

# USE OF HERBICIDES IN WEED CONTROL

by

Lyle A. Baker, Superintendent  
D. L. Phipps Forest Nursery, Elkton, Oregon

## INTRODUCTION

The use of herbicides in weed control is quite a broad subject particularly when we only have thirty minutes to discuss them. However, in spite of the innumerable herbicides on the market today I will try to confine my remarks to the relatively few of which I am familiar.

Before going into the subject further perhaps we should first cover a few definitions, and other points to keep in mind when using herbicides.

When we speak of a herbicide we are talking about a phytotoxic chemical used for killing or inhibiting (stunting) the development or growth of plants.

Herbicides can be divided into two groups according to their toxicity to plants as follows:

1. Selective herbicides.
2. Nonselective herbicides,

A selective herbicide is one which has more toxic action on some species of plants than on others. Thus weeds may often be controlled without significant damage to the crop, by selective herbicidal action. An example of this would be the use of 2,4-D in grain crops. The 2,4-D kills the broad-leaved weeds but does not affect the grasses.

A nonselective herbicide is a chemical, or formulation, that kills or prevents all plant growth without regard to the species being sprayed. An example of this type of herbicide is Amitrole T.

Herbicides can also be divided into two groups according to their action on plant tissues. These are:

1. Contact herbicides,
2. Systemic herbicides:

A contact herbicide, as it implies, is one that kills primarily by contact with plant tissue rather than as a result of translocation. Only that part of the plant contacted is directly affected. Annuals and other young seedlings are killed but perennials may recover from the uninjured parts of the plants below ground. Premerge, a product of Dow Chemical Company, is an example of a contact weed killer.

A systemic herbicide is one that acts through a plant's system, affecting parts of the plants other than those directly contacted- The herbicide is absorbed by the plant and translocated throughout its system. Examples of systemic herbicides are 2,4-D, 2,4,5-T and Amitrole T.

Most effective weed control is based on the proper timing. You can get more effective control faster and with a smaller amount of chemical when all the conditions are just right. Factors to watch for in determining proper timing are as follows:

1. Stage of weed growth.
2. Soil conditions.
3. Rainfall.
4. Temperature.
5. Humidity.

#### STAGE OF WEED GROWTH

Young, active growing plants are generally more easy to control than older plants. The efficiency of herbicides decreases as plants approach maturity. However, in the case of perennials, the reverse may be true. Herbicides may be more effective as the plant develops due in part to the large amount of leaf surface and also that a considerable amount of root reserve energy has been expended just prior to blooming.

#### SOIL CONDITIONS

The same conditions that favor rapid plant growth, such as warmth and moisture, favor the most effectiveness of herbicides. Drought conditions make good weed control more difficult. The type of soil also influences the effectiveness of a herbicide. There is more leaching in light, sandy soil than in soils containing greater amounts of organic matter and clay.

#### RAINFALL

Rain immediately following the application of a herbicide may cause the herbicide to lose its effectiveness. It may also cause some herbicides to leach into the root zone of the crop and cause injury. In other cases, a light amount of rain might be beneficial.

#### TEMPERATURE

The proper action of some herbicides is dependent on air temperature. Higher temperatures generally speed up herbicidal action while lower temperatures retard the action. Consequently it requires a higher application of chemical when the temperatures are low.

#### HUMIDITY

Generally a herbicide is less effective under very dry conditions than under the average humidity conditions found throughout the country.

### MATERIALS AND METHODS

There have been many herbicides developed by the various chemical companies. Most of these, however, are for use in agricultural crops, for use along highways, around storage tanks, along railroad rights-of-way, in drainage ditches, etc. Very few have been, or can be, applied to use in a forest nursery. There are still too many unknown factors about some of the herbicides that cause me to limit their use in the nursery. Perhaps the one

factor that concerns me the most is what residual effects will develop from the constant use of some of these chemicals. Consequently, we have used relatively few herbicides and then mainly those that will not, cause a residual buildup in the soil.

