

NSIP Meeting

Thursday – March 10, 2022

7 p.m. CST

Minutes submitted by Lisa Paris Weeks

Attendees: Matt Benz, Kristen Bieber, Rusty Burgett, Brady Campbell, Zach Meinders, Lynn Fahrmeier, Cody Hiemke, Tom Hodgman, Carol Heupel, Ron Lewis, Jim Morgan, Brett Pharo, Brenda Reau, Reid Redden, Bill Shultz, Curt Stanley, Jake Thorne, Todd Taylor, Lisa Weeks

Agenda:

- Secretary Report
 - Membership minutes from January meeting in San Diego were reviewed with no changes noted.
 - Reid Redden moved to accept the November minutes as submitted, seconded by Jim Morgan. Motion passed.
- Treasurer Report
 - Presented by Bill Shultz (report attached)
 - Our tax return is projected to cost \$600.
 - Our 2022 membership renewals are a little bit behind.
 - Reid Redden moved to accept the report, seconded by Jake Thorne. Motion passed.
- Program Director Report
 - Presented by Rusty Burgett (report attached)
 - A database is being kept of all genotyped animals.
 - The Searchable Database now indicates the genotyping status of an animal.
 - Small discussion on data from Neogen vs. Flock54. Flock54 is using around 1000 markers vs. GGP Ovine 50k array which utilizes 50,000 markers. Flock54 is a great option for parentage and some genetic conditions. Genomically Enhanced Breeding Values (GEBVs) require the 50k array.
- Technical Committee
 - Presented by Ron Lewis (report attached)
 - Working to validate genetic conditions to achieve the necessary accuracy in reporting.
 - GEMS is likely to extend to a 4th year as the Jan/Mar lambing in 2022 may have been missed for data collection.
- Sale Committee Report
 - Presented by Matt Benz (report attached)
 - The first NSIP Influenced Replacement Ewe Sale sold to 11 states, 40 bidders from 18 states, 300 head sold.
 - June 20 is the next NSIP Influenced Replacement Ewe Sale
 - Sept 12 is the third NSIP Influenced Replacement Ewe Sale.
 - July 11-13 Online NSIP sale

- July 30 Center of the Nation NSIP Sale in Spencer, IA.
- Brainstorming Ideas for Education, Outreach, Advertising
 - Rusty Burgett is working on a Beginner Webinar Series
 - Monthly Open Forum Zoom Calls
 - Brenda Reau brought focus to potential Outreach & Marketing by working with existing members, potential members, commercial producers, and downstream to the feeders and packers.
 - Bill Schultz suggested developing a budget to embrace any ideas.
 - Brenda Reau is point of contact for Social Media.
 - Reid Redden suggested improving service to the existing members, for example the NSIP Replacement Ewe Sale.
- New Business
 - Reid Redden approached the topic of getting Dorpers to embrace NSIP. Perhaps a good first step is to include the ones that are members in the Searchable Database. Rusty Burgett remarked that once Sheep Genetics migrates to their new platform that this can occur.
- Next Meeting will be Thursday, May 12 @ 7 p.m. CST.
- Brenda Reau motioned to adjourn, seconded by Reid Redden.

NSIP Treasurers Report

March 9, 2022

Bill Shultz

We are moving towards the end of our 2nd Quarter of fiscal year 2022. A more comprehensive report including our 2nd quarter Balance Sheet and Profit & Loss statement will be presented at that time.

Through February our total equity stands at \$57,047 (checking account balance, plus receivables, minus liabilities) after ending the FY 2021 at \$54,731. It should be noted that a little over \$16,000 worth of February income has not yet been deposited by Larry Kincaid into our ASI checking account. In general, we are on budget with our 2022 income and expenses.

Membership which is the main driver of our 1st half of year income stands at 171 paid memberships totaling \$41,613 for an average of \$243 per member. Through the same time period in FY 2021 we had 162 paid memberships totaling \$42,557 with an average of \$263 per membership.

As anticipated revenue from both DNA analysis and Data processing is light in the 1st half of the year with those figures currently representing less than a quarter of our total year budget projections.

As always feel free to contact Rusty or myself if you have questions.

March 2022 Director's Report

It has been a good start to 2022 for membership with 21 new members and one existing member adding a second breed in January and February. I also have another 6 new members that joined or plan to in March so far. I've spent several hours helping these new members with setting up Pedigree Master and data entry. We continue to receive DNA samples for genotyping as well with 188 samples being submitted from 10 different flocks for the February batching date.

