TURF RESEARCH REVIEW

Compiled by
The United States Golf Association Green Section
Plant Industry Station
Beltsville, Maryland
Fred V. Grau, Director
With the Generous Cooperation of Experiment Station Workers

A listing of Project Workers, Projects, Financial Support, Publications and Reprints covering the subject of Turf during the period of 1946-1949.

Distributed by the United States Golf Association Green Section to all State Experiment Stations, Golf Associations, Turf Associations, Turf Foundations, Greenkeeping Superintendents Associations, and USGA Officials and Committee Members in the United States.

This Turf Research Review is presented in an effort to promote more cordial relations and harmony among all turf workers, to provide an integration and coordination of effort, to reduce needless duplication, and to stimulate needed research on the most pressing current turf problems. Free direct correspondence among workers in related fields greatly is to be encouraged. It is hoped that this Review may be revised and reprinted each year so as to provide an up-to-date reference manual.

The costs of printing and mailing are borne by the USGA Green Section.
BELTSVILLE TURF GARDENS
United States Department of Agriculture
Plant Industry Station
Beltsville, Maryland

United States Department of Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering
and
United States Golf Association Green Section
Cooperating

Project Workers

United States Golf Association Green Section
   F. V. Grau, Director
   M. H. Ferguson, Agronomist in Charge of Research
   C. G. Wilson, Agronomist
   A. M. Radko, Technical Assistant
   J. M. Wilfong, Field Superintendent

Bureau of Plant Industry, Forage Crops and Diseases
   W. M. Myers, Head
   Ian Forbes, Jr., Agronomist

Projects

Critical studies on the nutritional requirements of zoysia in relation to seed production and turf quality. (Greenhouse studies supplemented by field plot work.) It is planned to continue similar studies on other grasses (bent, bluegrass, bermudagrass, fescues).

Studies on management of zoysia turfs in relation to:
   Seed yields
   Adaptation to varying turf uses
   Ability of different zoysia strains to associate harmoniously with various cool-season grasses
   Ease of harvesting seed as affected by different types of management

Study of planting methods for zoysia (vegetative and by seed)

Methods of harvesting zoysia seed

Method, dates, and rates of seeding zoysia

Studies to determine the optimum storage conditions for zoysia seed

Management studies on U-3 bermudagrass to learn reaction to:
   Fertility levels
   Heights of cut
   Methods of planting
   Association with cool-season grasses

Evaluation of bentgrasses from seed and from stolons under varying management conditions for fairways and lawns

Evaluation of selections of bentgrasses for quality factors for use on putting greens and fairways

Evaluation of Merion (B-27) bluegrass and common bluegrass alone and in combination with other grasses

Studies on the value of tall fescues alone and in mixtures

Studies of nurse grasses and their effects on permanent species
Evaluation of turf produced from seed of Z-52 strain of Zoysia japonica
Production of nursery stock of improved strains of grasses by vegetative propagation
Study of bermudagrass strains in association with bluegrass turf
Evaluation of red fescue strains in cooperation with Pennsylvania Experiment Station
Traffic tests on various turf
Studies of water relations in various sand-vermiculite mixtures (for possible use in putting greens)
Studies of Ureaform materials on Alta fescue turf

Much practical work is being done through cooperation with the Grounds Committee of the Plant Industry Station. These projects furnish information to augment that gained through research projects.

In addition to the projects listed above there is an additional group of cooperative projects which are primarily the responsibility of the Division of Forage Crops and Diseases.

Selection and breeding of improved strains of zoysia
Selection and breeding of improved strains of bluegrass

Publications During 1949

Numerous articles have been published by the Green Section Staff during 1949.
Journals in which articles have been published:
  What's New in Crops and Soils
  USGA JOURNAL
  Golfdom
  Greenkeepers Reporter
  American Cemetery Association News
Informal Cooperation - No USGA Green Section project or agreement
Supported by funds from several organizations in Southern California concerned with turf problems.

