

JerseyMate™: Delivering A New Level of Service

Is it too much to ask a mating program to increase production, improve functional type, and control inbreeding—all at the same time?

Not if that program is JerseyMate™, the next level in mating services and available now from the American Jersey Cattle Association.

The reason for using a mating program has always been to develop a herd that's going to be better tomorrow than it is today. That means a herd in which each generation is more productive, has better conformation, and lives longer—in short, one that can be more profitable.

Services like the Jersey Mating Program, which was introduced in 1986, were designed to meet such goals. They also made it easier to control the cost of semen and to avoid building up unwanted inventories, not to mention the time saved in not having to continually sort through bull proofs and cow information.

The Jersey Mating Program was one of the first to also consider inbreeding when making its mating recommendations. But what was a "mere" concern in 1986 is now a significant problem throughout Jersey herds in the United States (see Figure 1). Recent research at the University of Wisconsin, and partially funded by the AJCC Research Foundation, revealed that improvements could be made in accounting for the effects of inbreeding in a mating program designed for Jerseys.

That study was conducted by Kent A. Weigel and published in the October, 1999 issue of *Jersey Journal*. He concluded that the most effective way to reduce inbreeding while continuing to improve production was to apply a discount for economic losses associated with inbreeding to the expected lifetime net profit per heifer calf. In calculating the extent of inbreeding, Weigel noted a problem area: "If pedigrees are incomplete, inbreeding coefficients will be

erroneous." He added, "Many commercial mating programs consider only one or two recent generations of pedigree data [and] incomplete pedigrees for service sires can lead to ridiculous results." His conclusion? "It is extremely important to have complete historical pedigree data."

extent of inbreeding in a potential mating.

Then, \$20 for each 1% inbreeding is subtracted from the estimated lifetime net income for that calf.

Professor Ronald E. Pearson of Virginia Tech, who consulted with AJCA staff in the redesign of the mating program, illustrates this basic feature in the example presented in Table 1 (below).

Matings of Cow 1 to three bulls of different genetic merit are calculated. The inbreeding level of the future calf varies from under 3% to 20%. Each mating is then discounted by \$20 for each 1% inbreeding (from -\$46 for Sire A, and up to -\$400 for Sire C, who is closely related to Cow 1).

"This is an extreme example intended to show the maximum impact of the inbreeding adjustment," Pearson notes. "Sire A had the calf with the lowest Mating Index before adjustment, but the highest after adjustment."

JerseyMate™ would recommend Sire A as the mating sire for this cow. As Pearson points out, "Inbreeding may cost so much that optimum matings may come from use of bulls with 'less profitable' daughters if they result in lower inbreeding."

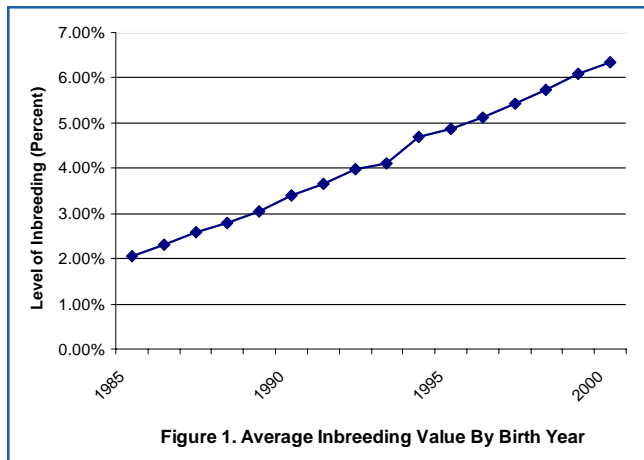
Are there other new features?

JerseyMate™ gives you mate suggestions under three different options for each cow and heifer, within the constraints placed upon the program (for example, limits you set on use of particular bulls). These options are called *Balance*, *Corrective Mating*, and *Inbreeding Control*.

Note the phrase "mating options." JerseyMate™ does not make first, second, and third choice recommendations. Instead, it provides three mating suggestions. Each of them addresses a unique goal or need.

How are they different?

JerseyMate™ provides a *Balance* mating suggestion that maximizes herd profit by optimizing inbreeding. The mating recommendations balance expected lifetime profit



In light of these findings, and also requests from Jersey breeders nationwide for program improvements, the AJCA Board of Directors directed the staff in March of 2000 to redesign and reprogram the mating program.

The headline says "a new level of service." What's new and better about JerseyMate™?

JerseyMate™ accounts for the cost of inbreeding depression when mating service sires with cows and heifers better than any other mating program in the industry. It does this in two steps.

First, the program uses eight generations of ancestors (510 in all) to calculate the inbreeding level for each potential calf. No other mating program can even come close to that when estimating the

Table 1. Effect of three levels of inbreeding upon calculation of Adjusted Mating Index in JerseyMate™ program.

