

January, 1968, using 25 pounds (50-W) DCPA (Dacthal) per acre. An attack on the broad-leaf weeds was made with 2, 4, 5-TP.

The final plans were developed by B. R. Gillis, project manager for the Del E. Webb Corporation; Edward Hardy, Club Manager; Bill Bengeyfield, USGA Green Section, and the author. The program was divided into seven distinct steps:

- 1) Where the turf was thin and severe soil compaction existed, the area was heavily aerified with large aeration spoons.
- 2) Using an old gang fairway mowing unit, the area was mowed vigorously to break up the plugs.
- 3) A four-foot wide dethatching machine attached to the power takeoff of our tractor was then employed. The vertical blades were set two inches apart and the area was crossed a minimum of two times at right angles. The vertical blades cut into the soil to approximately a 1/2-inch depth.
- 4) Where excessive trash accumulated following the vertical mowing treatment, hand or vacuum units were used for its removal.
- 5) Hulled bermudagrass was sown at the rate of 80 pounds per acre.
- 6) With a top-dressing machine, a 1/4-inch layer of fine sawdust was laid over the seeded area.
- 7) Once seeded, the areas were watered by hand at least four times a day and continued for 10 days.

The irrigation phase of the work was extremely important. One man was charged with the responsibility for watering all the seeded areas, and at no time was the water application

to exceed 15 minutes. This practice avoided overwatering fairways and interference with play.

Those areas that would normally receive heavy compaction from channeled traffic were roped off and given some degree of protection. The golfers respected these areas and carefully removed their golf balls from them. This assured better germination and bermudagrass development. Ten days following the seeding, all areas were fertilized with a complete fertilizer at the proper rate. Fertilization was repeated each month for three months.

Germination of the bermudagrass seeds took place within five to seven days. The plants emerged from the vertically mowed furrows and developed runners that closed the area between the cuts. Within 30 days the area was well covered with bermudagrass turf.

The cost of the entire summer project was \$9,000 for labor (in excess of the permanent staff) and \$4,000 for materials. During May, June, July, and August we were able to renovate and seed 15 fairways.

The club is very pleased with the results, and we intend to continue our fairway renovation program in the future. We have proven to ourselves that the best results are obtained when any competition to the seedling turf is greatly reduced or eliminated.

I believe there are six prime factors involved in the success of our fairway renovation program at Almaden Country Club. They include (1) adequate financing, (2) development of a sound master plan, (3) the choice of common hulled bermudagrass seed for the fairways, (4) proper seedbed preparation in addition to adequate nutrients, moisture and soil for good germination, (5) proper timing of seeding, i.e., May through August, and (6) the cooperation of members and staff in making the program work.

Bermudagrass Fairways in the Southeast

by JAMES W. DUDLEY

As a background to the establishment of our bermudagrass fairways, I think it is significant to note that our golf course was designed by

Donald Ross and built during the late 1920s. Consequently, we were never able to spend the money for labor and equipment that is used in

Seedling bermudagrass on its way in thatching grooves.



the modern golf course. For example, we didn't have a roadscraper to level the fairways. My father, who built the golf course, told me that they used large railroad ties hooked together in unison for leveling purposes.

I think it is interesting also to note that originally, no seeds were ever sown on our fairways. We were entirely dependent upon whatever "cotton patch" bermudagrass volunteered. Fertilizers at this time, when money was available, were usually in the form of nitrate of soda and a small amount of guano.

Our fairways made no appreciable progress until 1952, when financial conditions were such that we could devote part of our budget to fairway maintenance. It was at this time that we made soil tests and started applying complete fertilizers plus lime to better establish the grass we had.

As far as weed control was concerned, the only methods that we knew of were a mattock and hoe for dallisgrass control and nitrate of soda as a caustic measure for crabgrass.

Since 1952, our fairways are 100 per cent bermudagrasses of many varieties. We have been able to accomplish this through diligently following established methods and practices learned through Green Section visits and seminars. Various selections have been brought in

from the Southeast and observed in our nursery before planting on the course.

