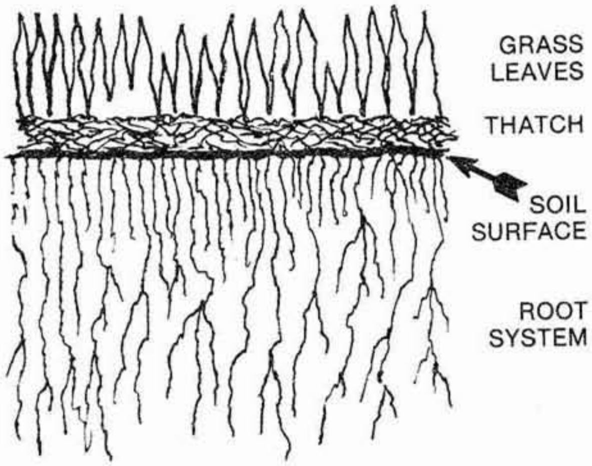
TURFGRASS RESEARCH CONFERENCE AND FIELD DAY



SEPTEMBER 16, 1987

UNIVERSITY OF CALIFORNIA
RIVERSIDE

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AND CONFERENCE SCHEDULE

THE DEVELOPMENT OF THE UC RIVERSIDE TURF PLOTS IS LARGELY DUE TO THE GENEROSITY OF THE FIRMS AND ORGANIZATIONS SHOWN HERE.

Stover SEED COMPANY

DURO SOD

HARDIE IRRIGATION

Hersey PRODUCTS INC

TORO

AM-SOD AMERICAN SOD FARMS

A-G Sod Farms Inc.

FARM BARN

TRI-CAL Incorporated

TORO TORO PACIFIC DISTRIBUTING

RESEARCH SCTC EDUCATION

SUPERIOR

RAIN BIRD

Cal-Turf

Royal Coach/ Buckner

GTP Gold Trade Publications, Inc.

RANCHO ABUELITO SOD FARM

Pacific SOD FARMS

SOUTHLAND SOD FARMS

IRRI-TROL

Warren's® TURF NURSERY, INC.

WEED CONTROL AND TURF MANAGEMENT

David W. Cudney[1]

Weed control is one of the most critical parts of a good turf management program. All aspects of turf management interact with weed control. The competitiveness of the turf sward is the major factor determining whether or not weeds can proliferate. If adapted varieties are grown in accordance with the proper mowing height, fertilization and irrigation regimes, then weeds are encountered in much lighter frequencies. Chemical weed control is often necessary to supplement good management practices in a turf management program.

Chemical weed control is most often necessary in well-managed turf when the following four weeds are encountered: Oxalis, spotted spurge, crabgrass and nutsedge. Trials in cool and warm season turf species including bluegrass, tall fescue, bermuda and zoysiagrass, are being conducted in southern California. The results of these trials and plans for succeeding herbicide trials will be discussed.

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[1] Extension Weed Scientist, University of California, Riverside

BERMUDAGRASS GENETICS: PROSPECTS FOR IMPROVEMENT

Ruth Shaw[1]

The value of Bermudagrass (Cynodon spp.) for use as turf in hot, arid regions is widely recognized. While Bermudagrasses are naturally well-adapted to survive in such environments, improvement of aesthetically important traits of Bermudagrss has been accomplished largely through the method of comparison and selection among hybrids between two species of Cynodon. This method has been highly successful in enhancing the texture and winter color of Bermudagrasses. Along with these improved characteristics, however, the hybrid cultivars carry the drawback that they require large investments of time and money for their maintenance. Moreover, these interspecific hybrids are in most cases sterile. Thus, further improvements through breeding cannot be made from this hybrid material.

In recent years, there has been increasing interest in development of grasses that require less effort for their maintenance. This objective, together with the traditional ones of improving winter color and texture, underscores the desirability of taking full advantage of the extensive genetic variability of Cynodon. Within the species of Cynodon dactylon alone, great diversity has been documented. This variability can be utilized in a breeding program that implements the theory and techniques of quantitative genetics. A program of breeding and selection within the species permits enhancement of characteristics and at the same time retains genetic variability and the potential for recombination, two population attributes that are necessary for further response to selection in subsequent generations. Thus, quantitative genetics provides an appropach that yields successive improvements not possible in the method of selection among sterile hybrids.

In my lab, we are initiating breeding studies to evaluate the genetic variability of Cynodon dactylon for many traits of interest. I have obtained, through the generosity of Dr. C. M. Taliaferro at Oklahoma State University, an extensive collection of seeds of Bermudagrass accessions from throughout the world. This collection will provide a broad genetic base for my studies of genetic variability and its ecological significance in Cynodon dactylon and for further improvement of traits of practical importance in Bermudagrass.

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[1] Asst. Professor of Genetics, Dept. of Botany and Plant Sciences, University of California, Riverside.

CURRENT NEMATODE CONTROL PROGRAM FOR CALIFORNIA TURFGRASSES AND SOD

John D. Radewald[1]

The nematode pests of established turf and sod in California are well recognized and for the greatest part defined. Nematodes recognized as pathogens include root knot (*Meloidogyne* sp.), root lesion (*Pratylenchus* sp.), ring (*Criconemoides* sp.), stubby root (*Paratrichodorus* sp.), dagger (*Xiphinema* sp.), and possibly spiral (*Helicotylenchus* sp.), and stunt (*Tylenchorhynchus* sp.). The nematodes are widely distributed and show no preference with regard to homeowners' yards, commercial landscapes or sod producer's fields. Effective control programs differ with regards to these growing situations. Quarantine measures, either self or government imposed, should be the primary safeguard to controlling nematode diseases. Simply put, don't introduce nematodes into a noninfested area with contaminated soil or infected propagation material. Always use resistant or tolerant cultivars of any sod or turf, if such is available and adequate for your needs.

Once soil becomes infested, or turf or sod infected, the control program is based on *living with the problem* as eradication under field conditions is usually impossible. We can usually learn or be taught to live with nematode problems on turf and sod by a combination of efforts including proper nutrition and watering alone and in combination along with insect and fungus control. Additionally, we may at times need to use selective nematicides to help bring up the vigor of the stand so that we may use the aforementioned tools and live with these pests. At this point in time, we have no biocontrol agents that will effectively control nematodes in established turfgrass.

As *preplant* materials for nematode control research has demonstrated, several materials do an adequate job for nematode control. These include methyl bromide, 1,3-dichloropropene (Telone), chloropicrin and SMDC (Vapam). For *postplant* control procedures, we have and are testing several materials. The materials we currently recognize as providing adequate control without serious deleterious effects include Dasinit, Mocap, Nemacur and Standak. All of these may provide additional benefits from their potential insecticidal activity. *Make certain of the status of registration before usage as this seems to change frequently*. An experimantal material, GY81 (PURGE), has shown preliminary promise. This material has fungicidal (not demonstrated on turf to date) as well as nematicidal properties.

All of the materials considered above are hazardous to use and require extreme care in handling. Permits are required for usage and label specifications and requirements as well as registration should be strictly followed. If questions arise with regard to usage, consult your local farm advisor, the author, or local Agricultural Commissioner.

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[1] Extension Nematologist, University of California, Riverside.

