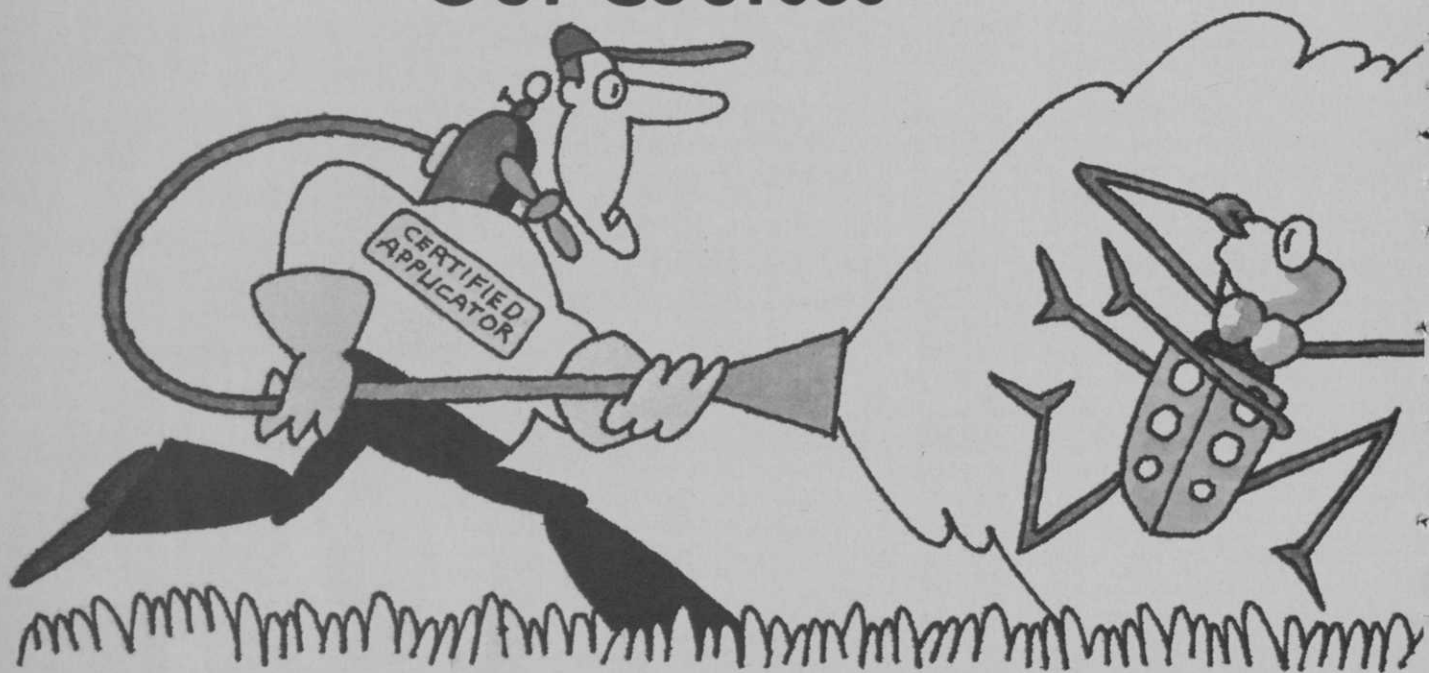


Chemical Regulations: How They Will Change Our Courses



Today's golfers seldom demand more than perfection in the condition of their courses, but few will accept anything less. Like the American farm, the modern American golf course is a scientific and technological marvel, unrecognizably different from its prototypes. On nineteenth-century Scottish golf courses, grazing sheep "mowed" the fairways. To clear the putting line on the greens, golfers had to brush away what were euphemistically called "impediments." Until World War II, watered fairways were a sybaritic luxury, restricted largely to ultra-exclusive millionaires' clubs. Seasonal changes from lush green to toasted brown fairways were accepted as part of the game. To cope with baked, concrete-surfaced greens, the chip-and-run-shot was a vital part of every golfer's repertoire. During a summer drought, one didn't dare fly a nine-iron shot to the green; one played the contours for the inevitable bounce and roll.

