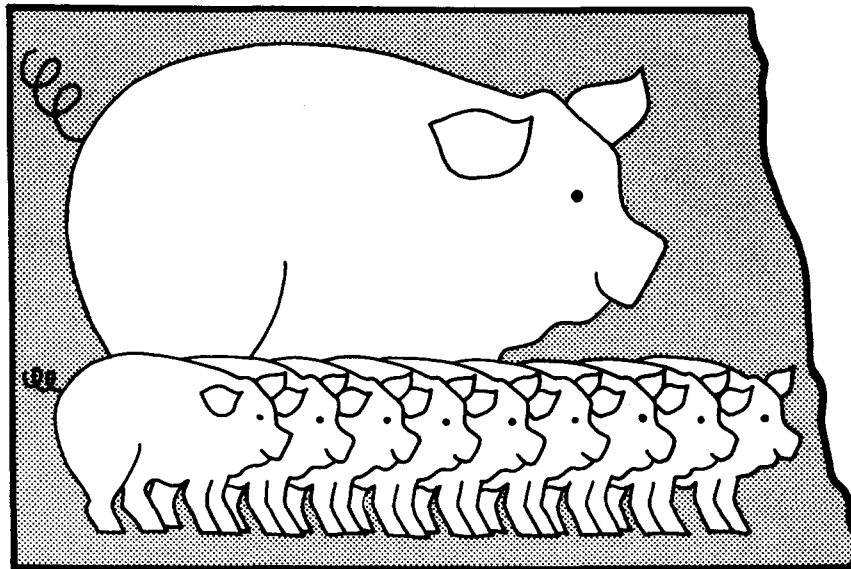




THE NORTH DAKOTA SWINE PRODUCTION TESTING PROGRAM

SOW PRODUCTIVITY



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The North Dakota Swine Production Testing Program is designed to help swine producers evaluate their sow herds. Its primary purpose is to measure the performance of individuals within the herd and provide production information that can be used as the basis for selection and genetic improvement.

The on-farm testing program is a within-herd management tool. The program will identify the higher producing sows and lines plus evaluate sires. It will also determine the present status of the herd so the producer can concentrate on strengths and weaknesses in management with the aim of raising the productivity of the entire herd.

Why Sow Productivity?

Sow productivity is the trait most affecting profit in both commercial and seedstock herds. It includes number of pigs born and reared per litter. It measures prolificacy, milking ability and mothering ability. The foundation of a successful pork operation is the productivity of its sow herd. The amount of feed required to maintain a sow for a year is the same whether she produces 12 pigs or 20 pigs.

Although the heritability for sow productivity is somewhat low (about 20 percent), the economic importance is substantial. Research indicates that productive sows tend to produce daughters which are also more productive. In addition, the heritability estimate for sow productivity increases as more records per sow are used, increasing the selection progress that can be made.

Traits Measured

Sow productivity has two separate components: (1) **number pigs born alive** and (2) **21-day litter weight**. These two traits are distinct in that one measures prolificacy and the other milking ability.

Research shows that the heritability for number of pigs born alive is 22 percent while the heritability for number born dead is 35 percent. This indicates that losses at birth (stillborns) are genetic in nature. Apparently the ability of a sow to farrow live pigs is something we can select for, so number of pigs born alive is the best criterion to use in measuring sow prolificacy.

Milking ability of the sow can best be determined by weighing the litter at 21 days. Why 21 days?

- It is the age that best reflects the sow's or gilt's milking potential.

- In practical production, few pigs are weaned prior to 21 days due to rebreeding problems associated with early weaning.

- The intake of creep feed prior to 21 days should be minimal and should have little effect on the litter weight.

Values Generated by Program

- **ADJ 21-Day Litter Wt.** — All litter weights are adjusted to a 21-day equivalent and a 10-pig litter size basis. Adjustment for age when weighed is made using the following multiplicative factors:

Day Weighed	Factor	Day Weighed	Factor
14	1.29	22	.97
15	1.24	23	.94
16	1.19	24	.91
17	1.15	25	.88
18	1.11	26	.86
19	1.07	27	.84
20	1.03	28	.82

Age Adjusted Weight = Factor X Litter Weight

Adjustment for litter size at weighing is added to the age adjusted weight.

