Slide 1

What's the Deal with "No Mow May?"

Horticulture Program
DIVISION OF EXTENSION
UNIVERSITY OF WISCONSIN–MADISON

Presented by: **Doug Soldat**
Professor and Turfgrass Extension Specialist
University of Wisconsin–Madison
djsoldat@wisc.edu

Slide 2

Contributors

Julie Hill	Ann Wied
Paul Koch	PJ Liesch
Lisa Johnson	Peggy Damann
Tim Ripp	Kevin Schoessow

Extension
UNIVERSITY OF WISCONSIN–MADISON
HORTICULTURE PROGRAM

UW Madison Department of Entomology
Insect Diagnostic Lab

TDL
TURFGRASS DIAGNOSTIC LAB

Slide 3

What is "No Mow May" and its impact?

What lawn and gardening practices support pollinators?

Where can I find more resources?

Slide 4

"No Mow May"
Pause mowing during May to allow flowers to bloom in your lawn.

Slide 5

2019
Plantlife (UK)

2020
Appleton (WI, USA)

Sparked nationwide movement

Slide 6

What does the research say?
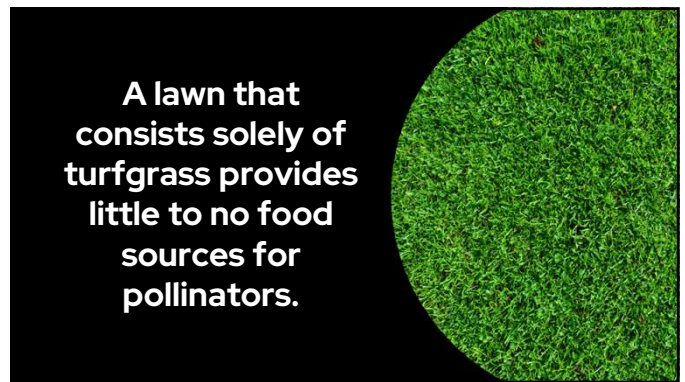
↑ Mowing

↓ Diversity

↓ Mowing

↑ Diversity

Slide 7

Do pollinators benefit from unmowed lawns?

7

Slide 8

A **pollinator** is any animal that visits flowering plants and transfers pollen from flower to flower.

White-lined sphinx moth | Clouded sulphur butterfly | Drone fly | Great black wasp
Hover fly | Wasps | Goldenrod soldier beetle | Ruby-throated hummingbird

8

Slide 9

What do pollinators need?

Blooming flowers | Safe places to nest, overwinter, hide | Protection from pesticides

9

Slide 10

A lawn that consists solely of turfgrass provides little to no food sources for pollinators.

10

Slide 11

Lawns that are mowed less often and use less herbicides tend to have more flowering plants.

Dutch white clover | Common blue violet

11

Slide 12

2024 UW-Madison Evaluation of Lawn Quality and Species Diversity with No Mow May

- Treatments:
  - Regular Mow May-Mow at 2.5" at regular intervals
  - No Mow May-Do not mow during May. Then chop down to 2.5" on June 1
  - One Mow May-Only mow on May 15 during May. Then chop down to 2.5" on June 1
  - High Mow May-Mow at 3.5" at regular intervals

Key Findings:

