

SOME HERBICIDES FOR WATERSHEDS AND ROADSIDE RIGHTS-OF-WAY

by R.F. Pendleton

It would be great to be able to announce a number of new products and techniques for use on watersheds and roadsides. Unfortunately this is difficult since not nearly as many pesticides are being developed now as were developed in the 1950's and 1960's. This is due in part to the cost and time required to produce the required information to bring before EPA for registration. Nevertheless, some new herbicides have been registered and fortunately, some of the oldest remain on the scene and still fill the specific need for watershed application.

Public relations problems in chemical use are much more prevalent now than in the past. In the 1950's the whole concept of pest resistance or tolerance was little known; in fact, first indications of resistance were often explained as being due to insufficient pesticide or poor application. We were not aware of subtle environmental problems, such as greatly reduced survival of newly hatched lake trout brought on by black fly control efforts. Very few complained of involuntary exposure to pesticides during area mosquito control or gypsy moth treatments. On the contrary, most complaints were because the person felt his property had been left out of the program.

Now the attitude has changed. The public is sensitive, even hypersensitive, to chemical use. Spontaneous abortion, cancer, birth defects, and genetic change are concerns of the uninformed public who may develop these con-reports. Very few people, including media personnel, are aware of the intensive testing for toxicity, mutagenicity, carcinogenicity, teratogenicity, adverse environmental effects, efficacy, etc. that must be carried on for a number of years before a pesticide can be marketed. Nevertheless, even though most of us in the arboricultural industry feel that society is over-concerned we must be sensitive to this concern because we are a small minority and our continued effective use of chemicals depends on careful application and good public relations.

The changing scene is not all bad. I think that all of us are much more careful with pesticides than we were twenty or twenty-five years ago. We pay more attention to calibration, following label directions, and being mindful of ecologically and sociologically sensitive areas. Requirements of the certified pesticide applicator program may be inconvenient, but I believe that they have added markedly to our professionalism.

Over the years the aims of right-of-way maintenance have changed. Utility rights-of-way are now maintained not only for reliability of service but also "in harmony with existing land use and in a manner which does not compromise the quality of the environment." (From Goals of the Right-of-Way Management Program, NYS Electric and Gas). Those trees that have the potential to grow into wires are eliminated; low growing shrubs and herbaceous plants that are potential sources of food and cover for wildlife are encouraged. Consequently there has been a reduction of broadcast foliar spraying and a marked increase in selective spraying, both foliar and basal. Smaller, lighter equipment is used, as is selective cutting with stump treatment to prevent regrowth. The large scale brownout that was once seen along many highway and utility rights-of-way is now rare.

Both utilities and highway rights-of-way cross watersheds. Herbicides that can be used in other situations may not be permitted by the watershed authorities. Fortunately there are a few materials that are labeled for use adjacent to potable water. Several more are labeled for ditchbanks.

Ammonium sulfamate or AMS was developed by DuPont in 1945. Its oral LD₅₀ to rats is 3900 mg/kg which places it in the slightly toxic category. It is chemically very similar to ammonium sulfate, a fertilizer. Formerly there were two crystalline formulations — the bright yellow Ammate X, containing a chromate rust inhibitor which is undesirable on watersheds, and the white Ammate X-NI (non-inhibited). Now, only Am-

mate X-NI is available since one of the principal uses is on watersheds. This material is of low toxicity to fish, birds and other wildlife.

Ammate X-NI is registered on "land adjacent to and surrounding domestic water supply reservoirs, supply streams, lakes and ponds, as well as on right-of-ways, roadsides, drainage ditches,..." This is taken directly from the label. Ammonium sulfamate is readily broken down in water but the products released may stimulate undesirable aquatic growth; therefore some watershed permits may restrict its use close to the water's edge. It can be used to kill stumps immediately after cutting, applied either by sprinkling crystals over the fresh cut, or by applying a concentrated solution to the stump surface.

Ammate X-NI can be used very effectively as a foliar spray if "brownout" is not a problem. As I use it in agricultural work the "brownout" is desirable because the farmer can see that unwanted brush is dying after treatment. It lends itself well to restricting woody growth in hedgerows, so that the hedgerow does not encroach upon the field. Likewise, in those fields bounded by woodlands, young woody growth can be sprayed to prevent encroachment. Low limbs on established trees that would normally strike a tractor driver can be chemically pruned. Ammate X-NI is registered for use on pastures, range and fencerows. Since the target plant must be thoroughly covered for the herbicide to be effective, slight spray drift into meadows or pastures will not kill or seriously damage the crop. It is also very effective on poison ivy, so is a good choice for spot spraying on roadsides.