TURFGRASS ENDOPHYTIC FUNGI AND RESISTANCE TO INSECT PESTS

Timothy D. Paine[1]

Insects feeding on turfgrasses can cause both aesthetic injury and affect turfgrass performance. Damage can occur on all plant parts including leaf blades, crowns, roots and stems. Proper turf maintenance and cultural management can reduce the occurrence of insect problems by reducing the susceptibility of the grass plants.

Many species of grasses are associated with endophytic fungi. These fungi grow between the plant cells and derive their nutrition from the grass. However, the fungi are not parasitic since infected plants grow more vigorously than uninfected plants. The hyphae of fungal associates of tall fescue and perennial ryegrass are found in the leaf sheaths, inflorescence stems, ovaries, and embryos of mature seeds, but not in roots and leaf blades.

Pasture or forage grasses infected by the fungi can cause severe problems for grazing animals including reduced weight gain, neurologic disorders, and death. This results from toxic chemicals produced by the fungi. While this is a significant difficulty for livestock producers, it may be a benefit for turfgrass maintenance. Infected grasses are not only avoided by large herbivores, but they also are toxic and unpalatable to many insects.

The endophyte-based resistance seems to be chemically based. While the compounds may be somewhat mobile through the plant, those plant parts containing hyphae are the least preferred by insect herbivores. Consequently, endophyte infected turfgrasses may not be equally resistant to all insects. That is, these grasses may be more resistant to insects feeding at the crown of the plant or in stems, e.g. sod webworms and billbugs, and less resistant to root feeders, e.g. the white grubs.

In addition to providing resistance to some insect pests, the endophytes may provide other benefits. Infected plants grow more vigorously than uninfected plants. Thus, endopyte infected turf may be more competitive and less susceptible to weeds. Also, the endophyte may enhance disease resistance. However, sterol inhibiting fungicides may not only kill fungal pathogens, they may also eliminate the endophytes from the plants.

The potential for endophyte incorporation into turfgrasses is relatively new and unexplored. Compatibility of grasses containing endophytes with cultural practices and turf use must be examined. However, the possible benefits may be substantial for both turf and pest management.

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[1] Asst. Professor, Dept. of Entomology, University of California, Riverside.

INHIBITION OF TALL FESCUE GERMINATION BY GLYPHOSATE (ROUNDUP®)

Jim Downer and Dave Cudney[1]

There have been reports of glyphosate (Roundup®) causing inhibition of seedling germination in Los Angeles, Orange and Ventura counties. Researchers have found that glyphosate inhibited clover and tall fescue germination and growth when it was sprayed directly on the seed. Legume seedling growth was reduced when seeds were planted in glyphosate-treated soil[a]. The objectives of this research are to demonstrate inhibition of tall fescue germination and development during turfgrass renovation.

On December 2, 1986, a randomized complete block design was laid out at Ventura College. The existing turf was primarily kikuyugrass. Treatments included: three rates of Roundup® (4, 8 and 16 pounds ai/acre) and a control. There were four replications. Twenty days later, selected plots were renovated with a flail mower and the thatch was swept from the plots. Fourteen days after this on January 5, 1987, tall fescue seed was applied to all the plots.

Seed treatments were either overseeded with a light covering of steer manure or hydroseeded. In all treatments, the seed consisted of a blend of tall fescues containing; Bonanza (50%), Olympic (25%) and Apache (25%). Forty pounds of seed were applied in both the hydroseeded and overseeded plots. The hydroseeding was applied with 500 gallons of water, 175 pounds of mulch (100% wood fiber spray mulch), and 7 pounds of tacifier (Aztac brand).

On February 2, 1987, the plots were rated for turf score, kikuyugrass control, tall fescue stand counts, and kikuyugrass stand counts. Turf scores were determined visually. Kikuyugrass control was rated on a 0 to 10 scale; 0 is no control, 10 is complete control. Tall fescue stand counts were measured by averaging the number of grass plants counted inside a three-inch ring thrown randomly into the plot two times. Kikuyugrass counts were measured by the same method as tall fescue stand counts.

On July 14, 1987, the plots were rated for turf quality, kikuyugrass counts, crabgrass counts and clover (black medic and burr clover) counts. Kikuyugrass and crabgrsas counts were made using a footfall method and a random walk through the plot. Weeds were counted under 20-foot falls from each of two observers per plot. The results were averaged. Crabgrass counts were made by a single observer.

In the February rating, the tall fescue did not germinate well in the hydroseeded plots, yet there was good germination in the overseeded plots. This may have been caused by cold temperature inhibition of the seed germination in the hydroseeded plots. The weather was very cold, with ice on the plot during the morning hours. While the dark colored steer manure held heat, the light colored hydromulch may have reflected heat. The experiment is being repeated this summer during the warmer months.

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[1] Cooperative Extension Farm Advisor, Ventura County; Extension Weed Scientist, University of California, Riverside.

[a] Salazar, L.C. and Appleby, A.P. 1982. Germination and Growth of Grasses and Legumes from Seeds Treated with Glyphosate and Paraquat. Weed Science: 30:235-337.

CURRENT DISEASES OF TURFGRASS

R.M. Endo[1]

At the present time, three difficult-to-control fungal diseases occur on turfgrass on southern California. These are Pythium blight, sclerotium blight and spring dead spot.

Pythium blight is by far the most common, the most explosive and the most damaging disease affecting golf greens during warm weather. Since the disease is caused by a water mold, the disease tends to appear whenever the weather is hot and water stands for long periods on the greens. If the disease reoccurs yearly in the same areas on certain greens, steps must be taken to correct the water retentive conditions such as low spots, heavy thatch and adjacent plants that restrict air drainage. Subdue and Banol are both effective fungicides specific for _Phythium_ that should be used in alternate applications in order to slow down the development of fungicide-resistant strains of _Pythium_.

Sclerotium blight is also a very destructive warm weather disease of golf greens and ryegrass fairways. Once the fungus is introduced into an area, the disease tends to reoccur yearly whenever air temperatures approach 80°F and above, because of the abundant formation of mustard seed-like sclerotin. The fungicides Benlate and PCNB should be applied to the foliage in alternate applications every two weeks to control the disease. Immediately after application, the fungicide should be watered-in with a light syringing to inhibit the sclerotia formed beneath the soil. Care must be exercised in the use of PCNB since it tends to build-up in the greens to phytotoxic levels.

Although the Spring dead spot disease of bermudagrass is also very destructive, it has not spread appreciably in southern California since it was first detected 5 years ago. Once introduced within a turf area, however, its spread may be fairly rapid by means of infected plant parts carried on cultivation machinery. The following five fungicides have good control of the disease when applied as a drench once monthly for five consecutive months beginning in August: Systhane, Banner, Rubigan, Benlate and Spotless.

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[1] R.M. Endo, Professor, Dept. of Plant Pathology, University of California, Riverside.

NITROGEN FERTILIZATION OF COOL SEASON GRASSES

Matthew K. Leonard[1]

New lawn care companies that specialize in fertilization of residential and commercial turf are growing rapidly in southern California. These companies have specific requirements when it comes to selecting nitrogen fertilizers: turf green-up should be fairly fast; color should be a uniform dark green; and most importantly, color quality should persist for eight to ten weeks.