Based on Ohio State University (OSU) findings, the following adjustments are used:

Litter Size	Add
Less than 6	37
6	27
7	19
8	12
9	5

The **ADJ 21-Day Litter Wt. Ratio** compares the milking ability of the sows or gilts on a within-farrowing group basis with 100 being an average female.

- **Sow Productivity Index (SPI)** — The sow productivity index is a composite value using the number of pigs born alive and the adjusted 21-day litter weight. It is an index recommended by the National Swine Improvement Federation to measure sow performance. The formula is:

$$\text{SPI} = 6.5 \times (\text{number pigs born alive}) + \text{adjusted 21-day litter weight.}$$

To equalize parities, 16.4 is added to the SPI of first-litter gilts, 5.4 is added for second litters, and 8.5 is added for litters greater than six. These adjustments (OSU recommendations) allow a better comparison of sows and gilts.

The **SPI Ratio** compares sows and gilts on a within-farrowing group basis with 100 being average.

● **Breeding Value for Sow Productivity (BVSP)** — The breeding value for sow productivity is the best estimate of the genetic capability for sow productivity that a sow will transmit to her offspring. It is calculated from one or more sow productivity index ratio records on the same sow and uses a heritability estimate based on accumulated records. Ratio records are used because they remove much of the environmental differences that can affect sow productivity, making comparisons of genetic merit more valid. BVSP is valuable for comparing sows with different numbers of litter records. The average sow in a herd would have a BVSP of 100. The greater the number of records on a sow, the more reliable her BVSP value.

Information Provided to Producer by Program

● Provides a litter summary of each farrowing group with sows ranked by SPI.

● Provides individual sire summaries of both the sires of the litters and the sires of the sows.

● Provides an individual sow production record which includes her lifetime record plus a "Breeding Value for Sow Productivity." Ranks sows within each farrowing group by BVSP.

● Provides an annual herd summary which includes an evaluation of different litter breed makeups, an evaluation of daughters of different sires within the herd, and an evaluation of year-to-year differences.

● Provides a pre-listed farrowing worksheet for easy recordings of subsequent farrowing information.

Testing Recommendations

● The selection objectives of on-farm testing can best be met by evaluating all the animals in the herd. Testing a selected sample of the herd may yield biased and limited information.

● Standardize litter sizes as close to birth as possible, preferably within 48 hours. Try to avoid having a sow or gilt nurse fewer than six or more than 12 pigs. Standardization is done to facilitate a more accurate comparison of milk production between females. It also eliminates the negative environmental effects of large litter sizes in which a gilt is reared on her subsequent reproductive ability. Research data has shown that gilts reared in large litters are restricted in their later reproductive life.

● Utilize the results to cull sows and make initial replacement gilt selections. Cull the bottom 25 per-

cent of the sows and select gilts from sows that are in the top 25 percent of the herd. Rely heavily on the BVSP values of sows when selecting potential replacement gilts.

● Examine the results for management weaknesses as well as genetic improvement. Remember that learning how to manage a highly productive sow herd is as important or even more important than making genetic selections. Management should come first.

TESTING ESSENTIALS

● Identification — Each sow or gilt farrowing in the herd must have a unique identity. Litters and sires also need to be identified. **NO** two animals or litters in a herd can carry the same identification. Numbers, letters or a combination of both can be used in ID's.

● Breed Codes — Codes and numbers for breed identification are listed below.

1010—Berkshire (BERK)
 1111—Chester White (CHES)
 1212—Duroc (DURC)
 1313—Hampshire (HAMP)
 1414—Large White (LGWH)
 1515—Landrace (LAND)
 1616—Poland China (PLCH)
 1717—Spots (SPOT)
 1818—Yorkshire (YORK)
 1919—Crossbred (XBRD)
 2020—Other Breed #1 (OB#1)
 2121—Other Breed #2 (OB#2)
 2222—Breed Combination #1 (BC#1)
 2323—Breed Combination #2 (BC#2)
 2424—Breed Combination #3 (BC#3)
 2525—Breed Combination #4 (BC#4)
 2626—Breed Combination #5 (BC#5)

The **FIRST TWO DIGITS** indicate the **sire breed** and the **LAST TWO DIGITS** indicate the **dam breed**.

