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# An overview of blood collection strategies for boar studs

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## Introduction

It is well documented that PRRS virus can be transmitted through semen and infect sows or gilts.[1,2] The best way to prevent downstream infection is for the boar stud to remain negative to PRRS. However, if infected, early detection is critical so shipment of semen can be stopped to minimize the risk of downstream infection.

## How should boar studs be sampled

Most boar studs should sample blood rather than semen. It is clear the virus can be detected sooner and more readily in blood than semen in the early stages of infection in a boar.[3,4,5,6,7,8] The ideal sample is serum because the concentration of virus would be higher than in blood. Boars whose semen will be distributed downstream should be sampled at the time of collection to minimize the risk of distributing semen containing PRRS virus.

Serum sampling can be done on a boar without restraint. A blood sample can be drawn from any visible vein while the boar is ejaculating. For some boars, this can be difficult. This method is most practical for a stud doing random sampling. In other words, no downstream farms do not dictate that each boar be tested before distribution to their farm. In that way, if a sample is difficult to obtain on an individual boar, the technician can just move on and sample a different boar. Pooling of samples in 3 or 5 can be justified when sampling a negative stud that is testing daily, because the quantity of virus found in the early phases of infection is normally quite high, and even one positive diluted out with 4 other negatives will still yield a positive test result.

An alternative is the blood swab method.[8] While ejaculating and without restraint, a needle prick is made in an ear vein. Using a polyester tipped swab, the blood is collected and the swab placed into a tube containing saline or PBS. Most of the universities would need a volume of 0.5 ml to be able to do an individual PCR and repeat the test (in the event of a positive or suspect result). Some sensitivity is lost with this technique due to the dilution effect in the saline or PBS and also the dilution effect caused by the red blood cells. One should expect roughly a 7-11 fold dilution effect when using 0.5 ml of diluent. Pooling of samples can be done in pools of 3 or 5, understanding that some sensitivity is lost and the chances of missing a positive are greater. This is particularly true during early infection, when the odds are higher that only one positive would exist within the pool.

The blood swab method can be done on the same boars at each collection. In the field, the flinch rate (% of boars responding negatively to the needle prick) has matched the research setting, at around 10%.[8] Due to the short time frame needed to do the needle prick, the blood swab method is easier for staff when compared with drawing blood for a serum sample on an unrestrained animal.

Semen sampling is probably still the best option for a positive boar stud where one is trying to limit the risk of viral shedding downstream. On a previously exposed boar, the blood sampling techniques may not always predict semen shedding. However, due to the small quantity of virus typically found in semen, pooling of samples is not recommended when testing semen by PCR.

Other methods of viral detection in boars include saliva swabs or fecal swabs. Results have been poor with either of these.[3,8]

Monthly or weekly PRRS ELISA testing of boars is still recommended. Boars may turn negative on PCR in the blood or semen after 1-2 months, whereas PRRS ELISA results will typically remain positive for many months, in my experience. Strictly using the ELISA test to determine stud status is not advised because if the stud is first discovered positive via ELISA results, downstream infection has likely occurred. The ELISA test should be used as an adjunct to PCR testing to increase confidence in the stud status. It also provides an alternative test to check against sample handling problems that could result in a false negative result with PCR.

## How often should boar studs be tested

The simple answer is that every boar should be blood sampled at every collection and tested individually for all strains of PRRS by PCR. Of course, this is not economically feasible due to the high cost of PCR testing. Most boar studs can afford to do statistical sampling as a means of risk management downstream. I recommend to

further manage the risk by selectively sampling boars whose impact of infecting farms downstream is greater. For example:

- All boars whose semen will be distributed to nucleus or multiplication herds should be sampled each day they are collected.
- A statistical sample of the population collected each day should be sampled, as determined by the risk downstream farms or the stud are willing to take. The studs I work with do either a 95/10 or 95/5 sample on each collection day. For a large stud the numbers approach 30 or 60 per day, respectively.
- Any boar that is off feed, feverish, or showing any clinical signs should be sampled immediately. Although clinical signs or fever by themselves are poor indicators of PCR status, a boar who has been infected with PRRS[3,8] virus would be more likely to be showing clinical signs or fever than a boar who has not been infected with PRRS virus.

## Withholding of semen

Semen should always be withheld until negative results are obtained. There is little value in testing a stud if semen could have already been used when results are obtained. If it is impossible to do this, it may be more appropriate to test weekly using ELISA and PCR tests, understanding that downstream infection is much more likely to have occurred when positives are found.

## Summary

Boars are positive in serum/blood before semen by PCR and in much higher quantity in the early stages of infection, thus blood sampling is the preferred method for monitoring of negative studs. Monitoring should occur daily. Choosing how many boars to test and which boars to test should be determined on an individual system basis, and is dependent on the estimated risk of being infected and the potential negative costs of downstream infection. Semen should always be withheld prior to PCR negative results are obtained.

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