A continuing series of trials at the UCR turf plots has evaluated the response of perennial ryegrass and mixed perennial ryegrass/Kentucky bluegrass turf to ammonium sulfate, calcium nitrate, urea (liquid and dry), sulfur-coated urea (SCU, 37-0-0), and free urea/SCU (31-5-8). Application rates ranged from 1.5 to 4.5 lb. N/1000 sq ft. During the cool season from November to March, there was no significant difference between nitrogen sources, though there was a significant rate response. A minimum of 2.5 lb. N was necessary to produce satisfactory growth and color. Both rate and source responses were significantly different during the period from April through October. The minimum recommended rate of this period was 3.0 lb. N. SCU outperformed all other nitrogen sources. A series of applications made in October, November, December and January, indicated that nitrogen applied in November provided the greatest longevity of winter color response. Dry urea performed as well as the other sources, making it a good choice for winter fertilization due to its low cost.

A study of IBDU rate response demonstrated potential for good long-term color. A 3.0 lb. rate produced acceptable color for 16 weeks, though 1.5 lb. of urea was needed to provide early color.

The nitrogen fertilizer rates indicated by these studies are considerably higher than recommendations for other parts of the country. This suggests that conditions in southern California differ enough to warrant further reevaluation of current fertilizer practices.

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[1] Staff Research Associate, Dept. of Botany and Plant Sciences, University of California, Riverside.

MANAGING WHITE GRUBS

A.D. Ali[1]

White grubs, or the larvae of scarabaeid beetles in the genus *Cyclocephala*, are the key insect pests of turfgrass in California. Of the more common species are *Cyclocephala hirta*, *C. longula*, *C. pasadenae* and *C. melanocephala*. White grubs damage turf by feeding on the roots. Under heavy infestations the root system may be completely destroyed. Another problem associated with grubs is that birds, skunks and racoons tear up the sod while searching for the grubs. This results in an unacceptable sod texture and appearance. Control of white grubs has relied heavily on the use of chemical insecticides. This is not without disadvantages. In addition to the escalating cost of materials, there are the exposure hazard to applicators and inherent exposure risks to humans and pets.

Studies are underway to determine the feasibility of utilizing biological control agents for white grub control. Two entomogenous nematodes, *Neoaplectana carpocapsae* and *Heterorhabditis heliothidis* are being evaluated. The nematodes penetrate the grub and release symbiotic bacteria which kill the host. The host-specific symbiotic bacteria are *Xenorhabdus nematophilus* and *X. luminescens* associated with *N. carpocapsae* and *H. heliothidis*, respectively. Greenhouse drench studies were conducted utilizing selected rates of these nematodes. Grub mortality was higher with *H. heliothidis* than with *N. carpocapsae* both 2 and 4 weeks post-treatment.

Future studies are planned to evaluate the feasibility of utilizing these nematodes in the field. Additionally, the *Cyclocephala* strain of the bacterium *Bacillus popilliae* will be evaluated as another potential biological control agent of white grubs.

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[1] Extension Entomologist, University of California, Riverside.

BIOTECHNOLOGY CONTRIBUTIONS TO CROP IMPROVEMENT

Michael T. Clegg[1]

The term biotechnology refers to the use of molecular methods to alter the genetic material (DNA) of plants or animals. Although the applications of biotechnology in crop improvement are still in early stages of development, a number of promising case studies have now accumulated and these studies highlight the role that biotechnology will play in crop improvement in the 1990s. The two most promising applications of biotechnology to agriculture are the use of genetic transformation to introduce novel genes into plant genomes and the use of molecular markers in the manipulation of complex characters.

Genetic transformation in plants has advanced most rapidly in certain dicot species (e.g. tobacco, tomato, carrot, petunia) where whole plants can be regenerated from cell cultures. The novel gene is inserted into the plant genetic material (the plant genome) using a portion of the bacterial plasmid (the Ti plasmid) that has the capability of integrating into plant genomes. The gene of interest can be placed on the Ti plasmid (using recombinant DNA techniques) and is then integrated into the plant genome along with DNA from the Ti plasmid. Within the past three years, genetic transformation has been successfully employed to: 1) insert a bacterial gene (BT toxin gene) that confers resistance to insect damage into the tobacco genome; 2) insert genes for herbicide resistance into the genomes of petunia, tobacco and tomato; and 3) to insert the TMV (tobacco mosaic virus) coat protein gene into the genome of tabacco to confer resistance to TMV infection. Ti plasmid transformation has not been successfully used with most monocot species (including cereal grains) and this constitutes the most serious limitation of the technique.

Molecular techniques have provided a nearly unlimited supply of genetic markers and these markers are being used as tools in the manipulation of plant genomes. An important application is the genetic dissection of complex traits (e.g. photosynthetic efficiency, growth rates, water use efficiency) where major components of a trait can be located within the plant genome and then transferred through conventional sexual crosses. A second application is the use of molecular markers to monitor the transfer of desirable genes in backcrossing programs. These methods are of very wide utility and could be profitably employed in turfgrass improvement.

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[1] Professor of Genetics, Dept. of Botany and Plant Sciences, University of California, Riverside.

Proceedings of the UCR Turfgrass Research Conference and Field Day, September 1987

TURF-TYPE TALL FESCUE PERFORMANCE IN CALIFORNIA

Victor A. Gibeault and Richard Autio[1]

Tall fescue (Festuca arundinacea Schreb.), a native of Europe, was introduced into the United States by early settlers for pasture use and soil stabilization purposes. Two varieties of pasture-type tall fescues, Kentucky 31 and Alta, were widely used for low maintenance turf sites because of their comparative low maintenance requirement, high wear tolerance and broad environmental adaptation capability.

In the early 1960's, Dr. Reed Funk of Rutgers University initiated a tall fescue breeding program which concentrated on developing a finer leaf texture, darker green color, increased density and improved resistance to insects and diseases. That work resulted in the release of a turf-type tall fescue in 1979.

The study that is reported here was conducted in southern California to evaluate the new turf-type tall fescues. The objective was to determine the performance of several varieties to two mowing heights.

Ten varieties of tall fescue were established at the University of California South Coast Field Station, Irvine, in January 1981. In February 1982, the plots were split with 3/4-inch and 1-1/2-inch mowing heights. Turf quality ratings (Turfscores), based on color, texture, density, uniformity and pest presence, were made monthly for 27 months.