Examples:

1212 is a DURC-DURC purebred
 1317 is a HAMP-SPOT crossbred
 1812 is a YORK-DURC crossbred

NOTE: Breed codes 20 through 26 can be utilized by a herd which has purebreds other than those listed or breed combinations beyond two-breed crosses that they wish to keep track of. Information regarding what the other purebred breed is or what breeds make up the breed combination is strictly maintained by the producer themselves.

● 21-Day Litter Weight — Litter weights should be taken between 14 and 28 days, preferably close to 21 days.

● **Farrowing Groups** — Environmental factors play an integral part in sow performance with a decline in sow productivity normally occurring during the summer months. Sows need to be compared on a within farrowing group basis.

Twenty-four possible farrowing periods are available in the program. These periods are either one month or a combination of two.

- | | |
|------------------------|-----------------------|
| 1 = Dec-Jan (DJAN) | 13 = June-July (JJUL) |
| 2 = January (JAN) | 14 = July (JUL) |
| 3 = Jan-Feb (JFEB) | 15 = July-Aug (JAUG) |
| 4 = February (FEB) | 16 = August (AUG) |
| 5 = Feb-March (FMAR) | 17 = Aug-Sept (ASEP) |
| 6 = March (MAR) | 18 = September (SEP) |
| 7 = March-April (MAPR) | 19 = Sept-Oct (SOCT) |
| 8 = April (APR) | 20 = October (OCT) |
| 9 = April-May (AMAY) | 21 = Oct-Nov (ONOV) |
| 10 = May (MAY) | 22 = November (NOV) |
| 11 = May-June (MJUN) | 23 = Nov-Dec (NDEC) |
| 12 = June (JUN) | 24 = December (DEC) |

NOTE: Evaluating sows in farrowing groups with approximately 30 days or less spread in farrowing dates will increase the timeliness of the production results in making culling decisions.

TESTING OPTIONS

Scores — Two optional parts of the program are the **farrowing score** and the **21-day litter score**. Both are subjective measures that may help in culling sows or selecting replacement gilts.

The scores are strictly optional and do not affect any of the production results. If a producer wishes to keep these records, the following are some guidelines developed by the National Swine Improvement Federation.

● **Farrowing Score** (Relates to farrowing ease)

5 = farrowed and cleaned with no outside stimulus and less than 10 percent stillborn.

4 = farrowed and cleaned with oxytocin injection and/or less than 20 percent stillborn.

3 = needed physical assistance or up to 30 percent stillborn.

2 = needed repeated assistance and/or more than one-third stillborn.

1 = required caesarean or died during or shortly after farrowing.

● **21-Day Litter Score**

3 = pigs large and uniform.

2 = pigs average in size and/or some uniformity.

1 = pigs small and/or lack uniformity.

NOTE: Replacement gilts should be selected from litters scoring 3 or 2.

REPORTING INSTRUCTIONS

A farrowing worksheet is the only form required to enter sows or gilts into the program. A producer is required to fill it out every time a **group** of sows and/or gilts farrow. It is important that the worksheet is legibly and preferably in **pencil**. Initially, a producer provides his herd name, address, county and phone number. A code number is assigned to his herd.

FILLING OUT THE FARROWING WORKSHEET

For the first time a group of sows or gilts are entered into the program, an initial farrowing worksheet is used. The year and farrowing group period should be filled in. The number codes given earlier should be used for the farrowing group period. Example is 15 for July-August farrowing group. Once the farrowing group is entered into the program, a new farrowing worksheet is produced for the next farrowing period by the computer with all the sow's pedigree information prelisted (Items 1-5). Only new gilts or added sows need pedigree and parity information (Items 1-5) filled in. In addition, the new farrowing group period for these sows is projected to be about five and a half months later. If this is not correct, cross out the projected period and put in the correct month(s) code (use number code).

Information needed in the worksheet is explained below. A sample farrowing worksheet is included for reference.

