

-Reminder to pesticide applicator license holders-

Do at beginning & end of today's 2-hour session:

✓Type full name (as it appears on your license) and license number in chat

TWO OR MORE PEOPLE ARE AT ONE COMPUTER:

✓Email to Kelly Ensor:

-Selfie (with monitor or screen in background)

-Full name (as it appears on your license)

-License number

[kelly.ensor@oregonstate.edu](mailto:kelly.ensor@oregonstate.edu)



## TURFGRASS IPM: MOWING, FERTILIZATION AND IRRIGATION

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Oregon State University

### ADDITIONAL INFORMATION

BeaverTurf/Lawns

<http://blogs.oregonstate.edu/schoolipm/new-osu-school-ipm-website/>

### PRIMARY CULTURAL PRACTICES

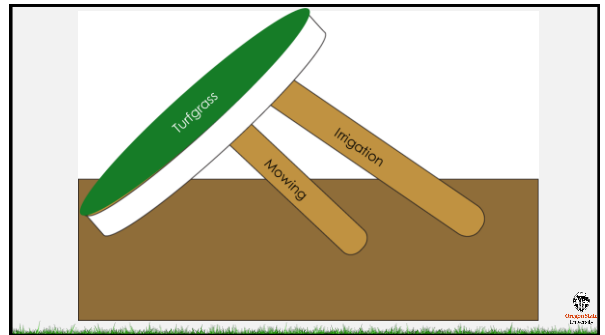
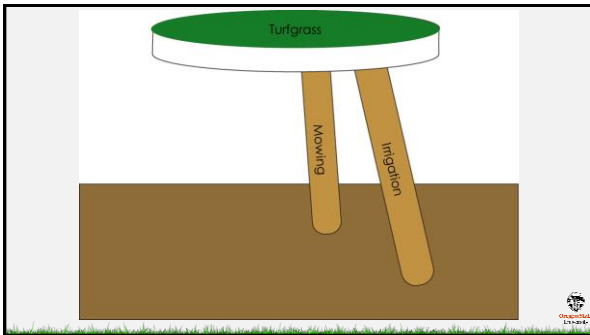
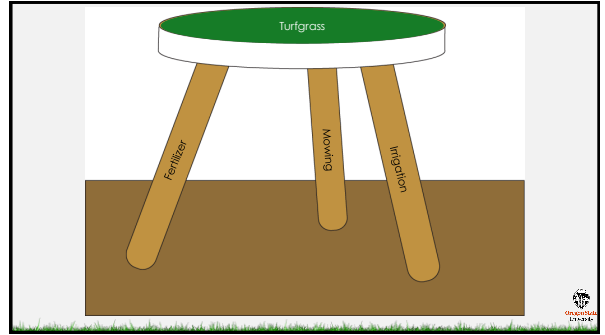
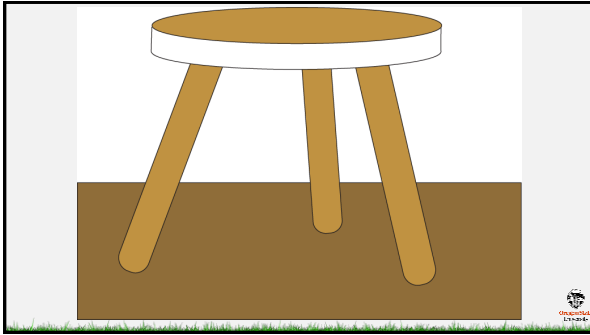
Fertilization

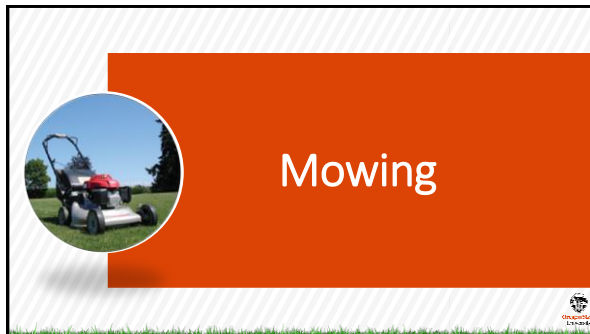
Mowing

Irrigation



\* More time and money should be spent on these practices than the other cultural practices