The two herbicides that we have used the most are Amino Triazole and Amitrole T. Amino triazole is a nonselective systemic herbicide and comes as a powder containing 50% active ingredient. It is a white crystalline substance that is quite readily soluble in water,

Amino triazole is most effective on hard to kill weeds such as horsetail rush, dog fennel, groundsel and purslane, to mention a few, when used at the rate of 16 pounds in 100 gallons of water per acre. It is readily absorbed by leaves of plants that are in the early succulent stage of growth. As the plants become older the chemical is less effective, The characteristic symptom of Amino Triazole is chlorosis and eventually complete whitening of the plant. It takes approximately two weeks to complete this process. Amino triazole affects chlorophyll production and the formation of the chlorophyll-containing bodies or chloroplast. It is readily attacked by microorganism in the soil and so consequently does not remain in the soil for a very long period. In other words, there is very little, if any, residual effects after the use of Amino Triazole,

Amitrole T comes in the liquid form. It is another of the nonselective systemic herbicides. Amitrole T is a preparation of Amino triazole and ammonium thiocyanate and is reportedly even more effective on some of the hard to kill plants than Amino Triazole alone. To be most effective, Amitrole T is used at the rate of 3 gallons in 100 gallons of water per acre, A small amount of sticker can be added to each tank of mix to make it adhere to the plants better until absorbed by them.

Plants sprayed with Amitrole T react the same as those sprayed with Amino triazole in that it causes the chlorotic effect and takes approximately two weeks to kill the plant. After that the ground can be worked and planted without any residual effects from the chemical, We have been using the liquid Amitrole T since 1960.

Both of the above mentioned herbicides give excellent, results in weed control when used prior to planting the tree seed. Both are relatively inexpensive, costing approximately \$32,00 per acre for Amino triazole and approximately \$26.00 per acre for Amitrole T. They are easy to handle and apply. One man can do the mixing and spraying.

Recently we began the use of another herbicide for control of weeds in the seedbeds during the winter months. This is a selective pre-emergence herbicide known as Dacthal 50W which was developed to control crabgrass and certain other annual grasses and weeds,

Since this herbicide works primarily on germinating seeds it is necessary to cultivate before application to have the ground loose and free of vegetation other than the tree seedlings. Dacthal has no detrimental effect on the tree seedlings once they are above the ground. It is applied at the rate of 16 pounds in 50 to 100 gallons of water per acre. Dacthal has a low water solubility and therefore must be kept vigorously agitated while spraying.

The ground should be irrigated thoroughly after application of the chemical to achieve the best results. This chemical provides only seasonal weed control. We use it in October on the 1-0 seedbeds to control weeds and grasses that would otherwise grow during the winter months. Using this chemical in the fall has greatly reduced the amount of hand weedling necessary in the seedbeds early the following spring. Cost of this material is approximately \$20.00 per acre.

Although not a herbicide, there is another weed control agent that we use and this is Stoddard solvent. I mention this because up until we began the use of Dacthal 50W it was the only chemical used over the seedbeds during the first growing season. Stoddard solvent has been used in forest nurseries for many years, both as a pre-emerge and post emerge spray. We use 40 gallons per acre over the seedbeds after the seedlings are six weeks old.

We have tried a number of other herbicides on an experimental basis only. Some would have given us good results, but were extremely expensive as compared to the ones being used at present. Others were not used because of their residual effects to the soil. These were all discussed at the Eighth Biennial Western Forest Nurserymen's Meeting at Mesachie Lake, British Columbia in August 1962 and can be found in the proceedings of that meeting.

#### CONCLUSION

In conclusion I would like to leave you with these few thoughts regarding the use of herbicides in forest nurseries.

1. There are numerous herbicides on the market today. Many of these, however, are still too unpredictable in their reactions and residual effects to be used in the nursery. Much more time must be spent by research men in the use of these herbicides as applied to our use. This research must be worked out for each individual nursery as factors differ from one area to another.

2. Before using a herbicide, determine the type that will do you the most good. Do you want a selective or nonselective herbicide? Can you achieve desired results by using a contact herbicide, or would better results be achieved by using a systemic herbicide?

3. Other factors that must be considered in order to get the maximum benefit fastest and with a minimum amount of herbicide are stage of weed growth, soil conditions, rainfall, temperature and humidity.

#### DISCUSSION

Q: Who is the new product Vorlex, by?

A: Morton Chemical Company. To be used at the rate of 40 gallons per acre. Vorlex is effective in controlling weeds if it can be sealed off with water.