

## Service sire conception rate – SCR

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Bull fertility evaluations called Estimated Relative Conception Rate (ERCR) were provided to the industry by Dairy Records Management Systems (DRMS) from 1986 to November 2005. In May 2006, AIPL assumed responsibility for evaluation of U.S. bull fertility. As an initial step, AIPL implemented the ERCR evaluation as previously computed by DRMS. Since 2006, the scope of the data was broadened from regional to national, and the model and edits were improved to increase reliability. Those efforts are ready for implementation for August 2008. The new evaluation will be called Sire Conception Rate (SCR) and will be based on conception rate rather than non-return rate. SCR will also utilize multiple services per lactation (up to 7), rather than first service only. Data will be primarily from 3 of the 4 major DRPCs, which is also an enhancement relative to previous evaluations. For the sake of improving reliability, the evaluation will also utilize what has been called an "expanded service sire term." This involves estimating components affecting bull fertility separately and then formulating the prediction as a sum of the components. In contrast to ERCR, SCR will be reported with one decimal. Evaluations will be expressed as deviations from the overall mean; an SCR of 1.2, for example, means that the bull is 1.2% above average, -1.2 would mean he is 1.2% below average, and 0.0 would mean he is average. All 6 traditional U.S. dairy breeds will be evaluated, provided sufficient data are available. To be publishable, a bull must have an AI status other than inactive and cannot be more than 13 years old. Holstein bulls must have at least 300 total breedings, 100 breedings in the most recent 12 months, and at least 10 herds. Minimum number of matings and herds are somewhat less for the other breeds, in order to allow for more publishable bulls. For more details, refer to <http://aipl.arsusda.gov/reference/arr-scr1.htm>.

**Starting in August 2008, sire conception rate (SCR)**, a new and more accurate evaluation of the fertility of artificial-insemination (AI) service-sire fertility will be available to dairy producers from USDA. From 1986 to November 2005, bull fertility evaluations termed estimated relative conception rate (**ERCR**) were provided to the dairy industry by [Dairy Records Management Systems \(DRMS\)](#) (Raleigh, NC). In May 2006, USDA's Animal Improvement Programs Laboratory assumed responsibility for phenotypic evaluation of U.S. bull fertility. As an initial step, ERCR evaluations were implemented without change in calculating methods.

Over the next 4 years, an intense research effort primarily by Dr. Melvin Kuhn was made to develop methods that would improve the accuracy of bull fertility evaluations as well as broaden the scope of the data used for those evaluations. Those studies can be roughly categorized into two approaches. First, factors were identified that were related to the bull that provided the unit of semen and that helped to improve the prediction of whether that unit of semen resulted in a pregnancy. Second, factors were identified that were related to the cow receiving the unit of semen and that distorted the fertility measure for the bull providing the semen (nuisance variables); those nuisance variables were removed to allow obtaining the best measure of the bull's success in impregnating the cow.

Which factors associated with service sire contribute to SCR?	Which nuisance variables are removed to improve SCR?
<ul style="list-style-type: none"> <li>• Inbreeding of the bull</li> <li>• Inbreeding of the embryo from the mating</li> <li>• Age of the bull</li> <li>• AI organization combined with year of the mating</li> <li>• Effect of the bull itself</li> </ul>	<ul style="list-style-type: none"> <li>• Group effect of cow herd, year of mating, cow lactation number, and cow registry status</li> <li>• Month and year of mating combined with State in which mating occurred</li> <li>• Lactation number of the cow</li> <li>• Service number</li> <li>• Effect of having a short interval between matings</li> <li>• Age of the cow</li> <li>• Standardized milk yield of the cow</li> <li>• Effect of the cow (both permanent environmental and genetic)</li> </ul>

## Comparison of ERCR and SCR

Category	ERCR	SCR
Trait evaluated	First service 70-day nonreturn rate	Conception rate
Breeds evaluated	Holstein, Jersey	Ayrshire, Brown Swiss, Guernsey, Holstein, Jersey, Milking Shorthorn
Lactation numbers included	All lactation numbers with 6th and above set to 6th	1st through 5th
Service numbers included	1st	1st through 7th
Bulls included	AI, <12 years old	AI (not inactive,) <14 years old
Minimum number of matings	≥300 first services	≥300 services in the last 4 years and ≥100 in the last year for Holsteins; somewhat fewer services for other breeds
Minimum number of herds	None	10
Fertility expression	Deviation from mean (nearest 1%)	Deviation from mean (nearest 0.1%)
Base assigned	Published bulls sum to 0	Published bulls sum to 0
Dairy records processing centers participating	<a href="#">AgSource Cooperative Services</a> , <a href="#">DRMS</a> , <a href="#">Minnesota Dairy Herd Improvement Association</a>	<a href="#">AgriTech Analytics</a> , <a href="#">AgSource Cooperative Services</a> , <a href="#">DRMS</a>

## Interpretation of SCR

How SCR evaluations should be used remains largely unchanged from how ERCR evaluations were used. Technically, 70-day nonreturn rate and conception rate differ in that conception rate is based on confirmed pregnancy. However, the two traits are highly related when derived from the same cows. A bull with an SCR of 2.0% is expected to produce a conception rate of 32% in a herd that normally averages 30% and historically has used average CR bulls. The term “expected” indicates what the results would be if based on extremely large numbers of matings. Obviously, a herd with only two inseminations to that bull could realize only a conception rate of 0, 50, or 100% for his matings.

## Improved accuracy

The addition of more inseminations for calculation of SCR is one of the main reasons for the higher accuracy compared with ERCR. Not only are more services (2nd through 7th) being used from the same herds, which approximately tripled the data, but new large herds are now included, specifically from [AgriTech Analytics](#) (Visalia, CA). In addition to incorporating many desirable features of ERCR, SCR also includes a number of new benefits that have been shown to improve accuracy of predicting conception rate for an independent data set.

## ABS Statement on Fertility

ABS Global has a universal reputation for producing and marketing highly fertile semen in both ½ ml and ¼ ml straws. ABS has always endorsed the critical importance of semen fertility, while recognizing that management and environment and female fertility have a much greater influence on conception rates.

We encourage dairy producers to base their decisions on semen fertility using all of the information available and note that accurate fertility comparisons require thousands of breedings to properly evaluate. ABS recognizes Agri-Tech Analytics (ATA) sire fertility evaluations and incorporates both evaluations when determining ABS Pregnancy Kings.

**ABS encourages dairy producers to use ABS Pregnancy Kings when selecting sires based on semen fertility.**