Project Workers

V. T. Stoutemyer
Duane O. Crummett
Edward F. Roach
Jesse Skoss
John Gallagher, Jr.
M. R. Huberty
Pierre Miller
R. N. Jefferson

Projects

Plant Tissue Testing, Duane O. Crummett and Edward Roach
Types of Herbicides and Their Uses, Jesse Skoss
Herbicide Tests, John Gallagher, Jr.
Turf Insect Control, R. N. Jefferson
Grass Variety and Turf Management Studies, V. T. Stoutemyer
A Survey of Twelve Golf Courses in the Los Angeles Area, Edward F. Roach
(graduate student now with Rio Hondo Golf Club)
Soil Compaction and Amendments, M. R. Huberty
Studies on Turf Diseases, Pierre Miller

Other Projects

Plant Nutrition Studies
Mechanical Cultivation of Turf
California Turf Survey, Charles K. Hallowell, Visiting Associate
Ecology of Grass Mixtures

Publications, Reprints and Reports

"Fall Field Day on Turf Culture," October 10, 1949.

Plots were established in 1947 with Green Section assistance and guidance.
Informal Cooperation - No USGA Green Section Project or Agreement

Project Worker
John C. Schread

Projects

Control of white grubs (Jap beetle, Asiatic beetle, native white grub)
DDT, Chlordane, Parathion, Aldrin
Control of chinch bug - Chlordane - 5% dust and as emulsifiable concentrate
Control of oriental earthworm (stinkworm), Parathion, Chlordane, Aldrin emulsions
Phytotoxicity of insects
Compatibility of insecticides with 2, 4-D and PMAS
Effects of organic phosphates and chlorinated hydrocarbons on the fauna in turf

Publications, Reprints and Reports

"Chlordane for the Control of Soil Insects." September 16, 1947.

*Work was initiated in 1947 as the result of correspondence between H. Alfred Langben, USGA Green Section and the New Jersey Experiment Station. Supported by funds raised in the New York Metropolitan area from interested clubs.

Contributed through
Education Fund $900
USDA 300
USGA (in Offset) 300

$1500

Project Workers
Roy A. Bair
David L. Stoddard
E. G. Kelsheimer
Warren N. Stoner
Walter A. Thames

USGA Green Section Project
Adaptation of turf grasses

Other Projects
Selection studies with strains of bermuda and bentgrasses maintained under putting green conditions
Testing new selection of grasses for use in lawns
Determination of agronomic practices combined with fungicide applications as related to obtaining a stand with temporary winter greens
Trials with Fairway Green Aerifier on greens and fairways and use of moling equipment on greens
Evaluation of spray chemicals and agronomic practices for weed control on fairways and greens
Identifying pathogens on St. Augustine and bermuda and disease control spray treatments. Warren N. Stoner
Rates of application with compound 118 and other insecticides on insect control. Walter A. Thames

Publications, Reprints and Reports
GEORGIA COASTAL PLAIN EXPERIMENT STATION
University of Georgia
Tifton, Georgia

USGA Green Section Cooperation - and U. S. Department of Agriculture

Research Grant, July, 1946 - $400
Research Fellowship replaced Grant

Contributed through
Contributions $7,030
GS Budget 1,200
USDA 900
USGA (in Offset) 900

Total Funds Contributed 1946-1950 $10,030

Project Workers

Glenn W. Burton
B. P. Robinson

USGA Green Section Projects

Seed production in turf grasses
Insect control in turf
The production and sterilization of organic topdressing materials
The development of superior turf grasses

Other Projects

Seed production in turf grasses - centipede and bahia
Development of superior turf grasses - bermudagrass, centipedegrass and bahiagrass
The effect of various nitrogenous fertilizers upon the seasonal growth of centipedegrass
Insect control in turf
The production and sterilization of organic topdressing material
Lime and fertilizer requirements of southern turf grasses
Hastening the transition from ryegrass to bermuda and vice versa
The establishment of southern turf grasses
The effectiveness of various chemical fungicides and herbicides upon southern grasses should be investigated (no funds for this)

Publications, Reprints and Reports

"The Influence of Various Nitrogen Sources upon the Yields of Dry Clippings of Centipedegrass Grown on a Tifton Sandy Loam." July 10, 1946; December 16, 1947; and December 3, 1948.
"The Southeastern Turf Research Center." G. W. Burton. Published in Greenkeepers Reporter, October 25, 1947.
"Centipede, A City Lawn Grass." Published in Southern Seedsmen, November 12, 1948.

