

The Minnesota Project

OPP Eradication Trial

Fall 2013—Fall 2017



**Minnesota Grown Program
Minnesota Board of Animal Health
USDA-APHIS-Veterinary Services
Minnesota Lamb and Wool Producers
University of Minnesota Veterinary Diagnostic Laboratory
OPP Concerned Sheep Breeders Society**

What a journey this has been . . .

And yet, in some ways it's just the beginning. When Wisconsin science teacher Jim Schultz and his veterinarian, Bob Leder, hatched the idea for a sheep disease club back in 1990, we will admit to having wondered why. Turns out that Jim had eradicated OPP and was having a devil of a time finding test-negative rams, so a need to network with other producers was their motivation.

Today, nearly 30 years later, we're in the same fix and to an even greater degree. As flocks with many hundreds of ewes begin to eradicate OPP there's a growing need for test-negative replacement stock in large numbers. And producers tell us that they can't find the animals they're looking for, ewes as well as rams, in the quantity that they need. So we're hopeful that this report will be incentive for others to test, and then deal with OPP if it's discovered — one more way to boost ASI's *Let's Grow* efforts.

To say that much remains to be done is an understatement, but producers need to be the driving force. For starters, check out our proposal on the back cover. Yes, controversy remains over the economic importance of OPP, and we address that later in this booklet. But for now consider USDA Microbiologist Mike Heaton's observations at the Meat Animal Research Center in Clay Center, Nebraska: Mike reports that *more than 90% of sheep showing OPP at necropsy exhibit no obvious clinical signs*. This is a truly stealth virus, rapidly spread from sheep to sheep but often taking years to develop into full-blown disease.

Minnesota, to our knowledge, is the first and only state to offer an official OPP program, but we're certainly not the only ones promoting eradication. Our role model was Paula Menzies, who pioneered Ontario's program and was the first to introduce the Elitest ELISA to North America. Geri and Jay Parsons continue to work with producers in Colorado and neighboring states. And Mary Smith reports that New York now has a sheep and goat health assurance program that is encouraging eradication.

Several flocks now use the Elitest ELISA and we're consulting with producers from New York and Pennsylvania in the East, to Wyoming, Utah and Montana in the West, and all points between. You may have heard that we're providing additional test data to these cooperating producers, with results held in strict confidence, and the resulting feedback has been helpful to all parties including ourselves. Feel free to get in touch with either of us if you'd like to explore this option. The plan is for these expanded results to eventually become standard, but for now the lab will continue to report as simply positive or negative.

While the eradication trial has been a success, *it's important to note that this was not a scientific study* but rather a producer-driven attempt to rid OPP from infected flocks as quickly as possible through use of a newly available test in combination with recent research findings. Further, *we did not test every lamb born during the trial*. To maximize limited available funds, only those lambs selected as potential replacements were tested.

So where to now? Only producers can make it happen, and we're indebted to those whose stories are included here. By sticking to their guns they've proven that this new eradication strategy works. We know you'll enjoy their reports, which are more powerful than anything we could say. Also inside is a piece by Bill Fosher that was commissioned by Premier 1 Supplies. It's the most eloquent OPP saga we've seen and we thank Stan Potratz and Ben Rothe (Premier's CEO) for allowing us to use it.

If your flock's status is unknown, we hope you'll now be inspired to find out. While we always encourage producers to consult with and support their local veterinarian, the sad fact is that only 50% of sheep producers do so. Hopefully, a shared interest in OPP will allow more of these critical vet-client-patient relationships to develop over time. We've seen it happen. But for now, if you're one of those hardcore DIY types, you'll be happy to know that we'll be working with Premier to make blood sampling supplies more readily available.

In closing, we want to recognize ASI for helping to spread the word through *Sheep Industry News*. Also Cat Urbigkit for carrying on the legacy of the Floras and Karks at *The Shepherd* magazine. And last but never least, our fellow members of the OPP Society. Your support has made all the difference.



Holly Neaton, DVM

Judy Lewman

Minnesota's OPP Eradication Trial

New strategy works — no more orphaning!

Judy Lewman with Holly Neaton, DVM

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?

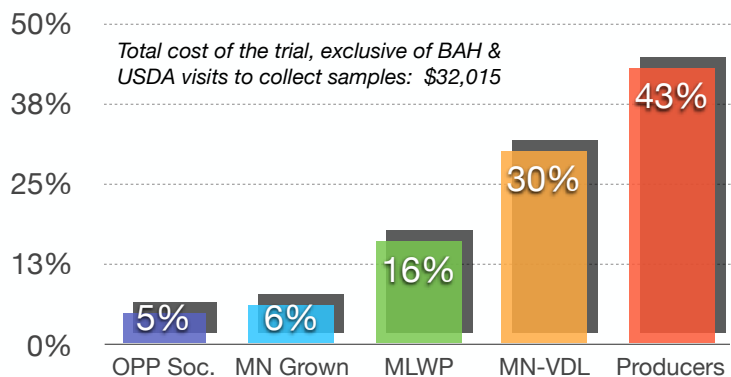
Therefore, while some may opt to employ this new genetic testing in their OPP -control- efforts, at this time the OPP Society does not advocate genetic selection as a route to eradication. In summary, all breeds are susceptible to infection with the OPP virus, so all shepherds need to be aware of this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

Spring Sheep Day a Resounding Success – More Than 100 Participants!

Small groups rotated through stations for hands-on demos in the morning. Afternoon lecture sessions focused on OPP, Scrapie and biosecurity, followed by an OPP Trial producer panel. The day ended with tours of the Sheep Barn and VDL.