In total, we have 8,423 genotypes on file that have been processed through Neogen and those animals originated in 102 different flocks. The majority of these samples were genotyped as part of various research efforts. The majority (7,266 genotypes) are from Katahdins but there are also genotypes for White Dorpers (56), Rambouillet (761), Polypay (86), Suffolk (244) and Texel (9). With the GEMS project underway, these numbers will certainly increase as we've already had producers collecting TSUs and will be shipping samples in the very near future. I have the technology in place now to scan each individual TSU upon arrival which has helped clear up several reporting issues and increased labor efficiency. Batching dates have been set for 2022 and are posted on the data run calendar on the NSIP website. With the GEMS project, we may also need to submit special orders outside the normal schedule but Neogen is aware and can accommodate. I've had several meetings and communications with personnel at Neogen, SheepGenetics and AGBU to address issues with turnaround time which I think have been solved. We should be on track for a 6-8 week timeframe for parentage and condition results. Recently, I re-submitted all previous genomics orders for Katahdins for parentage re-runs. One producer still has some discrepancies which we are working through.

In the coming weeks, I will host 2 different Zoom meetings for an "Introduction to Pedigree Master" tailored towards new members. Approximately 1/3 of new members will schedule an individual Zoom call with me to discuss using PM and I think more might attend these scheduled meetings on March 22 and 31. I'd like to have regular discussions/meetings throughout the year (ideally, we'll schedule those monthly) so if there are any ideas for topics, please let me know. I'd like to finish scheduling those topics by April 1 so I can announce them for the remainder of the year. We will also continue the monthly open discussions which are scheduled for the first Wednesday of each month at noon central time. There is a regular group of about 6 attendees and they've voiced their appreciation for those open chat times. We discuss a variety of topics, some pertaining to genetic selection but many about management or other considerations so I highly encourage anyone to join in.

Along with the regular educational sessions, it may be beneficial to develop a plan for outreach/advertising for the year. I'm open to all ideas!

Thank you to everyone for all of your help!

Thanks to everyone who consigned, purchased and bid in the NSIP Replacement ewe sale. We think it was a great success.

100 Polypay October 2021 ewe lambs averaged \$437.50

175 Polypay January 2022 ewe lambs averaged \$447

10 Bred Polypay yearling NSIP ewes averaged \$770

13 Texel March 2021 ewe lambs average \$655

Sheep sold to 11 states. There were 40 bidders from 18 states. 5442 different IP addresses viewed the sale.

NSIP will be sponsoring two more NSIP Replacement ewe sales on June 20th and September 12th. These sales are open to ewes sired by rams enrolled in NSIP.

There will be an NSIP Online sale July 11-13 for single rams and ewes enrolled in NSIP and a live auction, broadcast on DVAuction, July 30th in Spencer, IA.

The National Sheep Improvement Program(NSIP) is the vehicle where ebv's for sheep in the US are developed. This data can help you achieve your goals in your management situation and climate.

For information about any of these sales visit the NSIP website www.nsip.org

NSIP Technical Advisory Committee Report

March 2022

Reporting genetic conditions

Genomic information using the GeneSeek Genomic Profiler (GGP) Ovine 50k array is being collected in several NSIP member flocks and breeds. Through the genomics pipeline established with Neogen and Sheep Genetics [and their partner the Animal Genetics and Breeding Unit (AGBU)], those data are being accumulated into a genomics database to benefit NSIP's genetic evaluation services.

Beyond using those data to obtain genomic enhanced Estimated Breeding Values (GEBV), now available in Katahdin sheep, the GGP array has genetic markers useful for verifying parentage and for providing information on genetic conditions. Through collaboration with Neogen and AGBU, and using data available on NSIP Katahdin, Rambouillet and Polypay sheep, the reporting process for the five genetic conditions available on the GGP platform is being validated. Those five genetic conditions are:

- Ovine Progressive Pneumonia (OPP) susceptibility
- Scrapie susceptibility (codons 112, 136, 141, 154, and 171)
- Myostatin
- Callipyge
- Booroola FecB

Among these conditions, OPP is most complex to report. It involves combining information from 11 genetic markers to define different versions of the *TMEM154* gene, called haplotypes, that are associated with the susceptibility of sheep to infection with the OPP virus. Appendix 1, which was prepared with help from scientists at the U.S. Meat Animal Research Center, provides guidelines for interpreting the test results that are forthcoming.

Genotypes on 7,027 sheep were used to investigate options for reporting the *TMEM154* gene haplotypes. Although molecular technologies have evolved to allow accurate determination of genotypes, like any chemistry-based lab test they are not perfect. Some genetic markers are more easily measured than others. Based on increasing levels of scrutiny of the results on the genetic markers for the *TMEM154* gene, between 93.4% and 86.2% of the sheep evaluated could be assigned a haplotype. Unfortunately, there is no clear way to assign an accuracy, or level of confidence, to an individual genotype. Either it is or is not reported.

