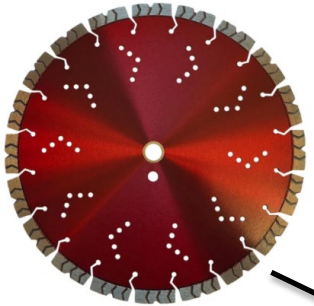
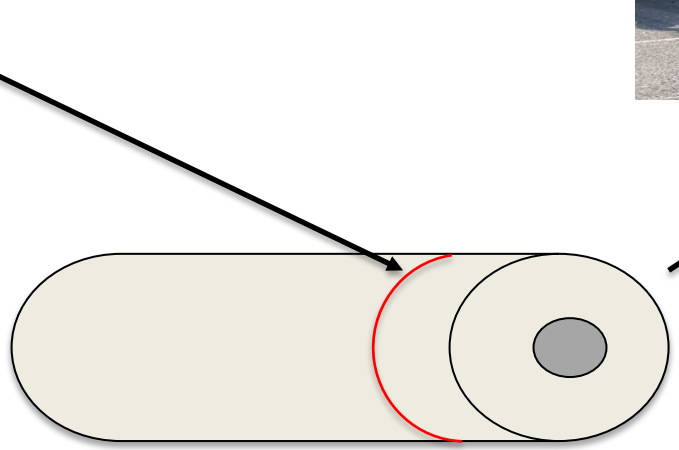
Use of Sediment Basins for Separation of Diamond Grinding Slurries

Karina Lenko

Josh Heitman, Christina Kranz, Adam Howard, Rich McLaughlin

Diamond Grinding





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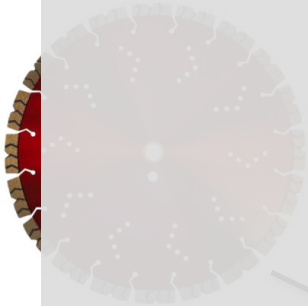
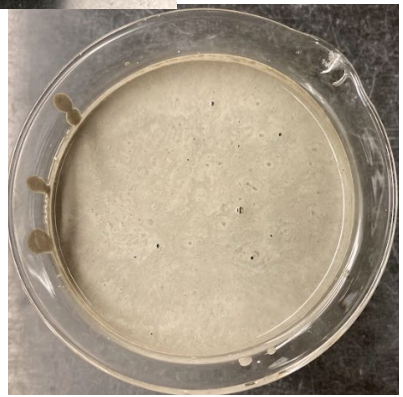
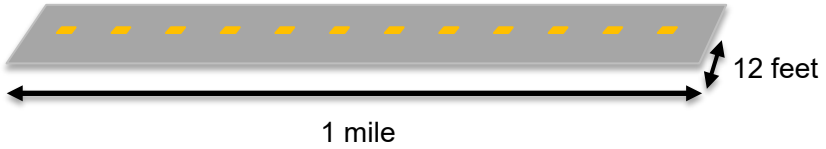


Diamond Grinding Slurry (DGS)

pH between
9-12.5 depending
on the concrete



~4.33 gallons of slurry produced per square yard of concrete resurfaced



~30,483.2 gallons of DGS generated

Equivalent to:
725.8 oil barrels

Would require 3.38 heavy-duty tanker trucks

Overview

- Diamond Grinding
- Diamond Grinding Slurry Management Practices
  - Roadside Application
  - Press Plate
  - Sediment Basin

Diamond Grinding Slurry (DGS) Management

- Roadside Application

Via: IGGA

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DGS transported via tanker trucks to the press plate system

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Water reused in grinding or sent to water treatment plant

Solids used as backfill or sent to a landfill for disposal

Diamond Grinding Slurry (DGS) Management

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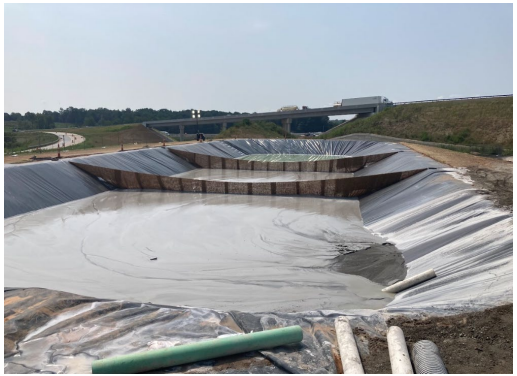

