MEASURING BOAR FERTILITY

Philip Dzuik
Department of Animal Science
University of Illinois

There are several means of measuring the fertility of boars, each with strengths and weaknesses. There is still another alternative. Do not measure fertility but take a course of action that will help insure a relatively high herd fertility. In either case it is to our advantage to know how to measure fertility that is influenced by the boar so we have a sound basis for whatever plan we follow.

We must recognize that the boar can have a profound influence on the proportion of estrous females that are mated normally and on both the proportion of mated females that conceive and farrow and on the number of pigs per litter. All too often producers have the notion that a boar is fertile because he is an "active" breeder or he does a "good job", whatever that is. A boar that does not mate is effectively infertile but because a boar does mate is no assurance that he is fertile. Thus it goes without saying that a boar that is unwilling or unable to mate is infertile. Those can usually be detected by careful observation. In some groups of boars less than 50% are effective in seeking, selecting and mating estrous gilts. Do not overlook the obvious in checking to be certain that normal matings are actually taking place.

Once the physical and psychological aberrations are eliminated as limits to fertility then what can we do to measure fertility? One of the first thoughts is an evaluation of semen by a microscopic or biochemical test. When these tests are done by experienced persons who perform these tests consistently and who examine a series of semem samples from a male over a period of time there is usually a small relationship between the outcome of the test and fertility. When the tests are done on a single sample they are not meaningful and when done by persons with infrequent experience the results are more often misleading than useful. The best that can be said is that a male producing a semen sample devoid of sperm is not fertile at that time. Because the period from beginning of sperm formation to ejaculation ranges from 45 to 50 days in boars, the characteristics of the sperm indicate what went on 45 days ago but is not a certain predictor of what happened or the fertility of a boar either earlier or later. A high temperature from the environment or a high fever may affect fertility not at the time of exposure but 4 to 7 weeks later. Recovering from a fever or toxic materials takes time. In this connection any benefit to fertility that might be anticipated from any management, nutrition or drug regimen will take 6 or 7 weeks to have an effect. In this regard it appears that the first rise in environmental temperature seen in May and June may have a greater detrimental effect on fertility in August and September than the steady high temperatures of July and August to which the boar has become adjusted.

If examination of semen has limited value in estimating fertility, one needs complete records of the proportion of gilts conceiving to a boar and the litter size go hand in hand, if one is up or down the other follows (Tables 1 and 3). A boar that has both a low conception rate and small litter size is very costly in terms of loss of potential profit each time he is mated to a gilt or sow. His cost may be even higher if the reduced fertility is at all heritable which on the basis of experiments in other animals appears to be quite high. How does one avoid the problem if it cannot be readily detected? The simplest and safest means is mating each gilt to <u>at least</u> two different boars during each heat period (Table 2). The more fertile boar will sire the majority of the offspring and the conception rate and litter size will be at least as high as that of the most fertile boar used.

The offspring will come from the most fertile boar so genetic selection will be automatically for the most fertile. In Tables 2 and 3 boars Y1 and Y4 were litter mates, they had equal libido, the volume and general appearances of the semen was the same and both appeared healthy. Yet when the results of breedings were compared Y1 clearly exceeded Y4 and as a matter of fact Y4 was really quite infertile. Y4 sired a very small proportion of offspring when double mated in competition with the three D boars and had a low conception rate and small litter size when used alone.

Useful tests for fertility of boars should include careful observation of mating, a check for presence of sperm in the ejaculate and either records of conception rate and litter size or mate each gilt to at least two different boars.

TABLE 1. The influence of the Boar on Litter Size and Conception Rate (Boender, 1966)

BOAR	Number of Litters Sired	Conception Rate %	Mean Litter Size	Litters with 7 or less Pigs %	Litters with 14 or more Pigs %
G	185	69	11.53	8.6	20.0
L	170	66	11.46	5.9	18.8
I	244	65	11.20	7.8	15.2
K	378	65	11.04	8.2	11.1
H	310	61	10.30	13.2	9.4
P	205	55	9.48	21.9	5.4
E,K,S	116	35	8.99	28.4	8.6

TABLE 2. Relative fertility of 6 boars following double matings

	Percentage of piglets sired by Y boars		
	Y1	**Y2**	**Y4**
D2	**73 (41)**	**100 (7)**	**6 (17)**
D4	**73 (39)**	**43 (75)**	**29 (59)**
D8	**84 (37)**	**51 (45)**	**17 (46)**

( ) Total number of piglets for each D and Y pair

From Martin and Dziuk, 1977.

TABLE 3. Relative fertility of 5 boars following single matings

Boar	No. of Matings	No. of matings to fertile gilts+	Pregnant No.	Pregnant %	CL No.	litter size	% Embryonal survival	Fertility index†
Y1	34	31	26	84	12.5	9.8	79	66
Y2	37	34	30	88	12.6	9.4	75	66
D4	32	29	24	83	13.3	9.4	71	59
D8	19	17	12	71	12.1	7.6	63	44
Y4	23	15	6	40	13.0	7.8	60	24

+ Gilts pregnant after 1 or 2 matings at consecutive oestrous periods

$\frac{(\%\ \text{gilts pregnant}) \times (\%\ \text{embryonal survival})}{100}$ = fertility index.