Many dairy farmers are reluctant to use AI progeny-test young sires in their herds. After all, why use a young sire when so many good proven bulls are available? Why gamble on a young sire before you know what his progeny-test proof will be? These are good questions; therefore, let’s take a closer look at some of the genetic and economic implications of using young sires.

**Can we predict what a young sire’s proof will be before he has milking daughters?**

A frequent argument made against using a young sire is that we don’t know what his production proof will be until after he has milking daughters. This is not entirely true.

AI organizations select young sires for progeny sampling based on pedigree merit. One common measure of pedigree merit is parent average. A bull’s parent average is calculated as one-half of his sire’s Predicted Transmitting Ability (PTA) plus one-half of his dam’s PTA for a particular trait. Although parent average is a good predictor of the bull’s eventual proof, we know that some young sires will come through with proofs below their parent average, while others will come through with higher proofs. The net result is that the average proofs for a group of bulls is usually quite close to the overall average of the bulls’ parents.

How good a predictor is parent average? In Figure 1, the July 1991 USDA sire summary for Holsteins is used to compare the bulls’ PTAs for milk with their parent averages. The bulls in the comparison were born in 1985, but due to recent major changes in genetic evaluation procedures, (particularly the incorporation of the animal model in 1989) using parent averages from 1985 is not valid. Although there is some overlap between a bull’s current parent average and production proof which reduces the size of the difference, the general relationship still exists.

Figure 1 examines 158 bulls with parent averages between 950 and 1050 pounds. The average of the parent average for milk was 1000 pounds. Although all bulls had similar pedigree expectations, actual PTAs for milk ranged between -371 pounds and +1713 pounds, a difference of 2084 pounds. However, the average PTA milk for these 158 bulls is +1002 pounds, only two pounds higher than the average of the parent average. As Figure 1 shows, PTA milk values are evenly distributed above and below parent average. Using a group of young sires minimizes the risk of having daughters from only those bulls with PTA milk values below parent average.

Figure 1. Parent Average and PTA Milk distribution from July 1991 for 158 bulls born in 1985 with Parent Averages between 950 and 1050 lbs. milk.
How do proofs on young sires compare with proofs on proven bulls that were available at the same time the young sires were sampled?

As a group, little difference exists between the genetic merit of young sires and the genetic merit of the Active AI bulls that were available at the same time the progeny-tested bulls were sampled.

Figure 2 lists the PTA Milk average for AI progeny-test young sires and Active AI proven bulls used in the years 1971-1984. The averages were calculated using the bulls’ January 1988 PTA milk proofs. The results indicate that dairy farmers not using proven bulls from at least the 50th percentile or higher could possibly make faster genetic progress by using young sires in their herds.

Dairy farmers should also consider that the average genetic merit of AI progeny-test bulls is substantially higher than the average genetic merit of natural service bulls. First-time proofs on AI progeny-sampled bulls were $106 higher for PTA$ Protein than first-time proofs on non-AI bulls in July 1991. This means that daughters of AI young sires are expected to generate an additional $106 of income (305-2x-ME basis) per lactation compared to daughters of young, non-AI bulls. Over the course of three lactations, average daughters of AI young sires would generate approximately $300 additional income per daughter from milk sales compared to average daughters of natural service bulls.

Figure 2. PTA Milk average (January 1988) for Active AI sires and AI progeny test bulls used in years 1971-1984.*

How heavily can young sires be used in a herd?

What are the risks associated with breeding a large portion of the herd to young sires? A research herd in North Carolina has been breeding a part of the herd to 100 percent young sires since 1971. The bulls were the highest genetic merit young sires available based upon pedigree. Simultaneously, another portion of the herd was bred to the highest proven bulls for milk yield. Average Estimated Real Producing Abilities of cows sired by young bulls and proven bulls are depicted in Figure 3. As reported previously in the USDA study, little difference exists in the genetic merit of cows sired by the young sires and the proven bulls. Average production for the two groups has been essentially equal. A preliminary study on the proportion of daughters surviving to later lactations again showed little difference between the two groups. Overall, the performance of the cows sired by young bulls was very comparable to the performance of the cows sired by proven bulls.

Although dairy farmers may be reluctant to breed 100 percent of their herds to young sires, almost any dairy farmer can confidently breed 25 percent or more to them. The key is to use a few units of semen on many different bulls rather than many units of semen on a few bulls. Do not use more than ten units of semen from any one young sire. Since about six units of semen are needed to get a milking daughter, using ten units of semen or less on a bull should normally result in only one or two milking daughters of the bull. Milking ten daughters from ten different young sires is a far safer bet than milking ten daughters from just one young sire, as demonstrated in Figure 1. Consequently, if a young sire comes through with a poor proof, you have only one milking daughter from this bull, rather than ten.

Even if a young bull has an outstanding pedigree, don’t get caught up in his credentials and breed a large portion of your herd to him. Research shows that elite sampler bulls have no better track records than other progeny-test bulls in the stud. The safest and simplest approach is to use a few units of semen from a randomly selected group of young sires.

Additional economic considerations

Young sire semen usually costs $3 or less per unit—almost always less than semen from proven bulls. Additionally, most AI organizations provide various incentive payments to dairy farmers participating in their stud’s progeny test programs. For example, payment for identifying daughters might be $5 per daughter, and payment for first milking daughters could be $20 or more per daughter. You might also get preferred access to bulls with limited semen supply or discounts on semen of proven bulls.

The information in Table 1 compares sample costs of breeding a portion of the herd to young sires rather than proven bulls. In this example herd of 80 cows, semen costs and incentive payments resulted in a savings of $550 per year when 25 percent of the herd was bred to young sires rather than proven bulls.

Table 1. Sample costs when breeding 25% of herd to AI progeny test bulls rather than average AI proven bulls.

<table>
<thead>
<tr>
<th>Assumptions:</th>
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<tbody>
<tr>
<td><strong>Semen cost, young sires</strong></td>
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<tr>
<td><strong>Semen cost, proven bulls</strong></td>
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<tr>
<td><strong>Percent of heifers born that enter milking string</strong></td>
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<tr>
<td><strong>Heifer identification incentive payment</strong></td>
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<tr>
<td><strong>First milking daughter incentive payment</strong></td>
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<td><strong>TOTAL</strong></td>
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**Young Sires**  **Proven Sires**

- $80
- $400
- $0
- $0

Cost advantage of using young sires per year: $550
Semen costs should always be taken into consideration when selecting sires to use in the herd. Because of the low semen price and high genetic merit, all dairy farmers should consider using young sires. Dairy farmers who want to improve cash flow can take particular advantage of the low-cost semen and incentive payments. Under no circumstances should a natural service sire be used as a method of saving money on the semen bill.

Summary
After looking at the facts, dairy farmers may safely conclude that the genetic and economic advantages of incorporating AI young sires into a breeding program compare very favorably to using AI proven bulls. The main points to remember are summarized below:

1. The average genetic merit of AI progeny-test bulls is comparable to the average genetic merit of Active AI bulls available at the same time.
2. When using young sires, use a few units of semen from many different bulls rather than many units of semen from any one bull.
3. Consider breeding 25 percent or more of the herd to AI progeny-test young bulls.
4. Take advantage of the low semen cost and incentive payments offered by most AI progeny sampling programs.

References
