

# PESTICIDE REGULATIONS AS THEY EFFECT NURSERYMEN AND HERBICIDES IN THE NURSERY

Roger E. Sandquist  
Multiregional Pesticide Specialist  
U.S. Forest Service  
State and Private Forestry  
Ogden, Utah 84401

My comments this afternoon will address some of the items that a nurseryman must be aware of when using pesticides. Also, I will relate briefly the activities of the Western Nursery Herbicide Study which hopefully will solve some of your weed control problems.

As you know, many people have become concerned with the effects of pesticides upon man and the environment. Congress in 1972 amended the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) to, among other things, regulate the use of pesticides. Previously only the manufacture and sale were regulated.

This amended FIFRA is rather complex, it has 27 sections each addressing an area in which the U.S. Environmental Protection Agency (EPA) may regulate the research and development, manufacture, sale and use of pesticides. There are four sections which apply directly to the application of pesticides and which may have some effect upon how the nurseryman conducts his business. These are Sections 4, 5, 12 and 14 of FIFRA. Sections 3 and 6 apply indirectly and the other 21 apply to pesticide manufacturers, formulators and other regulating agencies. This presentation is limited to those sections which have the most obvious impacts upon nurserymen's operations.

Section 4 - Use of Restricted Use Pesticides, Certified Applicators. If the EPA determines that a pesticide, when used according to its label directions and precautions may cause, unreasonable adverse effects upon the environment, including injury to the applicator, it will be classified as a restricted use pesticide. The criteria for determining unreasonable adverse effects are written in specific terms.

For our purposes, since no pesticides have been restricted by EPA to give us guidance, the following generalities can be made: a pesticide use will be restricted if its toxicity is category I and calls for the signal words Danger, Poison and has a skull and crossbones on the labeling. Those meeting this criteria which may be used in the nursery are the fumigants chloropicrin and methyl bromide, the herbicides dinoseb (dinitro) and paraquat and the insecticide azinphos-methyl (guthion).

Also, a pesticide may be restricted if its occurrence as a residue immediately following application in or on the food of mammals or birds likely to be exposed, in amounts equivalent to the average daily intake exceeds 1/5 of

the acute oral LD or  $LC_{50}$  of the test species used. The use of the insecticide carbofuran which is hazardous to birds is the most likely one to be used in nurseries or seed orchards.

Other factors which may result in a pesticide use being restricted are its toxicity to aquatic organisms, effects upon reproduction of wildlife species, or subacute, delayed, or toxic effects upon man or other non-target organisms.

These criteria may have no apparent relevance to the use of pesticides in the nursery or seed production area. However, these uses are found on labels which have a variety of use patterns which may pose a significant hazard to man and the environment. Because of the relatively limited market for forestry and nursery uses, manufacturers are reluctant to label products for these uses only; the market does not justify the expense.

The point to which I am leading is that the use of certain pesticides will require the applicator to be certified. The certification process is done by the individual states after their state plans are accepted by EPA. Each state may, and frequently does, have standards and requirements which exceed the EPA requirements. Generally the certification consists of attending a training session and then an evaluation of competence. Some states require a written test. For information on the need for any individual to be certified the local county extension agent should be contacted.

Section 5 - Experimental Use Permits. If a substance or mixture of substances is being put through laboratory, greenhouse or limited replicated field trials on an cumulative total of not more than 10 acres, no experimental permit will be required. The principal investigator or the chemical company representative working with your nursery or seed orchard is responsible to obtain an experimental permit if it is required.

Section 12 - Unlawful Acts. The nurseryman must be aware that it is unlawful to use any pesticide in a manner inconsistent with its labeling. This means that the application rates, pests, directions for use and the precautions must be followed to the letter. However, in many cases this is impractical, so interpretations of this part of the law have been made. Pesticide Enforcement Policy Statements (PEPS) are periodically issued by EPA to define pesticide applications or use practices which will (a) will not) subject the user to prosecution. Several PEPS are of interest to nurserymen. The first one allows the use of a registered pesticide at less than the label dosage. This use will be permitted if the application is: (1) recommended in writing by a knowledgeable expert, (2) efficacious against the target pest and has only beneficial effects to man and the environment, (3) performed in accordance with all other label instructions and precautions, and (4) not repeated at the lower dosage so frequently as to result in a higher total dosage than that specified on the label.

