

Minnesota's OPP Eradication Trial

New strategy works — no more orphaning!

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Background:

The pieces of this puzzle have finally come together. Following the lead of OSU's Dr. Bill Shulaw, we both eradicated OPP nearly 20 years ago by simply shifting emphasis to the testing of young lambs. Holly's flock of Polypays had become 75% infected following purchase of a "test-negative" ram, while Judy's Border Leicesters, initially 100% test-positive, remained heavily infected in spite of seven years of test-and-cull combined with orphan rearing.

Unfortunately, Bill's OPP project involving sequential testing of very young lambs was cut short by a dog attack. But his work piqued our curiosity and, having nothing to lose, we started testing lambs at 3-4 months of age. To our amazement, this was our ticket out of the OPP woods. By early removal of the few lambs that came up AGID positive, we were able to establish new 100% test-negative flocks within 12-18 months. Granted, we had continued to remove lambs for orphaning. But then . . .

Fast forward to 2007, when **research by USDA's Dr. Lynn Herrmann-Hoesing strongly suggested that dams do not transmit the OPP virus (OPPV) to lambs via milk and colostrum.** Lynn's finding was supported six years later by USDA's Dr. Kreg Leymaster, who concluded in a 2013 paper that **the primary cause of infection (70-90%) in a flock of mature ewes is likely due to non-maternal exposure that occurs after young ewes join the infected breeding flock.** So the secret to eradication was just as we'd done, but without the need to separate lambs from their infected dams for rearing on expensive milk replacer.



Working Together:

In the Fall of 2013, encouraged by USDA Sheep & Goat Epidemiologist Dr. Chuck Gaiser and with Minnesota's OPP Pilot Program* no longer piggybacked on the Scrapie Flock Certification Program, we approached the Minnesota Lamb & Wool Producers (MLWP) about the feasibility of a three-year OPP eradication trial. Leadership quickly signed on to match producer contributions; the Minnesota Board of Animal Health and USDA-Veterinary Services agreed to visit flocks to collect samples; and the University of Minnesota Veterinary Diagnostic Laboratory offered to waive accession fees and discount testing charges for trial flocks. The trial was on!

Working as OPP Society volunteers, we have coordinated the trial in collaboration with the Minnesota Board of Animal Health, the U of M Veterinary Diagnostic Laboratory (MN-VDL) and USDA-Veterinary Services. Following completion of the third year of the Trial, a 'Minnesota Grown' grant was awarded to support the project through a fourth, and final, year

New ELISA Test at the University of Minnesota:

Shortly before the start of the trial, the MN-VDL imported the Elitest ELISA at our request and we have used this test throughout. **While not licensed by USDA, 'Elitest' is the only ELISA for detection of OPP and CAE, the related goat disease, to have been validated according to the stringent standards of OIE, the World Organization for Animal Health.** This very sensitive and highly specific ELISA, some features of which are patented, was developed through a collaborative effort between labs in the U.K., Spain, Italy and Belgium, and is now used in OPP/CAE programs worldwide, including Ontario and Minnesota.

New Eradication Strategy:

The protocol we've used is simple and can easily be applied by anyone. **All breeding ewes in the infected flock are managed as a single unit, regardless of test status,** and allowed to birth and raise all lambs to weaning. To reduce the opportunity for contact transmission from adults to lambs (expect 10-30% per USDA study), producers are encouraged to wean at 60 days or less while undergoing eradication. **Offspring selected for replacements, and found to be OPP-negative post-weaning, are then permanently segregated from the adult flock and periodically retested to confirm their continuing test-negative status.** (Refer to Management Recommendations later in this booklet.) This creates the base for a 100% test-negative flock, with all test-positive adults culled once adequate test-negative replacements have been retained. . . . next page

15 Flocks Tested:

All Minnesota Lamb & Wool Producers members were invited to apply for the trial and 15 did so. To determine eligibility, all 15 flocks completed an initial test run in late 2013/early 2014. Two flocks were completely free of OPP; two more were minimally infected; four dropped out voluntarily; and three were unable to follow trial protocol. **The four flocks remaining range from 30 to 400 ewes and represent a wide variety of breeds, facilities and management styles.**

Results to Date:

Results are in for 2013, 2014, 2015, 2016 and 2017 lambs from the four flocks remaining in the trial.

