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Reconciling biodiversity and carbon stock conservation in an Afrotropical forest landscape

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Biodiversity loss and climate change are among the most important threats that humanity faces in the 21st century. Consequently, the international community has engaged in a series of initiatives that aim at protecting either biodiversity or carbon stocks. The United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) are binding multilateral commitments that include specific targets (the Paris Agreement and Aichi Biodiversity Targets). However, actions that simultaneously minimize carbon loss and maximize biodiversity conservation represent the best use of limited resources and available land. Nonetheless, exploration of synergies between these conservation goals has been limited to consideration of aspects of tree diversity, neglecting other important species groups that represent different trophic levels. We assessed this relationship for multiple trophic levels across the tree of life (10 organismal groups, 3 kingdoms) in lowland rainforests of the Congo Basin. Comparisons across regrowth and old-growth forests evinced the expected positive relationship for trees, but not for other organismal groups. Moreover, differences in species composition between forests increased with difference in carbon stock. These variable associations across the tree of life contradict the implicit assumption that maximum co-benefits to biodiversity are associated with conservation of forests with the highest carbon storage. Initiatives targeting climate change mitigation and biodiversity conservation should include both old-growth and regenerating forests to optimally benefit biodiversity and carbon storage.