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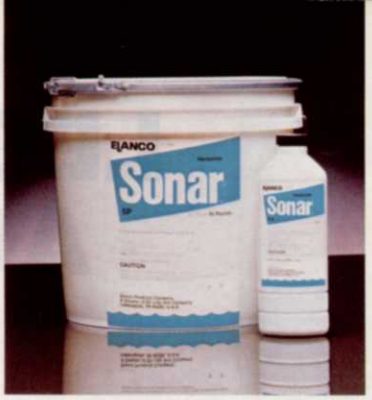


Circle No. 118 on Reader Inquiry Card

LEGISLATION AND AQUATIC WEED CONTROL

Just because it's been delayed doesn't mean that the Endangered Species Act—and others—won't have an eventual effect on the aquatic site manager who applies chemicals.

by John E. Gallagher

Current legislative activity that may affect the business of aquatic weed control personnel is associated with public concern. How?

For many years, environmental activists have made the general public aware of the many "insults to the environment" associated with the use and misuse of pesticides. Now instead of speaking individually, the separate environmental groups have merged into a coalition that speaks with a loud voice. Our politicians recognize this. So the potential for far greater regulations and restrictions on the use of pesticides (aquatic herbicides are pesticides) has now become reality.

We live and work in a social climate where pesticide use remains synonymous with "poison"—a concept not without justification, considering our past mistakes. Your personal and business philosophies must take this organized public concern into consideration in your future operations.

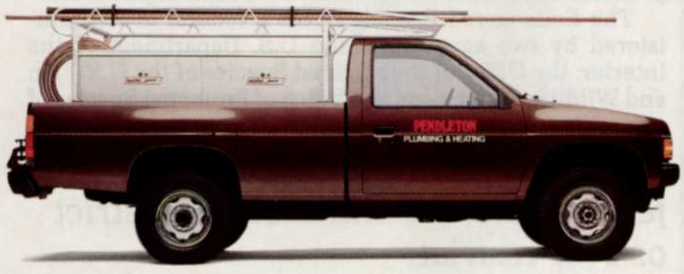
John E. Gallagher is a graduate of Penn State University. He spent 20 years as aquatic weed control specialist with various companies. He is now retired.

The CAST 2,4-D report

Concerted action can also work for the pesticide industry. The combined voices of the weed science societies, the growth regulator society and the aquatic plant management society worked recently. All speaking in defense of

Aquatic site managers who apply pesticides should know about some important legislation coming down the pike.

If your name is on the door, make sure it's the right one.



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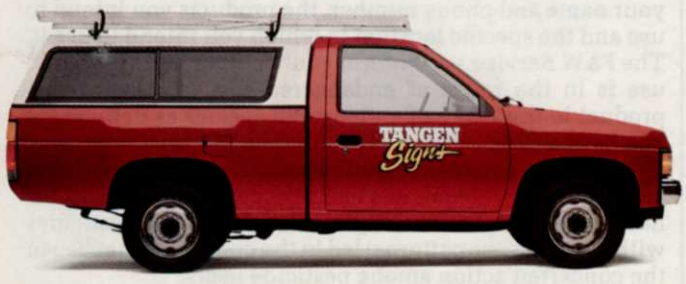

Standard Regular Bed

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2,4-D, the organizations were able to pursuade CAST (Council for Agricultural Science and Technology) to form a task force to do a critique and summary of the "Kansas Farm Worker Study" and other epidemiological studies on 2,4-D and cancer among farmers.

A report "Perspectives on the Safety of 2,4-D" was produced and is available from CAST at a price of $2.

The task force summary concluded that, "2,4-D—as it is generally used—does not represent a significant health threat." It did, however, recommend that "users should apply it with care and respect required of every chemical that can cause harmful effects at high doses." This report should be read and carried by any applicator applying 2,4-D for aquatic weed control.

The Endangered Species Act

Again, concerted efforts on the part of many individuals and state agencies, helped the EPA decide to delay implementation of the Endangered Species Act. The act and associated product label modifications required of pesticide registrants do not take effect until Sept. 15, 1988.

