



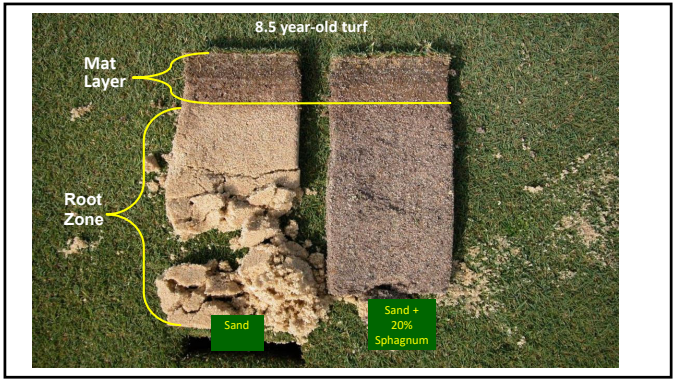
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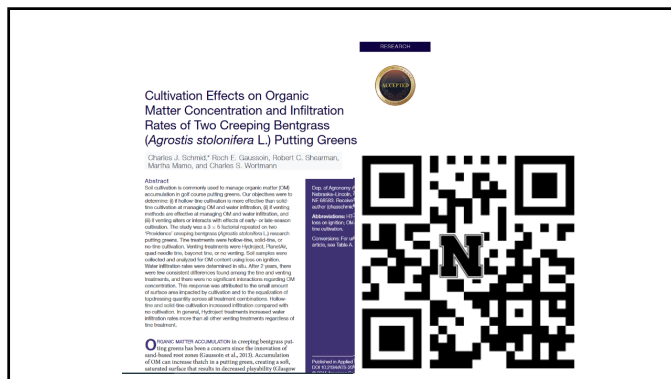
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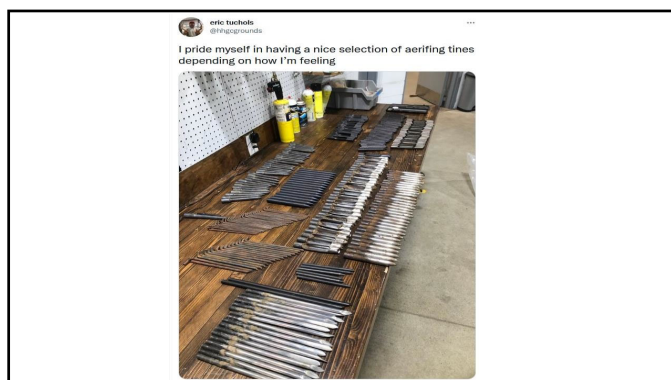
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### Tine Trial Fall 2021

- Check
- Hollow 1/2" ID
- Solid 1/2" OD
- DryJect (3x3)
- 1/4" Solid (Needle)
- DryJect (3x2)
- Needle + Solid
- Needle + Hollow

Procure - 3" target depth on all tines  
Dryject = 5"

Sampled for OM the day after  
Treatment in 1' depth increments to 4"

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Treatment	% OM 0-4"	Significance
Check	4.5	a
Hollow	3.7	b
Needle	3.1	c
DryJect (3x3)	2.7	d
Needle + Hollow	2.3	d
DryJect (3x2)	2.3	d
Needle + Solid	2.3	d
Solid	2.2	d




- No differences among depths
- Dilution only
- Dryject and needle tine were least surface disruptive
- **Data is preliminary**

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### Spring 2023 Tine Trial

- 9 tine types/configurations including Viper tines
- 26 devices (ProCore and DryJect)
- Timing (spring/fall)
- Topdressing before or after
  - OM
  - Surface parameters using the USGA GS3 digital golf ball
  - Other data

Equipment and Tine Support Provided by

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### Treatments (Oct 3 except DryJect on Oct 16)

- Main Plots (42' X 60' with a 6' border between)
  - 1. Topdress before tines with 0.25"(0.125 on October 2023) on surface (equates to 1 (1/2 fall) ton/1000 ft<sup>2</sup> or 20 ft<sup>3</sup>/1000ft<sup>2</sup>)
  - 2. Topdress after tines
- Sub-plots (tine treatments) set at 3" depth
  - 1. 5/8" Viper Nose™
  - 2. 1/2" Viper Nose™
  - 3. 3/8" solid
  - 4. 1/2" solid cross
  - 5. Untined control
  - 6. 3/4" solid
  - 7. .50" solid
  - 8. 3/8" hollow, side eject
  - 9. 1/2" solid cross
  - 10. .75" solid slicing
  - 11. 1/2" hollow, tapered
  - 12. 1/2" hollow side eject
  - 13. DryJect 3X3
  - 14. Untined Control
  - 15. DryJect 2X3

