

**October 1991**

**LAWN  
INSTITUTE**



# harvests

**Volume 38 Number 3 B**

## THE HARVEST MIX

This is the second part of volume 38 number 3. You will find the continuation of the listing of CRIS research projects. It starts with the rest of Southeast and Hawaii-Puerto Rico and goes on to North Central/Midwest, Southwest, West and Northwest. We hope that this answers many of your questions about what research is being done or where it is being conducted.

In this issue we announce the release of the new LISTS NOTEBOOK. This 385 page loose-leaf publication has no copyright and the pages can be taken out to copy, cut and paste and then masters returned to the binder. There are many uses for this material.

The Jacklin Seed Company has shared "A Look at the Growth Cycle and Field Care of Grass Seed" which is an interesting synopsis of the steps in getting seed ready for market.



It's great !

It's turf-er-cise.

# Southeast and Hawaii - Puerto Rico

## CONTINUED



Yum Yum A Better Diet!



### FERTILIZERS

#### /MINERAL NUTRITION

#### Influence of Soil Fertility on the Growth and Quality of Turfgrasses

- University of Florida  
Gainesville, Florida
- Sartain
- Oct 86 - Sept 91 0099163
- Study the influence of extractable soil nutrient status and tissue nutritional contents on the growth, quality and thatch accumulation of both cool and warm season turfgrasses.

#### Influence of Soil Fertility and Other Parameters on the Growth and Quality of Turfgrass

- University of Florida  
Gainesville, Florida
- Sartain
- Jul 80 - Sept 86 0082022
- Correlate extractable nutrients and other soil properties with the growth and quality of turfgrass production and study effects of fertilization and other management practices on turfgrass culture parameters.

#### Influence of Soil Fertility on the Growth and Quality of Turfgrasses

- Agricultural Research and Education Center  
Belle Glade, Florida
- Snyder
- Oct 86 - Sept 91 0099162
- Study the effect of different fertilizer materials at various rates and ratios on selected turfgrass culture parameters and on nutrient leaching.

#### Influence of Soil Fertility and Other Parameters on the Growth and Quality of Turfgrasses

- Agricultural Research and Education Center  
Belle Glade, Florida
- Snyder
- Jul 80 - Sept 86 0082023
- Determine the influence of nitrogen source, rate and irrigation on turfgrass color, yield and on nitrogen leaching.

#### Turf Nutrition and Systems Physiology

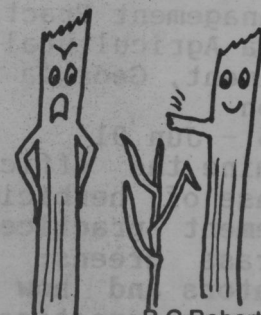
- North Carolina State University  
Raleigh, North Carolina
- Peacock
- Aug 87 - Sept 88 0132930
- Determine turf nutritional requirements and discern how these interact with native and modified soil conditions based on fertilization practices; study stress tolerance; define species and varietal differences.

#### Nitrogen and Water Application Practices for Ornamentals and Turfgrasses

- Clemson University  
Clemson, South Carolina
- Wagner, Mazur
- Jul 85 - Jun 90 0095915
- Establish standard procedures for determination of nitrogen levels, moisture release, saturated flow and cumulative drainage in soils when highly amended; determine efficiency of nitrogen utilization and potentials for increasing efficiency.

### Blades of Grass

Another mouth  
to feed!



B C Roberts



## WEED RELATIONSHIPS/GROWTH REGULATION

### Biology and Control of Turfgrass Weeds

- Auburn University  
Auburn, Alabama
- Dickens
- Nov 82 - Sept 88 0089037
- Determine cultural and/or biological factors responsible for rapid increase of Virginia buttonweed in warm season turf; determine range of variability in morphology and herbicide response; evaluate new herbicides for control of perennial weeds in commercial turf sods.

### Weed Control in Turfgrass

- University of Florida  
Gainesville, Florida
- Dudeck, McCarty
- Feb 82 - Dec 86 0089027
- Evaluate new and existing materials for weed control for warm season turfgrasses; document interaction of herbicides and cultural practices on efficacy of materials.

### Weed Control in Ornamental Crops

- University of Florida  
Gainesville, Florida
- Currey
- Feb 82 - Dec 86 0086887
- Conduct field studies on weed biology, weed competition, herbicide programs and integrated cultural practice modification to enhance weed control in turf and ornamentals.

### Weed Control, Plant Growth Regulators and Other Management Practices on Turfgrasses

- Georgia Agricultural Experiment Station  
Experiment, Georgia
- Johnson
- Jul 86 - Jun 91 0098133
- Determine the efficiency of herbicides and response of herbicides applied with other management practices on performance of bentgrass greens; evaluate plant growth regulators and how they relate to other management practices on warm and cool season grasses.

### Chemical Management of Turfgrasses and Ornamentals

- Georgia Agricultural Experiment Station  
Experiment, Georgia
- Johnson
- Jul 81 - Jun 86 0034217
- Determine influence of herbicides with other management practices on weed control and performance of turfgrasses; evaluate herbicides for weed control and turfgrass tolerance with emphasis on new chemicals as replacements for others where registration has not been renewed.

### Weed Control in Turf

- North Carolina State University  
Raleigh, North Carolina
- Lewis
- Oct 85 - Sept 90 0068163
- Develop effective weed control practices in established turf and in the establishment of turf and evaluate growth retardants in turf.

### Herbicide Phytotoxicity and Early Disease Detection in Turfgrasses

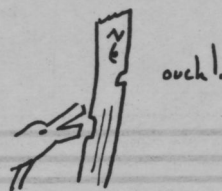
- Clemson University  
Clemson, South Carolina
- Miller
- Jul 86 - Sept 89 0098528
- Evaluate experimental herbicides for phytotoxicity on selected turfgrass cultivars; determine pathogenic Phythium species on putting greens throughout South Carolina and compare standard diagnostic techniques to monoclonal antibodies for early disease detection.

Don't give that  
weed seed any space  
to germinate.





## INSECT RELATIONSHIPS



### Biological Control of Pest Mole Crickets

- University of Florida  
Gainesville, Florida
- Frank, Walker, Boucias
- Oct 87 - Sept 92 0132201
- Improve methods for laboratory culture of the mole cricket; complete evaluation of the effectiveness of the Uruguayan strain of parasitic nematode as a biological control agent; develop economically feasible field application methods; complete evaluation of the effectiveness of a parasitic wasp as a biological control agent.

### Biological Control of Tropical and Subtropical Mole Crickets

- University of Florida  
Gainesville, Florida
- Walker, Frank
- Jul 83 - Jun 87 0090640
- Identify localities with major mole cricket problems; determine what species are involved; locate their homelands; identify natural enemies; evaluate candidate control agents; introduce promising safe agents; monitor mole crickets and their enemies at release sites.

### Mole Cricket Biology, Control and Management

- University of Florida  
Gainesville, Florida
- Walker, Koehler, Frank
- Feb 80 - Sept 86 0081026
- Develop sufficient information on southern and Changa mole crickets to allow management of these pests on turf; study basic biology and natural history; develop sampling procedures; assess natural mortality factors; re-evaluate chemical control tactics; identify resistant grasses.

### Mole Cricket Biology, Control and Management

- Agricultural Research Center  
Fort Lauderdale, Florida
- Howard, Busey
- Feb 80 - Sept 86 0081025
- Develop information on basic biology and natural history; derive sampling procedures for determining population densities; assess the impact of natural mortality factors on resident populations; evaluate control and/or management tactics; develop IPM strategies.

### Infectious Diseases of Insects in Hawaii

- University of Hawaii  
Honolulu, Hawaii
- Tamashiro
- Aug 69 - Sept 86 0011734
- Discover, test and utilize insect pathogens in pest management systems; determine the effect of diseases on insects; develop a model for the susceptibility of the lawn armyworm to NPV.

### Ecology and Control of Insect Pests of Crops, Turf and Range Grasses

- University of Hawaii  
Honolulu, Hawaii
- Mitchell, Tamashiro, Murdoch
- Oct 86 - Sept 88 0131207
- Investigate role of bacteria in the ecology of tephritid fruit flies and their parasites; develop non-carcinogenic lures and ecologically acceptable and effective control measures for insect pests.