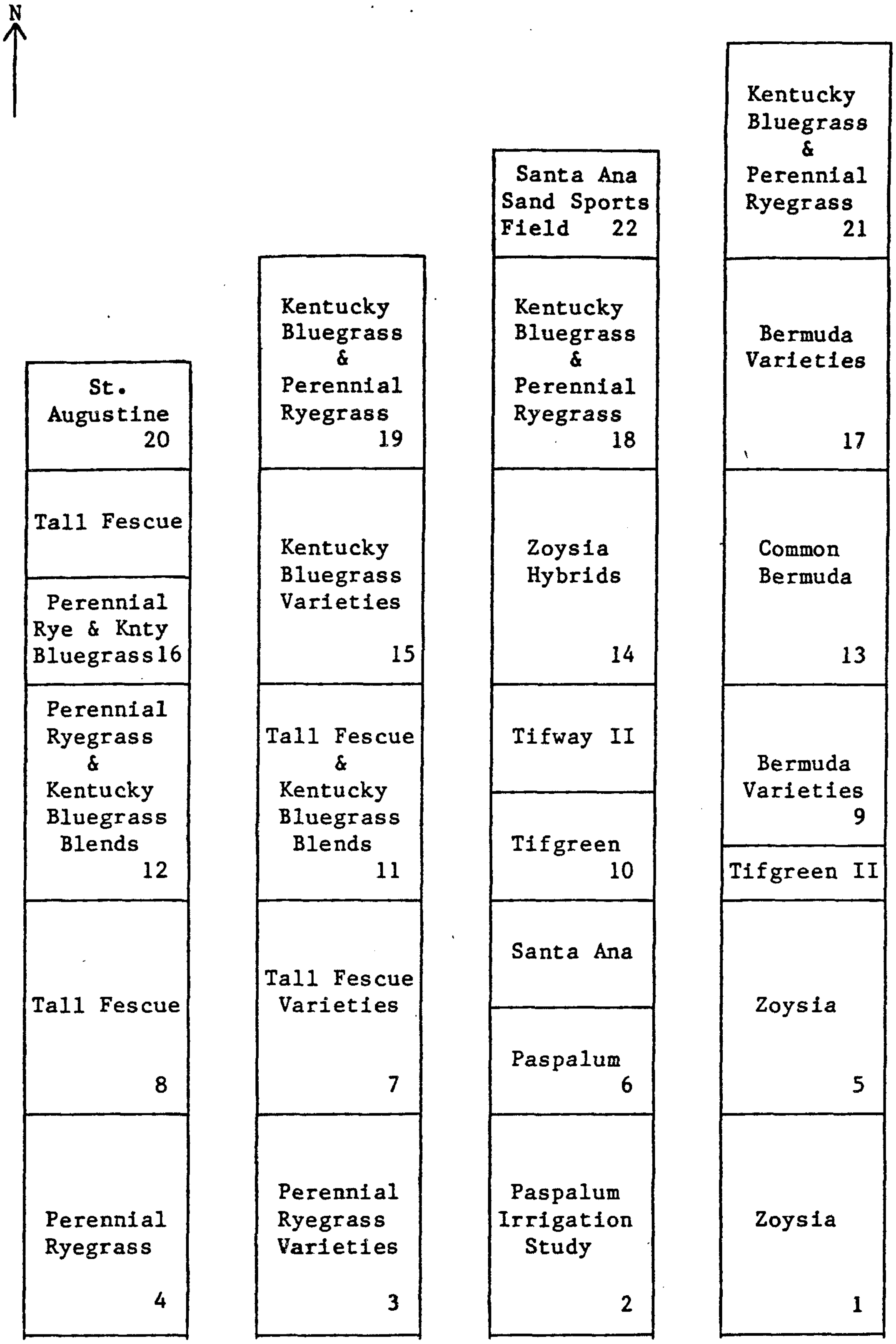
Of the grasses tested in this study, Alta and Kentucky 31 are pasture-types, Clemfine is considered an intermediate-type, and Falcon, Rebel, Olympic and Houndog are considered turf-type tall fescues. The experimental lines 616, 655 and 616 x 635 are not categorized.

There was an obvious difference in varietal performance based on the categories of tall fescues. At the high cutting height, the turf-type tall fescues performed significantly better than Clemfine, the pasture-types, or the three experimental grasses. The turf-type tall fescues had better color, better resistance to crabgrass invasion, and better resistance to rust activity than the pasture-type tall fescues. These characteristics, plus their better density and texture, resulted in the superior appearance of the four turf-type tall fescues.

Although the same variety performed better at the high cutting height than at the low cutting height, the turf-type varieties gave significantly higher turfscores at the 3/4 inch mowing height than did the pasture-type and experimental grasses at both the high and low cutting heights. This supports observations that the turf-type tall fescues do tolerate closer mowing better than previously available varieties. Nevertheless, optimum response of all tall fescues was recorded at the 1-1/2-inch cut, as previously stated.

[1] Extension Environmental Horticulturist, University of California, Riverside; Staff Research Associate, University of California, Riverside.

UCR TURF RESEARCH PLOTS



UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 29 May 86

Completion Date

Project No.

Plot No. 9 North & 17

Title: National Bermudagrass Trial

Objective: To evaluate Bermudagrass cultivars in southern California.

Investigator(s):

Name V.A. Gibeault Dept. Coop Ext Phone X 3575

Name R. Autio Dept. Coop Ext Phone X 4430

Species/Cultivars: 32 Bermudagrass cultivars.

: Mowing Frequency 1 or 2 x/Wk. Height 3/4 in.

/M/6 wk.

Irrigation - ☒ as needed _____ % ET_o ☐ Other (Specify Below)

Special

Experimental Design: ☐ CRD ☒ RCB ☐ SPLT ☐ Other

No. of Reps 3 Total Plots 90 x 90 (Block 17), 60 x 70 (N Block 9)

Treatments:

Data Collection: 1) Variable Turfscores Frequency Monthly

2) Variable Frequency

3) Variable Frequency

Special Instructions/Comments:

N ↑

NATIONAL BERMUDAGRASS TRIAL, UCR
Planted May 29, 1986

Plot Size 10' x 10'

Block #9 & #17

	32	31	30	24	3	10
	25	7	6	26	15	21
I	1	29	12	5	11	16
	2	19	9	28	13	8
	4	20	27	18	14	17
	22	23	7	3	16	13
	23	2	12	5	29	11
	25	24	9	19	15	27
II	21	14	17	28	8	22

(Common Bermudagrass)

	4	10	31	32	18	6
	20	30	26	1	8	2
	30	22	9	27	11	7
	26	6	18	25	5	1
III	12	16	19	14	29	13
	17	15	21	28	24	23
	32	31	3	20	10	4

Entry Number	Name
1	CT-23
2	NM 43
3	NM 72
4	NM 375
5	NM 471
6	NM 507
7	Vamont
8	E-29
9	A-29
10	RS-1
11	MSB-10
12	MSB-20
13	MSB-30
14	A-22
15	Texturf 10
16	Midiron
17	Tufcote
18	Tifgreen
19	Tifway
20	Tifway II
21	NMS 1
22	NMS 2
23	NMS 3
24	NMS 4
25	NMS 14
26	Arizona Common
27	Guymon
28	FB-119
29	C19
30	C84
31	Tifgreen II
32	Santa Ana

Objective:
To evaluate Bermudagrass varieties in southern California.

Methods and Materials:
In May, 1986, 1" plugs were placed on 1' centers in 10' x 10' plots. The plots are mowed at 3/4", fertilized at 1# N/M every 6 weeks and irrigated as needed.

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 13 Sept 84
Completion Date
Project No.
Plot No. 5

Title: UC Zoysia Selections

Objective: To evaluate turf performance.