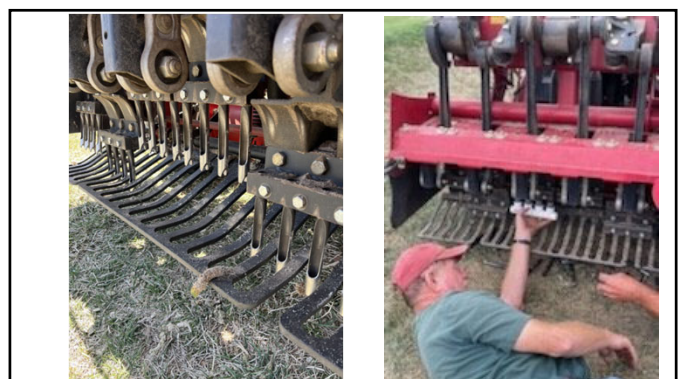
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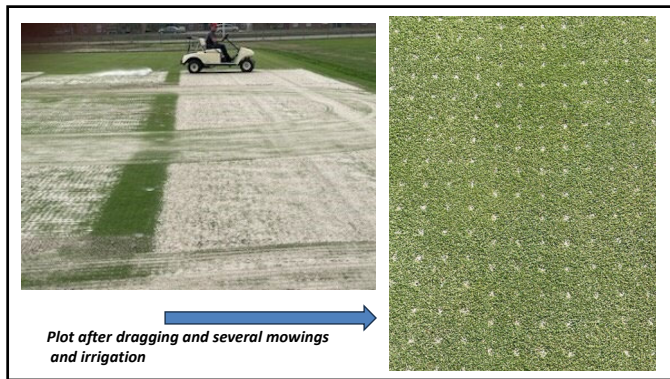
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### Data Collection

- Organic matter, 3-5 days after treatment
- Infiltration approx. weekly
- NDVI (cover measured digitally) every few days
- Firmness
- Surface Moisture 0-3'; 3-6"
- GS3
  - Ball roll
  - Smoothness
  - Trueness

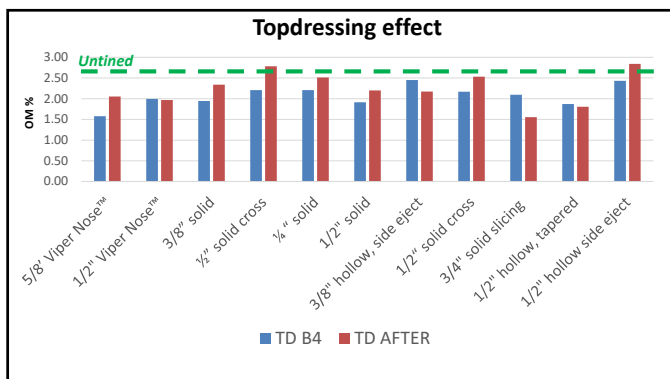


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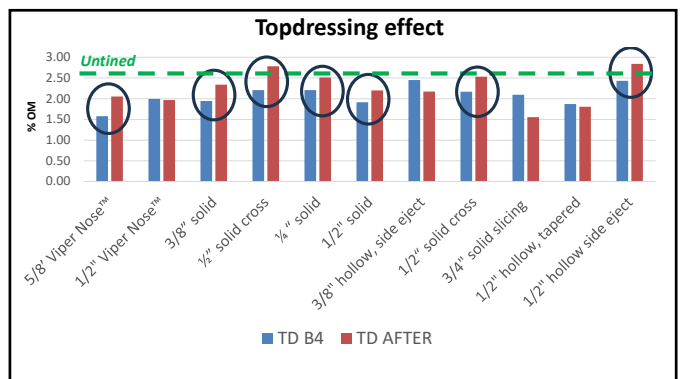
### 2023 Data Results

ANOVA	10-Oct	18-Oct	21-Oct	26-Oct		9-Oct	16-Oct	25-Oct
Effect	NDVI-1	NDVI-2	NDVI-3	NDVI-4	%OM	Infil-1	Infil-2	Infil-3
Topdressing (TD)	0.1161	0.5583	0.6987	0.2785	0.0466	0.3444	0.188	0.1061
Tine TRT	<.0001	0.0049	0.0353	0.114	<.0001	<.0001	<.0001	<.0001
TD*TRT	0.0761	0.925	0.2796	0.1175	0.0107	0.1	0.0076	0.4673