Separation of Diamond Grinding Slurry via Sediment Basin

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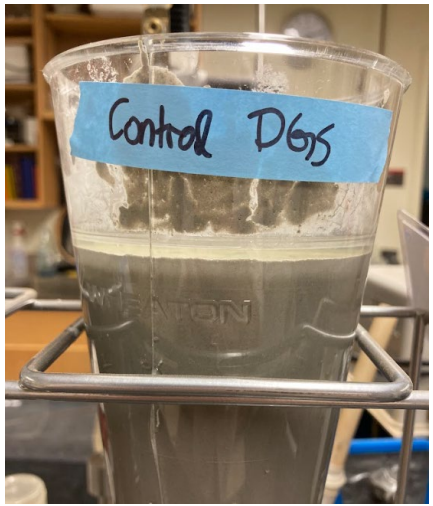
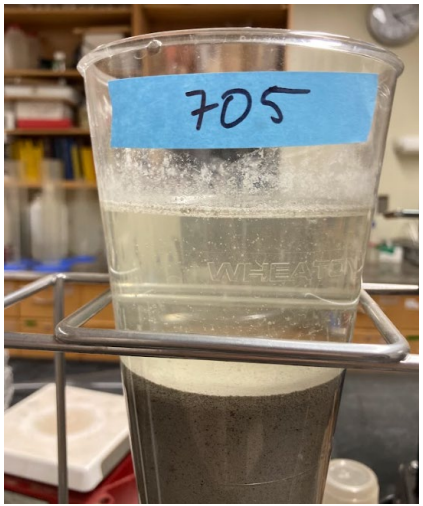
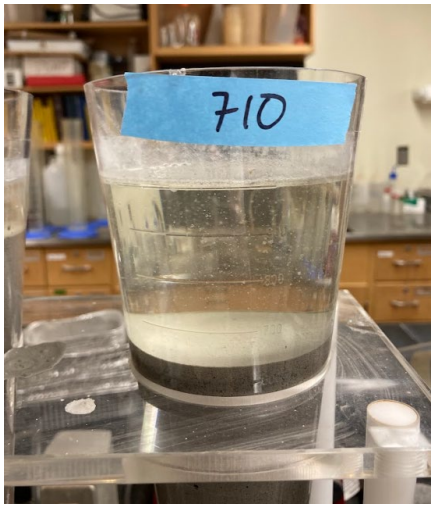
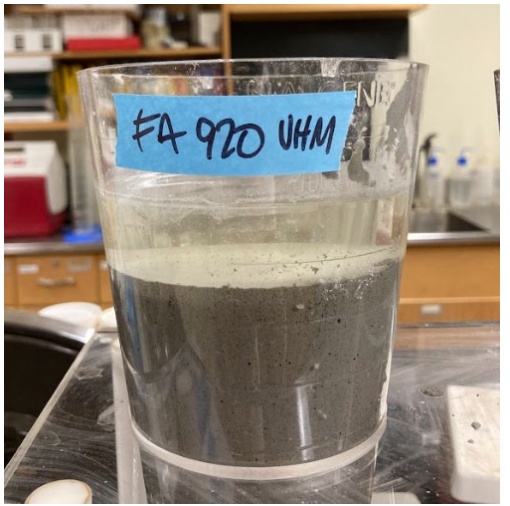
Polyacrylamide is a viable option for enhanced settling of DGS









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DGS Sediment Basin End of Life

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Two Waste Products:

