

COMMENTS

W. J. Garmhausen:

At what height of cut are stumps most effectively controlled by herbicides?

Bramble:

Brush 3 to 4 in. in diameter or larger should be cut low; i.e., below 12 in. Smaller brush should be cut higher, say 2 to 3 ft., so that stumps can be located easily and the spray applied properly. In both cases the spray should be put on in high volumes so as to wet the sides and base of the stumps to assure run-down.

Torbert Slack:

What is the cost per acre of the several methods of herbicidal control of vegetation you report over a period of several years?

Bramble:

The answer to this is indicated by the percentage of control reported by each of the several methods and by the data in Table 4 of the report.

Frank H. Brant:

Is high pressure necessary for basal spray or would the low pressure of a knapsack sprayer be effective?

Bramble:

High pressure is not necessary for basal spraying. However, knapsack tanks are not as efficient as power equipment, with the possible exception of some locations which are entirely inaccessible for power equipment, and where follow-up spraying of brush is done on scattered plants. Commercial operators have used extremely long lines of hose from power equipment rather than depend on knapsack equipment where brush is moderate to heavy in density.

ROADSIDES as LIVING MUSEUMS of NATURAL HISTORY

Richard H. Pough, President
The Nature Conservancy

The United States covers a vast area, each climatic region of which has its own characteristic native plants and animals. Within each region local variations in soil, degree of wetness, slope, and other factors gave rise to many different plant-animal communities and produced a varied landscape. As the country was settled and the land was put to use raising crops, feeding livestock, or growing timber, these natural plant-animal communities were greatly altered or completely destroyed.

Were it not for the network of rights-of-way that spans the country from coast to coast, biologists would not, in many areas, know very much about the original character of the soils and vegetation. Fortunately rights-of-way, as they cut here and there across the country, invariably intersect samples of each local soil and each local plant-animal community, providing for the biologist a set of samples of unplowed soils and relatively little disturbed plant communities.

The importance of natural areas to the biological sciences is just beginning to be fully appreciated. As a result, there has been a rapid increase in the num-

ber of areas set up as "natural areas" for the use of biologists. Unfortunately, in many sections this recognition has come too late, as no undisturbed land remains that can be set up as a natural area. In such sections botanists, soil scientists, and microbiologists must of necessity use rights-of-way as their outdoor laboratories, which means that every effort should be made to safeguard the naturalness of the unused areas of all types of rights-of-way.

Those who simply enjoy the variety and beauty that our native plants impart to our roadsides join the biologists in asking those who are charged with their care to interfere as little as possible with the plants that grow there of their own accord. Where certain tree and large shrub species must be removed when they exceed a certain size, please do it selectively. Above all else, please avoid that most deadly of all practices, blanket spraying with herbicide, that spells the doom of any naturalness the roadside might have had.

Americans have always taken great pride in the beauty of their land. Aside from such features as mountains, waterfalls, and the like, landscape beauty is largely a matter of the variety and attractiveness of the trees, shrubs, and wildflowers of the region. The blazing color of a New England autumn is heavily dependent on the color of the shrubs and vines of roadsides and fence rows. Most of the tall, showy wildflowers known and enjoyed by all are roadside plants. In short, by turning the job of highway landscaping over to nature, a more attractive and varied landscaping can be achieved than where an effort is made at considerable expense to plant exotic species.

Ecological studies show that roadside vegetation, if left undisturbed except for the selective renewal of a few woody species capable of developing into trees, is remarkably stable. Annuals such as ragweed and other common weeds of agricultural lands can seldom make much headway against established native perennials. Only when these native species are disturbed is the ground left open to invasion by annuals. To a considerable degree, well-established growths of native perennials and shrubs resist invasion by trees. Once the unwanted trees and their root systems are selectively removed, reinvasion is often so slow as to be negligible. In general, the taller and the denser the cover that can be tolerated, the more effectively it inhibits tree invasion and the lower the maintenance costs drop.

Two alternatives in roadside vegetation management emerge from the foregoing. One retains and works with the native vegetation that nature has evolved for the site; the other reduces the cover to some type of sod-forming grass by seeding, frequent cutting, or blanket spraying with an herbicide deadly to all broad-leaved plants.

Under the first system the cost of establishing a cover of vegetation is zero. Only when the subsoil has been exposed in construction operations may steps be necessary to help pioneering plants to establish themselves and initiate the development of a topsoil layer capable of supporting a more mature vegetation. If such pioneers include ragweed, it may be desirable to hasten the succession by applying fertilizer and mulching with hay that will be a source of seeds of native perennials and grasses. Where the initial community included trees too large to tolerate, some effort may be required to get rid of all the seedlings and shoots from the roots of these species, but after that has been done little care will be required.

The second system generally produces a monotonously uniform cover of grass devoid of interesting wildflowers, berry-bearing shrubs, and fall color. It is also expensive to maintain and catches fire easily from discarded cigarettes. In general, woody plants invade grassy areas more readily than they do the dense growths of shrubs and perennials that develop on areas left to nature.

It seems clear that the wisest policy on roadside maintenance is to leave as much of the job as possible to Nature, who works without having to be paid.

COMMENTS

William C. Bramble:

The keynote of this paper is good; that is, selective spraying should be used wherever possible, and the vegetation that comes in on the right-of-way beyond the areas near the roadway which must be mowed should be treated so as to preserve plants that may be desirable.

