

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 1. Water: Agricultural Engineer – Irrigation [Southwest – Phoenix, AZ]

Justification: With water use on turfgrass being limited or eliminated in many areas, the highest priority research area identified by industry is the efficient use of potable and recycled water on turf. This first position will be located in the southwest U.S., where intense demand for a limited water supply is the most important issue faced by industry, legislators and the population, in general.

Approach: An agricultural engineer is desperately needed to work specifically on turfgrass. This position will be located at the U.S. Water Conservation Laboratory in Phoenix, AZ. A scientist in this position will do the following:

- Develop and implement improved irrigation technologies for southwestern soils and the environment
- Develop improved water stress measurement tools for turfgrass managers
- Modify and develop improved water stress and plant management growth models for turfgrass
- Develop and evaluate water conservation measures with respect to water consumption and turf quality

Expected Outcomes: Increased efficiency of irrigation used on turfgrass; better tools for turfgrass managers to apply the proper amount of water; a better understanding of the basic science behind turfgrass water needs and use; a better understanding of the use of recycled or reclaimed water on turfgrass and its affect on soils and the environment.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass agricultural engineer research position and support in Phoenix, AZ (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

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Position 2. Germplasm: Molecular Biologist [Southwest – Lubbock, TX]

Justification: With water restrictions and increasing demand on a limited water supply, grasses are needed that will use less water, use available water more efficiently and perform well even if irrigated with poor quality water. This position will be located in the southwest U.S., where improved, water-efficient turfgrasses are desperately needed to offset increased water demands by a booming population.

Approach: This position will be located at the Cropping Systems Research Laboratory in Lubbock, TX. There is very little turfgrass germplasm development in the region, although it is critical to support the population growth in the Southwest. This location is ideal for research and development of drought resistant turfgrasses. A geneticist is needed to do the following:

- Identify turfgrass germplasm emphasizing drought stress, water use efficiency and response to varying quality irrigation waters
- Identify morphological and physiological characteristics that improve turf plant performance
- Identify, characterize and map genes controlling stress reduction and provide genetic screening techniques to improve plants used for turf and seed production
- Develop strategies to regulate expression of functional genes in turf plants

Expected Outcomes: Improved, drought-resistant turfgrasses for the southwest U.S.; identification of genes and morphological characteristics that affect and determine drought tolerance in grasses; a better understanding of the basic science behind turfgrass drought tolerance.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass molecular biologist research position and support in Lubbock, TX (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 3. Environment: Agricultural Engineer – Fate & Transport [Southwest – Phoenix, AZ]

Justification: Increasing demand for water in the southwest U.S. is requiring municipalities, parks, golf courses, commercial and residential developments and other areas to utilize low quality recycled or waste water for turfgrass irrigation. These waters may have high levels of biologicals or other chemicals. However, very little is known about the impact of these low quality waters on turfgrasses, the soil and the environment.

Approach: An agricultural engineer is needed to better understand the fate and transport of biological and chemical products found in low quality irrigation water applied to turfgrass. This position will be located at the U.S. Water Conservation Laboratory in Phoenix, AZ. A scientist in this position will do the following:

- Develop technologies to utilize waste waters from concentrated animal feeding operations, agricultural and municipal waste treatment plants, and urban and rural storm runoff to meet local, state, and federal regulations
- Determine the on-site impacts and movement in the air, soil, plant, and ground water of biological and chemical substances contained in treated and untreated waste water used for irrigation of turfgrass
- Develop technologies to diagnose, mitigate, and remediate areas of turfgrass affected by salinity across southwestern environments and soils
- Develop safe and environmentally sound methodologies to use saline waters for turfgrass irrigation

Expected Outcomes: A better understanding of the on-site and off-site impacts of low quality water use on turfgrass, soil and the surrounding environment; development of technologies to utilize low quality and waste waters on turfgrass; development of environmentally sound practices and technologies to prevent, reduce or mitigate areas affected by salinity, biologicals or chemicals.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass agricultural engineer research position and support in Phoenix, AZ (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

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Position 4. Water: Stress Physiologist – Salinity [Southwest - Riverside, CA]

Justification: Due to water shortages, water restrictions and an increasing population in the desert southwest, there is a great need to utilize saline irrigation sources for turfgrass irrigation. However, there is concern on the affect of saline water on turfgrass, soil and the environment. Very little research has been conducted on the affects of saline irrigation yet its using is increasing exponentially.