"Centipede Grass Seed Production." November 27, 1948.

"Control of Fall Army Worm on Turf." G. W. Burton. Published in Greenkeepers Reporter, September 5, 1947.

"2, 4-D Aids the Establishment of Southern Turf Grasses." Published in Timely Turf Topics, August 1947.

"Instructions for Those Who Received Planting Stock of Tifton 57 Bermuda." August 16, 1949.

"Comparative Performance of a Number of Bermudagrass Selections, etc." August 25, 1949.

USGA Green Section Cooperation - Research Fellowship, September 15, 1947

$4500, 3 years at $1500

Indiana Associations $500
USGA Green Section 500
MRTF 500

Contributed through:

Contributions $500
Education Fund 1500
U. S. D. A. 1200

$3200

Project Workers

G. O. Mott
E. G. Sharvelle
Kenyon T. Payne
Richard R. Davis
Don E. Likes
Earl Staten
William Daniel

USGA Green Section Projects

Test new adapted species of grasses under conditions of fairway management - height of cut - fertility treatments, G. O. Mott - 1947
Species and strain testing for fairway and greens, E. C. Holt - 1948
Studies on nutritional requirements of turf grasses, Richard Davis - 1948
Management studies, Don Likes and G. O. Mott - 1948
Disease control, Eric Sharvelle and Don Likes - 1948
Increase nursery of proven strains for distribution, H. H. Kramer - 1948
Greenhouse studies on turf-stabilized granular materials, W. H. Skrdla and E. J. Yoder - 1948
Breeding of Turf Grasses, Kenyon Payne - 1949
Soil factors and their effect on turf, Richard Davis - 1949
Chemical weed control, Richard Davis - 1949
Seed setting studies in creeping bents, Kenyon Payne - 1949
Cool season - warm season grasses for fairways and tees, Don Likes and G. O. Mott - 1949

Publications, Reprints and Reports

"Bentgrass Strains." Ethan Holt.
"Fairway Turf Nursery." Richard Davis.
"Spraying Weeds with 2, 4-D." Leaflet 293, 1948.
"Fertilizing Golf Greens." G. N. Hoffer
"Midwest Turf News and Research." Published quarterly.
Informal Cooperation - No USGA Green Section Project or Agreement

Project Worker

H. L. Lantz

Projects

Thirty strains bentgrass tested for adaptation. Congressional, Arlington, and Old Orchard found superior.

Strains tested for disease resistance (dollarspot particularly). Arlington, Old Orchard, Congressional, Metropolitan proved most resistant. Toronto, Washington and Norbeck proved very susceptible.

Fungicide tests. Cadmium compounds outstanding in control of dollarspot.

Mercury compounds and Tersan dependable for control of brownpatch.

Crabgrass control. Tat-C Lect gave 85% control on football field. Tests on greens failed.

Aero-Cyanate. Preliminary work indicates promise in lawns and fairways.

Further trials to be made in 1950.

Fungicide treatments - dandelion count. Mercury compounds had a definite effect in inhibiting germination of dandelion seed.

Various grass seed mixtures planted spring and fall of 1949 for observation and for cutting height experiments.

U-3 bermuda added to nursery to test for winter hardiness.

Fertilizer tests. None have been feasible on bent grass plot design.

Problems which need study under Iowa conditions:

Topdressing vs. no topdressing

Soil compaction

Drainage on flat low lying greens, mole, french wells, tile, etc.

Tile vs. no tile in new greens

Food materials. Conventional methods vs. liquid form

Weed killer cooperative test in 1945 (with USGA Green Section and Dow Chemical Co.)

Bentgrass plots and test greens (species and strain testing). 1945.

