

HOW IS BIODIVERSITY AFFECTED BY CHEATGRASS INVASION: A PRELIMINARY SURVEY OF TERRESTRIAL ARTHROPODS

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Bio 410 Spring 2006

INTRODUCTION How Bad Is It?

- Invasive species cost the U.S. \$120 per year
- There are 50,000 foreign species and counting
- Invasives are responsible for 42% of our threatened or endangered species
- If invasive species are present they impact the entire ecosystem!
- The goal of Restoration Ecology is to return the target site to as near its original condition as possible including functional systems and community populations.
- Arthropods are a significant part of this community and will be impacted by invasive species.
- This study investigates how the diversity of arthropods is being impacted by an invasive grass *Bromus tectorum*.
- The motive for this project is to establish baseline data at a restoration site to gauge restoration success and to begin to discover any patterns that may lead to the discovery of an arthropod indicator species.

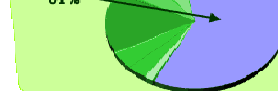
Abstract – This study compares arthropod biodiversity in areas infested with invasive cheatgrass *Bromus tectorum* with areas not infested. The goal of this project was to establish a baseline of the types of arthropods found in both habitats, discover if there is more diversity in either habitat and to find any patterns which might eventually help identify species that could be used as indicators of ecological or environmental status. Arthropods were collected with pitfall traps which were evenly spaced along a gradient containing both habitats. The results show that there is higher species richness and diversity in the areas infested with *B. tectorum*. Research and data processing on this project continues to date, however the author feels that impending data will support the results obtained so far.

Why Consider Arthropods in Restoration Projects?

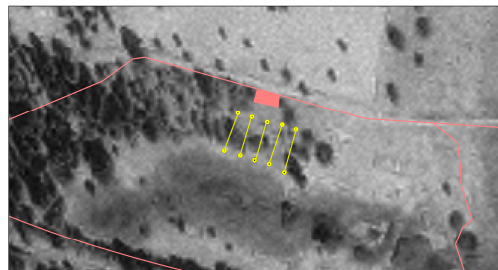
1. Arthropods have the highest level of diversity among all animals.
2. Arthropods occupy the widest range of niches of all animal groups.
3. Arthropods excel as research subjects because of their large populations and quick generation cycles.
4. The small size of Arthropods makes them super-sensitive to environmental changes.
5. Specimens can be preserved nearly indefinitely.
6. Many researchers are beginning to use specific arthropods as indicators of environmental/ecological change and as representatives of biodiversity as a whole.

What percent of our world's living things are arthropods?

arthropods
61%



An indicator species is one which is used to 'indicate' a change that has happened in its environment – it can also be used to represent overall diversity within its group.



Meadow Boundary and Parking Lot
Sampling Transects

Methods and Materials

Study Site – Camp Polk Meadow

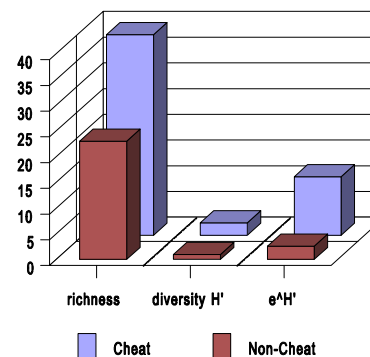
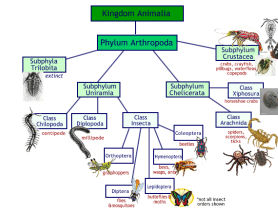
- Plots** – 40m by 50m square divided by 5 transects which were then divided into 11 trap sites each.
- Each **transect** covered terrain in which there was approximately 50% cheatgrass and 50% non-cheatgrass.
- Traps** – 55 pitfall traps made of 9cm diameter plastic cup set flush to soil surface containing soapy water.

RESULTS

Higher richness and diversity are shown for areas that are infested with at least 50% *Bromus tectorum*. This would indicate that care needs to be taken that the restoration process doesn't end up lowering diversity by removing cheatgrass habitat. Also, further research needs to be done to establish whether the higher diversity is due to invasive/exotic arthropods.

CONCLUSION

Analysis still needs to be done on subset areas that contain 100% cheatgrass. I predict that arthropod diversity will decrease as the cheatgrass becomes dominant. This prediction is based on the direct correlation between vegetation diversity and faunal diversity usually found in communities. The idea is that cheatgrass may increase diversity of vegetation at first but then as it crowds out natives it ultimately lowers diversity.



•H' shows Shannon index (richness and evenness)

•e^{H'} shows how many individuals would be in a comparison community which had **perfect evenness**

•e^{H'} for cheat is greater than 11 individuals

•e^{H'} for non-cheat is less than 3 individuals

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