THURICIDE 16B is designed specifically as a low-volume aerial spray against many forest pests. This formulation has consistently given 75 to 90 percent foliage protection from gypsy moth caterpillars when properly applied.

Unlike toxic chemicals, THURICIDE has proven to be harmless to other living things—man, fish, wildlife, pets and beneficial insects—when used as directed. There is no health hazard or damage from drift. No harmful residues.

For all the facts about dependable, potent THURICIDE, the "new generation" insecticide, see your local distributor's salesmen or call (305) 245-0712, collect.

Sandoz, Inc.  
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 **Thuricide**®  
"The Specialist"

Don't settle  
for less  
than . . .



## Warren's® A-20

KENTUCKY BLUEGRASS  
SOD AND SOD PLUGS

A-20 is rated first in disease resistance and recovers fast from injury because of its vigorous rhizome growth. A-20 will do well in up to 50% shade.

## Warren's® A-34

KENTUCKY BLUEGRASS  
SOD, SOD PLUGS  
& SEED

A-34 should be considered where shade is a problem together with areas of full sunlight. A-34 will thrive in up to 65% shade and grows vigorously in full sunlight.

**A-20 AND A-34 ARE  
PERFORMANCE  
PROVEN FROM  
COAST TO COAST**

University ratings on A-20 and A-34, descriptive literature, prominent job site list and nursery locations are available upon request.

### WARREN'S LAWN FOOD

We sincerely recommend you use Warren's Lawn Food. It is the same lawn food used to produce Warren's highly rated grasses.

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## —People on the Move—

**Merritt L. Raiford**, joined Thompson-Hayward Chemical Co. as an agricultural sales representative working in the Norfolk, Va., area.

\* \* \*

Agrico International, a division of Agrico Chemical Co., subsidiary of The Williams Companies, announces the following personnel changes: **Harvey E. O'Neill**, appointed vice president. **Frederico Zurcher**, named managing partner of Agrico Industries e Commercio Limitada in Brazil. **Kevin de Thompson**, joined the company as vice president of sales. **John D. Martens**, promoted to manager of project development. **James A. Paden**, promoted to coordinator of supply and distribution in the international marketing department. **Scott Reneau**, promoted to supervisor of market research for international marketing.

\* \* \*

**Hans Karl Reiwitz**, appointed sales manager, agricultural chemicals South America, for Uniroyal Chemical, a division of Uniroyal, Inc.

\* \* \*

**John Platta**, appointed creative services supervisor at FMC Corp.'s Outdoor Power Equipment Division. His responsibilities will include public relations work and creative writing for the Bolens line of lawn and garden equipment.

\* \* \*

**Isabel T. Duffy**, named USDA Forest Service public information officer at the Northeastern Forest Experiment Station, Upper Darby, Pa.

\* \* \*

Amchem Products, Inc., Agricultural Chemicals Division, has appointed two new area research representatives: **Ronald F. Spotanski**, responsible for Amchem's research and development program in Iowa and for technical supervision of the company's research farm. **David A. Austin**, has assumed technical supervision of Amchem's research farm at Greenville, Miss., and is the company's area research representative for Arkansas.

\* \* \*

**James R. Novak**, joined Tri State Toro Co. as general sales manager. Tri State Toro is a specialized wholesale distributor of turf maintenance and beautification equipment and supplies.

\* \* \*

**Gene B. Anderson**, named president of Energy Equipment, Inc. of Jackson, Miss., the newly-appointedushman golf car distributor for southern and central Mississippi and northeastern Louisiana.

\* \* \*

**Myron Bliss, Jr.**, named to newly-formed position of product supervisor of insecticides for the Agricultural Chemicals Division of Diamond Shamrock Chemical Co.

\* \* \*

ProTurf Division of O.M. Scott and Sons announced the appointment of two new technical representatives who will work with golf course superintendents and other professional turf managers in Florida: **Thomas E. Hemphill**, who will be responsible for the northwestern section of the state, and **Phillip D. Holcombe**, southeastern Florida.

## The cost of weeds is growing higher.

But it's one cost you can easily eliminate.  
Not just cut, but eliminate altogether.

How?

Simply by calling in a Custom Applicator,  
a weed and brush control expert.  
He's listed under "Weed Control Service"  
in the yellow pages.

Ask him about spraying with KROVAR® I  
weed killer or HYVAR® bromacil weed killer.

Both kill most costly weeds with a single  
spraying each season. It's more  
economical than cutting weeds all season  
long. And more effective.

And no longer will weeds grow to trap  
moisture that accelerates deterioration.  
No longer will rodents and other pests  
find weeds to nest in.

