

## Pricing Boars On Their Breeding Values

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International Boar Semen is a profit organization founded in 1974 at Eldora, Iowa. Its business is the acquisition of genetically superior boars and the processing, distribution, and sales of the semen from these boars. Semen is sold primarily in a frozen state rather than fresh.

I.B.S. purchased the swine section of East Central Breeders, Waupun, Wisc. They had sold fresh swine semen for a number of years, and frozen semen for about two years before acquisition by I.B.S.

The I.B.S. selection criteria for boar purchases are many and varied, but most center around data available from central test stations.

In reviewing a boar for possible selection we first look at some raw data. Because of 25 years of purchasing boars on raw data, (example; lbs gain per day) rather than contemporary scores or breeding values, swine producers still want this data. Semen will generally not sell well for I.B.S. unless these minimum standards are met.

These standards are noted in Table 1.

BREED	GAIN (over)	B.F. (under)	L.E. (over)	Minimum Litter Size	Minimum Nipples
Berkshire	2.2	.80	5.5	9	12
Chester White	2.3	.80	5.0	10	14
Duroc	2.6	.90	5.5	8	12
Hampshire	2.4	.65	6.0	8	12
Landrace	2.3	.85	5.0	11	14
Poland China	2.3	.75	6.0	8	12
Spot	2.4	.80	5.5	9	12
Yorkshire	2.3	.85	5.0	11	14

Boars must be relatively sound and of acceptable type. Underline must be adequate with more selection pressure on white breeds than dark breeds. If at least 6 of these 8 items meet our needs I.B.S. will then look at contemporary data.

For the protection of our user, we would like to see all boars purchased be at least 10% over the group average in test data reported. The exception would be Feed Efficiency where 5% is used. This should assure us that in most herds no regression will be made in any trait while some trait is really being concentrated on. Very few boars meet these standards.

At the November 5, 1980 sale at Ames the average data was; Index 194.3, Gain 2.04, Probe .75, F.E. .257. Boars meeting our standards would need; Index 214, Gain 2.24, Probe .68 and Feed Eff. of 244. Of the 76 boars for sale; 15 met Index, 25 met Gain, 8 met Probe and 18 met Eff. Only one pig meets all these requirements. If we ignored Eff. because of poor data (2 & 3 sires per Pen)

then 2 boars met the test criteria. One was the lead off pig in a Duroc pen that gained 2.42/day, which does not meet our raw data requirements, and the other pig was a Spot that met all raw data requirements, but had a feed score of 91 and not acceptable. Thus this sale was not attended by I.B.S.

Starting in 1975 we developed a program that we called the "I.B.S. Index". It included a calculated index, a breeding value for gain (API) along with a score for easier reading, and the same for Back Fat. It also included the NSIF feed score, as well as an accuracy score which related to the number of littermate boars tested. Different adjustment figures are used for different breeds. These calculations would be part of our next evaluation.

The formula for Duroc calculation for index is;

$$\text{Index} = 200 + (\text{DG} - \bar{\text{DG}}) \times 66 + (\text{BF} - \bar{\text{BF}}) \times -63$$

The formula for Hampshire calculation for index is;

$$\text{Index} = 200 + (\text{DG} - \bar{\text{DG}}) \times 32 + (\text{BF} - \bar{\text{BF}}) \times -93$$

A Duroc boar gaining + .40 lbs. over average and with B.F. of -.10 under average would index as follows:

$$\text{Index} = 200 + (\text{DG} - \bar{\text{DG}}) \times 66 + (\text{BF} - \bar{\text{BF}}) \times -63$$

$$\text{Index} = 200 + (.40 \times 66) + (-.10 \times -63)$$

$$\text{Index} = 200 + 26.40 + 6.3$$

$$\text{Index} = 232.7$$

In addition to an index, we prefer to use a breeding value (BV) calculation for Gain and B.F. Using the above example we can also calculate the values.

$$\text{BV} = (\text{Gain difference}) \times (\text{Heritability})$$

$$\text{BV} = .40 \times .30$$

$$\text{BV} = .120$$

Average Pig Improvement (API) is equal to  $\frac{1}{2}$  or  $\frac{1}{2}$  the BV based on the boar only.

$$\text{API} = \frac{\text{BV}}{2}$$

$$\text{API} = \frac{.120}{2}$$

$$\text{API} = .060$$

This boar would be expected to sire pigs that gain .06 lbs/day faster than pigs sired by the boar in the middle of the contemporary group. Based on standard deviation, we developed a chart that allows us to relate this to an easy reading score. In this case the gain score is 8. That is to say this boar is better in API than 80% of the pigs in this test.

I.B.S. prefers boars tested by breed in units of 75 pigs or more. We also prefer to buy boars with littermates on test so that we can increase our BV by the inclusion of their data. We also use an accuracy score.

