

Abstract

Periodic dieoffs of cheatgrass (*Bromus tectorum*) have occurred in the western U.S.A. for decades. These fluctuations, compounded by variations in productivity, make this exotic annual grass an unreliable forage and periodically increase grazing pressure on perennial species. Understanding these fluctuations is critical for managing these areas. Although risk of fire is reduced on dieoff areas, there is increased risk of erosion and of invasion by other weeds. These declines are commonly attributed to drought. Cheatgrass dieoffs occurred in Colorado, Utah, Nevada, and Idaho in 2003, a year of record heat and drought. Mormon crickets (*Anabrus simplex*) were common in some areas, but have not been linked to cheatgrass dieoffs. Native miller moths (*Euxoa auxiliaris*) were also recorded and their army cutworm larvae were observed feeding on exotic cheatgrass. Although the exact role of insects in dieoffs is not clear, sharp borders between bare areas and unaffected cheatgrass suggest a biotic agent, rather than a widespread climatic factor. We are monitoring moths and cutworms in Idaho and Nevada and investigating interactions between these insects and climate. Cutworms likely act in concert with drought and heat, which produce barren areas for egg-laying, stressed plants that are susceptible to damage, and rapid growth of larvae. These putative interactions may be part of a complex web of interactions, which includes bears that feed on miller moths over-summering at high elevations. The cheatgrass dieoffs of 2003 may foreshadow other changes in interactions between native and exotic species as a result of predicted global environmental change.

Background

- Cheatgrass dieoffs occurred in Nevada, Idaho, Utah, and Colorado in 2003.



Map by Nevada BLM Map by T. Barton
Areas of cheatgrass dieoffs (pink), Winnemucca, NV BLM district

- Established perennial grasses & shrubs unaffected.
- Reduced risk of fire, but increased risk of erosion & invasion by other weeds.
- Summer annual weeds colonized dieoff areas: *Salsola*, *Amaranthus*, *Atriplex*.



Photo, M. Zielinski
Perennial grasses in dieoff area, NV.



Photo, L. Salo
Summer annuals in dieoff area, NV.



Photo, L. Salo
Summer annuals in dieoff area, ID.

- Miller moth's (*Euxoa auxiliaris*) army cutworm larvae observed feeding on cheatgrass.
- Declines commonly attributed to drought, but sharp borders between dieoffs & unaffected cheatgrass do not support widespread abiotic cause.



Photo CA Dept Food, Ag
Adult miller moth



Photo, Colo State Univ.
Army cutworm larvae



Photo, L. Salo
Sharp borders of dieoff

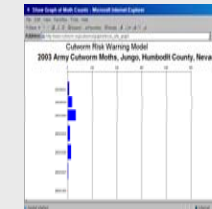
Approach

This work investigates links between cheatgrass dieoffs and army cutworms at Boise, ID and Winnemucca, NV

- Monitored adult miller moths, Boise and Winnemucca, Sept.-Oct. 2003, data posted on Cutworm.org

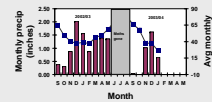


Moths trapped, Boise

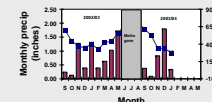


Moths trapped, Winnemucca

- Will monitor army cutworm larvae, Boise and Winnemucca, March-May 2004
- Will install larvae exclusion plots at Boise
- Mild winters allow higher survival of larvae



Boise weather, Sept. 2002-Jan. 2004



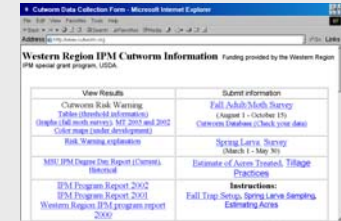
Winnemucca weather, Sept. 2002-Jan. 2004

- Growing degree day models predict larval size



Growing degree days model, 22 Jan. 2004

Resources



<http://www.cutworm.org>

- Data from fall moth surveys and spring larvae surveys
- Growing degree day models
- IPM information
- Contact: Will Lanier, wlanier@montana.edu

Army cutworm life cycle

- Eggs laid late summer/early fall, hatch few weeks later
- Overwinter as larvae, may congregate in large numbers and damage vegetation in spring
- Pupate in soil
- Moths emerge late spring, migrate to mountains, summer in talus slopes, are important food of grizzly bears, return to lower elevations late summer



Photo, John Marriott

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