The Endangered Species Act is a federal law administered by two agencies of the U.S. Department of the Interior: the Office of Endangered Species of the U.S. Fish and Wildlife Service and the Office of Protected Species of

There is a feeling that a single federal law will either under-restrict or over-restrict.

the National Maritime Fisheries Service. EPA becomes involved (and subsequently the pesticide industry) since EPA is responsible for registration and labelling of pesticide products including aquatic weed control herbicides.

The basic premise of the act is "a prohibition on the use of pesticides in the range of endangered or threatened species or their habitat."

Section 7(a)2 of the act requires that all federal agencies (including the EPA) conform to the above requirement. The EPA notified manufacturers, formulators and registrants of pesticides of a label reform program which would put it in compliance with the law. This statement was to appear on product labels or on supplemental labelling which must be distributed at the time of sale.

Endangered Species restrictions

The following notice arrived on the desk of company representatives in May of 1987, with a compliance date of Feb. 1, 1988: "Before using this product (specific cluster) in a county listed below, you must contact the endangered species specialist in the regional/field office of the U.S. Fish and Wildlife Service. You must provide FWS with your name and phone number, the products you intend to use and the specific location in which you intend to use it. The F&W Service will inform you whether your proposed use is in the range of endangered species. Use of this product in the range of endangered species as defined for you by the F&W Service is prohibited."

Industry began to implement the proposed label changes. The problems of a lack of accurate county species habitat maps and an incomplete list of clusters (pesticides with common use patterns) led to the confusion that began the concerted action among pesticide users.

The ESA implementation has been delayed, but once the needed accurate county habitat maps are produced and other necessary compromises have been made, the

ESA will, I believe, become an enforceable reality. You, as the ultimate product user, will have to continue to abide by the restrictions on the label.

Groundwater legislation

A very critical legislative battle is under way. It will also affect the daily working operations of the aquatic weed control applicator.

The Durenberger-Leahy S.B. 1419 has as its major premise a requirement that all groundwater come under the regulations that govern drinking water contamination.

The pesticide industry as a whole favors H.R. 2463 which defines potable water—current or potential—on the basis of common sense criteria such as depth, hydrology and water quality. The opposition, environmental groups in support of S.B. 1419, argue that all water must be pure and that the concept of uncontaminated groundwater is a basic property right.

The groundwater issue is much too complex to do more here than to alert you that it, too, is very real. Within a relatively short time, legislation of some sort will be passed.

One final note about groundwater legislation: EPA is encouraging the states to take over. But there is a feeling that a single federal law will either under-restrict or over-restrict.

To get a feel for what can happen, read published information on California's Proposition 65 now in force. Proposition 65 states, "No person in the course of doing business shall knowingly and intentionally expose any individual to a chemical known to cause cancer or reproductive activity." The law includes a provision concerning the discharge of chemicals into drinking water. Iowa and Arizona have passed their own safe drinking water acts and it is expected that more will do the same.

This paints a somewhat dreary picture for the commercial aquatic herbicide applicator. But, as indicated earlier, concerted effort on the part of you and your societies can control some of the unrealistic over-regulation that is being proposed. To paraphrase an old movie, you should "support your local Congressman" to let him know how you feel about these proposed legislative actions and why you feel as you do. You also are concerned about environment pollution. For the industry as a whole, hope for reasonable regulations is totally dependent on cooperative dialogue with concerned environmental groups. It can work.

Consider, for example, the comments made by Richard K. Long, director of corporate communications at Dow Chemical, as reported in the March 14 *Chemical and Engineering News*, on the editor's page:

'The image of chemicals'

"I am glad to talk about public fears of chemicals and technology. Recent publicity shows that not nearly enough is being done to address public concern.

"News media aren't perfect, nor has the chemical industry always been helpful—reporters have seen 'charm school' treatment, wasted threats of legal action and other stonewalling tactics by public relations people. Net result? Prickly reporters, angry industry officials, an often confused public and mostly negative news coverage of chemicals and chemistry.

"Six major environmental laws were enacted in Washington. This suggests that the pro-environmental lobbying was more effective than the industry's effort.