But times have changed. Club members, proud of the soggy length of Gnarled Oaks' championship course, don't want it shortened into

The American standard of golf, like the standard of living, is the world's highest. An impending Federal law regulating pesticide use could drop that standard back to the weed-cluttered, disease-ridden level of 1930 golf courses, according to pessimists. Optimists say it will merely spur American ingenuity to find better ways of keeping American courses green, lush and carpetlike

By C.W. Griffin

a drive-and-pitch layout by a summer drought. The maintenance of perpetually good playing conditions has become a financial necessity for Southern public courses competing

for the patronage of winter vacationers. The same golfer whose front lawn looks like the morning after the Day of the Locusts demands a smoothly textured carpet of verdant turfgrass yielding a perfect lie anywhere on 50 acres of fairway. He wants putting greens true as a billiard table, yet soft enough to stop a half-skulled two-iron shot. Says Sam Cifelli, veteran golf course superintendent at Rockaway River CC in Denville, N.J.: "I die a thousand deaths a year. Every day is a different headache."

Tough as it now is, however, the superintendent's job may become even tougher when Congress finally enacts Federal legislation establishing new nationwide pesticide controls. Pesticides are only one weapon in a potent arsenal that has enabled golf superintendents to produce their minor miracles over the past quarter century. But they have proved indispensable in combatting the worst pests. If their use is drastically curtailed, golf clubs would face the unpleasant alternatives of either a) raising the \$90,000 annual maintenance cost required to keep an 18-hole course in



top condition or b) accepting lower quality in the course's condition.

Whether the impending law will in fact drastically curtail pesticide use on golf courses is currently unknown. Called the Federal Environmental Pesticide Control Act, it will establish administrative procedures for the newly-created Environmental Protection Agency to regulate pesticides as "general use" or "restricted"—i.e., to be applied only by a "certified pesticide applicator." Most experts seem relatively unconcerned about the impending law's effects. They believe that it will cause golf course superintendents only mild inconvenience, that there are alternative means or ready substitutes for any chemicals that might be banned. Dr. Paul Alexander, director of education for the Golf Course Superintendents Assn. of America, however, takes a starkly pessimistic view:

"This new Federal law could deal a severe setback to the quality of golf courses. It could set them back to the standards of the late 1920s and 1930s. United States golf courses could again be overrun with crab-

grass, dandelions, pigweed, ragweed, brown patch, dollar spot, Pythium, Japanese beetles and cinch bugs. Anthills could appear again on greens. What golfer today can remember seeing anthills?"

Enactment of the new Federal controls is practically certain. By a 3 to 1 margin, the House of Representatives has already enacted its version and the Senate is expected to follow sometime in early 1972.

Battling nature

To put the pesticide problem in perspective, let's take a broader look at the entire problem of golf course maintenance. As indicated earlier, the modern American golf course is a triumph of technology over nature. Bulldozers, graders and other earth-moving carve out the trees and shape the topography to the architect's plan. Hundreds of tons of sand are poured into trap excavations. Specially bred grass seed is planted or pregrown turfgrass is unrolled for the greens. Fine-bladed bentgrass flourishes in the damp, cool English summers; London's parks look like

practice putting greens. But keeping bentgrass alive in our torrid continental summers is a botanical feat comparable to such medical marvels as iron lungs and mechanical hearts.

Maintaining a well-conditioned American golf course is thus a perennial war against nature. Left to itself, nature creates an ecosystem brimming with diversity. A tropical jungle, with its abundant, interdependent species of plant and animal life, is ecologically stable. Cornfields, grass lawns, rose gardens and other "monocultures" are highly unstable. Growing and maintaining a putting green is the world's most difficult and exacting horticultural task, according to Dr. Alexander. The ecological stability of a putting green is comparable to a bowling ball balanced on a cuestick.

Pesticides, which include fungicides, herbicides and insecticides, are of course only one aspect of scientific golf course management. Underground watering systems keep fairways green and sparkling throughout the golf season. Proper watering is critical. Too little water,

continued

too infrequently applied, allows the grass to burn and wilt. Too much water, frequently applied, produces shallow roots and tender leaves susceptible to fungus disease. In torrid climates, water can even act as a coolant, applied as often as three times a day. Water cooling can temporarily reduce soil surface temperature by as much as 40 degrees Fahrenheit. It prevents bentgrass from wilting and suffering permanent damage during prolonged hot weather.

Greenskeeping machinery has kept pace with the new course maintenance technology. Ten-bladed fairway gang mowers, replacing the conventional six-bladed mowers, enable a superintendent to eliminate the slight rippling that results from wider blade spacing. Mechanical spikers puncture and loosen compacted soil, allowing better root penetration and better aeration. Power thatchers remove the dense accumulations of old grass blades and new clippings that retain water and obstruct the passage of water and oxygen into the soil. Other equipment includes sprayers, sod-cutters and powered putting greens rollers-mowers, capable of producing carpet smoothness.

Also included in the golf course superintendent's arsenal are potent new nitrogen-releasing fertilizers and hybrid grasses—weed resisting U-3 bermudagrass for hot climates and fungus-resistant Penncross bentgrass for cooler climates.

