A New Turfgrass Center for Southern California

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The tremendous ingress of new residents to Southern California creates a great demand for living areas. A tabulated daily addition of 590 workers along with 510 children of school age would substantiate an estimate that by mid-1965 the population of California will be over eighteen and a half million. Whereas a portion of these new residents will settle in apartments, many will crave the house with a beautiful lawn. Some will be forced to settle for a tract home with a hastily prepared lawn that will soon present all types of cultural problems. Some will acquire spacious home grounds in suburban areas.

Trends in our economic development indicate a decrease in the length of the average work day. Consequently many more hours of leisure time may be anticipated. It may be assumed that no little part of these hours will be spent in activity involving turfgrass. This would include the care of the home grounds where the upkeep of the lawn is a major item, as well as the recreational activity in parks, playgrounuds and golf courses.

In a 1954 survey, Dr. Vernon Stoutemyer (5) determined that there were more than 63,000 acres of turfgrass in Los Angeles of which 54,000 acres were in home lawns. There were also 3,100 acres in golf courses and 500 acres in parks and athletic fields. At that time this represented an investment of over 750 million dollars with an annual maintenance budget of about 250 million dollars. John Stark (5) states that at least 19,000 acres of land in the Los Angeles area have been designated for new parks and playgrounds to be developed within the next few years. This will involve an investment of some 26 million dollars for purchase of land and subsequent improvements. Mr. Stark has also calculated that by 1965, turfgrass areas in Los Angeles County alone will equal a green carpet 330 feet wide extending from Los Angeles to New York.

Since its inception in 1947, the Arboretum has been keenly aware of the importance of the community aspects of turfgrass culture. Dr. Louis Martin (7) of the Arboretum staff began the first research lawn plots here in the summer of 1950. The program was designed to determine grasses and grass combinations which would provide year-round green lawns under Southern California conditions of prolonged warm growing seasons and drought. It was recognized that the home owner needed a place where he could observe these grasses growing under a variety of conditions and determine which ones would be suitable for his particular lawn. Also it was felt that the Arboretum could well serve as a center for the accumulation and dissemination of information on turfgrass culture for the general public. The aesthetic appeal of well-cared-for grass areas as an inspirational factor was not overlooked.

The first grasses that were cultivated in the new plots were the Bermudas and the Zoysias. Observations on the behavior of these two grasses and their individual varieties and strains was reported in LASCA LEAVES for the Autumn of 1953. As will be reported later in this article, these two grasses remain in great favor and demand.

Entrance to the turfgrass research and demonstration areas.

On June 6, 1960 (6), Dr. William S. Stewart, Dr. Louis B. Martin and Mr. George Spaulding of the Arboretum Staff met with Mr. Richard G. Maire and Mr. Wayne C. Morgan of the University of California Agricultural Extension Service and decided that because of the size of the turfgrass industry and the great general public interest in lawns, an Arboretum turfgrass variety demonstration center would be a very worthwhile undertaking. Under the direction of Dr. Martin and Mr. Morgan and through the cooperative efforts of the Arboretum staff and the turfgrass industry, the present turfgrass center was established and to this day has continued to grow in effectiveness and importance.

