

A close-up photograph of a pile of dark, fragmented charcoal. The charcoal pieces are irregular in shape and size, with some showing a porous, layered texture. In the center-right of the frame, a small, vibrant green seedling with two leaves is growing out of the charcoal, symbolizing new life or sustainability. The background is a dense field of similar charcoal fragments, creating a textured, dark grey surface.

Charcoal: the intersection of
sustainable farming and forestry

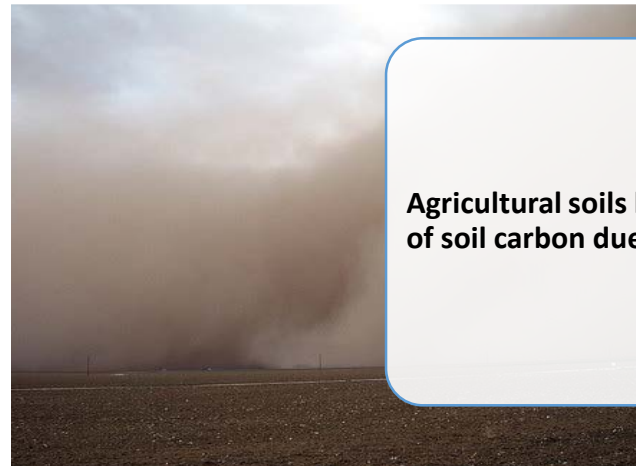
Problems

Forest Fires



2015 was the largest wild fire year in recorded United States history, costing the US government close to \$4 billion dollars

