

Montana Sheep Institute Project

BACKGROUND

The concept of the “Montana Sheep Institute” project originated from a sheep industry summit meeting held in the fall of 2000. The sheep industry was in a crisis state and approximately 20 sheep producers from all over Montana came together with the goal of developing a plan to improve the profitability and competitiveness of the Montana Sheep Industry. The cornerstones of this plan were to increase the use of sheep in natural resource management programs, improve production efficiency of Montana sheep operations and explore methods for Montana producers to add value to Montana lamb and wool. A follow up meeting was conducted with private and public land managers (ranchers, USFS, BLM, BIA, county weed boards) to explore the opportunity to increase the utilization of sheep in weed management programs. This group suggested that efforts should be concentrated on developing and implementing systems. Land managers expressed the concern that decreasing sheep numbers will limit the potential use of this extremely valuable tool (sheep grazing) in managing landscapes. They confirmed the need to improve the profitability of Montana sheep operations. As a result of these summit meetings, the Montana sheep industry pursued federal funding for the Montana Sheep Institute Project.

CURRENT STATUS

The Montana Sheep Institute is dedicated to developing and implementing non-traditional strategies that will increase the competitiveness of Montana’s lamb and wool in the world market. This project is dedicated to: 1) developing and implementing grazing strategies to control non-native invasive plants, and 2) to improve animal husbandry, management and marketing systems necessary for a sustained sheep industry.

Encroachment of these non-native noxious weeds represents the single most serious threat to natural habitats. Noxious weed invasion reduces the ecological integrity of land and waters, alters ecosystems, impacts wildlife habitat and threatens survival of native plants. Targeted grazing with sheep is a natural approach to manage vegetation and enhance landscapes. This approach provides land managers an alternate tool in their fight against invasive plants that is more economically feasible and environmentally sensitive compared with traditional methods to control weeds. Currently, targeted grazing represents the only economically and environmentally sound alternative to address large infestations of invasive plants. However, the limited availability of sheep and, until recently, the lack of identified, appropriate, large-scale targeted grazing strategies has limited using sheep as a tool to manage invasive species. A sustained and profitable sheep industry must exist for this tool to be readily available to land managers. Thus, the second part of this project addresses the animal husbandry, nutrition, selection, management and marketing issues necessary for a sustained sheep industry. This project represents a true partnership between MSU and the Montana sheep industry, but also includes numerous additional stakeholders, including county weed districts and supervisors, federal and state land managers, and private land owners.

An advisory committee was formed by the Montana Wool Growers Association to provide input on direction and oversight of Sheep Institute project activities. This committee meets once each year, but committee members contact MSU personnel on a regular basis throughout the year.

ACCOMPLISHMENTS AND OUTCOMES

Overall

- This project represents a true partnership between MSU and the Montana sheep industry but also includes numerous additional stakeholders (county weed districts and supervisors, federal and state land managers, and private land owners).
- In 2009, the American Sheep Industry Association (ASI) sponsored a U.S. Sheep Research Symposium at its annual convention. Scientists from 18 research units submitted 26 project synopses. A committee of 3 researchers and 1 producer selected 8 projects to be presented. Research by staff associated with the Montana Sheep Institute contributed to 4 of the 8 projects selected.
- Conducted an average of over 100 outreach or extension activities (presentations, workshops and ranch visits) per year.
- Developed website: www.sheepinstitute.montana.edu
- Published 12 peer-reviewed manuscripts; three manuscripts have been submitted and are in the review process for publication in a peer-reviewed journal. Ten additional manuscripts are in preparation.
- Presented 29 papers at national and regional symposiums at scientific meetings.
- Published two invited book chapters.
- Trained 2 PhD and 4 M.S. graduate students.
- Project funding was used as leverage and matching funds at the local county and weed district level for additional funding from Montana Noxious Weed Trust Fund and other funding sources.
- The project employs 1 full-time Research Scientist, 1 full-time regional extension agent, 1 full-time research associate, and 1 half-time research associate.
- Improved research capabilities at Fort Ellis (feedlot and sheep working facilities), Red Bluff (lambing and automated weighing technology) and Wool Laboratory (wool grab sampling) Experiment Station facilities.

Targeted Grazing

- Targeted grazing projects involve major weed projects with Dalmatian toadflax, spotted knapweed and leafy spurge, and minor weed projects with sulfur cinquefoil and common tansy.
- Developed a strategic, targeted livestock grazing method to control Dalmatian toadflax, spotted knapweed and leafy spurge on Montana's rangelands, while maintaining and enhancing native landscapes.