Disease Control

Publications, Reprints and Reports


Conducts Iowa Greenkeepers Short Course.
Informal Cooperation - No USGA Green Section Project or Agreement

Project Workers

E. N. Fergus
R. C. Buckner
Lawrence Henson

Projects

Zoysia tests
Kentucky 31 and Alta fescue comparisons
Clipping heights on various turf grasses
Study of adaptation of species and strains for fairway and lawn use
Study of U-3 bermudagrass and bluegrass, including Merion bluegrass

Publications, Reprints and Reports

None

Plots were established in 1948 and 1949 with Green Section assistance.
USGA Green Section Cooperation - Agreement dated December 14, 1948
Research Grant for $300 for two years
Contributed through Education Fund $300

Project Worker
Lawrence S. Dickinson

USGA Green Section Project
A study of Zoysia japonica - Cool season grass combinations

Other Projects
Test bent putting green
Winter 1948-1949. Seven fungicides compared for snowmold. Mercuric compounds most effective. Ryegrass used as nursegrass in all but sodded velvet bents.
Records kept on green - open to general use mid-May 1949 - 5,000 rounds of putting golf played
Variety tolerance of N-P-K deficiency
Use of hops as a pre-seeding soil amendment and as topdressing fertilizer.
Trials to be continued in 1950.

Winter School for Greenkeepers

No publications
USGA Green Section Cooperation - Research Fellowship
July 15, 1947, $4500 - $1500 for 3 years
Detroit Dist. G. A. 750
USGA Green Section 375
MRTF 375

Contributed through
Contributions $1500
Education Fund 750
USGA (in Offset) 500
$2750

Project Workers
James Tyson
B. H. Grigsby
John Vaughn
E. A. Andrews
Ray Hutson
Walter Morofsky

USGA Green Section Projects
Fairway management in relation to playing conditions
  Fertilization
  Soil properties and management
  Mowing practices
  Suitability of various species and strains

Other Projects
Times and rates of seeding turf - comparison of seeding mixture and individual
  varieties in establishing turf, Carter Harrison
Chemical control of weeds - crabgrass control, B. H. Grigsby
Disease control studies, John Vaughn and E. A. Andrews
Insect control, Ray Hutson and Walter Morofsky
Fertilizer on growth of grasses, particularly effect of various levels of NPK on
  Washington, Arlington, Congressional and Cohansey bents, James Tyson.
Soil relation to growth of bents, bluegrass and red fescue
Studies with Farm Crops Department to compare relative values of different
  strains and varieties for producing putting green and fairway turf
Studies with Michigan State Highway Research on highway shoulders and re-
  sultant effect of treatments on stability
Studies on soil moisture, its measurement and control
Publications, Reprints and Reports

"Destruction of Quackgrass Rhizomes by Application of Isopropylphenylcarbamate."
Missouri Agricultural Experiment Station
University of Missouri
Columbia, Missouri

USGA Green Section Cooperation - Research Grant, August 30, 1949 - $400
Contributed through Contributions - $700

Project Workers
R. B. Livingston
E. Marion Brown

USGA Green Section Project

Adaptation and Management Studies of Species and Strains for Fairway and Lawn Use in St. Louis Vicinity
Selection of suitable turf grasses
Warm season grasses: zoysia - slow growing
80 selections of bermuda planted - Maples 6 (Pinehurst, N. C.)
  Thomas 1 (Charlotte, N. C.) and U-3 most promising for fairways and tees
Methods of establishing superior grasses in existing fairways and tees
  Best method - stripping best for bermudagrass
  Seeding of B-27 bluegrass seed good - must have at least one years test

Publications, Reprints and Reports

"Lawn Culture in Missouri," T. J. Talbert and E. Marion Brown.
USGA Green Section Cooperation - Research Grant, in cooperation with U. S. Department of Agriculture Contributed through

USDA
USGA (in Offset)

<table>
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<tbody>
<tr>
<td>Ralph E. Engel</td>
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<tr>
<td>Jack C. Harper</td>
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<td>S. H. Davis</td>
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<tr>
<td>Gus Silbers</td>
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<tr>
<td>Warren Wistendahl</td>
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<tr>
<td>Raymond Battle</td>
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<td>Steve Szabo</td>
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USGA Green Section Project

Study of turf species and strains and their management for fairway and lawn use. Includes mixtures of grasses.