Thanks to VDL's Necropsy Section Head Marc Schwabenlander for organizing, Sheep Barn Tour Leader Kim Beaubien, and student assistants: Erica Bingham, Chris Deegan, Laura LoBuglio, Olivia Mellgren, Nicole O'Sell, and Katherine Pjevach



Morning Welcome by MLWP President, Randy Kinney



MN-VDL Director, Dr Jerry Torrison, leads baby lamb necropsy session, assisted by Holly Neaton, DVM



Minnesota's OPP/CAE Program presented by Linda Glaser, DVM, Board of Animal Health



ASI Region III Director and MLWP Past-President, John Dvorak served as the day's commander in chief



MN-VDL Pathologist, Matt Sturos, DVM, assisted by Stacy Schwabenlander, DVM from the Board of Animal Health



Collecting blood samples demonstrated by U of M College of Veterinary Medicine students and OPP Society Founding Director, Cindy Wolf, DVM



OPP Eradication Trial Producer Panel:
Dan Hammond
Jean Froehlich
Karen Stormo
Rob Goerger

Photos courtesy of:
Don Drewry, MLWP Director
Dr Travis Hoffman, MN & ND
Sheep Extension Specialist

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When we started raising sheep in 2007 we had never heard of ovine progressive pneumonia virus (OPPV). Our original purchased flock was OPP negative (as stated by the



previous owner). But upon expanding our flock through purchasing new ewes and rams who turned out to be OPP positive, the rest of our flock quickly became infected.

Around 2009 signs of the virus appeared. Great ewes, previously healthy, started spiraling downhill while exhibiting a variety of symptoms including labored

breathing, swollen hock and knee joints, lameness, snotty noses, and hard udders with no milk.

The ewes essentially wasted away while maintaining a healthy appetite. Lambs born to these ewes were weak and unthrifty. Multiple veterinary visits and medications appeared to have little to no affect.

Furthermore, an obvious decrease in fleece quality was observed, lacking luster and having many breaks.

This was a big hit on the bottom line as our main income is produced by selling high quality fleeces to fiber artists.

Around 2010, while searching on Google, signs described for OPP mirrored exactly what we were observing in our flock. At the time the only solution seemed to be orphaning lambs and raising them segregated from the adult flock. We tried this for one year and found it unsuccessful and expensive.

In 2013, we learned about the MN OPP trial and were accepted for enrollment. After the first two years our results were disappointing. We then realized we would have to tighten up our management by keeping fences in good condition and the positive animals completely separated to prevent the virus from spreading. Even though we had them separated in the barn by an alleyway, we found the virus could still spread by coughing if the conditions were favorable. We culled genetically good ewes that showed signs of OPP and divided our farm in half with positive and negative ewes in their own pastures and buildings, separated by our driveway.

Our fleeces have improved in quality and signs of the virus we used to battle have disappeared. We enjoy showing our sheep and worry about bringing home the virus again but quarantining and retesting sheep that come back from shows has been successful.

We were, and still are, ecstatic to have help in muddling through a problem that has caused a lot of frustration. It has been a relief to know that there are people who recognize OPP as a problem that can be solved.

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- **Lincoln:** most ewes home bred, occasional purchase; rams purchased and home bred; show/exhibit at state fair and fiber festivals
 - **Symptoms:** hard udder, little or no milk, swollen hock and knee joints, lameness, weight loss despite good appetite, labored breathing, lag behind flock, chronic cough, fleece quality impaired
 - **Lamb January through April;** cold open barn (animals in and out at will), also large greenhouse w/ventilation; excellent facilities for separation of groups; pasture in season
 - **Baseline:** 70 adult ewes, known infected from previous partial-flock testing; flock accepted for trial based on 2013-born lambs testing at 35% positive
 - **Potential replacements** tested during the trial, most weaned at 2 months:
 - 2013: 8 of 23 (35%) test-pos @ 9-10 mo
 - 2014: 8 of 17 (47%) test-pos @ 7-11 mo
 - 2015: 4 of 36 (11%) test-pos @ 3-6 mo
 - 2016: 2 of 15 (13%) test-pos @ 2-4 mo (first of two segregated groups born in 2016; these were raised on test-pos dams and weaned individually at 4-6 weeks)
 - 2016: 21 of 21 (100%) test-neg @ 2-4 mo (this segregated group was raised on test-neg dams)
 - 2017: 12 of 12 (100%) test-neg @ 8 mo
 - Earlier testing of lambs appears to have been the key to eradication for this flock, which was likely carrying an especially virulent strain of the OPP virus
 - Current flock includes 14 of the original ewes, now 5 to 10 years of age, that have remained test-neg throughout the trial
 - What we suspect to be hormonal influence has been observed with some animals, both rams and ewes of all ages, testing high-neg during the breeding season, later reverting to strongly negative
 - Only 3 positives (yearling + 2 lambs) on Jan 2017 whole-flock test of 66 animals; pos results likely due to hormones as all 3 were segregated and confirmed negative on re-tests in March and June
 - Showing animals, **if producer is aware and vigilant**, does not appear to be as risky as we anticipated; all 7 animals exhibited at 2016 state fair were negative when retested 4 months later; 8 exhibited at 2017 state fair also negative on retest

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We've been breeding and selecting for a 200% lamb drop or better on a consistent basis for 20 years. Now that we've achieved this level the amount of milk available to lambs



is critical. Not enough colostrum at birth can greatly hinder immunity for future diseases. And later, a shortage of milk will cause everything from starvation to lower weaning weights; artificial rearing then falls into place.

