Weed Control Near Grass Areas

soil fumigants and contact spray materials included in series of studies on control of weeds in relatively confined areas

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Machine and chemical methods of weed control in relatively restricted areas—flower beds, ornamental trees and shrubs, small drainage channels, parking areas and patios—are not adaptable to most situations or are hazardous to adjacent plantings.

When properly applied, soil sterilants are not hazardous to nearby turfgrass. Leaching carries the chemicals predominantly downward with very little lateral movement. The principal hazard is to trees and shrubs having roots extending under treated areas. Where distance from trees is considerable—30′ to 50′ or more—it is advantageous and relatively safe to use permanent soil sterilants. Single treatments of the urea herbicides—monuron, or CMU, and diuron, or DCMU—chlorates, borates, arsenicals, or combinations of these materials, control all vegetation for several seasons and may be renewed periodically at relatively low cost. These chemicals are leached into the soil by rainfall or irrigation. They are toxic to all plants and will be picked up by roots under the treated area and transported to trees and shrubs where systemic injury may result. For long-term sterilization, monuron may be used at rates of 20 to 40 pounds per acre, borax or chlorate-borate mixtures at two to four pounds per 100 square feet, and borascu at four to eight pounds per 100 square feet. These chemicals are applied dry or may be dissolved and sprinkled or sprayed on the soil surface. Treated areas should be sprinkler-irrigated—avoiding runoff—to take the chemical into the soil.

Fumigants may often be used to advantage to control perennial weeds near turf plantings. However, fumigation is only temporary because no toxic materials remain in the soil and recontamination can occur immediately. Furthermore, fumigation kills the roots of trees and shrubs in treated areas but is a pruning action without absorption and systemic injury.

Methyl bromide controls such weeds as nutgrass and bermudagrass but must be applied under well-sealed tarps and held for 24 hours. It is very poisonous and must be handled with caution.

Injections of carbon bisulfide control deep-rooted perennials such as wild morning glory, but the vapors are highly explosive.

Ethylene dibromide and DD control nutgrass, oxalis, and other tuberous or bulbous species when injected at the rate of one-half ounce per hole with 12″ spacings and 4″ to 6″ deep.

Vapam—a new liquid fumigant—controls bermudagrass and other perennials when used at the rate of one quart per 100 square feet. The Vapam is mixed with water and sprinkled or sprayed on the soil surface and then leached in by sprinkler irrigation. Deep leaching is needed to kill the roots and rhizomes of deep-rooted weeds. For control of shallow species such as bermudagress less leaching is required. Excellent control of shallow-rooted perennials above tree or shrub roots has been obtained by thoroughly soaking the soil and—while it is fully wet—applying the Vapam and immediately leaching it into the soil by a very light sprinkling to a depth of 2″ to 4″—about 1/4″ of water.

Contact Sprays

General contact weed killers—materials that kill only the parts of plants actually wet by the spray—are particularly useful in ornamental plantings. Contact sprays give a complete kill of annual plants, but perennials usually regrow from underground roots or stems.

Stoddard solvent—a light oil well known as carrot oil—does not stain flagstones and other masonry work. Similar oils may be purchased from service stations and hardware stores as cleaning solvent or paint thinner. For best results, stoddard solvent and other oils should be applied when weeds are less than 2″ tall. Annual bluegrass becomes resistant, for example, soon after it emerges as a seedling and forms a crown.

The solvent may be applied from a compressed-air knapsack sprayer operating at 30 to 40 pounds pressure. Very fine fan-type nozzles with capacities of one half to one gallon per hour are preferred for precise applications. The spray may be controlled by holding the nozzle close to the weed growth. This permits accurate spraying between bricks, along the edges of sidewalks, and close to the stems of shrubs and flowers. Actually wetting the stems of ornamentals with the oil should be avoided. A 6″ funnel over the nozzle enables a skillful operator to spray under foliage.

In areas where staining of masonry is not a problem or where a little yellow stain is not objectionable, commercial grade, high-aromatic weed oils are preferable. They are better weed killers for general spraying of weeds in all stages of growth. Some lots of diesel fuel are good weed killers, others are not. Diesel oil fortified with a herbicide makes an excellent weed killer.

Ammate—ammonium sulfamate—is an excellent weed killer for driveways and walks. Annual weeds are killed, and top kill as well as some root kill of perennials is obtained from a thorough wetting with a solution containing 3/4 pound of ammate and 1/3 teaspoonful of liquid laundry detergent per gallon of water. However, ammate is corrosive to metal, and spray equipment should be carefully washed after use. In the quantities used, weed oils and ammate do not leave soil residues that are toxic to underlying roots or subsequent plant growth.

Regardless of the particular material used, spraying should be on a program basis so that successive crops of weeds will be killed before they go to seed. This gradually depletes the population of weed seed in the surface soil until only occasional weeds reappear after a spraying. Deep cultivation should be avoided for it will bring a new lot of weed seeds to germinating depth. If they remain deeply buried they will not grow.

Other Weed Killers

Of the many weed killers available for specific uses, several have possible value in the management of landscaped areas.

SES—Crag herbicide No. 1—a nontoxic formulation, decomposes in the soil and releases a material toxic to germinating seeds. Mature plants of most species are not affected. The activity of SES gradually disappears after several weeks.

Alanap is a temporary soil sterilant applied to the bare soil prior to germination, and the weeds are killed as they germinate. Mature plants are relatively resistant.