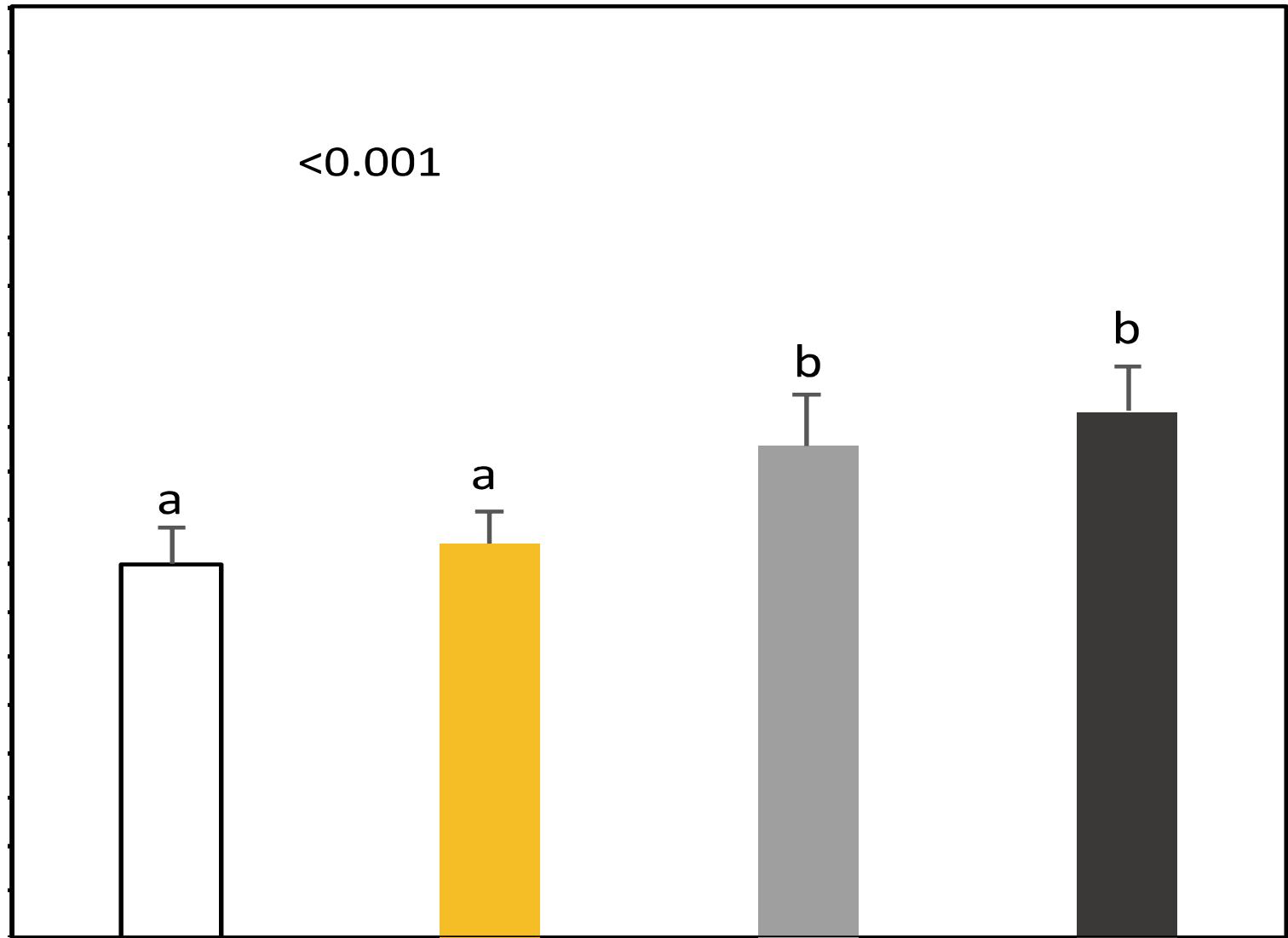
Carbon Loss in Soils



Agricultural soils have lost 50-70% of soil carbon due to tillage

Key Findings

- Enhanced soil total carbon by 32-33%
- Enhanced soil available NH_4^+ by 41-71%
- Enhanced Soil active organic N by 52-118%,
- Active P by 39%
- Soil NO_3^- -N retention of 33%
- Increased retention of soil P, Fe, Mg, Zn was reflected in nutrient density of harvested dry beans.
- Benefits last for between 500-10,000 years

