How to Grow Healthy, Attractive Lawns

Kelly Kopp, USU Extension Water Conservation and Turfgrass Specialist

CENTER FOR WATER-EFFICIENT LANDSCAPING

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Management

- Fertilization
- Mowing
- Irrigation
- Aeration
- Seeding/Overseeding
- Pests

Management Schedule

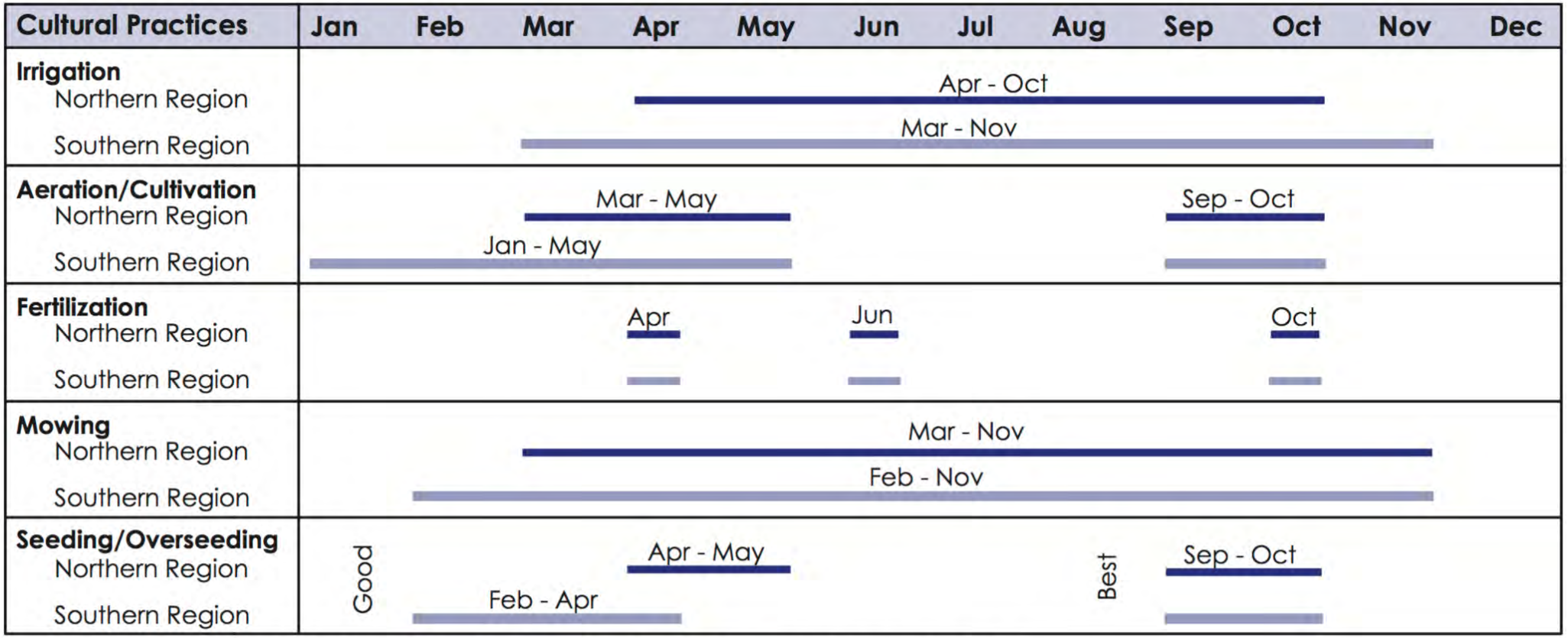


Fig. 1. Turfgrass cultural practices and timing of application for northern and southern Utah.

December 2017 Horticulture/Turfgrass/2017-05pr

Northern Utah Turfgrass Management Calendar

Kelly Kopp, Michael Caron, Helen Muntz and *Jaydee Gunnell*

Figure 1. This northern Utah, area turfgrass management calendar applies to Box Elder, Cache, Daggett, Davis, Duchesne, Juab, Morgan, Rich, Salt Lake, Summit, Tooele, Wasatch, Weber, Salt Lake, Summit and Utah counties. (Image credit: Terence Larson)

Seeding

Cool-season grasses, such as Kentucky bluegrass or the fescues, may be seeded any time from mid-spring to early fall, but late summer is the optimum seeding time in northern Utah. The warmth of the soil in late summer is more advantageous for seed germination than the wet and cool soil conditions of the spring, allowing for faster germination (allow 4-6 weeks before expected first frost). In addition, cool-season grasses planted in the late summer will have both the cool fall and spring growing seasons to establish before the heat and dryness of the summer months returns. Annual weed pressure is also lower in the late summer and early fall than during the spring months. Warm-season grasses, such as buffalograss or blue grama, should be seeded in the spring or early summer months to take best advantage of the warmer temperatures that they prefer.

Refer to Preparing Soil for Turfgrass Establishment-Northern Utah

Turfgrass Cultivars for Utah

Turfgrass Species Characteristics

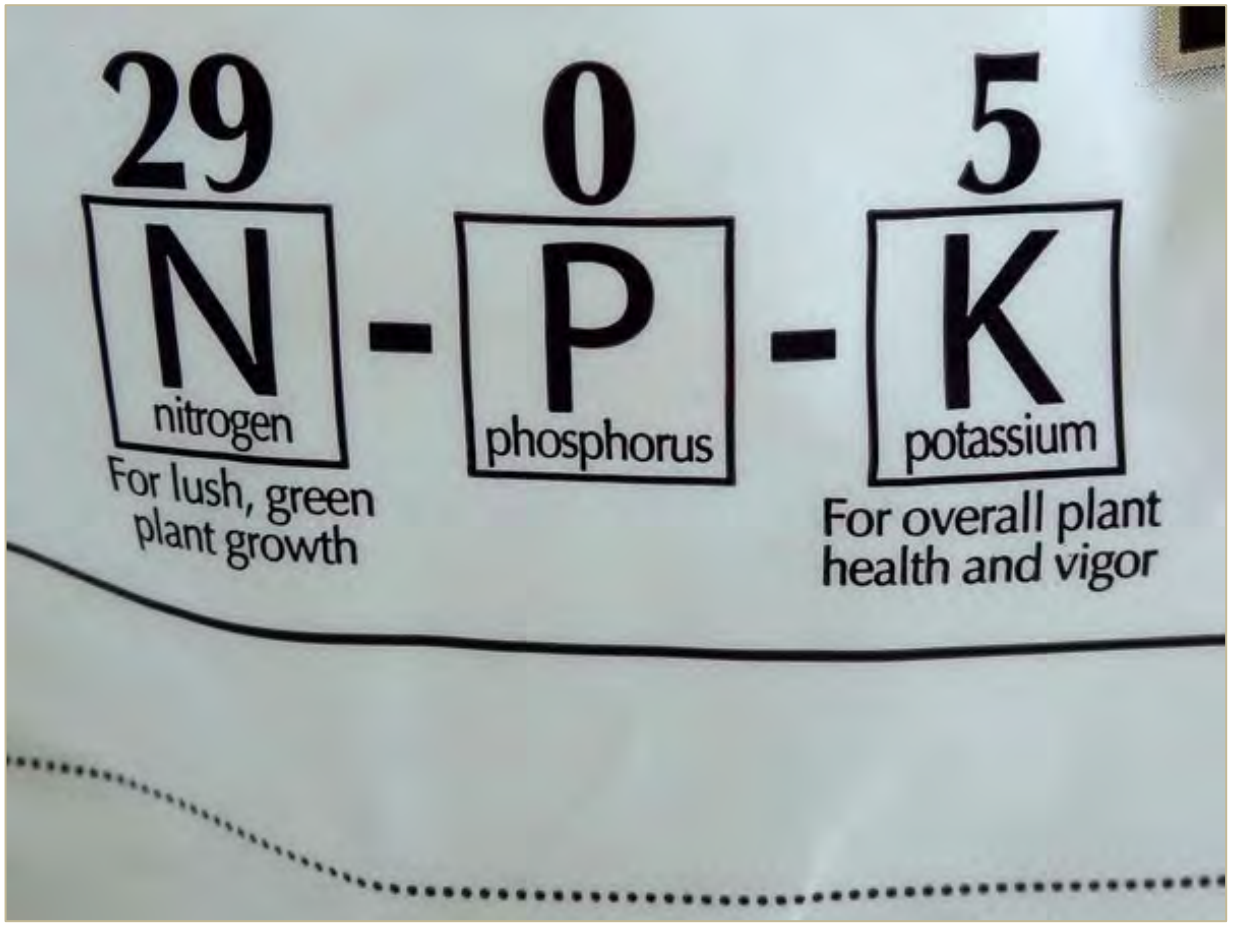
Species	Water Requirements*	Fertility Requirements**	Drought Tolerance	Shade Tolerance	Mowing Quality	Wear Tolerance
Blue grama	Low	Moderate/Low	High	Low	Moderate	Moderate
Buffalograss	Low	Moderate	High	Low	Moderate	Moderate
C. Wheatgrass	Very Low	Low	Very High	Low	Poor	Low
Fineleaf fescues	Moderate/Low	Low	High	High	Moderate	Moderate
Kentucky bluegrass	High	Moderate/High	Low	Low	Good	High
Koleria spp.***	Moderate	Low	Moderate	Low	Poor	Low
Perennial ryegrass	High	High	Low	Low	Moderate	High
Tall fescue	Moderate	Low	Moderate	Moderate	Moderate	High