Another PEPS allows the use of registered pesticides for the control of pests not named on the pesticide label. This is particularly helpful in pest control in nurseries and seed orchards because of the unanticipated, infrequent and sporadic nature of pest outbreaks. Also because of the

minor specialty nature of these uses the economic incentive to the pesticide industry is lacking to add these uses to the label, therefore, registration is rarely sought. This control of pests not listed on the label is allowed if all other label directions, rates and precautions are followed. It must be recommended in writing by a knowledgeable expert meeting certain qualifying experience or educational requirements, and no registered pesticide labeled for that use is reasonably available in the area.

Also of interest and perhaps of some surprise to nurserymen is the fact that preventive pest control treatments in the absence of target pests is allowed. Most pesticide labels do not specify that a product can be used in the absence of the target pest. However, in the use of fungicides and pre-emergent herbicides, for example, it is commonly recognized and accepted practice to use preventive treatments. Therefore, if the label does not prohibit preventive treatments they are allowed if the target pests are expected to infest the area to be treated.

Section 14 - Penalties. In general any commercial applicator who violates any provision of the Act may be assessed a civil penalty of not more than \$5000 for each offense or a criminal penalty not more than \$25,000 or 1 year in prison or both. Private applicators may be subject to a civil penalty of not more than \$1000 for each offense or criminal penalties of not more than \$1000, or 30 days in prison or both.

Sections 3 and 6 affect the nurseryman indirectly in that they affect the availability and cost of pesticides. Section 3 requires that pesticides be registered. In order to be registered, the registrant must provide data which shows that the product is safe and effective when used according to label directions and precautions. The extent of the data required and the costs of developing the data may not justify the return a manufacturer can expect on a nursery application. The tremendous potential for liability, if for some unforeseen reason a crop is lost due to this pesticide application, also reduces the desirability of marketing for nursery applications. Section 6 deals with administrative review. Every five years or whenever new information shows that a pesticide may pose an imminent hazard to man or the environment an administrative review may be held. The review most likely will result in the reregistration of the pesticide with no further restrictions. It may also result in additional use restrictions or cancellation of some uses. Since the nursery applications are not usually the greatest profit gainers, they will not receive the attention that the cotton, corn and soybean uses will. There is a hazard that the registrations could be lost by default.

I have given you information on how pesticide regulations may affect the nurseryman. This could be perceived as bad news, however, most will agree that in many areas of pest control this regulation is sadly needed. I believe there is some good news for nurserymen in that several individuals have conceived, secured funding, and started the execution of "An Administrative Study for Herbicide Screening and Weed Control Demonstration in Western Forest Tree Nurseries."

I would like to acknowledge the efforts of Steve McDonald, Westwide Nursery and Greenhouse Specialist, Ron Stewart, Project Leader, Pacific Northwest Forest and Range Experiment Station, and Larry Abrahamson,

formerly Multiregional Pesticide Specialist now with the Applied Forestry Research Institute, Syracuse, New York.

The use of herbicides in western forest tree nurseries is very limited at present. Hand weeding, fumigation, and repeated spraying of diphenamid are the accepted practice. Sporadic efforts at individual nurseries (Anderson 1968, Duffield and Rediske 1963, McDonald 1973, McDonald and Isaacson 1974, Newton et al 1976, Van den Driessche and Balderston 1974) have been made to develop herbicide treatments for forest tree nursery use. McDonald and Isaacson, 1974 illustrated that as much as a 75 percent reduction in weed control costs and a \$6 per thousand reduction in seeding cost could be accrued. Herbicides are available and their potential usefulness has been demonstrated. However, before they may be used, or their use accepted by nurserymen, they must undergo thorough testing at various locations to develop effective and safe treatments; treatments which reduce 70 percent of the weeds and have no significant effects on the conifer species.

The Western Nursery Herbicide Study was divided into three general geoclimatic provinces: the "Pacific Coast" consisting of Washington, Oregon, and California including 15 federal, state and private nurseries. The "Rocky Mountain - Great Basin" consisting of Idaho, Montana, Utah, Nevada, New Mexico, and Colorado including 9 federal, state and private nurseries, and the "Great Plains" consisting of North Dakota, South Dakota, Nebraska, Colorado and Oklahoma including 6 federal and state nurseries. Dr. Ron Stewart and Dr. Russ Ryker are the principal investigators for the "Pacific Coast" and the "Rocky Mountain - Great Basin" phases respectively. We expect to name the principal investigator for the "Great Plains" phase in the very near future.