Wastewater

Concrete Solids

DGS Concrete Solids Liming Experiment

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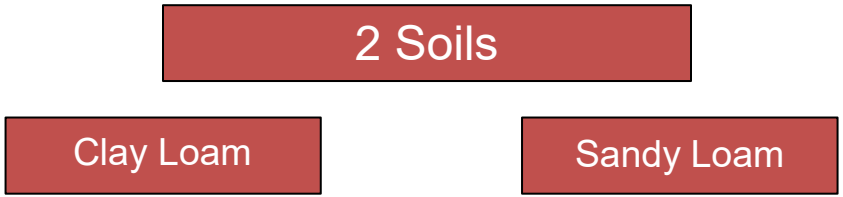
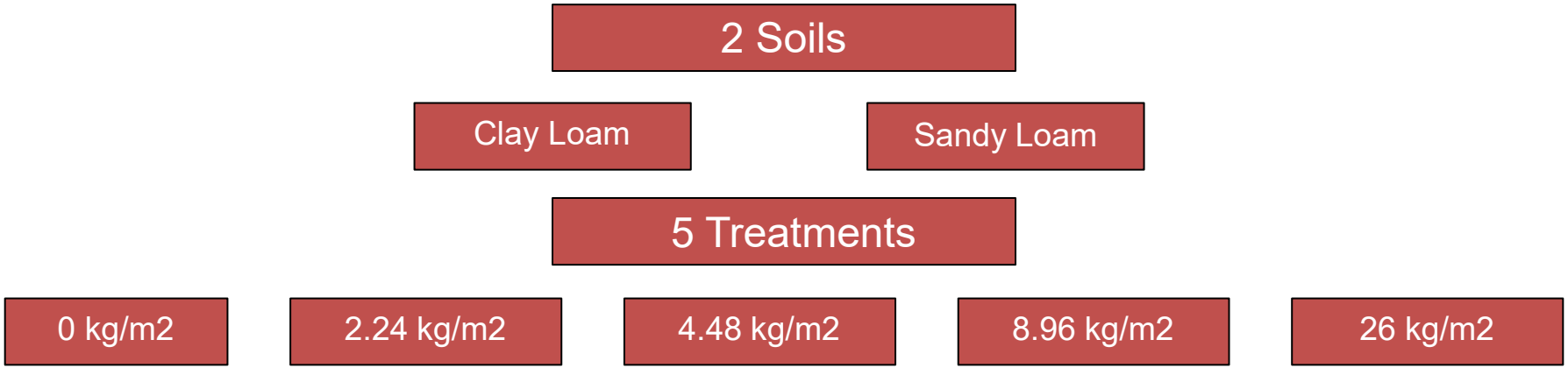


DGS Concrete Solids Liming Experiment



DGS Concrete Solids Liming Experiment

2 Soils

Clay Loam

Sandy Loam

5 Treatments

0 kg/m2

2.24 kg/m2

4.48 kg/m2

8.96 kg/m2

26 kg/m2

Soil Incubation Study

pH and electrical conductivity (EC) measurements taken at 2, 4, 8, and 16 weeks
Incubated at 20˚

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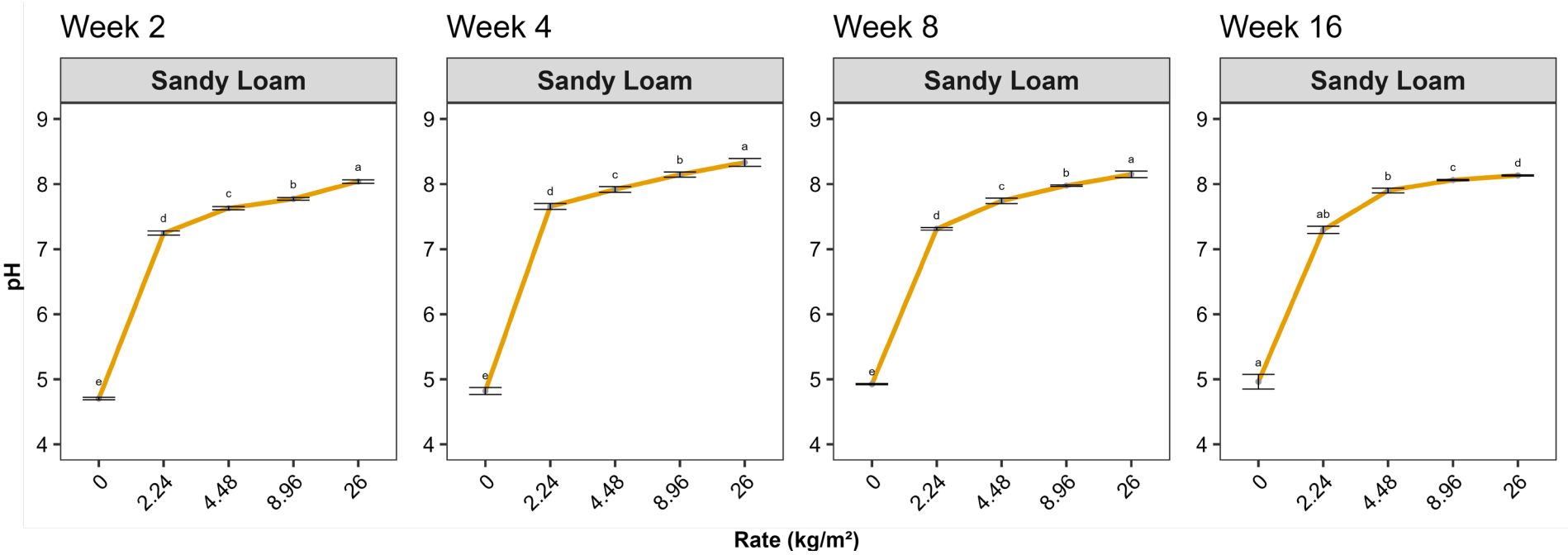
Seed Germination Study

