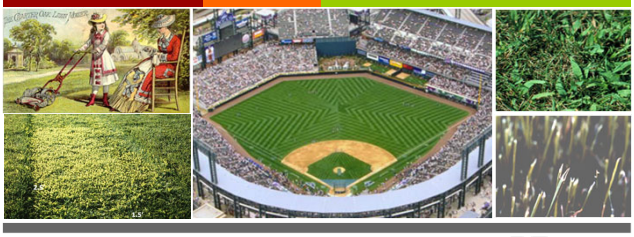
Best Mowing Practices to Reduce Weed Competition



Roch Gaussoin, Extension Turfgrass Specialist, University of Nebraska

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1

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Primary Cultural Practices

Practice	Effect on Weeds
Mowing	**********
Fertilization	*********
Irrigation	****
Pest Management	**N/A**
Cultivation	**

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3

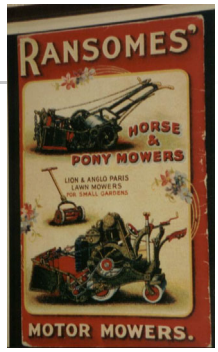
Mower History

- 1830 Budding developed and patented the first mower
- Reel mower design has changed little over the years

4

Mower History

- 1880 47,000 person-powered mowers manufactured in America



5

Mower History

- 5 million walk-behind mowers manufactured annually in the U.S.
- There are approximately 50 million mowers in the U.S.

6

Mowing Basics and Weed Management

- Equipment
- Species
- Height
- Frequency
- Purpose

7

Mowing Equipment – Rotary Mowers

Advantages
- Easily mows tall grass
- Easier maintenance than reel type mower
- More maneuverable
- Better for uneven terrain

Disadvantages
- Reduced quality of cut
- Less effective at low heights
- More dangerous to operate
- Allows violation of 1/3 rule

8

Mowing Equipment – Reel Mowers

Advantages
- Best mowing quality
- Allows low height of cut
- MUST follow 1/3 rule

Disadvantages
- Require smooth terrain
- Mow best at low heights
- Require frequent adjustment
- Difficult to trim around trees and other objects

9

10

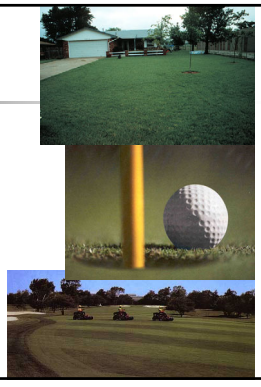
Leaf Shredding

- Problem with poorly adjusted reel mowers
- Common with dull rotary mower blades
- Most frequently seen on ryegrass, fescues, zoysiagrass

11

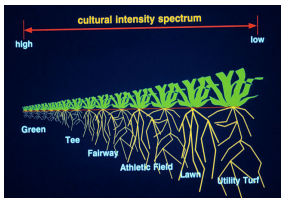
Mowing Height

- Home lawn grasses, parks, lower maintenance sports turf (bluegrass, ryegrass, fescue)
  2-3½ inches
- Higher maintenance sports turf
  (1-2 inches)
- Golf greens
  1/10-3/16 inch
- Golf tees & fairways
  ¼ - ¾ inch



12

Mowing Affects Root Growth



- Lower mowing heights remove more photosynthetic tissue
- Lower mowing heights require more frequent mowing
- Lower mowing heights reduce root depth and health

13

Other Effects of Mowing Height

- Reduced wear/traffic tolerance/recovery with low heights
- Reduced resistance to heat, cold, and drought stress with low mowing heights
- More weed, disease, insect pressure with lower mowing heights

14

Mowing Height Effects on Rhizome Development

Mowing Height	1″	1.75″	2.5″
	rhizome	weight	(mg)
Kentucky bluegrass	1.0	64	656

15

Height effects on leaf area & photosynthetic capacity

Mowing Height	1″	2″	3″
	relative	change	(%)
turfgrass	1.0	240	5760

16

Effects of deeper rooting and increased photosynthesis

- root pathogens & insects
  - increased tolerance
- Drought
  - deeper water harvesting
  - better recovery
- Traffic
  - better cushion
  - better recovery

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17

Height Effects on Turfgrass Quality

Mowing Height	1.5″	2.5″	4″
species	quality	1-9,	9=best
tall fescue	5.7	6.6	7.4
Kentucky bluegrass	5.2	6.4	6.8
perennial ryegrass	5.2	5.8	5.5

