Honors College Thesis Proposal

Mentor:

Committee Member:

Proposal:

In the early to mid-1600s, European colonizers arrived in North America, bringing new people and new species. Worms were one of them, and European earthworms took over a niche that was previously empty. Prior to the last glaciation period, North America had many native worms. However, when the glaciers receded, the worms died off. Worms circulate soil layers, and as far as biologists know, the introduction of these worms into the new environment didn't cause many detrimental effects. In fact, they benefitted the environment, which is often rare for invasive species.

Nearly 80 years ago, Asian Jumping Worms were reported to be introduced into the United States. Though their presence in East Coast states have been steadily growing, the worms were reported to have been spreading westward. Asian Jumping Worms consume organic matter at an alarming rate- much faster than their European counterparts and much faster than organic matter is being deposited onto the soil. Being endogenic, they mostly live within the organic horizon. This does not allow for soil mixing, and they move in such a way that destroys porosity, soil structure, and increases compaction. This could pose an issue in many other ways. Decreased structure and increased compaction can lead to increased soil moisture and erosion. This can lead to native plant death, which opens the environment to invasive species, changing the niche as a whole. Their spreading poses an issue not only to farmland in the Midwest, but also deciduous forests in the Northeast.

Our Research Questions:

Do different species effect soil respiration? Do certain species of worms accelerate the decomposition of oak and maple leaves/do the worms have a preference?

Experimental Design:

TREATMENTS	
Asian Jumping Worm	Oak litter + soil
	Maple litter + soil
European Earthworm	Oak litter + soil
	Maple litter + soil

CONTROLS	
No Worms	Oak litter + soil
	Maple litter + soil
	Soil alone

There will be five replicates of each (n=5), resulting in 35 experimental units (15 controls, 20 treatments). CO_2 flux will be measured, along with the rate of decomposition and general observation.

Project Timeline:

SEPTEMBER	• Research and review literature
OCTOBER	• Research and review literature • Collection of leaf litter • Collection of specimens • Collection of soil
NOVEMBER	• Trials • Begin data collection
DECEMBER	• Continue data collection • Write methods
JANUARY	• Begin data analysis
FEBRUARY	• Write full draft
MARCH	• Submit preliminary draft to committee members • Make needed edits to draft
APRIL	• Submit final draft to committee • Present and defend thesis