

# Increased Efficiency of Sheep Production

NCERA-214 (2009-2014)

## *Sheep Industry Faces Many Challenges, but Shows Promise*



Problems with fertility related to improper breed selection or body conditioning or a short lambing season contribute to inefficient sheep production. Photo by Natasha Pettifor, Cornell University.

Sheep production is an important part of American agriculture. More than 80,000 farmers and ranchers raise sheep in the U.S. Each year, these producers sell over \$760 million worth of products from over five million sheep. Although per capita consumption of lamb is low relative to beef, pork, and chicken in the U.S., growing markets for sheep products—especially among recent immigrant populations—are promising, and the American Lamb Board is finding new ways to promote lamb in traditional markets. A wide array of breeds, relatively strong recent lamb prices, and millions of acres of potential pasture make the sheep industry able to adapt to market conditions, producer needs, and consumption trends, such as rising demand for cheese and yogurt made from sheep milk. However, the industry is still struggling with animal health concerns, economic issues, and global competitiveness. Gastrointestinal parasites, predators, and diseases can affect product quality and safety and require costly prevention and treatment methods to control. Of the 154 million pounds of lamb and mutton produced by U.S.

farmers in a typical year, just over nine million pounds are exported to other countries. To overcome production challenges, farmers and ranchers need new knowledge and technology that will improve efficiency, sustainability, profitability, and competitiveness in the worldwide market.

## *Committee Forms to Facilitate Research & Extension*

Formed in 1999, multistate research and extension project NCERA-214 uses a collaborative approach to deal with the wide scope of challenges facing the sheep industry and to generate sustainable solutions that can be applied effectively industry-wide. Collaboration enables researchers to exchange limited resources, including information, research animals, and genetic material, among different institutions and use common research approaches, allowing comparisons among studies. With scientists trained in genetics, reproduction, nutrition, meats, management, and animal health, the NCERA-214 committee is uniquely suited to develop integrated animal management and animal health and well-being systems that support efficient, competitive, and sustainable production of safe, wholesome products.

## *Multistate Project Guides Sheep Industry Toward Sustainability*



Photo by University of Wisconsin-Madison, College of Agricultural and Life Sciences.

Research results from this committee benefit sheep producers and consumers by cutting production costs, improving animal productivity, and increasing product quality. Extension programs and workshops have been incredibly successful in raising awareness and knowledge among producers, with participating producers reporting changing their practices and increasing production efficiency.

More specifically, research results have provided breed resources, genetic information, and guidelines that help the sheep industry use the most appropriate breeds in crossbreeding programs. With more breeds available and better information about breed performance, sheep producers have been able to improve reproductive efficiency and produce more nutritious, leaner lamb. Furthermore, research-based recommendations have led to increased adoption of out-of-season breeding. Combined with higher levels of fertility, this has allowed producers to sell more lambs during the months with the highest lamb prices. In West Virginia, the net result has been

increased revenue of 15% to 20%. Research has also helped farmers cut feed costs and reduce losses due to parasites.

These improvements to productivity and quality increase the competitiveness of the U.S. sheep industry with other major sheep producing countries. A viable sheep industry contributes to sustainable agricultural practices and provides economic stability to rural communities.

# Selected Research Findings & Impacts

## FEEDING PRACTICES

- **Cornell University:** Research on the effects of fermentable fiber in diets for weaned lambs has helped farmers balance the pros (improved animal health) and cons (reduced growth rate) of incorporating fiber in lamb diets.
- **South Dakota State University:** Research on soyhulls and distiller's dried grains (DDGS, a nutrient-rich co-product of ethanol production) has provided sheep producers with cost effective alternatives to conventional starch-based diets. Following NCERA-214 recommendations and outreach activities, thousands of commercial ewes in the region are now offered soyhulls or soyhulls/DDGS mixtures. Those producers report lower labor costs and other production costs and improved animal performance.
- **Virginia State University:** soyhull pellets (a source of digestible fiber) incorporated in hay-based rations increased feed efficiency and growth rate in eight-month-old lambs.
- **University of the Virgin Islands:** weaning lambs at 120 days could save tropical hair sheep producers about \$11 per animal.

## BREEDING

- NCERA-214 research has helped producers make informed decisions about whether to raise Dorper breed sheep and how to manage these sheep, filling a gap in information and comparative studies on a breed that is relatively new to the U.S.
- Utilizing the sheep Eazi-Breed device for controlled internal drug release to synchronize the breeding period for ewes in fall and winter-spring reduces lambing period labor requirements by 50% or two hours per ewe annually.
- **U.S. Meat Animal Research Center:** Highly productive crossbred ewes can be produced by using either rams or ewes of prolific breeds; therefore, producers can use the breeding system that is most convenient for their situation.