There is one caution. Ammate X-NI is highly corrosive. Sprayers and metal accessories such as spray guns must be rinsed thoroughly after each use and on a daily basis. Where possible a coat of oil on all metal parts is suggested. The label gives more specific instructions for sprayer care. Read it; it is important!

Another DuPont product, Krenite, was first marketed in 1974. It is almost non-toxic, having an oral LD₅₀ to rats of 24,000 mg/kg. The two formulations, Krenite and Krenite S, are both water soluble liquids containing four pounds per gallon active ingredient. Krenite S differs from Krenite only in having a surfactant already added.

Krenite has two unique characteristics; it does not cause "brownout" of deciduous plants, and it is applied later in the season than most other brushkillers, from early August until the first heavy frost. It also is registered for use in watersheds. In this last respect the label bears exactly the same phraseology as that found on the Ammate X-NI label.

Krenite is registered for non-cropland use on rights-of-way, ditchbanks, storage areas and for other similar uses. When applied to deciduous woody plants during the two months prior to fall coloration, there is little or no visible response. No "brownout" occurs and the plant goes through the usual fall change of colors. However, the following spring the new buds do not develop into leaves, or if they are formed they are small and spindly and the plant subsequently dies. The lack of "brownout" makes Krenite a valuable choice in aesthetically sensitive areas. However, don't spray pines, as they will turn brown soon after application.

Krenite is of little hazard to fish and wildlife. It degrades rapidly into the soil. I find it useful in treating farm hedgerows where neighbors might object to "brownout." It is also highly effective against nuisance multiflora rose. The New York State Department of Transportation relies heavily on Krenite in its brush control program.

2,4-D is another of our old line herbicides that is still an excellent material on turf. It is a selective systemic material. It kills many broadleaf weeds but leaves the grasses unharmed. The herbicide is translocated from the leaves to the roots and kills the entire plant. Although 2,4-D was developed in 1942, it totaled 10% of all herbicide use in the United States in 1980.

The oral LD₅₀ in rats is in the range of 375 to 800 mg/kg, placing it in the moderately toxic category. I know of two human fatalities in New York State, both of them due to accidental ingestion of 2,4-D concentrate that was improperly stored in unmarked containers.

Small amounts of 2,4-D drift can cause substantial injury or death to sensitive plants. There have been losses of crops and ornamentals when roadsides have been carelessly sprayed with 2,4-D or when ester formulations have been used. Many flowering plants, grapes, tomatoes, beans, and

carrots are among the sensitive crops that have been damaged. Ester formulations are generally more volatile than amine salt formulations but they are faster acting and consequently less subject to washing off by unexpected rains. Low volatile ester formulations are available and should be the only ester formulations used along highways or other sensitive areas. Effects of drift along roadsides can be minimized by spraying when the wind is calm or no more than five mph, by using low pressure and large droplets, by using adjuvants designed to reduce drift by suspending spraying near sensitive plants, and by spraying sensitive areas in the fall after crops are harvested. 2,4-D is still relatively cheap, both in price per gallon of concentrate and price per area treated.

Unfortunately, 2,4-D and 2,4,5-T are similar sounding names and the general public is aware that use of 2,4,5-T has been suspended for many uses including forest lands, management areas and rights-of-way. The concern is from a manufacturing contaminant, a dioxin. The word "dioxin" refers to a whole complex of materials, one of which is very toxic. The common terminology for this dioxin, one of 75 possible isomers, is TCDD. TCDD was present in earlier commercial formulations of 2,4,5-T at anywhere from one to 70 ppm. The current level of this contaminant is at the general level of 0.01 ppm with occasional batches as high as 0.05 ppm, and is believed to be nonhazardous at this level. Very few commercial formulations of 2,4-D contain any dioxins, and none contains the highly poisonous TCDD.

There are formulations of 2,4-D for weed control in water but special permits are needed in most situations. Tolerance in potable water is 0.1 ppm, but there is the problem that humans can taste a very small amount in water, I believe in the range of one ppm, so there may be a reluctance to allow its use close to or in potable water.