Other Projects

Development and Evaluation of turf grasses
A comparison study of five colonial bents and five red fescues
The use of companion grasses in turf
A test of bentgrasses for putting green turf
Performance of Z-52 and U-3 bermuda in combination with cool season grasses
A comparison of 4 Kentucky bluegrass strains
A rate of seeding study with New Jersey #1 grass seed mixture

Turf Maintenance
Cooperative turf fungicide trials
Rates of N, P, and K on putting green turf
The effect of time of fertilization of bent turf (1/4-inch)
The effect of time of fertilization on turf seeded with New Jersey #1 (mowed at 7/8-inch and 1-1/2-inches)
The effect of several rates of N, P, and K on turf seeded to New Jersey #1 (mowed at 7/8-inch and 1-1/2-inches)
The effects of frequency of topdressing
The effects of frequency of aerifying on mixed turf mowed at 7/8-inch
Time of cultivation of bent turf (1/4-inch) with different levels of nitrogen, phosphorus
Cultivation of mixed turf (7/8-inch) with different levels of nitrogen, phosphorus, and potash
Cultivation of mixed fairway turf in conjunction with different levels of fertilizer, lime, and gypsum
Rutgers offered two types of curriculums in turf maintenance.

Short Course - 10 weeks - Turf management, weed identification, weed control, identification of grasses, diseases, insects, etc.

Four-year Regular Course - B. Sc. degree

Crabgrass Control Tours - September 22, 1948
September 22, 1949

Annual Turf Field Day

700 different plots for crabgrass control (sodium arsenite, ammonium sulfate, phenyl mercury compounds)

Publications, Reprints and Reports


Progress Report on "Renovation, Improvement and Evaluation of Turf on Lawns, Parks, Athletic Fields, Fairways and Similar Areas and Renovation Study." Ralph E. Engel.

"Nitrogen Absorption and Aeration." John W. Shive and Luther B. Arrington. Reprint from New Jersey Agriculture, September and October 1934.


"Utilization of Nutrients by Colonial Bent (Agrostis tenius) and Kentucky Bluegrass (Poa pratensis)." H. B. Sprague. Bulletin 570, 1934.


USGA Green Section Cooperation - Agreement dated June 1, 1949

Secured by Research Grant of $400
Contributed through Education Fund - $400

Project Workers

John F. Cornman
Gene C. Nutter

USGA Green Section Project

The determination of the usefulness of the mole drains in the draining of putting greens and other turf areas.

Other Projects

Crabgrass control with potassium cyanate - American Cyanamid Company Grant

Publications, Reprints and Reports


"Control of Weeds in Special Purpose Turf with 2, 4-D." Progress Report No. 1, July 1948.


Bulletin of the New York State Turf Association.
USGA Green Section Cooperation - Research Fellowship - $6000 (Tulsa Golfers' Fund for War Wounded, Inc. February 26, 1948). ($2000 a year for three years.) Contributed through contributions $4500.

Research Grant - $5000 (Project 669) $1000 a year for five years. June 1, 1949. Contributed through contributions - $1000.

Project Workers

W. C. Elder
William L. Garman
Alva Niles
James Stephens

USGA Green Section Projects

Study of prevention of invasion of bentgrass greens by bermudagrass
Study of species and strain adaptation and management
Project #669, "Study of the Mechanical Composition of Soils in Relation to Turf Development." Project Leader, William L. Garman. (Topdressing mixture has been of too coarse texture - too low clay content. Recording on porosity of soil materials and synthetic mixtures.)