"Experience says that if an industry wants to win, it must be seen as part of the solution, not the problem. Instead of saying 'There's no problem,' we must say with conviction, 'We'll fix it.'" **LM**

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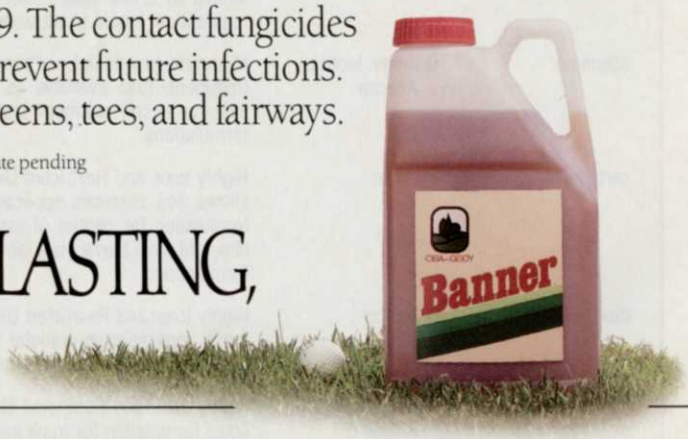

Circle No. 110 on Reader Inquiry Card

SOIL-APPLIED SYSTEMIC INSECTICIDES

These insecticides are a viable alternative to foliar applications, which sometimes raise concerns in the areas of drift and effects on non-target organisms.

by Whitney S. Cranshaw, Colorado State University

Certain insecticides have the ability to move systemically within the sap stream of plant tissue. These "systemic" insecticides can often provide improved plant coverage. They are also particularly effective for control of insects living within foliage (e.g., leafminers, gall makers, leafcurling aphids). For several plant protection purposes, systemic insecticides are superior to non-systemic insecticides with purely "contact" activity.

Relatively few insecticides have systemic activity. All those currently used in woody plant protection are limited to the carbamate and organophospate insecticide classes (Table 1). These systemic insecticides are variously applied to foliage, in trunk injections and as soil treatments.

All systemic insecticides are capable of moving systemically within the plant following foliar application. This remains the greatest use of systemic insecticides in landscape plant care since many commonly used insecticides, such as acephate (Orthene) and dimethoate (Cygon) have systemic activity when sprayed on plants. Following foliar applications, these systemic insecticides move within the leaf and often travel upwards in the plant to a limited extent.

A lesser number of systemic insecticides are also capable of being picked up by roots following soil applications.

Many systemic insecticides (e.g., acephate, mevinphos) are decomposed rapidly or are absorbed by soil particles following soil treatment.

Some soil-applied systemic insecticides remain in effective concentration within the soil before root uptake. After uptake, they move in the xylem and are later also diffused more generally through the phloem by radial transfer. Subsequent movement of systemic insecticides within trees is highly dependent on the tree's respiration and growth. Generally the insecticides become most concentrated in more rapidly-growing tissues.

Some remobilization of insecticides may occur, such as from older needles to new needles, but usually herbicide breakdown in the plant is rapid enough to allow maximum effective persistence of a few months.

Soil systemic insecticides can be variously applied, but all require that the material be injected below ground into the root zone. Granular formulations are placed in holes dug around the base of the plant. Solid forms exist as fertilizer/insecticide spikes or as cakes used for root feeder systems.

Liquid formulations are perhaps the most easy to apply. One of the

The author is an assistant professor and extension entomologist in the Department of Entomology, Colorado State University.

Table 1.

Characteristics of systemic insecticides used on landscape plants.

Common name	Trade names	Remarks
oxydemetonmethyl	Metasystox-R 2, Inject-A-Cide	Moderately toxic. Available as trunk injection or soil application in liquid formulation. Foliar treatment uses have been eliminated. Recent label improvements have clarified soil application uses.
dimethoate	Cygon, Dimethoate	Moderately toxic. Primarily used as a foliar spray but has soil systemic activity. Soil appliction uses limited to a few states with Special Local Need registration. Liquid formulation.
acephate	Orthene, Isotox, Acecap	Moderate-low toxicity. Primarily used as foliar treatment. Also available as trunk implant. Not-effective as soil treatment. Liquid and solid implant formulations.
carbofuran	Furadan	Highly toxic and Restricted Use. National labelling allows soil systemic application use of granular formulation for control of insects of cottonwood, elm, and pine. Some state labelling for use of liquid formulation.
disulfoton	DiSyston	Highly toxic and Restricted Use. Used as soil systemic application in granular formulation. Broadly labelled for use on woody plants.
dicrotophos	Bidrin, Inject-A-Cide B	Highly toxic and Restricted Use. Only available in liquid formulation for trunk injection uses.

