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Long-term Cultivation and Sand Topdressing Trial

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Long-term Cultivation and Sand Topdressing Trial

- Organic matter reaches 4.0% drainage is compromised
  - Periods of dry weather
    - Desiccation
    - Hydrophobicity
  - Period of wet weather
    - Retain excess water
    - Impede drainage

Long-term Cultivation and Sand Topdressing Trial

- Hollow tine core cultivation
- Sand topdressing

Long-term Cultivation and Sand Topdressing Trial

- Hollow tine core cultivation

Long-term Cultivation and Sand Topdressing Trial

- Remove cores

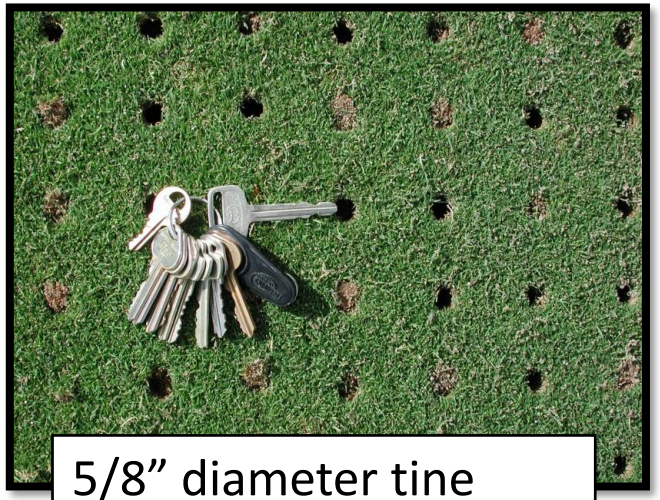
Long-term Cultivation and Sand Topdressing Trial

- Removes organic matter

- Golf Course Superintendents Association of America (GCSAA)
  - 20% affected surface area annually (keep organic matter at 4%)

- Tine size and spacing
  - 3/8” diameter, 1”x 2”
    - 4 times per year
  - 5/8” diameter 2”x 2”
    - 2 times per year

3/8” diameter tine



5/8” diameter tine

Long-term Cultivation and Sand Topdressing Trial

- Fills holes
- Dilutes organic matter

Long-term Cultivation and Sand Topdressing Trial

- United States Golf Association
  - Couples with cultivation in spring and fall
    - 14 cubic ft sand per 1,000 sq ft
  - Every 14 days between spring and fall cultivation
    - 1 cubic ft sand per 1,000 sq ft
      - 100 lbs per 1,000 sq ft
      - 0.01 inches

Long-term Cultivation and Sand Topdressing Trial

- Temporarily improve drainage (does not significantly reduce organic matter)
  - Vertical mowing
  - Grooming - PlanetAir Turf Products, Naples, FL
  - Venting – bayonet tines

Long-term Cultivation and Sand Topdressing Trial

- Temporarily improve drainage (does not significantly reduce organic matter)
  - Injection equipment
    - Sand injection - DryJect, Inc., Hatboro, PA
    - Sand injection - LandPride, Salina, KS
    - Water injection - HydroJect (Toro, Bloomington, MN)
    - Air injection - Air2G2 (Foley Company, Prescott, WI)]

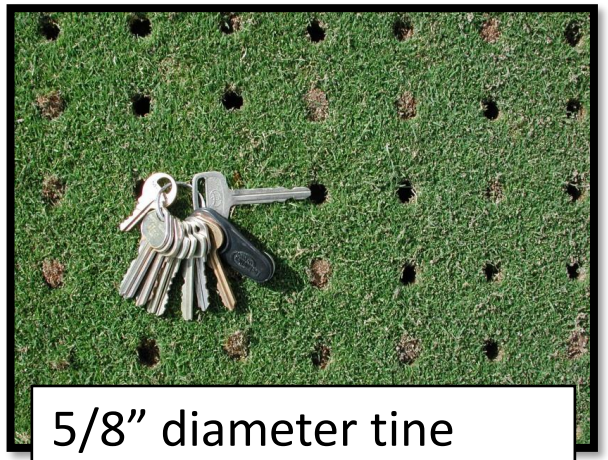
Long-term Cultivation and Sand Topdressing Trial