1. Clover did not start blooming until the end of May, therefore our mowing treatments only had an effect on clover counts after this. Higher clover counts on two rating dates in May for the "No Mow" and "One Mow" treatments. But lower clover counts after June 1 after the mow down.
2. It took the "No Mow" treatment 1 month to recover from being mowed
3. "One Mow" treatment did recover much faster than "No Mow".
4. On most rating dates, we did not see any effect of mowing regime on flower counts. Likely a result of mowing induced flower production, and/or other confounding factors.
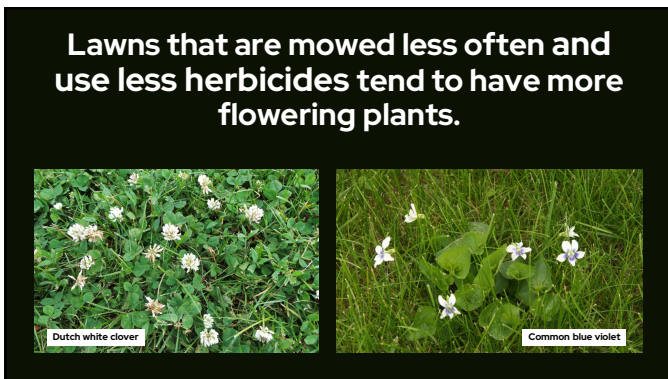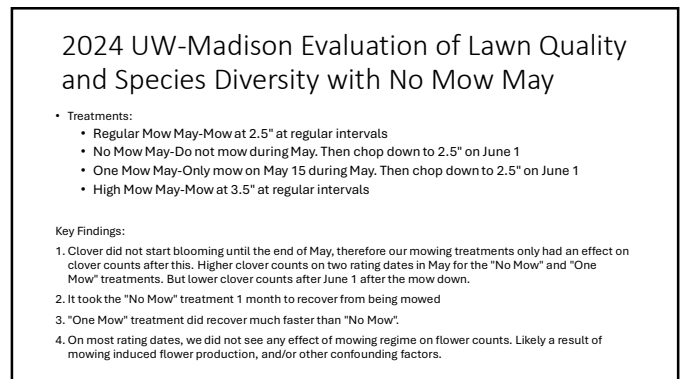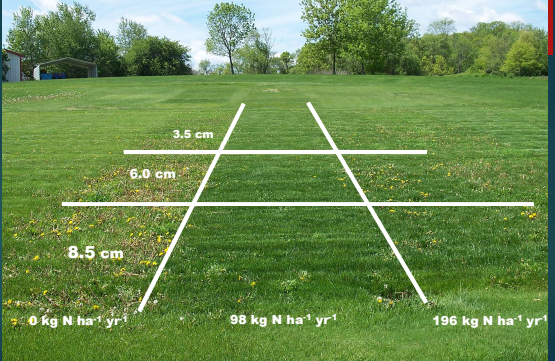
12

Slide 13

Ecology of Herbicide-Free Lawns in Southern Wisconsin

BRITTA WELSCH
DOUG SOLDAT, PHD
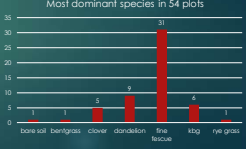DEPARTMENT OF SOIL SCIENCE
UNIVERSITY OF WISCONSIN - MADISON

A Creative Economy for Sustainable Development

13

Slide 14

3.5 cm
6.0 cm
8.5 cm

0 kg N ha⁻¹ yr⁻¹   98 kg N ha⁻¹ yr⁻¹   196 kg N ha⁻¹ yr⁻¹

14

Slide 15

Regular lawns have diversity

Richness and Dominant Species

Dominant Species	Richness
Perennial ryegrass	6.51 A
Bare soil	6.00 A
KBG	4.83 B
Creeping bentgrass	4.72 BC
Clover	4.66 BC
Fine fescue	4.54 BC
Dandelion	4.40 C

Fertilization and Richness

Rate (kg N / ha / yr)	Richness
0	5.78 A
98	5.01 B
196	4.50 C

Planted grass and richness

Planted Grass	Richness
Perennial ryegrass 'Jiffe'	5.85 A
KBG 'Kingfisher'	5.75 A
Mixture	5.14 B
KBG KenBlue	5.00 BC
Tall fescue	4.65 C
Fine fescue 'Chewings'	4.19 D

HOC and Richness

Mow Height (cm)	Richness
3.5	5.56 A
6	5.20 B
8.5	4.53 C

Most dominant species in 54 plots
(bar chart: bare soil, bentgrass, clover, dandelion, fine fescue, kbg, rye grass — fine fescue 31)

15

Slide 16

I want to participate in "No Mow May," what do I need to know?

Check your local ordinances

Reduce or eliminate pesticides

16

Slide 17

The 1st mow in June will be stressful to your mower and turfgrass plants.

17

Slide 18

Transitioning from "No Mow May"

18

Can my lawn be more pollinator friendly?

Mow less often

Add low growing flowering plants

Self-heal
(Prunella vulgaris)

Creeping thyme
(Thymus serphyllum 'Album')

19

Can my lawn be more pollinator friendly?

Mow less often

Add low growing flowering plants

Plant a "bee lawn"

FREE!

**Establishing a Bee Lawn – Current Research and Practical Techniques
April 25
12:00 p.m.**

20

Can my lawn be more pollinator friendly?