In our Duroc example, if we had a littermate with the same data we can also use heritability factors for littermates. The final data would appear as in Table 2.

(Table 2)

BOAR	INDEX	GAIN SCORE	GAIN API	BF SCORE	BF API	ACCURACY
Boar	233	8	+.606	6	-.025	.548
Boar +1 littermate	238	9	+.078	7	-.030	.581
Boar +2 littermate	241	9	+.092	7	-.033	.605

Conversely, boars with littermates that performed at rates under the boar, will reduce the above figures. Littermates performing lower would be normal in that we would be seeking the highest indexing boar unless he was unavailable.

Another screening process is the NSIF index. I.B.S. strongly urges all test stations to adapt the NSIF testing recommendations and calculation procedures. We will be reporting NSIF scores on all boars where available in our 1981 catalog.

A review of the three index formulas available can be found in the NSIF publications.

To use our earlier Duroc example we would use this NSIF formula;

$$\text{Index} = 100 + 110 (\text{DG} - \bar{\text{DG}}) - 105 (\text{B.F.} - \bar{\text{B.F.}})$$

$$\text{Index} = 100 + 110 (.40) - 105 (-.10)$$

$$\text{Index} = 100 + 44 + 10.5$$

$$\text{Index} = 154.5$$

Now to the Dollars and Sense of tested boars for I.B.S. I am going to use the NSIF index as the measure of performance. I.B.S. has purchased over 120 test station boars in the past 5 years. About 60 of these boars are currently available thru frozen semen.

Some data by breed is shown in Table 3.

(Table 3)

DATA ON TESTED BOARS AT I.B.S.  
where NSIF Index available

BREED	NO	NSIF INDEX	
		RANGE	AVERAGE
Berkshire	2	87-149	118
Chester White	4	113-153	137
Duroc	27	109-175	
Hampshire	11	109-171	
Landrace	9	90-166	137
Poland China	2	101-115	108
Spot	4	122-155	
Yorkshire	20	92-196	

Of the boars noted in Table 3, I took all of those currently available for sale, and which have been available for at least 1 year and compared their sale values and sale volume. Because of limited numbers I used the 4 top breeds only

This data is summarized in Table 4.

BREED	SALE PRICE BY BREED BY INDEX				DIFFERENCE
	AVE	AVE	AVE	AVE	
	INDEX Top $\frac{1}{2}$	PRICE Top $\frac{1}{2}$	INDEX Lower $\frac{1}{2}$	PRICE Lower $\frac{1}{2}$	
Duroc	165.5	19.50	143.4	16.78	\$ +2.72
Hampshire	155.4	18.60	130.5	16.50	+2.10
Landrace	162.0	17.33	145.5	19.33	-2.00
Yorkshire	159.0	16.78	135.8	18.67	+ .11

Assuming a Duroc boar can produce 1000 services per year, is in the top  $\frac{1}{2}$ , and has a 3 year life span, his additional value to I.B.S. is \$18,160.00 or \$373.00 per NSIF index point.

A Hampshire boar in the top  $\frac{1}{2}$  would create \$6,300.00 additional income or \$253.00 per NSIF index point.

I also have analyzed the sales for these 4 breeds and this data is in Table 5

(Table 5)

BREED	<u>IF TOP <math>\frac{1}{2}</math> SELLS</u>	<u>LOWER <math>\frac{1}{2}</math> SELLS</u>
Duroc	100 tubes	44
Hampshire	100	25
Yorkshire	100	162
Landrace	100	100

In the case of Durocs, a boar in the top  $\frac{1}{2}$  based on selling price and selling volume could produce gross income 3 times that of a boar in the lower  $\frac{1}{2}$ . This boar direct relation to what I.B.S. can economically bid for the animal at sale time. Data calculations using BV and API produce substantially the same results.

The white breeds have presented us with a different opportunity. White boars that are not tested do not sell well. There have been rare exceptions. It would seem however that if the whites test out with indexes of over 130, then other selection pressure enters. This pressure is related to litter size, nipples, mothering score, and what is perceived at least to be "reproductive characteristics". We need to be able to report dam production to our customers on the white boars. We encourage the use of the breed's sow productivity programs

The pork industry and I.B.S. needs the nations test stations filled with the best pigs that our breeders can produce. It is only thru this procedure that we can meet the efficiency demands of the next 20 years. I.B.S. will continue to be an aggressive buyer of test station boars.

I would also hope that the NSIF would become active in the calculation of and in the methods used in presenting data in our A. I. units. These units are beginning to appear across this great land and will be a major factor in the next 10 years. Let us learn from the dairy industry, and establish a procedure of data reporting that will be recognized and understood by all producers. The alternative is a mixture of data that will allow the principle of "Figures don't lie, but liars figure" to be exploited to the detriment of the industry.