Fence Line Vegetation Control

a Problem researched by Minnesota highway engineers

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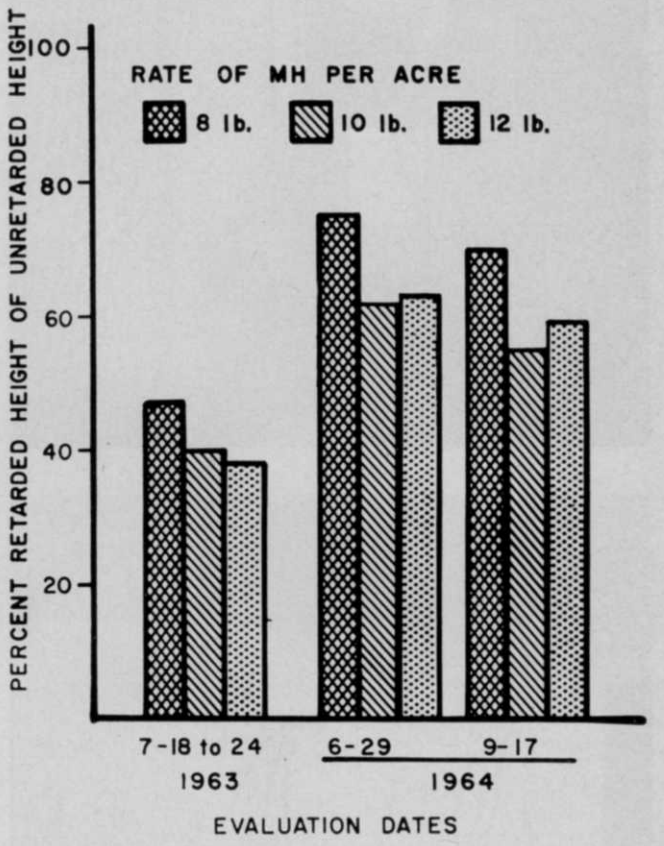

Figure 1. The effect of various rates of MH on height of turf along fence lines over a growing season.

THE amount of roadside area maintenance for which highway departments are responsible has been rapidly increasing. One roadside maintenance problem is fence line growth. Tall, uneven plant growth in fence lines is unsightly and in both urban and suburban areas often leads to complaints by citizens. The problem is also common on industrial sites and other areas where chain link fences are used.

Since mowers can safely operate only within about one foot of fences, other methods of vegetation control must be used. These include hand clipping, soil sterilization, or plant growth retardation. The first is costly and the second often leads to erosion, unsightly appearance and loosening of posts. A study conducted by the Minnesota Highway Department evaluated the effectiveness of a growth retardant, 1,-2-dihydropyridazine-3, 6-dione (Maleic Hydrazide, known as MH), in controlling plant growth along fence lines to reduce maintenance work and improve appearance.

Maleic Hydrazide or MH prevents cell division, but has no effect on cell elongation. Thus it must be applied before seedhead formation has been initiated. Failure to do so will result in no inhibition of growth. Application timing is important. In Minnesota, applications should be made during the 2 weeks in the spring when the grass is 2 to 4 inches in height for best results. Fall applications, both in Minnesota and elsewhere, also have been tried with limited success.

Experiments were established in 1963 and 1964 along fence lines beside interstate highways in the area of St. Paul and Minneapolis, Minnesota. Treatments both years were MH at 0, 8, 10, and 12 pounds per acre. Plots were 2 feet wide, being one foot on either side of the fence.

The MH was applied using a 3-gal. hand sprayer May 15 and 16, 1963, and May 20, 1964. The spray in both years was applied from one side of the fence, but an attempt was made to spray through the fence to the other side. Data were collected from the side on which the spray operator walked. Data were collected from the 1963 experiment July 18, 19 and 24 regarding number of seed stalks, discolored leaves, total leaves, and vegetation height. In 1964, the vegetation height, number of leaves and seed stalks were obtained June 29; height measurements and seed stalk counts again were obtained Sept. 17. All data from both years were subjected to an analysis of variance and the differences discussed are significant at the 5% level of probability.

