CHEMICAL WEED CONTROL ON LAWNS AND SPORTS FIELDS

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A few years ago when the news of a cheap, effective, reasonably safe method of controlling weeds in turf with chemicals began to spread, there were many who harbored the illusion that this was the final answer. There would be no more weeds! Simply sprinkle a magic powder over the lawn and presto!—a perfect lawn with no work involved! This idea, more than any other, has retarded the cause of chemical weed control by producing disappointing results. Some illusions are dispelled quickly, others gradually; this one takes no time at all. The first trial convinces anyone that chemical weed control is but one step in the production of beautiful turf.

After the weeds are killed, the grasses must be properly fed to encourage them to crowd into the bare spots left by the death of the weeds. The weeds prefer the same environment as grass and, like grass, they are encouraged by a lack of competition. It is therefore important to accompany the application of chemicals for weed control with a good fertilizing program in order to establish a turf so thick and sturdy that competition with the grass discourages the weeds.

Whereas various methods of application may be used, experience with controlling weeds in lawns and in sports turf in Pennsylvania has taught us several things.

Dry treatments are safest from the fire hazard standpoint when using sodium chlorate. They are uniformly distributed only with great difficulty either by hand or by machine. Few people can broadcast uniformly by hand. Operators of most

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Hand spotting rosette weeds with arsenicals by means of a spoon.

machines are quite likely to miss on some strips and overlap on others. This doubling of the rate of application on the overlap may be disastrous to grass.

Chemicals can be distributed most uniformly when in solution, but in the case of sodium chlorate a greater fire hazard to operators is presented unless proper precautions are observed. It is possible, however, to miss or to overlap with any type of sprayer, dependent upon the operator.

It may be interesting to consider a few case histories of demonstrations of successful chemical weed control in Pennsylvania. These demonstrations taken from our files illustrate

the importance of combining chemical control with a good fertilizing program.

A Home Lawn

The turf on this home lawn consisted of Kentucky bluegrass, Chewings fescue and white clover, but this was thin due to close clipping and starvation. It was overrun with speedwell, knotweed, chickweed, self-heal and sorrel. Hand weeding had proved ineffective.

On August 17, 1936, a mixture of 12 quarts of dry sand and 4 ounces of sodium arsenite to 1,000 square feet was uniformly broadcast by hand. The soil was moist, weather mild, and the poison was not watered in. The turf was slightly browned but recovered in a few days. Weeds, except dandelions, were killed 90-95 per cent. All dandelions, except the very young plants, recovered.

On September 25, 75 pounds of limestone and 30 pounds of complete fertilizer were applied and the mower set to 1½ inches. By September, 1937, the turf was vigorous and weeds negligible. Another treatment in the spring would have been desirable but the one treatment was satisfactory.

A School Lawn

A school lawn on well drained shale soil consisted of Kentucky bluegrass, with some Chewings fescue, bent and *Poa trivialis*. Close cutting and lack of fertilizer had resulted in a thin turf overrun with ground ivy, speedwell, buckhorn plantain, yarrow, self-heal, sorrel, mouse-ear chickweed, common chickweed, dandelion and crabgrass. Due to the severity of infestation and the lack of help, hand weeding was out of the question.

