Getting to Know the Elitest ELISA

We've joked that working with Elitest is somewhat like piloting a Ferrari after having learned to drive in grandpa's trusted Jeep. So as an addendum to the management guidelines, here are some things we've learned along the way.

- The Elitest is read by a machine which reports a 4 or 5 digit OD (optical density) reading. The OD is then divided by the cutoff, another 4-digit number, to arrive at the S/N (signal/noise) ratio for each animal. Since Elitest cutoffs vary each time the test is run, these s/n ratios are the best way to track results over time.
- To interpret: An s/n ratio above 1.0 is positive; above 3.5 is positive with greater specificity; those between 0.8 and 1.2 are considered borderline (near cutoff).
- According to the test's developers, the best "true negatives" are those with s/n ratios of 0.0 or 0.1 (or OD reading of 0.000 to 0.020), and that should be the goal.
- We've learned to watch for high negatives as well as the positives, and begin to pay attention when s/n ratios exceed 0.5. Some elect to segregate these individuals for retesting, and our experience has been that most, *but not all,* will convert to strongly negative following sequential testing over 2 to 4 months.
- Note that fluctuating values are often observed in early infection while the immune system battles the virus *(the excerpt at bottom of page explains this in detail)*. We've also seen *temporarily* elevated ODs in young ewes entering estrus, but rarely have these been above cutoff.

ANIMAL ID	SEX	AGE	BREED	Elitest OD	Elitest cutoff	Elitest S/N ratio	NOTES
1634	F	1 yr	Dorper	0.126	0.232	0.5	
1635 RD	F	1 yr	Dorper	0.024	0.232	0.1	
1637 RD	F	1 yr	Dorper	0.257	0.232	1.1	Positive / remove
1638 RD	F	1 yr	Dorper	2.461	0.232	10.6	Positive / remove
1639	F	1 yr	Dorper	0.004	0.232	0.0	
1640 RD	F	2 yr	Dorper	0.021	0.232	0.1	
5006 RD	F	2 yr	Dorper	0.004	0.232	0.0	
5029	F	2 yr	Dorper	0.056	0.232	0.2	
5030	F	2 yr	Dorper	1.378	0.232	5.9	Positive / remove
5032	F	2 yr	Dorper	1.795	0.232	7.7	Positive / remove
5035	F	2 yr	Dorper	0.133	0.232	0.6	High negative / watch
6056 RD	F	1 yr	Dorper	0.007	0.232	0.0	
6057	F	1 yr	Dorper	3.064	0.232	13.2	Positive / remove
6058	F	1 yr	Dorper	2.817	0.232	12.1	Positive / remove
6059	F	1 yr	Dorper	0.410	0.232	1.8	Positive / remove

Understanding How the Virus Does its Dirty Work

Text below excerpted from:

Ovine progressive pneumonia research at the Texas Agricultural Experiment Station: What we have learned in the last decade

Andres de la Concha-Bermejillo

Sheep and Goat, Wool and Mohair CPR 2002. 129-138

OPP VIRUS REPLICATES RAPIDLY SOON AFTER INFECTION. REPLACEMENT SHEEP MUST BE QUARANTINED AND TESTED FOR OPP SEVERAL TIMES BEFORE MIXING THEM WITH OTHER SHEEP.

As mentioned previously, OPP virus is a lentivirus. The name lentivirus was given to this group of viruses because they were thought to replicate slowly (lenti means slow). Previously, it was believed that after initial infection, OPP virus would hide in tissues of infected sheep (remain latent), and that several years later, for unknown reasons, the virus would start multiplying; only then inducing clinical disease (Bulgin, 1990). We were the first research team to demonstrate that this theory was incorrect. To prove this, we inoculated 16 lambs with OPP virus. Every other week after infection the amount of OPP virus in blood was measured. What we found was that OPP virus replicated to high titers soon after infection. In most sheep, the maximum virus titer in blood was reached between 4 and 6 weeks. Then, a strong immune response by the infected animal partially controlled virus replication causing a decline in virus titer by 8 weeks after infection. From then on, there is a constant battle between the sheep's immune system and the OPP virus. In this battle, the virus first replicates rapidly; then, the immune system partially controls the virus. A small amount of remaining virus in the infected sheep mutates; thus escaping the initial immune response and producing a new spike in blood virus titer. This is followed by a secondary immune response against the new mutated virus. Eventually, the constant fight between new virus mutants and the immune system leads to tissue damage and the development of clinical disease. A major finding of this project was that because during the first few weeks after infection infected sheep have high titers of virus in blood but lack antibodies against the virus, shedding and transmission of the virus are more likely to occur during this period (Juste et al., 1998). For this reason, sheep producers obtaining replacement sheep from flocks where the infection exists should quarantine new sheep for several weeks and test them several times before mixing them with other sheep.