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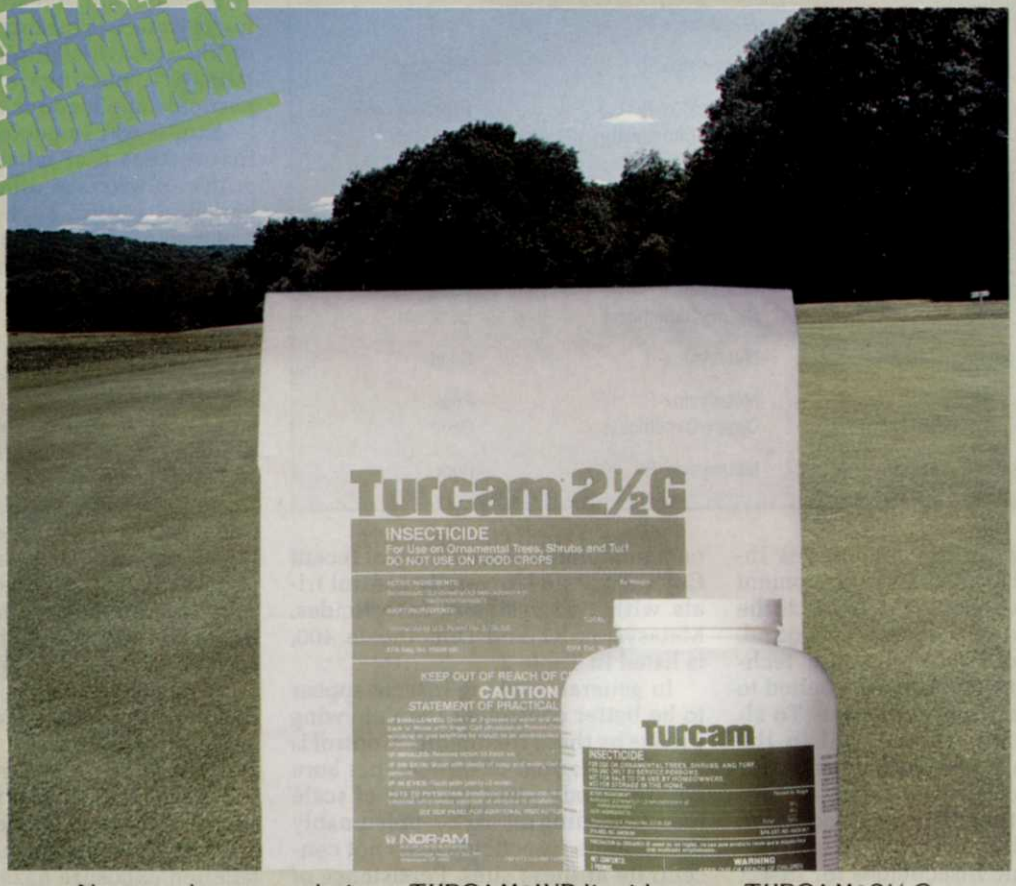

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IMPORTANT: Please remember always to read and follow carefully all label directions when applying any chemical.

Circle No. 138 on Reader Inquiry Card

Table 2.

Summary of Colorado State University control trial results using soil applied systemic insecticides, 1984-1987.

