The influence of ungulate grazing history and soil biota on plant tolerance to simulated herbivory

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Abstract. Arbuscular mycorrhizal fungi (AMF) maintain symbioses with nearly two thirds of all plant species. These fungi colonize plant roots and perform many integral functions in support of plant health. In this study, the effects of ungulate herbivores and AMF on their plant hosts were explored by examining how the history of grazing affects plant tolerance to simulated herbivory. Soils were acquired from experimental plots in Kenya in which different levels of herbivore exclusion have been in place for 16 years. Experimental pots were established containing native host plants and soil inoculum from areas of total ungulate exclusion, wildlife access, cattle access, and full ungulate access. These were subjected to experimental treatments including live soil, sterilized soil, and lastly, the influence of non-AMF microbes was accounted for by establishing a "microbial wash" treatment which included sterilized soil supplemented with a microbial filtrate consisting of non-AMF soil microbes. A subset of plants per treatment was clipped to simulate herbivory, while the remaining plants were left as controls. Above ground growth was measured weekly throughout the experiment and above and belowground biomass and percent mycorrhizal root colonization was measured upon completion.

Delays due to unforeseen complications led to the postponement of the set up of this experiment. These include a delay in the shipping of soil from Kenya that resulted in a delay in soil inoculum establishment. Further, seed germination and sterilization trials proved challenging as many seeds were damaged by seed predation or arrived contaminated with a pathogen. At the time of the Student Research Conference, the experiment will be seven weeks underway and data will be available regarding weekly growth rates and biomass of clipped plant material. The experiment will reach completion at the end of May, 2012, with final results available in July.