

# David Little Livestock Range Management Endowment

AT THE UNIVERSITY OF IDAHO

## **2011 Project Progress Report:**

### ***Impact of Livestock Grazing on the Primary Insect Food Items of the Greater Sage-grouse***

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#### **FIRST-YEAR RESULTS:**

Weather conditions prevented access to the study area in May. Therefore, two trips were taken during 2011 (June to begin identifying potential study sites and July to establish initial sites and collect insect specimens). Eight sampling sites were established in the vicinity of known sage-grouse leks and sampling transects were situated so that they occurred inside (without domestic grazing activity) and outside (with grazing activity) of established grazing exclosures. All sites were in Twin Falls Co., ID (within 25 km of Rogerson, ID) and were selected in collaboration with the BLM.

#### **Insect Sampling Results**

Grasshopper densities were extremely low in 2011 throughout the research area. Sweep-net sampling was conducted using four, 1-minute transects per site (2 transects inside and 2 outside of exclosures). No more than 2 grasshoppers were captured per transect (the majority of transects resulted in no captures). By comparison, in a prior study examining a different disturbance (prescribed burning) but also occurring in sagebrush steppe habitat in southern Idaho, we captured an average of 34 grasshoppers per transect in treated areas and just over 10 grasshoppers per transect in non-treated areas. Weather (i.e. temperature and moisture) can influence both the overall hatch rate and survival of grasshopper eggs and this may have played a significant role in the low grasshopper densities during 2011. However, sampling occurred during the time period when sage-grouse chicks would have been completing development and it is important to note that the low occurrence of grasshoppers was unrelated to where transects were located (inside versus outside of exclosures).

Although the density of scarab beetles (primarily dung beetles) was also low, more were captured outside of the exclosures (where previous grazing occurred) versus inside the exclosures. There were primarily three genera of scarabs captured (*Canthon*, *Copris* and *Orthophagus*) and all three of these genera are dung-feeders. The beetle species that were reared from dung piles were in these three genera but rearing had to occur from old dung piles because of the delay in cattle grazing activity on the BLM allotments in the area during 2011. Densities of tenebrionid beetles were also very low both in and out of the exclosures. Because of the delay in grazing activity and the low number of individuals captured, no statistical analysis was conducted using the scarab or tenebrionid data.

The density of *Pogonomyrmex* ant colonies was significantly higher ( $t = 2.75$ ;  $df = 7$ ;  $[P > t] = 0.0284$ ) inside the grazing exclosures (distance between colonies =  $15.2 \pm 1.4$  m) versus outside of the exclosures (distance between colonies =  $20.5 \pm 1.5$  m). However, there was a higher overall diversity of ants outside of the exclosures (possibly due to the use of older dung piles as colony sites by some ant species such *Solenopsis*). The overall community of ants present on the sites was comprised of species in the genera (*Pogonomyrmex*, *Myrmica*, *Temnothorax*, *Lasius*, *Tapinoma*, *Formica*, *Aphaenogaster*, and *Solenopsis*). Similarly, in a prior project examining a different disturbance (prescribed fire), we found altered ant densities and community structure in treated versus non-treated areas

### **PROCEDURES FOR YEAR 2:**

A minimum of 20 sample sites will be established and sampled during 2012. Sites will be established in the same manner as 2011, using paired (inside versus outside of enclosure fence) transects. Sampling will occur during June and July. All 20 sites will be sampled during each of the sample periods and will concentrate on three insect groups (ants, scarabs and grasshoppers).

Ant communities will be sampled using three techniques. First, short transects of pitfall traps (6 traps per site, 3 inside and 3 outside of the enclosure fence) will be placed at each site. Next, the density of large-colony forming *Pogomyrmix* and *Formica* will be determined based upon nearest neighbor measurements (as was done in 2011). Finally, the nearest dung pile (within 10 m) to each large ant colony will be examined for additional ant colonies and representative specimens collected. An overall comparison of ant communities captured inside versus outside of the enclosure fence will be conducted.

Grasshopper communities will be sampled using sweep net techniques similar to 2011. Four transects (2 inside and 2 outside of the enclosure fence) will be swept for 60 seconds each. Grasshoppers will be identified to family, maturity (nymphs and adults) and species (for adults). Any grasshoppers captured in the pitfall traps will also be identified. An overall comparison of grasshoppers will be conducted between the communities captured inside versus outside of the exclusion fence.

Scarab beetles will be sampled using the same sweep-net transects and pitfall traps described above. In addition, directed sampling of the nearest dung pile to the large-ant colonies will occur (when present). As with the ant and grasshopper samples, comparisons of scarab community occurring inside versus outside of the enclosure fences will occur. Similarly, any tenebrionids captured on the sites will be identified and compared.

Along with the targeted families, all captured insects will be identified to family and used to determine and compare the composition of insect communities between grazed/non-grazed areas (abundance, species richness, and biomass) using paired multivariate analyses and analysis of covariance techniques. Correlation analyses will be used to determine insect associations with specific vegetation parameters. All statistical comparisons will be conducted using the SAS or STATISTIX packages.

### **ADDITION TO ORIGINAL DESIGN:**

If found, Sage grouse scat will be collected from the sites. Scat samples will be processed in Moscow by dissolving the samples in 95% EtOH and collecting all insect parts that are present. Insect parts will be identified to the level of family (when possible) for comparison with the insect collections from the sites.

### **DURATION:**

The project was originally proposed as a two year project. This is the second year of the project and a final report will be completed by December 31 December 2012. However, if sample numbers remain low, a third summer of sampling may be recommended.