Approach: This position will be located at the world renowned U.S. Salinity Lab in Riverside, CA. This laboratory is the ideal location for this position because of the state-of-the-art facilities and equipment housed there. A scientist hired in this capacity would conduct the following research:

- Develop technologies to diagnose, mitigate, and remediate turfgrass affected by salinity across a wide range of geographic environments and soils
- Develop safe and environmentally sound methodologies to use saline waters for turfgrass irrigation
- Identify pesticide and salinity interactions in turfgrass and disease, insect and weed growth

Expected Outcomes: Methodologies to safely utilize saline irrigation on turfgrass; technologies to reduce and/or mitigate any on-site and off-site impacts of saline water use on turfgrass, soil and the surrounding environment; strategies to integrate saline irrigation into best management and integrated plant management systems.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research stress physiologist position and support in Riverside, CA (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

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Position 5. Germplasm: Geneticist – Stress **[Transition Zone – Beltsville, MD]**

Justification: Concerns about chemical and nutrient pollution of groundwater, streams and estuaries, such as the Chesapeake Bay, are requiring a reduction in pesticides and fertilizers applied to turfgrass. Periodic drought and resulting water restrictions are reducing water available for turfgrass irrigation. Overuse of recreational facilities such as parks, playgrounds and athletic fields is resulting in inadequate turf stands and often times, unsafe conditions. Turfgrasses are needed that can withstand drought, diseases, insects, foot traffic and compacted soils with reduced pesticides, fertilizer and water.

Approach: A turfgrass scientist (molecular biologist) was hired and placed in Beltsville, MD in 2002 to identify and develop turfgrass germplasm that requires less water, pesticides and fertilizers while maintaining high quality. This position complements that scientist by creating the second position of a research ‘team’ that can work to accomplish these goals. A scientist in this position will focus on turfgrass physiology by conducting the following research:

- Identify physiological and biochemical functions/genetic mechanisms that control resistance of turfgrasses to disease, drought, flooding, salt, insects, extreme temperatures, shade, traffic, compacted soil, etc.
- Collect and maintain germplasm of native and introduced turfgrasses and nontraditional species
- Evaluate and characterize germplasm by agronomic and molecular methods and document data in the Germplasm Resources Information Network (GRIN)
- Develop a nationally coordinated competitive funding source for evaluation of new germplasm sources at diverse locations and for diverse uses
- Distribute collected germplasm for research purposes

Expected Outcomes: Turfgrass germplasm with improved tolerance of drought, disease, insects and traffic; a better understanding of the biochemical mechanisms of turfgrass stress tolerance; reduced pesticide, water and fertilizer use on turfgrass.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research geneticist position and support in Beltsville, MD (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 6. Water: Agricultural Engineer - Irrigation [Transition Zone – Florence, SC]

Justification: Water use on turfgrass is being restricted or eliminated in many areas. Less available water for turfgrass irrigation requires greater irrigation efficiency, conservation of water and better plant water stress models. Different water use efficiency programs and technologies need to be developed for the humid southeastern U.S compared to the dry southwestern U.S. With increasing population in the southeastern U.S., water efficiency and conservation is critical for home lawns, parks, athletic fields, golf courses and commercial sites.

Approach: This position will be located at the Coastal Plain Soil, Water and Plant Conservation Research Center in Florence, SC. This center already has the experience and facilities to conduct research on water use in the southeast U.S. Now they need a scientist to focus on turfgrass research with the following goals:

- Develop and implement improved irrigation technologies for southeastern soils and environment
- Develop improved water stress measurement tools for turfgrass
- Modify and develop improved water stress and plant management growth models for turfgrass
- Develop and evaluate water conservation measures with respect to water consumption and turf quality

Expected Outcomes: Increased efficiency of irrigation used on turfgrass in the southeastern U.S.; better tools for turfgrass managers to apply the proper amount of water; a better understanding of the basic science behind turfgrass water needs and use; a better understanding of the use of recycled or reclaimed water on turfgrass and its affect on soils and the environment.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research agricultural engineer position and support in Florence, SC (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 7. Environment: Agricultural Engineer – Fate & Transport [Northeast - University Park, PA]

Justification: The fate of pesticides, fertilizers and other products applied to turf systems is of increasing concern in the northeastern U.S. Efforts are underway by some groups to reduce or even eliminate the use of turfgrass in some areas due to unknown affects of turf systems on the environment. Investigations of turfgrass management practices on an entire watershed are desperately needed to determine the effect of these practices on our soil and water systems.

