

## How Much Does Dairy Sire Semen Really Cost?

Jeffrey F. Keown, Extension Dairy Specialist

Factors to consider in determining the true cost of dairy sire semen are discussed here.

Many factors must be taken into account when deciding to place a value on semen used in a dairy herd. The price charged by the Artificial Insemination (A.I.) Organization may not reflect the true cost to you as a producer. Before deciding which A.I. sires to purchase, the following factors must be considered:

1. **The objectives of your breeding program must be outlined.** Which trait or traits are you planning to select for in your program? How much production are you willing to sacrifice to select on non-production traits? Are you going to select on Predicted Transmitting Abilities Dollars (PTA\$), Cheese Yield Dollars, Predicted Transmitting Abilities Milk (PTAM) or Predicted Transmitting Abilities Fat (PTAF)?
2. **Are the factors you plan to select of economic importance for your dairy enterprise?** Will they return you a profit over the short and long run?
3. **Can you change factors in your breeding program through modifications in the housing, feeding or milking programs?** A good example would be feet and legs — it may not pay to select on these traits due to their low heritabilities, but you can change feet and legs by scraping the barn more often, using a foot bath regularly, and having a routine foot trimming program.

The three points mentioned above all must be considered by each dairy producer before discussing the real cost of semen. The way you decide to select your A.I. sires will have a direct effect on your herd's potential profit.

Relative semen costs vary from producer to producer. Major influences on relative semen costs are:

1. **Conception rate.** If a producer has a conception rate of 1.5 services/conception, compared to 3.0 services/conception the relative semen costs are twice as high for the second producer.
2. **Survival rate.** The number of calves lost from freshening to two years of age (optimum first calf freshening age is 24 months) will affect relative semen costs. If one producer loses 20 percent of calves from birth to two

years in comparison to another producer losing only 5 percent, the semen cost per replacement heifer entering the milking herd is greatly affected.

3. **Investment cost.** Since breeding A.I. is a long-term investment, you need to consider the cost and how long you as a producer are willing to take to recover the cost of the initial semen investment.
4. **Semen cost.** The actual cost of purchasing the semen is a factor that must be considered.
5. **Cost of natural service.** The cost of using a barnyard bull should be considered. It is estimated the cost of maintaining a barnyard bull is around \$1,200/year. This does not include the threat of injury or death, the genetic potential loss, or the potential to spread reproductive diseases throughout your herd.

### Semen Value Index

There is a simple formula to estimate the Semen Value (SV) Indexes of sires given certain herd management conditions. The formula is:

$$\text{Semen Value Index} = \text{Herd Management Factor} \times \text{Predicted Transmitting Abilities \$} - \text{Actual Semen Cost in \$} \quad (1)$$

As was previously stated, the Herd Management Factor varies for each herd. There are, however, some general groupings that can be made to allow you to quickly locate a Herd Management Factor that approximates a given herd situation. *Table 1* lists four herd management factors (.4, .3, .2 and .1) that correspond to the herd situations described. Look through the listing and find a value that most closely fits your herd.

The next step is to multiply this figure (.4, .3, .2 or .1) by the PTA\$ value from the USDA Animal Model Sire Evaluation. PTA\$ formerly was referred to as PD\$. PTA\$ is simply the dollar value of a sire's genetic value for milk and fat at the current average milk price of \$11.30 per hundredweight and 15.4 cents per point for fat.

In other words, a sire that is +1,000 pounds for milk and 55 pounds of fat has a PTA\$ figure of 144 corresponding to the income you would generate if 1,000 lbs of milk and 55 lbs of fat were sold on the open market. The PTA\$ figures are available on all A.I. sires.

After multiplying the Herd Management Factor by PTAS\$, you only need to subtract the cost of the semen to rank bulls on the Semen Value Index.

Table II shows the Semen Value Indexes for 10 A.I. sires for four Herd Management Factors. As can be seen in Table II, under the best herd management level (.4) the best semen buy is Sire 3 at \$64, followed by Sire 2 and Sire 5.

When conception rate and management are quite good the Semen Value Indexes are not as affected by the actual semen cost. Producers in this category can afford to purchase semen without paying as much attention to price.