#1-Fertilization

- **Nitrogen**-vegetative growth and green color, a constituent of plant proteins, chlorophyll, amino acids, and other plant substances
- **Phosphorus**-root development and many vital growth processes
- **Potassium**-physiological functions, disease resistance, drought tolerance, and winter hardiness

Nitrogen

- **Quick release**-water soluble, immediately available, stimulates quick shoot growth and greening
- **Slow release**-more uniform growth, less likely to burn grass, may last 6-8 weeks or longer
  - Organics-must be broken down by microbial activity
  - Slowly soluble or coated products-require soil moisture and warmer temperatures



Fertilization Schedule

Maintenance Level	Late Spring	June/ July	July/ August	Late Summer	Late Fall	Total
---------- pounds N/1000 ft^2 ----------						
Low				1	1	2
Medium	1			1	1	3
High	1	0.5	0.5	1	1	4

Late Fall Fertilization

- Apply after top growth has stopped, but plants still green
- Carbohydrate accumulation
- Good response in spring
- Increased density
- Potential for leaching in sandy soils

#2-Mowing

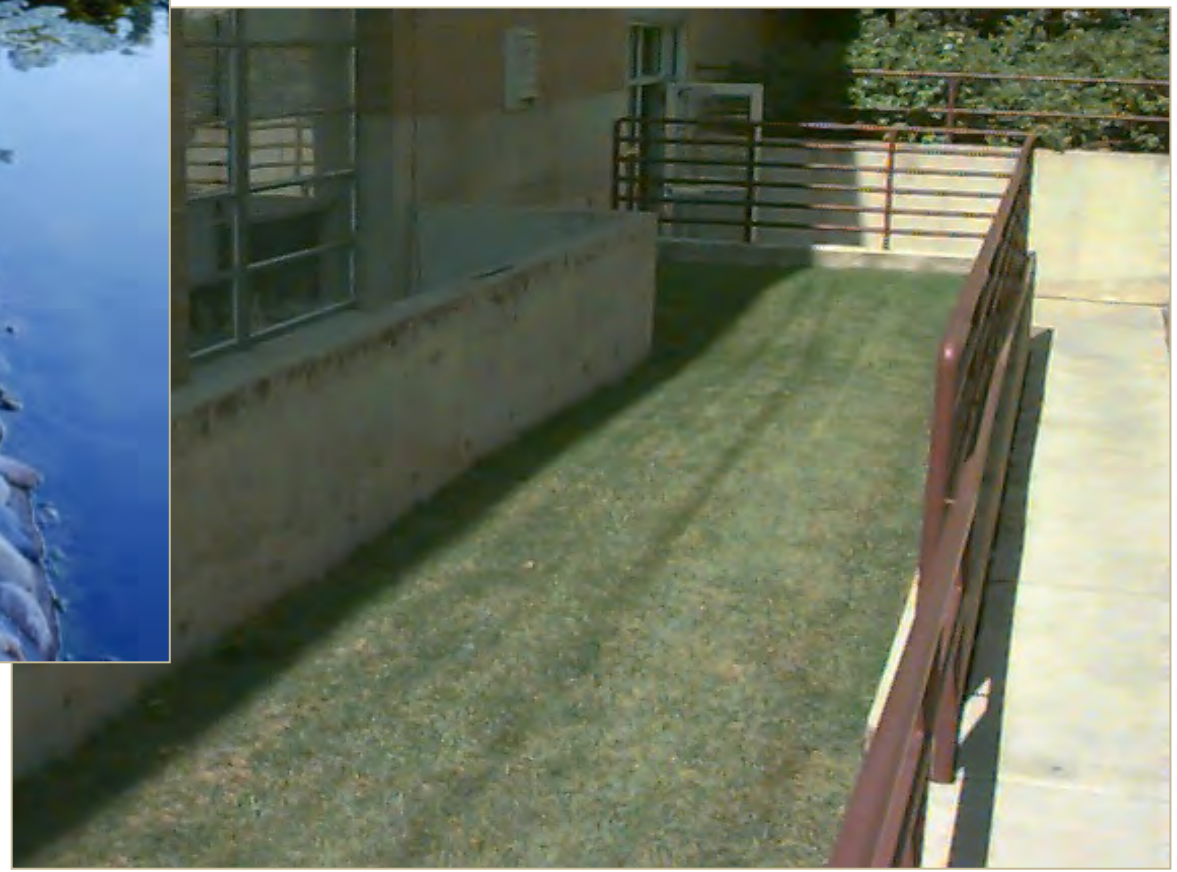
- Temporary cessation of root growth
- Reduced carbohydrate production
- Port of entry for disease-causing organisms
- Temporary increase in water loss
- Reduced water absorption by roots, BUT…..
- *Partial defoliation is nothing new to grasses!*

Mowing Height and Root Growth

Species	Height (in.)
Annual bluegrass	0.125-0.75
Creeping bentgrass	0.125-0.75
Fine leaf fescues	1.5-3.0
Kentucky bluegrass	0.75-3.0
Tall fescue	0.75-3.0
Perennial ryegrass	0.5-3.0
Buffalograss	2-unmowed

What to do with clippings?

- Clippings DO NOT contribute to thatch
- Clippings = about 1-2 lb. N/year
- Exceptions:
  - excessive growth
  - interference with turf use
  - safety
- Mulching mowers not necessary



#3-Irrigation

- *Evaporation*-evaporation of moisture from the soil surface, usually not important for turfgrass
- *Transpiration*-movement of water through a plant and out through stomata

What impacts ET rate?