Mow less often

Add low growing flowering plants

Plant a "bee lawn"

Reduce pesticides

Consider reducing the size of your lawn

21

Supporting pollinators goes beyond pausing the mower for a month.

22

What do pollinators need?

Blooming flowers

Safe places to nest, overwinter, hide

Protection from pesticides

23

Scan to go to website:

Wisconsin Online Pollinator Habitat Assessment

We are glad you are interested in evaluating a site to identify actions you can take to improve the abundance and health of your local insect pollinator community. Whether you have a single garden bed, a yard, or a multiple-acre property, this tool can support your planning.

This tool is designed to give you:

1. Familiarity with the features that create a healthy pollinator habitat.
2. A simple yet complete assessment of the quality of pollinator habitat for food and nesting and ways to mitigate activities that are potentially harmful to pollinators.
3. A list of actions (and supporting resources) to improve the pollinator habitat on your site.

This tool was developed in 2020 by the *University of Wisconsin-Madison Gratton Lab* and the *Dane County Environmental Council.*

Quick Links

Begin my site assessment»
Download our pollinator habitat guide (PDF)»
Improve my pollinator habitat»

24

25

Pollinators need blooming flowers from April to October.

26

27

Finding plants that are best for your space takes a little research....

28

29

Insects need suitable shelter to nest, overwinter, and hide.

30

Try to avoid....

| Cleaning up too early in the spring | Disturbing nests | Plastic mulch and landscape fabric | Heavy, treated, dyed wood chips |

31

Exposure to pesticides can negatively impact pollinators.

32

Pest problems happen, what do I do?

Correctly identify the "problem."

Learn your options. Use non-chemical methods first.

If chemicals are warranted, research how to use them safely.

33

Correctly identify the "problem."

Ask Your Gardening Question Online Form

34

Correctly identify the "problem."

TDL
TURFGRASS DIAGNOSTIC LAB

UW Madison Department of Entomology
Insect Diagnostic Lab

Plant Disease Diagnostics Clinic

UW-Madison's Diagnostic Labs

35

Learn your options. Use non-chemical methods first.

Healthy lawns and plants are *less susceptible* to insect and disease problems.

36

If chemicals are warranted, research how to use them safely.

Pesticides should be the *last* resort and only used when necessary.

37

If chemicals are warranted, research how to use them safely.

Look for the bee icon – signals the product's hazard to pollinators. Read and follow **ALL** label directions carefully.

38

If chemicals are warranted, research how to use them ~~safely~~.

39

If chemicals are warranted, research how to use them safely.

If you choose to use chemicals, use them in the least damaging ways.

40

Add flowers
Leave areas for nesting
Reduce or eliminate pesticides

41

Mowing Best Practices

- **Choose the proper height**
  - Lawns: 2.5 to 3.5 inches
  - Stimulate dense turf
- **Follow the 1/3 rule**
- **Use sharp mower blades**
  - Turf heals faster
  - Less disease
  - Better appearance
- **Mulch the grass clippings**

42

Slide 43

Mowing is the most under-studied aspect of turfgrass science

43

Slide 44
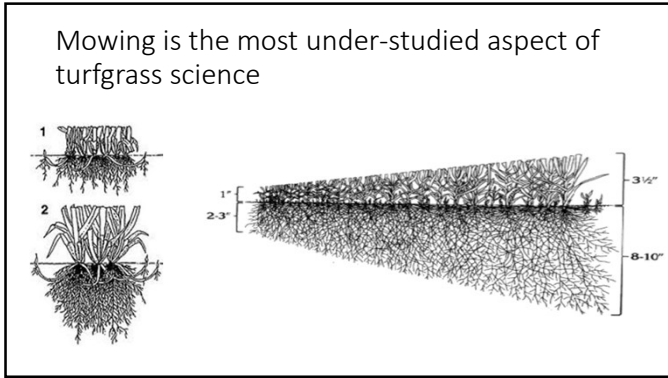
Miller et al (2019): mulching vs side discharge

- Evaluated small, medium, and large mowers

- Studied the size of the clippings from mulched and side discharged grass

- Two lawn species (tall fescue and zoyzia) in North Carolina

Table 5. Specific projected area (sq inch) of total turfgrass leaf tissue pieces collected as a function of grass, mowing mode, and mower. Values represent a mean of six samples (three replications from two collection points).