## FERTILITY & LAMB MORTALITY

- **U.S. Meat Animal Research Center:** Producers can overcome the seasonal constraint of fertility rate by using Romanov crossbred ewes, which had fertility rates of 87% to 89% when exposed during May (compared to 60% to 70% using Dorset, Finnsheep, and Rambouillet ewes), regardless of the remaining breed composition.
- **Cornell University:** Pasture lambing had the same lamb mortality as barn lambing for ewes that had not pasture-lambed for generations.

## PARASITE & DISEASE CONTROL

- **USDA-ARS, Louisiana State University, Auburn University & Fort Valley State University:** *Sericea lespedeza* (a perennial legume) can be included in sheep diets to help control gastrointestinal nematodes (parasitic worms). Producers who graze sheep on fresh or preserved *sericea lespedeza* can expect to save more than 50% on dewormer treatments. With *sericea lespedeza* as a viable substitute, available vermicide drugs that expel parasitic worms could have extended useful life before the parasites develop resistance. *Sericea lespedeza* is also a good option for organically produced animals, which lose their organic status if treated with certain vermicides. A patent and a USDA-NIFA Small Business grant was awarded to facilitate commercialization of a pelleted product.
- **Virginia State University:** Incorporating juniper leaf meal into lamb diets can help control parasites and lower lamb mortality.
- **University of Rhode Island:** Oral vitamin E supplementation, at the level currently recommended by the National Research Council, significantly reduced worm presence in lambs and reduced egg count in their feces.
- **Cornell University:** A vaccine against pinkeye administered by skin scratching was effective.
- **Louisiana State University:** Copper treatment in the form of copper oxide wire particles was more effective than copper sulfate for controlling intestinal nematode infection in lambs during summer grazing season.
- **Utah State University:** A genome scan identified a genetic region that may control parasite resistance in two U.S. sheep breeds. Genetic markers for parasite resistance can be used to evaluate flocks and identify resistant and susceptible animals.
- **U.S. Meat Animal Research Center:** A genotyping test for ovine progressive pneumonia (one of the most costly sheep diseases in the U.S.) was developed for commercial use.

## WORKSHOPS & OUTREACH

- **University of Wisconsin-Madison:** The only dairy sheep production research unit in North America provides research and outreach necessary for continued growth of the dairy sheep industry in the U.S., Canada, and Mexico. In 2009, the Wisconsin Sheep Dairy Cooperative more than doubled the amount of sheep milk marketed in 2003.
- **Michigan State University:** Michigan sheep producer organizations had record increases in membership in 2011, with growth directly linked to educational efforts according to survey results from outreach programs. In particular, enrollment in accelerated production systems went from zero to 10 farms and a total of 4,820 ewes in Michigan in just one year.
- Industry grant support was secured to facilitate the South Dakota sheep education program (sheepSD) for beginning farmers and ranchers.
- **University of Rhode Island:** Producers who participated in farm visits during the summer of 2011 felt that the program helped them to identify animals susceptible to parasites and evaluate vermicide resistance on their farms.
- **University of Maryland:** The Small Ruminant Extension Program has become a leader in using Internet technologies to disseminate research-based knowledge to producers. Web sites and social media have further extended reach and engagement.

## Want to know more?

NCERA-214 was supported, in part, through USDA's National Institute of Food and Agriculture by the Multistate Research Fund established in 1998 by the Agricultural Research, Extension, and Education Reform Act (an amendment to the Hatch Act of 1888) to encourage and enhance multistate, multidisciplinary research on critical issues that have a national or regional priority. For more information, visit <http://ncra.info/>.

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### Participating Institutions & Researchers:

Cornell University, Fort Valley State University, Iowa State University, University of Kentucky, Lincoln University, Louisiana State University, Maine Cooperative Extension, University of Maryland, Michigan State University, North Dakota State University, Ohio State University, Oklahoma State University, Oregon State University, Pennsylvania Cooperative Extension, University of Rhode Island, South Dakota State University, Texas A&M University, Utah State University, Virginia Polytechnic Institute and State University, Virginia State University, West Virginia University, University of Wisconsin, University of Wisconsin-River Falls, USDA-ARS, U.S. Sheep Experiment Station, USDA Roman L. Hruska U.S. Meat Animal Research Center

This Impact Summary was compiled and designed by Sara Delheimer.



Research at the South Dakota State University Sheep Unit Lamb Nutrition Feedlot has led to alternative feeds for sheep.