

Factors Affecting Alfalfa Stand Longevity in Montana

Dennis Cash (Montana – Research & Education Grant)

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Title: Factors Affecting Alfalfa Stand Longevity in Montana

Principal Investigator:

Dennis Cash
Professor, Extension Forage Specialist
Animal & Range Sciences Dept.
235 Linfield Hall
Montana State University
Bozeman, MT 59717
(406) 994-5688
dcash@montana.edu



Field monitoring included the use of sweep nets bimonthly to evaluate harmful and beneficial insect populations.

Cooperators:

Sue Blodgett (former PI, now with North Dakota State University)
Rebecca Baril, Project Coordinator, MSU Research Associate
Cecil Tharp, MSU Research Associate
Dave Wichman, Superintendent, Central Montana Ag Research Center
Duane Griffith, MSU Extension Farm Mgt. Specialist
Ken Kephart, Superintendent, Southern Montana Ag Research Center
Mary Burrows, Assistant Professor, Extension Plant Pathologist

Participants by County:

Rosebud County: Byron Hould, Agent; Steve Seleg and Mark DeCock, Producers
Roosevelt County: Gina Snyder, Agent; David Christoffersen and Miles Knudsen, Producers
Gallatin County: Ron Carlstrom, Agent; Ken Flikkema and Glenn Droge, Producers
Yellowstone County: Paul Dixon, Agent; Roger Schwarz, Producer
Custer County: Kent Williams, Agent; John Viall and Bill Griffin, Producers
Phillips County: Mark Manoukian, Agent; Kevin Wiebe, Producer
Garfield County: Eric Miller, Agent; Tom Stanton, Producer
Fergus County: Darren Crawford, Agent; Dee Boyce, Producer
Teton County: Mark Major, Agent; Dee Boyce, Producer

Western SARE Grant: \$139,397



Arthropods captured in a typical sweep of the net.

Situation:

Alfalfa is Montana's largest crop, with more than 1.5 million acres harvested a year – half irrigated with yields averaging 3.3 tons an acre, the rest dryland with yields averaging 1.04 tons. More than 90% is fed on site by producers to support the \$1.1 billion livestock industry.

Establishing new stands or renovating existing stands can cost \$150 an acre or more, so growers try to keep stands producing as long as possible. Optimizing stand persistence could help producers sustain stable hay production and minimize economic risks.

Objectives:

1. Survey pests and production practices in a variety of Montana production areas for effects on alfalfa stand longevity
2. Identify the impact of clover root curculio, *Sitona hispidulus*, other arthropod pests and plant diseases on alfalfa stand longevity
3. Evaluate the impact of fall harvest timing on alfalfa stand longevity
4. Evaluate the impact of nurse crops on alfalfa stand longevity
5. Provide economic analysis of individual, recommended and non-recommended practices from the results of research plots and cooperating producer fields

Actions:

Statewide Survey:

Identified 12 alfalfa fields representing a cross-section of Montana production systems. Collected bimonthly insect samples and data on stand counts, clover root curculio feeding, foliar diseases and root or crown rot symptoms. Monitored soils, climate and producer records on fertilizer, pesticides, irrigation and harvest.

Nurse Crop Trials:

Established a replicated trial at the Central Montana Agricultural Research Center with 'Shaw' alfalfa (5 pounds per acre) in combination with low and high seeding rates of barley harvested for grain, barley harvested for hay, spring wheat for hay and triticale harvested for hay, seeded in furrow and perpendicular to alfalfa.

Cultivar and Harvest Management Trials:

Alfalfa plots (from previously planted trials) were managed identically for first and second harvests. For the third crop, half were harvested Sept. 1 and half in mid October.

Insecticide Trials:

Conducted four trials in irrigated hay fields to assess the potential for applying topical insecticides (Furadan vs. control) to reduce clover root curculio root feeding damage.



Root damage from the clover root curculio.



Crown root rot.

Results:

Statewide survey

Key points among the large body of data compiled from 12 fields:

- Confirmed significant numbers of alfalfa weevil larvae, pea aphid and other pests, but rarely above economic thresholds for control.
- Clover root curculio detected at all sites, the first report of its widespread distribution in Montana.
- First statewide confirmation of alfalfa mosaic virus incidence across Montana.
- Clay content is fairly predictive of clover root curculio feeding damage.

Nurse Crop Trials

The data from the study suggest the subject warrants further study. Meanwhile, the project team recommends:

- Plant nurse crops that are less competitive (wheat).
- Plant the nurse crop at an angle or perpendicular to alfalfa.
- Harvest the nurse crop as forage.
- A reduced seeding rate may be more economical than high rates.

Cultivar and Harvest Management Trials

Across three trials, fourth-year and total alfalfa yields were significantly reduced by the Sept. 1 harvest. In some trials, this harvest timing increased the severity of crown rot and clover root curculio damage.

Insecticide Trials

Results show that alfalfa root damage by clover root curculio can be delayed but not likely eliminated with insecticide treatments. Further study is needed.

Potential Benefits:

Economic evaluations of several important findings show that:

- Better insect monitoring can eliminate unnecessary costs of applying insecticides and their detrimental impacts on beneficial arthropods.
- Harvesting hay twice before early August and grazing or ensiling the aftermath can extend stand life, reduce workloads and lower risks associated with tillage.
- Based on biomass of roots and crowns remaining after terminating alfalfa in its fourth year, potential N credits range from 123 to 208 pounds per acre, or \$74 to \$125 based on current N prices.

Harvest timing can affect yield and stand life.

