Southern California Turfgrass Culture

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TURFGRASS - WHAT IS ITS FUTURE?

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It is a pleasure to be with you today. It is more--it is an honor to participate in this significant gathering. In a sense, this is your tenth birthday. The Research Advisory Committee, which has grown into the Southern California Turfgrass Council, was organized in 1948. This group, representative of the Los Angeles metropolitan area and of the several turfgrass interests, has been a critical organization in the development of a turf consciousness and in the promotion of research and education in the turf field in California. This, too, is your tenth annual meeting. To be a part of it is both a pleasure and an honor.

The subject assigned me: "Turfgrass - What of Its Future," is one which needs neither soothsayer nor prophet. The information I have is that which you have. The reasoning I can apply to it is the reasoning which you can apply to it.

The first consideration in this treatment should be that of the general economic outlook. We live in a prosperous economy. Good living is characteristic of a prosperous economy. Good living is characteristic of California living. We generally measure our economic prosperity--consciously or unconsciously--in terms of standards of living rather than in terms of dollar profits or financial gains. It is the children of a prosperous economy who can demand the type of service with which you are concerned and which the turfed areas of the state supply. Turf is a part of our standard of living in this dynamic and prosperous era. The so-called recession or depression-- call it what you will - which we have been experiencing over the past several months, is past. We are on the upgrade. Channels of trade, manufacturing, and employment all reflect this change. We have increased our economic and our production efficiencies and there are resulting changes in the offing which will have increasing effects on the demand for recreational and leisure time services.

Sylvia Porter, popular and widely read writer on economics, points out that the billions spent by industry on new modern plants, mechanization, automation and similar improvements are paying off and industry can turn out more goods with fewer workers. This probably means there will be less demand for factory workers. A decrease in the number of workers in this field of employment seems to be one of the factors of the future. This situation will add momentum to the shorter work week movement. It seems just as likely, however, that increasing numbers of workers will be absorbed in government jobs, finance, services and trades. Once we have made the adjustment, the demand for leisure time services will increase.

We are coming more and more to realize the need for a break in the tense routine of every-day activities and for recreation. The park and recreation fields of our urbanized areas provide much of the opportunity for this. More leisure time and a greater attention to recreation is creating a demand for a more adequate usage of present recreational facilities and for additional facilities and increased services. It is creating a greater demand for help in home improvement and this means lawns.

We cannot think of the future of turfgrass in California without a consideration of our population trend. The State Department of Finance recently released figures on the State's population which are particularly pertinent. They indicate that in 1950 we had ten and one-half million people. By mid-1957, we had a little over 14 million - - an increase of over three and a half million, or an approximate 25 percent increase in that seven-year period. Projecting into the future, they indicate that the population by mid-1959 will be nearly fifteen and three quarter millions. Going further, they indicate that by mid-1965 we will have a population of over eighteen and one-half millions. This means that in the eight years between 1957 and 1965, there will be an increase of one-third in the population of California. It means that between 1950 and 1965 we will have had an average population increase of approximately 500,000 annually. Dr. Kenneth Farrell, Agricultural Economist on the staff of the Agricultural Extension Service, points out that we have an average of 590 additional workers in California's labor force each day and an additional 510 new children enrolling in our schools.

The State Division of Public Highways, in order to plan its needs for service to the State, must project population. It goes beyond these figures and predicts a population of nearly 22 million in 1970, over 26 million in 1975, and by 1980 31 1/2 million people.

**Talk given at the Southern California Turfgrass Institute Luncheon, Tuesday, October 21, 1958*

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This trend has well defined implications for turf. Urban resources and accommodations will not be adequate to meet the demands of this increasing population. Suburban areas will grow. They may become somewhat more congested. Certainly they will increase in extent. Home building will continue at a rapid rate. California will maintain its lead over the other states in the building of new homes. This has already been projected for 1959 by the various housing agencies. Urban living demands a greater land area for the homestead. This increases the home lawn problem. It also increases the demand for parks and recreational areas.