- Grass species
- Humidity
- Temperature
- Wind
- Management factors

Management Factors

- Mowing height
- Excessive N fertilizer
- Irrigation methods

Month	Irrigation Interval (0.5”)
Startup through April 30th	*Once every 6 days*
May	Once every 4 days
June	Once every 3 days
July	Once every 3 days
August	Once every 3 days
September	Once every 6 days
October 1 to shutdown	*Once every 10 days*

Simple Sprinkler Testing

Horticulture

UtahStateUniversity COOPERATIVE EXTENSION

extension.usu.edu

May 2013 Horticulture/Turfgrass/2013-26pr

Simple Sprinkler Performance Testing for Weber County

Kelly Kopp, Niel Allen, and *Jerry Goodspeed*

Did you know that the majority of the water used by Utah homeowners is applied to ornamental landscapes as irrigation (Utah Division of Water Resources, 2003)? Our arid climate and low annual precipitation (17.6 inches of annual rainfall in Weber County) make supplemental irrigation an essential requirement for many landscape plants. Since landscape irrigation is the single largest residential use of water, efficiently using that water is a very effective way of conserving precious water resources. Irrigating your landscape efficiently means you are doing your part to conserve water for the future, helping to delay costly water development projects, and being a good steward of Utah's natural resources.

Choosing appropriate plants, grouping them according to water needs, and maintaining them appropriately will help you to irrigate them effectively. However, three simple steps—focused on your irrigation system—will help you to be even more efficient.

1. A site inspection,
2. A sprinkler performance test, and
3. An appropriate irrigation schedule.

Site Inspection

Even the most well-designed landscape irrigation system requires regular maintenance to operate most efficiently and to avoid minor operation and performance problems. Examples of sprinkler problems include misaligned heads, sunken heads, broken or missing heads, heads blocked by plants, and heads that do not pop up or rotate properly. Irrigation systems may also be poorly designed, with inadequate or excessive water pressure or poorly spaced heads, resulting in a lack of water application uniformity. Mixing of head types or brands within a zone when broken heads are replaced can also reduce uniformity. Such problems can result in excessive water use over time and can reduce plant health and quality. The best way to identify such problems is to turn the system on and visually inspect it.

Sprinkler Performance Testing

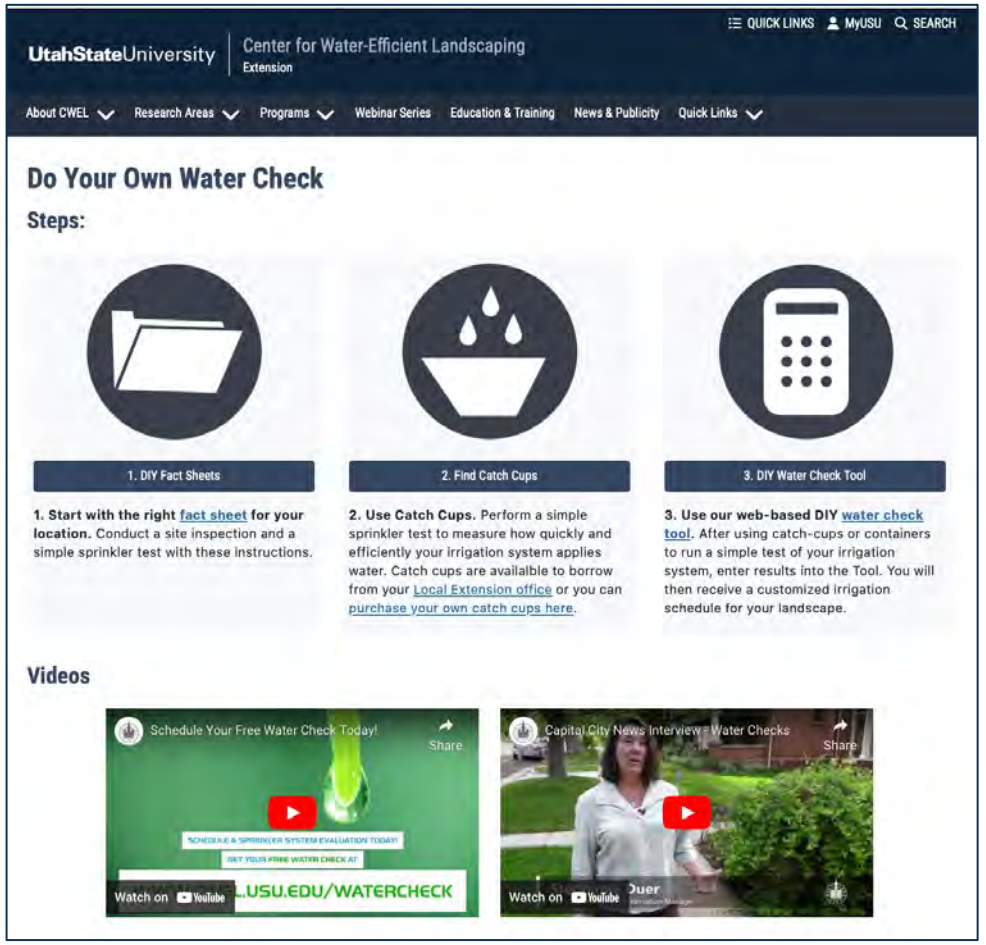
In a well-designed irrigation system, spray and rotor sprinkler heads, along with associated valves, controllers and piping will deliver water in a uniform manner. The more uniformly water is applied to the landscape, the more efficiently it can be managed. However, irrigation systems do not always have efficient designs and sprinklers may not actually operate as specified.

A simple sprinkler performance test using catch cans*, milk cartons or soup cans will help you determine both the water application rate (essential for setting the irrigation time on your controller) and uniformity of application for your irrigation system. Catch cans distributed in a grid pattern across the landscape will measure the amount of water that actually lands on different places in the landscape. Since irrigation systems may use different types and brands of sprinklers in each portion of the landscape, it is important to conduct performance tests for each zone or station in the system.

Performance test procedure:

1. Turn on the irrigation system, one zone (station) at a time. Locate and mark sprinkler heads.
2. Starting with a zone of your choice, distribute catch cans in a grid pattern across the zone.

Catch cups are available in USU County Extension offices



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Do Your Own Water Check

Steps:

1. DIY Fact Sheets

1. Start with the right fact sheet for your location. Conduct a site inspection and a simple sprinkler test with these instructions.

2. Find Catch Cups

2. Use Catch Cups. Perform a simple sprinkler test to measure how quickly and efficiently your irrigation system applies water. Catch cups are availalble to borrow from your Local Extension office or you can purchase your own catch cups here.

3. DIY Water Check Tool

3. Use our web-based DIY water check tool. After using catch-cups or containers to run a simple test of your irrigation system, enter results into the Tool. You will then receive a customized irrigation schedule for your landscape.

Videos

Schedule Your Free Water Check Today! Share

Watch on YouTube L.USU.EDU/WATERCHECK

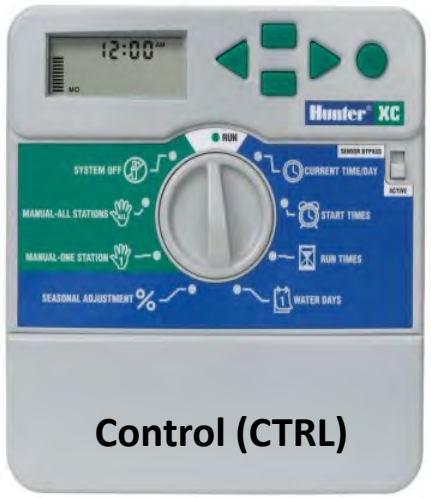
Capital City News Interview - Water Checks Share

Watch on YouTube

Irrigation Technologies

- Climate-based controller testing
- Wi-fi enabled controller testing

Climate-Based Controllers



Control (CTRL)

WeatherMatic® (WTM)

Rainbird® (RBR)

Hunter® (HTR)