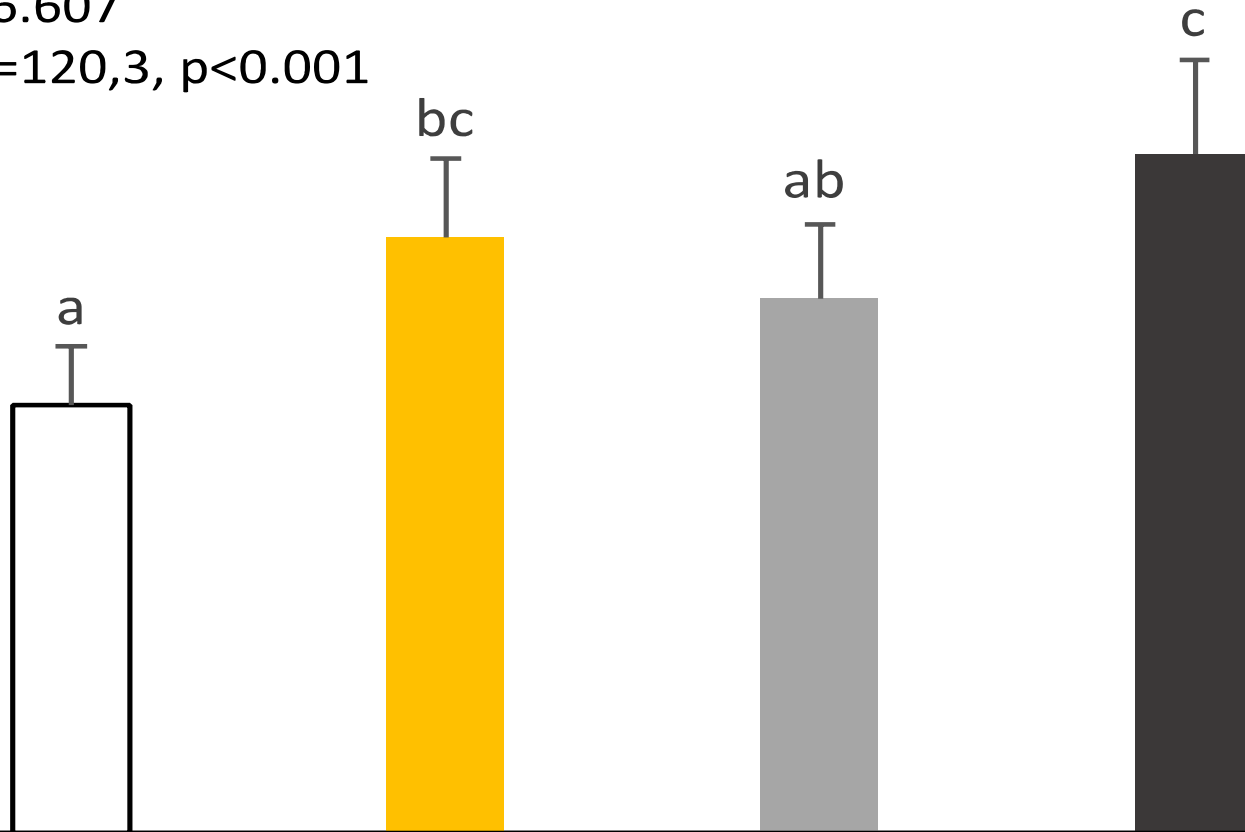


(b) End-growing Season

ANOVA

F=6.607

dF=120,3, p<0.001