Another factor of interest is the factor of land use. The Soil Conservation Service, in a report issued in April 1956, indicated a little more than 16 1/2 million acres, of the better than 100 million total acres in the state, as capable of cultivation and crop production. Of this 16 1/2 million acres, almost two million were devoted to non-agricultural uses prior to 1942 Since 1942, or between 1942 and 1955, an additional 418,520 acres were diverted to non-agricultural uses in private ownership and almost 401 thousand acres to non-agricultural uses in public ownership. This is 17 percent of the 16 1/2 million acres of good agricultural land in the state now devoted *to uses* other than agricultural production. It is an increase of almost 50 percent between 1942 and 1955. Of this increase, 229,000 acres were in Los Angeles County, 56,000 acres in Santa Clara County and 28,000 acres in Alameda County.

About a year ago, John Stark, Farm Advisor in Los Angeles County, released a statement indicating that some 19 thousand acres of land for parks and playgrounds are planned for the Los Angeles area in the next few years. This land will be under the control and development of the California Division of Beaches and Parks. It will entail an investment of 26 million dollars for land acquisition and improvement - - improvement of this and of present county park holdings. Although a portion of it will go toward beach frontage and mountain camp sites, the greater part will be spent on parks, playgrounds and turfgrass.

Turf is an important industry in California. A survey in Los Angeles County in 1954, conducted through the cooperation of Dr. Vernon Stoutemyer of UCLA; the Advisory Committee for the turfgrass research program under the chairmanship of Colin Simpson; Fred Roewekamp, Superintendent of Park Development in the Department of Recreation and Parks for the City of Los Angeles; and James Beutel, Farm Advisor in the Los Angeles County Extension office; was our first real measure of the acreage, investment and costs of maintenance of turf in the state.

At that time, there were more than 63,000 acres of turfgrass in Los Angeles. The largest acreage-- approximately 54,000 acres-- was around homes and apartment houses. The second largest-- that of approximately 3,100 acres-- was in golf courses, while the third-- a little over 500 acres -was in parks and athletic fields. These figures led to a state estimate, at current costs, of a total turf investment in California of approximately 750million dollars and a total annual expenditure for maintenance of around 250 million dollars.

John Stark, referring to this survey this morning, indicated that a well considered estimate would raise the 63,000 plus acres of turfgrass in Los Angeles County to around 85,000 acres in 1958. Turfgrass installations are expanding at fantastic rates. John estimates that by 1965 the turfed areas in Los Angeles County alone will equal a green carpet 330 feet wide reaching from Los Angeles to New York. New homes, industrial and civic buildings, parks and civic playgrounds, golf courses, schools and cemeteries are typical examples of the expanding need for grass.

Those who are concerned with turf were not unaware of the problem and the need for information and improvement shortly after the end of World War II. In the mid-1940's, leaders interested in the improvement of turf, largely golf course and park people, sought means for comprehensive programs of research and for the accumulation and spread of information concerning the adaptability, installation, care and maintenance of grasses for the purposes of turf areas. In 1948, an advisory committee representative of the Los Angeles metropolitan area designed to work with the Department of Floriculture and Ornamental Horticulture on the Los Angeles campus of the University of California in the development of a program of research and education was organized. This committee has since become the Southern California Turfgrass Council. It has provided funds for research work. It has encouraged the extension of the findings of this new research and of previous research. It sponsored the first turfgrass conference to be held in California in the Spring of 1949. It publishes a quarterly newsletter which is widely distributed and is considered among the best of the current periodic publications in its field.

Early in 1949, stimulated by the California Horticultural Council and aided by the research committee in southern California, a committee was organized in northern California for the purpose of sponsoring a turfgrass conference in the northern part of the state. This committee evolved into the Northern California Turfgrass Council.