Our Jan/Feb 2017 lambing group, an all OPP-negative status group, was our first 200% lamb crop for this

time of year. All ewes had soft pliable udders with lots of milk like they should have. The few milk replacer lambs from this group were good and healthy. No bad lambs in this group at all: *Cull rate was cut in half. Nice to cull for reasons other than hard udders. Lamb death loss from birth to market is lowest we've ever had. Lamb weaning weight average is in the 50# range for all whiteface lambs weaned.*

Our April 2017 group dropped our biggest lamb crop ever, 233%. This is a test-positive group of ewes with many not able to feed a second lamb, much less a third. Lack of colostrum is an under-statement, but we did good for what we had: *A large cull rate, a 50% increase in death loss from birth to market, a 4# less average weaning weight, and these are terminal-sired lambs for market.*

In May 2017, another test-positive group of ewes lambd for us and had the usual 200% lamb drop and the lack of colostrum continued: *An even larger cull rate, a 100% increase in death loss from birth to market compared to our negative group, a 7# less average weaning weight, and again these are speckle faced lambs. Not at all looking forward to lambing these last two groups of ewes in Jan/Feb 2018.*

Anyone considering raising sheep on a current or future large-scale basis needs to seriously consider eradicating OPPv from their flock. Test all breeding sheep and cull, or manage as a separate group of positive ewes. Buy or build your own set of OPP test-negative ewes for your future replacements.

This money stealing virus — adding the expense and labor due to raising milk replacer lambs; higher replacement costs due to high cull rates; lower weaning weights and higher death losses — will keep future sheep producers from continuing in this enterprise. This is the last thing that we need.

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- **Dorset, Finn x Rambouillet x Dorset, Finn x Rambouillet x Polypay;** primary ewe flock home bred; large group purchased early in the trial; rams purchased and home bred
 - **Symptoms: hard udder, little or no milk, weight loss despite good appetite**
 - **Accelerated flock; groups lamb in Jan/Feb, March, May and October;** various buildings: cold open (animals in and out) and cold closed barns, also mechanically heated barn with ventilation; pasture in season
 - **Baseline: 390 adult ewes;** those home bred were 42% pos on initial partial-flock test; purchased group of 87 were 64% pos; no testing done prior to the trial
 - **Potential replacements** tested during the trial, most weaned at 2 months of age:
 - 2013 (born Jan/Feb): 1 of 42 (2%) test-pos @ 9-10 mo
 - 2013 (born Oct): 6 of 14 (42%) test-pos @ 24 mo (*these were missed inadvertently, so not tested as young lambs*)
 - 2014 (born Jan/Feb): 7 of 50 (14%) test-pos @ 6-7 mo
 - 2014 (born Oct): (none retained)
 - 2015 (born Jan/Feb): 3 of 82 (4%) test-pos @ 7-8 mo
 - 2015 (born Oct): 1 of 13 (8%) test-pos @ 6 mo
 - 2016 (born Jan/Feb): 5 of 60 (8%) test-pos @ 6-7 mo
 - 2016 (born Oct): 3 of 30 (10%) test-pos @ 8 mo
 - 2017 (born Jan/Feb): 2 of 91 (2%) test-pos @ 6 mo
 - Producer is a member of the Pipestone Management Program and follows that protocol, so young ewes join the main breeding flock at around 2 years of age; this has been an added challenge
 - Ewes in such large management groups present another challenge: too many to count on a daily basis; a single test-pos ewe jumped in with a neg group and went undetected for months
 - While genetic susceptibility testing was done early on, producer no longer relies on this; a purchased test-neg ram with the favorable 1,1 TMEM154 diplotype turned positive at 4 years of age following exposure to test-positive ewes
 - Rather than retaining every available test-neg replacement to speed flock turnover, owner has continued to select on production merit as well as test status; slower, but a more valuable outcome
 - This highly prolific flock is making excellent progress; will lamb the remaining test-positive ewes for the last time in Jan/Feb 2018

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What do you do when you find out you have OPP in your flock? Sell all and start over, or try to save as much of twenty years of genetics as you can? I made the decision to save.



Up until about 2010 I had been happy with a flock that gave and raised twins, and even triplets, until they were ten or eleven years old with little help from me.

But by 2011, three years after bringing in a new ram, I started to have to help with births and some

lambs didn't have any desire to nurse; they seemed to be born too weak. The ewes had some runny noses and occasional coughing but it all cleared up in the spring once they got outside.

2012's lambing had a bunch of bottle lambs, a ewe died while lambing and a third of the lambs just died. I had tried different treatments suggested by local non-sheep-enthused vets, but with no luck.

So 2013's lamb crop had up to half of the lambs die, and the rest didn't grow very fast. Many were bottle lambs and one died at three-and-a-half weeks. So when they finally had enough weight in February they all went to market. I started to think about leaving sheep; it just wasn't fun anymore.

That's when I heard about the OPP trial; it sounded like what was happening in my flock. With almost all positive for OPP it was easy to segregate the two negatives: one ewe and my ram. I wanted to replace positive ewes as fast as possible so all ewe lambs from positive ewes were weaned at four weeks of age and kept separate from the rest of the flock.

During 2014 half of the positive ewes were culled along with a positive ewe lamb. **For 2015 I culled the rest of the positive ewes** after lambing, along with three more of the 2014 ewe lambs that tested positive. **In 2016 and 2017** two separate sets of tests gave me four negative tests in all so I could say I am test-negative and I made it.

Things that had to be done to control the spread of the virus were to have a 9 to 10 foot separation between positive and negative animals, and always work the negative animals first. Luckily my ram is still negative. He worked the negative ewes first, then the positives. He tested negative before going back to the negative ewes.

This has been extra work but what's life without a good challenge. That's why we farm.

