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Mycorrhizal networks and nitrogen fluxes between *Pterocarpus officinalis* and Taro in swamp forests of Guadeloupe

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Swamp forests of *Pterocarpus officinalis* (jacq.) form remarkable monodominant forest stands growing on temporarily or permanently flooded soils in mangrove hinterland areas, along rivers and in wet depressions in the mountains of the Caribbean and Guiana regions. In Guadeloupe, smallholder farmers traditionally cultivate flooded Taro (*Colocasia esculenta* (L.) Schott) monocultures under the canopy of *P. officinalis* stands in the swamp forests. Taro corms and unrolled leaves are commonly consumed in Guadeloupe. The understorey culture of Taro is conducted without pesticides and fertilizers, which could be partly due to the net input of nitrogen into the soil by *P. officinalis* through its ability to fix atmospheric nitrogen. Furthermore, the mycorrhizal networks could favor the transfer of fixed nitrogen from *P. officinalis* to the intercropped Taro. Taro cultivation is conducted during the dry season to facilitate their planting between mature *Pterocarpus* trees and their harvest when the marshy soils are dewatered. The sampling of roots and leaves on Taro and two cohorts of *P. officinalis* (mature trees and seedlings) were made during the dry season in two swamp forest sites located at Gosier (approx. 0.1 ha in area) and Belle-Plaine (approx. 0.5 ha in area) in the island of Grande-Terre, Guadeloupe. The arbuscular mycorrhizal (AM) fungal community was compared between Taro and two cohorts of *Pterocarpus*, by using pyrosequencing of partial 18S rDNA gene. We also compared natural abundance of 13C and 15N contents in leaves of the two cohorts of *Pterocarpus*, Taro and surrounding non-nitrogen-fixing plant species, in order to estimate what proportions of N and C were transferred to Taro. Of the 210,676 sequences, 37,631 sequences were assigned to a total of 215 OTUs belonging to the orders of Glomerales, Paraglomerales, Archeosporales and Diversisporales. A low AM fungal community membership was observed between *P. officinalis* and *C. esculenta*. However, certain AM fungal community taxa overlapped between both plants, notably predominant *Funneliformis* OTUs, suggesting a potential common AM network. The isotopic analyses did not show any direct link between the mycorrhizal status of both associated species and the transfer of N and C between *P. officinalis* and Taro. The proportion of N derived from atmospheric fixation in *P. officinalis* varied according to the study site, from about 80 to 95% in adult trees and from 50 to 80% in young seedlings while we estimated that 35% of fixed N was transferred from *Pterocarpus* seedlings to Taro in mixed stands of both species. The implementation of experiments under controlled conditions are needed to demonstrate the possible role of mycorrhizal networks in the transfer of nutrients between *P. officinalis* and Taro.