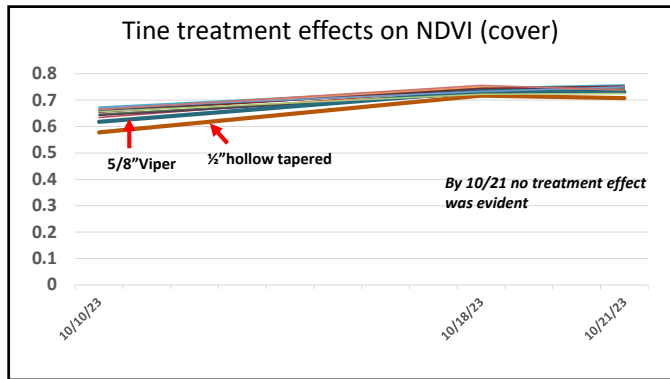
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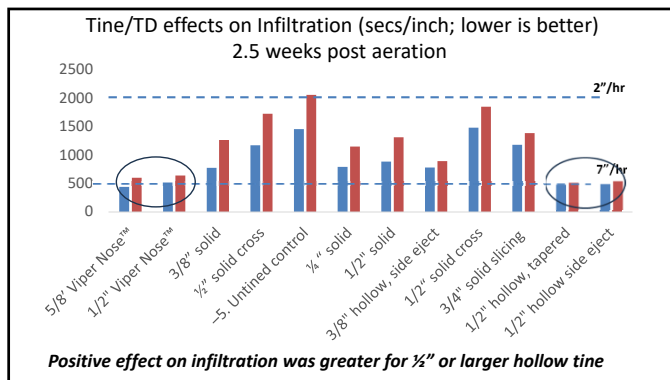
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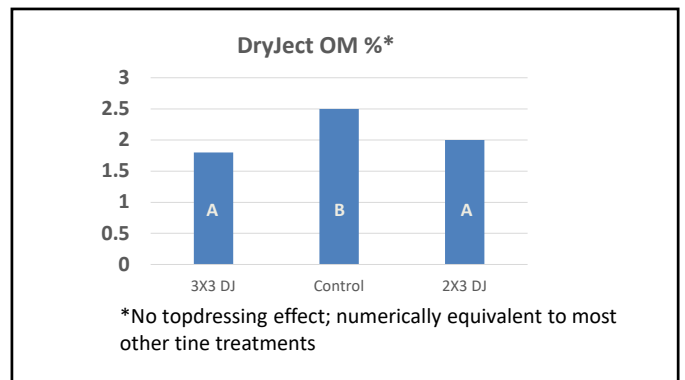
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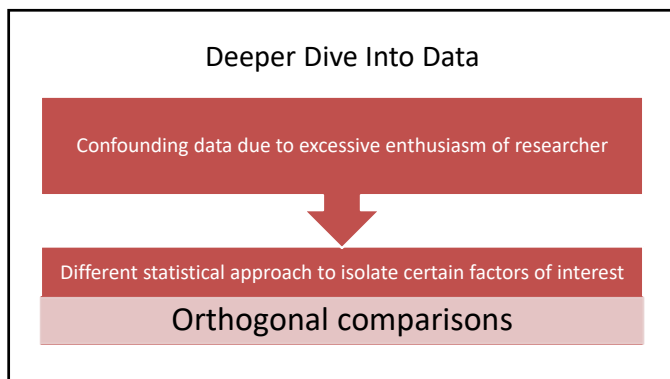
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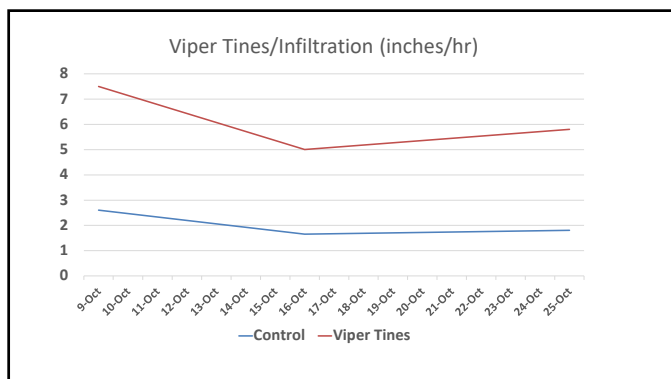
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1/2 Solid	1/2 Hollow
% OM	
1.8	2.4

Oct-25 Infiltration	
1/2 Solid	1/2 Hollow
Inch/hr	
2.8	6.6

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### Early Results

- Lots of stuff going on
- Topdressing before aeration, even with some hollow tines can incorporate more sand
- Higher and prolonged infiltration greater for hollow tines ½” or larger than solid tines
- Viper tines had greatest increase in infiltration over time than any other tine
- More to come (Phoenix, GCSAA, Power Hour)

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### PROCORE 648 VS 648S

- Is there a difference in solid tine displacement and sand reception?




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### Champions Run, Omaha, NE

Aerated on separate areas of the sand-based nursery putting green at 0.125” HOC, with ½” solid tines set at 3” with a 648S and 648. Each area was 60 ft<sup>2</sup>.

Sampled with a 1” probe above aeration hole; 0-3” and 3-6” with 10 random locations per aerator



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### Results

	648	648S
OM % 0-3”	2.2a	1.6b
		27% more sand
OM % 3-6”	1.6a	1.4a

*Different letters within a row indicate statistically significant differences at P < .01 based on a paired t-test with 18df*

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### Acknowledgements (UNL)



- USGA
- Environmental Institute for Golf
- Nebraska GCSA
- GCSA of South Dakota
- Peaks & Prairies GCSA
- Jacobsen, Toro, JRM & PlanetAir, DryJect
- Nebraska Turfgrass Association

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