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- **Columbia x Dorset:** ewes homebred; rams purchased
 - **Symptoms:** hard udder, little or no milk, weight loss despite good appetite, chronic unresponsive pneumonia, coughing, snotty noses, lagging behind flock
 - **Lamb February/March;** cold closed barn; ewes on pasture in season; lambs raised indoors with free access to dry lot (no pasture)
 - **Baseline:** 27 adult ewes, 96% positive (and the lone holdout was positive on the next test); OPPv likely introduced via a purchased ram; flock had been less than 1% infected when first tested in 2001
 - **Potential replacements** tested during the trial, several weaned as early as 4 weeks of age:
 - 2013: None tested (all shipped to market prior to start of trial)
 - 2014: 1 of 17 (6%) test-pos @ 5-7 mo, and 3 more turned positive by 2015
 - 2015: 10 of 10 (100%) **test-negative** @ 7 mo
 - 2016: 3 of 3 (100%) **test-negative** @ 5 mo
 - 2017: 21 of 21 (100%) **test-negative** @ 1-3 years of age (2017-born lambs were not tested since this was the 3rd consecutive negative test for all adults)
 - All test-positives were gone from the premises by May 2015
 - To minimize the opportunity for horizontal transmission, owner elected to wean lambs from this heavily infected flock at 4 weeks of age; half of the original ewes were culled in 2014, the rest in 2015
 - Turning over the entire flock so quickly while using only two rams resulted in some loss of genetic diversity, but this can easily be remedied now that the flock is clear of virus
 - Ram suspected as infection source had been purchased in 2008 at 9 months of age, exhibited symptoms intermittently (weight loss, "summer pneumonia") and died suddenly at 2 years of age
 - This was the first flock in which we observed some elevated test results, one just above cutoff, in young ewes approaching estrus; these were re-tested as a precaution, with all strongly negative months later

Karen Stormo

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I started raising sheep in Oregon, in the early '90s, in the worst way possible. I bought all the \$1 sheep at the sales barn. Sometimes I spent \$5! I also raised Pygmy and

Angora goats and Angora rabbits. I enjoy the fiber arts, especially dyeing.



I moved to Minnesota in 1994 with 19 sheep, a mix of Border Leicester, Finn and Dorset ewes. By 2000 I had ~85 ewes, then bought a semi-load of Western whiteface ewes from North Dakota, and started to lamb in May of 2001. I had 440 ewes and a big wreck

about to happen. Between bad weather, and not enough barns, the ewes started dying and the bottle lambs were taking over the farm. It turned out to be OPP, and I culled 75%, and ended up with less than 100. On the bright side, I am good at tube feeding now. I hate doing it, though.

News Flash: Rick joins this party in progress. It turns out that he likes sheep, so he decided to stay.

Fast Forward to 2013, the health problems started to mount up. Between foot rot, respiratory ills, skinny lambs and more bottle lambs, we jumped at the chance to be in this eradication trial. The ewes were tested and we lambed them all out, trying to keep all positives separate

until weaning, then culled them. It was hard to do, but there just aren't enough pens for two separate flocks.

We had one ewe test positive last year, and after she lambed (triplet girls), we culled her as well. Two of her lambs were tested this fall, both negative.

We have noticed quite an improvement in the overall health of the flock. Of course it is much younger now, and our lambing percentage has lowered quite a bit, but we can see that improving. We have spent a lot less on medicines and vet costs. There is a real noticeable reduction in milk replacer purchases. This year we had 8 sets of triplets. Those are the good kind of bottle lambs, if there is such a thing.

It takes more time to do this eradication process, but we both think it has been worthwhile. With a young flock, growing rapidly, there are bound to be some surprises coming (genetics are fun!). We plan to cull a few more next year, and select more carefully for the replacements. We have also enrolled in Minnesota's OPP pilot program and will continue to test as necessary.

We live in Northern Minnesota on 320 acres, mostly pasture, some corn silage acres; we purchase nearly all of our feed. In addition to the sheep we run ~200 head of cattle and also have horses plus an assortment of alpacas, rabbits, poultry and dogs and cats. In our spare time we like to go camping, especially in Medora, North Dakota.

We both work off the farm as well, Rick at the grain elevator, and I for the local library and also the Census Bureau. We don't have much spare time.

My Favorite sheep quote: *"Never have more sheep than your wife can take care of."* Helmut Lang, Canada

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- **Border Leicester / Columbia / Coopworth / Icelandic:** closed ewe flock; rams both purchased and home bred
 - **Symptoms:** hard udder, little or no milk, swollen hock and knee joints, stiff gait, lameness
 - **Lamb in March/April;** cold open barn; separation facilities limited in winter; pasture in season
 - **Baseline Fall 2013:** 29 adult ewes, 61% test-positive; had also tested in 2001 with 75% pos
 - **Potential replacements** tested during the trial, weaned at 2-3 months:
 - 2013: 8 of 8 (100%) **test-neg** @ 8 mo
 - 2014: 20 of 20 (100%) **test-neg** @ 8 mo
 - 2015: 25 of 25 (100%) **test-neg** @ 6 mo
 - 2016: 29 of 29 (100%) **test-neg** @ 9 mo
 - 2017: 46 of 46 (100%) **test-neg** @ 7 mo
 - All test-positives from the original "parent flock" were gone from the premises by November 2014
 - Original test-neg's not allowed contact with young replacements until the older group had passed two consecutive 100% neg tests
 - Following two whole-flock 100% negative tests with 9- and 3-month intervals, one older ewe came up Elitest-pos but AGID neg; she was segregated, and confirmed pos by Elitest and AGID 3 months later
 - Ewes now number 110, including 7 from the original flock that have remained negative throughout the trial
 - Some yearlings, but not lambs, have tested with high-negative Elitest readings when first coming into estrus, later returning to strongly negative

Can YOU Afford to Eradicate OPP?

A better question might be: Can you afford *NOT* to test, and then eradicate OPP if you find the virus lurking in your flock?

You may be familiar with the figures in the box below, provided by the Schwebachs from South Dakota. These ewes are not pampered! Tom and Marilyn lamb the entire flock within a few short weeks. This adds stress due to crowded barns, and yet their ewes sail through for the most part without a hitch.

Note especially their comments between the red stars. OPP has been around for so long that many now consider a ewe past her prime and ready to ship by 5 or 6. But if healthy and given the chance, ewes can produce until 9 or 10, leaving many more ewe lambs to market or available for expansion.

Going into the trial we were fairly confident that this new strategy for getting rid of OPP was going to work, but there were no guarantees. On the preceding pages you heard from those producers who had the courage to stick with the project.