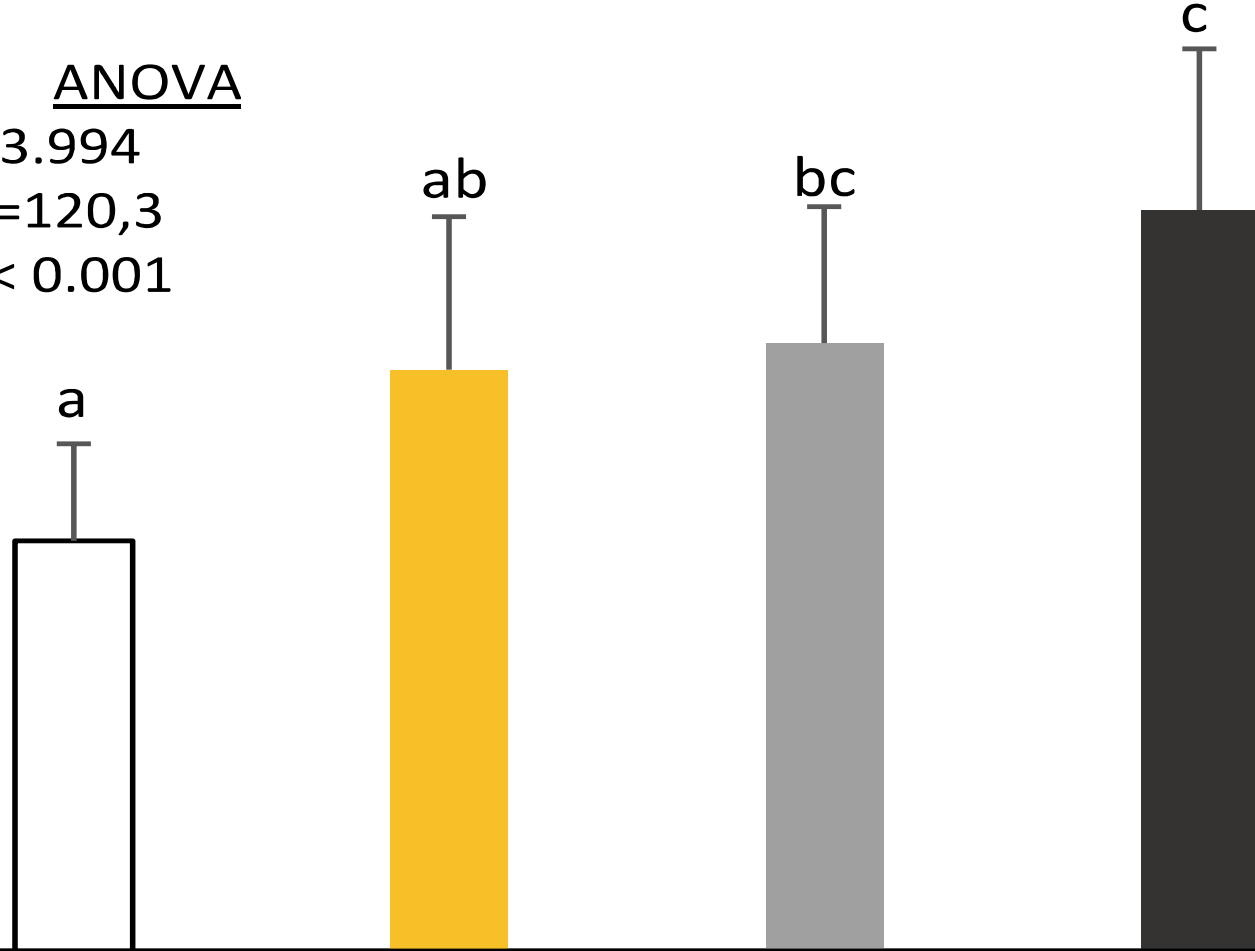
(d) End-growing Season

ANOVA

F=3.994

