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## Functional diversity dominates positive species mixture effects on ecosystem multifunctionality in subtropical plantations

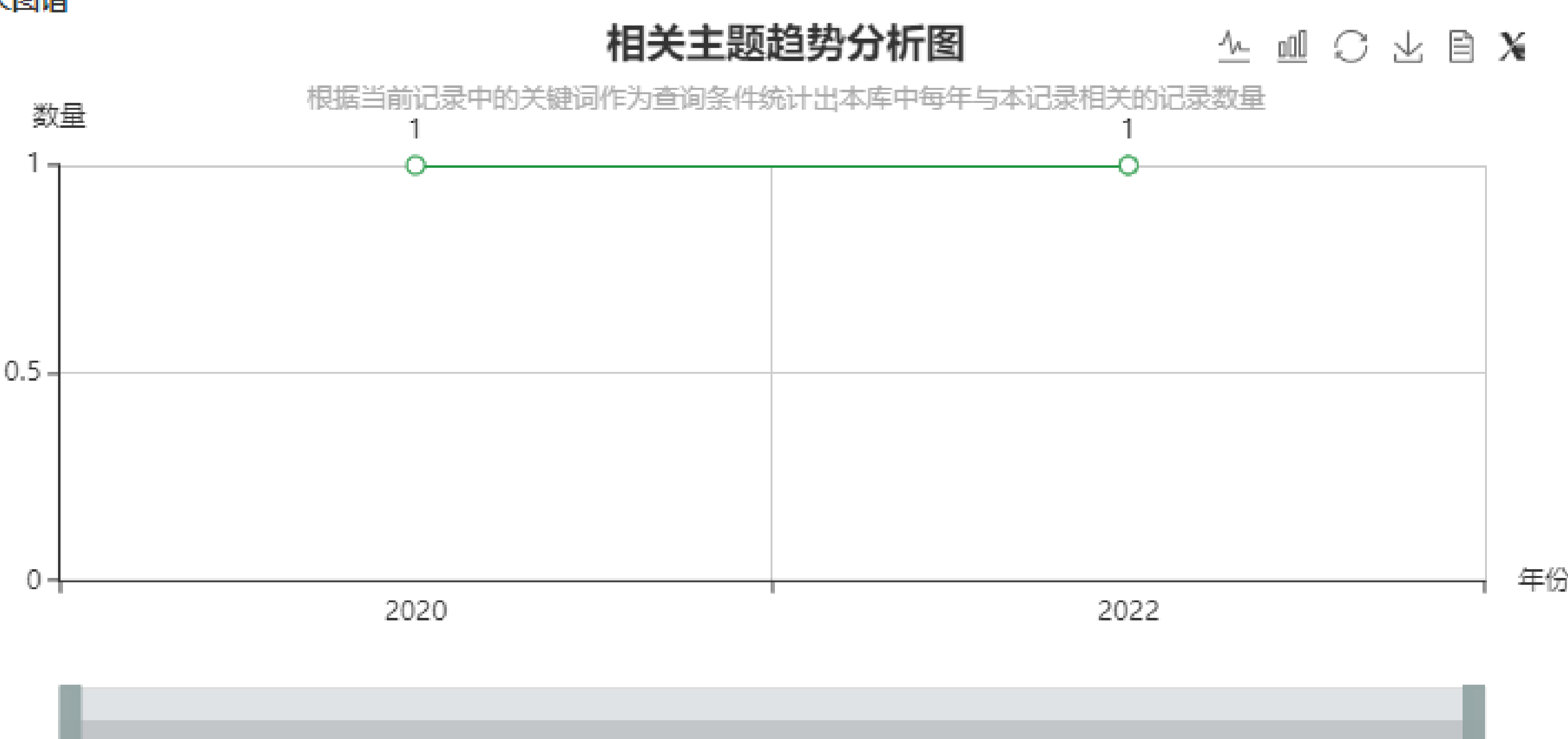
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摘要	Mixed-species plantations generally exhibit higher ecosystem? multifunctionality?than monospecific plantations. However, it is unclear how tree species functional composition influences species mixture effects on ecosystem? multifunctionality. We selected 171 monospecific and mixed-species plantations from nine regions across subtropical China, and quantified 13 key ecosystem functional properties to investigate how species mixture effects on ecosystem? multifunctionality?are modulated by functional diversity and identity. We found that ecosystem?multifunctionality?was significantly higher ( $p < 0.05$ ) in mixed tree plantations than in monospecific plantations except the mixed-conifer species plantations. Across all regions, ecosystem?multifunctionality?was significantly higher ( $p < 0.05$ ) in mixed conifer-broadleaf plantations than in monospecific plantations of the corresponding species, but not different between mixed and monospecific coniferous plantations. The magnitude of species mixture effects on ecosystem? multifunctionality?varied greatly with tree species compositions. Taking <i>Cunninghamia lanceolata</i> Lamb. as an example, the effects varied from a range of 2.0%-9.6% when mixed with a conifer species to 36%-87% when mixed with a broadleaf species. The functional diversity was the dominate driver shaping ecosystem?multifunctionality, while functional identity, as expressed by community-weighted mean of specific leaf area, also had a positive effect on ecosystem? multifunctionality?through the increased below-ground nitrogen and phosphorus stocks regulated by specific leaf area of the mixing tree species. Our study highlights the important role of functional diversity in shaping ecosystem?multifunctionality? across region-wide environmental conditions. Mixed conifer-broadleaf tree plantations with distinct functional traits benefit the enhancement of ecosystem? multifunctionality, and the magnitude of species mixture effects is modulated by the functional identity of tree species composition; those relationships deserve a special consideration in multifunctional management context of subtropical plantations.
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