Weather data source	N/A	On-Site temperature and rain sensor and solar radiation estimated based on date and location.	Public and private weather stations data managed by centralized computer server	On-Site Temp, solar, and rain sensors
Irrigation Scheduling	Base irrigation scheduling required	Base irrigation scheduling required	Fully automatic schedule	Base irrigation scheduling required
ET_o Data		Modified Hargreaves	Penman-Monteith	Modified Penman-Monteith

Wi-Fi Enabled Controllers

Hunter Controller

- Experimental control
- Programmed according to USU Extension recommendations

Smart Controllers

- Wi-Fi-enabled
- Emergency schedule
- Can be programmed from smart phone

Results

- Average water savings compared to Control: Hunter® (37%), Rainbird® (39.5%) and WeatherMatic® (48%)
- All controllers adjusted irrigation application in response to weather conditions.
- Compared to the average homeowner, all controllers saved water
  - Utah's Water Check Program found participants apply ≈ 48 inches of water/year
  - Orbit B-Hyve and Rachio controllers applied ≈ 34 inches of water/year
  - Hunter and Skydrop controllers applied ≈ 22 inches of water/year
- When programmed according to USU Extension recommendations, manually programmed controllers were just as or more effective than Wi-Fi-enabled smart irrigation controllers

Species and Variety Trialing

- Turfgrasses can be functional in drought situations, *when managed properly*.

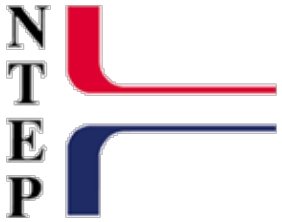
- Selection of drought tolerant turfgrass species and cultivars is *critical* in light of recent and periodic drought conditions and increasing population.

Species and Variety Trialing

- Perennial ryegrass—*standard and drought*
- Kentucky bluegrass—*drought*
- Tall fescue—*standard and drought*
- Cool-season—*low-input*
- Warm-season—*low input* (St. George, UT)
- USGA/NTEP cool-season species—*water use and drought tolerance*
- Tall fescue (TWCA)—*drought*

Species and Variety Trialing Programs

- Turfgrass Water Conservation Alliance
  - tgwca.org
- Alliance for Low-Input Sustainable Turf
  - a-listturf.org
- National Turfgrass Evaluation Program
  - ntep.org
- USGA
  - usga.org



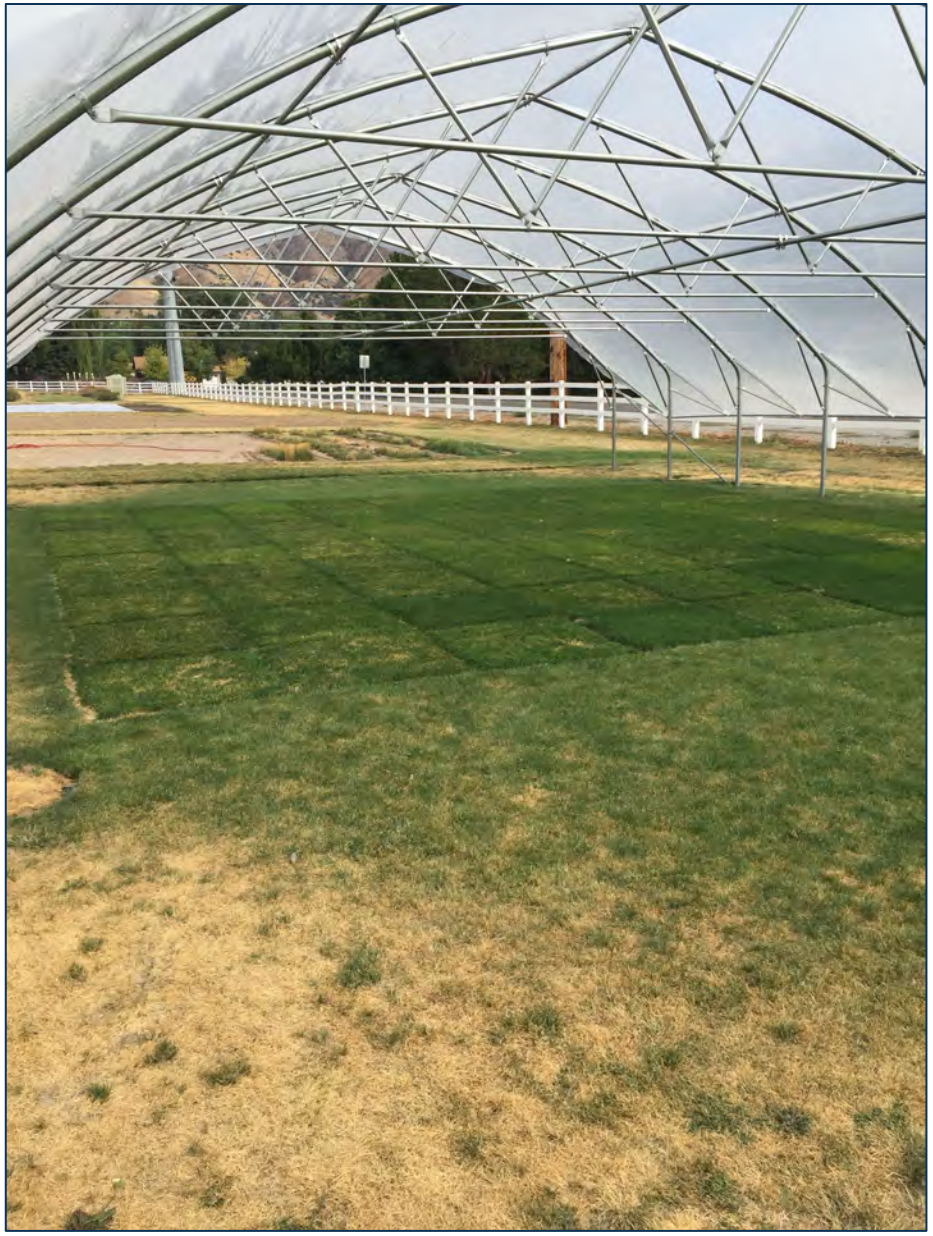
Screening Methods

Chronic Drought Stress

- Decreased irrigation
- Watered weekly (% ET)
- Digital image analysis quantifies % green cover
  - ✓ 2 x per week for 90 days
  - ✓ Immediately before watering, and 2 days after

