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Modelling the role of mycorrhizal associations in soil carbon cycling: insights from global analyses of mycorrhizal vegetation

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STELLINGEN

(Propositions)

Behorende bij het proefschrift

Modelling the role of mycorrhizal associations in soil carbon cycling: insights from global analyses of mycorrhizal vegetation

1. In-vitro cultivation techniques provide a chemical blueprint, crucial for understanding mycorrhizal fungal contributions to soil carbon dynamics (Chapter 2, this thesis).
2. Explicit consideration of mycorrhizal pathways enhances predictions of plant litter decomposition and sheds light on the role of mycorrhizal impacts on long-term soil carbon dynamics (Chapter 3, this thesis).
3. The Yasso-Myco model demonstrates the significant role of mycorrhizal associations in controlling the dynamics of labile and recalcitrant soil carbon compounds (Chapter 4, this thesis).
4. Exploring the impacts of climate change and shifts in mycorrhizal-vegetation distribution on future soil litter decomposition illuminates potential cascading effects on nutrient cycling and carbon sequestration (Chapter 5, this thesis).
5. Assessing the quality and quantity of mycorrhizal fungal biomass is pivotal for unraveling its significance in soil carbon dynamics and nutrient cycling (Frey, 2019; Langley & Hungate, 2003).
6. Shifts in mycorrhizal fungal community structure may be the key factor driving the sequestration of carbon through the formation of soil organic matter (Clemmensen et al., 2015).
7. Investigating the synergistic relationships between mycorrhizal fungi, soil microbes, and plants can reveal comprehensive insights into how these interactions collectively influence carbon cycling (Ostle et al., 2009).
8. Advancing the representation of terrestrial ecosystems in Earth system models can enhance our ability to assess the multifaceted impacts of global change stresses (Bonan & Doney, 2018), and should include mycorrhizal modeling.
9. We need to recognize the role of mycorrhizae in carbon cycling and nutrient availability to enhance the effectiveness of policies aimed at preserving biodiversity and ecosystem services.
10. Echoing Leonardo da Vinci's insight, "Simplicity is the ultimate sophistication", mycorrhizal associations illustrate the intricate sophistication of nature's processes.

Weilin Huang

Leiden, 10 April 2024