Two and one-half years ago, these two Councils developed the Federated Turfgrass Councils of California to provide a statewide organization. The purposes of this Federation are to provide a means of clearance and coordination of activities of the member

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organizations, of gathering and exchanging information, and of working with other organizations and agencies on a statewide scale. The activities of this state group center around the encouragement of adequate research, aggressive education, and organized activities designed to improve the turfgrass of California. This Federated Council wisely provided for admission to membership of additional sectional councils as they develop. At the present time, there are indications that a similar local council will be developed in the San Joaquin Valley.

A year and a half ago, this group, after considerable study of the turfgrass situation in California, developed a statement of needed research and extension. This statement has been widely distributed among research agencies, extension workers and commercial and private organizations. A recent review of progress made by the Federal Council indicates considerable advances being made along the lines outlined by the Council.

An informal review of the research of the Experiment Station of the University indicates that there are 20 research enterprises in the general fields of management, soils, weeds, diseases, entomology, genetics and varietal work on the UCLA campus. There are 17 such research enterprises in the general fields of irrigation, diseases, ecology, mineral nutrition, management, weed control and variety testing on the Davis campus. Farm advisors in some 30 counties have cooperative turfgrass plots under their supervision. Many of these are highly satisfactory plots and are being used as teaching devices in the areas where they are located. In seven or more counties, farm advisors are carrying on organized programs of educational work.

Other educational institutions among our state colleges, particularly Cal-Poly, are giving attention to turfgrass. They are offering training for men interested in the turf field. They are providing the use of their facilities to the turfgrass interests. They, as well as the University, are receiving scholarship funds from various interested organizations which are enabling them to increase their student attendance and improve their training resources.

This and other conferences, field days and training schools now being held annually in both the northern and southern parts of the state are short courses for turf workers. Some work in which turf is involved has seen its beginnings through general University Extension. In a few instances small, highly localized groups meet informally from time to time to discuss experiences and exchange information. One such group, centering around Marysville, meets three or four times a year. It draws from a radius of around 100 miles and involves four or five counties. A farm advisor, and often instructors from nearby schools, attend these meetings. Commercial organizations, including those supplying equipment, fertilizer and seed, are directing a part of their efforts toward the turfgrass problem.

As the problem has grown, we have developed a recognition of it. With our development of a consciousness of turf, we have developed a will to meet the challenge. In a period of great specialization, there is a need for specialized organizations. We have in our turfgrass groups the necessary specialized organizations and we have the cooperation of research and educational agencies. We are making real progress.

It is when research, education and industry cooperate and work together that we make progress. It was through this pattern that we developed our food production potential. As we developed an agricultural technology, we released thousands upon thousands of farm hands from the farms and fields and freed them to provide the gadgets of modern living standards. By the same pattern, industry has developed a technology and efficiency which is in turn freeing hands from the factories and plants for other activities. Among the other activities are the service fields demanded by a prosperous economy.

Turfgrass has the challenge of complex problems. Our increasing population, our greater urbanization and concentration of people, our prosperous economy and need for recreational facilities are demanding more adequate services from present resources and will impose an increasingly greater strain on our turf resources. There is a growing need for training among those who are concerned with turfgrass. There is a need for greater skill in the actual handling of the turf areas. No longer can we depend upon unskilled labor for the more skilled work demanded or for development of supervisional talent. Such personnel requires training. There is a need for greater managerial abilities. No longer can we expect a man to become the manager we want simply because he has been a good workman. Managers, like skilled workers and technicians, require training.

The development of research will give us new information. Education will prepare men to carry on the tasks of applying this new information, and leaders to point the way and intelligently plan its application. Extension activities will provide assistance in meeting problems and developing the application of new knowledge and new development. It will be a means of constant in-service training to keep us abreast of changing situations and knowledge in a fast moving period.

Turf interests must face the problem of taxation. Land used for turf covered purposes in public ownership is not on the taxroll. As more land goes into public ownership for this and other uses, it will disappear from the tax rolls. Consequently, land in private ownership devoted to golf courses, private recreational areas and similar installations will have to bear an increasing tax burden.

One of the basic requirements for turf is water. Turf is a competitive interest in the battle for water. Its

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water requirements are high. It requires more water to provide good turf than it does to produce some crops.

