Swine Genetics International, Ltd. SGI

Online AI Manual

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The Key Steps to a Successful Breeding Program with Artificial Insemination

1 Maintain only those females which are healthy and in sound breeding condition. This includes strict culling of gilts with infantile or deformed genital systems and delayed puberty (greater than 8 months) and sows which do not return to heat within 10 days after weaning. Gilts or sows which return to heat after breeding twice should be considered for culling.

2. Accurately detect and record the time females come into estrus. Twice a day estrus checks are an important part of any successful breeding program and probably the most important factor in a successful AI program (especially when using frozen semen). Ideally, these estrus checks should be at 12 hour intervals. This will enable you to predict more accurately the proper time to breed, as compared to the more commonly employed 7-8 and 16-17 hour interval. Estrus checks should always be performed at the same time each day. If a once a day limit feeding program is used, do not check for estrus immediately preceding this time or until all feed is consumed. Afternoon feeding may be desirable so morning estrus checks can be performed earlier, which will increase the day time estrus check interval. Females in estrus respond to the sight, sound, smell, and touch of a boar. All of these senses need to be utilized if all females in estrus are to be detected. A vasectomized boar is ideal for pen estrus checks since accidental mating will not result in undesirable crosses and periodic mating (1-2 times per week) can be allowed, which will keep the boar's estrus checking interest alive. Females in crates or tethered should be checked for estrus by running the boar in the alleyway in front of the females. Careful observation of the sow or gilt for signs of estrus is especially critical under these circumstances. A few days prior to standing

estrus gilts or sows may a) exhibit a swollen red vulva, b) discharge a mucus type secretion from the vulva,

c) show interest in the boar, but play aggressively with him, rather than permitting him to mount, d) pursue other females attempting to mount them (but will not yet stand to be mounted) and roughly nuzzle their flank area. After a female comes into estrus, she will often emit a peculiar growling sound, will assume a rigid stance and elevate her ears when mounted (by a boar, gilt or sow) or when back pressure is applied by the herdsperson. The optimum estrus check system therefore involves running the boar in with the pen of gilts or sows or in an adjoining pen and applying back pressure to each female.

Gilts should reach puberty between 6-8 months of age and should be bred during their second heat period. Transporting gilts at 6 months of age and/or exposing them daily to a boar is often beneficial in triggering and synchronizing estrous cycles. Sows should be bred at the first estrus following weaning.

The length of the estrous cycle in swine varies from 18-24 days, with 20-21 days being the most common. Gilts normally remain in estrus for 1 1/2 - 2 days while sows usually remain in estrus 2 1/2 - 3 days.

3. Inseminate at the optimum time. As shown in Fig. 1, gilts and sows both ovulate near the end of standing estrus. To achieve optimum fertility, insemination must occur early enough in estrus so that the sperm are in the vicinity and ready to fertilize the eggs upon ovulation. However, since sperm only survive for a limited period of time in the female reproductive tract, insemination must also not take place too early. The optimum time to inseminate liquid semen is 10-12 hours prior to ovulation. Frozen sperm (from some boars) decreases in viability after 6 hours in the reproductive tract and therefore needs to be inseminated closer to ovulation. Even though we know the approximate time of ovulation with respect to when the animal came into standing estrus, we may not know the exact time standing estrus began. For this reason inseminating at two different times during estrus is recommended to insure that one insemination will provide viable sperm near the time of ovulation. These two inseminations should be performed during the period of maximum fertility shown in Fig. 1 (gray shaded area). Table 1 lists the optimal breeding time for

gilts and sows with liquid or frozen semen and double or single insemination. Since these hours often occur during the night, it is obvious that some deviation from this schedule will be necessary. With liquid semen, many producers breed their gilts at 12 and 24 hours, and their sows 24 and 36 hours after first standing estrus. Very good fertility can be achieved when using liquid semen in this manner. Studies have shown that fertility equal to that of fresh semen may be obtained with frozen semen when the semen is deposited within 6 hours of ovulation. Therefore, in order to assure optimum results with frozen semen (single or double insemination) please follow the recommendations given in Table 1 as closely as possible. Since single (vs. double) insemination with liquid semen will also decrease the length of time that viable sperm are available for fertilization, the optimum breeding time listed, again is more critical when using single insemination with liquid semen.