df=120,3

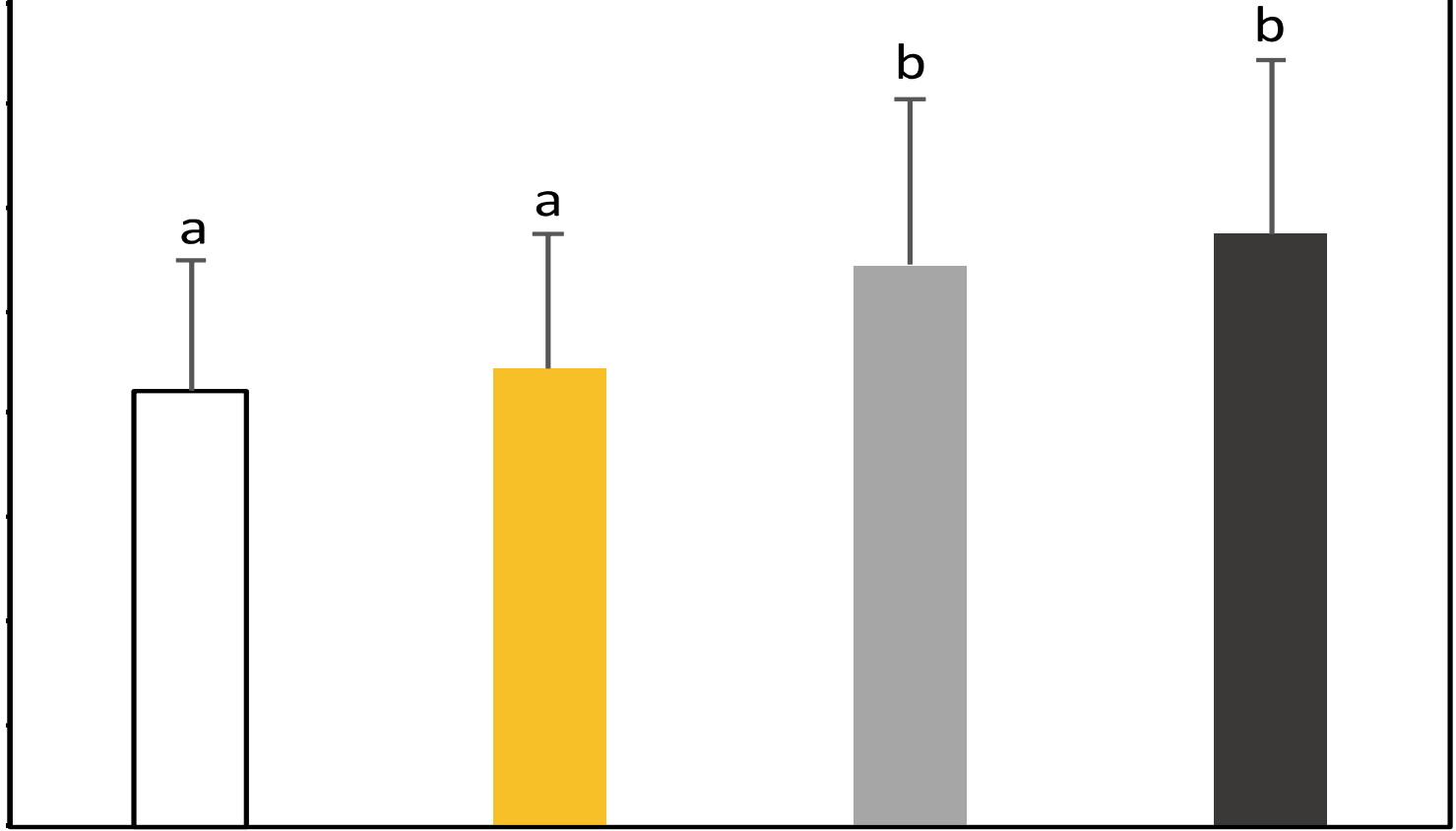
p < 0.001

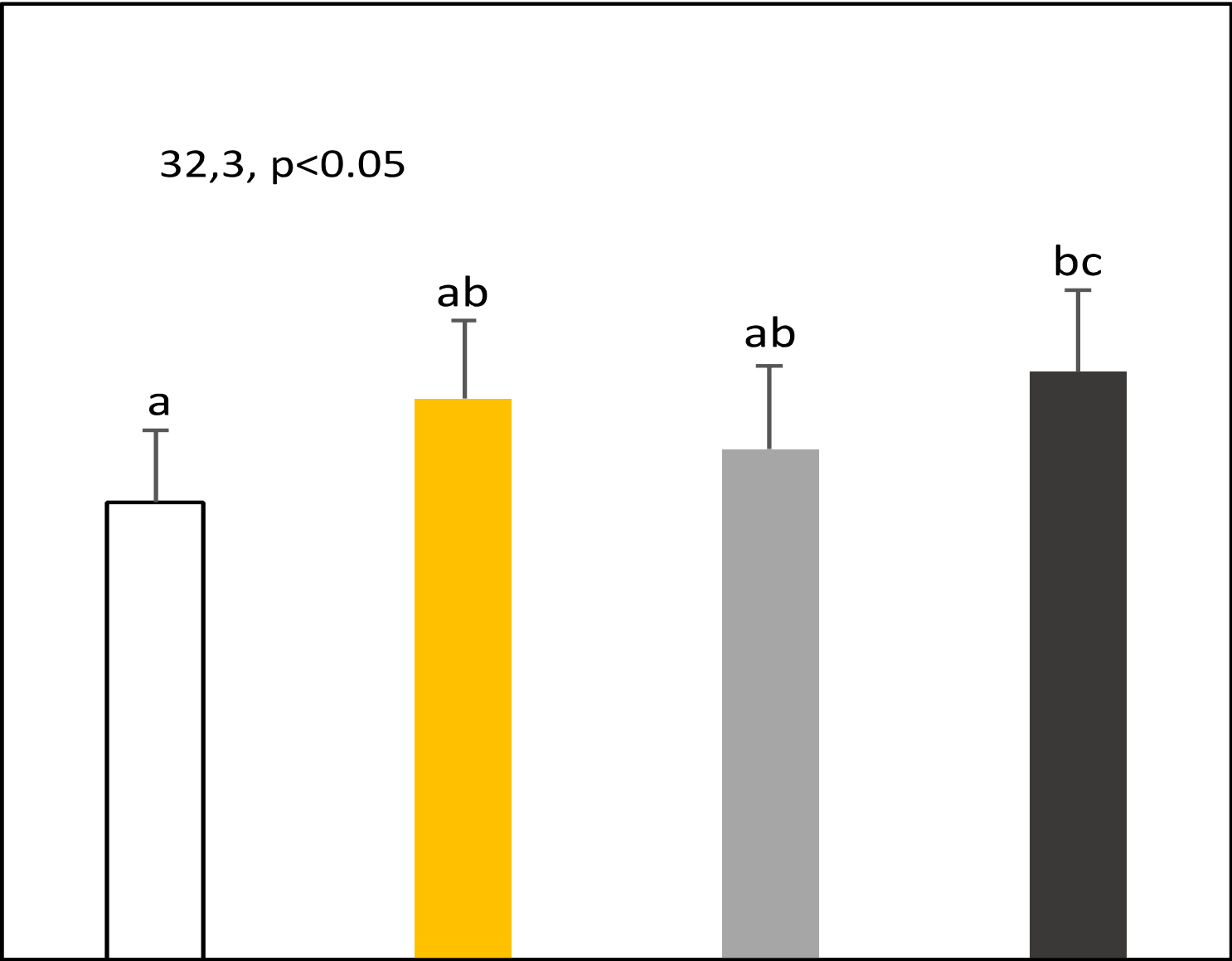