Cow 1 x	Mating Index (PA for milk value and type traits)	Inbreeding percentage of calf	Discount for Inbreeding	Adjusted Mating Index
Sire A	\$ 847	2.3%	-\$ 46	\$ 801
Sire B	905	12.8%	- 256	649
Sire C	1,002	20.0%	- 400	602

against losses due to inbreeding.

The second set of recommendations is called the *Corrective Mating* option. The idea is to focus more closely on improving the physical traits that allow the future calves to stay in the herd longer.

The final set of recommendations does one thing. The *Inbreeding Control* option minimizes inbreeding across all matings.

How do I begin using JerseyMate™?

Provide an inventory of the cows and/or heifers you want to be mated. A registration number is required for each animal before they can be mated. Submit that list of cows and/or heifers to the email hotline: JerseyMate@USJersey.com. You can also fax, mail, or call in your list over the telephone.

If your herd is enrolled on REAP, TPE or STEP, we can generate the list of cows to mate from your DRPC records and the heifers from the AJCA's database. The cows will be selected by their calving dates and last breeding date within a three-month time frame corresponding with the USDA genetic evaluations. You can increase, or reduce, that time frame; for example, a four- or six-month interval might work best for you.

Getting a list of heifers is just as easy, if your registrations are current. All heifers in the ownership of customer numbers associated with your herd can be sorted from the AJCA database, and then selected according to birthdates. The default is to select heifers between nine (9) and 18 months of age. Again, you can change the age ranges as you want to.

How do I specify the bulls I want to use?

It is as simple as making a list of the bulls with their registration numbers and/or NAAB stud codes, then sending it in.

You can list the bulls currently in your semen inventory, and add to it bulls that are not in active A.I. service, and even unproven bulls. If there are definite amounts of semen to be used, then make a note of it on the list. For example, you may have 25 units of a bull. If you specify that, it will be used up.

You can also just use the program's default list of bulls. That group is the 50 highest Active A.I. sires ranked by Production Type Index (PTI). If you want to use the top 50 bulls ranked by another index, all you need to do is specify how

they are to be ranked (by PTA protein, or Cheese Merit dollars, Net Merit dollars, or Fluid Merit dollars). Even if you start with this list, you can revise it. For example, you might decide to delete one or two specific bulls, and add a bull that's not in A.I. to the list.

JerseyMate™ is programmed to make no more than 15% of the matings to one bull. That has been done in order to increase the diversity in the mating recommendations. But, you can override that limit if desired.



What are the steps in producing mating recommendations?

The program that JerseyMate™ runs starts by calculating a Mating Index (MI) for each bull-cow combination, then adjusts it for inbreeding depression.

The Mating Index is a prediction of relative lifetime profit for each potential calf, using genetic evaluations for milk, fat, protein, linear type traits, productive life (PL), and somatic cell score (SCS). The values for milk, fat, and protein are the ones used in most Federal Orders (and also by USDA in calculation of Net Merit dollars):

$$\text{Milk Value} = .010 \text{ PTA milk} + 1.15 \text{ PTA fat} + 2.55 \text{ PTA protein}$$

It's worth noting at this point how many different calculations will be made each time JerseyMate™ is run. For example, you might mate 50 cows and heifers to a group of 20 different service sires. The computer is going to produce 20 different Mating Indexes for each cow, each representing a potential calf sired by each bull. Thus, 1,000 different matings are being considered.

In the second step, the inbreeding level

is calculated for each one of those 1,000 potential calves. The percentage of inbreeding is multiplied by \$20, then subtracted from the Mating Index (the estimate of lifetime net profit).

The result is termed the Adjusted Mating Index, previously illustrated in the Table 1 example.

What happens with the Adjusted Mating Indexes?

For each cow, the 10 bull combinations with the highest Adjusted Mating Indexes are selected and ranked. This is the first step in the process of producing mating recommendations for each of the Balance, Corrective Mating, and Inbreeding Control options.

Tell me how each suggestion is made.

Let's begin with the Balance option. The suggested matings are those that produce the highest Adjusted Mating Index calves. There's a special feature to this option, however. When bulls are used for 15% of all matings, they are having maximum economic impact. So, the program optimizes their use. It mates them to produce calves with the lowest possible inbreeding level.

Turn the page and look at Table 2. This shows the top 10 Adjusted Mating Indexes calculated for Cow 1. The Balance mating suggestion is to Bull K, because he produced the highest Adjusted Mating Index for this cow: \$1,329.38.

Matings for the Inbreeding Control option are selected by starting with the lowest inbreeding level calves until the semen allocation for a bull is used up. The program then selects the next lowest inbreeding mating choice until all cows are mated.

Thus, Sire L is the Inbreeding Control recommendation for Cow 1. The inbreeding level of his potential calf is 4.12% (see Table 2).