Acute Drought Stress

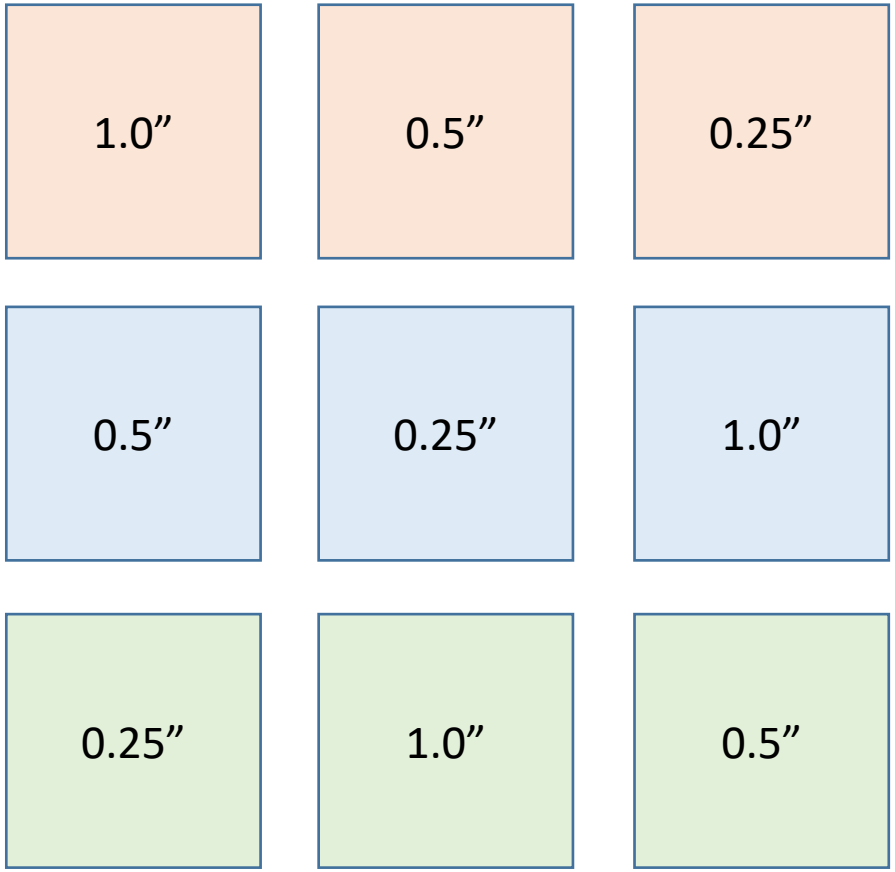
- No irrigation
- Irrigation shut off until top performer reaches 25% green cover
- Then 1”/week recovery
- Digital image analysis quantifies recovery rates




Club Car

Infrequent Irrigation During Drought

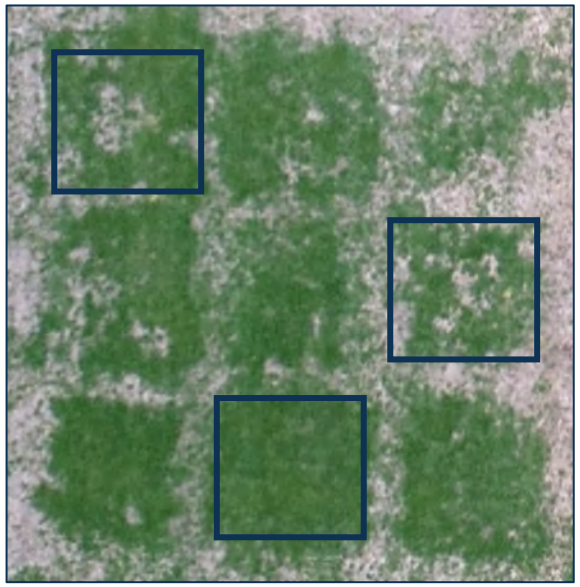
- 18-year-old stand of KBG varieties
- Established from sod
- 0.25 in., 0.5 in., or 1 in. of irrigation
- Irrigated once per month
- June 1 – Sept. 17, 2021