### Ecology and Control of Insect Pests of Endemic and Cultivated Plants

- University of Hawaii  
Honolulu, Hawaii
- Mitchell, Murdoch, Cho
- Sept 74 - Sept 86 0008901
- Develop ecologically acceptable and effective control measures for insect pests of turf and range grasses; develop an effective IPM program for insect pests.

### Genetic Transformation of a Soil Nematode by Microinjection of Cloned DNA

- North Carolina State University  
Raleigh, North Carolina
- Miller
- Oct 86 - Apr 88 0131463
- Develop a reliable method for inserting genes into the chromosomes of a soil nematode; identify DNA sequences that regulate the expressions of nematode genes; better understand the genetic specification of nematode development.

### The Insect Fauna of Puerto Rico

- University of Puerto Rico  
Mayaguez, Puerto Rico
- Medina-Gaud, Franqui, Aereu
- Jul 83 - Jan 99 0028096
- Maintain and improve the Agricultural Experiment Station's insect collection; determine the geographical distribution, host plants and degree of damage of insects attacking local flora, including turfgrasses.



## DISEASE RELATIONSHIPS

### Diseases of Turfgrasses

- University of Florida  
Gainesville, Florida
- Freeman, Simone, Berger
- Jun 88 - Sept 93 0135055
- Determine the etiology, factors affecting occurrence, the control of diseases of turfgrasses and to utilize information generated in overall disease management programs.

### Diseases of Turfgrasses

- University of Florida  
Fort Lauderdale, Florida
- Juhnke
- Jun 88 - Sept 93 0135058
- Determine the etiology, factors affecting occurrence, the control of diseases of turfgrasses and to utilize information generated in overall disease management programs.

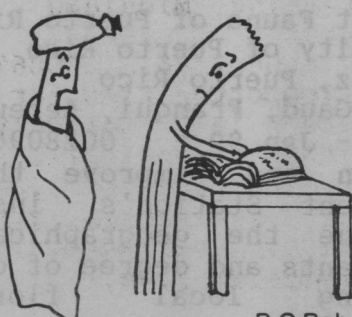
### Disease Management Systems For Forages, Turfgrasses and Soil Improving Legumes

- University of Georgia  
Tifton, Georgia
- Wells
- Jul 82 - Dec 85 0088072
- Identify major pathogens and disease resistant genotypes; develop screening techniques for disease resistance; combine disease resistance and other desirable characteristics; develop management systems to reduce disease damage; evaluate fungi for biological control.

### Blades of Grass

Don't waste  
your time  
looking the  
symptoms up!

It's the  
flu!!



B C Roberts

We sure have  
an impressive  
team of  
grass doctors!



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

### Identification and Control of Diseases of Ornamental Plants and Turf Grasses

- Louisiana State University  
Baton Rouge, Louisiana
- Holcomb
- Oct 86 - Sept 91 0099678
- Identify important diseases, including studies of etiological agents and factors related to disease occurrence and spread; evaluation of disease management strategies for efficient and economical disease control.

### Identification and Control of Diseases of Ornamental Plants and Turf Grasses.

- Louisiana State University  
Baton Rouge, Louisiana
- Holcomb
- Jan 75 - Sept 86 0069459
- Identify disease problems on ornamental plants and turfgrass; determine their incidence, cause and factors relating to their occurrence and spread; determine feasibility and type of control measures needed.

### Etiology, Epidemiology and Control of Diseases on Turfgrasses

- North Carolina State University  
Raleigh, North Carolina
- Lucas
- Oct 85 - Sept 90 0096335
- Isolate Leptosphaeria species and related fungi from spring dead spot affected turf; determine pathogenicity; determine role of ring nematodes in centipedegrass decline; evaluate isolates of nonpathogenic Rhizoctonia species for biological control of Rhizoctonia solani; select and evaluate tall fescues for disease resistance.



## North Central/Midwest

### CULTURAL PRACTICES/CULTIVAR EVALUATIONS AND UTILIZATION

#### Improving Turfgrass Management Practices

- University of Illinois  
Urbana, Illinois
- Fermanian, Wehner
- Oct 88 - Sept 93 0089324
- Evaluate suitability of cultivars; measure degree of pest resistance; study use of herbicides in integrated weed control systems; develop the use of plant growth regulators to reduce energy requirements for maintaining turf; modify current cultural practices to reduce energy input.

#### Effective Management is Hampered by Lack of Information About Urbanites Perceptions of Urban Recreation

- North Central Forest Experiment Station  
Chicago, Illinois
- Dwyer, Schroeder
- Sept 83 - Sept 88 0100230
- Develop information on how sites and management efforts are perceived by users and the general public in order to understand how preferences for particular recreation opportunities arise.

#### Turfgrass Culture and Management Systems

- Purdue University  
West Lafayette, Indiana
- Throssell
- Mar 86 - Sept 90 0097883
- Determine adaptation of turfgrass species and cultivars in Indiana; study epidemiology of the bacterial wilt organism; continue pesticide exposure studies to applicators, site users and the environment; research techniques for irrigation scheduling; develop improved cultural systems.

#### Turfgrass Improvement

- Purdue University  
West Lafayette, Indiana
- Daniel, Freeborg
- Jul 69 - Sept 85 0003157
- Continue research on the aggressive, fast spreading, recently released, patented Wabash bluegrasses; continue improvement of dwarf type Kentucky bluegrasses; continue research on porous rootzones [sands] in athletic fields; continue research on soil warming, vented covers and moisture sensing.

#### Field, Greenhouse and Laboratory Investigations of Turfgrass Cultural Practices

- Iowa State University  
Ames, Iowa
- Christians, Agnew
- Jul 87 - Jun 92 0073113
- Investigate ways of improving the efficiency of nitrogen use; investigate adaptation mechanisms; study the adaptation of grass species and cultivars to Iowa conditions; evaluate pesticides; study turfgrass management practices in the Midwest.

#### Robotics in Agriculture

- Michigan State University  
East Lansing, Michigan
- Gerrish
- Apr 82 - Sept 86 0086993
- Assess opportunities for the application of robotics in agriculture; demonstrate technical feasibility of robotic applications and provide data for rough economic evaluation; modify a battery-powered garden tractor to automatically mow a rectangular lawn.



### The Biology and Utilization of Turfgrasses

- University of Minnesota  
St Paul, Minnesota
- White
- Oct 88 - Sept 93 0001810
- Expand breeding and genetics program of perennial Poa annua and Poa Supina for moisture and cold stress tolerance, disease resistance and turf quality; investigate ecological dynamics of Poa annua and Agrostis stolonifera; investigate new ways of culturing turfgrasses in vitro; investigate high and low temperature stress.

### Testing New Horticultural Cultivars

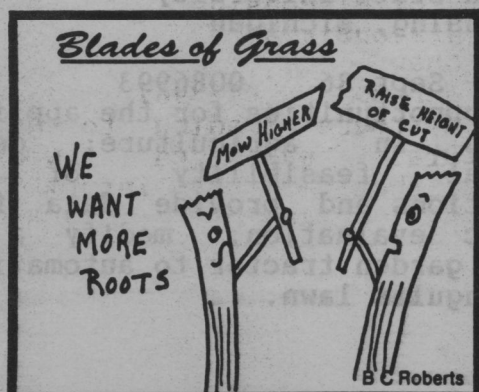
- North Dakota State University  
Fargo, North Dakota
- Ace, Smith, Scholz
- Jul 87 - Sept 92 0131791
- Develop new cultivars of horticultural crops for use in North Dakota; evaluate these new cultivars.

### Integrated Turfgrass Management For Environmental Enhancement and Resource Conservation

- Ohio State University  
Wooster, Ohio
- Shane
- Oct 87 - Sept 92 0134099
- Determine the interrelationships among turf genotypes, pests, environmental stresses, pesticides and cultural practices that enhance turf management.

### Turf Culture in Ohio

- Ohio Agricultural Research and Development Center, Columbus, Ohio
- Danneberger, Street
- Jan 78 - Dec 86 0004270
- Evaluate cultivars, mixtures and blends for tennis, golf courses, athletic fields and other uses; evaluate herbicides, the performance of various slow and fast release nitrogen sources on Kentucky bluegrasses and creeping bentgrass; determine water use rate of cool season turfgrasses used in Ohio.



### Turfgrass Cultural Practices

- University of Wisconsin  
Madison, Wisconsin
- Kussow
- Jul 86 - Jun 91 0098949
- Relate turfgrass growth and quality to tissue analysis and soil tests; determine the influence of nitrogen source on invasion of bentgrass by Poa annua; establish guidelines for slurry application of five grades of Milorganite; characterize agronomic performance of experimental Milorganite formulations.