No longer will weeds create  
fire and safety hazards.

And no longer will weeds interfere with work.

Let a Custom Applicator eliminate weeds  
and their costs in one easy spraying.

Give him a call.



**INDUSTRIAL HERBICIDES**

*With any chemical, follow labeling instructions and warnings carefully.*

# Commercial Sod Industry

## Nutsedge, Aquatic Herbicide Research Results

*Editor's Note: The following two articles, the results of just-completed or on-going research, were presented by the authors — both of whom are with the University of Illinois, Urbana, Ill., — at the 29th North Central Weed Control Conference, St. Paul, Minn.*

### Aquatic Herbicides In Irrigation Water

By ROBERT C. HILTIBRAN

AQUATIC WEEDS can present serious problems in irrigation ponds by clogging irrigation lines and pumps, interfering with play on golf courses and detracting from the aesthetic value of the landscape. Attempts at controlling aquatic weeds with herbicides are limited by the subsequent use of the water for irrigating putting greens and other turfs. This experiment was designed to evaluate the suitability of various aquatic herbicides in terms of their safety to intensively cultured turf.

The herbicides were added to barrels of water at normal treat-

ment concentrations and the water was then applied to 'Penncross' creeping bentgrass, maintained as putting green turf, at 9.8 gallons per 30 square-foot plot (equivalent to 1/2 inch of irrigation). Applications were made twice in the spring study (May 31 and June 3), four times each in the spring-summer (May 31, June 3, July 29 and 30) and summer-summer (July 30 and 31, August 7 and 8) studies, and twelve times in the multiple summer study (from August 14 to September 17).

Turfgrass injury varied with type and formulation of herbicide and timing, rate and number of applications (see Table 1). No injury was observed in plots treated with any of the copper compounds, diuron, fenac, 2,4-D amine, or endothall formulations. Diquat, and 2,4-D ester were slightly to moderately injurious depending upon rate and number of applications. Silvex, dichlobenil and simazine were moderately to highly injurious

resulting in complete loss of turf in some instances.

An additional consideration when using herbicide-treated water for irrigating turf is the residual toxicity of the herbicide in water. The relatively short residual activity of diquat in the aquatic environment would allow for safe use of diquat-treated water soon after treatment. In contrast, 2,4-D ester, silvex, and dichlobenil have a longer residual life in the water requiring a longer waiting period between treatment and use of the water for irrigating bentgrass turf. □

### Cultural Practices And Yellow Nutsedge

By A. J. TURGEON

YELLOW NUTSEDGE is a serious weed of lawns and intensively-cultured turfs which has increased in occurrence and distribution in recent years. Studies were undertaken to determine the effects of cultural practices and Kentucky bluegrass competition on the growth and development of yellow nutsedge.

In a greenhouse study, six yellow nutsedge plants were planted in glass-sided boxes with and without Kentucky bluegrass, and additional boxes were planted with Kentucky bluegrass alone. Half of the boxes were mowed weekly while the other half were unmowed for the first 12 weeks, then mowed weekly for the remainder of the 32-week experimental period.

Observations were made on shoot density, below-ground development and tuber formation. Nutsedge density was highest in boxes in which nutsedge was planted alone and not mowed. Mowing or competition with Kentucky bluegrass substantially reduced nutsedge density during the initial 12 weeks of the experiment. However, the combination of mowing and competi-

(continued on page 52)

TABLE 1. Potential Hazard From Aquatic Herbicides In Irrigation Water To Creeping Bentgrass Turf

Aquatic Herbicide	Rate, ppm <sup>a</sup>	Hazard <sup>b</sup>
Copper sulfate	1 (Cu)	low
Copper-triethanolamine complex <sup>c</sup>	1 (Cu)	low
Diuron	0.25	low
Endothall		
potassium salt	1	low
N,N-dimethylalylamine salt <sup>d</sup>	1	low
mono (dimethyltridecylamine oxide)	1	low
di (dimethyltridecylamine oxide)	1	low
Fenac	2	low
2,4-D		
dimethylamine sale	2	low
butoxyethanol ester	2	moderate
butoxyethanol ester	4	moderate
Diquat	1	moderate
Diquat + copper-triethanolamine	1+1 (Cu)	moderate
Dichlobenil	2	high
	1	moderate
Silvex		
butoxyethanol ester	2	high
potassium salt + endothall <sup>e</sup>	2+1	moderate
Simazine	0.5	high

<sup>a</sup>Rates expressed as acid equivalent or active ingredient of each herbicide rather than as salt or ester formulation; <sup>b</sup>Hazards expressed as: low (little likelihood of turfgrass injury from use), moderate (some thinning and discoloration of turf), and high (severe injury or loss of turf); <sup>c</sup>Cutrine Plus; <sup>d</sup>Hydrathol-47; <sup>e</sup>Aquathal Plus.