However, biologists in the forested regions of the country certainly do not depend on the network of rights-of-way for knowledge about the original character of soils and vegetation. Mr. Pough emphasized the fact that he was referring to the prairie areas of the United States and not to the forested regions. Certainly samples of undisturbed soils and plant communities are not found along rights-of-way of highways through forested country. It is not felt that no undisturbed land remains except for rights-of-way in the forested areas in the eastern United States. These rights-of-way are greatly disturbed areas and, while convenient for travel, are not used by most ecologists for study of undisturbed land. Again, Mr. Pough probably is referring to the prairie region, because in the northeastern area many noxious weeds come in on rights-of-way because most of these have been disturbed. Certainly, these weeds should be removed and this, if possible, through selective spraying. However, blanket or broadcast spraying can also be somewhat selective on these plants provided that they are herbaceous weeds with large tap-root systems.

There is a limit to the height of brush which can be said to offer an inhibiting barrier to tree invasion. A low dense cover of bracken or heavy grass of the sod-forming type is a fairly effective barrier to tree invasion, whereas tall shrubs often harbor and protect young saplings under their cover and permit them to come in. Exceptions to this rule may be found; on the other hand, the sweeping statement, "the taller and denser the cover, the less the invasion," is not correct.

The remark about low-cost establishment of natural vegetation may be true, but if one observes the new highway between Washington and Baltimore, for example, it can be seen that the road banks extending up to the surrounding forest are being invaded by pines and other plants, such as poverty grass and broom sedge, which are hardly examples of natural undisturbed vegetation and in most cases will need to be controlled to maintain the slopes of the rights-of-way in a desirable condition.

Frank H. Brant:

A number of requests have been received from various groups for reestablishment of wildflowers on all roadside areas, but such a development is being studied on a smaller scale. First of all, it is agreed by all that shoulders and drainage areas must be kept mowed. Adjacent to agricultural areas it is considered desirable to keep the entire right-of-way in grasses or legumes and mowed regularly wherever possible, for two reasons in particular: (a) to prevent development and spread of weeds as much as possible, and (b) because it is considered desirable to keep the neatness and well-kept appearance of adjacent fields unbroken. In wooded areas, however, and also where adjacent land is uncultivated wasteland, there is a good opportunity to reduce frequency of mowing and maintain wildflower growth on the highway right-of-way outside of drainage channels. These areas, however, are seeded to grasses and legumes, but wildflowers as well as volunteer shrub and tree growth soon become reestablished when mowing is restricted. To date, no attempt has been made to reseed wildflowers, their reestablishment being left to natural processes.

John L. Wright:

The practice of conserving all possible desirable native growth along the roadsides, particularly in rural forested areas, cannot be questioned. And certainly limiting chemical weed and brush control to selective spraying in these areas is a sound operation. However, Mr. Pough's plea to desist from all blanket or broadcast chemical spraying along the highways is open to question.

Road shoulders, drainage ways, medians, and the roadsides on the inside of horizontal curves on two-lane highways, of necessity, in the interest of safety and general appearance, must be kept close-cropped. On these areas proper blanket chemical weed and brush control spraying is most effective from the standpoints of efficiency and economy. Fast-growing weed growth can be eliminated readily, and in many instances the frequency of mowing can be reduced and the appearance of the roadsides appreciably increased.

Rockwell Smith:

Mr. Pough's paper is very interesting, and those in the railroad business are in full sympathy with his aims. Also, there is nothing in the usual policy of vegetation control along railroads that conflicts with his stated purpose. Outside of the ballast section of the track, where total eradication and sterilization is desired, the railroads are interested in control for other parts of the right-of-way only insofar as growth will interfere with signal, power, and communication lines or reduce sight distances at grade crossings. For most of these, control of woody brush, trees, and tall weeds such as ragweed is sufficient, leaving the herbaceous shrubs, grasses, etc., undisturbed. The ideal situation is one without brush but with a low ground cover not requiring mowing or other expenditures.

Mr. Pough's condemnation of what he calls blanket sprays seems somewhat harsh. For brush control the railroads spray the foliage on the high growth, and little or none of it penetrates to the ground. In addition to this, the chemicals used for this purpose affect the grasses slightly, if at all. It has been noticed that control of the brush has acted as a stimulant to the growth of grass and low shrubs which, according to Mr. Pough, is to be desired.

On railroad lines across prairie sections, years of steam operations have deposited cinders on the right-of-way, and the present vegetation is usually a mass of broad-leaved plants bearing little resemblance to the typical virgin growth, which was predominantly grass. This is possibly because of the change of soil from basic to acid, and it is possible that with the present diesel operations both the soil and growth will revert to type.

In spite of these objections, Mr. Pough has brought forth a worthy objective and one that can be kept in mind by all.

USE of HERBICIDES by UTILITIES on HIGHWAY RIGHTS-of-WAY

Torbert Slack, Roadside Development Engineer
Louisiana Department of Highways

Because there has been considerable discussion with the utilities in Louisiana during the past three or four years about extending their herbicide spraying to highway rights-of-way, and because other members of the Roadside Development Committee believe that a study of this nature might be valuable, an attempt has been made to approach the subject of the use of herbicides by utilities on highway rights-of-way.