The two roadside fence line turfs treated in 1963 and 1964

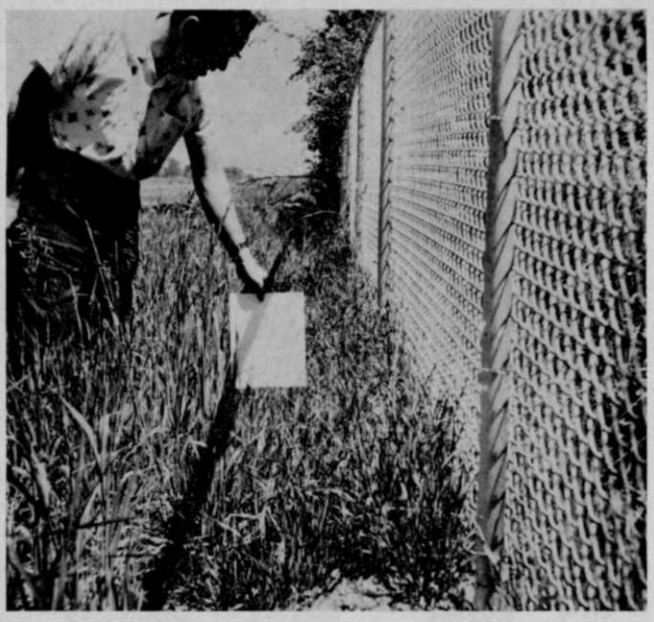

Photo 1.
Fence line treated in 1963.

Photo 2.
An untreated fence line, or check, 1964.

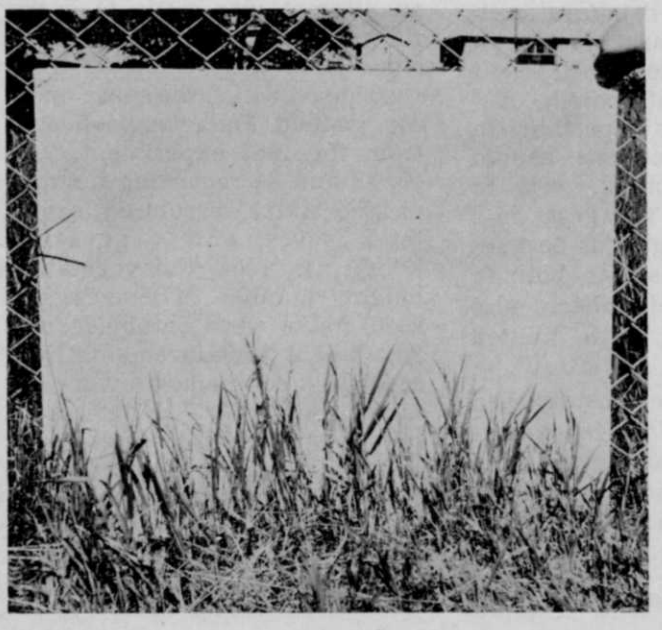

Photo 3.
Fence line treated with MH at the 10 lb/A rate, 1964.

varied considerably. The turf treated in 1963 had been established about 18 months previously and was very heterogeneous. It contained a large number of grass and legume species, both planted and volunteer, weeds, and rye which had reseeded from the companion crop. Smooth brome grass was the most commonly occurring grass. The numerous species present afforded an opportunity to study the effects of MH on different plants. The turf treated in 1964 had been established about 30 months previously and was composed almost entirely of smooth brome and Kentucky bluegrass. In both years, the weather at time of application was warm and sunny and vegetation was in a vigorous growing condition.

Retarded Growth Easily Spotted

Visual observations of the 1963 and 1964 treated and untreated areas showed a definite retardation of plant height (Photo No. 1). The percent height of the treated plants as compared to the untreated plants is shown in Figure 1. The reduction in plant height due to MH was greater in 1963 than 1964. The mean treated height equalled 67% of the untreated height in 1964, and 42% in 1963. Some of the difference between 1963 and 1964 was due to the lower effectiveness of the 8 lb/A rate in 1964 and to the presence of a greater amount of Kentucky bluegrass in the 1964 turf. The findings indicated that MH reached its maximum effectiveness in height retardation between 10 and 12 lb/A, that MH at 12 lb/A had achieved its maximum height retardation effect and the variance in the retarded height at the 12 lb/A rate was largely controlled by the natural potential height of the turf.

The variance of the height of each plant from the average plant height could be considered a measurement of plant height unevenness, and unevenness is objectionable because it results in a ragged appearance. The treated turf was determined by measurements to be more uniform in height than the untreated turf.