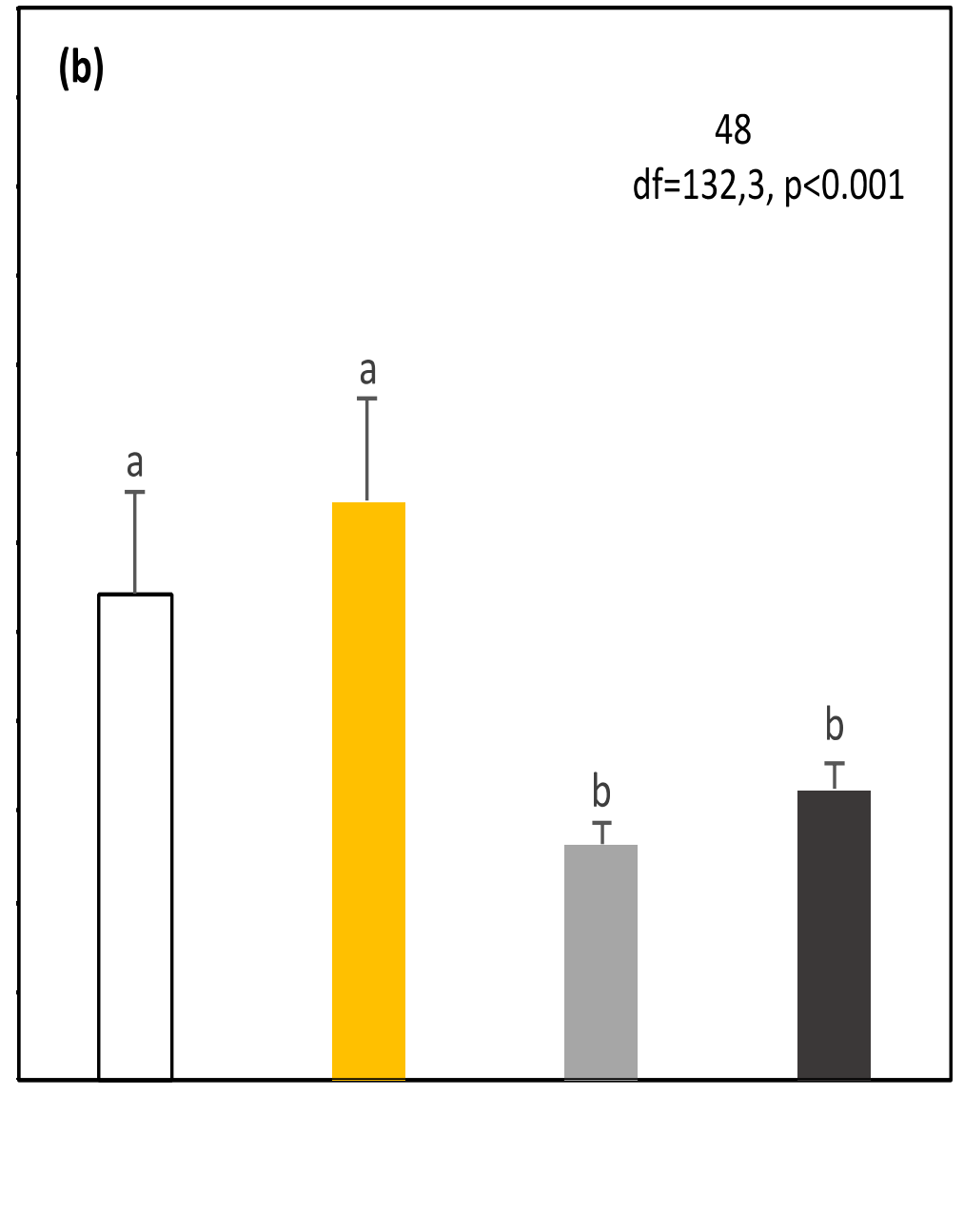
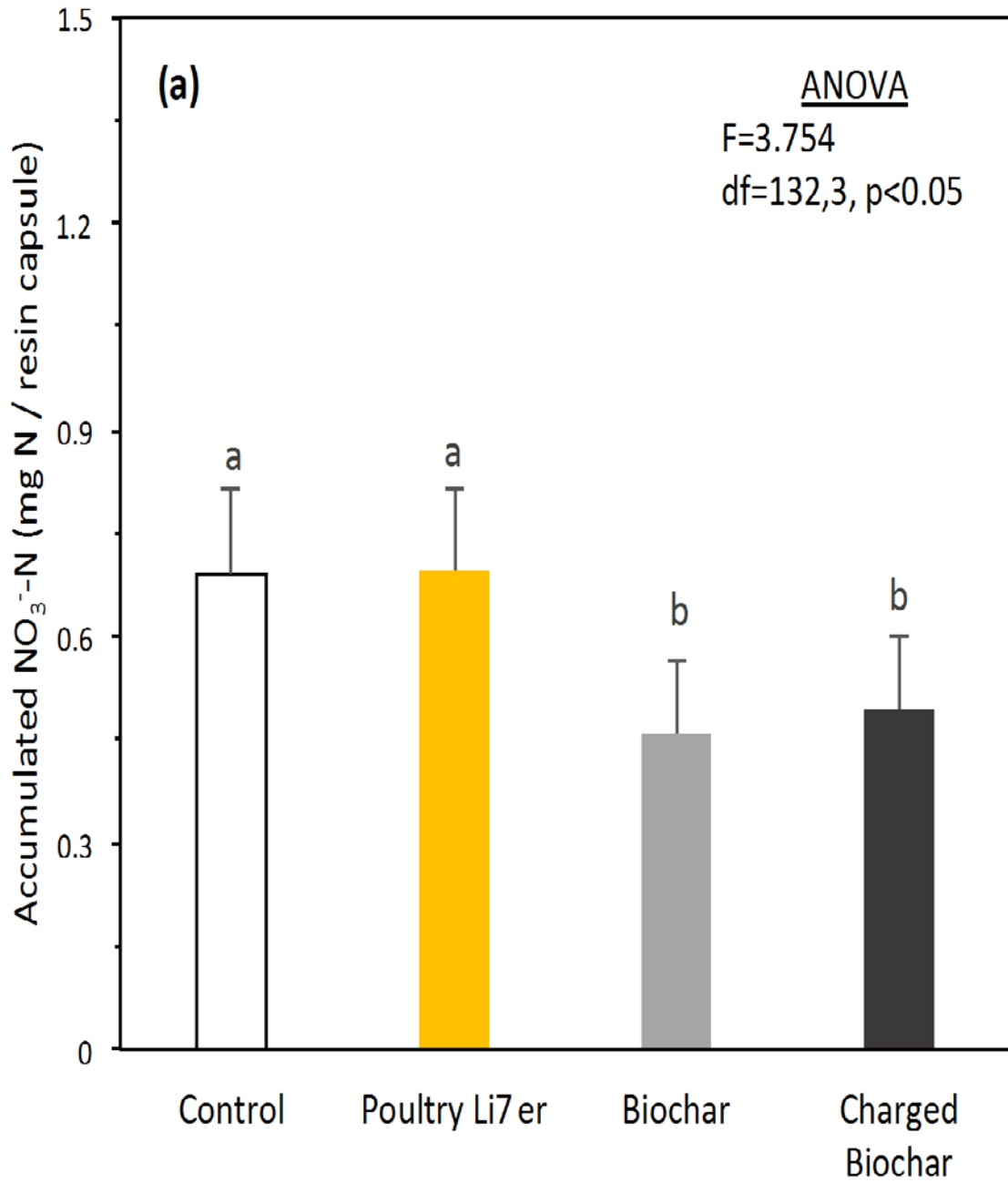
ANOVA