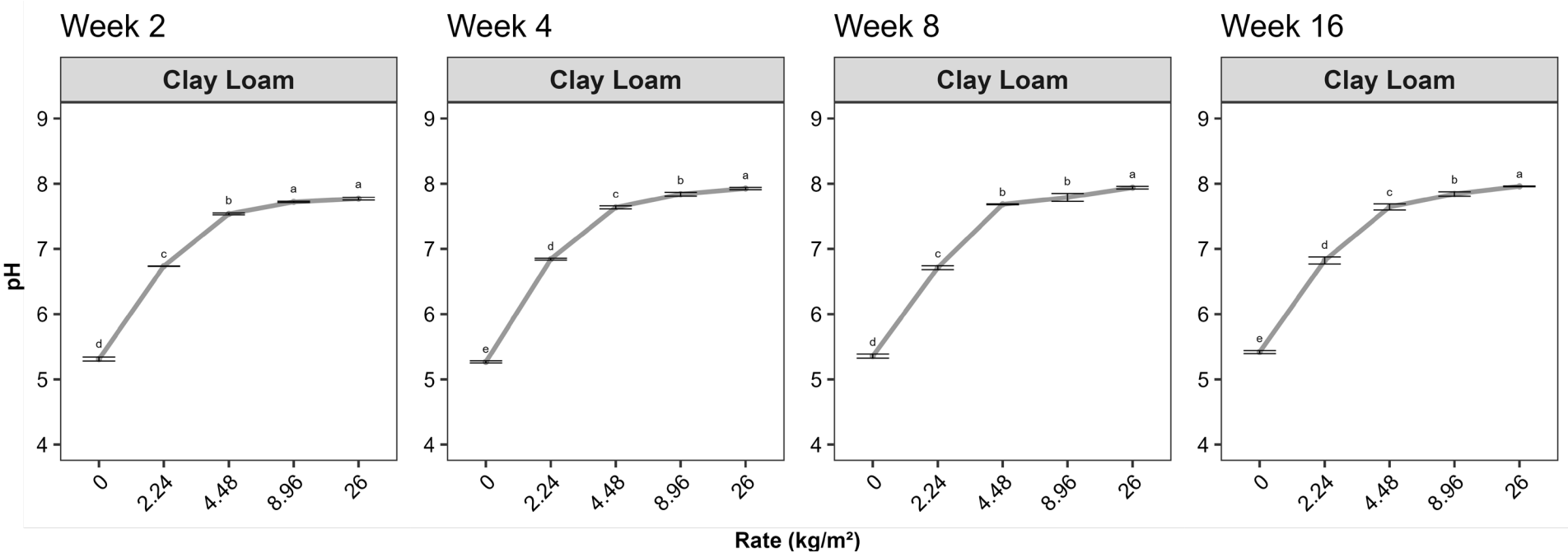
Centipede, Bermuda, and Kentucky blue grasses, and rye grain
~30 seeds of each species