Publications, Reprints and Reports

Progress Report - Project 628
"Mechanical Analyses, Infiltration Rates and Moisture Percentages of Greens from Several Golf Courses in Oklahoma."
Informal Cooperation - No USGA Green Section Project or Agreement

Project Workers

E. R. Jackman
H. A. Schoth

Projects

2, 4-D Tests with Dow Company - February 1946
Airplane landing strips
Alta fescue
Red fescues
Merion (B-27) bluegrass
Highland bent

Publications, Reprints and Reports

"Weeders Readers"
"Man with 20,000 Friends." (E. R. Jackman), Saturday Evening Post, January 31, 1948.
USGA Green Section Cooperation - Research Grant $500, April 22, 1946. (Terminated)

Research Fellowship $4,500 (Jim Watson) $1,500 a year for 3 years, February 7, 1947. (Terminated)

Research Fellowship $6,000 (H. L. Wagner Grant) $2,000 a year for 3 years, July 1, 1948. (Payment completed)

Grant Contributed through G. S. Budget $500
Fellowship (Watson) Contributed through Education Fund $5,060.
Fellowship (Wagner Grant) Contributed through G. S. Budget $6,000.
Aerification Research Fellowship (West Point Lawn Products) Contributed through G. S. Budget $2,000.

Project Workers

H. B. Musser
H. W. Thurston
F. J. Holben
Albert E. Cooper
C. K. Hallowell
R. P. Pennington
C. D. Jeffries
J. O. Pepper
L. Neal Wright
Jack C. Harper
Robert M. Means
J. P. Stanford

USGA Green Section Projects

Studies of fairway management, compaction, irrigation and aeration
Weed control
Breeding and testing of bents and fescues
Strain testing
Studies on physical characteristics of soils
Disease control
Seed production studies
Soil Aeration

Other Projects

Production of improved strains of grasses (Musser and Wright)
Creeping bent - 225 selections, 50 under test for turf quality
Study of practicability of producing seed by polycrossing

Red fescue - 75 selections, 35 under test for clipping heights at State College and Beltsville
Studies in progress to determine whether type can be held in successive seed generations of improved strains

Kentucky bluegrass - 10 selections under turf quality test

Soil relationships to turf production
Potash-nitrogen ratios. Effects on growth rates and disease incidence, Holben, Jeffries, Musser
Ureaform as source of N. Comparison with other N carriers. Effect on growth, disease, weed invasion, Musser, Stanford, Watson
Effects of excess water and soil compaction (Watson). To be continued next two years by Harper.

Trace elements on golf course soils (Pennington)

Special Projects
Crabgrass control
Association of warm and cool season grasses
Association of improved strains of cool season grasses
Pre-seeding soil treatments with herbicides for weed control in seeding turf (Musser)
Highway slope control (Stanford)
Best adapted species
Production of seed mulching materials
Off-season seedings and companion plantings of crown vetch with one and two grasses

Disease Control Studies - at State College and Philadelphia (Thurston and Means)

Extension Work - A. E. Cooper

1949 - 202 demonstrations, field meetings and tours
6,500 individual contacts

Publications, Reprints and Reports


"Comparison of 2, 4-D Formulations." May 1946.
"Athletic Field Renovation." A. E. Cooper.
"Fertilizer Suggestions where Reseeding is not Necessary."
"Compaction and Irrigation Studies on Compacted Turf." J. R. Watson, Jr.
"Turf Disease Control 1948." Robert M. Means.
USGA Green Section Cooperation

Research Grant - $450, April 1, 1946
Research Grant - John S. Clapper Memorial - $1,500
$500 a year for 3 years, 12/15/47
Contributed through:

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John S. Clapper Memorial Grant
Contributions

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Project Workers

T. E. Odland
J. A. DeFrance
J. A. Simmons
J. B. Rowell
F. L. Howard
T. O. Diener
Joseph G. Barrat

Recipients of the John Samuel Clapper Memorial Awards

1948
James Simmons
Robert Wakefield
Miasnig Hogopian

1949
Conrad R. Skogley
Minot Crowell
William Marcil

Projects

The control of diseases of grasses and a study of seed production of bent grasses based on velvet and Rhode Island colonial bent strains developed from crossed or inbred plants.