Despite the great progress in all other phases of the golf superintendents' arts, pesticides are currently crucial in preserving the precarious quality of the nation's golf courses. About 10 per cent of a typical golf club's \$90,000 annual maintenance expense goes for pesticide materials and application. The most serious pests attacking golf courses are fungus diseases. Greens are especially vulnerable to fungus diseases, because they must be continually watered to promote growth and keep the low-cut grass alive.

Insects form a second major category of pests attacking turfgrass. Soil infesting insects—mole crickets, billbugs and grubs (beetle larvae)—attack roots. Others—cinch bugs, cutworms, scale insects, sod webworms—feed on leaves or stems. Ants

do their own unique thing, boring holes and piling the excavated soil on the greens.

Weeds also harass the golf course superintendent: Crabgrass, dandelions, chickweed, clover and *Poa annua*.

The golf course superintendent fights these pests with an arsenal that includes some of the most potent chemicals used on farmland—notably mercury-based fungicides and the notorious insecticide, DDT.

The pesticide controversy

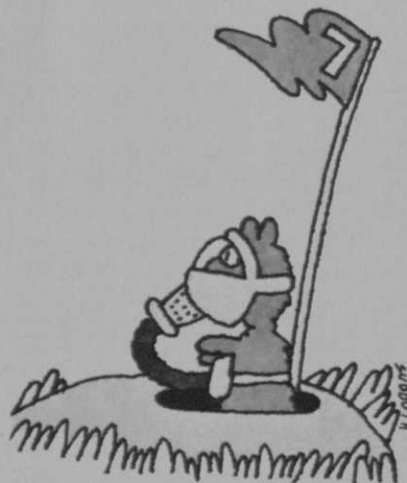
The direct threat posed by unrestricted use of pesticides is far less serious than the indirect threat. The conservationists' case against DDT, as an example, concerns its long-term effects rather than immediate hazards. As one of the major poisons developed during World War II by the pesticide industry, DDT has been sprayed extensively and in some instances with reckless stupidity. After the spraying of some one million tons of this durable poison over the past 25 years in the United States alone, DDT has invaded the entire food chain. Ocean algae contain several parts per billion; small algae-eating fish contain several parts per million and fish-eating seabirds contain many parts per million. Americans are storing DDT in their fat, in their livers and other organs. The effects of this storage are unknown, but ignorance is not to be confused with bliss. Even if current storage levels are harmless to human life, DDT, nonetheless, presents a potential threat. Its unrestricted use threatens largely unknown, but potentially hazardous changes in the ecological balance. Some insects have developed an immunity to DDT, but their natural control agents, predatory birds, have not. Uncontrolled growth of these DDT-immune insects could escalate the chemical warfare with even graver ecological consequences.

Against the conservationists' argument for banning pesticides like DDT, Dr. Alexander cites several counter arguments for permitting their continued use on golf courses. First there is the small scale of golf courses compared with farmland, the biggest pesticide consumer. More important, however, according to Dr. Alexander, is the nature of the land. Farmland readily leaches out pesticide

chemicals, which then run into streams and waterways. But the soil under good turfgrass is stabilized into a tightly bound system of interlocking turf roots. Mercury-based compounds are apparently retained for years, moving only a few inches, in the turfgrass soil. Golf course superintendents take great care in applying pesticides, especially in calibrating application equipment to guard against harmful overdoses. They seldom use aerial spraying, which often releases pesticides outside the target areas. In the past some large-scale DDT users have applied DDT as indiscriminately as saturation bombing. Golf course spraying is highly controlled—done either by superintendents skilled in the techniques or by an expert contractor called on for the purpose.

A recently-enacted New York State law offers a preview of problems that may soon confront golf course superintendents all over the United States if the Federal Environmental Protection Agency rigorously exercises its new powers to ban the more hazardous pesticides for general use. New York State's law bans several of the more potent pesticides—notably DDT and the mercury-based fungicides suspected of contaminating tuna and swordfish with mercury deposits after they leach out of the soil and ultimately flow to the oceans. Several New York State superintendents report no major problems resulting from New York State's law during the law's first golf season. Joseph Baidy, superintendent of Rochester's Oak Hill CC, site of the 1968 National Open, has successfully substituted the newest, general-purpose fungi-

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cides for the prohibited mercury compounds. But Baidy says it's still too early to assess the ultimate effect of the state law.