Approach: The USDA-ARS Pasture Systems and Watershed Management Research Unit in University Park, PA is the ideal location for this research. This unit has considerable expertise in and facilities for watershed management research. The industry requests a turfgrass scientist position at this unit to conduct the following research:

- Collect data sets at a range of temporal and spatial scales that capture and quantify both positive and negative potential contributions of turf systems to environmental concerns related to soil, water, and air due to nutrients, pesticides, sediment, pathogens, and heavy metals
- Assess the impact of exposure to applied chemicals on beneficial soil and non-target organisms and mammals
- Determine the mechanisms controlling transformation and movement of nutrients, pesticides, sediment, pathogens, and heavy metals in turf systems

Expected Outcomes: A better understanding of the impacts that turfgrass management practices have on the soil, water and other organisms in a watershed; determination of what parameters increase and reduce movement of inputs applied to turfgrass; recommended practices to reduce and eliminate any negative affect that turfgrass management practices have on the environment.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research agricultural engineer position and support in University Park, PA (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 8. Pest Management: Weed Scientist **[Northeast – University Park, PA]**

Justification: Control of weeds is one of the most prevalent pest management practices for turfgrass managers. Preventative and curative control of weeds is basically limited to herbicide applications. In addition, adults and children come in contact and use turf in lawns, athletic fields, parks, school grounds, etc. almost daily. Therefore, with concerns over pesticide increasing among the general public, much research needs to be conducted to better understand weed species, their population dynamics and how they can be successfully controlled utilizing sound environmental practices.

Approach: Some of the greatest weed control challenges, plus concerns over herbicide use on turf, occur in the northeastern U.S. Therefore, we ask that this position be located at the Pasture Systems and Watershed Management Research Unit in University Park, PA. Hence the goals of this position:

- Characterize weed species and their population dynamics to better understand how they successfully compete with turfgrasses
- Develop environmentally sound approaches to weed management, including biological controls and Integrated Pest Management (IPM) strategies
- Identify the turf management and ecological implications of introduction of herbicide-resistant turfgrass cultivars

Expected Outcomes: The characterization of weed species and their population dynamics; weed control strategies, biological controls and management practices that are environmentally friendly and reduce chemical inputs; a better understanding of the impact herbicide-resistant turfgrasses have on other plant and weed species, their ecology and other turf management practices.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research weed scientist position and support in University Park, PA (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 9. Environment: Agricultural Engineer – Fate & Transport [North Central – Ames, IA]

Justification: The fate of pesticides, fertilizers and other products applied to turf systems is of increasing concern in the midwestern U.S. Efforts are underway by some groups to reduce or even eliminate the use of turfgrass in some areas due to unknown affects of turf systems on the environment. Investigations of turfgrass management practices on an entire watershed are desperately needed to determine the effect of these practices on our soil and water systems.

Approach: The USDA-ARS National Soil Tilth Laboratory in Ames, IA is the ideal location for this research. This unit has considerable expertise in and facilities for watershed management research. The industry requests a turfgrass scientist position at this unit to conduct the following research:

- Collect data sets at a range of temporal and spatial scales that capture and quantify both positive and negative potential contributions of turf systems to environmental concerns related to soil, water, and air due to nutrients, pesticides, sediment, pathogens, and heavy metals
- Assess the impact of exposure to applied chemicals on beneficial soil and non-target organisms and mammals
- Determine the mechanisms controlling transformation and movement of nutrients, pesticides, sediment, pathogens, and heavy metals in turf systems

Expected Outcomes: A better understanding of the impacts that turfgrass management practices have on the soil, water and other organisms in a watershed; determination of what parameters increase and reduce movement of inputs applied to turfgrass; recommended practices to reduce and eliminate any negative affect that turfgrass management practices have on the environment.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research agricultural engineer position and support in Ames, IA (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 10. Pest Management: Pathologist **[Transition Zone – Beltsville, MD]**

Justification: Concerns about chemical and nutrient pollution of groundwater, streams and estuaries, such as the Chesapeake Bay, are requiring a reduction in pesticides and fertilizers applied to turfgrass. Periodic drought and resulting water restrictions are reducing water available for turfgrass irrigation. Overuse of recreational facilities such as parks, playgrounds and athletic fields is resulting in inadequate turf stands and often times, unsafe conditions. Turfgrasses are needed that can withstand drought, diseases, insects, foot traffic and compacted soils with reduced pesticides, fertilizer and water. Currently, ARS does not employ a pathologist to work full-time on turfgrass.