Mower	Tall fescue		Zoysiagrass	
	Mulch	Side discharge	Mulch	Side discharge
Small	0.0015 a†	0.0017 a	0.0011 a	0.0011 a
Medium	0.0013 ab	0.0012 b	0.0009 a	0.0009 b
Large	0.0009 b	0.0009 c	0.0009 a	0.0007 c
Mean	0.0013 A	0.0013 A	0.0010 A	0.0009 A

† Means with the same lowercase letter within the column or uppercase letter in a row (same grass) are not significantly different (P = 0.05) according to Fisher's protected least significant difference test.

44

Slide 45

Mulching doesn't work?

- "Mulching operation did not decrease clipping size as hypothesized. Instead, mulching resulted in average increases of 9 and 0.2% in clipping length and specific projected area, respectively. A side discharge mode of operation may result in fewer clippings on the surface, increasing surface uniformity compared to a mulching mode of operation."
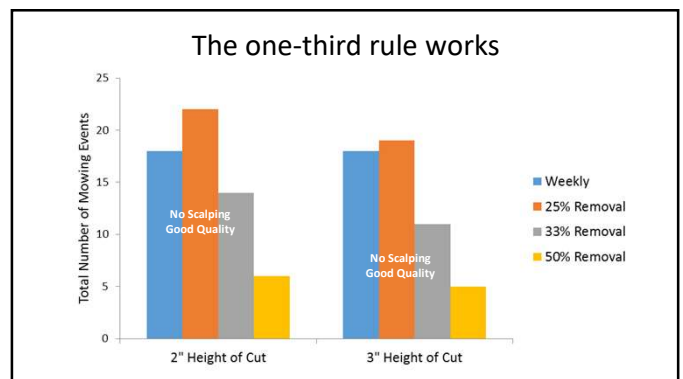
  Miller et al (2019)

45

Slide 46

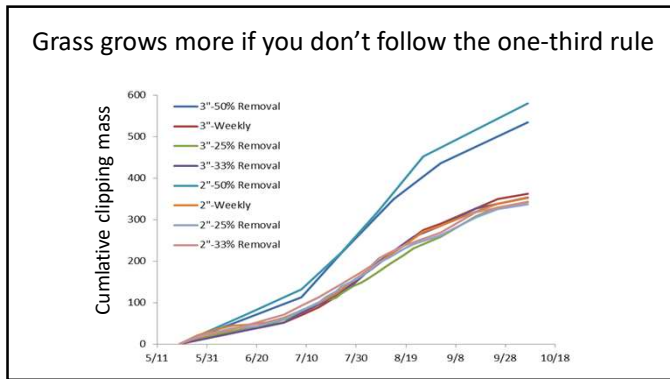# The 1/3 Rule:

- Don't remove more than 1/3 of the leaf tissue at one time

46

Slide 47

	2"	3"
Weekly	-	-
1/4 Rule	2.66	4
1/3 Rule	3	4.5
1/2 Rule	4	6

47

Slide 48

The one-third rule works

Total Number of Mowing Events

No Scalping Good Quality

No Scalping Good Quality

- Weekly
- 25% Removal
- 33% Removal
- 50% Removal

2" Height of Cut   3" Height of Cut

48

Grass grows more if you don't follow the one-third rule

49

The higher you cut, the slower it grows

50

Sharpness is good

EFFECT OF SHARP VERSUS DULL CUT ON GROWTH RATE ON TWO NEARLY IDENTICAL BLADES OF BLUEGRASS. (SKETCHED FROM ACTUAL TIME-LAPSE PHOTOS)
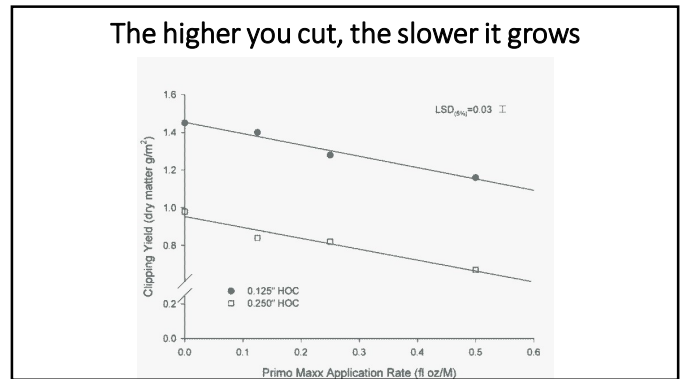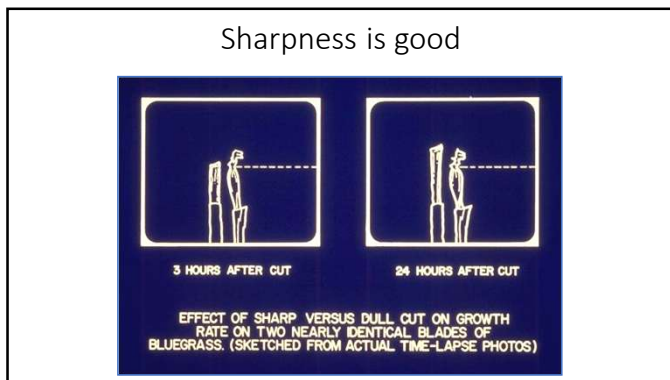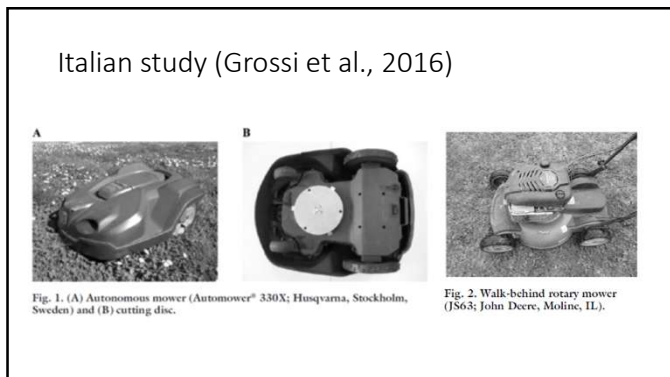
51

Robotic mowers should influence turf health

• They mow frequently and remove tiny amounts of grass

• They are lightweight

• They have extremely sharp cutting heads

• What does the research say?

52

Italian study (Grossi et al., 2016)

Fig. 1. (A) Autonomous mower (Automower® 330X; Husqvarna, Stockholm, Sweden) and (B) cutting disc.

Fig. 2. Walk-behind rotary mower (JS63; John Deere, Moline, IL).

53

Table 2. Mowing system treatment effects on tall fescue turf quality (1 = poor, 9 = excellent), mowing quality (1 = poorest mowing quality, 9 = cleanest cut), weed cover, and disease (1 = completely injury, 9 = no injury) after 7 and 12 weeks of treatment. At 12 weeks after treatment shoot density and leaf width are also indicated.

| | 7 weeks after treatment | | | |
Mowing system	Turf quality (1–9 scale)	Mowing quality (1–9 scale)	Weed cover (%)	Disease (1–9 scale)
Rotary mower	6.5	7.8	7	9
Autonomous mower	7.0	8.0	4	9
LSD 0.05[y]	0.3		1	NS

| | 12 weeks after treatment | | | | | |
Mowing system	Turf quality (1–9 scale)	Mowing quality (1–9 scale)	Weed cover (%)	Disease (1–9 scale)	Shoot density (no./cm²)[z]	Leaf width (mm)[x]
Rotary mower	6.4	7.8	9	8.0	2.1	2.7
Autonomous mower	7.3	8.0	6	8.4	3.2	2.1
LSD 0.05[y]	0.2	NS	2	NS	0.5	0.3

LSD = least significant difference; NS = nonsignificant.
[z]1 shoot/cm² = 6.4516 shoots/inch², 1 mm = 0.0394 inch.
[y]Fisher's LSD test at the 0.05 level.

54

9

Table 3. Operative characteristics, energy consumption, and estimated costs of the autonomous mower and of the rotary mower working on a surface of 1296 m² (1550.0 yard²) at 3.5 cm (1.38 inch) mowing height.