### Performance of Perennial Crops Established with Different Mulches on Sandy Soils

- University of Wisconsin  
Madison, Wisconsin
- Harrison, Tomesh
- Jul 84 - Jun 86 0093197
- Evaluate the effect of bluegrass turf cover, 4 synthetic and 2 organic mulches on perennial plant growth - apple, raspberry, grape and asparagus; determine effects on water conservation and soil temperature, seasonal growth and yields and weed suppression.

### BREEDING AND GENETICS

#### - SEED PRODUCTION

### Turfgrass Breeding

- Michigan State University  
East Lansing, Michigan
- Payne
- Oct 83 - Dec 87 0030793
- Develop cultivars of species of Festuca which have disease resistance and acceptable turfgrass quality.

### Breeding Poa Pratensis With Diminutive Habit and/or Stress Tolerance

- Montana State University  
Bozeman, Montana
- Evans
- Oct 88 - Sept 93 0090095
- Select from mutant treated Nugget seedlings those with prostrate habit or slow growth rates, resistant to drought or tolerant to salinity.



## SOIL PROPERTIES

### - CLIMATE AND STRESS

#### The Effect of Environmental Stress on Cool Season Turfgrasses

- University of Illinois  
Urbana, Illinois
- Wehner
- Oct 86 - Sept 89 0071325
- Investigate the effect of management practices while subjected to high temperature stress; study interaction between drought stress and high temperature in cool season grasses; evaluate relationship between direct and indirect heat stress injury; determine minimum time to condition heat tolerance.

#### Cell Osmolarity and Adjustment Studies Using Whole Plant Microculture Systems

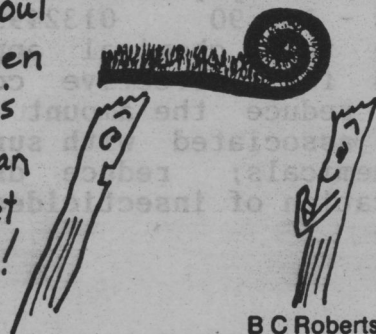
- University of Illinois  
Urbana, Illinois
- Smith
- Oct 89 - Sept 94 0095119
- Exploit the advantages of whole plant microculture systems to investigate and quantify osmotic adjustment responses to stress, and correlate osmotic responses with other typical plant stress symptoms.

#### Soil Management Investigations for Sod Production and Turf

- Michigan State University  
East Lansing, Michigan
- Rieke
- Mar 67 - May 88 0009326
- Study soil problems encountered under turfgrass conditions and study factors affecting production of quality sod for commercial sale.

### Blades of Grass

Rolling out  
the green  
carpet is  
better than  
red carpet  
treatment!



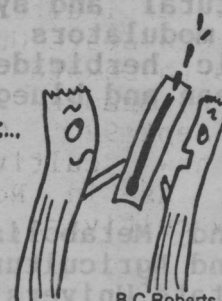
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#### Effect of High Temperature Stress on the Survival Rate of Annual Bluegrass Biotypes

- Ohio State University  
Wooster, Ohio
- Danneberger
- Jan 85 - Dec 89 0094845
- Determine if annual bluegrass biotypes collected from different climatic regions differ morphologically and physiologically in tolerance to heat stress; determine growth and survival rates of biotypes in the field under different irrigation and fertility levels.

### Blades of Grass

The mercury  
just broke out  
of the thermometer...  
hope they don't  
put any nitrogen  
on us!



B C Roberts

## IRRIGATION

### /WATER RELATIONSHIPS

#### Effect of Sustained Irrigation on Selected Soil Properties

- North Dakota State University  
Fargo, North Dakota
- Sweeney, Hopkins, Arndt
- Jul 79 - Sept 89 0079283
- Determine long-term effects of irrigation water quality on physical and chemical properties of soils in North Dakota; develop and test criteria for successful sustained irrigation with variable soil and water characteristics; study soils under lawns and golf courses.

#### Groundwater Quality Impacts From Subdivisions

- University of Wisconsin  
Madison, Wisconsin
- Madison, Shaw
- Jul 87 - Jun 89 0133967
- Estimate nitrogen loading to groundwater from rural unsewered subdivisions; determine chemical use information from homeowners in the subdivisions; analyze groundwater samples for commonly used VOC's and pesticides.



## WEED RELATIONSHIPS /GROWTH REGULATION

Chemistry, Biochemistry, Physiology and  
Biotechnology of the Greening Process

- University of Illinois  
Urban, Illinois
- Rebeiz, Robertson, Buetow
- Oct 88 - Sept 93 0063535
- Investigate chlorophyll biosynthesis;  
develop a taxonomic physiogenetic  
divinyl/monovinyl greening data base;  
develop natural and synthetic photodynamic  
herbicide modulators including specific  
photodynamic herbicide formulations for  
corn, soybean and bluegrass.

Physiology and Metabolism of Plant Growth  
Regulators and Agricultural Chemicals in Turf

- Michigan State University  
East Lansing, Michigan
- Branham
- Feb 85 - Jan 89 0095122
- Determine the environmental conditions  
necessary for optimum performance of  
synthetic plant growth regulators for  
seedhead and vegetative growth suppression;  
examine the site and mode of action of some  
synthetic PGR's.

Turfgrass Growth Regulation and Weed Control  
Investigations

- University of Wisconsin  
Madison, Wisconsin
- Newman
- Jul 84 - Dec 85 0067051
- Evaluate the application of herbicides in  
conjunction with approved management  
practices on several grass species for  
control of annual, biennial and perennial  
weeds; study application of growth  
retardants to reduce seed production and/or  
grass growth.

### Blades of Grass

They are treating  
us by the  
principle  
"If 2 work,  
then 4 must  
be better"!



B C Roberts

## INSECT RELATIONSHIPS

Biology, Ecology and Control of Insects and  
Other Invertebrates in Turfgrass

- Ohio State University  
Wooster, Ohio
- Niemczyk
- Feb 82 - Dec 86 0086723
- Study the population dynamics and seasonal  
life history of sod webworms, bluegrass  
billbug, chinchbug and greenbug; evaluate  
lime and conventional insecticides for  
control of the Japanese beetle.

Bioecology of Arthropods in Turfgrasses and  
Fate of Pesticides Used for Their Control

- Ohio State University  
Wooster, Ohio
- Niemczyk, Kelin, Krueger
- May 87 - Apr 91 0131745
- Trace the movement, dissipation and  
accelerated degradation of pesticides  
applied to turfgrasses; evaluate the  
efficacy and related factors of pesticides  
and other agents for control of arthropods;  
investigate and test a system for injecting  
pesticides.

Increasing the Efficiency and Safety of  
Turfgrass Insecticides With a Point Injector  
Applicator

- Ohio State University  
Columbus, Ohio
- Ozkan, Niemczyk, Reichard
- Apr 88 - Apr 90 01324952
- Reduce the chemical application rates  
needed for effective control of white  
grubs; reduce the amount of chemicals in  
runoff associated with surface application  
of chemicals; reduce drift from spray  
application of insecticides.



## DISEASE RELATIONSHIPS

### The Ecology of Turfgrass Diseases in Illinois Caused by Three Rhizoctonia Species

- University of Illinois  
Urbana, Illinois
- Wilkinson
- Oct 82 - Sept 87 0088085
- Determine occurrence of Rhizoctonia solani, R cerealis and R zeae in Illinois turfgrass and assess the severity of diseases of these pathogens; determine if these pathogens survive equally well; determine if herbicides affect pathogenicity.

### Biological Control of Soil-Borne Plant Pathogens in Integrated Crop Management Systems

- University of Illinois  
Urbana, Illinois
- Wilkinson
- Oct 84 - Sept 89 0094343
- Develop biotic agents for plant disease control; investigate biological control of crop disease management systems; study Poa, Triticum, Agrostis and Lolium species.

### Turfgrass Pathology

- Michigan State University  
East Lansing, Michigan
- Vargas
- Jun 82 - May 88 0055203
- Model anthracnose and dollar spot of Poa annua and Agrostis palustris; develop more energy efficient turfgrasses with disease resistance; study means of managing Nigrospora pathc of Poa pratensis; evaluate bacterial diseases of turf, their importance, occurrence and management.