- Hollow tine core cultivation
- Sand topdressing

Long-term Cultivation and Sand Topdressing Trial

- Solid tine cultivation

3/8” diameter tine



5/8” diameter tine

Long-term Cultivation and Sand Topdressing Trial

- Solid tine cultivation

Long-term Cultivation and Sand Topdressing Trial

Long-term Cultivation and Sand Topdressing Trial

OBJECTIVES

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1) Evaluate the long-term (5 yrs) effects of hollow tine vs. solid tine cultivation on annual bluegrass putting greens.

2) Evaluate the effect of cultivation timing (spring vs. fall vs. both)

3) Determine the effect of sand topdressing rate on annual bluegrass putting greens; and interaction with cultivation type and timing.

RESEARCH METHODS

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Site

- 12 yr old annual bluegrass putting green
- 12 inches of USGA spec sand over silty clay loam soil
- Flat drainage

Design

- Long-term trial – 5 yrs
- 7 x 2 factorial + nontreated control
  - Main factors – cultivation & topdressing
- Strip-split plot design with 4 replications

TREATMENTS

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Cultivation

- Hollow tine spring
- Hollow tine fall
- Hollow tine spring & fall
- Solid tine spring
- Solid tine fall
- Solid tine spring & fall
- No cultivation (topdressing only)

Hollow Tine (0.6” or 5/8” OD)

Solid Tine (0.6” or 5/8” OD)

TREATMENTS

Topdressing Rate

50 lbs 1,000 ft^{-2} every 14-d

0.5 ft^3 per 1,000 sq ft

0.005 inches

100 lbs 1,000 ft^{-2} every 14-d

1 ft^3 per 1000 sq ft

0.01 inches

*Nontreated control include, which receives no cultivation or topdressing


GANDY

TREATMENTS

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	1	2
1	Hollow tine spring + 50 lbs 1,000 ft-2 every 14-d	Hollow tine spring + 100 lbs 1,000 ft-2 every 14-d
2	Hollow tine fall + 50 lbs 1,000 ft-2 every 14-d	Hollow tine fall + 100 lbs 1,000 ft-2 every 14-d
3	Hollow tine spring & fall + 50 lbs 1,000 ft-2 every 14-d	Hollow tine spring & fall + 100 lbs 1,000 ft-2 every 14-d
4	Solid tine spring + 50 lbs 1,000 ft-2 every 14-d	Solid tine spring + 100 lbs 1,000 ft-2 every 14-d
5	Solid tine fall + 50 lbs 1,000 ft-2 every 14-d	Solid tine fall + 100 lbs 1,000 ft-2 every 14-d
6	Solid tine spring & fall + 50 lbs 1,000 ft-2 every 14-d	Solid tine spring & fall + 100 lbs 1,000 ft-2 every 14-d
7	No cultivation + 50 lbs 1,000 ft-2 every 14-d	No cultivation + 100 lbs 1,000 ft-2 every 14-d
plus 1	Nontreated control (no cultivation and no tropdressing)	