It wasn't all fun and games. There were numerous challenges, setbacks and some heartbreak along the way — but all say they'd do it again. Granted, those who were enrolled in the trial enjoyed the benefit of assistance from Board of Animal Health and USDA staff, as well as matching funds for tests.

But what would this cost *YOU*? Excluding sample collection, which you can learn to do on your own, we've prepared some rough guesstimates based on data from all four trial flocks

Below is what each producer would have paid per test-neg ewe *without* the \$\$\$ advantages of the Trial.

— Costs below based on: supplies at \$1 per test + VDL accession fee of \$10 per lot submitted + \$6 per test —
(Important to note that totals below do not include veterinarian fees to collect samples.)

30 ewes (96% infected at start; 3 whole-flock neg tests by end of trial) total cost would have been \$1,270 = **\$42 per ewe
400 ewes (64% infected at start; all positives will be gone by mid-2018) total cost would have been \$11,634 = \$29 per ewe
110 ewes (61% infected at start; 2 whole-flock neg tests by end of trial) total cost would have been \$2,709 = \$25 per ewe
70 ewes (21% infected at start; 1 whole-flock neg test by end of trial) total cost would have been \$4,340 = *\$62 per ewe

*The highest cost per ewe reflects management issues early in the trial; this was also the flock hit with copper toxicity. **Economy of scale also factors in: per animal accession fees of smallest flock 6x that of the largest.

ECONOMIC IMPACT OF OPP: Provided by South Dakota producers Tom and Marilyn Schwebach

— Comparison below illustrates how our flock's health improved as a result of eradicating the OPP virus. —

Our experience with 85% infected OPP flock:

- 500 ewes with 140% lamb crop
- Average 150–180 bottle lambs year after year
- Lambs lethargic due to lack of colostrum
- Slow rate of gain due to lack of milk
- Numerous down ewes
- ★ **Ewes dead or extremely thin by age 5**

Our experience with OPP-tested negative flock:

- 800 ewes with ≥185% lamb crop
- Average 20–30 bottle lambs (last year only 14)
- Lambs vigorous, up and nursing on their own
- Healthy good growing lambs
- An old ewe heavy with multiples may go down
- ★ **Ewes culled at age 10 (most in good condition)**

Noting the number of bottle lambs experienced with the two flocks puts the difference into perspective. In our operation, we use one bag of milk replacer per bottle lamb, at a cost this year of \$42.45 per bag.

OPP-Infected Flock:

- 500 ewes x 140% = 700 lambs; of these 700 lambs 150 were bottle lambs, or 21% of total lambs
- 150 bottle lambs x \$42.45 per bag of milk replacer = \$6,367.50
- \$6,367.50/500 ewes = **cost of \$12.74/ewe**

NOTE: This flock eradicated OPP years ago so was not in the Trial; data provided for educational purposes.

OPP-Tested Negative Flock:

- 800 ewes x 185% = 1,480 lambs; of these 1,480 lambs 30 were bottle lambs, or 2% of total lambs
- 30 bottle lambs x \$42.45 per bag of milk replacer = \$1,273.50
- \$1,273.50/800 ewes = **cost of \$1.59/ewe**

Additional cost of OPP-positive versus OPP-negative ewe: \$12.74 – \$1.59 = \$11.15/ewe

We ask the question, “Is the cost of \$11.15 per ewe, plus the extra labor and equipment needed to handle bottle lambs, slower growing lambs in the feedlot, and the cost of retaining and/or purchasing additional replacement ewes an economic factor in your sheep operation?”

Submitting Samples to the MN-VDL for ‘Elitest’ ELISA Testing

High quality samples and carefully completed paperwork will help to ensure fast turnaround.



SPECIMEN TUBES:

For collecting blood samples, use silicone treated glass tubes with red rubber stopper caps. If collecting with a disposable syringe, the 13 x 100 mm tube (7 ml, 1/2" diameter, 4" long) is a good size. If using double-ended Vacutainer needles and collecting directly into tubes, the larger 16 x 100 mm size (10 ml) fits into the needle holder better. For submitting the serum, tubes can be either glass or plastic. Falcon™ brand #2054 are preferred for serum as these 12 x 75 mm polystyrene tubes have caps that are easily and quickly snapped open while holding the tube in one hand. Please do not submit samples in slim (pencil diameter) or short (5 ml “stubby”) tubes.

BLOOD DRAW:

A 3 ml draw is adequate and can be done using a Vacutainer needle or a disposable syringe. In either case, use a new, sterile needle/syringe and specimen tube for each animal. If collecting into syringes, blood must be transferred immediately into red-top glass tubes by inserting the needle through the rubber cap. While transferring, try to direct blood gently down the inside of the tube to avoid “splashing” (splashing may cause red blood cells to make your serum pink — OK, but straw colored serum makes for easier reading of the test).

SERUM ONLY:

No blood clots! Submit only serum separated from clotted blood (1 ml is adequate). Your veterinarian can spin samples in a centrifuge to separate the clots, which must be removed unless samples have been collected in serum-separator tubes. Alternatively, blood can be allowed to clot at room temperature in the red-top tubes (tubes upright) and then serum poured into a fresh tube. Serum may be refrigerated or frozen. *If serum samples have been frozen, be sure to note this on your submission form.*

LABELING:

Using a permanent marker so the ink won't smear when wet, number tubes 1 through XXX. This number should be dark, written with care so it's easy to read, and placed at the very top of the label (nearest the rubber stopper/cap) while the tube is held upright. Then, turning the tube on its side (horizontal), write the date drawn, the individual animal ID, and your last name. Organize tubes in numerical order, matching the sequence noted on your submission form.

PAPERWORK:

Use the “Ruminant Health Test Chart” submission form available at www.vdl.umn.edu. The form is screen-fillable, or you can print a copy from the website and complete it by hand. *Please do not use the “OPP” form unless you are enrolled in Minnesota’s program.* All information on the form must match the labels on the tubes, and the completed form should be placed in a Ziploc bag separate from the sample tubes. Submit under your veterinarian’s name, noting whether blood was drawn by you or by the vet. If no vet, leave that section blank. Do not include payment; the lab will bill you.