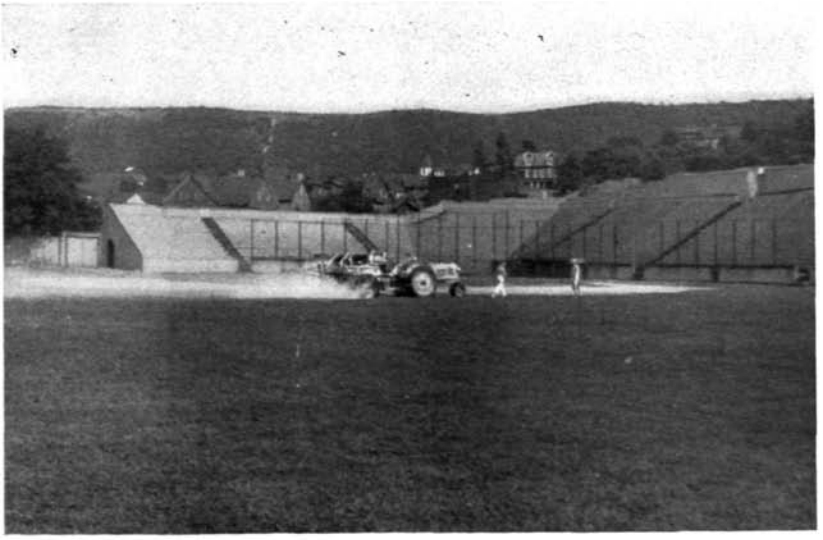
In April, 1937, 50 pounds of ground limestone and 25 pounds of 4-12-4 fertilizer were applied to each 1,000 square feet and the mower set to 1½ inches. On September 7, 1937, during a soft drizzling rain the area was sprayed with a solution of 12 ounces of sodium chlorate and 4 ounces of sodium arsenite in 3 gallons of water to 1,000 square feet. This was applied as a fine mist through a knapsack sprayer. The soil was moist and growth vigorous.

The grass was browned but soon recovered and after an application of 25 pounds of 4-12-4 fertilizer to 1,000 square feet in late September made a vigorous growth. Ground ivy was 98 per cent killed; buckhorn plantain, 95 per cent; and chickweeds, 100 per cent. In September, 1938, the turf was in fine condition, with only a few weeds. The untreated strip had poor, thin turf with 60 per cent weeds, mostly ground ivy.

A Sports Field

A college soccer field was on level ground with heavy clay soil and not well drained. The field was scarred from heavy play. The turf was almost entirely Kentucky bluegrass with some *Poa trivialis* in wet places but was infested with plantain, some buckhorn plantain, knotweed and a little crabgrass. Cultural control had been ineffective over a period of two to three years. Hand weeding was too expensive.

On August 18 the area was sprayed at the rate of 4 ounces of sodium arsenite to 1,000 square feet. The work was done with a calibrated tractor pulled power sprayer with a 10-foot boom and with 6 nozzles set 20 inches from the ground. The pressure gauge was set at 200 pounds. The tractor ran in low gear at 3½ miles an hour. Spraying was done between 2 and 4 p. m., with the soil moist and vegetation vigorous. The grass



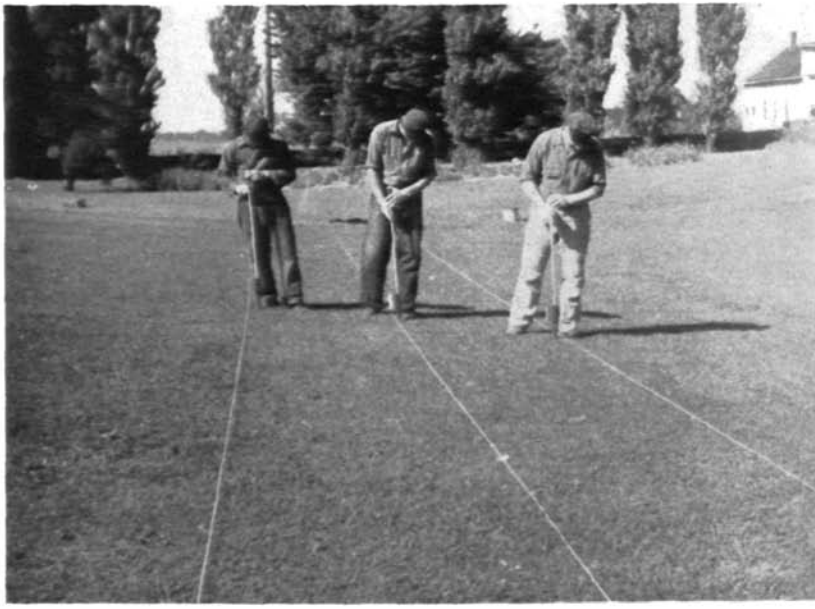
Eight-row potato sprayer with 20-foot boom spraying an athletic field to control weeds.