DATA COLLECTION

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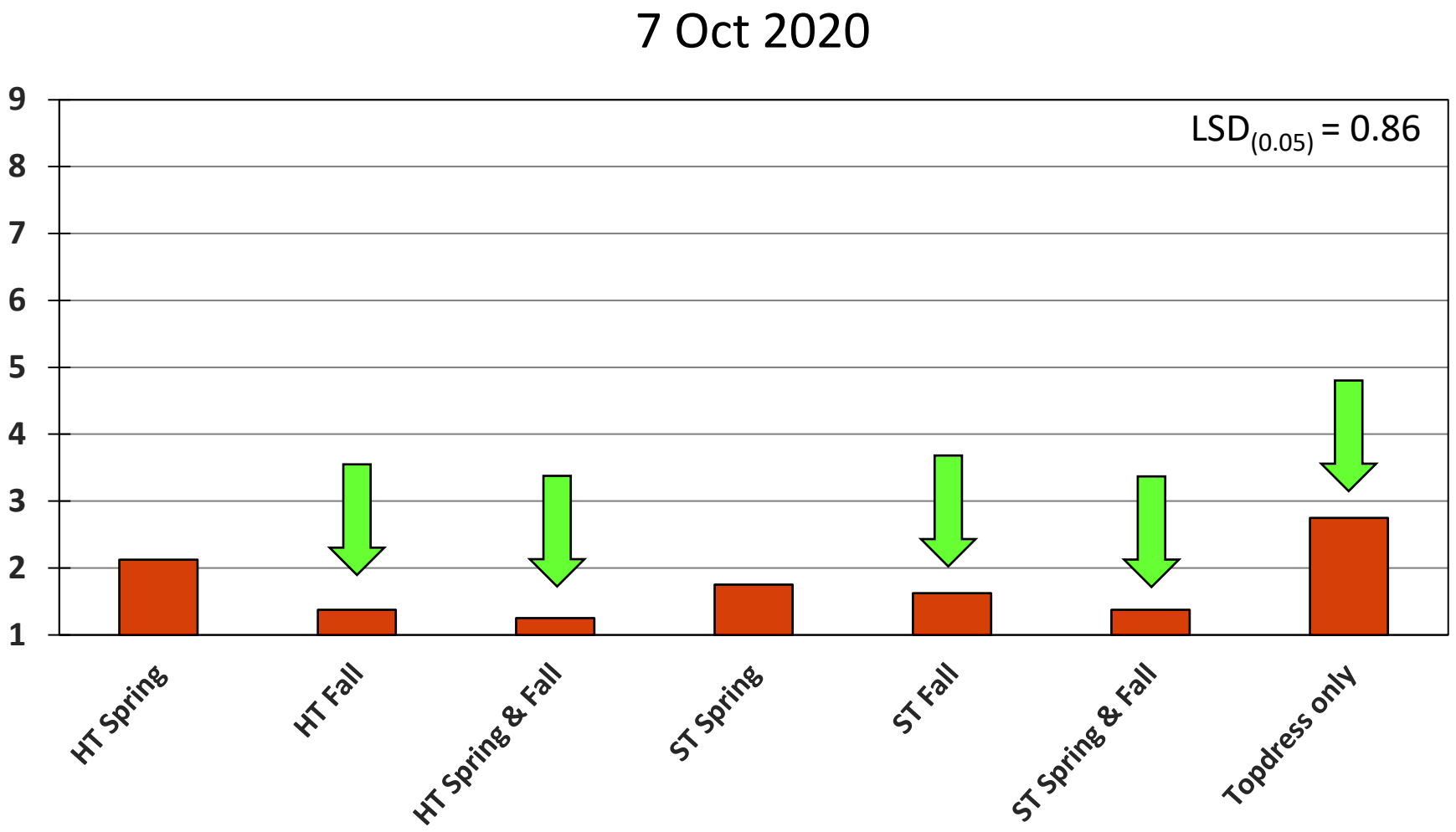
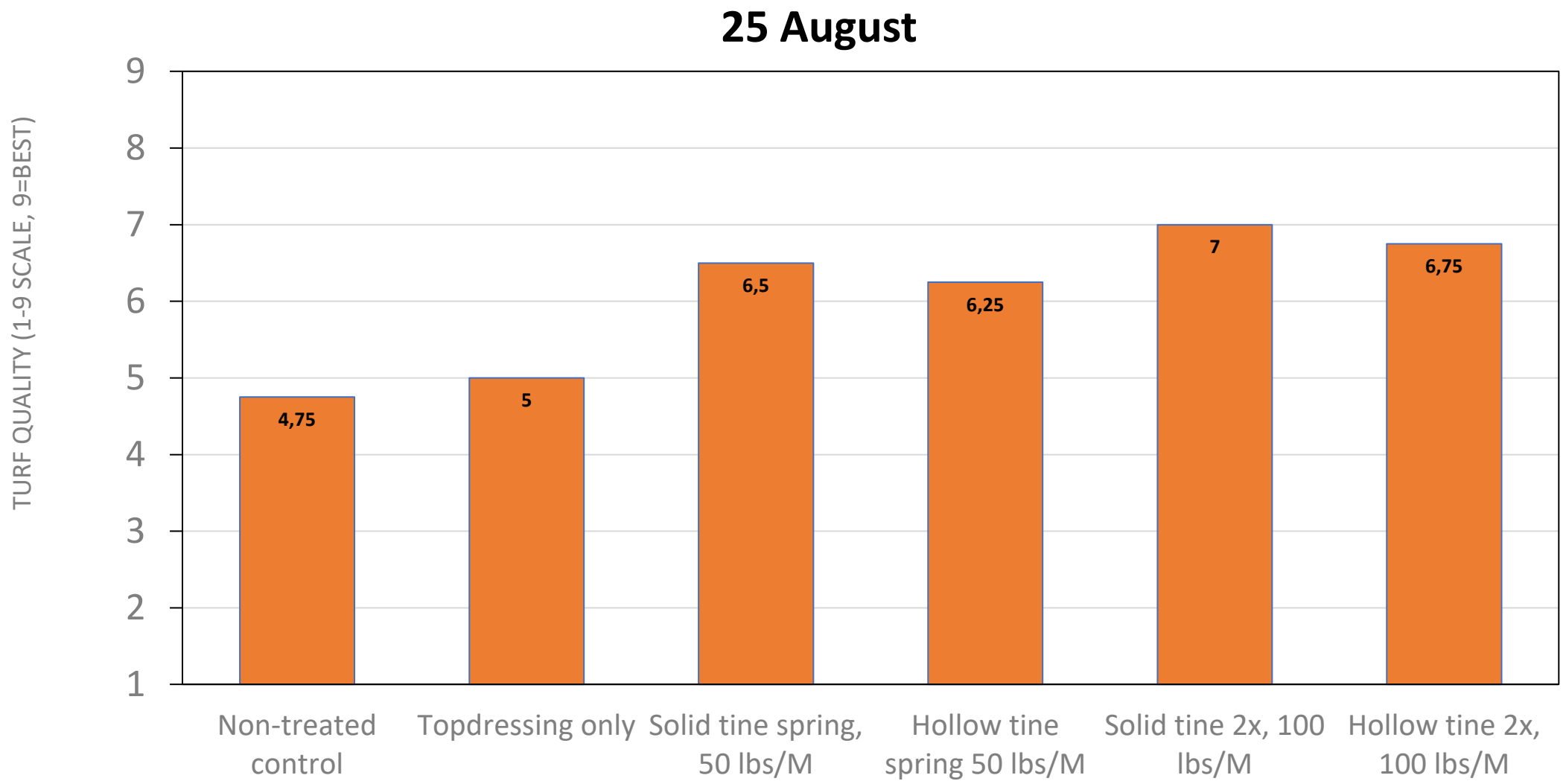
Yellow Patch