### Pathology of Turf, Soybeans and Corn

- University of Minnesota  
St Paul, Minnesota
- Stienstra
- Jul 87 - Jun 92 0060803
- Observe and evaluate diseases in Minnesota turf - golf courses, sod and seed production fields and landscape areas; record incidence and severity of new and current disease problems; determine factors important in selected disease development cycles; test disease control measures.

### Monoclonal Antibodies for Rapid Diagnosis of Summer Patch and Necrotic Ring Spot Diseases of Turfgrass

- Ohio State University  
Wooster, Ohio
- Shane, Nameth
- Feb 87 - Apr 90 0131539
- Prepare monoclonal antibodies against isolates of selected fungi; develop and evaluate monoclonal antibodies for routine clinical diagnosis of the summer patch and necrotic ring spot diseases.

### The Necrotic Ring Spot Complex in Turf-Fungi Involved and Varietal Evaluations

- University of Wisconsin  
Madison, Wisconsin
- Worf
- Oct 84 - Sept 88 0084548
- Determine the pathogenic significance of certain fungi associated with diseased crowns and roots of Wisconsin turf; develop laboratory techniques that will aid in their identification; determine which of several fungi are components of necrotic ring spot.

## PESTICIDES - GENERAL

### Reducing Pesticide Exposure of Applicators Through Improved Clothing Design and Care

- Michigan State University  
East Lansing, Michigan
- Slocum
- Oct 87 - Sept 92 0090695
- Develop and/or evaluate textiles and protective clothing that meet user's physical, socio-psychological and economic needs.

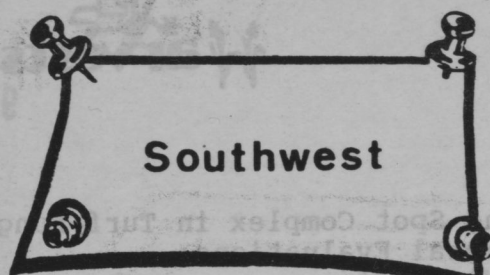
### Chemical Residues in Agricultural Products and the Environment

- North Dakota State University  
Fargo, North Dakota
- Fleeker, Cook, Peckrul
- Apr 83 - Sept 89 0089877
- Evaluate the transfer of pesticides from lawns to the home environment.

### Development of Improved Techniques and Equipment for Pesticide Application

- Ohio State University  
Columbus, Ohio
- Carpenter, Reichard, Ozkan
- May 84 - Dec 88 0092929
- Conduct laboratory tests on nozzle type/size and design to select the most uniform spray distribution in field operations over rough terrain; investigate the feasibility of chemigation for applying fertilizers and pesticides to turfgrass.





## Southwest

### CULTURAL PRACTICES/CULTIVAR EVALUATIONS

#### Impacts of Human Migration Flows on Nonmetropolitan People and Places

- University of Arizona  
Tucson, Arizona
- Carpenter
- Oct 87 - Sept 92 0063617
- Describe and explain population changes involving rural and non-metropolitan areas through mechanisms of changes in migration, mortality and fertility; analyze the interdependencies of agriculture including urban and urban fringe [turfgrass and nursery] employment and populations change.

#### Weed Control, Growth Regulation, Adaptations, and Tissue Culture for Turfgrasses

- University of Arkansas  
Fayetteville, Arkansas
- King
- Oct 87 - Sept 92 0132815
- Develop more effective herbicidal weed control practices; study growth inhibition and other methods for increasing the efficiency of producing good quality turf; evaluate adaptation of species and cultivars; conduct tissue culture research for improvement of bermudagrasses and zoysiagrasses.

#### Evaluation and Management of Grasses for Turf

- University of Arkansas  
Fayetteville, Arkansas
- King
- Feb 69 - Dec 87 0003216
- Evaluate adaptation of available turfgrass varieties and strains to specific uses and cultural regimes; develop more effective weed control practices; study over-all results of specific cultural programs; determine adaptability of subirrigation techniques; study results of specific pests and control measures.

#### Selection and Evaluation of Turfgrass and Ground Covers for Water Use Efficiency

- New Mexico State University  
Las Cruces, New Mexico
- Baltensperger, Gregory
- Jul 82 - Jun 87 0069473
- Identify the most water efficient bermudagrass cultivars adapted to New Mexico; establish turfgrass quality potential of selected bermudagrass cultivars at low irrigation levels; evaluate genetic variability under various moisture regimes.

#### Variety and New Crop Trials of Agronomic Crops for Northwestern New Mexico

- Agricultural Experiment Station  
Farmington, New Mexico
- Gregory
- Jul 65 - Jan 99 0030832
- Determine the adaptabilities, yield and other characteristics of varieties and strains of various agronomic crops that are being grown or that may be grown in northwestern New Mexico including turfgrasses.

#### Establishment, Evaluation and Maintenance of Turfgrasses Adapted to Oklahoma

- Oklahoma State University  
Stillwater, Oklahoma
- Kenna
- Jul 87 - Sept 92 0132138
- Develop and evaluate methods for enhancing the field survival and competitive ability of turf seedlings; determine seed characteristics related to seedling survival; evaluate introduced and domestic grasses; evaluate management practices.



## Factors Affecting the Establishment of Turfgrass in Oklahoma

- Oklahoma State University  
Stillwater, Oklahoma
- Brede
- Apr 83 - Sept 86 0039814
- Develop and evaluate methods for enhancing the field survival and competitive ability of turf seedlings; determine the causes of overseeding failures and evaluate alternative practices; evaluate introduced and domestic grasses for use as improved turfgrasses in Oklahoma.

## Cultural Practices for Quality, Minimal Maintenance, Functional Turfs

- Texas A & M University  
College Station, Texas
- Beard
- Feb 85 - Sept 89 0073643
- Develop more resource efficient turfgrass cultural practices; study resource efficiency on intensively trafficked sports fields, shaded sites and sod production; assess newly developed herbicides; characterize newly developed turfgrass cultivars.

## Alternative Turfgrass Cultural Systems for Integrated Pest Management

- Texas A & M University  
College Station, Texas
- Hipp, Colbaugh, Crocker
- Mar 89 - Feb 91 0137734
- Determine the effects of recycling grass clippings and fertilizer application on disease incidence, insect populations, weed invasion and visual quality.

## Study and Development of Resource Efficient Landscape Designs for the Southwest

- Texas A & M University  
College Station, Texas
- Westphal, Tipton, Horst
- Sept 84 - Aug 86 0092397
- Develop guidelines for the selection and placement of organic and inorganic materials in landscapes of the Southwest to improve resource efficiency and reduce maintenance inefficiencies while maintaining perceptual, aesthetic and functional landscape qualities.

## BREEDING AND GENETICS

### - SEED PRODUCTION

## Turfgrass Improvement and Management

- New Mexico State University  
Las Cruces, New Mexico
- Baltensperger
- Jul 83 - Sept 89 0090510
- Develop improved seeded strains of bermudagrass; determine effect of nitrogen, iron, moisture, cold and handling stress on recently developed strains; determine adaptation of recently developed ground covers and cool season grasses to local conditions.

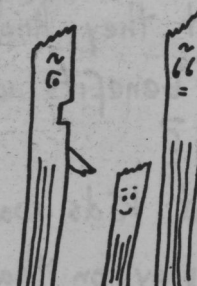
## Pasture, Range and Turfgrass Breeding

- Oklahoma State University  
Stillwater, Oklahoma
- Taliaferro
- Oct 87 - Sept 92 0012066
- Develop new cultivars of native and introduced grasses that are superior in productivity, quality, dependability and/or ease of establishment and maintenance; investigate the reproductive mechanism, breeding behavior and improvement potential of selected grasses; develop tissue culture techniques.

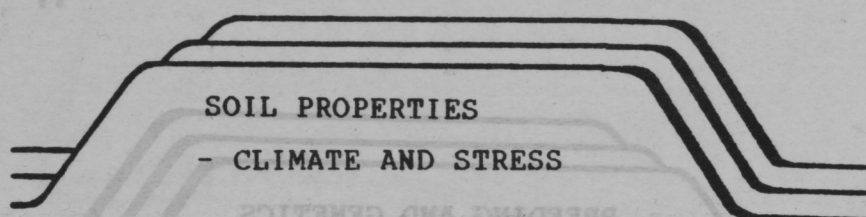
## Turfgrass Breeding and Cultivar Development

- Texas A & M University  
Dallas, Texas
- Engelke
- Jul 82 - Sept 89 0087773
- Assemble and evaluate germplasm of grass species with turf potential for Texas; develop improved turfgrass varieties with greater water-use efficiency, tolerance to temperature, moisture and soil extremes; determine efficient cultural practices to sustain quality turf with new cultivars.

