



Cornell Hemp

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Evaluation of basalt rock dust on fiber hemp production and soil carbon, 2021

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Basalt rock dust:

Basalt rock dust – pulverized to a grain size ~100 micrometers, often produced as a byproduct of mining operations – can be applied to cropland soils to provide beneficial micronutrients (e.g., magnesium, silica, boron), and to remove carbon dioxide from the atmosphere. As rock dust dissolves, elements like magnesium and calcium are released, increasing soil pH to convert carbon dioxide to dissolved carbonates. Rock dust may generate “carbon credits” for farmers to sell to carbon offsets purchasers.



Basalt rock dust (grey) mixed with soil (brown) at hemp field.

Experimental results:

In 2021 we applied a metabasalt rock dust to rows planted with Futura 75 hemp at 20 and 40 tons/acre, and compared their yield to rows planted without basalt application (see figure on back). On average, the 20 ton/acre rows showed ~9% increase in yield. At 40 ton/acre, yield decreased by ~23% on average compared to the 20 ton/acre rows, and on average decreased yield by ~16% compared to rows without basalt. This indicates an “optimum” threshold amount of basalt rock dust application, above which soil chemistry changes reduce hemp productivity.

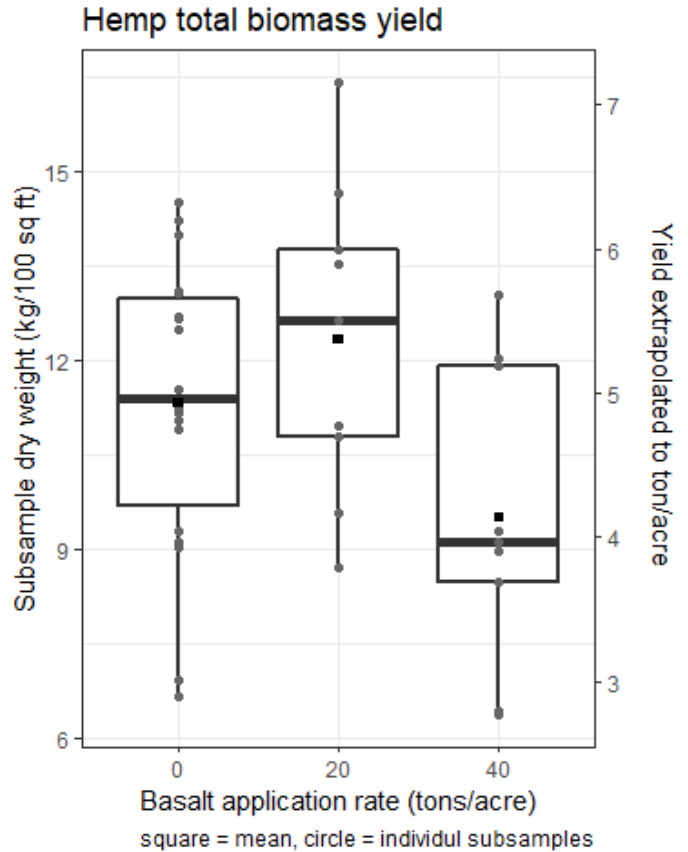
Soil carbon implications:

Moderate carbon credits could be generated from rock dust application rates that also improve hemp yield. Higher rock dust application rates show higher soil carbon sequestration potential, which may generate greater financial incentives through carbon credits, but may also reduce hemp yield. Ultimately, a farmer’s goals, based on economic incentives for hemp productivity versus carbon credits, should inform the amount of rock dust applied.





Basalt rock dust is very fine, and dissolves over time in soils



Aerial image of 5-acre hemp + red clover rock dust trial field in August 2021

Ongoing study:

This trial will continue for at least 2 more years, and includes a red clover – hemp annual rotation.