The New York State superintendents may be insufficiently alarmed, according to Alexander. He foresees great difficulty in controlling snow mold without mercury-compounds, because, he claims, there are no proven substitutes available. Dr. Alexander also cites what he considers undesirable additional expense when substitutes are available. Substitution of less hazardous methoxychlor for DDT can raise the cost of controlling leaf-feeding insects by 90 to 180 per cent, according to Dr. Alexander. (It takes three annual applications of methoxychlor to equal one application of DDT.) Dr. Alexander predicts that within the next year or two the New York State law will exact a considerable toll, in reduced quality and higher maintenance costs, in the state's golf courses.

Rees Jones of Robert Trent Jones, Inc., golf architects, takes a more optimistic view of the golf course superintendents' prospects. Proper design can build in natural resistance to pests, according to Jones. He cites a new course near Houston, Sugar Creek CC, to prove the point. Opened for play in April, 1971, Sugar Creek required no fungicides throughout its first spring and summer. Though it

will inevitably grow more susceptible to fungus disease as it ages, the course will permanently benefit from its excellent construction. Jones attributes Sugar Creek's health to the drainage designed for the greens. With modern bulldozers and other earth-moving equipment, it is possible today to contour putting greens and fairways for good drainage. Sugar Creek's greens are not only contoured for good drainage; they also have a porous top layer mixture of peat moss, "sharp" sand and a four-inch layer of gravel—plus 500 lineal feet of drain tile per green. The fairways are crowned in the center to drain water toward the roughs, woods and ponds. By minimizing standing water, the golf architect simultaneously minimizes the chances of fungus diseases, because funguses thrive on excessive moisture. Such precautions for good putting-green drainage may add \$50,000 to total construction costs. But even before the course opens, the benefits start appearing—in lower pesticide bills plus other maintenance savings and in perennially healthier turf.

Even for existing golf courses that will continue to need pesticide applications, there is no rational cause for alarm. The most important counterargument is the Nixon Administration's lethargic record in all aspects of pollution control. It is inconceivable that an Administration so lenient

with industrial polluters that foul the nation's air and water would take drastic action against pesticide manufacturers. Unless the political winds shift about 180 degrees, the Nixon Administration will not drastically curtail pesticide use. It is difficult to imagine a Federal law tougher than the New York State law, and golf superintendents have managed to live with it.

In the long run, pesticide regulation, if not politically motivated, could have a beneficial effect on turfgrass management practices, says Al Radko, Eastern Director of the United States Golf Assn. Green Section.

"We've probably been relying too much on chemicals, not enough on mechanical methods," says Radko. "Chemicals should be a last resort, not a first resort."

The new technique of vertical mowing is one promising mechanical method cited by Radko. Low-lying crabgrass tentacles that escape the horizontal mower blades would not escape the vertical mower.

Used in conjunction with more thatching, aeration and better watering, vertical mowing can promote a generally healthier environment for putting greens, according to Radko. Reducing a thatch layer from one inch to one-half inch creates a firmer base that admits more water into the putting green's subsoil. The

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What the impending law means

The impending Federal Environmental Pesticide Control Act will ultimately require golf course superintendents to register as Certified Pesticide Applicators, unless they are content to use the pesticides available to homeowners. This certification must occur within four years of the bill's enactment, which is expected no later than spring, 1972. States can elect to license Certified Pesticide Applicators (CPAs). In states that don't exercise this prerogative, the Federal Environmental Protection Agency (EPA) will administer the licensing. Presumably, the EPA will require licensing applicants to pass an examination testing their knowledge and skill in applying pesticides whose improper use would endanger either the applicator or the environment. As Certified Pesticide Applicators, golf course superintendents may be required to keep records and file reports with state or Federal officials.

Under the expanded Federal authority provided in the new law, all commercially marketed pesticides will fall under EPA jurisdiction. When its new registration system goes in-

to effect, presumably within the next year or two, EPA will regulate each pesticide in one of four ways: 1) Ban its use totally, by rejecting its registration application; 2) Register it as a "restricted-use" pesticide, i.e., a pesticide that may be applied only by a CPA; 3) Register it as a "general use" pesticide, i.e., a pesticide approved for general public sale, or 4) Register it as both a restricted and a general-use pesticide, distinguishing its restricted from its general uses.

Expanded Federal regulation will naturally tend to make pesticide controls more uniform throughout the United States. The states will generally retain authority to impose stricter controls than the EPA's, but they cannot weaken any EPA controls.

Judged by EPA's current policy, DDT will probably be banned. Other pesticide candidates for a Federal ban are those containing lindane, mercury, arsenic, lead compounds, chlordane, endrin, heptachlor, toxaphene and several others. If any of the foregoing are not banned, they will probably be restricted.