18

Height Effects on Weed Pressure

Mowing Height	1.5″	2.5″	4″
species	weed	infestation	(%)
tall fescue	45	23	2
Kentucky bluegrass	55	25	7
perennial ryegrass	57	58	52

19

Height effects on crabgrass pressure

Mowing Height	1.25″	2″	3.5″
	crabgrass	cover	(%)*
Kentucky bluegrass	49	20	2

*

20

Effects of mowing height on crabgrass cover

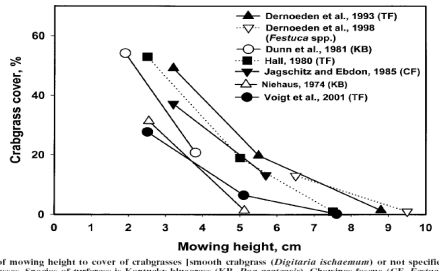


Fig. 1. Relationship of mowing height to cover of crabgrasses [smooth crabgrass (*Digitaria ischaemum*) or not specified (*Digitaria* spp.)] in cool-season turfgrasses. Species of turfgrass is Kentucky bluegrass (KB, *Poa pratensis*), Chewings fescue (CF, *Festuca rubra* subsp. *fallax*), or tall fescue (TF, *F. arundinacea*).

Busey, 2003

21

22

23

Mowing Frequency

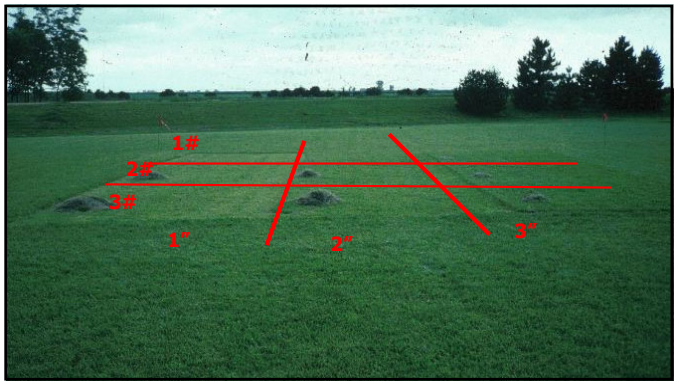
- Proper frequency is described by the "1/3 rule"
- Never remove more than 1/3 of the turf's height at any single mowing

24

Height Effects on Frequency

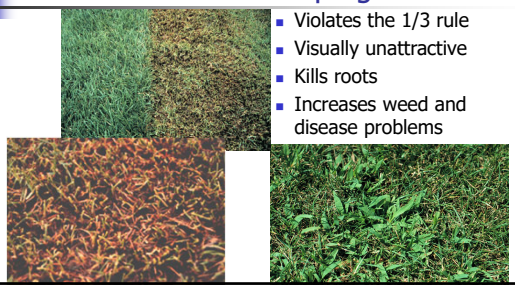
Mowing Height	1.5″	2.5″	4″
species	days	between	mowing
tall fescue	7	11	14
Kentucky bluegrass	9	15	17
perennial ryegrass	7	12	24
crabgrass	6	10	17

25



26

The Problem with Scalping



- Violates the 1/3 rule
- Visually unattractive
- Kills roots
- Increases weed and disease problems

27

Benefits of Grass Clipping Recycling

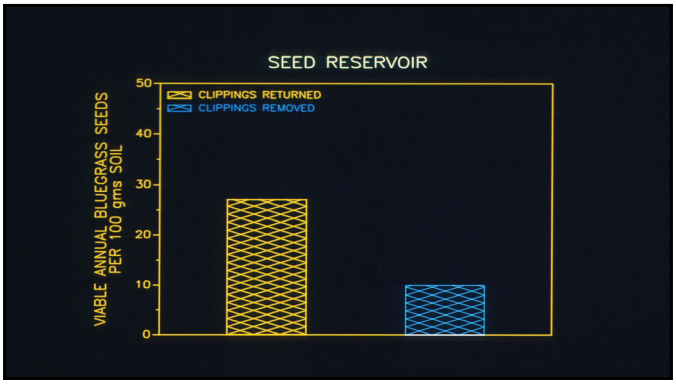
- Return nutrients
- Return organic matter
- Reduce load on landfills
- May reduce severity of certain diseases
- Returns pesticides to turf system

28

When to Collect Clippings

- When violating the 1/3 rule
- To use clippings for some other reason (compost, mulch)
- If turf is very weedy (seeds)
- On high maintenance turf (golf greens, tennis courts)

29



30

So what is the best mowing height for my field?