F=13.38

df=88,3, p<0.001

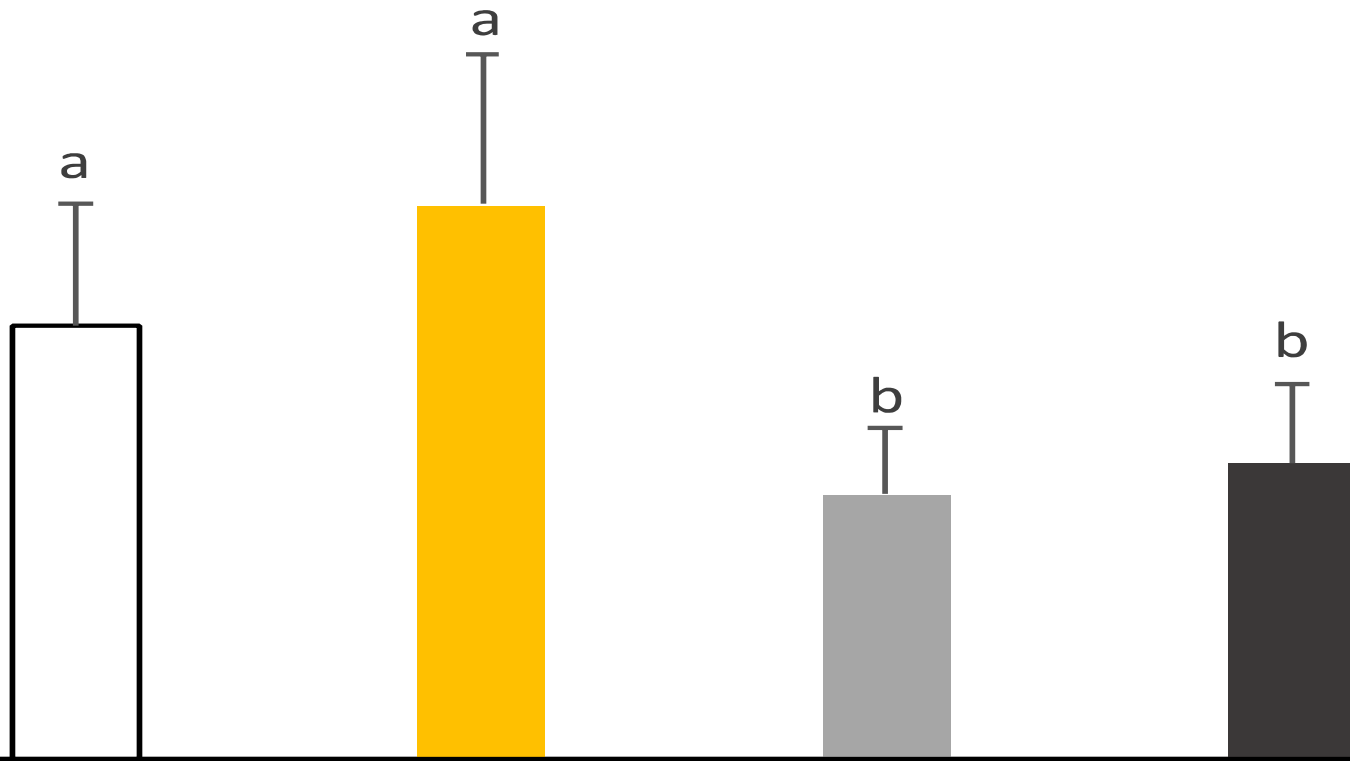


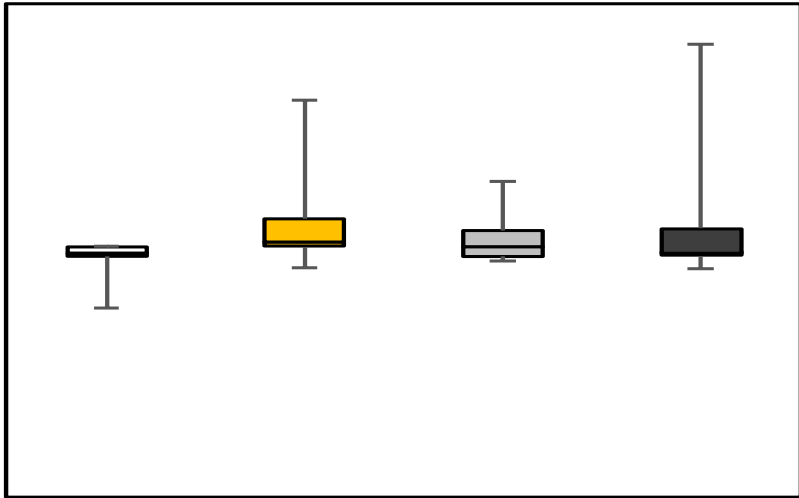
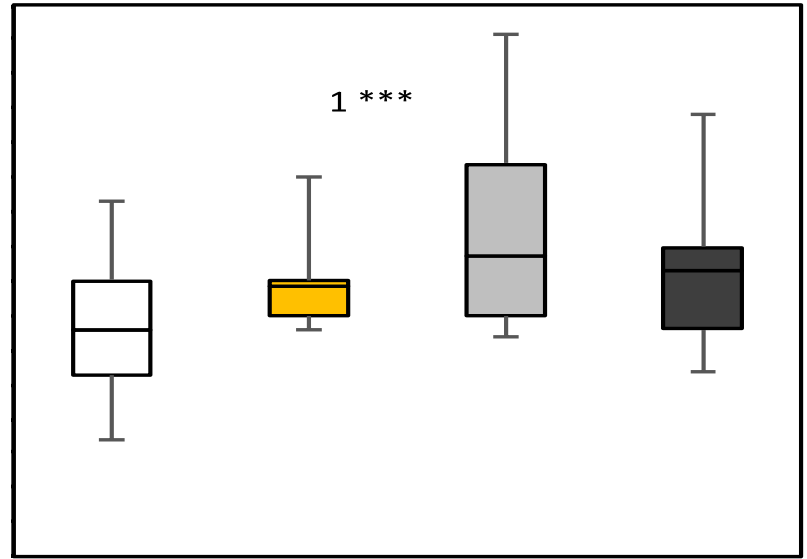
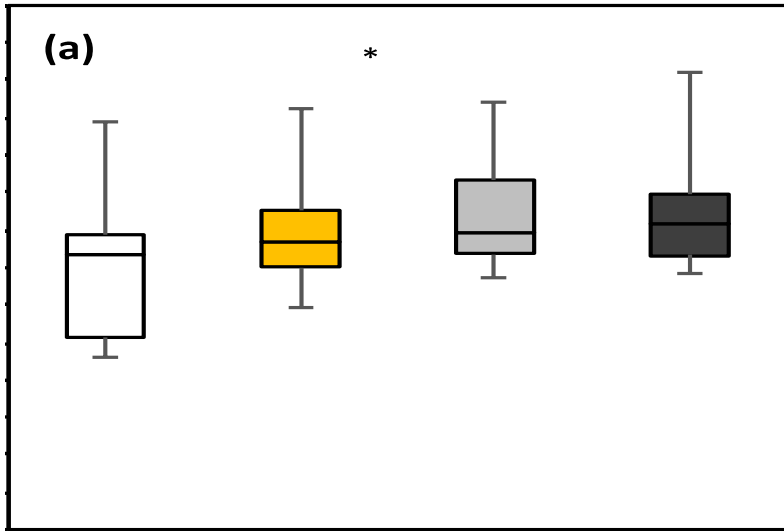