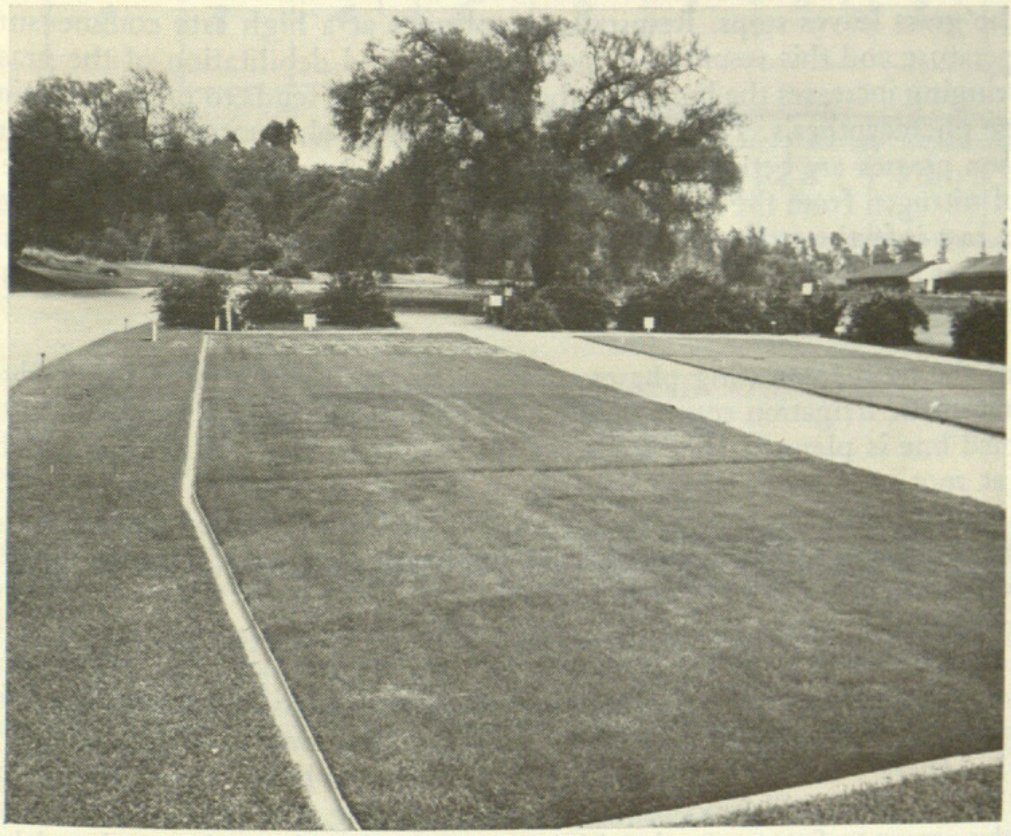
The most popular facet of our Arboretum turfgrass program is the demonstration plots. Here twenty different varieties of grass and Dichondra are maintained in sub-plots at two mowing heights and two fertilizer rates. Thus we have the benefit of four treatments in each plot, namely, high cut - high fertilizer, low cut - high fertilizer, high cut - low fertilizer, and low cut - low fertilizer. The low fertilizer dates were temporarily discontinued during the summer of 1963 to insure the survival of the grasses, but are being resumed now for the advent of cooler weather.

The main scheme of these plots divides them into two sections, namely, warm season grasses and those that are at their best during the cool season. Among the warm season grasses are four hybrid bermudas, two zoysias and three bentgrasses. Dichondra is also included here. St. Augustine grass is planted in a long strip nearby. Among the cool

season grasses are four bluegrasses, one mixture containing bluegrasses, two fescues, Pensacola Bahiagrass and a mixture of Alta fescue & Bahia. An inovation included with these grasses is Birdsfoot Trefoil *(Lotus tenuis L)*, an evergreen leguminous groundcover that reportedly thrives in poor soil.

The warm season grasses have seemed to profit by low cut and high fertilizer rates, being mowed twice weekly at five-eighths of an inch and bi-weekly applications of sulphate of ammonia at the rate of one-half pound of actual nitrogen per .... square feet. The few broadleaf weeds that appeared this year were controlled mainly by hand pulling after one treatment with 2, 4-D. Generally a dense turf resulted that seemed to resist both broadleaf weed and crab grass.

Thatch build-up was an undesirable factor with the high cut bermudas and bents but did not occur with the zoysias. Two light vertical mowings ("verticutting") resulted in increased growth after only temporary unsightliness. The mowing severed the surface runners and combed out some of the accumulation of thatch. Low cut bermudas were particularly improved by verticutting and further showed a desirable trait of not "scalping" easily during routine mowings. This was less true with the high cut bermudas and bents. The zoysias were not vertical mowed and both low and high cuts were equally satisfactory.



Kentucky bluegrass *(Poa pratensis)* and three of its selected strains at the end of a hot summer show varying degrees of survival. Newport (foreground) has a light green section, the result of re-sodding. Adjacent Park bluegrass is chlorotic. Merion is making good recovery from an all summer attack of rust and has regained most of its normal color. Kentucky bluegrass (top) is practically a complete loss after suffering from the heat and a late spring treatment of 2, 4-D for weed control. Hybrid bermudas *(Cynodon dactylon)* are at top right.