Approach: A turfgrass scientist (molecular biologist) was hired and placed in Beltsville, MD in 2002 to identify and develop turfgrass germplasm that requires less water, pesticides and fertilizers while maintaining high quality. This position complements that scientist by being part of a research ‘team’ that can work to accomplish these goals. A scientist in this position will focus on turfgrass pathology by conducting the following research:

- Develop or apply molecular biological tools for efficient and reliable identification and characterization (race, biotype, and virulence) of fungal, bacterial, viral, and nematode pathogens of turf
- Develop basic knowledge of biochemical and physiological processes in the host and pathogen during infection and the disease process
- Develop environmentally friendly approaches to disease management, including biological controls and Integrated Pest Management (IPM) strategies

Expected Outcomes: Turfgrass germplasm with improved tolerance of disease resistance; a better understanding of the biochemical mechanisms and physiological processes involved in turfgrass disease resistance; reduced pesticide use on turfgrass due to improved turfgrass germplasm and better Integrated Pest Management strategies.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research pathologist position and support in Beltsville, MD (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 11. Germplasm: Geneticist – Biodiversity [Upper West – Logan, Utah]

Justification: With water restrictions and increasing demand on a limited water supply, grasses are needed that will use less water, use available water more efficiently and perform well even if irrigated with poor quality water. This position will be located in the western U.S., where improved, water-efficient turfgrasses are desperately needed to offset increased water demands by a booming population.

Approach: This position will be located at Logan, UT at the USDA-ARS Forage and Range Research Unit. There is very little turfgrass germplasm development in the region, although it is critical to support the population growth in the western U.S. This location is ideal for research and development of drought resistant turfgrasses. A geneticist is needed to do the following:

- Collect and maintain germplasm of native and introduced turfgrasses and nontraditional species
- Evaluate and characterize germplasm by agronomic and molecular methods and document data in the Germplasm Resources Information Network (GRIN)
- Preserve genetic resources, by seed or vegetative means, of turf species to ensure genetic integrity, viability, and accessibility
- Improve turfgrass stress tolerance through genetic improvement

Expected Outcomes: Improved, drought-resistant turfgrasses for the western U.S.; identification of genes and morphological characteristics that affect and determine drought tolerance in grasses; identification and preservation of valuable turfgrass germplasm.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass geneticist research position and support in Logan, UT (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).

Priority USDA-ARS Turfgrass Research Position Descriptions

Position 12. Pest Management: Entomologist [North Central – Wooster, OH]

Justification: Insects control costs turfgrass managers many millions of dollars each year. Preventative and curative control of insects is basically limited to insecticide applications. In addition, adults and children come in contact and use turf in lawns, athletic fields, parks, school grounds, etc. almost daily. Therefore, with concerns over pesticide increasing among the general public, much research needs to be conducted to better understand insect species, their population dynamics and how they can be successfully controlled utilizing sound environmental practices. Currently, ARS does not employ an entomologist to work full-time on turfgrass.

Approach: The USDA-ARS's Wooster, OH location currently conducts research on some insect pests that affect turfgrass and ornamental crops. However, for significant progress to be made on managing turfgrass insects and reducing insecticide use, an entomologist needs to be hired by ARS to work on exclusively on turfgrass. The goals of this position are to:

- Develop a better understanding of the population biology of insect pests as parts of various turfgrass ecosystems
- Improve the detection and monitoring techniques available to scientists and turfgrass managers
- Develop environmentally sound approaches to insect management, including biological controls and Integrated Pest Management (IPM) strategies
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Expected Outcomes: A better understanding of the basic biology and population dynamics of various turfgrass insect pests; improved insect detection and monitoring strategies for turfgrass managers; development of economically and environmentally sound management practices for turfgrass, including reduction in insecticide use.

Funding Requested: **\$450,000** to be included in the 2005 Appropriation Bill for Agriculture, Rural Development, Food and Drug Administration and Related Agencies. We ask that this funding be allocated to the Agricultural Research Service (ARS) for the creation of a turfgrass research entomologist position and support in Wooster, OH (\$300,000); and for cooperative research grants to universities in support of this research (\$150,000).