Installing underground utility lines and sprinkler systems can be a problem for grounds maintenance people, landscaping contractors, and golf course superintendents.



Ditch Witch would like to help.

At most sites, it's possible to make underground installations of telephone and electrical cable — even a complete sprinkler system *without* having to dig a foot of trench across your expensive turf. Ditch Witch vibratory plow equipment can do the job quickly and efficiently.

Of course, in some cases, due to the soil conditions and other factors, trenching is required.

The point is this: we've been in the service-line trencher business ever since we started it by introducing the first such equipment more than 20 years ago. Whatever your particular requirements, there's a Ditch Witch that's exactly suited to your needs.

Selling and maintaining Ditch Witch underground equipment is your Ditch Witch dealer's only business. He knows your area and its soil conditions, so he can help you determine the most practical and economical way to solve your problems. Let's get together!



Ditch Witch . . . equipment from 7 - to 195-HP.

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For More Details Circle (118) on Reply Card



There's a trend back to low-cost three-wheelers for some types of work. Here a groundsman at Oakmont Country Club in Glendale, California pulls a long hose from one job site to another.

### WHEELS (from page 22)

price they have some conveniences such as electric starter, automatic shift torque converter, disc brakes, high flotation tires and a 10 cubic foot bed. Optional are: reverse transmission, dump bed, larger tires, and lights. Also available are: an LP conversion model, extra seat and turn signals. Top speed is 18 miles per hour. The manufacturer is HMC, Inc. in Torrance, California.

Grounds bosses react with in-

terest to the life cycle value analysis technique now being applied in so much government buying. It pinpoints the true annual cost of a product by adding up the original cost, plus service and maintenance costs, and then dividing the total by the number of expected years of service. There was general agreement that the life cycle value of the new type of low-cost three-wheeler utility carts worked out about as follows: \$900 original cost divided into

5 years expected life of cart .....	\$180 per year
Oil and gas (heavy use) @ 60¢ per day for a 6-day week ...	180 per year
Engine replaced once (\$125 into 5 years) .	25 per year
Maintenance and service .....	70 per year
<b>Complete cost per year for heavy use</b>	<b>\$455</b>

A life cycle cost per year for the more expensive three wheelers, said users, would vary substantially according to the make of cart. There was general agreement that it would average just a few hundred dollars more than for the above low-cost carts. Over a five year period this adds up and warrants including some low-cost carts in a vehicle pool.

Larger savings, of course, come when any type of cart carries a man (and tools) who otherwise would walk or be chauffeured; then labor savings could well run over a thousand dollars per year per cart. □

### DRIFT (from page 16)

"When we are spraying along roadsides, we have wind movements created by traffic flow. A passing truck will create enough wind to knock over "men working" signs, or blow the hat off a man working along the side of a shoulder," says Crenshaw. "We would lose a lot of chemical from our target area because of this, and a drift inhibitor helps minimize this problem," he adds.

Crenshaw says his crews are getting a better kill on weeds with a drift inhibitor included with the sprays. "We are spraying the same amount of chemical, but we are doing a better job because we are getting more chemical on the target area," he explains.

"Another surprise we didn't expect is that we also seem to get a better kill with our herbicides after a rain with a drift additive included," says Crenshaw. "The herbicides tend to stick to the plants better."

Crenshaw said that if it would rain in the afternoon after his crews had been out spraying all morning, most of the work had been wasted. The chemicals would wash off the plants. "But since we have been using a drift additive, rain hasn't seemed to affect us any," he says.

The biggest value of adding something to control drift is the extra margin of safety, says Crenshaw. "You can put the chemicals where you want them in spite of winds when we normally wouldn't have been working."

"Before we began using Lo-Drift, we would not spray anything when the wind had reached six mph. But with the additive we can spray in winds of 10 to 12 mph," he explains.

Crenshaw says there were many spraying operations that they couldn't do because of drift. "We never sprayed along roadsides where there was a danger of harming a farmer's crop with chemical drift. Once this year we accidentally sprayed along a man's tomato patch with 2,4-5T where just the fumes from the product will kill tomatoes. But we had included a drift additive with the spray and we did not harm the tomatoes at all," he reported.

(Editor's Note: Amchem does not recommend spraying at high wind velocities.) □

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