He's the new kid  
on the block...  
Do you think  
he'll try to  
replace us?







# Stress Physiology and Microclimate of Perennial Grasses

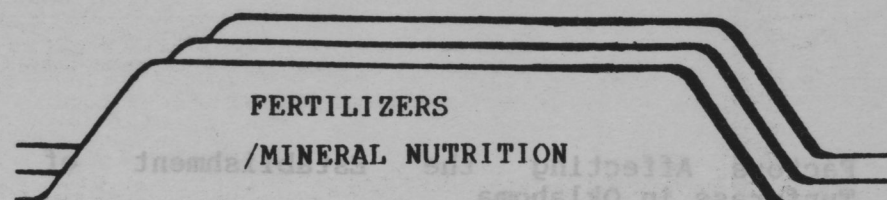
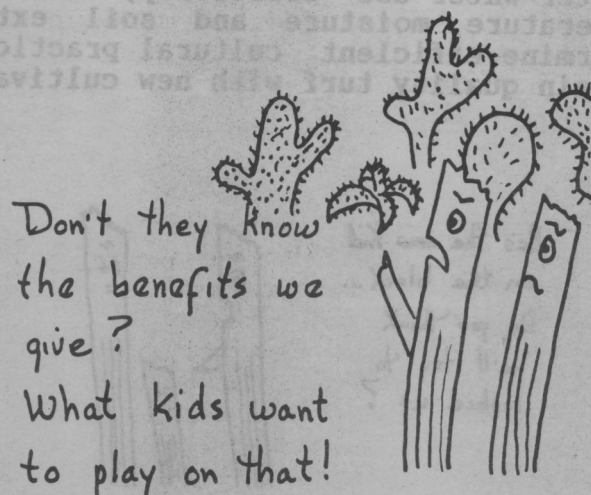
- Texas A & M University College Station, Texas
- Beard
- Apr 85 - Mar 90 0073142
- Determine the stress and describe the mechanism of injury which will allow the development of biological markers to be used in selecting for stress tolerance in a breeding program; develop cultural practices that will minimize the effects of environmental stress; study water, temperature, wear and shade stresses.

# Development of Grasses for Arid Environments

- Texas A & M University College Station, Texas
- Horst
- Mar 88 - Feb 93 0069841
- Determine water use and drought resistance of grasses; determine the nature of grass response to salinity stress; assess interactions of grass nutrition level in response to drought and salinity stress.

# Evaluation and Improvement of Drought Resistance of Dryland Crop Species

- Blachland Research Center Temple, Texas
- Otoole
- Apr 85 - Apr 88 00729334
- Investigate canopy temperature as a screening tool for drought resistance in sorghum, wheat and turfgrass species.



# Associative Nitrogen Fixation in Nonleguminous Plants

- University of Nebraska Lincoln, Nebraska
- Klucas
- Oct 83 - Sept 89 0092042
- Determine microbiological, physiological and environmental characteristics responsible for active nitrogen fixing association between bacteria and nonleguminous plants; identify genetic variability in bacteria and nonleguminous plants; study root-soil cores of turfgrasses

# Crop Productivity as Limited by the Rhizosphere and by Water and Nutrient Use Efficiencies

- University of Nevada Reno, Nevada
- Devitt
- Jul 84 - Sept 89 0093900
- Quantify the dynamic relationships among the following: root behavior, the physics, chemistry and microbiology of the rhizosphere and water and nutrient uptake of crop plants including turfgrasses.

# Soil, Water and Fertilizer Investigations in North Texas

- Texas A & M University Dallas, Texas
- Hipp
- Jan 84 - Dec 88 0075760
- Determine optimum fertilizer practices for agricultural crops, landscape plants and ornamental plants in North Texas; develop water conservation practices for urban landscapes including turf.



## IRRIGATION/WATER RELATIONS

### Antitranspirant Effects on Turfgrass Physiology and the Determination of Hilaria Belangeria as Turf

- University of Arizona  
Tucson, Arizona
- Mancini
- Jul 87 - Jun 90 0030153
- Determine how dodecenylsuccinic acid and dedecenylsuccinic anhydride influence turfgrass photosynthesis, transpiration, non-structural carbohydrate partitioning and canopy temperature of turf; determine sod forming ability of Hilaria Belangeria.

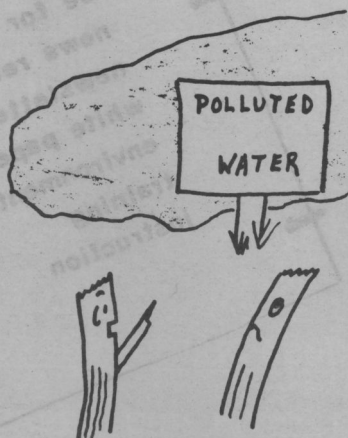
### Irrigation of Turfgrass With Sewage Effluent: Soil, Turf and Water Quality Aspects

- University of Arizona  
Tucson, Arizona
- Pepper
- Jul 87 - Sept 90 0131825
- Evaluate the effects of irrigation of turfgrass with sewage effluent on soil, turf and water quality; determine effective management for efficient utilization of effluent for turfgrass irrigation; determine crop water stress baselines using effluent water.

### Integrated Irrigation Water and Nitrogen Management to Sustain Groundwater Quality and Quantity

- University of Arizona  
Tucson, Arizona
- Slack, Fangmeier
- Oct 87 - Sept 92 0134869
- Develop integrated irrigation water and nitrogen management practices to protect groundwater quality; develop second generation irrigation scheduling techniques to optimize management of water supplies.

If only they'd  
stop paving  
everything and  
plant more of us,  
we'd help clean  
the water.



### Irrigation Scheduling Methods for Efficient Water and Energy Use

- University of Arizona  
Tucson, Arizona
- Slack, Fangmeier, Roth
- Aug 85 - Sept 88 0096227
- Develop and evaluate improved water balance techniques for irrigation scheduling in Arizona; develop and evaluate improved water application timing criteria for Arizona crops and climate.

### Investigations in Turfgrass Water Relations

- Oklahoma State University  
Stillwater, Oklahoma
- Barear
- Oct 88 - Sept 91 0136269
- Determine beneficial physiological and morphological plant responses from use of wetting agents on warm-season turfgrasses; evaluate drought avoidance mechanisms and evapotranspiration rates; evaluate nitrate content of leachates from golf course putting greens.

## INSECT RELATIONSHIPS

### Biology, Ecology and Management of Arthropods in Turf and Ornamentals

- Texas A & M University  
College Station, Texas
- Crocker
- Sept 87 - Aug 92 0070775
- Determine the biology and ecology of arthropods affecting turfgrasses; emphasize white grubs and chinch bugs; develop practical, ecologically sound integrated pest management procedures; detect and measure the potential impact of new pests of turfgrass.



## DISEASE RELATIONSHIPS

### Etiology and Control of Diseases of Turf and Other Grasses

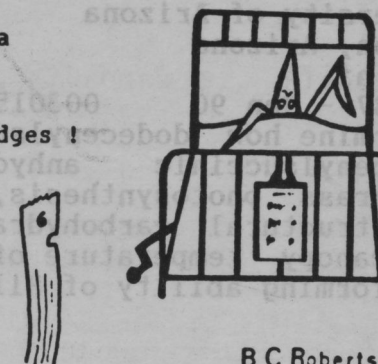
- University of Arkansas  
Fayetteville, Arkansas
- Dale
- Oct 85 - Sept 89 0027023
- Define disease problems, including those caused by nematodes affecting turf in Arkansas; determine causes, methods of spread of important diseases, host ranges and organism life cycles; evaluate fungicides for control efficiency; determine disease resistance of cultivars.

### Turf Disease Control of St Augustine Decline Virus

- Texas A & M University  
College Station, Texas
- Toler
- Sept 85 - Aug 90 0081265
- Identify and isolate new sources of resistance to SAD; test for correlation of virus concentrations and tolerance of resistance to SAD using Elisa; determine variability of SAD isolates in Texas; transfer resistance genes to improved cultivars.

## Blades of Grass

You do look a  
little green  
around the edges!



