Nitrogen addition increases the contents of glomalin-related soil protein and soil organic carbon but retains aggregate stability in a *Pinus tabulaeformis* forest

BACKGROUND

Glomalin-related soil protein (GRSP) and soil organic carbon (SOC) contribute to the formation and stability of soil aggregates, but the mechanism by which global atmospheric nitrogen (N) deposition changes soil aggregate stability by altering the distribution of GRSP and SOC in different aggregate fractions remains unknown.

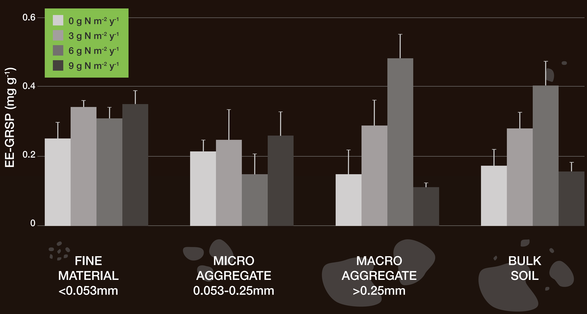
METHODS

We used a gradient N addition (0–9 g N m^{-2} y^{-1}) in *Pinus tabulaeformis* forest for 2 years in northeast China and then examined the changes in SOC contents, total GRSP (T-GRSP), and easily extractable GRSP (EE-GRSP) contents in three soil aggregate fractions (macroaggregate: >250 μm, micro-aggregate: 250–53 μm, and fine material: <53 μm) and their relationship with aggregate stability.

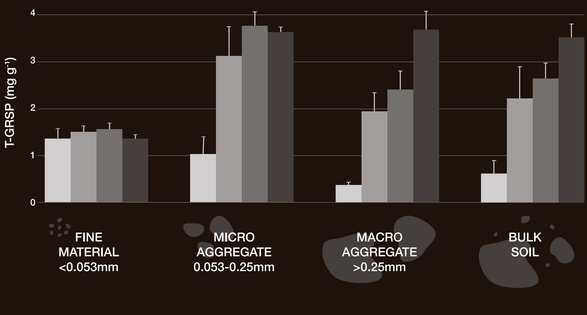
RESULTS

1 The soil was dominated by macroaggregates.
Short term N addition had no significant effect on mean weight diameter (MWD) and geometric mean diameter (GMD).

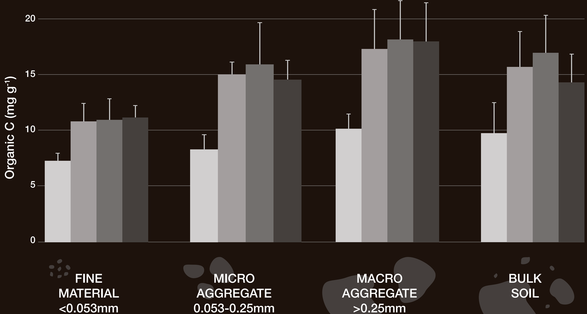
2 GRSP varied among aggregate fractions, and N addition had different effects on the distribution of GRSP in aggregate fractions.



3 The macro-aggregate had the highest SOC content, followed by the micro-aggregate and the fine material had the lowest SOC content.



4 GRSP and SOC contents were not significantly correlated with MWD.



CONCLUSION

GRSP and SOC contents increased by N addition, but this increase did not enhance aggregate stability in short term, and the improvement of stability might depend on binding agents and incubation time.

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