Investigator(s):
Name V.A. Gibeault Dept. Coop Ext Phone X 3575
Name R. Autio Dept. Coop Ext Phone X 4430

Species/Cultivars: 6 Zoysia cultivars

Management: Mowing Frequency 2 x/Wk. Height 3/4 in.
Fertilizer-Material Rate 1# N/M/6 wk.
Irrigation - ☒ as needed % ET_o ☐ Other (Specify Below)
Special

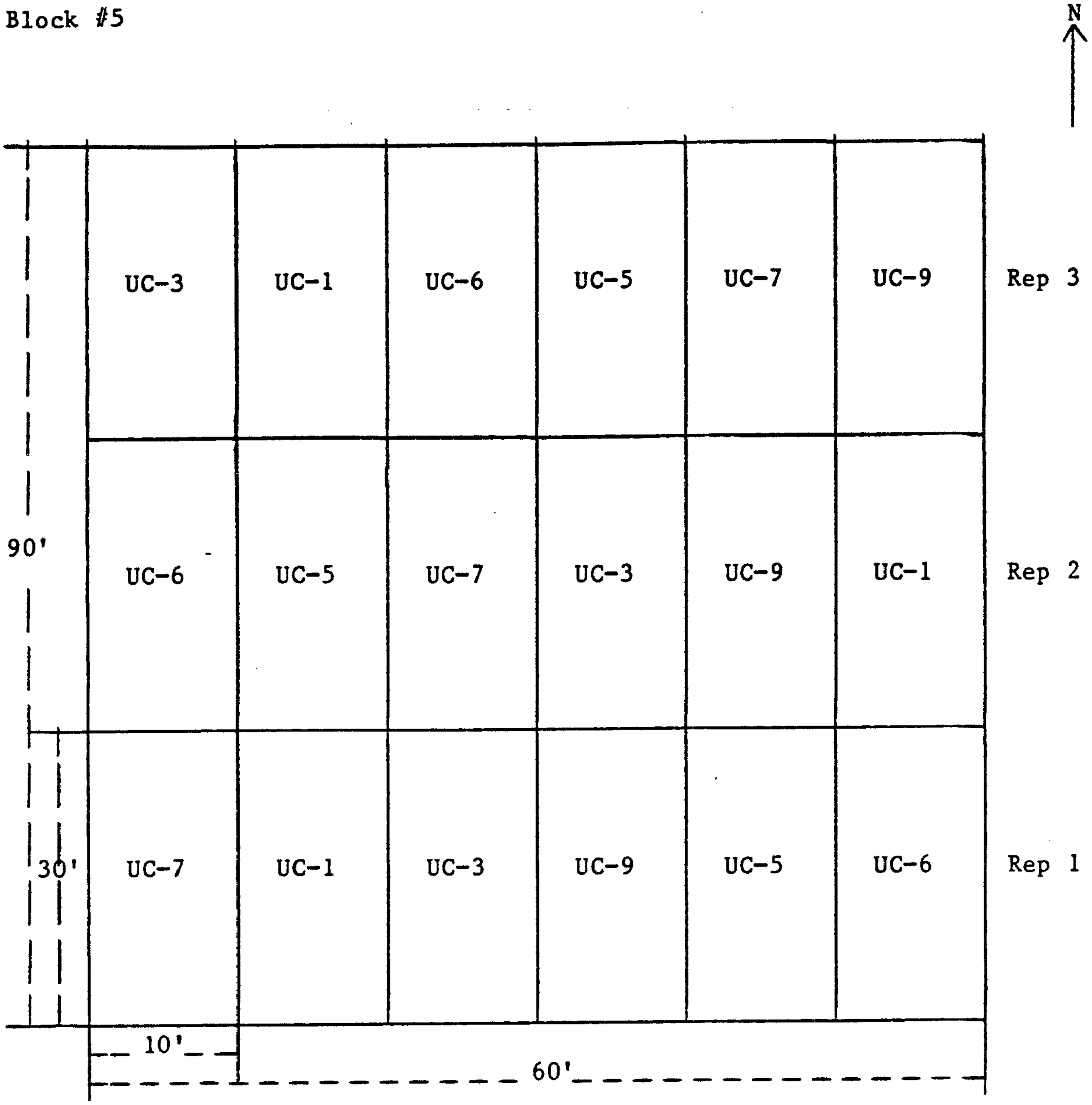
Experimental Design: ☐ CRD ☒ RCB ☐ SPLT ☐ Other
No. of Reps 3 Size of Rep. 60 x 30 Total Plot 60 x 90
Treatments:

Data Collection:
1) Variable Turfscores Frequency Monthly
2) Variable Frequency
3) Variable Frequency

Special Instructions/Comments:

U.C. Zoysia Selections

Block #5



UC-3	UC-1	UC-6	UC-5	UC-7	UC-9	Rep 3
UC-6	UC-5	UC-7	UC-3	UC-9	UC-1	Rep 2
UC-7	UC-1	UC-3	UC-9	UC-5	UC-6	Rep 1

Objectives:

To evaluate turf performance in the inland valley climate.

Methods and Materials:

Six selections of UC Zoysiagrass were stolonized at the rate of 7-10 bu/M 13 Sept. 1984. The plots are mowed at 3/4", fertilized at 1# N/M every 6 weeks and irrigated as needed.

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 8/84 Project No.
Completion Date 6/88 Plot No. 14

Title: Field Evaluation of Zoysiagrass Hybrids

Objective: To evaluate the adaptability of zoysiagrass hybrids for turf use under southern California conditions. Growth vigor and winter color retention are important selection criteria.

Investigator(s):
Name V.A. Gibeault Dept. Coop Ext Phone X 3575
Name M.K. Leonard Dept. B&PS Phone X 5906

Species/Cultivars: Various hybrids of Zoysia japonica, Z. matrella, and z. tenuifolia.

Management: Mowing Frequency 1 x/Wk. Height 3/4 in.
Fertilizer-Material NH_4NO_3 Rate 1 lb N/1000 ft^2/mo.
Irrigation - ☒ as needed 60 % ET_o ☐ Other (Specify Below)
Special

Experimental Design: ☐ CRD ☐ RCB ☐ SPLT ☒ Other None
No. of Reps 1 Size of Rep. 3' x 3' Total Plot 60' x 90'
Treatments: Individual seedlings are space planted on 4' centers.