The zoysias were scalped to the ground in April and at summer's end had formed a most satisfactory turf cover except for a few spots in Z. matrella. Most admirable was the bright green color that extended deeply through the zoysia turf, in contrast to the shallow green tips of the hybrid bermudas over a brown thatch underlay.

An additional undesirable characteristic of the bermudas was the tendency of the leaf tips to assume a brownish cast, believed to be caused by smog. However, mowing and removing these clippings left behind a most beautiful shade of green. Cores of soil taken in the bermuda plots showed feeding roots as deep as eighteen inches. This may account for the less rigid demand for frequent irrigation in contrast to the bents which required almost daily watering.

The plots remained generally free of insects and diseases even without preventitive sprays, except for Kentucky bluegrass. Weakened at the beginning of summer by an application of 2, 4-D, the Kentucky blue grass gradually declined to a point beyond recovery and the plot is now scheduled to be replanted. Rust appeared on the Merion and Newport bluegrasses but new growth was stimulated by frequent applications of nitrogen and rigorous attention to syringing with water during the heat of the day.

This latter practice gives rise to an interesting speculation. If wilting occurs the stomates close and photosynthesis ceases. Thus the production of elaborated materials within the grass leaves stops. Respiration continues at a high rate commensurate with the temperature and this results in a more or less rapid debilitation of the grasses. Frequent syringing increases the humidity about the turf and tends to prevent wilting and to encourage photosynthesis. Thus with a larger supply of elaborated food materials, these cool season grasses are better able to withstand the hot weather and to utilize a larger supply of nitrogen from the soil in its metabolism. The subsequent growth tends to stay ahead of rust infections. If subsequent experiments substantiate this theory, the role of bluegrasses as an all-year green turf may be advanced in warm climates such as we have here in Southern California.

One of the most interesting phases of the turfgrass work here is the study of completely automatic irrigation controls. We have two installations at work in the turf plots and a third one is planned. The basis for these systems is a moisture sensor buried in the soil at root zone levels which determines the actual need for water according to a present moisture percentage. When evaporation and transpiration reduce the moisture below this percentage, this information is registered at a control panel which in turn operates remote controlled valves at a preset time. The sensors are then responsible for shutting down the system when sufficient water has been applied. Thus an optimum level of moisture may be maintained automatically in the root zone of the turf, with a minimum of water waste. Timing this operation under clock control allows irrigation during periods of high water pressure at the mains and during night or early morning hours when there is little loss due to evaporation or wind blown spray. Being completely automatic, the system will function unattended as during a vacation. Aside from a reduction in the amount of water used, a higher quality of turf may be produced because of a more favorable water relationship.

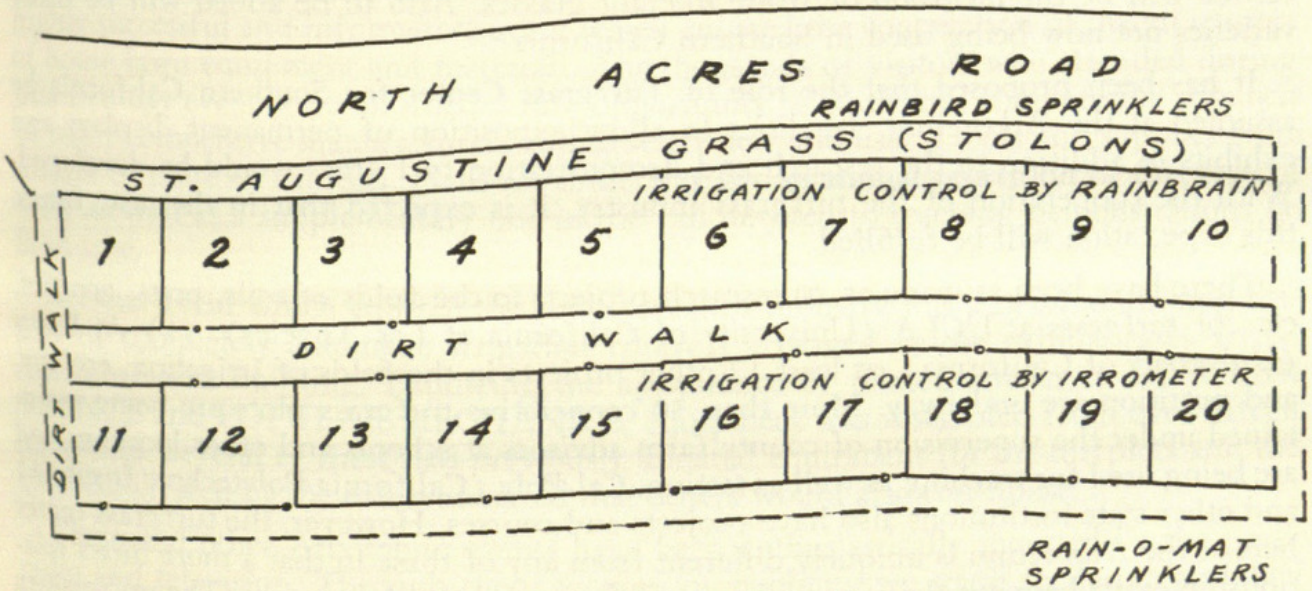
However, the garden hose is not ready to be relegated to the basement as a result of automation. Dry areas will invariably appear and should have separate irrigation as needed. Also, as previously mentioned, occasional syringing during hot and drying periods of the day appear beneficial, especially with the more shallow rooted grasses.