Aug. 21

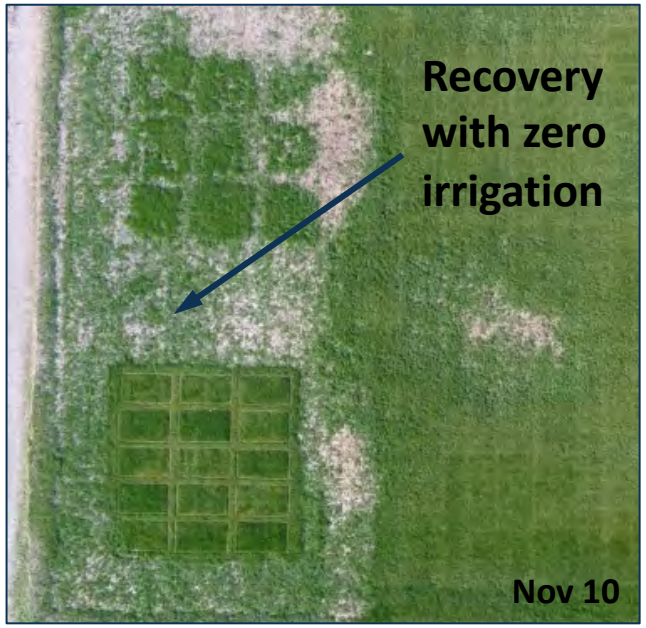
Sept. 3

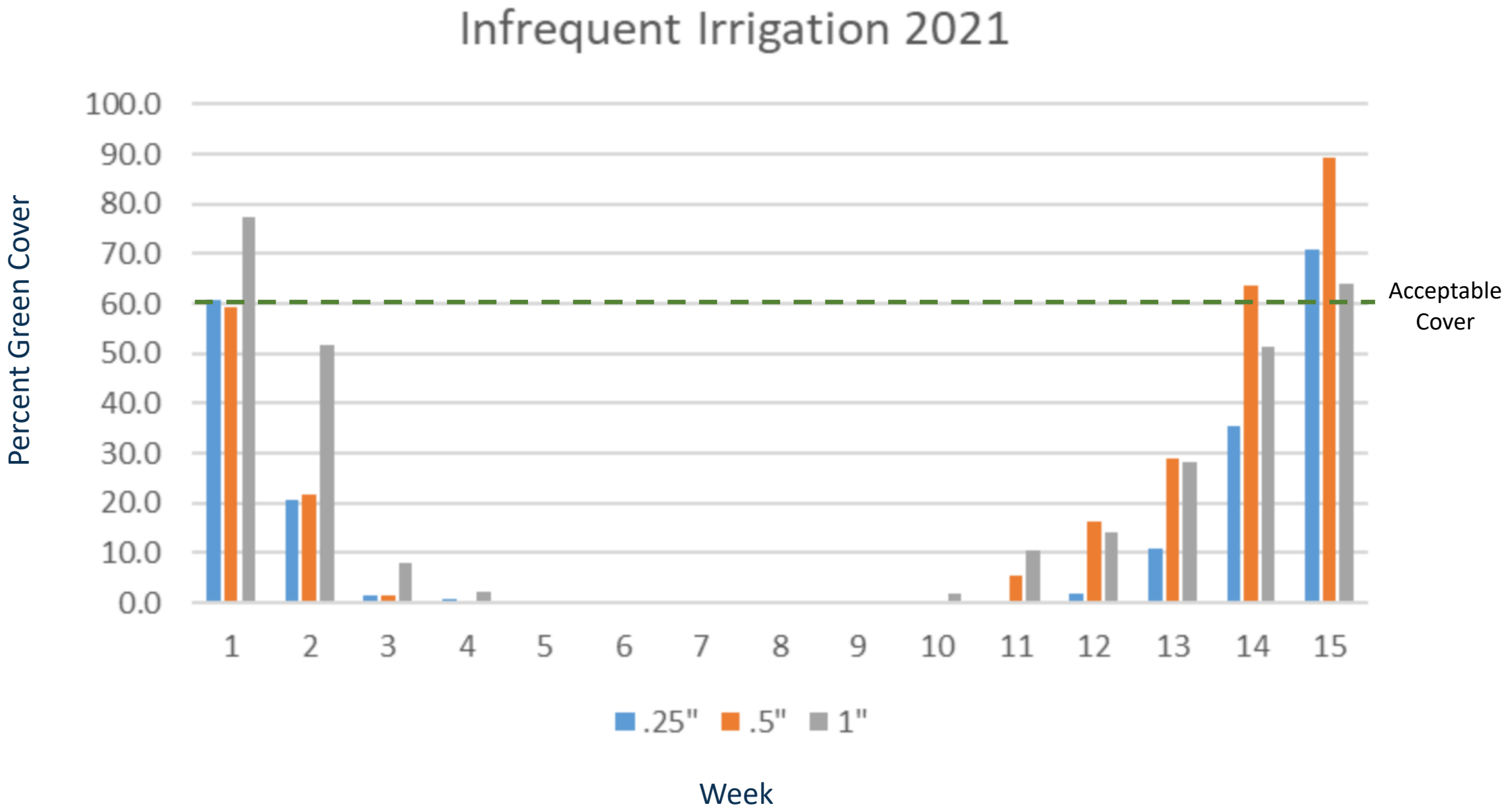
Sept. 26



Oct. 24

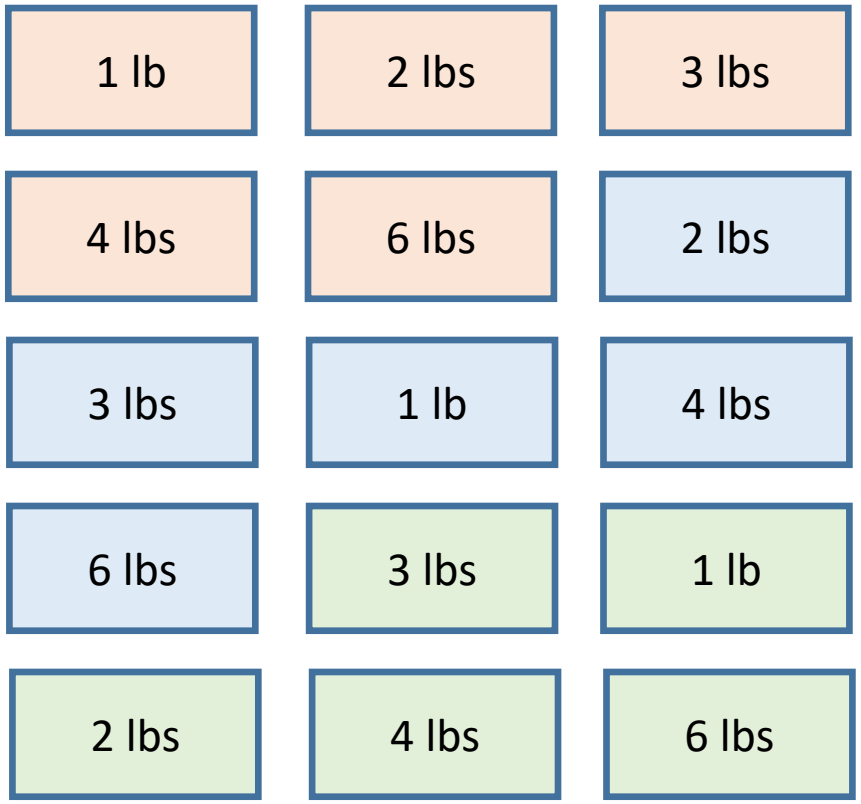
1.0”	0.5”	0.25”
0.5”	0.25”	1.0”
0.25”	1.0”	0.5”




Infrequent Irrigation 2021
Percent Green Cover
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
.25"
.5"
1"
Week
Acceptable Cover

Nitrogen, Reduced Irrigation Study

- Same site as previous study
- Irrigated at 50% ET twice per week
- 1, 2, 3, 4 or 6 lb N/M (46-0-0)
- 1 lb applied per application
  - 1 lb (May)
  - 2 lbs (May, Oct)
  - 3 lbs (May, Sept, Oct)
  - 4 lbs (May, June, Sept, Oct)
  - 6 lbs (May, June, July, Aug, Sept, Oct)



1 lb	2 lbs	3 lbs
4 lbs	6 lbs	2 lbs
3 lbs	1 lb	4 lbs
6 lbs	3 lbs	1 lb
2 lbs	4 lbs	6 lbs

