ABSTRACT

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When two invasive species meet: potential interactions between Asian jumping worms and common buckthorn

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The relationship between biotic invasion and ecosystem services (ES) is complex, with consequences often assumed despite limited evidence. This complexity is particularly apparent in urban areas, where non-native and invasive species comprise a significant proportion of total biodiversity. Additionally, most invasion-ES research emphasizes single species, while at management-relevant scales multiple invaders can have compounding impacts. We conducted reciprocal field experiments at the University of Wisconsin-Madison Arboretum to ask how the Asian jumping worm (*Amynthas tokioensis*), a recently discovered species in the City of Madison, might interact with an established invader, common buckthorn (*Rhamnus cathartica*) – with implications for ES in Madison and the surrounding area. Buckthorn, a widespread shrub, is among the most harmful invaders in Midwestern US forests, creating dense thickets that reduce carbon storage, impede recreation, and shelter harmful crop pests. The Asian jumping worm, discovered in Wisconsin in 2013, is a largely unstudied earthworm species expected to impact local forests. While facilitative interactions between buckthorn and invasive European earthworms have been documented, the ecological consequences of exotic Asian species, including *Amynthas*, are relatively unknown. We asked: Does a positive feedback exist between buckthorn and jumping worms? Specifically: a) are jumping worms more successful in environments that have been invaded by buckthorn, and; b) Does jumping worm presence increase buckthorn germination? Contrary to expectations based on well-studied European earthworm species, we find limited evidence of positive feedbacks between buckthorn and jumping worms, with positive implications for invasive species management and local ES provision.