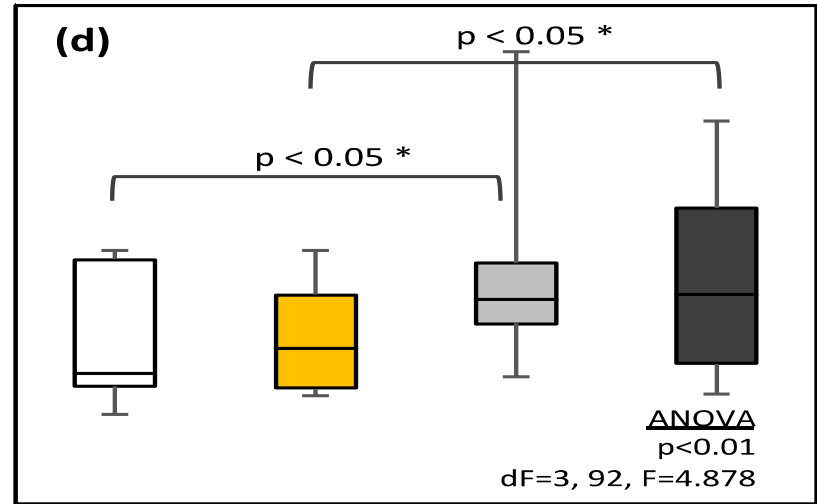
(c)

3, $p < 0.001$





Zn (mg kg⁻¹)



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Biochar

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