Supporting industries are contributing to the development of the turf program. These industries face their own problems. Fertilizer supplies must be planned in consideration of other demands for fertilizer. Equipment manufacturers will meet problems in developing equipment and machinery adaptable to turf needs. Shall this be accomplished by concerns largely devoted to the manufacture of other types of equipment and machinery or shall it be accomplished by specialized companies? To what extent will these supporting industries be able to give field service?

The problems of soil and water management are apparent 'in any form of land use. The grassing over of soil, the constant irrigation necessary, the wear and trampling and compaction which follow present problems for which we do not yet have the full answers. Research and field trials will assume an even greater importance in the future than in the past.

The problem of disease and insect control grow with time and with an increase in area. We were unaware of and probably did not have many of the diseases and insects which affect crops and livestock in the years before we had crops and livestock. Disease and insects frequently are the reasons for failure after populations have been built up, soils have become impregnated, vectors have been established and insufficient attention has been given to their control. If we were suddenly to stop our activities in research and control, it is safe to predict that disease and insects would eliminate most any crop, including turfgrass. Constant vigilance and constant development of methods of management, control measures and resistant strains are the price of continued production.

Turfgrass requires nutrition. There are still unsolved problems of nutrition and fertilization - - challenges to the industry and to research to be met in future years.

These, and many more, can be wrapped up together in the general problem of turfgrasses but we have not done much about it. I presume it was the problem on the commons of early New England and on the greens of Old England. It is not new. The Federated Turfgrass Councils of California, in their statement of research and extension needs of a year and a half ago, clearly pointed out this particular problem. They called attention to the fact that we know a great deal about the requirements and usability of pasture and range grasses. We can measure the grazing capacity of these grasses. We know little of the wearability and usability of turfgrasses.

This conference is an important conference because for the first time we have devoted a full program to traffic tolerance. We are not just talking about it. Research workers pointed out today something of what they have learned through organized and projected experiences. They have given us a progress report. They have put it in terms which we can understand. They have shown us a gadget designed by Marsten Kimball - Extension Ornamental Horticulturist, and Russell Perry of the Department of Agricultural Engineering, UCLA, for the measurement of wearability. This afternoon they will demonstrate it. If this gadget serves the purposes which it promises to, it will be a contribution' of great importance to California and to the whole turfgrass world. The very fact that this conference has gone this far with a new approach to an old problem makes it a milestone in turfgrass conference history.

There is a bright future in turfgrass. We cannot escape that conclusion. It is a future which focuses attention on certain requirements. First is the need for trained and professional personnel. If we are developing a program of research through experimental work, both public and private, we are also preparing and improving, through educational institutions, a training program for the men who must deal with and apply the findings of that research. We need and will increasingly need men on our turfed areas who have the necessary technical training and abilities for the best job possible and for progressive development of their abilities. The day for the untrained worker is rapidly drawing to its close. We need the trained professional worker in the more scientific fields to meet the complex problems of turf. We have need for men with the broad training for managerial responsibilities.

The future of turfgrass requires a special organization or organizations devoted to its interests. We have laid the foundation of these organizations in California. They have jumped the first hurdle-- they have learned to work together. Their accomplishments, up to now, are their promise of the future.

There is a continued need for a clear understanding of research and extension requirements. The present diversity and well adapted program of research, carried on through the University of California, will be greatly strengthened by the continual development of the Departments of Landscape Management on the Davis campus and Ornamental Horticulture and Floriculture on the UCLA campus. The work of our other state schools in training and assisting the industry will emphasize the building of personnel.

Turfgrass interests face problems of public relations. In a modern society, highly specialized interests belonging in a more general pattern require public relations of a high order so that they may adjust to and be fitted into that pattern in the greatest service to the general public.