In contrast, those producers in the fourth Herd Management Factor (.1) need to pay careful attention to semen prices. In this instance, there are only four sires that will actually return a profit over time. Purchasing high-priced semen under these management conditions is not warranted and, in fact, returns nothing to the enterprise.

How should you use the Semen Value Index in a sire selection program?

First, select the sires you wish to include in your breeding program. Check the semen prices with the A.I. organization, then calculate the Semen Value Index for these sires.

Once the values are calculated, select those sires that will return you the most income under your herd manage-

ment situation. This is an easy way to maximize your return in future years.

Many producers using this procedure will alter or drastically change the sires used in the breeding program. Producers need to look more at the economic decisions made in the dairy operation. Remember, every decision you make is an economic one.

Those producers whose Herd Management Factor fall in the third and fourth category (.2 or .1) should objectively analyze their entire management program. If A.I. does not pay, it usually means there are areas in reproduction, herd health, mastitis prevention, feeding and overall herd management that should be considered. Have your feed analyzed and rations balanced, look at your DHI records, start a routine veterinarian herd health program, change your heat detection practices, take an A.I. refresher course to increase conception and attend information meetings to learn how things can be changed at little or no cost.

Remember, as dairying becomes more technical, it is more important than ever to have a management program in place to take advantage of all the new technologies.

Additional dairy information can be found at [www.nebraskadairy.unl.edu](http://www.nebraskadairy.unl.edu).

**Table I. Guidelines for choosing herd management factor for the SV Index.**

<i>Herd Management Factors</i>	<i>Herd Situation</i>
.4	<ul style="list-style-type: none"> <li>• Herd has excellent reproductive performance (e.g., less than two services per conception)</li> <li>• Herd has low calf mortality rate (e.g., less than 5 percent)</li> <li>• Goal is long term genetic gain</li> <li>• Farm has no cash flow problems</li> <li>• Farm has good financial situation (i.e., high equity:debt ratio)</li> <li>• Willing to accept low rate of return on investment</li> <li>• Able to wait 10 years or more for complete recovery of investment cost</li> </ul>
.3	<ul style="list-style-type: none"> <li>• Recommended for most farms with average or good management and financial condition</li> <li>• Herd has intermediate reproductive performance and calf mortality</li> <li>• Cash flow is not a serious consideration</li> <li>• Equity:Debt ratio is reasonably high</li> <li>• Desire a moderate rate of return on investment</li> <li>• Want to recover investment cost in less than 10 years</li> </ul>
.2	<ul style="list-style-type: none"> <li>• Herd has below average reproductive performance (e.g., more than 2.5 services per conception)</li> <li>• Herd has above average calf mortality (e.g., 20 percent)</li> <li>• Cash flow is of some concern</li> <li>• Equity:Debt ratio is somewhat low</li> <li>• Need a rather high rate of return on investment</li> <li>• Must recover investment cost in less than eight years</li> </ul>
.1	<ul style="list-style-type: none"> <li>• Herd has serious problem with reproduction (three or more services per conception)</li> <li>• Herd has a high rate of calf mortality</li> <li>• Farm has severe cash flow problem and must minimize semen cost</li> <li>• Financial condition is weak (i.e., low equity ratio)</li> <li>• Genetic improvement of the herd is of little interest</li> <li>• Require a high rate of return on investment</li> <li>• Require recovery of investment cost in four or five years</li> </ul>

**Table II. PTAS, semen costs, milk and fat PTA's and SV Indexes for four management factors. (Values rounded to the nearest dollar).**

Sire Number	PTAS <sup>b</sup>	PTAM	PTAF	Price\$	SV Indexes \$ <sup>a</sup>			
					Herd management factors			
					.4	.3	.2	.1
1	243	2122	77	50	47	23	-1	-26
2	199	2013	52	25	55	35	15	-5
3	184	1675	55	10	64	45	27	8
4	165	1363	55	20	46	30	13	-4
5	149	1201	50	9	51	36	21	6
6	120	664	53	14	34	22	10	-2
7	105	672	42	20	22	12	1	-10
8	88	1368	4	8	27	18	10	1
9	71	701	19	12	16	9	2	-5
10	70	254	36	5	23	16	9	2

<sup>a</sup>Semen Value Indexes \$ = (Herd Management Factor x PTA\$) - Semen Price.

<sup>b</sup>PTAS = value in \$ on market for selling a given volume of milk and fat.

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