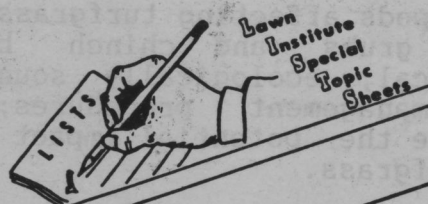
B C Roberts

### Diseases of Ornamental Plants and Turfgrasses

- Texas A & M University  
College Station, Texas
- Colbaugh
- Dec 85 - Nov 90 0067074
- Investigate methods of disease control; determine the identity, biological nature and pathogenic potential of causal disease agents; develop preventive disease control measures using cultural, chemical, environmental and microbiological methods of disease suppression.

**NEW**

385 pages  
\$ 30

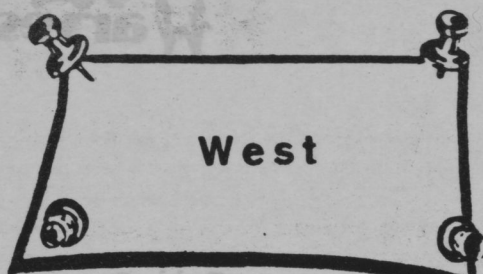


loose leaf

no copyright

Use for -  
news releases  
newsletters  
white papers  
environmental reports  
training  
instruction





West

## CULTURAL PRACTICES/CULTIVAR EVALUATIONS

The Improvement and Maintenance of Turfgrasses in California

- University of California Riverside, California
- Gibeault
- Oct 87 - Sept 92 0132638
- Determine comparative performance of commonly used warm and cool season turfgrasses; develop and evaluate warm season grasses and cultural systems for improved winter growth, color and appearance and ability to withstand athletic field use; develop grasses for minimum maintenance turf.

Horticulture Research Center

- Kansas State University Manhattan, Kansas
- Pair, Allison
- Jul 83 - Jun 88 0065072
- Evaluate ornamentals, turfgrasses, fruits and vegetables for hardiness and adaptability.

Adaptation, Propagation and Stress of Ornamentals and Turfgrass in South-Central Kansas

- Kansas State University Manhattan, Kansas
- Pair, Tisserat
- Jul 88 - Jun 93 0134668
- Introduction and evaluation of ornamental and turfgrass species and cultivars for winter hardiness, tolerance to environmental stresses and demonstration of plants having potential for landscape use.

## Horticulture Research Center - Wichita

- Kansas State University Manhattan, Kansas
- Pair, Tisserat, Allison
- Jul 73 - Jun 88 0058582
- Test hardiness, adaptability and performance of ornamental plants and turfgrass selections to soil and climatic conditions.

## Horticultural Investigations in Northwest Kansas

- Kansas State University Colby, Kansas
- White
- Jul 88 - Jun 93 0079993
- Evaluate adaptability and variety response of selected flowers, turfgrasses and ornamental trees and shrubs for use in home gardens in Northwest Kansas.

## Variety Evaluation and Culture of Selected Horticultural Crops in Western Nebraska

- University of Nebraska Lincoln, Nebraska
- Nuland
- Nov 86 - Oct 91 0150303
- Document performance on developing turfgrass for commercial acceptability when grown in the environment of Western Nebraska; study disease relationships.

I'm not getting

OLDER...

I'm getting

BETTER !!





**Turfgrass Evapotranspiration Rates, Canopy Resistance and Drought Avoidance Mechanisms**

- University of Nebraska  
Lincoln, Nebraska
- Shearman, Kinbacher
- Feb 84 - Jan 89 0092468
- Determine evapotranspiration rates of cool season species and cultivars and for warm season and native species; evaluate seasonal variations; assess factors contributing to canopy resistance mechanisms; determine cultural practices responses.

**Low Maintenance Landscaping - Reno Cannon International Airport**

- University of Nevada  
Reno, Nevada
- Johnson, Krall
- Jul 80 - Sept 86 0092693
- Screen ground covers, grasses and forbs for adaptability and survival as cover in saline alkaline soils around runways and taxiways; identify cultural and chemical management systems for establishment and maintenance of desirable landscape species.



**BREEDING AND GENETICS**

**- SEED PRODUCTION**

**The Genetics, Breeding and Ecology of Turfgrass**

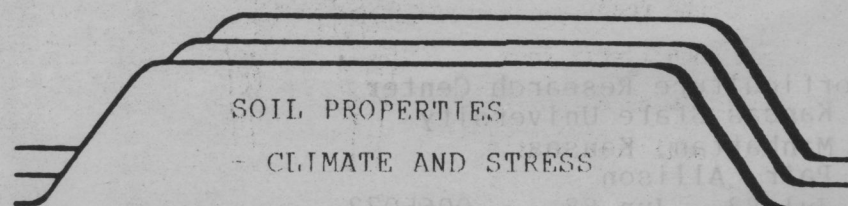
- University of California  
Riverside, California
- Gibeault
- Mar 78 - Sept 87 0003974
- Study genetics and breeding methods; develop superior drought resistant strains with low nitrogen requirements; identify and introduce new germplasm; study growth and differentiation of vegetative and floral structures; study bentgrass responses to environmental factors.

**Breeding Kentucky Bluegrass, Tall Fescue and Native Turfgrasses for the Central Great Plains**

- University of Nebraska  
Lincoln, Nebraska
- Riordan
- Jul 85 - Jun 90 0077970
- Develop cultivars that are adapted to Nebraska and the Great Plains, are superior in overall performance and have a lower consumptive energy requirement than commercially available cultivars.

**Evaluation and Enhancement of Cool Season Forage, Pasture, Range, Turf Grass and Legume Germplasm**

- Agricultural Research Service  
Logan, Utah
- Asay, Rumbaugh
- Feb 88 - Apr 93 0142785
- Evaluate and define existing germplasm; characterize genetic diversity; facilitate efficient germplasm enhancement; develop cytological, biochemical and genetic engineering techniques.



**Physiological and Genetic Studies of Stress Resistance in Turfgrass Species**

- University of California  
Davis, California
- Wu, Paul, Harding
- Oct 86 - Sept 91 0083151
- Evaluate genetic sources of environmental stress tolerance in turfgrass species.

**Stress-Induced Dormancy in Turfgrass and Its Alleviation**

- Kansas State University  
Manhattan, Kansas
- Gaussoin
- Jul 89 - Sept 92 0137980
- Evaluate survival of Kentucky bluegrass when subjected to prolonged summer dormancy; determine chemical effects on alleviation of summer dormancy stress; evaluate seed germination response to exogenous applications of gibberellic acid.



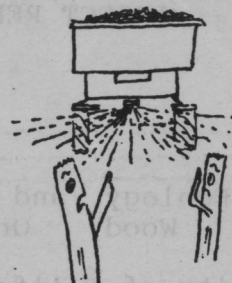
# Thermal Infrared Techniques For Assessing Drought Resistance in Turfgrass Species

- University of Nevada  
Reno, Nevada
- Fernandez
- Jul 89 - Jun 90 0137677
- Determine the extent of inter- and intra-variability for drought resistance traits; identify genotypes possessing superior drought resistance potentials; use stress-degree-day and crop-water-index measures with infrared thermometer as a screening technique.

# The Effects of Salinity on Growth, Nitrogen Uptake and Nitrogen Assimilation by Turfgrasses

- University of Nevada  
Reno, Nevada
- Bowman
- Jul 89 - Jun 92 0137806
- Evaluate relative salt tolerance of tall fescue and zoysiagrass varieties; characterize salt effects on growth and mineral composition.

Look at that  
truck sanding  
the road....  
Don't they know  
I'm on a  
salt-free diet ?



## IRRIGATION/WATER RELATIONS

## Irrigation Sprinkler and/or Drip System Optimization

- University of California  
Riverside, California
- Cannell, Meyer, Kasimatis
- Jun 70 - Sept 87 0057497
- Investigate drip irrigation on grapes, turf varieties and turf quality using sprinklers and buried drip systems with less water than known evaporation demands; study fertilizer injection systems.

## Turfgrass Water Use and Varietal Evaluations

- Colorado State University  
Fort Collins, Colorado
- Koski
- Jul 89 - Jun 92 0024372
- Determine water use rates of turf species which appear to require lesser amounts including buffalograss, bluegrama and crested wheatgrass; determine how cultural practices and growth regulator use can influence water use rates and irrigation requirements of other turfgrass cultivars.