PACKING/SHIPPING:

Pack tubes carefully in a strong carton to avoid breakage, enclosing absorbent material inside a leak-proof inner wrap. Tubes may be shipped in a horizontal position but be sure to keep them in numerical order. For highest quality samples, ship with a frozen gel pack and mail early in the week to avoid weekend layover. U.S. Priority Mail is fast and economical. Mark box with the words “Exempt Animal Specimens” and address to:

**University of Minnesota
Veterinary Diagnostic Laboratory
1333 Gortner Avenue
St Paul, MN 55108-1098
612-625-8787 — 800-605-8787**

Questions? Holly Neaton, DVM hjneaton@gmail.com (or) 952-955-2596
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MANAGEMENT RECOMMENDATIONS AND CONSIDERATIONS: VOLUNTARY OPP ERADICATION TRIAL, MINNESOTA (October 2013 – November 2017)

Below reflects what we've learned to date. Any updates will be posted at: www.bah.state.mn.us (and) www.OPPsociety.org

ABBREVIATED GLOSSARY (trial specific):

- PARENT FLOCK: Ewes and rams 12 months and older; may be either OPP positive or negative. Ewes are managed as a single unit, regardless of pos/neg status, and allowed to birth and raise all lambs to weaning.
- TEST-NEGATIVE REPLACEMENTS: Offspring of the Parent Flock that have been selected for replacements and found to be OPP negative post-weaning. To confirm continuing test-negative status, this group will be segregated and tested every 2 to 3 months until achieving two consecutive 100% negative tests.
- ERADICATION STRATEGY: Simply stated, Test-Negative Replacements will be *permanently segregated* from the Parent Flock after weaning and tested at 2 to 3 month intervals until achieving two consecutive 100% negative tests, thereby creating the base for a 100% test-negative flock.

Adoption of as many of the following management protocols as possible will increase the likelihood of success.

BLOOD TESTING FOR OPP ANTIBODIES:

Once OPP status of the Parent Flock has been determined through the initial test run, future tests will only be needed for potential replacement ewe and ram lambs, and young replacements found to be negative in previous years.

- The U of M Veterinary Diagnostic Laboratory imported the 'Elitest' ELISA at our request in 2013 and we have used this test throughout the trial. While not USDA licensed, it should be noted that this is the only ELISA for OPP that has been validated to World Organization for Animal Health (OIE) standards. Elitest is available to any U.S. flock.
- It's not necessary to test every animal to determine OPP status of the Parent Flock. The following table shows the number of animals 12 months of age and older that need to be randomly sampled and tested in order to be 95% confident of detecting at least one positive animal if 5% or more of the flock is infected.

		FLOCK SIZE		
<30 (TEST ALL)	80 (42)		180 (50)	450 (55)
30 (26)	90 (43)	(SAMPLE SIZE)	200 (51)	500 (56)
40 (31)	100 (43)		250 (53)	600 (56)
50 (35)	120 (47)		300 (54)	700-800 (57)
60 (38)	140 (48)		350 (54)	1000 (57)
70 (40)	160 (49)		400 (55)	2000 (58)

NOTE: Since sampling a truly random subset can present difficulties, producers should, to the degree possible, select for testing ewes that have been in the flock for at least 2 years. Doing so may increase the odds of detecting OPP infection at the flock level.

- It has been observed that if lambs are weaned at 8 months of age from OPP infected ewes, some lambs may still have colostral/milk anti-OPP antibodies remaining in their serum at 12 months of age. Therefore, earlier weaning at 6 to 8 weeks of age is advised while flock is undergoing eradication, and waiting to test until 2 to 3 months post-weaning is recommended.
- Potential replacements of high value, if test-positive at weaning, can be held in isolation and retested in 4 to 6 weeks to reduce the possibility of a false positive test due to passive maternal antibodies. Animals with discrepant results, if not culled, should always remain isolated until at least two consecutive negative tests have been achieved.
- Following *removal date* of any positives (not bleed date), it's best to retest the management group in 2 to 3 months (minimum 7 weeks to avoid missing early infections), preferably before rams go in for breeding or at a time of year when animals are not stressed. Continue testing at 2- to 3-month intervals and promptly removing positives until receiving at least two consecutive 100% negative reports.
- While OPP *transmission* via semen has not been documented, owners, managers and veterinarians utilizing artificial insemination should be aware that the *OPP virus has been detected in semen*. It is recommended that rams being collected for A.I. be tested well in advance of the collection date, and again prior to use of the semen.

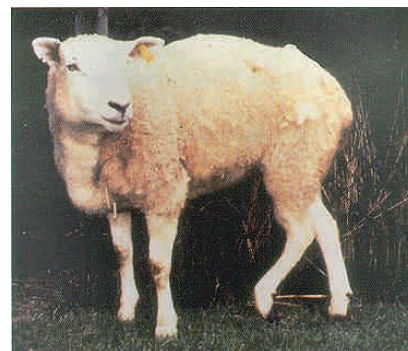
- Strict attention to permanent and easily read identification is crucial to the success of eradication efforts. In flocks running more than a few dozen ewes, serious consideration should be given to electronic ID.



Which ewe is infected with the OPP virus?

The only way to know is to test them!

Infected animals not showing symptoms can still infect others.



NO COMMINGLING OF TEST-POSITIVE AND TEST-NEGATIVE ANIMALS . . . EVER:

- Positive and negative groups may rotate through buildings and pastures. However, it is recommended that test-negative groups always be handled first (chores, etc.) before dealing with any test-positives.
- If young test-negative replacements are confined to the barn during lambing, it's best to lamb them at a time different from the Parent Flock, i.e. either before or after the older ewes.
- Second best would be to designate an upwind section of the barn for young test-negatives, with at least 10' separation between them and the parent flock. As an alternative, consider solid barriers.