Establishment and Fertilization

In general when using seeds we tried to establish them between May 1 and June 1 and not after July 15. Stolons can be planted throughout the summer, and sodding can be done anytime. Soil tests indicate that in most cases our soils need approximately one ton of agricultural lime per acre and 1,000 pounds of a complete fertilizer, such as 6-12-12, disced into the seedbed. This does an excellent job of getting the new seedlings off to a fast start. The lime and fertilizer are worked into the soil three to four inches deep.

When stolonizing, we used 200 bushels of stolons to the acre. The seedling rate has usually been 40 to 60 pounds per acre.

After the grass is established, our fertilizer program consists of 45 pounds of nitrogen per acre using a complete fertilizer such as 10-10-10 in the spring, preferably May 1. In the middle of the summer an application of some type of nitrogen at 45 pounds per acre is made, and then a follow-up in September of another complete fertilizer, such as 16-4-8, at the rate of 300 pounds per acre. Our fairway fertilization goal for the year is to supply between 120-160

pounds of nitrogen, 60 pounds of phosphorous, and 80 pounds of K₂O equivalent per acre. The combinations we use usually depend upon what is available at the best price.

Herbicide Program

Our weed eradication program begins in early March with an application of pre-emergence chemical on those fairways that are heavily infested with weeds the year before. Usually we find weeds in the compacted and shady areas, and our greatest problem is with goosegrass. This year we treated approximately 15 acres with pre-emergence chemical. I would say we were 75 per cent effective.

I think it is significant to state at this point that in no case did we get complete control, and consequently we have had to follow up with post emergence treatment. Our post emergence consists of three to four pounds of DSMA or MSMA per acre of actual material, plus one-half pound of 2, 4-D in 50 gallons of water. Treatments are about 10 days apart and three to four treatments keep our fairways fairly clean of most obnoxious weeds during the year.

Poa Annua Control in Bermudagrass

In general we have found that the above program has produced satisfactory results for

us. We still are faced with the problem of **Poa annua**. While it affords us some winter color until the bermudagrass emerges, it hinders this emergence to some degree and, of course, we never know how many seeds are tracked onto the green with the resulting problem.

This past year in two fairways, we used one quart of Paraquat in 30 gallons of water per acre and eliminated **Poa annua** that was growing. The bermudagrass must be dormant to spray this chemical and it is best to treat after two or three hard frosts. The reason for treating in December or January is that the **Poa** has not stooled out and will not leave unsightly areas as when sprayed in March.

These two fairways filled in much faster with the **Poa annua** eliminated than they did in the past. Reduced rates have been used with satisfactory results. Do not spray overseeded greens or cool-season grasses with this chemical or they will be eliminated.

We have found that with the many different types of bermudagrass that we have in our fairways, a "close knit" strain of common bermuda is easier to maintain than the hybrids. However, on stress fairways where shade or other factors, such as root encroachment from trees, are a problem, the hybrids, such as 419 and 328, are much more vigorous and weed free.

Damage To the Golf Course

by JAMES L. HOLMES

This is the time of year when the golfing public should be made aware of the damage that golf courses and golf course turf suffers both because of their activities and the activities necessary for maintenance.

If "damage" is brought to their attention, it is hoped that most of this damage will remain as potential, rather than becoming actual. Perhaps the best way to approach this problem is to divide and discuss damage under the following headings: traffic, golf carts, vandalism, snowmobiles, flooding, desiccation, and ice sheet cover.

Traffic

Even though one type of damage to a golf course could be included under the broad heading of "traffic," it is broken down in order to expand upon various types. First, player traffic

causes most extensive injury. Constant and heavy play on a given area frequently destroys turf. Teeing turf is most severely damaged, followed by turf on greens, and then fairways.

The one single factor of extracting divots, especially on tees and fairways, is an example. The United States Golf Association has steadfastly maintained that all divots die or are displaced by mowing equipment and many bare spots are left throughout the course. Even though divots may be replaced it is necessary to plug many divot scars or topdress such scars with soil and seed. That is done at the best maintained golf courses where the membership insists upon a complete turf at all times.

Foot traffic can be severely damaging to turf on putting surface and collars, especially when soil is overwet, or frost and ice is leaving the ground in spring.