This is your tenth birthday. May I therefore compare your organization to the ten-year-old boy. That character

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in our society has characteristics all his own. He may not like girls, but he likes the world in which he lives. He wants to he a part of it. He wants recognition on his own merits. He is beginning to want to contribute to the society of which he is a part and he is beginning to contribute to it. He needs sound and aggressive leadership. He faces problems, the handling of which will affect his future for many years. He may be on the brink of an awkward period, hut he is certainly on the brink of a period of growth and development which will lead him to maturity and achievement. And so it is with the Turfgrass Councils of California-- they have a growing part in the community, they need aggressive leadership, they are on the brink of a period of growth and development which will lead to maturity and achievement. They need to establish their relationships and encourage the development of training, of research, and of extension endeavor. They need to understand their service to society and their place in it. They need to be conscious of the problems of that service and to intelligently seek solutions.

You are ten years old and you have, at this conference, ventured into the future with your theme of "Turfgrass Traffic Tolerance." May I congratulate you on a challenging, brilliant and worthwhile future.

EXTENSION COURSE IN TURFGRASS CULTURE

The University Extension Course in Turfgrass Culture will be offered again during the spring semester of 1959 . Organization of the course will be similar to that of previous years. All aspects of turfgrass management will be covered, including grass varieties, soils, turfgrass fertilization, watering, diseases and insects, weeds and weed control. The class will meet Tuesday evenings from 7:00 to 9:30 for twelve weeks starting Feb. 10, 1959. The class will meet at the University of California, Ornamental Horticulture Area, 300 Veteran Avenue, Los Angeles.

The course is open to anyone interestedin the culture of turfgrasses, but is planned especially for the professional. The instructor will be Dr. Victor B. Youngner, Assistant Professor of Ornamental Horticulture, UCLA.

Students may register in advance at the University Extension Office on the UCLA campus, or they may register at the first or second meeting of the class.

1958 TURFGRASS INSTITUTE AND FIELD DAY

John J. Stark

University of California Agricultural Extension Service

The Southern California Turfgrass Institute was held on Tuesday, October 21, 1958 at the Riviera Country Club in Pacific Palisades. Sponsored by the University of California Agricultural Extension Service and the Southern California Turfgrass Council, the meeting featured nationally-known agronomists and experiment station personnel. The theme was "Turfgrass Traffic Tolerance," which included topics on wearing qualities, response and regrowth of various grasses after severe traffic tests.

Robert Berlin, president of the Southern California Turfgrass Council opened the meeting with acknowledgements and introductions of special guests.

John J. Stark, University of California farm advisor in Los Angeles County working in the field of commercial floriculture and turfgrass, set the stage for the meeting by presenting examples of traffic problems on turfgrass. He mentioned how the 1,175 acres of turf found in the Los Angeles City parks and playgrounds had repeated visits, totaling over 83,000,000 using the facilities last year. In Los Angeles County there are approximately 85,000 acres of turfgrass and it is expanding at a rapid rate. Statistics show that the Los Angeles City schools' athletic fields equal 141 Rose Bowls and receive some of the severest wear found in turfgrass, as nearly 2,000 students use each field daily.

Tom Mascaro, president of West Point Products in Pennsylvania, presented an enlightening subject on "Growing Grass the Hard Way." Tom showed numerous slides depicting problems faced by turfgrass men, ranging from animals, hailstones, lightning, tornados, and machinery. Traveling over 100,000 miles per year, Tom has an opportunity to view many types and variations of problems and damage.

0. J. Noer, agronomist with the Sewage Commission of the City of Milwaukee, presented many factors about the use of various bermuda grasses, T22, T57 and U-3. He feels that the close mowing of athletic fields, in order to keep the turf tight, helps various sports. He expressed the opinion that Ky 31 fescue is a good choice for rough play areas in hot, humid climates. Examples of turf planting and results at West Point were given.

Russell Perry, Department of Agricultural Engineering, UCLA, gave a detailed description on the development and construction of a turfgrass wear machine. Professor Perry, using a model which was a precursor of the operating machine, demonstrated the wear action. This machine promises to yield an extremely large amount of information in the future.