- Species/cultivar adaptation
- Field safety
- Level of field use
- Labor/time availability
- Equipment limitations
- Other management limitations (water, fertilizer)
- Playability/expectations
- Aesthetics

31

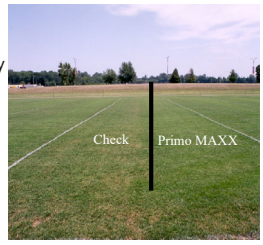
Seasonal Changes in Mowing Height?

- Keep the same mowing height throughout the year
  - Reducing mowing height in late summer causes a reduction in plant density
  - Scalping
- Adjust based on use and play
  - Subtle changes
  - Timed with most problematic weeds

32

PGR Use on Sports Turf

- Repeat applications of Primo MAXX to athletic turf can increase turf density and may enhance wear tolerance
- Slide of 1999 research at Iowa State University on practice football field
- Kentucky bluegrass
- Primo MAXX applied 4 times at 0.60 oz per 1000 sq. ft.



33

Fraise mowing for field renovation

- Fraise mowing (also spelled fraze, frase, and fraize) is a relatively new turfgrass cultivation practice designed to remove aboveground biomass while allowing turf to regrow vegetatively.
- May also remove seed bank of weedy species like annual bluegrass or crabgrass and increase overseeding effect.
- Some success with warm sreason grasses like zoysia and bermudagrass
- Kentucky Bluegrass data is limited

34

A B

Nonchemical annual bluegrass (Poa annua) management in zoysiagrass via fraise mowing Published online in Weed technology by Cambridge University Press: 13 January 2020 James T. Brosnan et al.

35

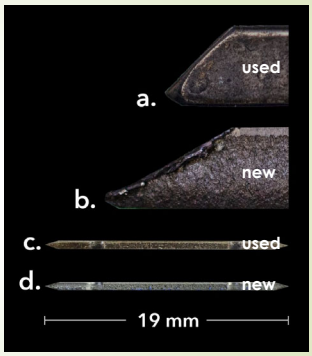
Robotic mowers

- Have been very popular in Europe for 15 years
- Renewed interest across all turf sectors because of the ongoing labor shortage
- Most popular category are landscape applications
- Growing interest in professional turfgrass settings

36

Univ. of Kentucky study by Travis Shaddox compared mowing quality of rotary vs robotic

- Husqvarna automower compared to John Deere Z925a rotary mower
- Rotary blade impacts a larger surface area on the leaf than a robotic blade



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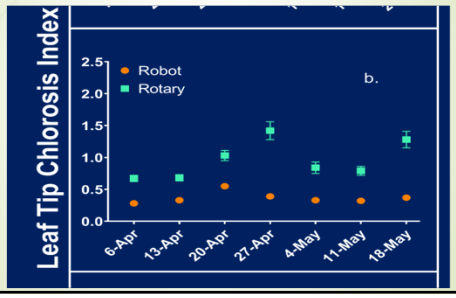

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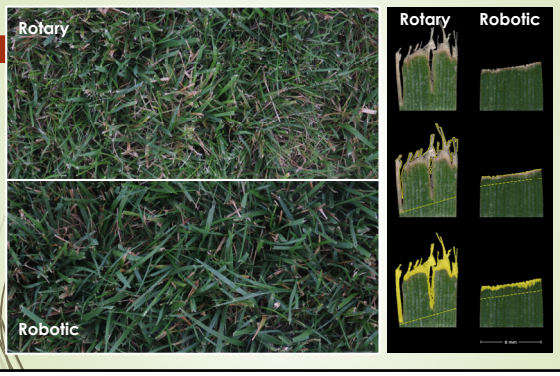
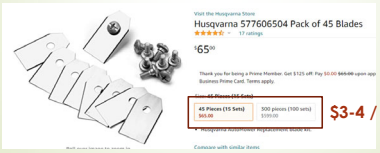


39

Blades need to be changed frequently to maintain their sharp edge

- Blades should be changed every 2-6 weeks
- Process is very simple and just takes a screwdriver and a few minutes



40

Some other thoughts on robotics…

- Mowing puts less stress on turf because scalping never occurs
- Fully electric, so virtually silent and can mow day or night
- Numerous safety features that prevent mishaps or theft
- Some lawncare companies are now offering robotic services rather than traditional mowing
- They never call in sick!!

41

Contact Information

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Thank you!

42