## Drought Tolerance and Water use of Turfgrasses

- Kansas State University  
Manhattan, Kansas
- Nus
- Jul 87 - Jun 90 0131096
- Determine the minimum water use requirements for a given level of turfgrass quality; investigate the water use as affected by soil wetting agents, plant growth retardants and potassium fertilization; study physiological and morphological adaptation and responses to water stress.

## Irrigation Scheduling and Water Stress Effects on Turfgrasses

- Kansas State University  
Manhattan, Kansas
- Nus
- Jul 83 - Jun 87 0089934
- Determine minimum water requirements for a given level of turfgrass quality; investigate new techniques for irrigation scheduling; determine important physiological/morphological responses to decreasing moisture, particularly root system and stomatal/leaf water potential adaptive responses.

## Blades of Grass

We need  
to write a  
book so they  
will KNOW  
how much  
water we need!



B C Roberts



# Evapotranspiration Feedback System for Improved Water Use Efficiency Under Arid Conditions

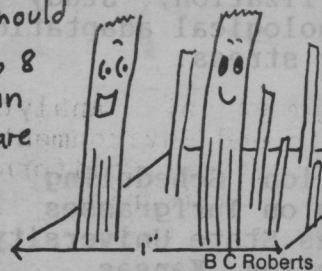
- University of Nevada  
Reno, Nevada
- Devitt
- Aug 87 - Jun 90 0132804
- Quantify the water savings associated with an evapotranspiration feedback system on turfgrass in an arid environment; generate crop coefficient for bermudagrass.

# Enhancement of the Southern Nevada Water Conservation Research Program

- University of Nevada  
Reno, Nevada
- Devitt, Morris
- Jan 89 - Dec 89 0137641
- Quantify water consumption of ornamental trees and turfgrass under varying irrigation practices; determine the physiological response of plants to water stress and correlate water use with meteorological information.

## Blades of Grass

There should be 6 to 8 of us in each square inch!



## WEED RELATIONSHIPS /GROWTH REGULATION

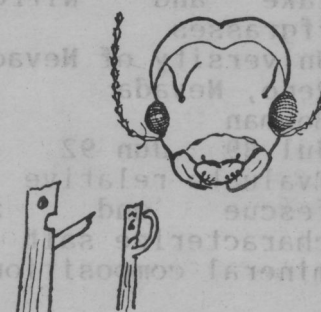
### Weed Control for Turfgrass

- Kansas State University  
Manhattan, Kansas
- Campbell
- Oct 85 - Sept 88 0087201
- Study effects of herbicide practices on germination and establishment of spring seeded bluegrass and tall fescue cultivars; determine effects of management of herbicide and fertility levels on weeds and Kentucky bluegrass turf; establish the efficacy of selected new experimental postemergent grass herbicides.

### Growth Regulation of Landscape Plants

- Kansas State University  
Manhattan, Kansas
- Campbell
- Oct 84 - Sept 88 0077040
- Evaluate growth regulators on turfgrass seeking compounds that will selectively retard stem and leaf blade elongation without prolonged inhibition of tillering, rhizome and root formation; stimulate vegetative growth of zoysia.

That's a face  
only a Mother  
could love !



## INSECT RELATIONSHIPS

### Biology, Ecology and Management of Insects Affecting Woody Ornamental Plants and Turfgrass

- University of California.  
Riverside, California
- Paine
- Aug 86 - Sept 92 0135481
- Determine developmental rates, aesthetic injury levels, host plant preferences and seasonal phenology; determine how growing conditions change plant suitability and susceptibility to insect herbivores.

### Studies in the Biology and Management of Colorado Horticultural Insect Pests

- Colorado State University  
Fort Collins, Colorado
- Cranshaw
- Jul 87 - Jun 90 0093267
- Develop information on the biology of horticultural insect and mite pests as it relates to their management; develop efficacious chemical controls with emphasis on methods that minimize environmental hazards; develop biological controls and cultural controls.



## DISEASE RELATIONSHIPS

### Etiology, Biology and Control of Turfgrass Diseases in Southern California

- University of California Riverside, California
- Endo
- Aug 88 - Sept 92 0135533
- Study the etiology and biology of diseases of turfgrasses to develop methods of control.

### Etiology, Biology and Control of Turfgrass Diseases

- University of California Riverside, California
- Endo, Ohr
- Mar 63 - Sept 87 0013645
- Determine the etiology of each new turf disease; study the life cycle of the pathogen including its spore stages in order to determine weak links in its life cycle; develop methods of controlling the disease.

### Mechanism of Pentaiodide Resin Disinfection on Parasite Cysts, Bacteria and Viruses

- Kansas State University Manhattan, Kansas
- Marchin, Upton, Fina
- Oct 89 - Sept 92 0137867
- Examine the membrane proteins of Giardia and Cryptosporidium for alteration after running cysts of the organisms through the resin against the relatively resistant RNA bacteriophage F2 and MS2.

### Fungicide Management Strategies for Control of Rusts, Leaf Spots and Blights of Grass Hosts

- University of Nebraska Lincoln, Nebraska
- Watkins
- Mar 84 - Feb 91 0098089
- Develop fungicide management strategies for control of rusts and foliar blights of turfgrasses.

## PESTICIDES - GENERAL

### Development of Analytical Procedures for Economic and Environmental Toxicants

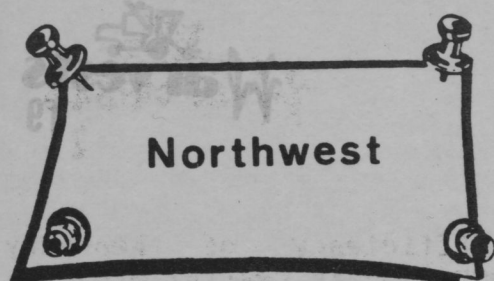
- University of California Davis, California
- Winterlin, Crosby, Kilgore
- Oct 86 - Sept 91 0067347
- Develop new and improve existing methods for analysis of toxicants including metabolites and/or degradation products; test these analytical methods in various substrates including air, water soils plants [turfgrass] and animal tissues.

# Turf's Important Role in Our Urban Forests

*"The Congress finds that tree plantings and ground covers such as low growing dense perennial turfgrass sod in urban areas and communities can aid in reducing carbon dioxide emissions, mitigating the heat island effect, and reducing energy consumption, thus contributing to efforts to reduce global warming trends..."*

*Excerpt from the 1990 "Farm Bill," establishing the Urban and Community Forestry Assistance and America The Beautiful programs as well as the National Tree Trust.*





## CULTURAL PRACTICES/CULTIVAR EVALUATIONS AND UTILIZATION

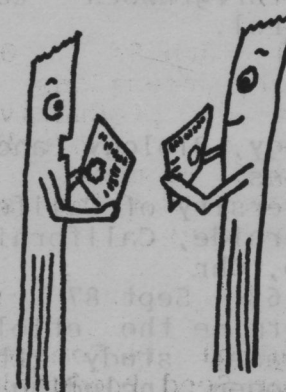
### Evaluation and Management of Turfgrass Species and Cultivars for Eastern Washington

- Washington State University  
Pullman, Washington
- Johnston, Evans, Brauen
- Jul 86 - Jun 91 0084171
- Evaluate established cultivars and new breeding material; evaluate herbicides for control of wild oats in Kentucky bluegrass seed production fields; determine effects of herbicides on seed yield; study fenarimol for *Poa annua* suppression and snow mold control

### Low Maintenance and Energy Efficient Management of Turfgrass

- Washington State University  
Puyallup, Washington
- Goss, Brauen, Chastagner
- Dec 85 - Aug 94 0094248
- Identify turfgrass cultivars for appearance, disease tolerance, thatch, fertility needs and mowing characteristics; determine constituents that control mowing quality; develop methods for maintaining stand purity; investigate effects of sulfur and aluminum on turfgrasses.

We received  
Certificates of  
Appreciation for  
all we do for  
the environment!



### Development and Application of Plant Materials for Stored Forage Pasture, Turf and Conservation Uses

- University of Alaska  
College, Alaska
- Mitchell
- Apr 82 - Mar 88 0005481
- Determine available grasses best adapted for revegetation uses particularly for coal spoils; determine available grasses best adapted for turf use and develop superior turf cultivars especially for low maintenance and roadside plantings.

