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# Network properties as functional traits for fungi

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Fungal mycelia consist of an interconnected network of filamentous hyphae and represent the dominant phase of the lifecycle in all major fungal phyla, from basal to more recent clades. Indeed, the ecological success of fungi on land is partly due to such filamentous network growth. Nevertheless, fungal ecologists rarely use network features as functional traits. Given the widespread occurrence of this body type, we hypothesized that interspecific variation in network features may reflect both phylogenetic affiliation and distinct ecological strategies among species. We show first that there is high interspecific variation in network parameters of fungi, which partly correlates with taxonomy; and second that network parameters, related to predicted-mycelial transport mechanisms during the exploration phase, reveal the trait space in mycelium architecture across species. This space predicts a continuum of ecological strategies along two extremes: from highly connected mycelia with high resilience to damage but limited transport efficiency, to poorly connected mycelia with low resilience but high transport efficiency. We argue that mycelial networks are potentially a rich source of information to inform functional trait analysis in fungi, but we also note the challenges in establishing common principles and processing pipelines that are required to facilitate widespread use of network properties as functional traits in fungal ecology.