NO SHARED FENCE LINES, FEEDERS, WATERERS, ETC:

- Electronet and/or an offset wire (either can be charged by a small portable battery unit) will discourage nose-to-nose contact between test-positive and test-negative animals through fences or dry lot panels.
- MOST IMPORTANT to avoid shared feeders since these result in close nose-to-nose contact.
- There is a significant correlation between needle re-use and OPP seroprevalence as flock size increases. Therefore, to decrease the risk of OPP and other infectious disease transmission when giving injections, a fresh needle should always be used for each animal.
- Due to the unstable nature of the OPP virus in the environment, equipment such as syringes, ear taggers, tattoo pliers and water buckets may be used for both infected and test-negative groups if cleaned and disinfected first.
- Shared waterers are a "depends on" category. The OPP virus is carried in macrophages, e.g. nasal discharge, which typically sinks to the bottom of the tank. Thus, *while still risky*, shared waterers may be OK if you can arrange to avoid nose-to-nose contact at the water source, such as groups drinking out of opposite ends of an oblong tank.

SALVAGING OF TEST-NEGATIVE ANIMALS FROM THE PARENT FLOCK:

- Those with adequate facilities for managing multiple groups over an extended period may wish to reintroduce test-negatives from the Parent Flock at some point in time. This must be done with caution, and only after these older animals have achieved two (preferably three) consecutive negative tests after removal of all positives.

GENETIC SELECTION:

- While some may opt to employ the new DNA 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.

Ovine Progressive Pneumonia – A Personal Story

By Bill Foshier, from Premier's *A Guide to All Things Sheep*® and used here with permission

Looking back on it, it all seems pretty obvious now. Of course the problem in my flock was Ovine Progressive Pneumonia (OPP). I have had sheep with just about all the symptoms, but it took me a few years to notice it and a few more to figure out how to deal with it. OPP is a classic flock health problem that can destroy profitability by making each sheep just a little less productive. In my flock, it first manifested itself with a few poor-doers who had little or no milk at lambing time. These ewes were culled. Then I started to notice weaning weights going down and ewes were having a hard time recovering body condition after weaning. This started to suppress reproductive efficiency, so not only was I weaning lighter lambs, but I was also weaning fewer of them.

I bring all my lambs to finish and market them as either whole carcasses or cuts, so I was also keenly aware that my low weaning weights were correlated with longer times on feed post-weaning to reach acceptable carcass weights. Where I used to be able to finish my May-born lambs on stockpiled pasture in November and early December, I was now having to buy hay and feed them into January, February and sometimes even March.

My first guess was that there was a nutrition problem. My flock grazes some fairly poor pasture, and I figured that the answer was to supplement their diets with concentrate. I started feeding a little bit of whole corn in late gestation, continued it through lactation, and gradually brought the lambs up to 1 pound each per head per day plus our best managed pasture after weaning.

The ewes did recover their body condition quicker, but there was no real improvement in weaning weights. I was able to cut a little bit of time off the length of lamb feeding post weaning, but it came at a very high cost.

Grains are very expensive in New England. For each lamb I marketed I was spending nearly \$25 on corn, which was an added cost of about 55 cents per pound on the carcasses. The fact that my lambs were no longer grass fed also cost me several customers.

I also checked for parasite problems. Like every pasture-based sheep flock in New England, I live with parasites and do my best to keep them from being a drag on production. Before-and-after fecal egg counts confirmed that the dewormers I was using were effective. Coccidiosis was a problem one summer, but not consistently.

My next strategy was to cull hard, bringing the flock down to just the ewes that could produce given the resources I could afford. I set a hard and fast rule: no ewe could stay in the flock unless she weaned at least 120 pounds of live lamb for multiples and 80 pounds for singles. I spent two years doing this, and my ewe flock dropped from 125 to 60. I figured I would rebuild from this core. When I studied who had stayed, I noticed that suddenly my oldest ewe was just five years old, whereas in the past I had had ewes that were productive to ages of seven, eight and even 10.

I also resolved to keep putting pressure on weaning weight as a selection criteria, because it was the heavier lambs at weaning time that were ready to go to slaughter the earliest and gained the best post weaning. But it quickly became apparent that I couldn't retain enough ewe lambs to grow the flock if I was going to keep just the ewe lambs out of the top 25 percent of the flock. The numbers kept falling. I faced a decision: would I rather keep trying to cull my way back to a smaller but productive flock, or just try to manage my way out of it.

Then one day when I was moving the sheep over a woods trail to a neighboring farm, one of the ewes was straggling. She was a little winded, but there was something else. Her right rear leg clicked every time she took a step...arthritis in a four-year-old ewe? Then the penny dropped: low milk production, shortened productive lifespan, and arthritis in young sheep. The only OPP symptom I didn't have in the flock was chronic lung problems.

After consulting with my vet, we decided to take a few random blood tests to see if my guess was right. I had the vet out for three blood draws. One was from the ewe with arthritis, the others were from seemingly healthy ewes who had met my standards for retention. All three were positive for OPP.

I got in touch with the OPP Concerned Sheep Breeders' Society <http://www.oppociety.org> and reviewed my options. In my particular situation, I decided the best option was to destock entirely and start over again. I could have tested every sheep, but with the symptoms so widespread in the flock it seemed I'd be better off to save the money the testing protocol would have cost and invest it in new stock. So, this winter, for the first time since 1990, there will come a point when I don't have a single sheep to tend.

This was a very hard decision for me to come to, and I limited my options by the fact that it took me years to realize what was causing the production problems I was seeing. If I had suspected OPP earlier, I would have been able to address the flock health issues before years of declining profitability drained the resources I needed just to handle the work involved with the testing and culling that would have allowed me to clear the flock early on. I also might have been dealing with an infection rate that was low enough to be able to rid the flock of the disease without getting rid of all the sheep.