Target Pest	Insecticide	Degree of Control
Honeylocust pod gall midge	Metasystox-R	Fair-Good
Honeylocust pod gall midge	DiSyston	Poor
Honeylocust spider mite	Metasystox-R	Excellent
Honeylocust plant bug	Metasystox-R	Poor
Honeylocust rust mite	Metasystox-R	Fair-Poor
Honeysuckle aphid	Metasystox-R	Excellent
	Cygon/Dimethoate	Excellent
Ash leafcurl aphid	Metasystox-R	Excellent
Pinyon spindle gall midge	Metasystox-R	Fair-Poor
	Cygon/Dimethoate	Excellent
Pinyon tip moth	Metasystox-R	Good
	Cygon/Dimethoate	Excellent
Hackberry nipple gall	Metasystox-R	Good
Hackberry bud gall	Metasystox-R	Poor
	Cygon/Dimethoate	Good
Elm leaf beetle	Metasystox-R	Poor

simplest application techniques involves use of low-pressure equipment of the Kioritz system which injects the fluid several inches below ground. Regardless of the application technique used, treatments are applied to multiple sites around the tree. To allow insecticide uptake, soil in the treated area must remain moist for several days after treatment.

Recently there has been increased interest and availability of soil-applied systemic insecticides for insect and mite control in landscape plants. This has been largely the result of increased concerns and limitations of foliar applications due to problems with insecticide drift and effects on non-target organisms such as beneficial insects, wildlife and clients.

Also important are recent improvements made in the label instructions of at least one soil-applied systemic insecticide, Metasystox-R2, which clarifies its use in landscape protection.

In light of the increased interest in soil systemic insecticide applications, a review of advantages and disadvantages of these treatments is in order.

Advantages

Effectiveness on insects and mites. Soil-applied systemic insecticides are highly effective for control of a wide variety of insects and mites that feed on plant foliage. A summary of recent Colorado State University control trials with two systemic insecticides, Metasystox-R2 and Dimethoate 400, is listed in Table 2.

In general, sucking insects appear to be better controlled than chewing insects by these treatments. Control is usually marginal of insects that bore within woody plant parts or of scale insects feeding on bark—presumably because the insecticide does not concentrate at these sites. Persistence of soil-injected systemic insecticides is often superior to that of foliar-applied insecticides.

Drift. A strong advantage of soil-applied systemic insecticides is the elimination of drift associated with spray applications. Soil systemic insecticide applications are limited to the below-ground areas of the plant. They should not drift onto adjacent properties if properly used.

One area requiring research attention is the possible problem of soil-applied systemic insecticides moving into groundwater.

Agriculture-related problems with the highly water soluble insecticide aldicarb (Temik) are well-publicized. Although the insecticides used in soil-applied systemic treatment of landscape plants have not been associated with similar problems, caution is advisable.

Ease of application. Soil-injected systemic insecticides can be substantially easier to apply than foliar treatments. Injection equipment is often portable and capable of being moved easily to hard-to-reach sites. Applications can often be made rapidly and pre-site preparations to cover furniture, fish ponds, etc. can be reduced.

In areas of considerable rainfall, soil injections can be made during periods when foliar sprays are not possible.

Finally, soil injection treatments may be more favorably considered by ordinances which limit or require notification postings of "air-borne" pesticide applications.

Non-target impacts. Soil-injected insecticides that move systemically within plants are often "easier" on benefical insects such as honeybees and insect natural enemies that do not feed on plant tissue. Nesting birds are also not inadvertently treated during application.

Phytotoxicity. Phytotoxicity remains a potential problem for soil-applied systemic insecticides as well as for foliar or trunk injection treatments. Although some buffering of phytotoxic effects does occur when insecticides are applied to the root zone rather than directly to plant tissue, damage can occur. Species sensitivity to the insecticide, insecticide rate, soil conditions and plant physiology all can affect this phytotoxic response. Expanded use and experience with these treatments will help define phytotoxicity risks.

Applicator safety. Relative applicator safety of soil treatments versus foliar treatments is mixed. On the positive side, soil applications should not typically involve the degree of inhalation exposure hazard that occurs during foliar treatments. Also, application equipment for soil applications can be simpler, involving low-pressure, and less susceptible to accidental exposure following equipment failures.

Conversely, use of soil-injected systemic insecticides typically involves the transportation and handling of highly concentrated pesticide in contrast to dilute mixtures used for spraying. Moreover, the relative toxicity of insecticides with systemic activity typically is much greater than commonly-used foliar treatments such as carbaryl (Sevin), malathion or fluvalinate (Mavrik).

Hazards with accidental exposure are greatly increased if high pressure application equipment is used. Additional training, a very high level of attention to equipment maintenance and the use of protective equipment is