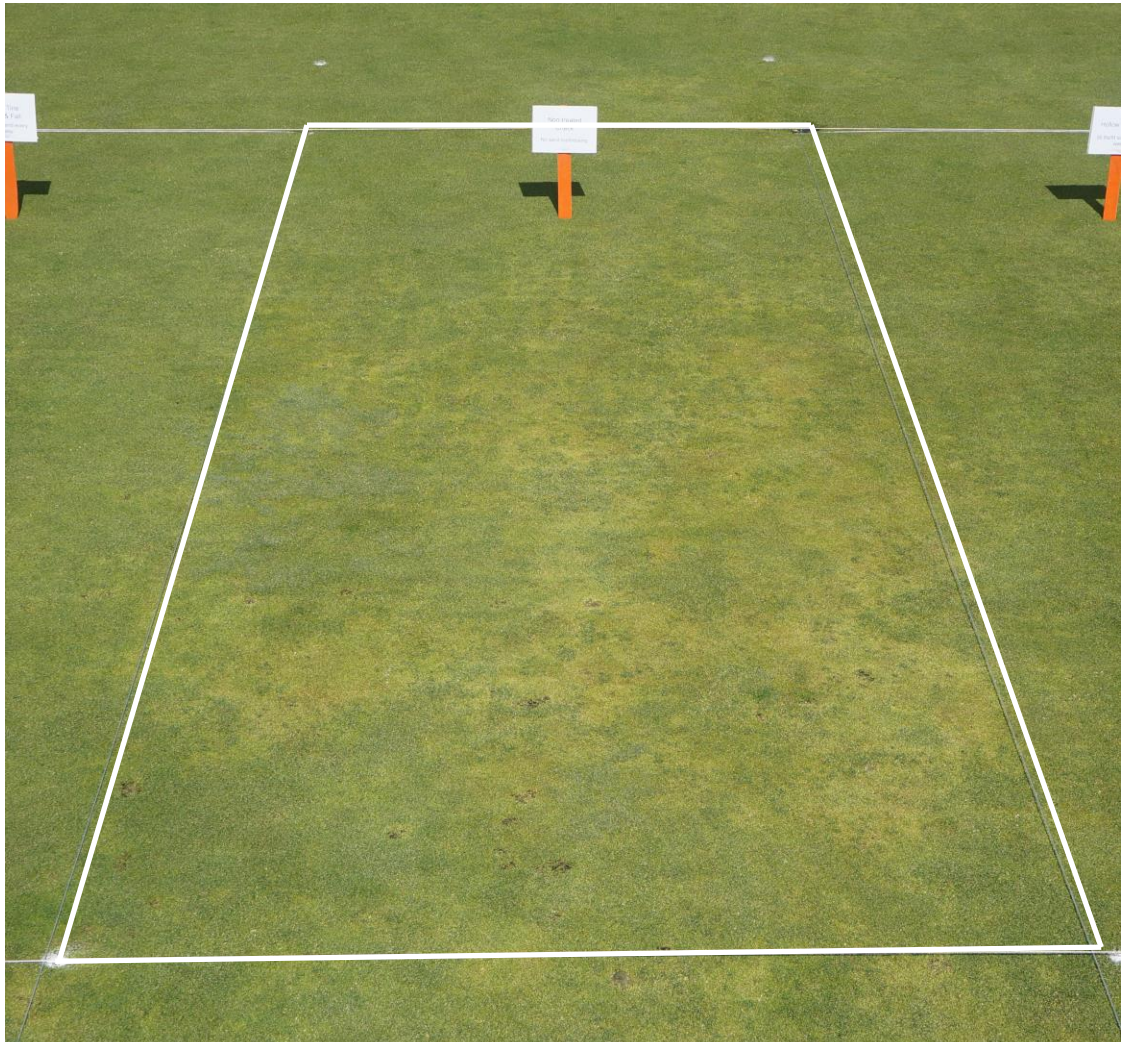


Turf Quality 2021

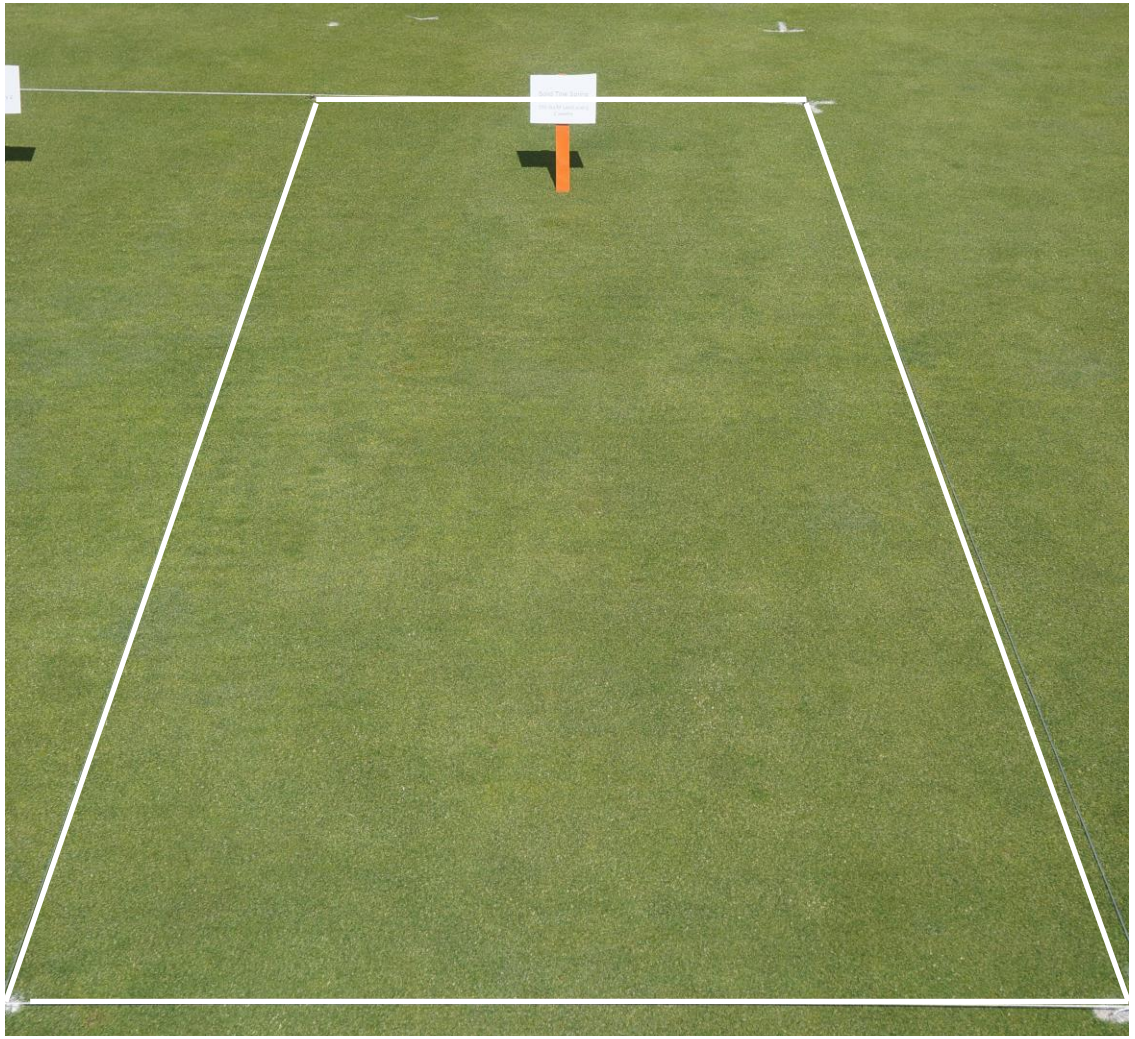


Turf Quality 2021

Oregon State University



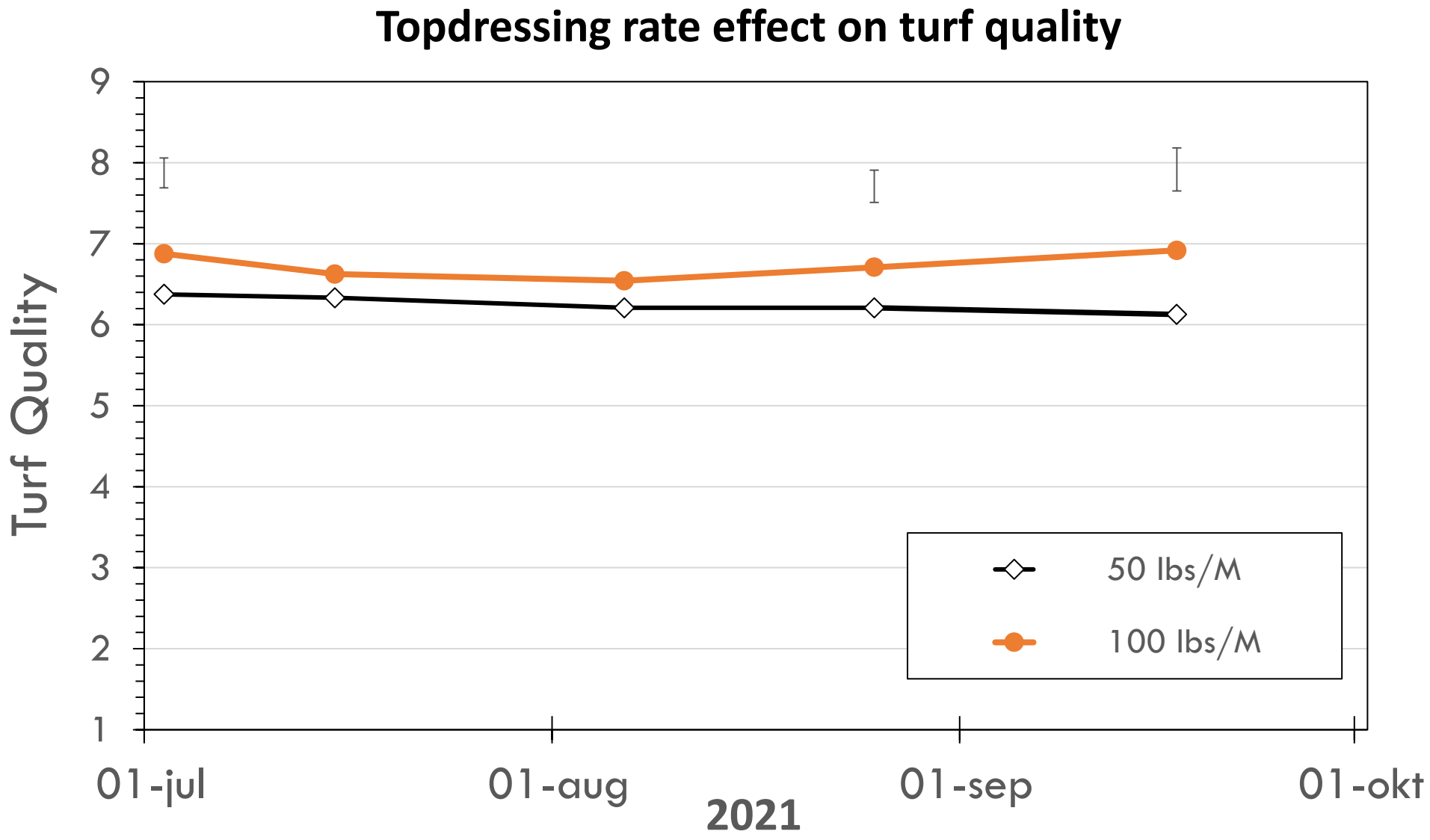
Non-treated - cyanobacteria (*Oscillatoria* sp.)



Solid Tine Spring, 100 lbs/M

Turf Quality 2021

Oregon State University



Preliminary Conclusions

1) Combination of cultivation and sand topdressing produced the highest turf quality

2) Higher topdressing rates (100 lb/M) resulted in greater TQ compared to lower rates and no topdressing in the second year

3) Topdressing alone had reduced TQ compared to the combination of cultivation and topdressing

4) Non-treated plots resulted in the poorest TQ and the most disease.


Northern California Chapter
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