2013 Baseline OPPv %	Status of Four Trial Flocks as of November 2017 (includes replacements born in 2013, 2014, 2015, 2016 and 2017)
96%	30 ewes: confirmed 100% negative via 3 whole-flock tests
64%	400 ewes: all test-positives will be gone by mid-2018
61%	55 ewes (now 110): 2 whole-flock negative tests
*21%	70 ewes: one whole-flock negative test, including many ewes now "salvaged" from originals (confirmed neg)

Baseline represents highest OPP% in lamb or adult subset from each flock

**Several animals from this flock had already been culled on symptoms and/or serology prior to the trial. And many more were lost during the trial due to copper toxicity (feed mill mixing error).*

Genetic Testing for OPP Susceptibility:

The MLWP requested TMEM154 susceptibility testing of rams as part of the trial and paid all costs (\$12/head) for genotyping one ram per 25 ewes in each flock. However, after the first two years we decided to discontinue this testing since some purchased rams with desirable genotypes had become infected following exposure to test-positive ewes. At about that same time, USDA reported that **some strains of the OPP virus had adapted to infect animals regardless of their genotype.**

Based on these limited findings, our feeling is that much more research needs to be done on genetic susceptibility/resistance before we can depend on it to help eradicate or breed the virus out of a flock. We've been left with more questions than answers, such as: Do the desirable genotypes allow the animal to live with the virus without it being detrimental to their health? And if true, are those animals without obvious clinical signs then still able to shed the virus to others in the flock?

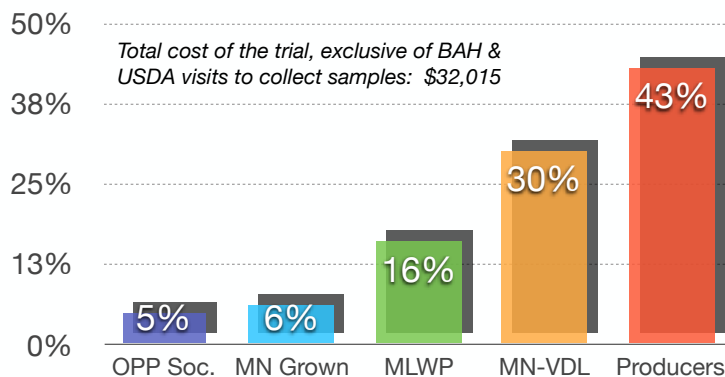
Therefore, while some may opt to employ this new genetic testing in their OPP -control- efforts, at this time the OPP Society does not advocate genetic selection as a route to eradication. In summary, all breeds are susceptible to infection with the OPP virus, so all shepherds need to be aware of this risk and the related need for biosecurity.

Total Expenditures for the Trial:

This was a truly collaborative effort and would not have been possible without the incredible support received from all parties.

OPP Society (print/mail reports)	\$1,500	50%
MN Grown (matching test fees)	\$2,000	38%
MLWP (matching test fees)	\$5,125	25%
MN-VDL (discounted test fees)	\$9,670	13%
Producers (test fees/supplies)	\$13,720	0%
MN-BAH/USDA (labor/mileage)	*Priceless	

*Minnesota Board of Animal Health and USDA Veterinary Services collected samples at no charge throughout the trial, and continue to do so for all flocks enrolled in the state's OPP/CAE program.



Online Resources:

For more on OPP and Minnesota's programs, including details of the management and testing protocol used in the trial as well as updated information when it becomes available, see: www.bah.state.mn.us (and) www.OPPsociety.org

**Minnesota's voluntary OPP Test & Control Pilot Program, the first in the U.S., was implemented in 2006 as an add-on to the voluntary USDA Scrapie Flock Certification Program. Now a stand-alone program administered by the Minnesota Board of Animal Health and coordinated by OPP Society volunteers, the pilot will graduate to full program status in 2018 and is open to all Minnesota producers.*