

ted, resulting many times in putting surfaces that are nothing but continuous sources of headaches and, in many cases, have to be torn up and rebuilt. Greens should be designed and contoured so that drainage occurs in many directions. This covers surface, lateral and internal drainage as well as drainage by diffusion and evaporation. If greens are properly constructed, the amount of money saved in irrigating them adds up to a very impressive sum in a year's time. Sprinkling time is reduced so that it consumes only about 1/10 of the hours that are spent in watering greens that are poorly built.

Work with Dealer

Stan Fredericksen: Disease often is the result of built-in problems. When you are trying to determine the source of turf trouble, do not leap to the conclusion that it is being caused by disease alone. Study the construction of the green, if that is the area affected, and review your maintenance practices to see if they, too, aren't partly responsible. Develop a complete fungicidal control plan that will see you through the entire year, working with your dealer, if necessary, to carry it out.

Roger Thomas — A supt. should train his employees to constantly keep an eye open for trouble, and to attune their ears to detecting it, especially where machinery is involved. The eye test comes in noting, for example, whether a mower is tearing up turf; the ear test comes in listening for sounds that may tell when equipment is not performing as it should. The biggest failure in handling course equipment is the result of poor instruction in its operation. Rainy days should be set aside for familiarizing employees with machinery by showing them how it should be used, what its function or capabilities are, and how it should be repaired.

Care in Topdressing

Bob Wiley: Topdressing shouldn't be handled in a haphazard way. Preparation should involve thorough discing to get the ground opened up; the topdressing material should be evenly distributed; and the final operation, dragging, should be thorough enough to get the material worked into the ground. The best thatch control program is started in the spring. Then, grass grows most vigorously and, as a consequence, the incidence of thatch



Gordon Sims



Al Caravella

is at its peak. None of us would be surprised to learn that we probably are watering greens too much. Maybe we should give more thought to the benefits of more cultivation and simple hand watering as a substitute for frequent soaking.

Al Suggests Hideout for Troubled Turfmen

Paul J. O'Leary, supt. at Ekwanok CC, Manchester, Vt., was chairman of the Wednesday morning 'Northern Maintenance' program and had these speakers on his roster: O. J. Noer of Dick Wilson & Assoc., Deerfield Beach, Fla.; Ted Woehrle, Beverly CC, Chicago; Alfred Caravella, Middle Bay (L.I.) CC; Beryl Taylor, Iowa State U., Ames, Ia.; John Gallagher, American Chemical Products, Ambler, Pa.; and James R. Watson, Jr., Toro Mfg. Co., Minneapolis.

Damage to Dormant Turf

Since winter and early spring are such critical periods in the survival of Northern grasses, O. J. Noer suggested that more study should be made of the damage caused by drought, water logging, ice accumulation and other factors that can be harmful to turf in its dormant state. The veteran agronomist cited drought, in particular, as being a source of injury to greens that the supt. must guard against. Deep roots that can feed on a water source through most of the cold months, dense turf that holds sufficient moisture, and either a snow cover, or brush, tree limbs, etc., that trap whatever snow that falls, give the best protection against the ravages of drought.

Other factors that enter into the winter survival of turf on greens, Noer said, are the way in which the putting areas are constructed and the composition of their soil. If the slopes are gentle, moisture will run off without causing any water-logging problems, but if there are ponded areas, and drainage generally is poor, injury to roots will result. The same effect also will be noted if too much water-holding peat is found in the soil mixture. The best properties in this respect, Noer pointed out, probably are found in soil that contains two parts of sand and one each of loam and peat.

Noer said that experiments now being carried on with plastic tarps as protective coverings may, in time, provide a solution to the winter-time turf dilemma.

Increased Fairway Maintenance

In his speech on routine maintenance, Ted Woehrle observed that his department in the last two or three years has been spending as much time in tending fairways as in maintaining greens. In outlining the details of his operation, the Chicago turf master said that he is using from 3 to 4 lbs. actual nitrogen per year in fertilizing fairways and is keeping the applications well spread out rather than concentrating them in any one season. Fungicide and herbicide treatments of fairways also have been stepped up in recent seasons at Woehrle's Beverly club, and aerifying is being carried out three or four times a year. Fertilization and disease and weed prevention treatments have been increased, he said, because manufacturers have brought down the prices of products used in these programs to the point where they are feasible for extensive fairway use.

Woehrle told of a divot repair program at his club that other clubs may do well to copy. Once every month 20 caddies are sent out to pick up the dead divot turf and repair the holes in the fairways with a mixture of topdressing and seed. It takes about a half day to cover the entire course.

Describes Renovation Program

Al Caravella, now of Middle Bay CC on Long Island, told the conventioners of a course-wide fairway renovation program he had carried out when he was at Echo Lake in New Jersey. The project took two years but effectively ridded the course's 18 holes of poa annua. Heavy doses of sodium arsenite were used to kill the original turf and thereafter each

fairway was aerified three or four times. Then, ground limestone was applied, thatch was removed with a sweeper, and another pass was made with the aerio-thatch machinery before seeding. A mixture of 1/3 Seaside and 2/3 Astoria was dragged into the soil.