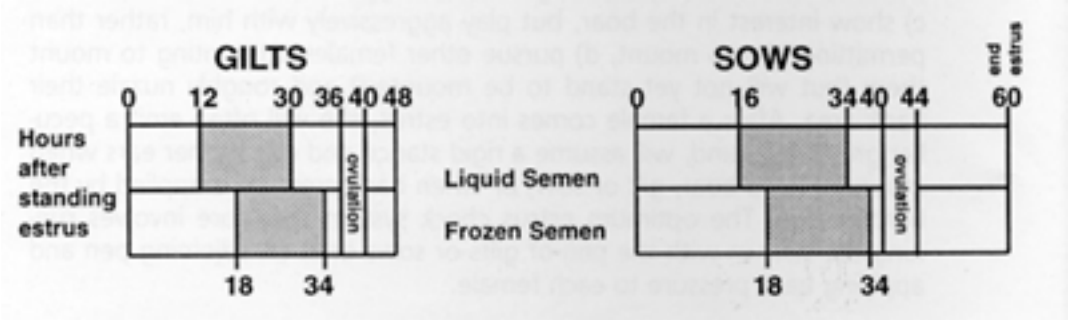

Figure 1 - Period of maximum fertility for gilts and sows using liquid or frozen semen.

Table 1 - optimum time (hours) to breed gilts and sows after first standing estrus.

	LIQUID SEMEN		FROZEN SEMEN	
	Single Insemination	Double Insemination	Single Insemination	Double Insertfination
GILTS	24-30	1st 12-24	29-32	1st 24-28
		2nd 24-36		2nd 30-34

sows	28-36	1st 24	33-36	1st 28-32
		2nd 36		2nd 36-40

*** Recent research has indicated 24 and 36 hours is the proper time to inseminate sows that exhibited estrus 46 days after weaning. For sows exhibiting estrus 2 to 3 days after weaning delaying breeding to 36 to 48 hours after first standing estrus will likely give better results. Also, for sows first exhibiting estrus at 7 or more days after weaning, breeding at 12 to 18 and 24 to 30 hours after first standing estrus may prove to be beneficial.**

4. Order semen sufficiently ahead of time to guarantee arrival when you need it. One of the best times to take advantage of the economic savings Swine Genetics' sires can offer you is after weaning a group of sows. Place your order with Swine Genetics several days before you wean your sows. This will enable us to reserve specific boars for you and make shipping arrangements. Sows that are in good physical condition and have nursed a litter of pigs for 20-35 days should come into heat 3-7 days after weaning. Make plans for your semen to be delivered on the 4th day after weaning. Semen shipped in this manner should remain viable throu hout the major part of the post-weaning breeding period. Frozen semen can be shipped at any time and stored on the farm for a readily available source of semen whenever needed.

5. Handle and store semen properly.

Liquid Semen - Liquid boar semen should be maintained at 64'F (18'C) to insure maximum fertility. Semen stored in this manner should maintain good fertility for a 5-7 day period. For best results, a refrigerated unit can be purchased from Swine Genetics. When an order is picked up at the Cambridge headquarters, the semen should be transported in an insulated box and immediately placed into your unit. If semen is shipped, place the liquid semen in the refrigerated unit as soon as it arrives if the temperature of the semen is 50'-80'F. if the semen is warmer than 80'F, it should be cooled slowly before placing in the unit. This will assure maximum fertility. it will also be beneficial to mix the semen once or twice daily since the sperm portion

may settle to the bottom of the tube. Mixing should be done by gently rocking the refrigerated unit or by slowly inverting the tube(s) several times. Do not shake vigorously. If the temperature of the semen is outside of the 50'-80'F range or the semen is stored longer than five days, it is advisable to check the semen under a microscope before use to insure that it has not been damaged during shipment or deteriorated during storage.

Frozen Semen - Frozen semen will usually be shipped in light weight liquid nitrogen tanks or dry shippers which have a short holding time.

The number of days the semen can be stored safely in these units will be affixed to each container with a yellow caution sticker. The dry shipper cannot be used as a storage unit. The semen must be transferred from the dry shipper to a liquid nitrogen unit immediately after arrival. We recommend that you purchase a liquid nitrogen storage tank so that you can transfer the semen to your tank for use whenever needed. Large liquid nitrogen tanks with longer holding times can also be used for shipping, particularly with foreign orders. Never allow the level of liquid nitrogen to get below four inches in either the liquid shipping unit (when it contains semen) or your on-the-farm storage tank. The extender for the frozen semen will be shipped in either a powder or ready to use form. All forms of the extender should be stored in the freezer or refrigerator until use. In all cases, proper directions for preparation, storage and use will accompany the extender. Extender should not be stored longer than six months for optimum performance.

6. Use proper techniques in thawing. Liquid semen arrives ready for insemination. Frozen semen needs to be thawed immediately prior to use. The procedure for thawing the frozen straws is very simple, but must be adhered to exactly to maintain fertility. The procedure is as follows:

a. Remove a bottle of frozen extender from the

freezer and warm to exactly 20'C (68'F).

b. Run some water into a sink, similar basin or SGI Thaw Bath and bring to 50'C (122'F). Remove one straw (one breeding dose) from the storage container. Lift the canister out of the liquid nitrogen only far enough to allow you to grasp the straw. The canister should not be out of the liquid nitrogen for more than five seconds.

c. Place the straw in the 50'C water for 45 seconds. Do not try to hold onto the straw during this thaw period.

d. Remove the straw from the 50'C water and wipe thoroughly dry with a paper towel. Holding vertically, snip the upper tip (with the ball) off with a pair of scissors. Place the end over the opening of the bottle of extender and snip the other end to allow the semen to drain into the bottle. Rinse the straw by aspirating extender up into the straw.