- 1. SOW ID** — Ear tag number, ear notch, etc. **Limit of eight digits (numbers and/or letters)**. The same identification must be reported throughout the lifetime of the animal. Should a sow lose her tag and you choose to replace it with another number, you must continue to report the sow's original number and keep your own personal records of the two numbers for herd identification.
- 2. SOW BREED** — Refer to the breed codes listed earlier. **Use the number codes**. Remember that the first two digits refer to the sire breed and the last two to the dam breed. Permanent identity of the breeds involved in a crossbred female can be maintained. Example is 1718 for a Spots-Yorkshire cross sow. If you do not know the breeds involved or have no need to maintain their identity, indicate the sow is a crossbred by the number code 1919.
- 3. SOW'S SIRE ID** — Identify the sire of the sow. **Limit of eight digits (numbers and/or letters)**. Optional part that is strongly recommended. Provides an evaluation of the productivity of daughters of sires.

4. **SOW PARITY** — Order of this particular farrowing in a sow's life. Is this her first litter, second, third, etc.
5. **SOW BVSP** — The Breeding Value for Sow Productivity will be listed after production is reported for the first time on a sow. **You DO NOT have to fill any information in this space.**
6. **LITTER SIRE ID** — Identify the sire of the litter. **Limit of eight digits (numbers and/or letters).** If the sow or gilt is mated to more than one boar, only one ID can be recorded.
7. **LITTER SIRE BREED** — Refer to the breed codes listed earlier. **Use the number codes.**
8. **LITTER ID** — Identify the litter by numbers and/or letters. In contrast to the other ID's, a limit of **six digits** is allowed for litter identification.
9. **FARROWING DATE** — Record the month, day and last two digits of the year that the sow or gilt farrowed.
10. **NUMBER BORN** — Record total number of pigs born to the sow or gilt. Include dead ones.
11. **NUMBER BORN ALIVE** — Record number of live pigs at birth.
12. **FARROWING SCORE** — Use number scores (1-5) defined earlier.
13. **21-DAY WEIGHING DATE** — Record the month, day and last two digits of the year that the litter was weighed.
14. **NUMBER PIGS WEIGHED** — Record number of pigs in litter when weighed at 21 days.
15. **21-DAY LITTER WT** — Record litter weight to the nearest pound.
16. **LITTER SCORE** — Use number scores (1-3) defined earlier.

FORMS AND ENROLLMENT

A producer can obtain initial farrowing worksheets from his county agent or by writing to the North Dakota Swine Testing Program, Roger G. Haugen, Extension Livestock Specialist, Hultz Hall, NDSU, Fargo, ND 58105. (701) 237-7645. Once on the program, these worksheets will be sent directly to the producer. All completed worksheets should be sent directly to the address above. A fee is assessed each litter that is recorded to cover the cost of running the program.

COMMENTS

Identification of productive individuals within a herd is economically beneficial to all pork producers. A producer needs accurate records to identify superior females. If a producer takes the time to collect records, study the results and use them for within-herd selection, genetic improvement can be made. If SPI indexes and BVSP values are used in selection decisions, the genetic potential of a sow herd will increase. Weighing pigs at 21 days can be thought of as just another habit like ear notching or giving iron shots.

Improving sow productivity has been shown to be economically rewarding to swine producers and is worthy of increased attention. The future holds a place for the production of animals with documented genetic values. The only way to obtain these is through the collection and the intelligent use of accurate performance records.

NORTH DAKOTA SWINE PRODUCTION PROGRAM

901 NDSU SWINE HERD
 ANI SCI DEPT HULTZ HALL FARGO
 ND 58105

1983 MJUN FARROWING WORKSHEET

***** FARMING *****										***** 21-DAY WEIGHING *****									
SOW										NO. LIT LIT									
ID	BREED	SIRE	FAR BVSP	ID	BREED	LITTER	DATE	NO. BRN	NO. LIT	DATE	WT	SCO	DATE	WT	SCO				
*****										*****									
06813304	DURC	VICTORY	3	98															
06813602	YORK-	02800510	3	108															
06813701	YORK-	ALE	3	99															
06813904	YORK-	02800510	3	105															
06814507	YORK-	ALE	3	99															
12810701	DURC	01805610	2	96															

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