## A Scientific Viewpoint:

**Dr. Thomas L. Watschke**

### Research Finding 1

*Water running off or passing through a well managed lawn is not likely to be of significantly lower quality than the tap water available in many cities.*

### Research Finding 2

*Most chemicals applied to turfgrass are trapped within the thatch and root-zone areas of the plant and do not contaminate water supplies.*

### Research Finding 3

*Lawns established with turfgrass sod are up to 15 times more effective in controlling runoff than seed-established lawns, even after three years.*



## BREEDING AND GENETICS

### - SEED PRODUCTION

#### Developing Improved Kentucky Bluegrass and Fescue Cultivars for Turf

- University of Idaho  
Moscow, Idaho
- Ensign
- Jul 81 - Jun 87 0083376
- Evaluate accessions of Kentucky bluegrass for seed productivity - turf quality; select new Kentucky bluegrass hybrids; evaluate common high seed yielding cultivars; develop superior turf types of tall fescues.

#### Weed Control in Forage Crops and Turfgrasses Grown for Seed Production

- Agricultural Research Service  
Corvallis, Oregon
- Mueller-Warrant
- Apr 86 - Mar 91 0141273
- Improve efficiency and quality of seed production by developing new technologies to enhance herbicide selectivity during stand establishment.

#### Improved Seed Production and Germplasm Enhancement of Forage and Turf Grass

- Agricultural Research Service  
Corvallis, Oregon
- Staff
- Feb 88 - Dec 88 0142771
- Develop improved seed production practices; evaluate seed production potential; develop enhanced germplasm lines with superior seed production capabilities.

#### Evaluation and Enhancement of Forage and Turf Grass and Legume Germplasm

- Agricultural Research Service  
Corvallis, Oregon
- Staff
- Feb 88 - Dec 88 0142770
- Evaluate germplasm for adaptation, agronomic characteristics and seed production potential; build enhanced germplasm pools for use by plant breeders.

#### Improving the Efficiency of Kentucky Bluegrass Seed Production in Central Oregon

- Central Oregon Experiment Station  
Redmond, Oregon
- Nelson
- Jul 81 - Jun 86 0084704
- Develop improved cultural and management practices for efficient production of grass seed in Central Oregon.

#### Seed Quality Investigations

- Washington State University  
Pullman, Washington
- Chastain, Maguire
- Oct 88 - Sept 93 0091943
- Determine improved methods to assess seed quality; develop a physiological and biochemical basis for seed quality; evaluate the effect of light on turfgrass seedling establishment.

## SOIL PROPERTIES

### - CLIMATE AND STRESS

#### Identification of Stress Tolerant Turfgrasses

- Research and Extension Center  
Puyallup, Washington
- Brauen, Johnston, Goss
- Jul 86 - Jun 91 0098522
- Determine water use rates; identify relationship of water use rate and root-shoot ratios, leaf extension rate and leaf turgor in Kentucky bluegrass and perennial ryegrass; establish relationship between water use requirements and ability to osmotically adjust to water stress; compare water use rates of grasses.

## DISEASE RELATIONSHIPS

#### Turf Diseases in the Pacific Northwest

- Research and Extension Center  
Puyallup, Washington
- Chastagner
- Aug 84 - Oct 89 0094245
- Determine the etiology of a take-all patch-like disease of bluegrass turf and study factors affecting the epidemiology of this disease; evaluate the effectiveness of fungicides and biological agents in controlling this disease on bluegrass and bentgrass turf.



# A LOOK AT THE GROWTH CYCLE AND FIELD CARE OF GRASS SEED

**Jacklin**  
Seed Company

Planted in the spring, the seed is laid in narrow rows by a special grass seed drill. Normal irrigation and fertilization follows stand establishment. About 16 months following planting, the first crop is harvested. Subsequent harvests are possible every year thereafter until field age results in a yield decrease. A typical year in the cycle of a mature grass field is illustrated below:

## IRRIGATION

Field irrigation of the seed begins in early April. The seed has now passed its winter dormancy and started its vertical growth. Irrigation continues through late June, when the seed matures.

## WEED CONTROL

After establishment of the grass, weeds are sprayed with various chemicals to insure weed-free fields, producing high quality seed. Oftentimes fields are weeded by hand in the spring of a selected chemical is not available for successful weed control. If weed problems arise in mature fields, they are quickly solved by spring or fall herbicidal applications.

## FIELD ROGUEING

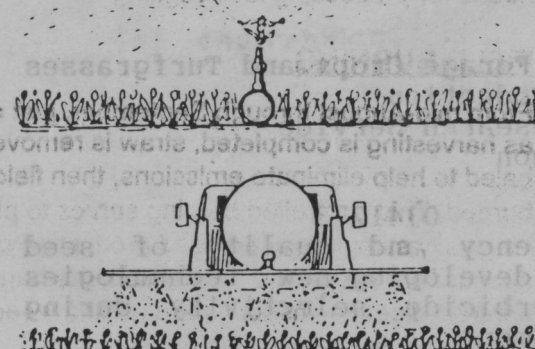
Rogueing (the weeding out of foreign plants and inferior or diseased seed heads) continues from spring through early June.

## SWATHING

Swathing the cutting of early maturing varieties, starts in late June and continues through July.

## WINDOW CURING

The swathed grass then lies in windrows, curing for at least 20 days prior to harvesting.





### **COMBINING**

After the grass is cured, it is picked up by means of a draper mechanism attached to a combine. The seed is threshed and augured into the combine bulk bin.

### **BULK TRANSPORTATION**

From the combine, the seed is transferred to mobile bulk field bins or trailers. The bins or trailers are then transported to a central storage area.

### **BULK ACCUMULATION AND STORAGE**

On arrival at the central storage area the seed is hydraulically dumped into a RADER Pneumatic Air System of rapid transit to bulk storage bins. From this point seed is transferred to the primary warehouse for processing and bagging.

### **FIELD BURNING**

From mid-August through September, just as soon as harvesting is completed, straw is removed and baled to help eliminate emissions, then fields are burned. This controlled burning serves to physiologically stimulate seed head production and subsequent seed yield. In addition, the burning controls disease, insects, rodents and weeds, while returning minerals to the soil.

### **IRRIGATION**

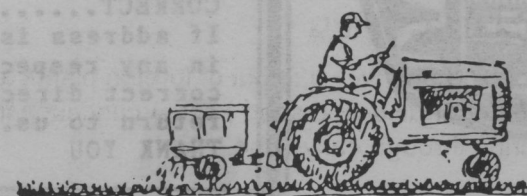
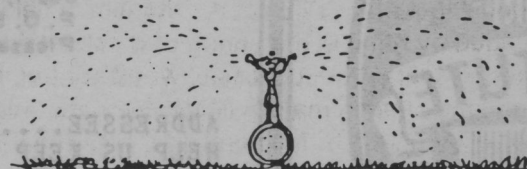
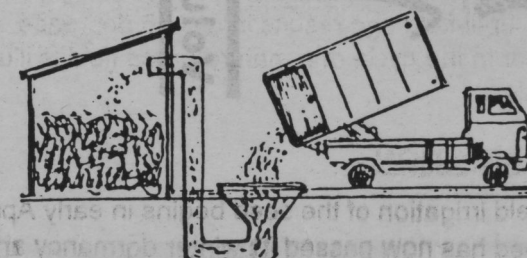
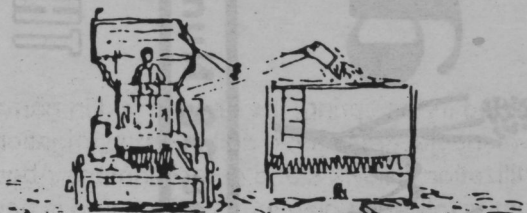
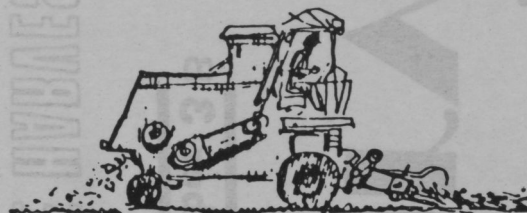
Immediately after burning, fields are watered, causing the grass to break dormancy, putting forth a green, fall flush of leaves.

### **FERTILIZATION**

After watering, the mobile irrigation pipes are removed and the grass is fertilized.

### **FIELD DORMANCY**

During the late fall, just prior to winter dormancy, the grass develops seed head primordia deep within its crown. Although essentially dormant, during the winter months, the grass plant continues to develop internally with individual seed florets forming within the crown. This formation continues until early spring at which time the plant starts its vertical growth.







## THE LAWN INSTITUTE

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