Data Collection: 1) Variable Frequency
2) Variable Frequency
3) Variable Frequency

Special Instructions/Comments:

Submitted by Date

ZOYSIA HYBRIDS

N

Plot 14

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
21	7x1	1x3	1x6	3x1	1x3	3x1	1x3	1x3	1x7	1x6	1x3	1x6	1x3	1x3
20	1x6	3x1	1x7	1x6	6x1	1x3	1x7	3x1	1x3	3x1	1x7	1x3	1x7	3x1
19	1x3	1x6	1x3	6x1	1x3	7x1	1x3	7x1	6x1	1x3	1x3	3x1	1x3	6x1
18	3x1	6x1	7x1	1x6	1x7	1x6	6x1	1x3	1x3	6x1	3x1	1x6	3x1	1x3
17	6x1	1x6	1x3	1x7	1x3	1x3	1x3	6x1	3x1	1x7	1x3	1x3	1x3	1x6
16	1x6	1x3	3x1	1x11	3x1	1x7	3x1	1x6	1x3	1x3	1x6	6x1	7x1	1x7
15	1x7	7x1	1x6	3x1	1x3	3x1	1x3	1x3	1x7	1x6	1x3	1x7	1x3	1x3
14	1x3	3x1	1x6	7x1	6x1	1x3		3x1	1x3	3x1	7x1	1x3	1x7	
13	3x1	6x1	1x3	6x1	1x3	6x1	1x7	1x7	7x1	1x3	1x3	3x1	1x3	6x1
12	6x1	1x6	6x1	1x6	1x7	6x1	1x3	1x3	1x3	6x1	3x1	1x6	3x1	1x3
11	7x1	6x1	3x1	6x1	1x3	1x3	7x1	7x1	3x1	1x7	1x3	1x3	1x3	1x6
10	1x6	6x1*	1x3	1x7	3x1	1x7	1x3	1x6	1x3	1x3	1x7	1x11	6x1	1x7
9	6x1	1x6	1x6	3x1	1x3	3x1	3x1	1x3	1x7	1x6	1x3	1x7	1x3	1x3
8	1x6	1x3	7x1	1x3	6x1	1x3	1x3	3x1	1x3	3x1	1x6	1x3	1x7	3x1
7	1x3	6x1	6x1	1x6	1x3	7x1		6x1	7x1	1x3	1x3	3x1	1x3	
6	3x1*	6x1*	3x1*	6x1*	1x7	6x1	1x3	1x3	1x3	7x1	3x1	6x1	3x1	1x3
5	6x1*	1x11*	6x1*	3x1*	1x3	1x3	1x7	1x7	3x1	1x7	1x3	1x3	1x3	7x1
4	RG-11*	R8-35*	3x1*	6x1*	3x1	1x7	1x3	1x11	1x3	1x3	1x7	1x6	1x7	1x7
3	R3-38*	R3-10*	R6-22*	3x1*	1x3	3x1	3x1	1x3	1x7	6x1	1x3	1x7	1x3	1x3
2	R5-4*	R7-23*	R7-26*	6x1*	6x1	1x3	1x3	3x1	1x3	3x1	1x6	1x3	6x1	3x1
1	R5-19*	R7-34*	R5-14*	3x1*	1x3	6x1	7x1	7x1	1x6	1x3	1x3	3x1	1x3	3x1*
0									6x1*	6x1*	6x1*	6x1	3x1	

* =

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 11/1/86
Completion Date 12/1/87
Project No.
Plot No. 13S

Title: Cool Season Overseeding of Common Bermudagrass

Objective: To evaluate a variety of cool season grasses for overseeding use on dormant common bermudagrass in southern California.

Investigator(s):
Name John Van Dam Dept. Coop Ext Phone 387-2171
Name M.K. Leonard Dept. B&PS Phone X 5906

Species/Cultivars: Common Bermudagrass (Cynodon dactylon); see below for overseeded grasses.

Management: Mowing Frequency 1 x/Wk. Height 1-1/2 in.
Fertilizer-Material NH_4NO_3 Rate 2 lb N/1000 ft^2/mo.
Irrigation - ☒ as needed 80 % ET_o ☐ Other (Specify Below)
Special

Experimental Design: ☐ CRD ☒ RCB ☐ SPLT ☐ Other
No. of Reps 4 Size of Rep. 5' x 9' Total Plot 36' x 50'
Treatments: Control-no overseeding; Poa trivialis seeded at 3 lb/1000 ft^2, all others seeded at 10 lb/1000 ft^2.

Data Collection: 1) Variable Turf Score Frequency Monthly
2) Variable Frequency
3) Variable Frequency

Special Instructions/Comments: Overseeded grasses: annual ryegrass; 'Caliente', 'Elka', 'Derby' 'Manhattan' and 'Manhattan II' perennial ryegrasses; 'Rebel' and 'Apache' tall fescue; and Poa trivialis.

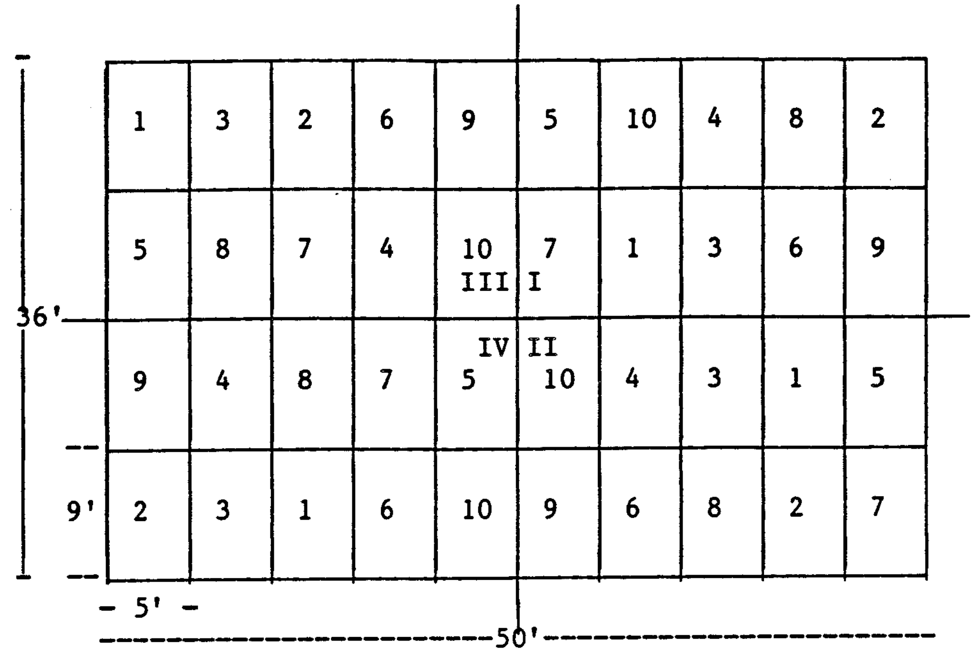
Plot requires vertical mowing prior to overseeding.

Submitted by Date

OVERSEEDING STUDY
(South Plot)

N

Plot 13S



1	3	2	6	9	5	10	4	8	2
5	8	7	4	10 III	7 I	1	3	6	9
9	4	8	7	IV 5	II 10	4	3	1	5
2	3	1	6	10	9	6	8	2	7

1) 'Caliente' Per. Rye
2) 'Manhattan' Per. Rye
3) 'Rebel' Tall Fescue
4) 'Derby' Per. Rye
5) Annual Rye
6) *Poa trivialis*
7) 'Apache' Tall Fescue
8) 'Elka' Per. Rye
9) 'Manhattan II' Per. Rye
10) Control (No Seed)

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 11/1/86 Project No.
Completion Date 12/1/87 Plot No. 13N

Title: Allelopathic Effects of Overseeded Grasses on Common bermudagrass.

Objective: To observe possible allelopathic effect of overseeded cool season grasses on regrowth of common bermudagrass following dormancy.

Investigator(s):
Name John Van Dam Dept. Coop Ext Phone 387-2171
Name M.K. Leonard Dept. B&PS Phone X 5906

Species/Cultivars: Common Bermudagrass (Cynodon dactylon); overseeded grasses listed below.