- Landscape grazing efforts consisted of working directly with 22 large landscape weed management projects in 18 Montana counties. Weed projects directly involve over 100,000 acres of weed-infested Montana rangeland and about 1,000 landowners. In addition, the projects involve 35 monitoring sites, 31 sheep producers, and 30,000 ewes and lambs. Using targeted grazing to control large infestations of these invasive plants has been accomplished at a much lower cost per acre (\$4-8) than by traditional herbicide treatments (\$25-30).
- Key project areas include controlling invasive plant on sensitive waterways (8 miles of Madison River, 96 miles of Powder River, and 25 miles of Yellowstone River), and key post-fire projects, e.g., the Bucksnot Fire Project in the Spokane Hills, east of Helena, MT.
- Developed additional information used to refine grazing prescriptions or “best management practices” for using targeted grazing for managing Dalmatian toadflax, spotted knapweed and leafy spurge.
- The Institute has been instrumental in the publication of the “TARGETED GRAZING HANDBOOK” and the “TARGETED GRAZING EDUCATIONAL MODULE” by the American Sheep Industry Association (<http://www.sheepusa.org/>).
- Used fecal near-infrared reflectance spectroscopy (NIRS) to predict chemical and botanical composition of sheep consuming spotted knapweed diets. This technology determined that sheep consume more spotted knapweed in August than in July. Such data has been used to “fine tune” targeted grazing prescriptions for spotted knapweed. For example, based on these data, the appropriate time to graze sheep would be late in the season, but before viable seed are produced.
- One Institute study indicated that 80 to 90% of the original ecological value of noxious weed-infested land over a five year period has been recovered with controlled sheep grazing.
- Demonstrated that under a controlled grazing régime, sheep will selectively graze certain target invasive plants.
- Grazing prescriptions that concentrate on time, duration and density of grazing, combined with a training period can achieve 60 to 70% utilization of the target plant and limit the utilization of native grass to 30 to 40 percent. Over time, targeted grazing should favor the re-establishment of the grass and forb components of the landscape.
- Comparisons from leafy spurge project sites indicate that, as a general rule, leafy spurge composition decreased about 7% per year of sheep grazing, whereas the grass component of the landscape increased by 5%.
- The Sheep Institute Project was recognized in 2008 as the Montana Weed Control Association’s “Weed Fighter of the Year.”

Animal husbandry, management and marketing systems necessary for a sustained sheep industry

- In 2008, genetic records and selection index values were available on rams offered at the Montana Wool Growers Association's Miles City Ram Sale. This will position Montana purebred sheep producers in a leadership role in genetic development in the U.S. (http://www.sheepinstitute.montana.edu/08sales/RamSaleCat_9_9_final.pdf).
- Over 90% of the rams sold at Miles City Ram Sale now report ultrasound ribeye area. Our ultrasound procedures will be used to develop a standardized protocol for ultrasound scanning of sheep.
- When used for fleece classing, the Optical Fiber Diameter Analyzer 2000 (OFDA 2000) mid-side samples produce lines of wool of different diameters in the direction as expected, e.g., the finer can be sorted from the coarser. However, targeting a specific micron is more difficult. Using the OFDA 2000 as a tool for classing fleeces with the goal of targeting a specific micron is possible, but its application for this purpose is not as precise as desired and must involve a subjective evaluation of OFDA 2000 results. These data indicate that the OFDA 2000 can be used to sort fleeces at shearing into fairly specific fiber diameter lines of wool, but the OFDA 2000 may be better suited as a management tool rather than a wool sorting tool.
- About half a million pounds of wool (17% of Montana's wool clip) from about 250 producers were marketed through the Institute. Over half of the producers had less than 2 bales of wool. Because of their small size and distance to a suitable market, marketing options for these growers are limited or nonexistent. Growers in the pool received a premium of about 25 cents per pound for their wool. The cost of the program is 7 cents per pound of wool. The bulk of the wool marketed through this project was exported. In 2007, one line of wool was sold directly to a Chinese buyer; the wool was containerized in Jordan, Montana and shipped directly to a port in China.
- Developed an online sheep ration balancing program that designed to assist producers in matching available feedstuffs with the animal's nutritional needs. Used this program to: 1) view sheep nutritional requirements, 2) view the standard nutrient content of more than 300 feeds, 3) enter a custom feed value based on laboratory results, 4) balance a ration for sheep at various lifecycle stages, 5) find answers to frequently asked nutritional questions, 6) balance feedlot rations, 7) determine quantities of feed for a flock, and 8) determine supplement needs for ewes grazing winter range. It is available at: http://www.sheepinstitute.montana.edu/feed_ration.html
- The sheep ked is the most serious insect pest affecting sheep in the U.S. causing damage to the pelt. Based on Institute data, the PYthon® insecticide ear tag and Permethrin WS low volume spray effectively controlled sheep keds (*Melophagus ovinus*). The PYthon® ear tag has received state label status in Wyoming and Montana to control biting gnats (*Culicoides spp.*) which is the main bluetongue vector. Bluetongue outbreaks can result in millions of dollars in losses due to the impact on livestock health and notably in the loss of markets for livestock due to regulatory restrictions on animal movement to limit the spread of the disease. Data from these trials have been sent to authorities in Europe, and are being used to justify another study this summer. This work has worldwide implications.

FUNDING – MONTANA SHEEP INSTITUTE

Year	Amount
2002	\$374,145
2003	\$520,082
2004	\$464,316
2005	\$531,517
2006	\$551,759
2007	\$175,000
2008	\$138,898
Total	\$2,755,717