1945 Formulation, development and testing of synthetic organic chemicals for control of diseases and insects in bentgrass turf
Selecting, testing and production of superior strains of colonial and velvet bentgrass, with emphasis on the production of seed

1947 Bentgrass for adaptability
Bentgrass for disease control
Disease control on colonial, creeping and velvet bents
Bentgrass seed production
Velvet bent - testing insecticides
Compatibility - ryegrass, Kentucky bluegrass, Canada blue, Chewing's and creeping red fescue and Colonial bent, clover with mixtures of the basic grasses
Height of cut - lawn turf with regard to quality factors, drought and disease resistance
Piper velvet bent - minimum maintenance on seeded and stolon plots
Improved strains of velvet bent and lime-compost study
Lime and compost study on Piper velvet bent to determine effect on mat of undecomposed root accumulation
Nurseries, varietal and hardiness test and increase
Velvet bent seed production
Special projects:
  Weed control studies - campus and athletic field
  Soil sterilization
  Insect control in cooperation with Dr. Theo. W. Kerr
  Fairway fertilization - Pt. Judith Golf Course
  Roadway test - Turf roadways between areas
  Formaldehyde - in cooperation with USGA - campus or athletic field
1948 Disease control studies on putting green turf
Insect control studies
Species and strain evaluation of various turf grasses
Soil sterilization studies
Weed control studies
Study of the value of ryegrass in turf grass seed mixtures
Evaluation of compost and lime on velvet bent putting green turf
Individual grasses and mixtures for turf roadways and for areas with competition from Norway maple tree roots
1949-1950 Lime and compost requirements of velvet bent turf - J. A. DeFrance and T. E. Odland
A study of the value of certain fertilizers and chemicals for destroying weed seeds in soils previous to cropping - J. A. DeFrance and T. E. Odland
Water-soluble mercurials for crabgrass control - J. A. DeFrance
Rhode Island bent selections for turf and seed production - J. A. DeFrance and T. E. Odland
Control of diseases of grasses - J. B. Rowell, F. L. Howard, J. A. DeFrance
Control of annual bluegrass (Poa annua) - J. A. Simmons and J. A. DeFrance

Publications, Reprints and Reports

"Selection and Developing of Improved Colonial Bents Based on the Study of Quality Factors, Drought and Disease Resistance at R. I. Agricultural Experiment Station," January 1950.
Publications, Reprints and Reports (Continued)

"The Control of Insects." Cedrick Jennings ) No. 26,
"Turf and Lawn Diseases." Harry L. Keil ) May 1945
"Previewing New Materials for the Control of Turf Diseases." Harry L. Keil and Frank L. Howard. December 1946.
"Turf Species and Fertility." "Soil Sterilization for Weed Control."
"Insect Control, 1947."
"Turf Insect and Disease Control Under Rhode Island Conditions."
Rhode Island Experiment Station publishes "Turf Maintenance Tips."
Rhode Island Experiment Station holds an Annual Greenkeepers Field Day.
TEXAS AGRICULTURAL EXPERIMENT STATION
Texas A & M College
College Station, Texas

USGA Green Section Cooperation - Research Grant $900 - $300 a year for 3 years, November 1, 1947
Contributed through Education Fund - $1800

Project Workers

R. C. Potts
Ethan C. Holt
James R. Watson, Jr.

USGA Green Section Projects

To collect and evaluate species and strains of turf grasses according to their:
- Seeding ability
- Vegetative characteristics and habits
- Reaction to environmental factors

To develop improved strains of turf grasses by breeding for:
- Resistance to disease
- Recovery from injury (use)
- Tolerance to climate
- Appearance and wearing qualities
- Turf forming qualities
- Drought resistance
- Soil nutrient requirements

To evaluate improved strains in specialized use tests

Establishment, Maintenance and Improvement of Turf by Cultural Methods
- The effects of fertilizer elements and combinations thereof on turf with regard to: rapidity of coverage, top growth, vigor and density, root growth and accumulation, weed population, wear resistance, speed of recovery, winter hardiness, drought resistance, and disease and insect incidence
- Aerification methods and their interrelationships with fertilizer elements as they affect the quality of turf
- The effects of time, rate and kind of topdressing on the quality of turf
- The proper rate and method of irrigation as it influences quality of turf
- The influence of clipping heights and frequency on:
  - Density of grass
  - Weed population
  - Root development
  - Drought resistance

Effective means of controlling turf weeds

Publications, Reprints and Reports

None