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1958 Turfgrass Institute and Field Day

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Victor B. Youngner, Department of Floricultural and Ornamental Horticulture, UCLA, presented factors involved in the operation and action of the wear machine. Height of cut, amount of thatch, density of the turf, and variety of grass are some of the main factors involved in wear. Weeds, damp conditions, texture, soil structure, and shade are other factors encountered in wearing qualities. Tifton 127 indicated best wearing qualities in one series of tests in Bakersfield. Tifgreen also rated well.

0. R. Lunt, Department of Irrigation and Soil Science, UCLA, presented examples of how certain soil properties affect growth of grass and its response to wear. He demonstrated the effect of traffic, the formation of a compaction layer and the advantages of mechanically alleviating this problem. Occasionally compaction can be regulated through proper irrigation and control of soil moisture. Unfortunately traffic usually occurs when soil moisture is most likely to result in damage. Dr. Lunt gave examples of various infiltration rates found in compacted areas where wear is great.

Marston Kimball, ornamental horticulturist for the University of California Agricultural Extension Service, presented observations on regrowth of the grasses worn by the turfgrass wear machine. He gave further facts about the ability of grasses to withstand excessive wear and abuse. Tifgreen recovered in two weeks after severe wear. Common bermuda recovered only 20 to 25 per cent in the same two-week period.

In the afternoon session the audience was divided into three groups which rotated between panels and demonstrations. "Grasses and Management in Regard to Traffic" was covered by a panel composed of Tom Mascaro, 0. J. Noer, William Bengeyfield, and V. T. Stoutemyer. Questions on soils, fertility, and planting stolons were answered by 0. R. Lunt, V. B. Youngner, and J. J. Stark. The third panel consisted of demonstrations in the nursery of the Rivera Country Club by Marston Kimball, Tosh Fuchigami, Jack P. Bockes, and Russell Perry. The methods of planting stolons and rate of growth of various bentgrasses and improved bermudas were shown. The "wear machine," developed by R. L. Perry, was operated and its functions explained.

Five men, each with many years of experience in growing turfgrass, were featured in the evening session. Frank Stewart, horticulturist, Forest Lawn Cemetery, presented the problems faced by cemeteries and the solutions found. William Beresford, superintendent, Los Angeles Country Club, told of the factors affecting turf growth and wear on golf courses. Carl Bloomfield, supervisor of the Rose Bowl Area, gave a brief accounting of the growing schedule he follows in the management of professional athletic fields. The problems of growing turf on school athletic fields were well covered by Charles Wenger, landscape and gardening supervisor of the Los Angeles City schools, who outlined the techniques employed by his department. John Coogan, district foreman, Los Angeles City Department of Recreation and Parks, gave recommendations for growing under conditions of severe wear.

Professor Russell Perry (right) explaining the operation of the turfgrass wear machine at the Southern California Turfgrass Institute.

This institute was considered one of the most successful held in the last five years.

Officers of the Southern California Turfgrass Council

Mr. Robert Berlin ..... Immediate Past President
Mr. Frank Stewart ..... President
Mr. John Gaughenbaugh ..... Vice President
Mr. Max Weeks ..... Secretary
Mr. Pat Pecorelli ..... Treasurer

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EFFECTS OF WINTER APPLICATIONS OF GIBBERELLIC ACID ON BERMUDA AND ZOYSIA TURF

Victor B. Youngner
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The application of the growth regulator, gibberellic acid, has been suggested as a possible means of stimulating growth on subtropical grasses during the winter months. A series of tests were conducted at UCLA during the winter of 1957-58 to determine the feasibility of this idea.

Blocks of established turf of U-3, Texturf 1F, Tiffine, Tifton 123 and common bermudagrass, and Emerald and Meyer Zoysia were treated with 10 and 100 ppm gibberellic acid solutions. Applications were made at approximately three week intervals, starting November 18, 1957 and continuing through February 1958 Sufficient amounts of the solution were applied each time to thoroughly wet all foliage. Each treatment block was split so that one-half received regular applications of ammonium nitrate and the other no fertilizer. All plots were mowed at weekly intervals throughout the experiment.

