

Shredded Cardboard as a Mulch and Compost Resource to Improve Soil Health and Water Management by Urban Growers in the Twin Cities

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Background and Objectives

- Twin Cities urban growers face rising mulch costs, making it difficult to maintain soil health & weed management
- COVID-19 pandemic led to an abundance of cardboard from home deliveries: Potential affordable mulch alternative?
- Our study aims to assess cardboard's impact on plant health, water use, and soil fertility while connecting to broader issues like environmental justice and climate change adaptation

Methods

University of Minnesota controlled trials:

- Comparing: shredded cardboard, straw, and bare soil mulch treatments
- Crops: dragon tongue beans, collard greens, Albion strawberries
- Measuring: yield, weed biomass, soil moisture, nitrogen cycling

Community garden trials:

- 6 community gardens using shredded cardboard on model crops
- Tracking: water usage, crop yield, soil nutrients
- Sharing experiences through journals and feedback forms

Sharing knowledge: hosted 18 co-learning gatherings in 2023

Connecting to broader systems: industry advisory panel, literature reviews, tours to recycling facilities, garden networks



Figure 1. Left: mid-season controlled plots, showing bare soil treatment in the foreground and shredded cardboard mulch in the background with collard greens. Right: Albion strawberries ready to be harvested in shredded cardboard mulch plots.

Results

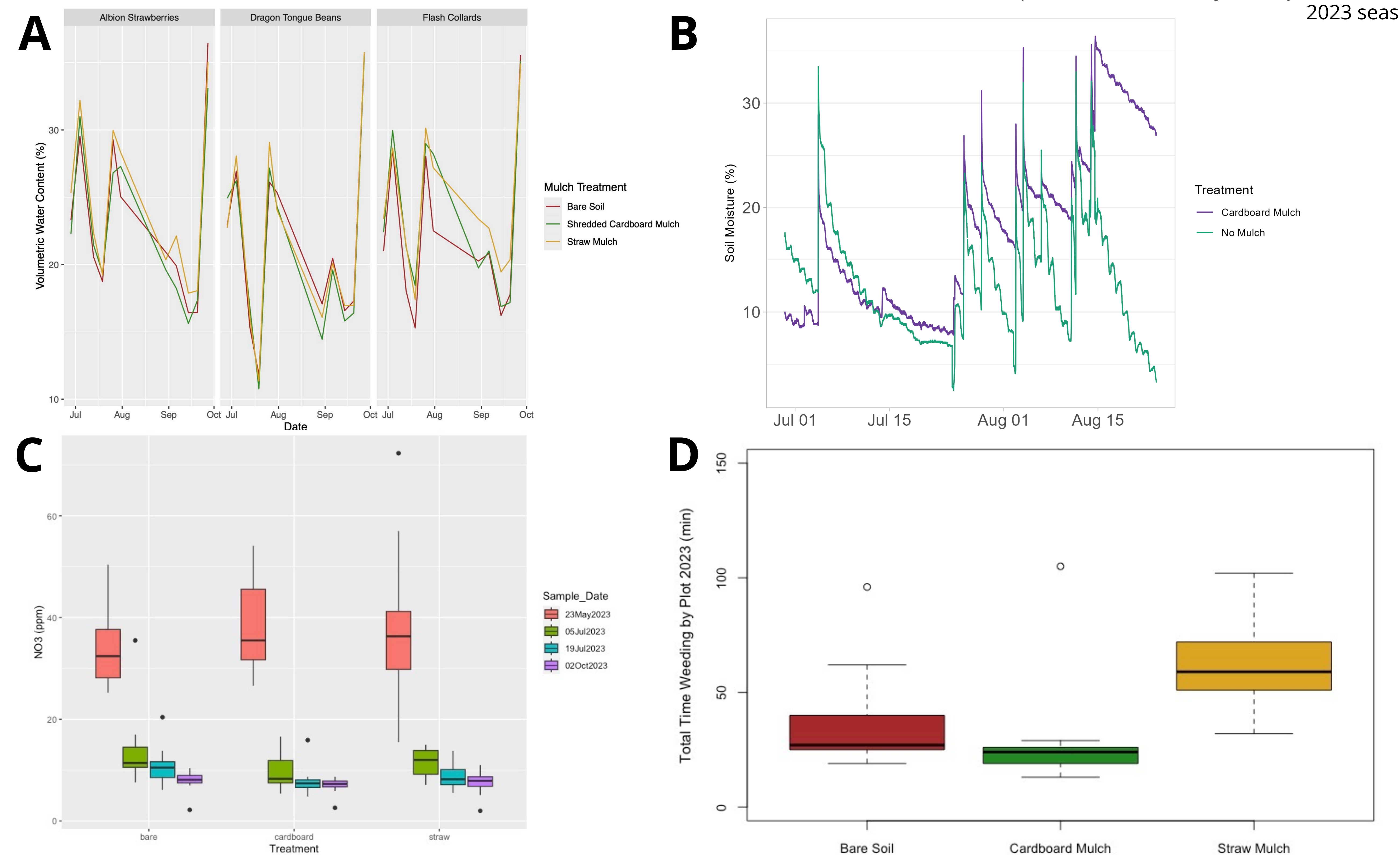


Figure 2. Volumetric water content by treatment and time for (A) controlled plots, (B) a representative community site. (C) Soil nitrate concentrations by treatment and time. (D) Boxplots of total weeding time by treatment for 2023 season.

- Shredded cardboard mulch had no significant impact on marketable yield (controlled, replicated)
- Shredded cardboard mulch's water content is variable and not significantly different from other treatments (controlled, replicated, irrigated); shredded cardboard mulch led to significantly greater water content relative to bare soil (non-replicated community observation).
- Shredded cardboard mulch significantly reduced weeding time relative to straw mulch and bare soil (controlled + non-replicated community observation).
- Shredded cardboard mulch treatment resulted in numerically lower but not statistically significant difference in soil nitrate levels (controlled, replicated).

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