

## Spray systems

your water into the more acceptable 4-6 pH range. Consult your pesticide dealer for a compatible adjuvant for this purpose.

Fungicides containing copper would not have the water adjust for pH. The acidity may cause enough copper to solubilize that it will cause plant injury. Sprays containing lime should not be acidified for obvious reasons.

### Disposal of Pesticide Containers.

EPA regulations call for no pesticide related materials to be disposed of by open dumping, open burning (except small quantities of combustible containers not in excess of 50 pounds, or those emptied in a single work day — whichever is less

and which did not originally contain organic forms of mercury, lead, cadmium, arsenic, beryllium or selenium), or water dumping.

However, it is interesting that the EPA would state in its publication that "Since adequate disposal sites and the necessary facilities are not readily available nationwide, and since significant information gaps exist which make it infeasible to write specific criteria for certain disposal methods; and procedures, prescriptive regulations requiring specific methods of disposal should not be insured at this time. The Agency has, however, elected to issue prohibitory regulations to limit and constrain the worst acts listed above."

WTT

## Helicopter spraying by Charles H. Tadge, Mayfield Country Club, South Euclid, Ohio

We've been using an aerial program at Mayfield, primarily for fungicide application, for the past eight years.

Shortly after moving to Mayfield in 1967 it became evident to me that a regular, preventative fungicide program was necessary since our turf was a combination of bentgrass and *Poa annua*, the greater portion being poa.

Mayfield was built on very rugged terrain. There are numerous steep slopes on the fairways. This makes pulling tractor drawn spray rigs very difficult. In those early years we were cursed — we're always cursed with poorly drained heavy clay soils — but in those early years we seemed to be cursed with perpetual wet weather. This really made spraying and even mowing difficult to accomplish without damaging the turf surface.

Our three primary fungal problems were and continue to be *Helminthosporium* leaf spot, dollar-spot, and snow mold.

We tried substituting a boomjet spray rig for our regular boom rig. This gave us better coverage and consequently fewer passes on the fairway and fewer tracks, but still it was more susceptible to wind drift and not quite as exact, and it still didn't completely eliminate the

problem of traversing the hills and subsequent marking of the surface.

In 1969, we became aware of a helicopter spraying service that was available in northern Ohio. Several courses were using their services and opinions were varied but mostly favorable.

During the winter of 1969-70, we found that snow mold incidence on our fairways was quite severe, despite treatment the previous fall. On the first of March snow coverage melted, but the snow mold fungi were still active. With more cold weather and snow very probable, it was imperative that we treat the fairways. Ground conditions were such that we couldn't drive on the course with anything so arrangements were made for the helicopter to come in and spray our fairways. This was done on March 3, 1970.

We were so impressed with the apparent coverage and speed of completion that we decided to try a complete program in 1970. That year they charged us \$160 per application and we furnished the chemicals. As might be expected, next year the price rose to \$240 per spray. Due to both price increase and the unavailability of the helicopter on a few occasions when we needed it, we

only used the spray two times in 1971.

After carefully analyzing the relative cost, we felt we could still justify aerial spraying and we went back to a complete program in 1972. We have continued the service on a regular basis since 1972 with an average of about eight sprays per year.

We don't rely 100 percent on the aerial spray program. Like any course we've got perennial trouble spots where disease, particularly dollar spot, seems to persist, so periodically we'll touch up these areas as needed with our boom spray.

We're presently the only course in northern Ohio that's using an aerial spray program on a regular basis. Several courses have used the service occasionally for spraying fungicides. Two courses have been sprayed for grubs and report good control. They have also sprayed one course for broadleaf weeds on fairways with good success. Usually once a summer we've had Mayfield sprayed for control of mosquitos.

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## Helicopter

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Probably the greatest single factor in the success of an aerial application is the effective performance of the pilot. We've been fortunate to have the same pilot over the past several years. He learned to fly in the service, had quite a bit of experience in Vietnam, and is very capable and conscientious. Last winter he became the owner of the company.

Actual spraying time involved at Mayfield has been about an hour, with an equal amount of time needed for filling and mixing chemicals. The helicopter is calibrated for an application of five gallons per acre at 35 miles per hour. Effective swath is 40 feet. Droplet size is very fine. Proper droplet size is very important to take advantage of the rotor wake and also to minimize drift.

Naturally, wind is a very significant factor. We try to spray when the wind is five miles per hour or less.

The helicopter is like a giant air-blast machine. Several million cubic feet of air are moved rearward and downward during flight. When flown at heights of less than 10 feet, the rotor wake effectively drives the material into the foliage. Swath width increases as height above the ground increases, but drift potential also increases.

There are curls formed at the ends of the rotor wake called vortices that disappear last into the foliage, presenting a reliable, visible indication of swath width at air speeds of less than 35 miles per hour.

The helicopter's maneuverability and agility to work in close spaces is a paramount asset. We found that pocketed greens may get too much material if the helicopter backs into the pocket and then sprays out from a standstill position. This can be eliminated by coming in over the trees and suddenly dropping down to the surface to be sprayed. You have to have a good pilot for this. Some pilots don't want to use this technique.

The cost for spraying is presently \$300 per application. An analysis has shown that spraying with our equipment would cost between \$170 and

\$200 per application. This includes wages, payroll taxes, gasoline, equipment maintenance, and depreciation. This still falls short of the \$300 price we pay for aerial spraying, but there are other factors to consider. It frees a key employee and tractor to perform other tasks. No ruts, soil compaction, or tire spins ever occur, no matter how wet the soil surface may be. When adverse weather threatens and fungal diseases are active or imminent, the spraying can be accomplished very quickly.

The prime question which must be asked is how much is it worth to have all the fairways and greens sprayed in one hour with no tractor sprayer interfering with the golfers or other maintenance operations. We feel these factors justify the added cost for aerial spray.

Another factor that might be worth considering for some courses would be the use of EPA restricted chemicals. If the course personnel were not certified to apply these chemicals, the helicopter service could be contracted to perform the function. All hazards inherent with the handling of the materials could be born by the aerial spraying applicator.

In conclusion, aerial spraying by helicopter may not be the ultimate answer. It may not fill everyone's needs, but at Mayfield we are well satisfied with the results we have experienced. WTT

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