The results of these investigations were discussed at a meeting of the NSIP Technical Advisory Committee held on February 7, 2022. Opinions differed on the level of scrutiny that should be applied. Clearly, reporting results on more animals for the *TMEM154* gene, and for other genetic conditions, would be preferred.

Since that meeting, genotype data on the other genetic conditions were supplied by AGBU and are being evaluated. Further discussions are also underway with Sheep Genetics and AGBU to set up standard guidelines for their reporting of the five genetic conditions to NSIP.

Sheep GEMS NSIP flock recruitment

With a formal start date of Jan. 1, 2022, the Sheep GEMS project is underway. So far, most focus has been on developing descriptions of the traits to be measured in NSIP flocks that volunteer to participate—Innovation Flocks—and to communicate those descriptions to NSIP producers.

To assist in this process, a Producer Advisory Group was established. It consists of four representatives from each of the four breed groups [hair, maternal (semi-prolific), western range, terminal sire]. This includes the breed group representative on the NSIP Board, and the NSIP representative for each breed directly involved in the project (Katahdin, Polypay, Rambouillet, Suffolk). Additionally, the NSIP Executive Chair and Program Director serve on the committee. Based on a survey of the Producer Advisory Group members, and a committee meeting held on Dec. 13, 2021, input on the project measurements was collected and incorporated into the documents prepared and circulated.

With help of the Producer Advisory Group members, since January eight informational meetings have been held with Katahdin, Polypay, Rambouillet, and Suffolk breeders to discuss Sheep GEMS. One more meeting is scheduled. These sessions were designed as open forums to address questions that producers had about the measurements to be recorded and the support of genotyping costs to be anticipated through project funds.

As outcomes, we hopefully have addressed producers' question, and have communicated our excitement about the project including the opportunities it offers to NSIP members and the U.S. sheep industry generally. We look forward to many NSIP flock owners joining us as Innovation Flocks in Sheep GEMS.

Ron Lewis
NSIP Technical Committee Chair
Mar. 10, 2022

Appendix 1. Interpreting test results from genetic testing for ovine progressive pneumonia (OPP) virus susceptibility for NSIP

Different versions of the *TMEM154* gene, called haplotypes, affect the susceptibility of sheep to infection with ovine progressive pneumonia (OPP) virus. There are more than 10 different haplotypes of *TMEM154* known. The four most common forms of *TMEM154* are haplotypes numbered “1”, “2”, “3” and “4” and account for more than 97% of those present in US sheep. A lamb inherits two copies of *TMEM154* haplotypes, one from its sire, and one from its dam. Together, the two haplotypes comprise an animal’s *TMEM154* diplotype. For example, a sheep with diplotype “1,1” has two copies of haplotype “1”, while a sheep with diplotype “1,3” has one copy of haplotype “1” and one copy of haplotype “3”.

In controlled infection research experiments spanning more than 5 years at the U.S. Meat Animal Research Center (USMARC), results show that ewes with one or two copies of haplotypes “2” or “3” are **five to 10 times more likely to become infected** than sheep with two copies of haplotype “1”. Therefore, any ewes carrying haplotypes “2” or “3” are at the greatest risk for infection. Ongoing studies at US Meat Animal Research Center (USMARC) suggest that diplotypes “1,1”, “1,4”, and “4,4” are roughly equivalent in their association with reduced susceptibility to infection. Although many other rare diplotypes have not yet been carefully tested, no diplotypes are known to offer 100% resistance to OPP infection for every animal in the flock upon high levels of OPP virus exposure. The natural function of *TMEM154* in sheep is not yet known and ewes with two copies of haplotype “4” are predicted to have no functional copies of this gene. For this reason, the common diplotype “1,1” is preferred over “1,4” and “4,4” when all other things are equal.

While haplotypes other than those numbered “1” through “4” are present in US sheep, they are predicted to be at low frequency in most populations. Furthermore, less is known about the relative susceptibility of these rare haplotypes (numbered “6” or “9” to “15”), but some general predictions can be made based on their sequence compared to the more common variants. For example, we expect the “9” haplotype to be highly susceptible based on its similarity with the highly susceptible “3” haplotype. Some preliminary data at USMARC is consistent with this notion. Likewise, the “10” haplotype would be predicted to be less susceptible because it appears to descend from the “1” haplotype. The haplotype “6” variant is also expected to be less susceptible since it encodes a truncation of *TMEM154* predicted to inactivate the protein. That said, research has not been conducted on these low frequency haplotypes to establish concrete guidelines for their use.

A reasonable genetic strategy for reducing the risk of OPP virus infection is to increase the frequency of sires and dams with haplotypes “1” and “4” while reducing the frequency of those with haplotypes “2” and “3”. This would be part of an overall management strategy aimed at reducing OPP prevalence in an infected flock or reducing risk of re-infection in an OPP-free flock.