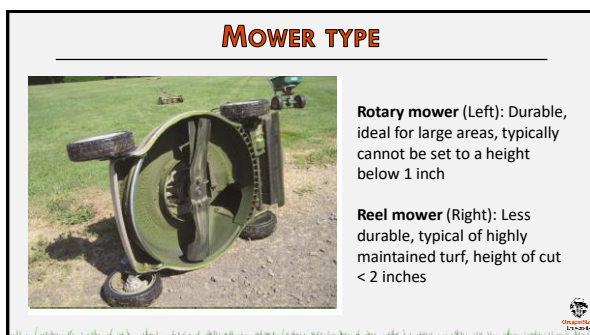


## MOWING

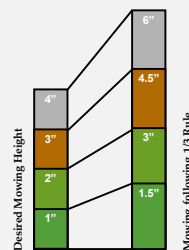
- Mowing has **more impact** on turf quality than ANY other cultural management practice
- Frequent mowing, with sharp blades, will produce the best looking turf
- Dull mowers rip and tear leaves which increase moisture losses
- Turf is denser at optimum heights and frequencies
- Turf vigor and rooting is better at moderate heights and intermediate frequencies



(PC: Jake DeBartolome, The University of Utah)



## THE ONE-THIRD RULE



- Greenhouse study by USDA Scientist on **forage Kentucky bluegrass**
- Investigate the effect of cattle defoliation on root growth
- Root growth pauses for short period after significant defoliation (> 40%)
- Results morphed into one-third rule



## MOWING TOO HIGH OR TOO LOW

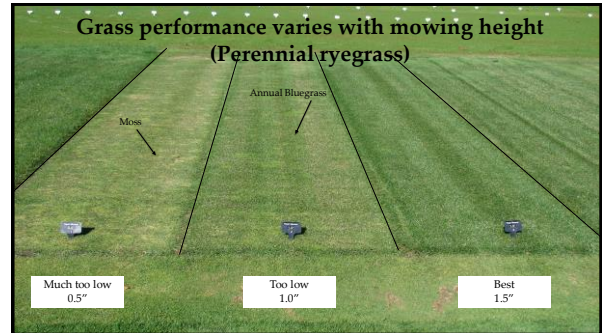
### Too Low

- Grasses will thin out resulting in weeds, moss, and other grasses invading



### Too high, or too infrequent

- Will likely scalp the plant because you remove too much foliage
- Leave heavy clipping on the surface
- Create a perfect environment for diseases



## WEEDS THAT INDICATE MOWING HEIGHT IS TOO LOW



Crabgrass



Annual bluegrass



**RAISE YOUR MOWING HEIGHT!**

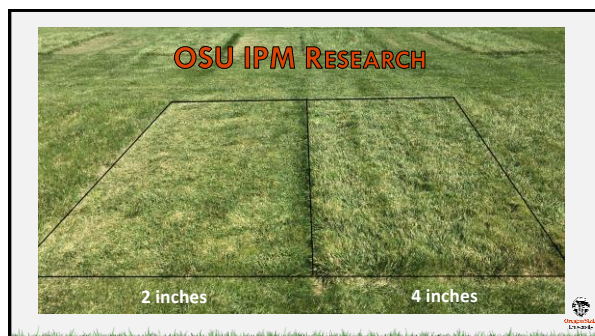




## RAISING THE MOWING HEIGHT

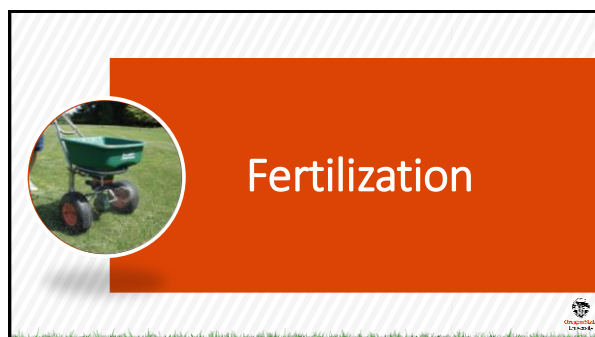
- Improve turf quality
- Reduce weed populations:
  - Crabgrass cover by up to 52%
  - Dandelion population by up to 45%
  - White clover by up to 58%
- Improve rooting- increased drought tolerance
- Prevention of weed seed germination