For the Corrective Mating recommendation, an index is created that combines bull and cow genetic evaluations for a group of functional traits, then finds the mating for each cow that maximizes productive life. Bulls used at the 15% level are mated in order to produce calves with the highest Corrective Mating Index. The rest of the matings will be to the bulls that produce the highest Mating Index calves.

In Table 2, the highest index for correc-

Table 2. Example of 10 highest Adjusted Mating Indexes for one cow with Parent Averages, Inbreeding level, and Corrective Mating Index for each potential mating.

POTENTIAL MATING	PARENT AVERAGE							INBREEDING %	ADJUSTED MATING INDEX	CORRECTIVE MATING INDEX
	MILK	FAT	PROT	CM\$	NM\$	FM\$	PTI			
Cow 1 x										
Sire K	1127	39	43	346	364	285	221	4.97	\$1329.38	0.47
Sire L	1156	35	42	350	365	301	228	4.12	1247.32	0.50
Sire U	928	42	42	323	349	231	224	5.21	1207.71	0.44
Sire T	1144	51	33	323	323	336	210	7.16	1152.72	0.49
Sire A	1216	50	38	321	328	310	213	6.57	1095.18	0.28
Sire M	782	40	32	284	301	223	184	5.09	1093.09	0.30
Sire Z	862	39	33	314	328	267	200	5.04	1073.38	0.64
Sire R	1010	32	39	307	324	249	200	5.29	1070.92	0.34
Sire E	666	43	36	295	322	189	203	5.04	1061.46	0.47
Sire J	965	36	34	317	328	288	207	7.23	1051.84	0.58

tive mating of Cow 1 is to Sire Z (0.64).

Can a bull be suggested for more than one option?

Yes. The same sire can be the recommended mate for two, or even all three options.

What kind of reports will I receive, and when?

Two reports will be provided. One is a summary of the semen purchase plan. It will also list the mating averages for each option. The other report will list the actual mating suggestions, with Parent Averages, the inbreeding level of each mating, and the lifetime profit estimate.

Reports will be available the next business day. You will be able to receive them by email, download them from the AJCA website (www.infoJersey.com), or have printed copies sent by mail.

And I could pick the Balance mating for some cows, the Inbreeding mating for another group, and the Corrective Mating option for the rest of my cows?

Yes. If you do, be sure to recalculate how much semen you will need from each bull, because that will not be on the semen purchase plan.

What else do I need to know?

JerseyMate™ is a *herd* mating program. When you receive the mating suggestions for a fairly large number of cows and heifers—say, 25, 40, 100 or more—there may be a few suggestions on the print-out that at first glance do not seem “quite right.”

Here’s an example.

Cow 2 x	Inbreeding percentage of calf	Adjusted Mating Index
Balance: Bull T	4.58%	\$1274.15
Corrective: Bull U	6.31%	1143.34
Inbreeding: Bull V	5.33%	1094.46

You notice right away that the Inbreeding Control mating has an inbreeding level *greater* than the inbreeding level for the Balance suggestion. Your question is, “Why wasn’t Bull T recommended for both the Balance and Inbreeding matings?”

The program sorts out the suggestions for each option separately. In other words, the Balance suggestions are produced on one run. Then the computer goes back and produces the Corrective Mating suggestions. In a third pass, it makes the Inbreeding Control suggestions. The program doesn’t “remember” what recommendations were made for a previous set.

The most likely answer to your questions, then, is that the semen allocation had been used up for Bull T when the Inbreeding Control recommendations were made. The program had to select the second lowest inbreeding mating as the mating recommendation.

The most important point is this. The factors that are combining to constrain the mating recommendations are not obvious just by looking at the print-out. Keep in mind that a rather large set of factors are influencing the final result. Depending upon what these factors are, some may be mutually exclusive.

When you have questions about JerseyMate™ results, you are encouraged

to review them with Cari Wolfe, Director of Research and Genetic Development.

How much return can I expect from using JerseyMate™?

It is a highly cost-effective service. For an investment of \$2 per mating, the Net Present Value is \$20 per heifer calf, assuming a 9% interest rate and three lactations in your herd.

Is JerseyMate™ included in the REAP package?

Yes. There is no extra charge for using the mating service up to four times a year.

I’m not enrolled on REAP. Can I use JerseyMate™?

Certainly. JerseyMate™ is offered by subscription to other herds. Herds enrolled on TPE and STEP will be charged a per-cow fee. All others will be charged a herd set-up fee, plus a fee per cow mated.

If you are not enrolled on REAP, this may be a good time to consider it. Anyone wanting the full benefits of JerseyMate™ must have their Jerseys registered and have them on production test and scored for type. The most cost-effective way to register, evaluate production and functional type, and mate Jerseys is to enroll in the REAP program.

What I’d also like to do is make just one mating and get the results right now on the InfoJersey website.

Enhancements are planned to make JerseyMate™ more accessible on the Web, and more flexible to handle single matings online. Start using the service now, and give us your feedback for improvements at JerseyMate@USJersey.com.