Three years work will be required to achieve the program goals in each area. This program involves screening of registered and promising herbicides for conifer and hardwood selectivity and weed control the first year. The second year, herbicides that in the first year have demonstrated good selectivity and weed control will be tested on additional tree species and weed problems to develop optimum rates, use patterns and information on remaining soil residues. The third year the best weed control programs will be tested on an operational basis where information on costs and benefits can be compared. At the end of the study in each area, a journal publication summarizing the work, a nursery weed control manual, and a slide-tape training program on nursery weed control will be developed.

The following are the species of seedlings selected for testing at individual nurseries: "Pacific Coast" - Douglas-fir, ponderosa pine, lodgepole pine, sugar pine, scotch pine, Monterey pine, noble fir, white fir, red fir, grand fir, coast redwood, and western hemlock.

"Rocky Mountain - Great Basin" - Douglas fir, ponderosa pine, lodgepole pine, Austrian pine, western larch, blue spruce, Englemann spruce, Russian olive, black locust, green ash, and Siberian pea.

"Great Plains" - this portion of the study is not finalized, however, presently included are ponderosa pine, Colorado blue spruce, caragena, green ash, honeysuckle, Northwest poplar, apple, Siberian elm, Russian olive, plum, cotoneaster, rose and buffaloberry.

Fourteen selected herbicides are to be compared with four herbicides registered for nursery weed control and untreated check plots. (See Table 1).

Very preliminary findings suggest that we can expect to have about four additional herbicides for use in the forest nursery. Further replication and additional studies to determine optimum application rates and effects of any remaining residue must be made before recommendations can be made. As the data becomes available, applications for registration will be made either to the states or to EPA for federal registration. The intent is to gain registrations throughout as wide a geographical area as possible. Data will be shared with others such as the Southeastern Cooperative Forest Nursery Weed Control Study. All involved in these programs have high hopes of significant benefits from them.

TABLE 1. Herbicides and application timing of treatments tested at western forest nurseries.

Herbicide	Application timing <sup>a/</sup>		
	Pre-seeding incorporation	Post-seeding	Post-germination
<u>STANDARD TREATMENTS</u>			
Untreated			
Diphenamid	X	X	X
Trifluralin	X	--	--
DCPA	--	X	X
Chloramben	--	--	X
<u>SELECTED TREATMENTS</u>			
Propazine	--	X	X
Chloroxuron	--	X	X
Profluralin	X	--	--
Oryzalin	--	X	X
Napropamide	X	X	X
Glyphosate	--	--	X
Velpar	--	X	X
Butralin	X	X	X
Bioxone	--	X	X
Oxadiazon	--	X	X
Bifenox	--	X	X
Chloroprotham	X	X	X
Perfluidone	--	X	--
Cyperquat	--	--	X

<sup>a/</sup> Pre-seeding incorporation: incorporated into the top 2 inches of soil immediately before seeding.  
 Post-seeding: broadcast applied to soil immediately after seeding.  
 Post-germination: broadcast applied to soil 4 to 5 weeks after emergence.

REFERENCES CITED

Anderson, H.W.

1968. Two herbicides reduce weeding costs in Washington nursery trials. *Tree Planters' Notes* 19(1):10-14.

Duffield, J.W. and J.H. Rediske.

1963. A selective systemic herbicide for Douglas-fir nurseries-- preliminary findings. *Tree Planters' Notes* 59(Aug.):3-4.

McDonald, Stephen E.

1973. Isolation of a herbicide for general application at the Coeur d'Alene Nursery, 1968-1971. M.S. Thesis, Sch. of For. Univ. Idaho, Moscow. 50 p.  
, and John A. Isaacson.

1974. Using diphenamid herbicide for seedbed weed control cuts hand-weeding labor 75 percent. *Tree Planters' Notes* 25(3):15-17.

Newton, Michael, Jad Lemhouse, and R.K. Hermann.

1976. Chemical weed control in western conifer nursery beds-- research and program development. For. Res. Lab., Oregon State Univ., Corvallis. Unpublished report. 18 p.

Van Den Driessche, R., and M.B. Balderston.

1974. Trials with selective herbicides in Forest Service nurseries. *British Columbia For. Serv. Res. Note No. 61*, 44 p. Res. Div., B.C. For. Serv., Victoria.