Parameter	Unit[a]	Value
Autonomous mower		
Working speed	km·h⁻¹	1.60
Working width	cm	24.00
Set daily working time (mowing and recharging)	h·d⁻¹	10.00
Daily mowing time (no recharging)	h·d⁻¹	7.80
Electric energy consumption per week	kWh/week	2.21
Primary energy consumption per week	kWh/week	4.80
Cost per week	euros/week	19.36
Rotary mower		
Engine power	kW	5.00
Working speed	km·h⁻¹	3.00
Working width	cm	53.00
Total operative time	h/week	1.02
Gasoline consumption	L/week	1.36
Primary energy consumption	kWh/week	12.60
Cost per week (included labor 25 euros/h)	euros/week	32.22

[a]1 km·h⁻¹ = 0.6214 mph, 1 cm = 0.3937 inch, 1 L = 0.2642 gal.

55

Case Study: Stavenger, Norway
Atle Revheim Hansen, Golf Course Manager

56

Case Study: Stavenger, Norway
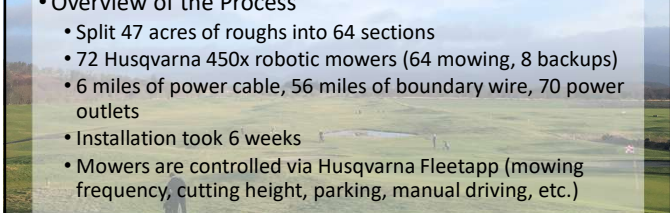**Atle Revheim Hansen, Golf Course Manager**

- 60,000 rounds per year
- 47 acres of roughs cut with Jacobsen AR 250 in 2016 and prior
- In 2017, switch to Husqvarna to mow roughs
 - Decision driven by poor drainage and inability to mow grass during periods of extended rainfall.

57

Case Study: Stavenger, Norway
Atle Revheim Hansen, Golf Course Manager

- Overview of the Process
  - Split 47 acres of roughs into 64 sections
  - 72 Husqvarna 450x robotic mowers (64 mowing, 8 backups)
  - 6 miles of power cable, 56 miles of boundary wire, 70 power outlets
  - Installation took 6 weeks
  - Mowers are controlled via Husqvarna Fleetapp (mowing frequency, cutting height, parking, manual driving, etc.)

58

Photo 2. The whole fleet of robotic mowers at Bærheim GC. Photo: Atle R. Hansen
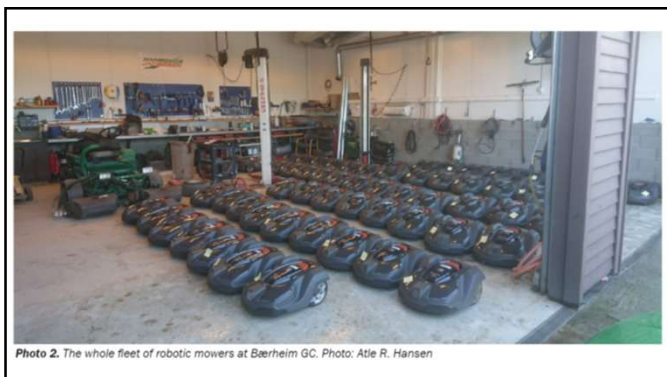
59

Case Study: Stavenger, Norway
Atle Revheim Hansen, Golf Course Manager

- Problems
  - Communication problems between mowers and app
  - Wheel motors went bad – all replaced
  - Charging station issues – replaced
  - Sections had to be redesigned for efficiency
  - Some mowers needed to be upgraded to four-wheel drive

60

Slide 61

Case Study: Stavenger, Norway
Atle Revheim Hansen, Golf Course Manager

BÆRHEIM GOLFPARK

- Benefits
  - Less clippings left on the roughs after wet periods
  - No stripes (golfers at this location thought the grain affected the lie)
  - Robots rarely interfered with play
  - Saved time
  - Reduced CO_2 emission by 21 tons
  - 70 electrical outlets have proven useful for other purposes

"The reputation for the course has been raised significantly. The benefits were significant and made us decide to robotize the driving range and fairways."

61

Slide 62

Case Study: Stavenger, Norway
Atle Revheim Hansen, Golf Course Manager

BÆRHEIM GOLFPARK

- Maintenance
  - Replace razor blades and clean mowers with compressed air every two weeks
  - Check Fleetapp every morning
  - Requires about 4 hours of monitoring and management from one employee every day
    - In contrast, mowing the roughs used to take 2 people 8 hours a day. Labor reallocated to putting green management

62

Slide 63

Case Study: Stavenger, Norway
Atle Revheim Hansen, Golf Course Manager

BÆRHEIM GOLFPARK

- Initial Investment and Costs
  - 72 mowers = $169,000 / electrical work = $101,000 / other costs = $56,000 / **Total = $326,000**

63

Slide 64

Photo 1. Golfers and robotic mowers «living together in peace» at Bærheim GC, Norway. Photo: Atle R. Hansen.