Following the first application a pronounced increase in growth was observed from the 100 ppm treatment and only a slight increase from the 10 ppm treatment. All varieties responded but the increase in growth over the check was more pronounced on the Zoysias than the bermudagrasses. Growth on the blocks treated with 100 ppm was a light green color. The application of additional nitrogen improved the color over that of the unfertilized.

Approximately a month after the first treatment it was observed that the bermuda turf receiving 100 ppm gibberellic acid was nearly colorless following each mowing. This was caused by a nearly complete removal of the elongated blade growth which exposed the brown thatch below. The period required for a return to green color following mowing increasedas the winter progressed.

Cool season grasses, primarily *Poa annua,* present in the turf responded more markedly than did the subtropical grasses. By the end of January practically all of the *Poa annua* had been eliminated from the turf given the higher concentration. This shallow rooted annual grass apparently was unable to with stand the constant removal of the excessively stimulated growth.

By February the bermuda plots given the 100 ppm treatment were all inferior to the untreated plots, being weak and of poor color. The 10 ppm treatment blocks were about the same in quality to the untreated. The treated Zoysia plots, while being weak in growth, were somewhat superior to the untreated in color throughout the winter.

All bermudas began normal growth in March and the treatments were discontinued. The bermudagrasses treated with 100 ppm of gibberellic acid were very thin and weak compared to the untreated throughout the spring. By June recovery appeared to be complete on all bermuda strains.

The Zoysia plots given the higher concentration remained weak and thin compared to the untreated until mid-summer. This weak thin growth permitted many weeds to invade which persisted throughout the summer.

These studies show that the value of gibberellic acid treatments to improve winter growth and color of subtropical grasses is extremely doubtful. Even if satisfactory color can be produced by these applications it may be undesirable because of the pronounced weakening of the turf.

WEED PHOTOGRAPHS AVAILABLE JANUARY 1959

Two-by-two color transparencies and black-and-white pictures of the following weeds in growth stages or close-ups indicated by "X" are now available. Each photo includes a label with both scientific and common name and an inch rule for size comparison. Weeds were placed in 6-inch pots for growth pictures, on black velvet for close-up of leaves, inflorescence, flower, seed or fruit. Nomenclature according to WEEDS OF CALIFORNIA, Robbins et al, 1951, with identification and labeling by Botany, UCLA. Potted and mounted specimens photographed with 35 mm Exakta equipment, speedlight illumination, by Leland R. Brown, Entomology, UCLA. Supplemental lists probably will be issued annually, as additional photos become available.

Transparencies in cardboard mounts may be ordered at 25 cents each, and black-and-white prints by arrangement according *to* size and finish. Arrange orders with Hays L. Fisher, 1760 Burkhart Ave., San Leandro, Calif. Orders placed by February 27 will be ready March 30, 1959. Orders received later will be pooled on a one- or two-months basis. If order list is made, please use scientific name and be specific on growth stage wanted.