## RECOMMENDED MOWING HEIGHTS

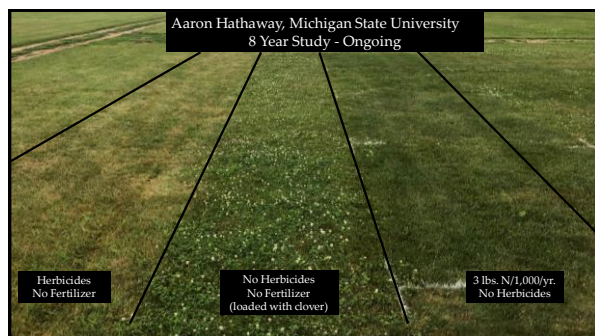
Turfgrass	Species	Maximum mowing height
Tall fescue	<i>Festuca arundinacea</i>	3"-4"
Creeping red fescue	<i>F. rubra ssp. rubra</i>	2.5"-3"
Chewings fescue	<i>F. rubra ssp. Commutata</i>	2.5"-3"
Kentucky bluegrass	<i>Poa pratensis</i>	2.5"
Perennial ryegrass	<i>Lolium perenne</i>	2"
Roughstalk bluegrass	<i>Poa trivialis</i>	1"-1.5"
Annual bluegrass	<i>Poa annua</i>	1"
Highland bentgrass	<i>Agrostis castellana</i>	1"
Colonial bentgrass	<i>Agrostis capillaris</i>	1"
Creeping bentgrass	<i>Agrostis palustris</i>	1"



## WHY APPLY FERTILIZER?

- Improves the vigor of the turf
- A healthy lawn will:
  - Resist weed encroachment
  - Reduce disease pressure
  - Resist insect pest
  - More drought tolerant
- Overall, intelligent fertilizer applications will reduce the need for herbicides, insecticides, and water





## WHEN DO WE APPLY FERTILIZERS?

### The Holiday Plan – Western OR

Goal is 3-5 lbs N/1000ft<sup>2</sup> per year

1. Memorial Day: 1.0-1.5 lbs N/1000ft<sup>2</sup>
2. 4<sup>th</sup> of July: 0.5-1.0 lbs N/1000ft<sup>2</sup>
3. Labor Day: 0.5-1.0 lbs N/1000ft<sup>2</sup>
4. Thanksgiving: 1.0-1.5 lbs N/1000ft<sup>2</sup>



Figure 2. Fertilizer calendar for irrigated lawns in central and eastern Oregon.

Visual turf quality	J	F	M	A	M	J	J	A	S	O	N	D
High				■	■	■	■		■	■	■	■
Medium					■	■	■		■	■	■	■
Utility				■	■	■	■			■	■	■

■ = Planned application

■ ■ ■ ■ = Optional application

Horizontal bars indicate time for each application. Adjust timing based on your goals and personal experience with your lawn. Each application is assumed to be at 1 lb N per 1,000 sq ft. On hungry lawns, 1.5 to 2 lb N per 1,000 sq ft can be used to stimulate density and color. Unless lawns are very weak, avoid early-spring applications since grass normally grows vigorously by itself at that time.



## RANKING SPECIES BY NITROGEN REQUIREMENT

Perennial ryegrass → **High**  
Kentucky bluegrass → **(4+ lbs/yr)**

Annual bluegrass → **Medium**  
Tall fescue → **(2-3 lbs/yr)**

Fine fescue → **Low**  
Bentgrasses → **(0-2 lbs/yr)**





## WHAT TO APPLY?

- **Nitrogen** is the key
- Phosphorus only if deficient or new seedlings
- Potassium rarely needed on native soils (exception is sandy soils)
- Synthetic fertilizers work fine
- Organic fertilizers work fine