After Caravella fertilized 40 acres of the front nine with a total of 800 lbs. of 12-12-12 and 10-6-4, aerified twice more, and saw the first grass shoots come through the soil, Hurricane Diana blew in and undid the whole job.

Talks to the Horses

Rather than sulk in the maintenance building and inveigh the goddess of turf (whoever she is), Caravella said he repaired to the race track for two or three days and talked to the horses who gave him the courage to go on, although they separated him from his wallet. A week later he re-seeded the first nine and the following spring (1960) renovated the back nine, both with excellent results. Caravella, who turned out to be one of the most entertaining speakers on the five-day education program, seriously recommends the "race track cure" for harried supts. He said that solutions to most problems can be found in watching the bangtails run, even though they may be stealing off with a fellow's money.

Outlines Green Program

Beryl S. Taylor, whose course at Iowa State University is considered one of the best conditioned in the Midwest, outlined his program for the maintenance of greens. Taylor revealed that he shoots for an actual nitrogen application of 8 lbs. per 1,000 sq. ft. over the year, with the heaviest dosages coming in April and Sept., and with light maintenance applications in between. He cautioned against going overboard in Sept.; however, saying that grass shouldn't approach the dormant stage in too lush a condition.

As for fungicide and herbicide applications, Taylor said that he feels that many supts. probably don't tie them in closely enough with their aerification operations. His course, he stated, is notably free of poa annua and crabgrass. It hasn't been hit by fungi to any great extent in recent years because he has made it a point to keep the soil in such condition that fungicides and herbicides, when applied, get good penetration.

Other recommendations made by the Iowa greenmaster: Don't feel that you should set a mower at 3/16 in. in June and not change it thereafter. Raise it as

soon as you see that hot and humid weather is threatening to damage your greens. If you're going to experiment, stick to the test plots until you are 100 per cent sure that everything is going to work out as it should; If you ever are guilty of overwatering, be certain that it is in areas where roots are shallow.

Need One-Shot Control

In his discussion of pre-emergence control of crabgrass, John E. Gallagher, a research specialist, said that the search still is going on for a chemical that will give safe and sure results with only a single application. In the last two or three years about four products have been developed that give anywhere from 85 to 95 per cent control under a wide range of conditions, and undoubtedly they are an improvement over the traditional arsenicals. They are diphenetrol, tri-fluorin, dipropylin and Zytron. Another, Ban Dane, also shows some promise.

It is being realized more and more, Gallagher stressed, that the timing of the pre-emergent applications is a quite critical factor. Early May, according to Ralph Engel, Rutgers agronomist who has carried on wide experiments with the new crabgrass killers, probably is the best month for making applications. But this is not a hard and fast rule since the percentage-wise control with chemicals applied in this month varies quite appreciably.

Tolerance Important

Turf tolerance to pre-emergent applications continues to be a very important factor, Gallagher continued. Tri-fluorin, for example, has proved to be a potent crabgrass killer, he said, but when it is applied at a 4 to 6 lb. rate, it burns the stems of the grass. Smaller doses, of course, would reduce injury but wouldn't be as effective in control.

Gallagher suggested that if the different chemicals are capable of giving only about 80 to 90 per cent control on an average, the only way to keep crabgrass suppressed is to grow such dense turf that the seedlings that resist the treatments won't have a chance to push through the soil.

Preparation is Vital

In his speech, "Putting the Grass to Bed for the Winter," Jim Watson, the Toro traveller, said that the preparation



This shelter, located on the Cape Coral (Fla.) CC course is much larger than the average shelter. It houses golf cars and carts as well as players and is particularly appropriate in a setting such as the Cape which quite often is hit by sudden thundershowers, especially in the summertime.

must begin with thorough aerification. "The old course," Watson observed, "becomes tired, compacted and in need of fertilization. If you don't cultivate it, it isn't going to get full benefit from the nitrogen, lime and other elements that you supply." Watson also recommended continued watering and mowing through the late fall months to cut down on the chances of winterkill, and added if the grass is to be overseeded it should be done for best results about four to six weeks before the heavy frost sets in.

Tells of Poly Cover Tests

Watson, who for the last few years has been carrying on tests with wintertime polyethylene grass covers to check their greenhouse effects, gave this summary of his findings:

All covers — clear, red, white, blue, green and black — protect against desiccation;

Before it is covered, the grass should be treated to resist diseases. Covers shouldn't be put on until the turf begins to go dormant;

Black Best Insulator

Temperatures under all covers remain quite high. Black is the best insulator and keeps the early growth retarded to some extent.

Clear and green covers induce the greatest growth;

A red clover permits strong growth but produces a chlorotic condition;

If the covers are removed too early in the spring, growth is retarded; if removed too late, growth becomes excessive and the tall grass is susceptible to disease.