X - 1 picture of stage XX - 2 pictures of stage (X) - Included in other stage

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SCIENTIFIC NAME	COMMON NAME	Photo avail. Mature Plant	Photo avail. Close up
ALLIUM SP.	Onion		X
ALYSSUM MARITIMUM	Sweet alyssum	X	X
AMARANTHUS GRAECIZANS	Tumbleweed		X
ANAGALLIS ARVENSIS	Pimpernel	X	X
ANTHEMIS COTULA	Mayweed - Dog fennel	X	X
BRASSICA INCANA	Short-podded mustard	X	X
BROMUS SECALINUS	Chess	X	X
CAPSELIA BURSA-PASTORIS	Shepherd's Purse	X	X
CENTAUREA SOLSTITIALIS	Yellow star thistle	XX	X
CERASTIUM VULGATUM	Mouse-eared chickweed (perennial)	X	X
CHENOPODIUM ALBUM	Lambs' - quarters	X	X
CHRYSANTHEMUM CORONARIUM	Garland chrysanthemum	X	X
CIRSIUM LANCEOLATUM	Bull thistle	X	X
CORONOPUS DIDYMUS	Wort cress, swine cress	X	X
COTULA AUSTRALIS	Australian brass buttons		X
CREPIS VESICARIA VAR TARAXACIFOLIA	Rough Hawksbeard	X	X
CYNODON DACTYLON	Common bermudagrass	X	(X)
DESCURAINIA SOPHIA	Flixweed		X
DICHONDRA REPENS	Dichondra	X	X
DIGITARIA SANGUINALIS	Hairy crabgrass		X
ECHINOCHLOA CRUSGALLI	Barnyard grass	X	X
EPHLOBIUM FRANCISCANA	Fireweed	X	X
EPILOBIUM PANICULATUM	Willow herb	X	
ERIGERON CANADENSIS	Horseweed		X
ERIGERON CRISPUS (LINIFOLIUS)	Flax-leaved fleabane	X	X
ERODIUM BOTRYS	Broad-leaf filaree	X	X
ERODIUM CICUTARIUM	Red-stemmed filaree	X	X
ERODIUM MOSCHATUM	White-stemmed filaree	X	X
EUPHORBIA PEPLUS	Petty spurge		X
FESTUCA MEGALURA	Foxtail fescue		X
FRANSERIA TENUIFOLIA	Poverty weed	X	X
GALINSOGA PARVIFLORA	Galinsoga	X	X
GERANIUM CAROLINIANUM	Wild geranium	X	X
GNAPHALIUM CHILENSE	Cudweed		X
HELXINE SOLEIROLII	Baby's tears	X	(X)
HEMIZONIA FASCICULATA	Tarweed	X	X
HYPOCHOERIS GLABRA	Smooth cat's-ear	X	X
JUNCUS BALTICUS	Baltic rush	X	X
LOTUS AMERICANUS	Spanish clover	X	X
LUNALARIA SP.	Liverwort	X	X
MALVA PARVIFLORA	Cheeseweed		X
MARRUBIUM VULGARE	Horehound	X	X
MATRICARIA SUAVEOLENS	Pineapple weed		X
MEDICAGO HISPIDA	Bur clover	X	X
MEDICAGO LUPULINA	Black medick	X	X
MELILOTUS ALBA	White sweetclover	X	X
MELILOTUS INDICA	Annual yellow sweet clover (bitter – sour)	X	X
MONTIA PERFOLIATA	Miner's lettuce		X
OXALIS CORNICULATA	Yellow oxalis	X	(X)
OXALIS CORNICULATA VAR ATROPURPUREA	Red oxalis	X	X
OXALIS RUBRA	Rose oxalis	X	X
PICRIS ECHIOIDES	Bristly oxtongue	X	(also young plant) X
PLANTAGO CORONOPUS	Crowfoot plantain	X	X
PLANTAGO LANCEOLATA	Buckthorn plantain	X	X
PLANTAGO MAJOR	Broad-leaf plantain		X
POA ANNUA	Annual bluegrass	X	X
POLYGONUM AVICULARE	Common knotweed		X
POLYGONUM PERSICARIA	Lady's thumb, spotted smart weed		X
RAPHANUS SATIVA	Wild radish		X
RORIPPA OBTUSA	Blunt-leaves yellow cress		X
RUMEX ACETOSELIA	Sheep sorrel		X
RUMEX CRISPUS	Curly dock	X	X
SENECIO VULGARIS	Common groundsel		X
SILENE GALLICA	Windmill pink		X
SISYMBRIUM IRIO	London rocket		X
SISYMBRIUM ORIENTALE	Oriental hedge mustard	X	
SOLANUM DOUGLASII	Douglas black nightshade		X
SOLANUM NIGRUM	European black nightshade		X
SONCHUS OLERACEUS	Common sow thistle		X
STELLARIA MEDIA	Common chickweed		X
TRIFOLIUM DUBIUM	Shamrock	X	X
URTICA URENS	Dwarf nettle	X	X
VERONICA PERSICA		X	X