Soil Incubation Study Results

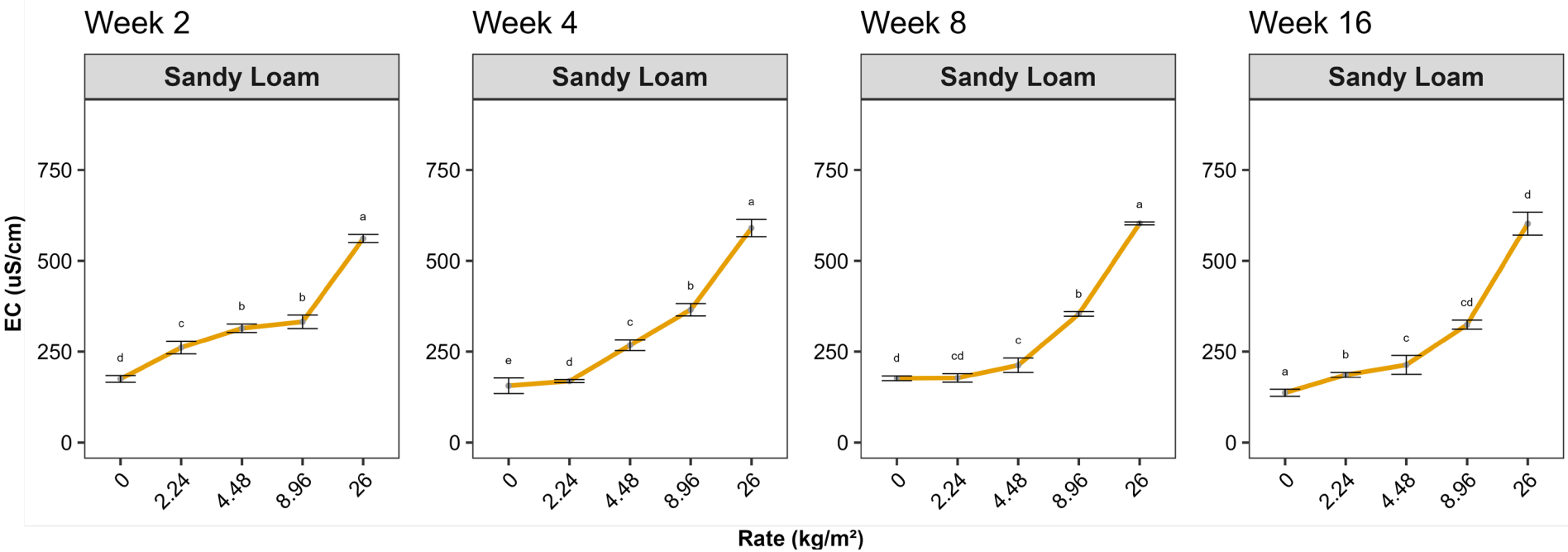
Sandy Loam Soil Incubation Results - pH



Clay Loam Soil Incubation Results - pH



Sandy Loam Soil Incubation Results - EC



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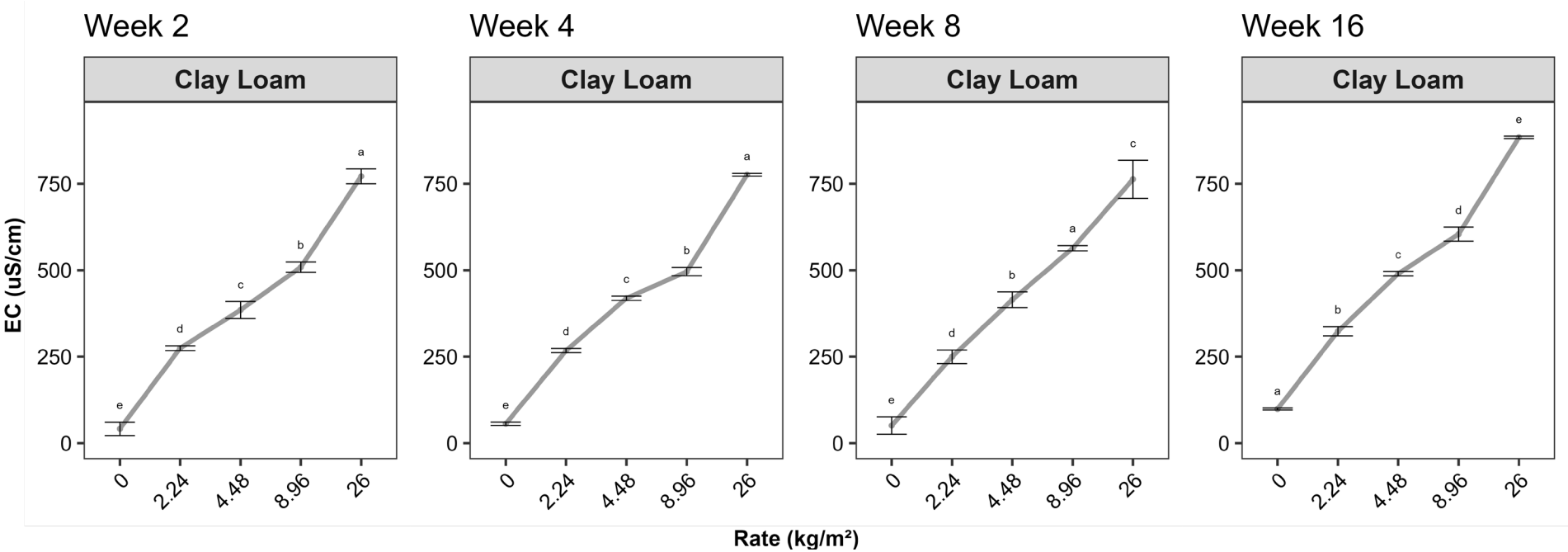

