be used when analyzing the effects of biochar soil amendment on crop yield, soil properties, and GHG emissions; 2) Unrealistically high biochar application rates used in lab experiments are likely impractical under field conditions because of the high cost of feedstock and its transportation and pyrolysis; 3) Long-term field experiments should be used to determine the legacy effects of biochar soil amendment on crop yield, soil properties, and GHG emissions; and 4) The costs associated with biochar production and its application to field sites, plus the potential impact of the chosen biochar product on crop yield, should always be considered and verified before deciding on biochar use as a soil amendment.

NOV. 2023 UPDATE

A 2023 article titled "Effect of biochar application on corn and soybean yield in Michigan and Ohio" by Silva-Pumarada et al. provides the following information about biochar addition to cropland.

- Pine-derived biochar was added to soils in the fall of 2020 at locations in Ohio and Michigan to test its effect on corn and soybean yields.
- Yield of both crops was unaffected by biochar additions.
- The authors concluded that 1) the positive environmental and soil quality benefits that may accrue from biochar soil amendment will not offset the short-term lack of its effect on corn and soybean yield because of the high cost of the biochar amendment and its application, and 2) biochar soil amendment may not be economically viable for corn and soybean farmers to use in the short-term.

These results further reinforce the conclusions about biochar use on corn and soybean production sites that have been alluded to previously in this article–i.e., the expense associated with biochar application to corn and soybean production sites will not likely be recouped in the short-term by yield increases of either crop.

APRIL 2024 UPDATE

An article titled "Biochar modifies soil physical properties mostly through changes in soil structure rather than through its internal porosity" by Zanutel et al. provides insight into just how biochar application rate and age affect physical properties of silt loam and sandy loam soils. Results from research reported in this article follow.

- Application of fresh biochar decreased bulk density about 17%, and increased saturated water content and macroporosity by 16% and 79%, respectively.
- The authors did not measure a consistent effect resulting from the two biochar application rates of 6 and 12 tons/acre.
- The improvement in soil physical properties in the short-term was related to the improvement in soil physical structure by biochar rather than the internal porosity of the biochar.
- "Old" biochar did not appear to affect soil physical properties in this study, probably because of clogging of biochar pores by clay particles in the soil over the long term.
- The authors concluded from their research that biochar can improve soil physical properties in the short-term, but the effects likely are not long-lasting due to clogging of biochar pores.

JULY 2024 UPDATE

Click here for an article on this website that provides a link to a report about a process that was developed by Korean scientists to provide a quick, on-site conversion of animal manure to biochar. The process described in the article is currently in the "pilot" phase, but it is anticipated that it can soon be operational on a scale that will allow it to be used in individual livestock operations in the U.S. The breakthrough technology described in the article can contribute to a 1) reduction in animal manure's contribution to some of the factors that are perceived to be associated with climate change, and 2) significant increase in biochar supply that will be available to crop producers to apply to fields as a beneficial and affordable soil additive.

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