64

Slide 65

University of Kentucky Robotic Mowing Studies

- Fertility – can robotic mowing reduce fertilizer requirements?
  - Rotary, zero-turn with 2 lbs N
  - Robot, 1.6 lbs N
  - Robot, 1.2 lbs N

- Irrigation – can robotic mowing reduce irrigation requirements?
  - Rotary + 80% ET
  - Robot + 70%ET
  - Robot + 60% ET
  - Husq 430 XH Automower, $2,000 to $3,000

65

Slide 66

Husqvarna 430xxxx

Dr. Travis Shaddox

University of Kentucky
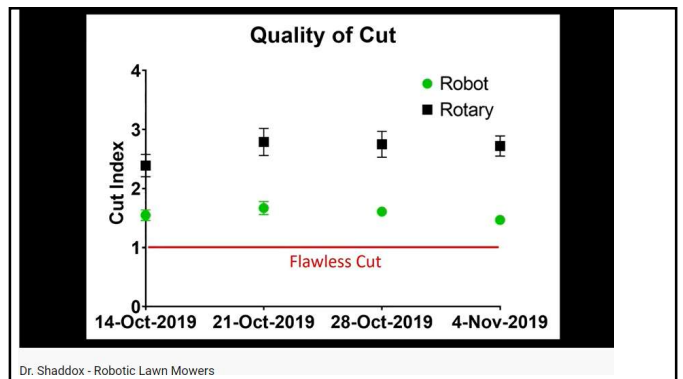
Dr. Shaddox - Robotic Lawn Mowers

66

67

68

69

70

71

72

Slide 73

Leaf Tip Chlorosis

Dr. Shaddox - Robotic Lawn Mowers

73

Slide 74
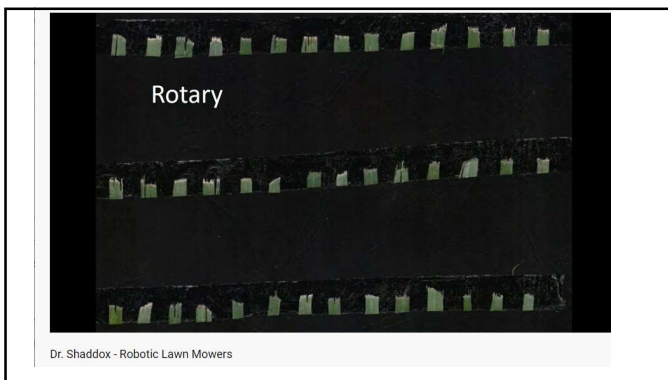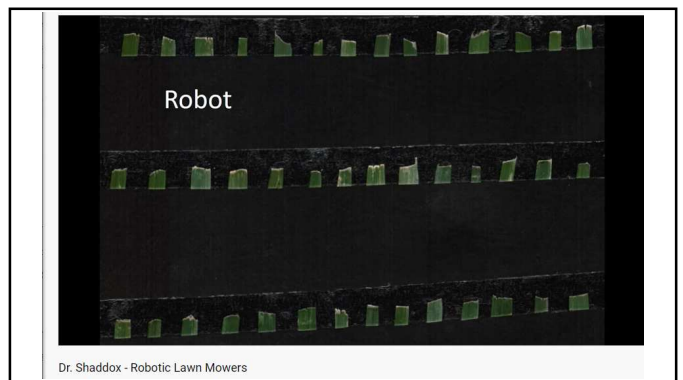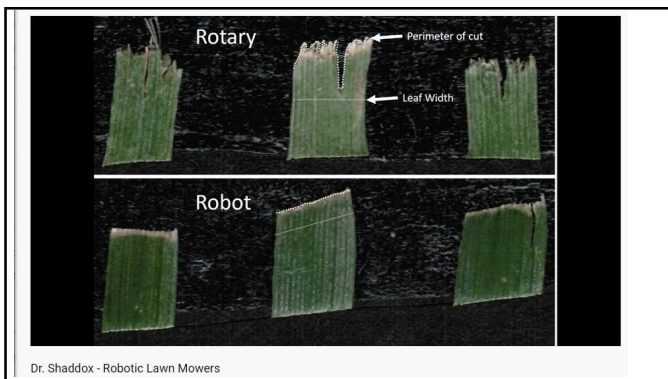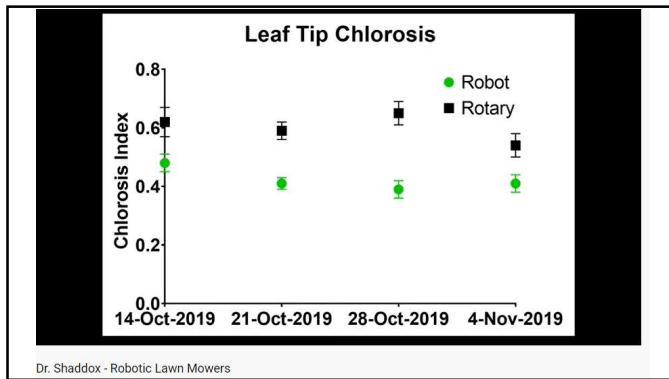
Mower	Acres Mowed	Boundary Wire Required	GPS	Approx. Purchase Price
Echo Robotics TM2000	6	Yes	Yes	$15,000
Robomow RC304	0.1	Yes	No	$1,000
WORX Landroid	0.25	Yes	No	$1,000
Husqvarna Automower 315x	0.4	Yes	Yes	$2,000