had been clipped at 3 inches, two days previously. The entire field became brown but 10 days later the bluegrass had almost completely recovered and 99 per cent of the plantain was killed. *Poa trivialis* recovered more slowly. Three hundred pounds of 8-24-8 fertilizer and 1 ton of limestone were applied to the acre. Within a month after the application of the arsenite the grass was growing vigorously and the field was green and being used for play.

All sports fields and many areas of lawn on that campus are now sprayed regularly for the control of plantain, buckhorn plantain, crabgrass and knotweed, using mixtures of chlorate and arsenite adjusted to the weeds and grasses present.

Another Lawn

On a home lawn with south and west slope the bluegrass was almost completely choked out with crabgrass and some buckhorn plantain, all other weeds having been choked out by



Weed canes for treating scattered weeds. By this method small quantities of chemicals can be applied to individual plants in a clean-up job.

crabgrass. This lawn had been spring seeded with a mixture consisting mostly of Kentucky bluegrass, but only straggling plants were left. Hand weeding was impracticable and weed control by cultural methods alone was too slow. The lawn might have been plowed and reseeded but this might have entailed loss of soil and seed from washing rains.

On August 15, 1936, when the soil was moist and the crabgrass vigorous and just starting to bloom, this lawn was sprayed with a solution of 2½ pounds of sodium chlorate in 3 gallons of water to 1,000 square feet. The material was applied with a knapsack sprayer and not watered in.

While the lawn was at first brown the Kentucky bluegrass resumed vigorous growth in 10 days while the crabgrass and

buckhorn plantain were dead. At this time 50 pounds of ground limestone, 15 pounds of 4-12-4, and 15 pounds of cottonseed meal were applied to each 1,000 square feet, and lightly raked in. On August 27 the area was reseeded with a good mixture lightly raked in and topdressed. On October 1 the new grass was vigorous and ready for clipping.

The owner had a green lawn throughout the fall, winter and spring for the first time in years. The following fall the lawn was in excellent condition. Only a few scattered crabgrass plants appeared in the new vigorous turf and they were removed by hand before the seed matured.

Results Vary with Conditions

The records above are only four out of many records of successful treatment on lawns, sports turf, cemeteries, parks, etc. There are also records of failures. These failures can mostly be traced to the "personal factor" making for lack of uniformity in the application of the poison. Another important factor is the weather. Treatments during extremely dry weather may result in a high mortality of the grass. In this case water should be applied. Treatments on dry parched turf and dry soil are likely to fail.

Spring and fall appear to be the most favorable seasons for the application of sodium arsenite. The perennials and biennials such as dandelions, buckhorn plantain and most rosette and mat-forming weeds are in most active growth at these seasons and the grass is most vigorous. In summer arsenicals are more harmful to grass and less selective. The contrary is true of chlorate. This is most effective during hot weather.

Heavy frost following an application of arsenite will greatly increase its effectiveness. Excess moisture in the soil will reduce

the effectiveness of both chlorate and arsenite. On light sandy soils rates of application must be reduced to about half.

As shown by the records, most weeds can be killed by applications not stronger than the grass can endure. It may be temporarily browned, but recovers. Dandelions, however, can seldom be eradicated with one application without killing all vegetation. Young plants are killed and the old plants weakened, but to effect complete control periodic applications must be made at a rate that will gradually weaken the dandelions but permit the grass to recover before the next application.

Applying arsenate of lead for control of grubs. These men were careless. Their faces and hands were white with arsenic dust. This is dangerous. Skin poisoning may result.