## FERTILIZER LABEL

# 28-5-18

Guaranteed Analysis		F292
Total nitrogen (N)	28.00%	
4.30% nitrate nitrogen		
23.70% urea nitrogen		
Available phosphate ( $P_2O_5$ )	5.00%	
Soluble potash ( $K_2O$ )	18.00%	
Boron (B)	0.02%	
Copper (Cu)	0.07%	
Iron (Fe)	0.10%	
0.10% Chelated Iron (Fe)		
Manganese (Mn)	0.05%	
0.05% Chelated Manganese (Mn)		
Zinc (Zn)	0.05%	
0.05% Chelated Zinc (Zn)		

← Nitrogen = 28% by weight

← Phosphorus = 5%  $P_2O_5$  by weight

← Potassium = 18%  $K_2O$  by weight

← Micronutrients

← Sources of each nutrient

Plant nutrients derived from monopotassium phosphate, potassium nitrate, urea, boric acid, copper edta, manganese edta, iron edta, zinc edta.

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## LOW FERTILITY WEEDS





## OSU IPM FERTILITY STUDY

4x/year @ 1.0 lbs N/1000ft<sup>2</sup>2x/year @ 1.0 lbs N/1000ft<sup>2</sup>

No fertilization



## OSU IPM FERTILITY STUDY

Fertilizer Rate (per year)	Percent Weed Cover (%) 18-July	Percent Weed Cover (%) 13-Sep
None	2.8	3.5
2 lbs N/1000ft <sup>2</sup>	0.7	2.1
4 lbs N/1000ft <sup>2</sup>	0.0	1.4



## Irrigation



## WHEN TO IRRIGATE AND HOW MUCH?

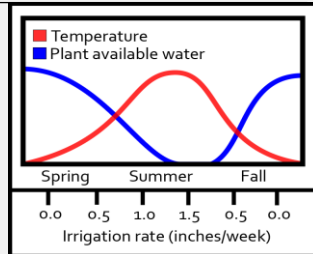
- From June-August, irrigating one to five times per week to provide the right amount of water
- Irrigating between 10:00pm-6:00am overlap with natural dew period
- Useful tool to determine how much water to apply is Pacific Northwest Cooperative Agricultural Weather Network website (AgriMet)



## SEASON VARIATION IN PLANT AVAILABLE WATER

Irrigation required from June - August to prevent grass from going dormant due to drought

Use rain gauge or catch cans to determine run time required to apply  $\frac{1}{4}$ " of water (Outdoor Track, week 3)



## TWICE AS MUCH IS NOT TWICE AS GOOD



Moss

## OVER IRRIGATION AND DISEASES



## OVER IRRIGATION AND WEEDS



## MORE IS NOT BETTER

- Leaching pesticides and fertilizers
- Waste of money
- Waste of water



## OSU IPM IRRIGATION STUDY

### Effect of Irrigation Rate (inch/month)

Irrigation rate (inches per month) <sup>†</sup>	August 28, 2016		August 28, 2017	
	Turf quality (1-9)	Percent green cover (0-100%)	Turf quality (1-9)	Percent green cover (0-100%)
2.0	6.0 b <sup>a</sup>	70.1 c	4.8 c	58.4 c
2.5	6.3 a	71.9 cb	5.3 b	67.7 b
3.0	6.4 a	77.9 ba	5.8 a	76.6 a
3.5	6.5 a	76.6 ba	6.2 a	78.6 a
4.0	6.6 a	81.1 a	6.1 a	77.7 a

Trial was conducted on perennial ryegrass turf maintained at 2 inch height of cut



## OSU IPM IRRIGATION STUDY

### Effect of Irrigation Frequency

Irrigation frequency (applications per month) <sup>†</sup>	August 28, 2016		August 28, 2017	
	Turf quality (1-9)	Percent green cover (0-100%)	Turf quality (1-9)	Percent green cover (0-100%)
2	5.5 d	59.3 c	4.4 d	47.6 d
4	6.1 c	73.6 b	5.3 c	68.0 c
8	6.5 b	78.8 b	6.0 b	80.5 b
16	7.3 a	90.3 a	6.8 a	91.1 a

Trial was conducted on perennial ryegrass turf maintained at 2 inch height of cut



## RATE VS. FREQUENCY



Peak of summer