Management: Mowing Frequency 1 x/Wk. Height 1-1/5 in.
Fertilizer-Material Rate
Irrigation - ☒ as needed 80 % ET_o ☐ Other (Specify Below)
Special

Experimental Design: ☐ CRD ☐ RCB ☒ SPLT ☐ Other
No. of Reps 4 Size of Rep. 10' x 6.5' Total Plot 40' x 52'
Treatments: Control-no overseeding; Poa trivialis seeded at 3 lb/1000 ft^2, all others seeded at 10 lb 1000 ft^2. Once established, wear treatments wll be imposed on half of each plot (in a strip across each block).

Data Collection: 1) Variable Turf Score Frequency Monthly
2) Variable Frequency
3) Variable Frequency

Special Instructions/Comments: Overseeded grasses: annual ryegrass; 'Elka' and 'Caliente' perennial ryegrass; 'Rebel II' tall fescue; Poa trivialis; 'Shadow' chewings fescue; and 'Flyer' creeping red fescue.

Plot requires vertical mowing prior to overseeding.

Wear treatments will consist of 10 passes weekly across plot with the mechanical traffic simulator.

Submitted by Date

ALLELOPATHY STUDY
(North Plot)

N

Plot 13N

									Blocks
2	7	6	4	1	8	5	3	N W	I
7	5	1	2	8	4	3	6	W N	II
5	3	2	1	4	7	6	8	W N	III
7	2	5	8	3	6	4	1	N W	IV

10'

5'

-6.5'-

52'

1) Control (no seed)
2) 'Caliente' Per. Rye
3) 'Elka' Per. Rye
4) Annual Rye
5) 'Rebel II' Tall Fescue
6) *Poa trivialis*
7) 'Shadow' Chewing's Fescue
8) 'Flyer' Creeping Red Fescue

N = No Wear Treatment

W = Wear Treatment

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 3/2/87 Project No.
Completion Date 6/1/87 Plot No. 16N

Title: Influence of Nitrogen Fertility on Wear Tolerance of Tall Fescue turf.

Objective: To observe how various levels of nitrogen fertility affect the turf quality of tall fescue subjected to several levels of traffic intensity.

Investigator(s):
Name Steve Cockerham Dept. Ag. Ops. Phone X 5906
Name Matt Leonard Dept. B&PS Phone X 5906

Species/Cultivars: 'Mojave' tall fescue (Festuca arundinacea)

Management: Mowing Frequency 1 x/Wk. Height 1-1/2 in.
Fertilizer-Material Rate
Irrigation - ☒ as needed 80 % ET_o ☐ Other (Specify Below)
Special

Experimental Design: ☐ CRD ☐ RCB ☒ SPLT ☐ Other
No. of Reps 3 Size of Rep. 5' x 15' Total Plot 45' x 60'
Treatments: Wear treatments: 0, 7 & 14 passes/wk with traffic simulator; nitrogen fertilizer (NH_4NO_3): 0,1,2&4 lb N/1000 ft^2 (one application).

Data Collection: 1) Variable Turfscore Frequency Monthly
2) Variable Thatch thickns Frequency end of expt.
3) Variable Shoot density Frequency end of expt.

Special Instructions/Comments: Plot was fertilized with 2 lb N/1000 ft^2 on 22 Jan 1987. Fertilization treatments will be started approximately 6 weeks after the start of the wear treatments.

Point of reference for wear intensity: 15 passes of traffic simulator produces wear on hybrid bermudagrass approximately a professional football field.

Submitted by Date 3/9/87

TALL FESCUE WEAR TOLERANCE TRIAL

N

Plot 16N

	4	2	0	1	14
I	0	4	2	1	0
	1	4	2	0	7
	0	1	4	2	0
II	2	4	1	0	14
	1	4	0	2	7
	1	2	0	4	14
III	4	1	2	0	7
5'	2	0	1	4	0

------15'-----

Treatments

Wear	Nitrogen
0 Passes/Wk.	0 lb. N/1000 ft.^{2}
7 Passes/Wk.	1 lb. N/1000 ft.^{2}
14 Passes/Wk.	2 lb. N/1000 ft.^{2}
	4 lb. N/1000 ft.^{2}

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 17 Oct 84
Completion Date
Project No.
Plot No. 3

Title: National Perennial Ryegrass Variety Trial

Objective: To evaluate the suitability of perennial ryegrasses in southern California.

Investigator(s):
Name V.A. Gibeault Dept. Coop Ext Phone X 3575
Name R. Autio Dept. Coop Ext Phone X 4430

Species/Cultivars: 55 perennial rye cultivars

Management: Mowing Frequency 1 x/Wk. Height 1-1/2 in.
Fertilizer-Material Rate 1# N/M/6 wk.
Irrigation - ☒ as needed ______ % ET_o ☐ Other (Specify Below)
Special

Experimental Design: ☐ CRD ☒ RCB ☐ SPLT ☐ Other
No. of Reps 3 Size of Rep. 45 x 30 Total Plot 45 x 90
Treatments:

Data Collection: 1) Variable Turfscores Frequency Monthly
2) Variable Frequency
3) Variable Frequency

Special Instructions/Comments: Seeding rate 5.3 #/M

UCR PERENNIAL RYEGRASS VARIETY TRIAL

Block #3

48	29	16	45	21	5	20	36	17		
37	54	14	35	6	28	25	53	22		
24	40	4	9	12	42	11	7	13		
50	34	26	1	31	23	55	2	15	I	
38	44	51	43	32	52	27	30	33		
49	18	41	10	3	19	47	39	8		
48	35	8	9	34	6	32	10	23		
12	18	15	13	29	52	53	51	25		
47	17	27	40	11	37	20	21	3		
55	43	28	1	4	50	30	7	31	II	90'
2	54	19	49	14	36	22	5	45		
41	38	39	42	33	24	16	44	26		
47	8	13	38	21	42	4	50	32		
49	29	1	45	54	18	6	37	36		
9	39	16	11	19	41	15	23	25		
52	26	20	27	34	22	48	31	55	III	
14	33	2	43	35	3	7	12	5		
24	30	51	53	28	40	17	44	10	5'	

Objectives:

To evaluate their suitability for turf use in southern California.

Methods and Materials:

On 17 October 1984, 53 cultivars of perennial ryegrass and one of intermediate ryegrass were seeded to 5' x 5' plots at a rate of 5.3 #/M. The plots are mowed at 1-1/2", fertilized at 1# N/M every 6 weeks, and irrigated as needed.