Dalapon is a new chemical of particular value in controlling weedy grasses.

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WEEDS

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At rates of 20 to 40 pounds per acre it controls bermudagrass and other perennial grasses. Annual grasses are controlled at rates below 10 pounds per acre. Dalapon is absorbed by the foliage and translocated throughout the plant, killing roots, rhizomes, and tops. After a treatment, dalapon residues may become leached into the soil in sufficient quantity to be toxic to the roots of trees and shrubs. Therefore, it should not be used over roots.

Amino triazole is another new weed killer that is effective on both grasses and broad-leaved weeds. It is absorbed by the foliage and translocated to underground plant parts. Preliminary experiments indicate that it can be safely used on weeds growing within the root zone of trees and shrubs.

Neburon, a new soil sterilant, is similar to monuron and because of its very low solubility does not leach readily to roots underlying treated areas. When this material is applied prior to seed germination, seedlings are killed at the time of emergence. Tests with neburon indicate that it may be safely used in the root areas of trees and shrubs. It is a herbicide of exceptional promise for a number of uses in landscape management.

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FUNGI

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in the vicinity of Old River and Cawelo.

In Tulare County, when diseased aphids were placed in a field near Earlimart in October 1955, the fungi became established quite rapidly and soon spread to adjoining fields. Shortly thereafter, heavy mortality caused by fungus diseases was noted in other parts of the county. During the spring and early summer of 1956, the expected build-up of the aphid was suppressed by lady-beetle activity. When the predators began to disappear in July, fungus diseases began to play an important role in controlling the aphid throughout the county and since then little treatment has been required.

Recent reports from Kings County—where several hundred fungus cultures were placed in fields during the summer months—indicate that disease outbreaks in spotted alfalfa aphid populations are becoming rather commonplace over much of the county. In Madera County—where a similar introduction program took place during the summer months—diseased aphids have been observed. Natural spread of the fungi has also been recently noted in Fresno County.

So far, the pathogenic fungi have not spread naturally into other counties in the San Joaquin Valley, and artificial distribution of about 500 fungus cultures into San Joaquin, Merced, and Amador counties has as yet given no indication of establishment.

In the Sacramento Valley, starting in June—when the aphid was beginning to build up and little or no disease was noted—a total of 870 cultures of the three species of pathogenic fungi were placed in infested alfalfa fields in Tehama, Sacramento, Solano, and Glenn counties. In September, after the culture distribution program was completed, the first signs of heavy disease in the aphid populations were noted in Tehama County. At about the same time the fungi began to appear in Glenn and Butte counties.

The spread of the fungi—whether by natural or artificial means—has been spectacular; so, also, has been their ability to become distributed throughout a field quite rapidly and reappear when an aphid build-up starts after a lengthy host-free period. As their distribution continues, the fungi should become widely recognized as an important part of the predator-parasite-disease complex in the biological control of the spotted alfalfa aphid.

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The above progress report is based on Research Project No. 1650.

APHID RESISTANCE

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Hinkley, 85.5% of the aphids were dead in the parathion plots. The remaining 15% of the aphids were mainly full-grown adults which apparently are more difficult to kill than the small young. To prevent further damage to the alfalfa, the whole field was re-treated.

In addition to the field tests, adult aphids from Del Mar, Big Pine, and Hinkley were tested in the laboratory. The aphids from Hinkley were about four times as tolerant to parathion as those from Big Pine and Del Mar.

New Insecticides

Three new insecticides were used with parathion in the field tests. Two of the materials—Trithion and Phosdrin—have been used on crops other than alfalfa in large-scale plots. In addition to being quite effective on other insect pests, they have given excellent results in field tests for the control of the spotted alfalfa aphid.

The third compound—8305—is still in the basic experimental stage. It gave satisfactory control of the aphids at Hinkley, but a considerable number of trials must be conducted in order to determine its value under varying climatic conditions.

In field tests, Phosdrin has given excellent control even when used as low as one-half ounce per acre. In one test in the Imperial Valley, one and three-ounce treatments were applied on large blocks of alfalfa, and the vapors eliminated the aphids in the large untreated plots. However, when Phosdrin is used at less than a half ounce per acre, the control is not satisfactory, and because it has little residual activity, it will not prevent a build-up from aphids migrating into the field. In the Big Pine test—where 0.6 ounce per acre was used—the control dropped from 99.8% to 89.9% 72 hours after treatment. The population was almost 100% newly born aphids from migrating winged forms.

Since Trithion was used at different dosages at Hinkley and Big Pine, it is difficult to compare the effect of the material on the two aphid populations. In tests conducted during the summer months, Trithion gave satisfactory control of the aphid when used at four ounces per acre. Additional tests with Trithion are in progress to further determine its value in controlling resistant aphids.

If these new insecticides are able to pass the rigid requirements for registration, they might be of great assistance—in the event the insecticides now used continue to lose their effectiveness—in controlling the aphid. Trithion would appear to have an advantage over Phosdrin in that it has greater residual toxicity. However, the short residual life of Phosdrin may prove advantageous under certain conditions.

Since the resistance to parathion is still in the early stage of development, it is not possible to predict whether parathion will become totally useless as an aphid control measure or whether the aphid resistance will eventually extend to other organic phosphate insecticides. Therefore, nonphosphate insecticides are being evaluated for their effect on the spotted alfalfa aphid.

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The above progress report is based on Research Project No. 1443.