June 22

July 7

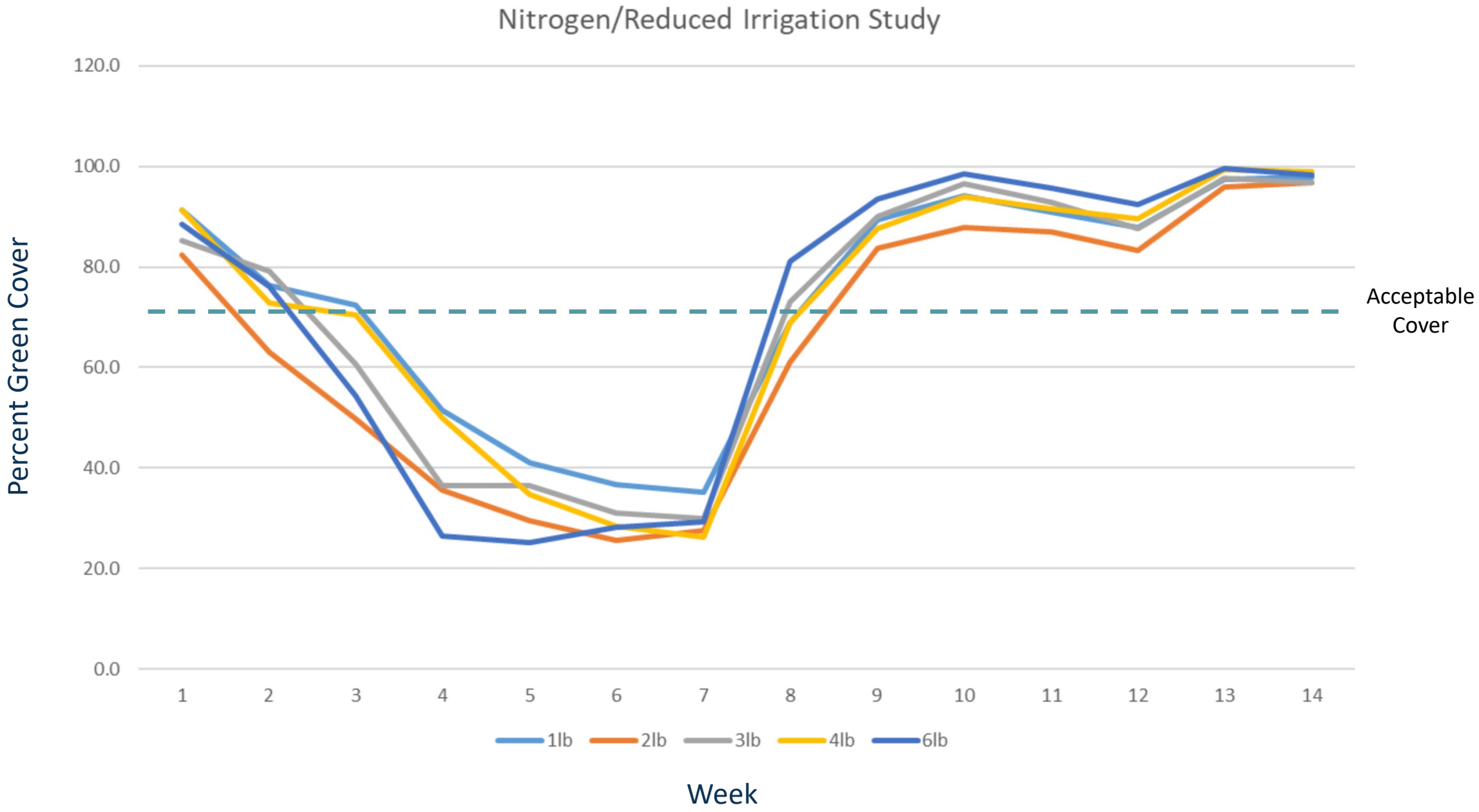
July 22

Aug 6

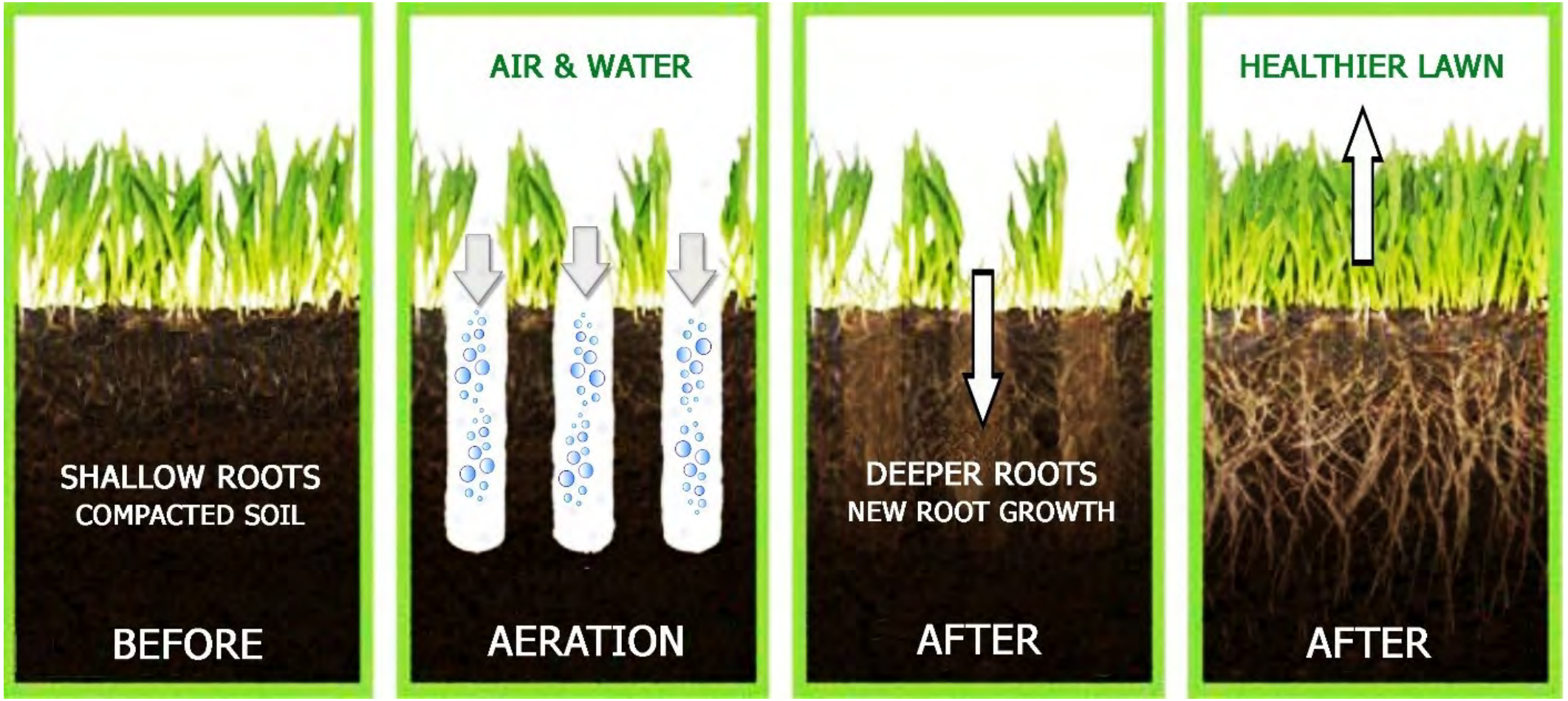
Aug 21

Sep 3

Sep 26


Nitrogen/Reduced Irrigation Study
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Percent Green Cover
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Week
1lb
2lb
3lb
4lb
6lb
Acceptable Cover

#4-Aeration



The Lawn Institute

Compaction

Thatch

- A layer of dead and living stems and roots between the vegetation and the soil.

Avoiding Thatch

- Proper fertilization
- Routine aerification
- Vertical mowing or de-thatching

Aeration

- Improves air movement
- Reduces compaction
- Breaks up crusts, layers
- Stimulates microbial activity

#5-Seeding and Over-seeding

- Soil test
  - Fertilization
- Seed selection
- Site preparation

Open, Sunny Locations (Well-Drained)

Species	Seed Composition	Seeding Rate
Kentucky bluegrass	100%	at 2-3 lb per 1,000 sq ft
Kentucky bluegrass	80-90%	at 3-4 lb per 1,000 sq ft
Perennial ryegrass	10-20%	
Kentucky bluegrass	40-60%	at 3-4 lb per 1,000 sq ft
Fine fescues	30-40%	
Perennial ryegrass	10-20%	
Turf-type tall fescue	100%	at 6-8 lb per 1,000 sq ft
Turf-type perennial ryegrass	100%	at 4-5 lb per 1,000 sq ft

Moderate to Partial Shade

Species	Composition	Seeding Rate
Fine fescues	40-50%	at 4 lb per 1,000 sq ft
Kentucky bluegrass	40-50%	
Perennial ryegrass	10-20%	
Fine fescues	100%	at 4-5 lb per 1,000 sq ft
Turf-type tall fescue	100%	at 6-8 lb per 1,000 sq ft

Revised July 2012

Turfgrass Cultivars for Utah

Kelly Kopp and Paul Johnson,
Plants, Soils and Climate Department, Utah State University

For many purposes, the turfgrass seed that may be purchased from a reputable garden center or nursery will usually fit the needs for most Utah lawns. When making such a purchase, look for a quality mixture of named turfgrass varieties avoiding those seed mixtures that contain annual ryegrass, 'K-31' or 'Kentucky 31' tall fescue, or 'Linn' perennial ryegrass. If you are interested in specific cultivars of turfgrasses, these guidelines will help you in making your choices.

There are many cultivars of turfgrasses available each year and this large number can make your choice difficult. This guide is designed to help you decide which cultivars to use from those that have performed well in tests in Utah and are commercially available. When choosing a turfgrass, consider the environmental aspects of where you plan to establish the turf and the cultural techniques that you will use to manage the grass. Then choose the appropriate grass for your situation.

You may consult your local phone directory to find suppliers of grass seed and sod. Remember that availability is sometimes a problem and you may not be able to find your first choices very easily. Packaged seed mixtures should list the species and cultivars that they contain. If you are unable to find pre-packaged seed for the cultivars you desire, you may choose to contact the suppliers listed at the end of this document.

shade. Kentucky bluegrass recovers well from frequent use.

Med.-High Input Cultivars (4 lb N/1000 sq ft, mowed at 0.5-2.5″, irrigated)
Midnight, Midnight II, Everest, Bluestone, Impact, Perfection

Low Input Cultivars (2 lb N/1000 sq ft, mowed at 3.0-3.5″, minimal to no irrigation)
Baron, EverGlade, Award, Bedazzled, Total Eclipse

Tall Fescue is a good general purpose turfgrass for Utah. It often has greater heat tolerance and can tolerate more shade than Kentucky bluegrass. It may also get by on somewhat less irrigation due to its deep rooting. While older varieties were coarse in texture, most tall fescue varieties approach the look of Kentucky bluegrass.

Coronado Gold, Blade Runner, Inferno, Matador GT, Cayenne, Silverstar

Fine-Leaf Fescue is ideal for shady areas and has slower growth and low fertilizer needs. Most are drought tolerant.

Marco Polo, Bighorn, Little Bighorn, Audubon, Inverness, Florentine, Garnet, Dawson, Aruba, Tiffany, Windward, J5

Low Water Use Grasses

- Kentucky bluegrass
  - Artesia, Bedazzled, Desert Moon, Full Moon, Sonora, Tirem, WaterWorks
- Tall fescue
  - 2nd Millennium, Aquavita, Bonsai 2X, Lifeguard, Raindance, Relentless, Saltillo, Sun Fire, Amity, Zigzag, Reservoir
- Buffalograss
  - Legacy, Texoka, Cody, Bison, Sharps Improved, Bowie
- Wheatgrasses
  - RoadCrest, Fairway, Ephraim

Step 1. The process for transitioning existing landscapes begins with preparing the area for new seed by removing non-functional turf areas, killing the existing grass, mowing as low as possible, and overseeding with certified, low water use turfgrass seed.