An important factor in the use

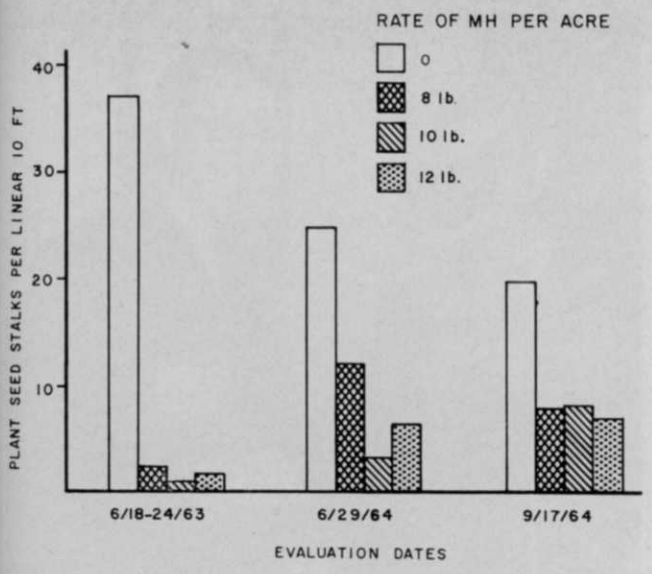

Figure 2. The number of plant seed stalks in turf treated with MH as related to time of growing season.

of an acceptable retardant is the amount of cover or number of leaves per unit area retained after the use of the materials. The number of leaves in the treated turf was not decreased. Living vegetative ground cover is retained with the use of MH. Therefore, MH is probably more desirable than soil sterilants which destroy vegetation and reresult in bare ground which can erode. Also, lateral movements of MH is no problem as it often is with soil sterilants.

Application of MH greatly reduced the number of plant seed stalks (Figure 2). The reduction was greater in 1963 than in 1964. This reduction in plant seed stalk formation lasted throughout the season. The only grass species which generally produced a near normal number of seed stalks was Kentucky bluegrass.

It would be desirable for MH-treated turf to remain in its natural green state. This was not the case with the fence line application in 1963. The discolored number of leaves appeared to increase linearly as the rate of MH application increased. Redtop and white clover were especially discolored by MH.

Qualitative observations regarding the effects of MH on various plant species were noted. The grasses most severely affected by MH were redtop, Reed canarygrass, rye, smooth brome grass, and timothy in decreasing order of apparent susceptibiilty. Kentucky bluegrass seemed to be much less susceptible. MH tended to increase the infestation and size of rust postules, especially on Reed canarygrass and smooth brome grass. Redtop was especially susceptible to MH and often died after treatment. All black medic seedlings in treated areas were killed and white clover was severely affected. Some plant species apparently were not affected or slightly affected (Table 1). Under practical field application conditions, MH does not seem to be remarkably uniform in plant response from species to species. Some loss of sensitivity seemed to develop with age and there was a wide range of specificity in action with regard to both grasses and broadleafed plants.

Table 1. Plant species apparently not affected or only slightly affected by MH applications (8 to 12 lb/A).

(Species Not Affected)
Common Burdock (Arctium minus)
Field horsetail (Equisetum arvense)
Horseweed (Erigeron canadensis)
Indian hemp (Apocynum cannabimum)
Milkweed (Asclepsis spp.)
Motherwort (Leonurus cardiaca)
Trailing wild bean (Strophostyles helvola)
(Species Slightly Affected)
Canada thistle (Cirsium arvense)
Dandelion (Taraxacum officinale)
Elm (Ulmus spp.)
Poplar (Populus tremuloides)
Sumac (Rhus spp.)
Wild raspberry (Rubus strigosus)
Willow (Salix spp.)
Plaintain (Plantago spp.)
Sedge (Carex spp.)

High Rate of MH Reduces Mowing

When used at a high rate (10 lb/A), MH may be quite effective in reducing or eliminating mowing or hand clipping in hard-to-mow areas, such as fence lines or under guard rail (Photo Nos. 2 and 3). MH has the advantages of not removing all the vegetation, of not washing into areas where its effects are undesirable, and of not making the areas subject to erosion. MH can be easily, safely and rapidly applied at a reasonable cost.

MH has the disadvantages of having only a short period of time in the growing season when it can be effectively applied, of not being equally effective on all plant species which may be encountered along a fence line, and of requiring an application each growing season.

Other research work by the Minnesota Highway Department has shown that when MH is used over broad areas as opposed to other narrow bands along fences, etc., the effect is less satisfactory due to "release" of undesirable annual grass types.

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