One of the main reasons I didn't consider OPP as a potential culprit early on was that I had been taught the main way OPP moves through a flock is from dam to lamb via the milk, a process known as vertical transmission. The problems I was seeing early on – lack of milk at lambing time and general low productivity – were not associated with family lines. The ewes with problems were not related.

I've since learned that OPP also moves quite readily from adult to adult, a process known as horizontal transmission. The OPP Society's website is a wonderful repository of information on how to identify OPP in your flock, and how to deal with it if it's there. Learn from my example and educate yourself to early warning signs of OPP in your flock, and deal with it while you still have choices other than destocking.

Those Who Laid the Groundwork Years Ago

- Randall C Cutlip, USDA-NADC Research Leader, now retired: an early mentor, standardized the AGID test.
- Guy & Pat Flora and Ken & Kathy Kark, former caretakers of *The Shepherd* magazine, published early OPP Society directories.
- Mary Jarvis: early OPP Society secretary: posted OPP information online before the rest of us even knew what a website was.
- Cleon V Kimberling: another of our early mentors, Dr. K first proposed a national sheep health program in 1993.
- Andrés de la Concha-Bermejillo: Veterinary Pathologist at Texas A&M, former OPP researcher from whom we learned so much.
- Marie S Bulgin: retired from the U of Idaho Caine Veterinary Teaching Center: an early mentor who also steered us to Andrés.
- Bill Hartmann, former State Veterinarian, and James E Collins, former MN-VDL Director: eased the path to MN OPP/CAE program.
- Michael M Jochim, of VDT, Inc: another early mentor who taught us more about the AGID, which remains a trusted workhorse.
- Dan Persons, producer: while serving as MLWP president in 2008, suggested that the group begin working with the OPP Society.
- Diane Sutton and Alan Huddleston, USDA-APHIS-Veterinary Services: offered advice and encouragement at crucial junctures.
- Brian Magee and Mary C Smith, of Cornell University: while Brian's retired, both continue important work in New York.

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Susan M Stehman, formerly NY-VDL at Cornell University (NY)

Sherry Stirling, producer, MLWP Liaison with 'Minnesota Grown' (MN)

Beth S Thompson, MN State Veterinarian, BAH Executive Director (MN)

Mary Thurn, MN Veterinary Diagnostic Laboratory IT Specialist (MN)

Ling Tong, Senior Tech, MN Veterinary Diagnostic Laboratory (MN)

Jerry Torrison, Director, MN Veterinary Diagnostic Laboratory (MN)

Janelle Wachter, MN-VDL Section Head, Administration Office (MN)

Jean T Walsh, producer, OPP Society Director (NY)

Courtney Wheeler, DVM, MN-BAH, OPP/CAE Program Director (MN)

Stephen N White, Research Geneticist, USDA-ARS-ADRU (WA)

Our University of Minnesota A-Team



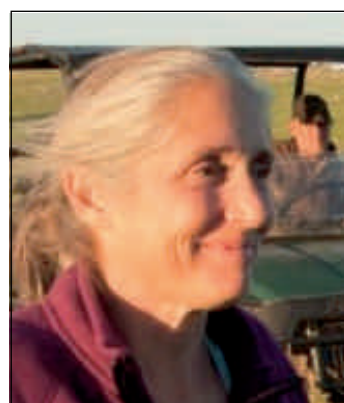
Londa Kroone, Sr. Tech.

Our acclaimed OPP technician is the most skilled in the country at reading AGID as well as Elitest plates. Londa patiently fielded all requests while we learned how best to use this new ELISA.



Devi Patnayak, BVSc, PhD

As the busy Section Head for Serology at VDL, Devi has gone way beyond expectations while on this journey with the OPP trial, never failing to assist in our search for more information.




Cindy Wolf, DVM

An OPP Society Founding Director who now wears many hats, Cindy is always in our corner when the stakes are highest and the chips down. A dynamic advocate for sheep and goats, and their owners.

OPP Test and Control Program

VOLUNTARY, NON-REGULATORY, NATIONWIDE



- **ASI supported** - whether by funding via grants, staffing, or positive reporting in monthly issues of *Sheep Industry News*.
- **USDA support** - field staff in each state responsible for collecting samples from participating flocks at no charge to producer, using inventory check list supplied by the Program Coordinator or by a USDA employee assigned to coordinate the flock testing. 
- **Program Coordinator** - responsible for keeping track of inventories and lab results; working with flocks and the local veterinarian on management strategies; and educating both participating flocks and general producers nationwide via written, online and personal presentations as monies allow. This would be the only paid position, funded through grants and/or available USDA or participating states' Animal Health funds.
- **Participating flocks** - voluntary, and with the knowledge that this is not a certification program but a source of help to guide the producer through testing and culling with the goal being eradication. Producer submits flock inventory via Excel spreadsheet and must be responsive to email. Producer responsible for testing supplies and laboratory test fees.
- **Elitest ELISA** - transparency regarding the lack of licensing in the U.S., while recognizing that the enhanced sensitivity of this test is essential to the success of eradication efforts. The University of Minnesota Veterinary Diagnostic Laboratory would run all tests until that time when the Elitest ELISA becomes available through additional AAVLD accredited labs.



NOTE: This program has been piloted in Minnesota since 2006, with the addition of an eradication component in 2013. USDA and Minnesota Board of Animal Health (BAH) staff visit farms and collect samples at no charge, and BAH issues an annual status letter for each flock. OPP Society volunteers coordinate the program, reporting to a BAH liaison, and once a flock is enrolled the entire program is paperless. BAH has been the program's "home" for 12 years but would not be allowed to function in that capacity for other states. Likewise, coordination of a national program is beyond the capabilities of the OPP Society. For more information on Minnesota's program, see <https://www.bah.state.mn.us>