Step 2. Seed is spread using a broadcast spreader and then the area is lightly irrigated to moisten the seedbed and promote seed germination.

Step 3. Though not an absolute requirement, spreading a light layer of compost will help to keep the seedbed moist as the new seed germinates. In the SLCDPU service area, local sources of compost material are readily available.

Step 4. Germination of these species and varieties occurs in 3-4 weeks. At that time, irrigation can be adjusted to be less frequent and deeper. Irrigation should be adjusted to established planting levels over the course of 1.5 to 2 months.


Salt Lake City, Concord Lift Station
Before
After

When should you seed cool-season grasses?

- Best-late summer (September or October)
- Next best time-spring (March or April)
- Dormant seeding in winter or summer

Establishment with Sod

- Site preparation is similar to seeding
- Purchase high quality, weed-free sod
- Delivered soon after harvest
- Lay in staggered, or “brick-like” pattern
- Roll, then water

Site Preparation for Renovation

- Soil test - representative sampling
- Kill vegetation with glyphosate (RoundUp®) or glufosinate (Finale®)
- Re-spray in two weeks (grass is more difficult to kill than you think!)
- Solarization
- If you have a complete kill and no thatch problem, leave the old turf as a mulch

Integrated Pest Management

- Focus on selection, establishment and maintenance of a competitive stand of turfgrass.
- Objective is to keep pest populations at a level that does not interfere with the purpose of the turfgrass.

Early Detection is Key

- Scouting is best IPM tactic
  - Helps detect early problems
  - Can prevent widespread outbreaks
  - Allows spot treatments to reduce damage
- Regular inspections are necessary
  - Confirms presence/absence
  - Assess the need for action
  - Evaluate treatment efficacy
  - Develop site history

Pest Management

- Cultural
  - Change the environment
    - Humidity, Free moisture, Temperature, Fertility
- Chemical
- Abiotic damage
  - Pest-like symptoms, but not true insect or disease damage
  - More common than actual insect or disease problems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Management Schedule

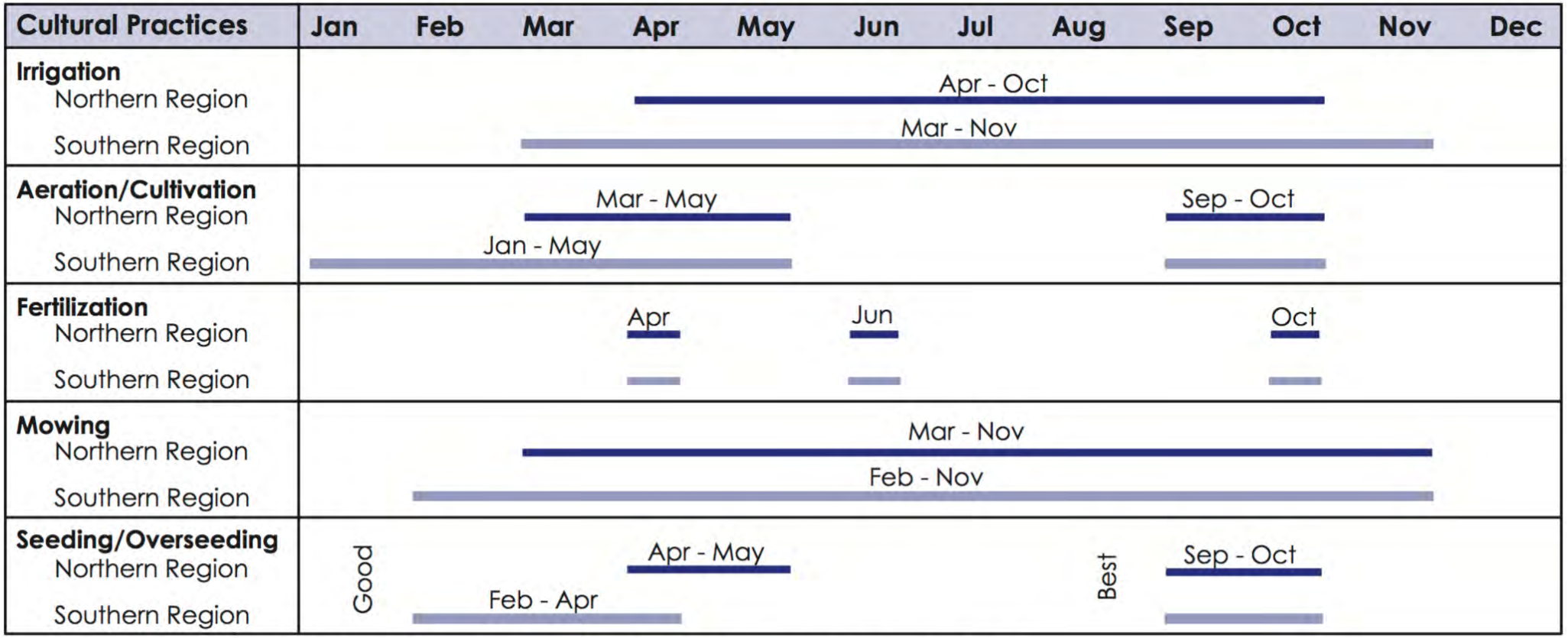

Fig. 1. Turfgrass cultural practices and timing of application for northern and southern Utah.

UtahState UNIVERSITY extension

Turfgrass IPM Advisory

UTAH PESTS

Seasonal Turfgrass Pest Update, Utah State University Extension, Fall 2008

Turfgrass Pest Management

The management of turfgrass insect pests and diseases is most effective when an integrative approach is taken. Oftentimes, cultural practices will help grasses to resist and recover from pest damage. Resistant turfgrass varieties may also be available.

News/What to Watch For

Diagnosed insect pests in the fall of the year have included armyworms, sod webworms, cutworms, white grubs, and billbugs. Diagnosed diseases have included necrotic ring spot, fading out (*Curvularia* blight), pink snow mold, and take-all patch.

Insect and Disease Activity and Information

Necrotic Ring Spot (*Ophiosphaerella korrae*)

Favorable Conditions: cool (40-60°F) and moist conditions, may be compounded by drought and compaction.

Necrotic ring spot (NRS) primarily infects Kentucky bluegrass, though it may also be seen in annual bluegrass and tall fescue. The disease damages the roots and crowns of the grass plants and the first symptoms are small, light green patches of turf that get larger over time. Frequently the turf will survive the infection and re-grow in the center of the patches, giving them a ring-like ("frog eye") appearance.

Cultural Practices

Maintain the highest mowing height possible and follow recommended irrigation practices to prevent drought stress. Core aerate once annually to reduce thatch and avoid over application of N fertilizers.

Resistant Turfgrass Varieties

Kentucky bluegrass: Adelphi, Eclipse, Midnight, Majestic, Wabash, Monte Carlo, Baron, Blue-Tastic, Unique, Voyager, Beyond, Eagleson, Cabernet, Abbey, Award, Brooklawn.

*Fungicide Options**

Azoxystrobin (Heritage), myclobutanil (Eagle), propiconazole (Banner MAXX, Propiconazole Pro, Fertilome Liquid Systemic Fungicide), and azoxystrobin + propiconazole (Headway).

Thank you!

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Resources

utahpests.usu.edu

cwel.usu.edu