



In Partial Fulfillment of the Requirements for the Degree of

## Master of Science

**Mira Word**

Will present her scientific paper

### **Adding a Soil Fertility Dimension to Locust and Grasshopper Management, a Case Study in West Africa**

#### **Abstract**

In Senegal, West Africa, soils are a vital resource for livelihoods and food security in smallholder farming communities. Low nitrogen (N) soils pose obvious challenges for crop production but may also, counterintuitively, promote the abundance of agricultural pests like the Senegalese locust, *Oedaleus senegalensis*. In this study I investigated how the abundance of locusts and grasshoppers are impacted by soil fertility through plant nutrients and how these variables change across land use types. We worked in two rural farming villages in the Kaffrine region of Senegal. Overall, there was little variation in soil properties and an agricultural landscape low in soil organic matter (SOM) and inorganic soil nitrogen. I corroborated that SOM is a significant driver of soil inorganic N, which had a positive relationship to plant N content. Of the management practices we surveyed, fallowing fields was important for soil nutrient restoration and years spent fallow was significantly correlated to SOM. *O. senegalensis* was most abundant in fallow areas where plant N was lowest. Additionally, I found a significant negative correlation between *O. senegalensis* abundance and plant N, suggesting that plant nutrients are an important driver of their populations. Grasshoppers, excluding *O. senegalensis*, were more numerous in grazing areas, perhaps due to a higher diversity of ecological niches and host plants. These results connect land use, soil, and vegetation to herbivores and suggest that improving soil fertility could be used as an alternative to pesticides to keep locusts at bay and improve crop yields.

Monday, March 26, 2018  
10:00 a.m.  
Wrigley Hall, room 102

Faculty, students, and the general public are invited.

Supervisory Committee:

Dr. Arianne Cease, chair  
Dr. Sharon Hall, member  
Dr. Scott Cloutier, member