Accomplishments 2010-2013
Virginia Polytechnic Institute and State University Project 439821
Technical Support for the National Sheep Improvement Program
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Submitted by
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Accomplishments: 2010

➢ Develop protocols for transfer of NSIP data to LAMBPLAN, Australia and for merger of genetic evaluation operations between NSIP and LAMBPLAN.

➢ Transfer data for NSIP Targhee, Suffolk, Polypay, Katahdin, Dorset, Hampshire, Shropshire, and White Dorper flocks to LAMBPLAN, Australia. Conduct comparative validations of NSIP and LAMBPLAN EBVs.

➢ Derive genetic parameters and adjustment factors required to support transfer of existing NSIP genetic evaluation operations to LAMBPLAN and provide that information to LAMBPLAN. These include parameters and adjustment factors for the basic NSIP array of traits as well as Katahdin fecal egg counts and ultrasonic scanning traits for farm-flock breeds.

➢ Develop equations to convert current NSIP measurements of ultrasonic loin muscle areas to estimates of loin muscle depth, as required by LAMBPLAN.

➢ Provide information and coefficients required to implement the Targhee Western Range Index and the Polypay and Katahdin Ewe Productivity Indexes in LAMBPLAN. These are now included as standard LAMBPLAN indexes and are available to NSIP breeders.

Accomplishments: 2011

➢ Transfer the final two NSIP data sets (Columbia sheep and Kiko meat goats) to LAMBPLAN, Australia. All historical NSIP data have now been transferred and EBVs have been generated for all NSIP clients.

➢ Transfer 2,757 ultrasound scanning records on Targhee and Columbia rams collected between 1998 and 2011 to LAMBPLAN.

➢ Provide necessary adjustment factors and genetic parameters to allow estimation of EBVs for:

♦ Fleece weight, fiber diameter, staple length, coefficient of variation in fiber diameter, yearling and hogget (18-month) body weights, ram lamb scrotal circumference, and ultrasonic fat and loin muscle depth in maternal wool breeds.

♦ OFDA fiber diameter coefficient of variation and fiber curvature, hogget body weights, ultrasonic fat and loin muscle depth, and ram lamb and yearling ram scrotal circumference in Western range breeds.

➢ Carry out sequential ultrasound scans to estimate fat and loin muscle depth, and make sequential measurements of scrotal circumference, in growing Katahdin lambs at the Southwest Virginia Agricultural Research and Extension Center to derive adjustment factors for lamb age and body weights for these variables in Katahdin sheep.

➢ Make a presentation on "Application of genomic information for improvement of quantitative traits" at the American Sheep Industry Convention, Scottsdale, AZ, January 24-28. Lead discussion on potential benefits and strategies for including genomic information in NSIP. Develop a proposal for collection and use of genomic information.

➢ Make presentations on "Relevance of loin eye size to the sheep industry: relationship of ultrasound and carcass measurements to carcass yield and value" and "Relationships between loin muscle depth and area in sheep" at the American Sheep Industry Convention, Scottsdale, AZ, January 24-28.

Accomplishments: 2012

➢ Re-evaluate adjustment factors for effects of lamb birth and rearing type and ewe age on weaning and postweaning body weighs in Terminal Sire sheep breeds. Evidence has emerged to suggest that current adjustment factors are not equally applicable across flocks with widely differing mean performance levels and that more sophisticated methods are needed to properly adjust for these non-genetic effects. To date:

♦ Adjustment factors have been shown to differ between Terminal Sire breeds with very high growth rates (i.e., the Suffolk, Hampshire) and more modest growth rates (i.e., the Dorset, Shropshire, and two additional terminal sire composite breeds). Separate adjustment factors were derived for these two groups of breeds and provided to LAMBPLAN for implementation into the NSIP/LAMBPLAN genetic evaluation system.

♦ A general relationship between the mean growth rate in a flock and the size of the adjustment factors required to correct for differences in lamb type of birth and rearing and age of dam was discovered. Protocols to customize adjustment factors based on the mean growth rate the flock were developed and provided to LAMBPLAN. However, use of flock-specific adjustment factors would require significant modifications to LAMBPLAN software and have not yet been considered for implementation.

➤ Provide technical support to develop procedures for regular listing of EBVs for proven sires and elite young rams on the NSIP web site.

➤ Participate in the April, 2012 meeting of the LAMBPLAN Technical Committee in Armidale, Australia. Issues addressed include:

♦ A need for changes in LAMBPLAN protocols for analysis of reproductive traits has been identified. Changes to current software required to implement these protocols are anticipated to occur within the next 2 years. The NSIP procedures for genetic evaluation of reproductive traits currently differ from the standard LAMBPLAN protocols, and are believed to be superior for U.S. producers. Proposed changes to LAMBPLAN procedures will increase consistency of EBVs for reproduction between LAMBPLAN and NSIP flocks. NSIP will continue to use the current NSIP procedures until the full LAMBPLAN software rewrite is implemented, at which time, protocols for genetic evaluation of reproductive traits will become uniform for NSIP and LAMBPLAN.

♦ LAMBPLAN now considers the reproductive and maternal performance of ewe lambs as separate traits from comparable expressions of reproductive and maternal performance in adult ewes. This is an initial step in revisions of procedures for genetic evaluation of reproductive traits described in the previous paragraph. Given current NSIP protocols for genetic evaluation of reproductive and maternal effects, no advantage to the proposed immediate revisions is anticipated, and implementation by NSIP will therefore deferred until implementation of the full set of revised procedures for genetic evaluation of reproductive traits.

➤ Sequential ultrasound scanning to estimate fat and loin muscle depth and sequential measurements of scrotal circumference in growing Katahdin lambs at the Southwest Virginia Agricultural Research and Extension Center was completed. Data were summarized and can now be used to derive adjustment factors for lamb age and body weights for these variables and to develop procedures for genetic evaluation of these traits in Katahdin sheep.

➤ With funding from Utah State University, provide technical support for enrollment of the Rafter 7 Ranch in LAMBPLAN. Activities for 2011-12 included software evaluation and procurement, database design, and preparation of data for transfer to LAMBPLAN. The project is currently on hold pending possible sale of the Rafter 7 ranch.

Accomplishments: 2013

➤ Provide LAMBPLAN with all adjustment factors and genetic parameters required to generate EBVs for scanning traits and scrotal circumference in Katahdin sheep.