TURFGRASS VARIETY PLOTS

These plots show the effects that different rates of fertilization have on the various turfgrass species and varieties with different cutting heights. Each cutting height has two fertilization rates, the equivalent of three pounds vs. nine pounds of actual nitrogen per one thousand square feet for cool season grasses (left of center walk), and three pounds vs. twelve pounds of actual nitrogen per one thousand square feet for warm season grasses (on the right).

Irrigation is regulated by two completely automatic timing systems, a pre-determined level of moisture being maintained under the control of an electronic (RainBrain) and a hydraulic (Irrometer) moisture sensor, respectively, buried in the soil.

Material and equipment for the plots were donated by twenty-five or more companies specializing in irrigation equipment, agricultural chemicals and fertilizers, turfgrass seed and sod, and clay products.



KEY TO TURFGRASS SPECIES AND VARIETIES

NO.	SCIENTIFIC NAME	COMMON NAME	HOW PLANTED
1	Festuca elatior arundinacea	Alta Fescue	Seed
2	Festuca elatior	Meadow Fescue	Seed
3	Paspalum notatum	Pensacola Bahiagrass	Seed
4		Exposition Park Mix	Seed
5		Mixture of #2 & #3	Seed
6	Lotus tenuis	Birdsfoot Trefoil	Seed
7	Poa pratensis var.†	Newport Bluegrass	Seed
8	Poa pratensis var.†	Park Bluegrass	Seed
9	Poa pratensis (B-27)	Merion Bluegrass	Seed
10	Poa pratensis	Kentucky Bluegrass	Seed
11	Dichondra repens*	Dichondra	Sod
12	Agrostis palustris var.†	Old Orchard Bent	Stolons
14	Agrostis palustris var.†	Congressional Bent	Stolons
15	Agrostis palustris var.†	Seaside Bent	Seed
16	Zoysia japonica X tenuifolia	Emerald Zoysia (hybrid)	Plugs
17	Zoysia matrella	Manilagrass	Plugs
18	Cynodon transvaelensis X	T-35A Tifway (hybrid)	Sod
19	Cynodon dactylon sel.	Everglades-3 Ormond	Sod
20	Cynodon dactylon X transvaelensis	Magemisii - Sunturf	Sod
	Cynodon sp.	Tifton 57 - Tifgreen	Sod

*Not a grass
†Cultivar

Results of this turfgrass work indicate that the ubiquitous Devilgrass or common bermuda may also be not ready for retirement. Its vigorous and hardy characteristics make it a front contender in turfgrass culture. Since so many grasses are classified as high cost maintenance turfs, economics may dictate that common bermuda remain a front contender in our recommendations. Management problems are few and the results very rewarding. New chemiclas are available to keep the turf under control, insects and diseases are few, and a simple annual overseeding with inexpensive seed assures a year-round green.