74

Slide 75

Turfgrass Quality Over the Season

Treatment	16 July	24 July	31 July	8 Aug	15 Aug	22 Aug	29 Aug	13 Sept
	-------------------------------- 1-9, 9 is best --------------------------------							
Echo Mower	No data	5.7 b	5.3 b	5.3 b	6.0 b	6.3 a	6.2 b	5.8 a
Control	No data	7.0 a	6.7 a	7.0 a	7.2 a	7.2 a	7.2 a	6.7 a

Treatment	16 July	24 July	31 July	8 Aug	15 Aug	22 Aug	29 Aug	13 Sept
	-------------------------------- 1-9, 9 is best --------------------------------							
Robomow	7.0 a	5.3 b	5.5 b	5.7 b	5.7 a	5.8 b	6.0 b	6.8 ab
Worx	5.7 b	6.7 a	6.5 a	5.8 b	5.8 a	6.0 b	6.5 b	6.2 b
Husqvarna	6.0 b	6.7 a	6.0 ab	6.7 a	6.0 a	6.8 a	7.2 a	7.2 a
Control	6.0 b	6.8 a	6.7 a	6.7 a	6.2 a	6.0 b	6.0 b	6.2 b

75

Slide 76

76

Slide 77

Differences in models was apparent

Table 5 - Average color index, visual quality, rust pressure, and percent green cover from 9 May 2019 – 4 October 2019. Results followed by different letters within each column are statistically different according to Fisher's Least Significant Difference (alpha=0.05).

Treatment	NDRE	Visual Quality	Density 9 July	Density 20 Sept
	0-1 (1 is greenest)	1-9 (9 is best)	--------- plants / in^2 ---------	
Robomow	0.378 a	5.98 c	4.55 a	5.02 ab
Worx	0.364 b	6.15 bc	4.69 a	4.48 ab
Husqvarna	0.390 a	6.56 a	3.98 a	5.81 a
Control	0.359 b	6.31 ab	4.04 a	4.02 b

77

Slide 78

Robotic Mower   Conventional Mower

78

We did not observe cut quality differences

79

Robotic mowing pros

- May help with labor issues
- Lower energy use may reduce costs long term
- Can mow during times of high rainfall

Robotic mowing cons

- High upfront cost
- Barrier wires
- Learning curve for mowing settings/app
- Need to optimize the cutting zone – remove obstacles, etc.

Robotic mower wishlist

- No boundary wires
- Patterned mowing
- Improved app functionality

80

What's the Deal with "No Mow May?"

Presented by: **Doug Soldat**
Professor and Turfgrass Extension Specialist
University of Wisconsin–Madison
djsoldat@wisc.edu

Horticulture Program
DIVISION OF EXTENSION
UNIVERSITY OF WISCONSIN–MADISON

81