Pork Checkoff Report
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What does "1-4-4" Mean?

PRRS is an RNA virus, which means that it mutates rapidly, similar to the human influenza virus. To determine the similarity between PRRS strains, a process known generally as "sequencing" is done at the diagnostic laboratory. This scientific process involves isolating the ORF5 gene within the PRRS genome, and sequencing the nucleotides in that single area of the virus. The result is an array of A, C, T & G's.

ATGTTGGGGAAATGCTTGACCGCGGGTTATTGCTCGCAATTGCCTTTTTTGTG
GTGTATCGTGCCATTCTGTCTTGCTGC

That information is then compared with other virus sequences to determine how many nucleotides are the same. A chart called a dendogram helps to visualize the difference between sequences. The smaller the difference, the more related are the viruses. Strains that are within 2% similar of each other are often considered to be the same strain. However, a single strain can also mutate within a single herd over time at a rate of up to 2% each year, creating even more unique strains that can re-infect herds. This is one reason why herds that are positive remain stable for a while, and then have a PRRS reoccurrence.

The more common means of referring to PRRS strains is that of using the RFLP (Restriction Fragment Length Polymorphism) number. This process consists of using an enzyme to break the virus into 3 segments, and assigning a number to each segment (or fragment) based on the size of the segment produced—like "1-4-4". Sequencing is still the more accurate means of determining PRRS sequence relatedness, but the RFLP patterns are useful in "naming" different PRRS strains. Thus, we end up with different RFLP patterns as the means of communicating the differences in strains. We have identified 16 different cut patterns and many more unique sequences in our N212 dendogram.

Many producers may use a Modified Live Vaccine (MLV), which means that it too will trigger positive PRRS tests, but is considered not to be virulent or disease-causing. The 2-5-2 RFLP is associated with the Boehringer Ingelheim MLV vaccine and the 1-3-2 RFLP is associated with the Zoetis MLV vaccine. Unfortunately, even though viruses may be closely related by sequence or RFLP cut pattern, it does not necessarily mean that the immunity from that virus will "cross-protect" against a related virus. It is one of the frustrating mysteries of PRRS still to be solved.

One goal of the N212 Regional PRRS Elimination project is to reduce the number different field viruses on our farms, thus improving production and performance.

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