Hundreds of new chemicals are being made available for the control of lawn pests, including insects, diseases and weeds. Many of these show great promise, particularly as broad spectrum pest controls or as selective herbicides. Some of these are currently being tested as a part of our turfgrass research program.

Plans are underway for an expansion of the turfgrass variety area. Immediately concerned will be the inclusion of shade tolerant grasses. Also to be added will be many varieties not now being used in Southern California.

It has been proposed that the role of Turfgrass Center for Southern California be assumed at the Arboretum. Facilities to allow exposition of permanent displays and exhibits in addition to the research and demonstration turf areas would be developed. With the cooperation of the turfgrass industry, it is expected that in the near future this expectation will be fulfilled.

There have been as many as 20 research projects in the fields of soils, pests, genetics, etc., of turfgrass at UCLA (University of California at Los Angeles). (1) At Davis (University of California), at least 17 other projects in the fields of irrigation, ecology, and nutrition are underway. More than 30 cooperative turfgrass plots are being maintained under the supervision of county farm advisors at schools and other locations and are being used for teaching as well as testing. Cal-Poly (California Polytechnic Institute) and other state institutions also have projects and courses. However, the turfgrass center here at the Arboretum is uniquely different from any of these in that a more direct relationship exists between the average home gardener and the Arboretum. The universities are mainly concerned with their students whereas the Arboretum caters to the general public. Thus it would seem that our primary role here is the dissemination of information on a caliber and level that readily meets the needs and understanding of the home gardener.

It might be added that the pending removal of the Department of Ornamental Horticulture from the campus of UCLA will deprive the local area of this important demonstration center. In view of our position here, it would seem expedient that the Arboretum coordinate and utilize all available facilities to meet the growing need for turfgrass information. We have a rapidly expanding library and expertly staffed departments of plant physiology, pathology, entomology and taxonomy which constitute a complete educational and research center.

These facilities are currently being utilized in a commendable educational program which includes in addition to youth projects, classes in home horticulture, home landscaping, plant identification, and the breeding of better ornamentals. These partially constitute the training of students in professional gardening. Also offered here is a special course in turfgrass management through the cooperation of the Extension Service of the University of California.

The Arboretum is constantly in demand as a meeting place for seminars and institutes held for the benefit of professional gardeners. Among the most notable is the annual

Southern California Turfgrass Institute, sponsored by the University of California Agricultural Extension Service and the Southern California Turfgrass Association and Council. In turn, the staff members here hold membership in all the professional associations devoted to turfgrass work and are in attendance at all seminars, institutes and meetings. Thus there is maintained a mutual interchange of scientific and practical information with these agencies.

Not to be overlooked is the relationship of commercial enterprise with our turfgrass work. Much equipment and materials have been donated for testing and demonstration as well as information on how well these provide assistance in solving turfgrass cultural problems. Knowledge of these useful tools and materials becomes imperative in a well-planned operation where the public stands to profit through their use in the establishment and maintenance of a successful lawn.

With this in mind, the Arboretum under the direction of Mr. Norman A. Isbell, Jr., sponsored a Homeowners Lawn Field Day during the spring of this year. It was a highly successful and informative event which enlisted the cooperation of manufacturers of home lawn equipment and materials. The thousands of visitors who attended during this two-day event were afforded a rare opportunity to study and compare the products of many competitive manufacturers and to select new and useful tools and supplies from a score or more of exhibits. Plans are underway for an annual repetition of this type of show as well as a supplementary one in the fall devoted to teaching demonstrations on lawn care.

Another event which enlisted the cooperation of industry was a two month long display of completely automatic irrigation controls arranged in the exhibit cases at the Administration Building. Following the appearance of related articles in POPULAR SCIENCE and POPULAR MECHANICS, equipment was assembled from over fifteen companies. Several of these had previously donated equipment for the turfplots and the goodwill created by the exhibit assured that others would also contribute.

These and other Arboretum events have been enthusiastically reported by the press, radio and television. Through these avenues of publicity we stand to derive a mutual benefit since they are able to reach the masses of people and acquaint them with our programs. Certainly, the more of the public that we contact the more our work is justified and the more we execute our duty as a public institution.

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