One interesting feature of the act is the dis-

criminatory favoritism accorded farmers. Although they collectively pose a far greater ecological hazard than all other pesticide users combined, almost infinitely greater than the nation's golf course superintendents, farmers are favored in the proposed act's provisions:

- 1) Golf superintendents and other pesticide users are liable to a \$25,000 maximum fine for violating the act; farmers are limited to a \$1,000 fine;
- 2) Farmers are exempted from the record-keeping and report-filing that may be required of golf course superintendents and other CPAs;
- 3) Licensing standards must be "separate" (translate "easier") for farmers than for golf course superintendents and other CPAs.

One interesting sidelight: No one from the Golf Course Superintendents Assn. of America testified at the House Agriculture Committee's hearings, which were swarming with farm, industry and conservation lobbyists.

Questions about the bill's provisions should be addressed to: Pesticides Regulation Division, Environmental Protection Agency, Washington, D.C.

—C.W. Griffin

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near the pick-up area.

Special attention should be paid to the food service pick-up area. In most kitchens the waitresses or waiters place the order and wait until the cooks and pantry girls put the order in front of them. The modern method relies on self-service. Items are pre-prepared, ready-to-pick up. Not only water, ice and coffee should be ready, but milk, juice and other appetizers, such as salads, desserts, soups, and even some vegetables or entrees that are suitable for pre-dishing (pies and casseroles), should be ready.

In the pantry the use of pass-through cooling units with sliding glass doors, speeds up service. The waitress or waiter can pick up grapefruit, cantaloupe or salads, while the pantry girls replenish.

The hot food dishout and steam table is designed to permit team work and for self service. The waitress or waiter, having access to soups and vegetables, can also garnish steaks or fish with watercress or lemon.

All kitchens need ranges, broiler ovens and steam kettles, but the modern kitchen uses less of these. Generally, home butchering is out, and in smaller operations the pastry shop

has been eliminated, saving from 10 to 20 per cent in space and equipment. Once the pre-cut and portion-control system has been adopted, fewer steam kettles and stock pots are needed. Even the various pre-prepared soup and gravy bases replace the eternal stock pot and espagnole.

To sum up, when planning a kitchen, begin with the menu and type of service. Decide on home butchering versus pre-cut and portion-control meat and ready-to-serve cakes and pastry. Offer simple, but effective menus. Display food where feasible. Pay special attention to the food service and pick-up area and purchase equipment that have proven their value.

A golf club in which the food operation is outstanding and self-supporting grows and is a valuable asset to its members. □

Matthew Bernatsky, *professor emeritus, retired in 1971 as a professor at Cornell University's School of Hotel Administration. A well-known lecturer, he has appeared at Club Managers Assn. of America seminars and is celebrated for his designs of food service facilities at many restaurants and country clubs throughout the country.*

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consequently healthier turfgrass reduces weed growth and even aids fungus resistance.

Fred V. Grau, president of Grasslyn, Inc., a former director of the USGA Green Section and a columnist for GOLFDOM, agrees that better turfgrass management practices—liming, fertilization and watering gauged to prevailing conditions—can offset the losses caused by prospective pesticide regulation. Rees Jones sees pesticide regulation as challenge to American ingenuity.

"We're an enterprising people," says Jones. "Some of the younger golf course superintendents sympathetic with the new conservationist movement are voluntarily seeking less hazardous substitutes for DDT and mercury-based fungicides. Grass breeders are producing new disease-resistant grasses. One new variety of bentgrass already appears suitable for use in hot climates formerly limited to bermudagrass putting greens."

American agronomists seem eager

to accept new challenges. In Southern California, smog injury to two susceptible varieties of bermudagrass stimulated development of smog-resistant variety called Santa Ana. Writing in the book, "Turfgrass Science," agronomist Coleman Y. Ward blandly accepts smog resistance as merely one more problem for grass breeders:

"... Since air pollution is expected to be a more serious problem in the future, turfgrass breeders will be required to add resistance to the repertoire of turf-quality characteristics now involved in grass-breeding programs."

This spirit seems more than a match for some mild restrictions on pesticide use. □

Bill Griffin is a registered professional engineer and noted free-lance writer. His work has appeared in many national publications, including *GOLF Magazine*, *Harper's Magazine*, *Saturday Review* and *Atlantic Monthly*.

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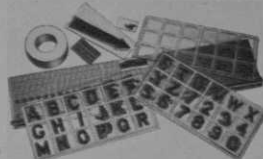
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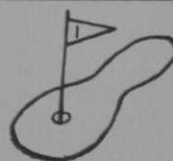
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