Using this simple procedure, several breeding doses can be prepared in just a short period of time. It is recommended that you place no more straws in the 50'C water than there are people on hand to handle the straws, as the 45 second thaw time is highly critical. A straw thaw bath can be purchased which omits the need to heat and maintain the 50'C water temperature. The semen should be inseminated as soon as possible. During transfer of the semen to the breeding area, place the semen (liquid or frozen-thawed) in a styrofoam container in a vehicle or similar warm area (60-80'F). This is important even when the temperature outside is between 60 and 80'F, since light adversely affects semen.

7. Use proper Al procedures. The technique of artificial insemination is

simple compared to that for the bovine and with a little practice can be mastered easily . We recommend all interested individuals to attend one of our swine Al clinics, discussed earlier, to get a more detailed explanation of the procedures than is possible here.

Proper placement of the insemination catheter is essential in AI. The proper placement of the catheter for cervical semen deposition, along with a lateral (side) view of the swine female reproductive organs, is illustrated in Figure 2.

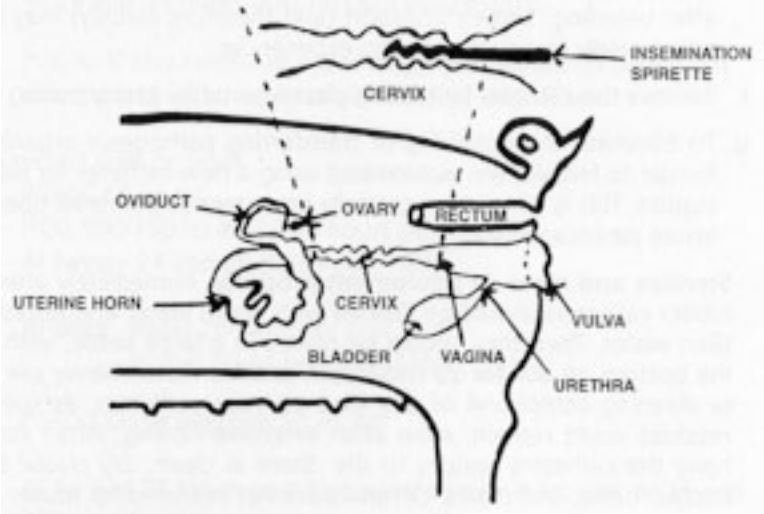

Figure 2 -Proper Placement of Catheter for Cervical Insemination of Semen

The following steps should be followed during the AI process:

a. Bring the female to be inseminated to an area where she can smell, see, and/or hear a boar. Apply back pressure to bring about an immobile stance.

b. Clean the vulva with a clean paper towel, dampened as necessary.

c. Lubrication of the catheter with nonspermicidal jelly (available through SGI) is necessary when using the rubber catheters, and optional when using the disposable plastic catheters. Slowly insert the catheter into the vagina, keeping the tip pointed upward (to prevent entrance into the bladder). The catheter should slide easily through the vagina until it reaches the cervix.

d. When the spiral catheter cannot be pushed forward any further, begin to turn the catheter counterclockwise until it will not turn any further (3-4 revolutions). Pull the catheter back gently towards you to ensure it is properly locked in place. With the foam tip catheter, gently push forward with a slight right to left upwards rotating movement until penetration of the first villosities (fold) of the cervix.

e. After snipping off the plastic end piece to the bottle (frozen) or tube (liquid), insert into the end of the catheter. Holding the bottle or tube in an upright position, squeeze the tube gently. At least three minutes should be taken to empty the container completely. Do not force any of the air in the container through the catheter when the container is emptied. A small amount of semen run back often occurs initially. if large amounts continue to run back, recheck the catheter placement. It is important to always handle gilts and sows gently before, during and after breeding. Semen transport (and therefore fertility) may be affected adversely by any frightening experiences.

f. Remove the catheter by turning clockwise while gently pulling outward.

g. To eliminate the possibility of transferring pathogenic organisms from female to female, we recommend using a new catheter for each insemination. This is of course especially important in purebred operations to insure parentage.

8. Sterilize and store Al equipment properly. Immediately after use, the rubber catheters should be flushed with warm water and rinsed with distilled water. Then they should be placed in a large kettle, with a rack in the bottom, to boil for 20 minutes in distilled water. Never use any soap or cleaning compound of any kind on your catheters, as sperm killing residues could remain, even after extensive rinsing. After sterilization, hang the catheters upright to dry. Store in clean, dry plastic bags. The bottles, tubes, and plastic catheters are not intended for reuse.

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