Germination Study Results

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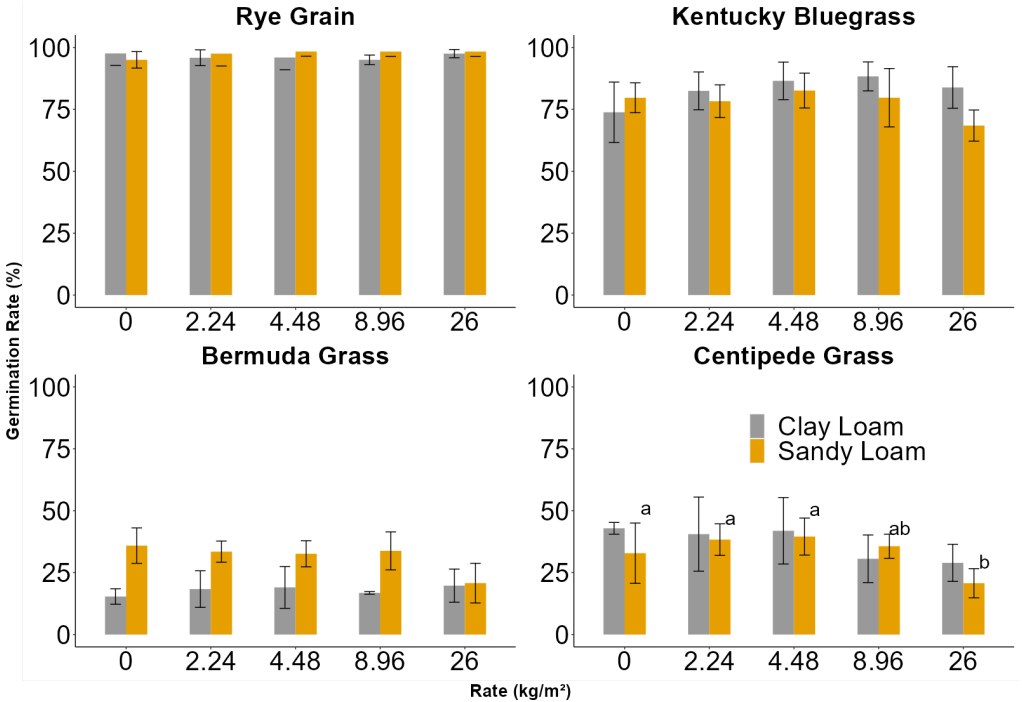

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- Sediment basins are an effective option for on-site DGS separation
- Polyacrylamide is effective in DGS
- DGS solids could potentially be used on-site for liming
- DGS additions to NC soils increase soil pH and EC
- Germination of rye grain, Bermuda grass, and Kentucky bluegrass was not impeded by DGS additions to soil
- Centipede grass germination was diminished when high rates of DGS were added to soil

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Acknowledgements

- NCDOT (RP 2023-13)
- Ana Casillas-Rodriguez & April Dobbs
- Lane Construction

Questions?

Please Remember to Complete the End of Workshop Evaluation

https://bit.ly/2023EscEval

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