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The effect of Piper aduncum invasion on soil in tropical ecosystems of Papua New Guinea

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Piper aduncum is successful Neotropical invasive species in Papua New Guinea. Despite its interaction with aboveground part of ecosystem has been extensively studied little is known about its effect on soil. Here we report two studies, in first we compare soil chemistry and soil biota in sites invaded and non-invaded by P. aduncum near Wanang village. In other study we use benefit of previous experiment when P. aduncum was experimentally removed near Ohu village. Here we compare soil chemistry and chemistry of plant leaves growing in garden originating by slashing and burning two adjacent patches with and without P. aduncum.
Soil under P. aduncum had significantly less phosphorus in 0-5 cm soil layer and less nitrates, nitrogen and carbon in 5-10 cm soil layer than soil in old gardens uninvaded by P. aduncum. P. aduncum soil also harbors fewer microfloras than uninvaded soil as shown by PLFA analysis. No difference was found in fauna communities.
Gardens created on patches where old P. aduncum was removed did not differ in soil chemistry from plots which were overgrown by P. aduncum, but leaves of sweet potatoes (Ipomoea batatas) in gardens where P. aduncum was previously removed contained more nitrogen.
Results suggest that P. aduncum invasion may affect some chemical and microbial properties in invaded soil. P. aduncum has negative effect on traditional shifting agriculture.