N

Entry No.	Name
1	Palmer
2	Diplomat
3	Prelude
4	Barry
5	Yorktown II
6	Ovation
7	LP 702
8	Crown
9	LP 210
10	Acclaim
11	HE178
12	HE168
13	Ranger
14	Blazer
15	Fiesta
16	Dasher
17	LP 792
18	WWE 19
19	Cockade
20	Cigil
21	Cowboy
22	Manhattan
23	Manhattan II
24	Citation II
25	Citation
26	Omega
27	Birdie II
28	NK 80389
29	NK 79309
30	Pennant
31	Premier
32	SWRC-1
33	M382
34	HR-1
35	Linn
36	Pennfine
37	Delray
38	NK 79307
39	Cupido
40	Regal
41	Derby
42	All Star
43	Elka
44	Gator
45	Tara
46	
47	Pippin
48	Repell
49	P2
50	Servo
51	All Star
52	Agree Int. Rye
53	GTI
54	CBSII
55	Omega II

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 17 Oct 84
Completion Date
Project No.
Plot No. 7

Title: National Tall Fescue Trial

Objective: To evaluate the suitability of turf-type tall fescue in southern California

Investigator(s):
Name V.A. Gibeault Dept. Coop Ext Phone X 3575
Name R. Autio Dept. Coop Ext Phone X 4430

Species/Cultivars: 40 tall fescue cultivars

Management: Mowing Frequency 1 x/Wk. Height 1-1/2 in.
Fertilizer-Material Rate 1# N/M/6 wk.
Irrigation - ☒ as needed ____% ET_o ☐ Other (Specify Below)
Special

Experimental Design: ☐ CRD ☒ RCB ☐ SPLT ☐ Other
No. of Reps 3 Size of Rep. 50 x 20 Total Plot 50 x 60
Treatments:

Data Collection: 1) Variable Turfscores Frequency Monthly
2) Variable Frequency
3) Variable Frequency

Special Instructions/Comments:

UCR TALL FESCUE VARIETY TRIAL

N

Block #7

5	34	29	26	16	11	19	7	25	18	I
14	2	20	15	36	1	17	31	9	39	
22	27	35	30	6	38	28	21	13	32	
12	10	24	3	40	33	4	37	23	8	
32	35	28	24	37	39	20	17	33	27	II
13	10	2	8	1	16	4	21	26	3	
40	29	22	23	19	9	34	30	6	7	
31	11	38	25	5	12	18	14	15	36	
35	19	28	20	13	15	17	23	21	25	III
30	26	8	14	32	27	38	34	29	22	
1	31	4	7	18	33	6	2	37	24	
36	3	9	40	39	12	16	5	11	10	5'
									5'	

Entry No.	Name
1	Johnstone
2	Rebel
3	Clemfine
4	Willamette
5	Mer Fa 83-1
6	Pacer
7	Houndog
8	Brookston
9	Falcon
10	Maverick
11	Mustang
12	Adventure
13	Trident
14	Olympic
15	Jaguar
16	5GL
17	Apache
18	Bonanza
19	FineLawn I
20	Unknown
21	Ky-31
22	Syn-Ga-1
23	Chesapeake
24	Arid
25	NK 81425
26	NK 82508
27	Tempo
28	Barcel
29	Festorina
30	Unknown
31	51W
32	5DW
33	562
34	Rebel 2
35	Mojave
36	5M4
37	Finelawn I
38	5D2
39	OL2
40	5D3

Objectives:

To evaluate the suitability of the new turf-type tall fescues for use in southern California.

Methods and Materials:

On 17 October 1984, 40 cultivars of tall fescue were seeded to 5' x 5' plots at a rate of 5.3#/M. The plots are mowed at 1-1/2", fertilized a 1# N/M every 6 weeks, and irrigated as needed.

UCR - TURFGRASS RESEARCH CENTER - PROJECT SUMMARY

Starting Date 12 Apr 85
Completion Date
Project No.
Plot No. 11

Title: Tall Fescue/Kentucky Bluegrass Mix

Objective: To evaluate the compatibility of high, medium and low levels of competitition between tall fescues and Kentucky bluegrasses for turf purposes.

Investigator(s):
Name V.A. Gibeault Dept. Coop Ext Phone X 3575
Name R. Autio Dept. Coop Ext Phone X 4430

Species/Cultivars: 3 cultivars tall fescue alone and with 3 cultivars Kentucky bluegrass

Management: Mowing Frequency 1 x/Wk. Height 1-1/2 in.
Fertilizer-Material Rate 1# N/M/6 wk.
Irrigation - ☒ as needed % ET_o ☐ Other (Specify Below)
Special

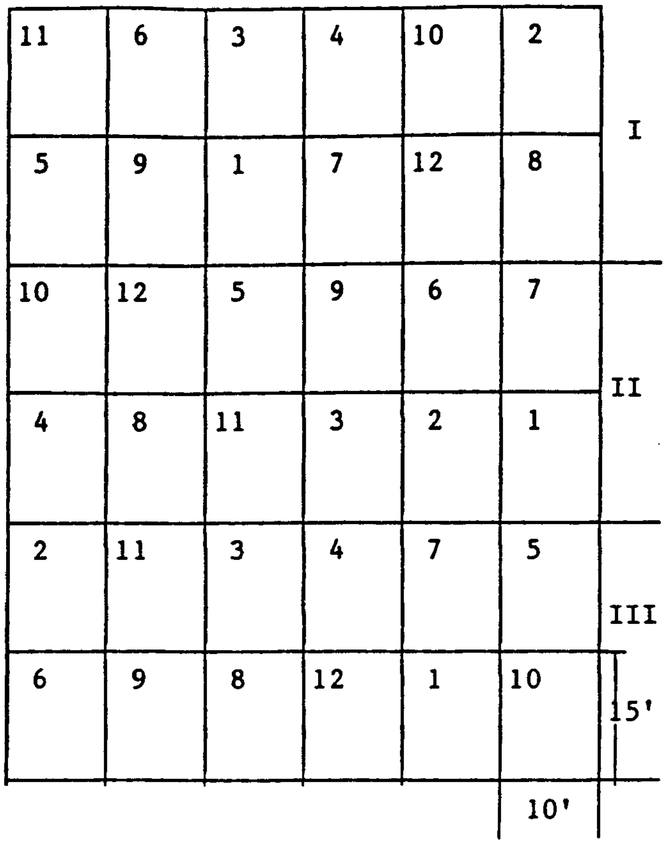
Experimental Design: ☐ CRD ☒ RCB ☐ SPLT ☐ Other
No. of Reps 3 Size of Rep. 60 x 30 Total Plot 60 x 90
Treatments:

Data Collection: 1) Variable Turfscores Frequency Monthly
2) Variable Frequency
3) Variable Frequency

Special Instructions/Comments:

UCR TALL FESCUE AND KENTUCKY BLUEGRASS MIX TRIAL

Block #11



11	6	3	4	10	2	I
5	9	1	7	12	8	
10	12	5	9	6	7	II
4	8	11	3	2	1	
2	11	3	4	7	5	III
6	9	8	12	1	10	

Entry No.	Name
1	Alta
2	Alta + A34
3	Alta + Columbia
4	Alta + Kenblue
5	Mustang
6	Mustang + A34
7	Mustang + Columbia
8	Mustang + Kenblue
9	Jaguar
10	Jaguar + A34
11	Jaguar + Columbia
12	Jaguar + Kenblue

Objectives:

To evaluate the compatibility of high, medium and low levels of competition between tall fescues and Kentucky bluegrasses for turf purposes.

Methods and Materials:

On 12 April 1985, three cultivars of tall fescue were seeded individually and in blends with three cultivars of Kentucky bluegrass (95% tall fescue + 5% Kentucky bluegrass) at the rate of 6#/M to 10' x 15' plots. The plots are fertilized at 1# N/M every 6 weeks, mowed at 1-1/2", and irrigated as needed.