In 1974 Monsanto introduced glyphosate under the trade name, Roundup. Roundup is a broad spectrum, nonselective herbicide that is systemic in action. While it is of low oral toxicity with an LD₅₀ of 4320 mg/kg it carries the signal word "WARNING" which indicates that it is moderately toxic. This is because it can cause severe eye irritation. It has a tolerance of 0.1 ppm in potable

water and is registered for use on ditchbanks, dry ditches, roadsides, rights-of-way and other non-crop uses. Because it binds strongly to soil it has low leaching tendencies; however, the label does require a buffer distance of 75 feet from lakes, ponds or streams used for "significant domestic purposes" if applied at less than two pounds per acre, or 125 feet at rates greater than two pounds per acre. Roundup is of low toxicity to fish and wildlife.

Roundup controls several woody plants and most herbaceous plants. Because it bonds so tightly to soil it does not act as a soil sterilant, so undesirable bunch grasses can be spot treated and removed from turf. Any good turfgrass contacted by the spray will die but the hole in the turfgrass can be reseeded within a few days. Before Roundup was available, about the only alternative was to dig up and remove the unwanted clump.

One caution: Roundup reacts with galvanized or iron tanks to produce hydrogen gas, which could explode if ignited. Consequently the label states that mixing, storing or applying should be done only in stainless steel, plastic, fiberglass, aluminum or plastic lined steel containers.

Oust, a new DuPont herbicide was used last year on a limited trial basis by the New York State Department of Transportation (DOT). As used in New York State, it is a generally nonselective, broad spectrum herbicide, effective against many annual and perennial grasses and broadleaf weeds, both pre- and postemergence. Most woody plants are tolerant of the material. DOT will use it as a soil sterilant under guide rails, where it will be compared with the standard amitrole-simazine mixture. This large scale comparison will be applied to about one-third of the state's guide rail mileage. DOT projects that only 412 pounds of Oust is needed for the entire mileage to be treated.

Obviously Oust is a highly active herbicide. The recommended rate for preemergence to early postemergence is three to five ounces per acre. An acre represents a lot of guide rail mileage. In one trial eight ounces was sufficient to treat the guide rails on 21 lane miles.

The acute oral LD₅₀ of Oust is greater than 5000 mg/kg so it is categorized as almost nontoxic. The formulation is a dry, water dispersible

granule. Shelf life is indefinite but mixed spray solutions should not be stored for more than two days. Half-life under summer field conditions is about four weeks but there is little breakdown in wintertime.

Because the material is active at such low rates, storage inventories are no problem, nor is field transport. It seems that the low rate of application should reduce lateral movement. However, with such low rates the calibration of the spray machinery must be accurate.

There are many other herbicides that can be used on utility and roadside rights-of-way. Careful

assessment of sensitivities and needs together with a careful review of the various products' label information will help you make your choice. Then, most important, careful and considerate application will help preserve the use of these valuable tools.

*Senior Extension Associate
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ABSTRACTS

CHAPMAN, DOUGLAS. 1983. **15 Plants to add to 1983 landscapes.** *Weeds, Trees & Turf* 22(1): 44, 46.

With the new year here, your shopping list for additional trees to use in the landscape should include a few of the following for their aesthetic qualities, tolerance to unique environmental conditions, or disease resistance. The plants are cultivars of crabapple, white ash, linden, and several conifers. These plants, hopefully, give one an idea of the rich variation which is now being offered in many of our nurseries from the East and West Coast and in between. If these plants are not native to your area, they should be put on your want list to experiment with. They exhibit desirable characteristics, e.g., lower maintenance, environmental tolerance, and disease resistance.

KNOX, G.W. and D.F. HAMILTON. 1982. **The long-term effects of light intensity on established woody plants.** *Am. Nurseryman* 156(9): 83-85.

Light intensity influences woody plants' growth during production and their landscape characteristics after transplanting. Previous studies have shown that many woody plants grow better in moderate light intensities than in full sun. To date, most studies have examined seedlings and cuttings at controlled light intensities for only one growing season. Thus previous studies may not accurately indicate the long-term effects of light intensity on the growth of older, established plants. The objective of this study was to determine the growth characteristics of older, established woody plants under selected light intensities for several growing seasons. Leaf area increased with decreasing light intensity for all species. Shoot length of Japanese barberry and Regel's privet was greatest when they were grown at 70 to 53 percent light. The longest shoots for Vicary golden privet occurred at 53 percent light, and red-leaved Japanese barberry had the longest shoots at 37 percent light.