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PRESIDENT’S COLUMN

Travails, Travels, and Kudos

Visiting the Holstein industry in other countries is an eye opener

It’s a third of the way through January and not much winter has been here in the Northeast yet. Our thoughts and prayers go to our fellow dairymen in the Southwest and others affected by Goliath’s flooding and blizzard conditions of this late December.

Congratulations to our membership and the Holstein USA staff—over 380,000 new registrations in 2015. This is 80,000 more than just ten years ago—great job! Many of these were through the Holstein COMPLETE program. I am sure you have heard that after more than ten years of no price increase there will be a slight one this year, but not for those using Holstein COMPLETE. This continues to be a great investment for our membership.

I have recently had the opportunity, with Foreign Agricultural Service funding, to travel to both Japan and Mexico. In October, I went to Japan’s National Show. This show was held in Hokkaido and had cattle representation from the entire country. Japan is approximately 1,200 miles in length, so many of the cattle traveled by both boat and trailer to get there. The Japanese were most gracious hosts and are very committed to the use of North American genetics.

I had the opportunity to visit several farms while there. Along with Holstein Canada President John Buckley and CEO Ann Louise Carson, we visited Nakata Farm in Ebetsu, near Sapporo. This farm is run by Kazutaka Nakata and his son. Using the prefix Midfield, this farm has a 40-cow tie barn and freestall heifer and pen barn. They raise all their roughage and feed. We saw milking Goldwyns, Toystorys, Moguls, Dempseys, Atwoods, and others. Then we saw heifer pens with four to five Doormans and four to five Defenders, a dozen McCutchens, and other daughters of recent bulls.

Many others from North America were there, including Dr. Stan Henderson from CalPoly, who judged showmanship at the show and did a demonstration in the center of Sapporo. Pat Maddox, an HAUSA board member, came with a trainee who came to Ruann Dairy 40 years ago and stayed. Many others involved in our industry were at the show.

In December, I, along with HAUSA national sales manager Steve Peterson, went to Quertero, Mexico, for the Holstein de Mexico annual meeting and show. Holstein USA provided the judge, Nathan Thomas. Our good friend Felipe Ruiz was an outstanding host, having his daughter interpret for us at the annual meeting.

The show was of great quality, especially at the top end. Two Goldwyn four-year-olds were Grand and Reserve; two Sid three-year-olds were Intermediates. I presented our trophy to the Premier Breeder. The competitiveness of the show is only outdone by the graciousness and hospitality of the breeders after it’s over. This market is a great trading partner with us, as many cattle from the U.S. are not only at the show but also in dairy barns in Mexico. Having said that, their economy right now is not good because the state-owned petroleum business is very depressed with such low oil prices. I noticed today that, in mid-January, the wholesale price of home heating oil is 99 cents a gallon at the terminal.

Prior to show day, Felipe took Steve and myself to several dairies. One was very modern, with a brand-new 80-cow carousel; another was a newly constructed conventional parlor. This was an exceptional trip. We met many North Americans there, including H. John Meyer and his son, John, who have exported many U.S. cattle to Mexico.

These trips to our fellow Holstein Association meetings and shows are very valuable to our relationships with these countries. We did, however, sacrifice several blue agave plants while in Mexico.

Our board of directors had a great meeting in California, which included a trip to Agritech Analytics and several outstanding dairies in the Fresno area. On the night of Nov. 18, the MLA with the Council on Dairy Cattle Breeding (CDCB) was signed and as of Dec. 2015, the CDCB was weaned and on its own. Now we need to be vigilant in having their main goal be to provide an unbiased and accurate U.S. genetic evaluation for our dairymen. A topic within the CDCB that has generated quite a bit of discussion is the use of genomics to determine the percentage of breed-based representation. The accuracy of this value is plus or minus 4 percentage points. While not too useful for our Purebred Registered Holstein®, we are learning that it may be a necessary piece of information for some other breeds. Rest assured, our members’ best interests will guide our role in these decisions.

Also on my mind...December milk price again led by high fat value...still concerned about loss of so much export market...no third party can do it….we only need to remember how perishable milk is; the last pound prices it all….1 percent overproduction costs dairymen a minimum of 30 percent of its value.

And as Columbo used to say “Oh, just one more thing:” Milk protein has become a byproduct. To get more butterfat we skim, leaving skim milk powder, a world commodity. Why don’t we label the amount of protein in regular milk? For example, “contains 3.2% protein,” and recognize its presence to create a value. Any thoughts? 🤔

— Gordie Cook is President of Holstein Association USA, Inc.
On the Cover
California dairy producer Mike Santos Jr. speeds up improvement of his Registered Holstein® herd with genomics.

Terra Linda Dairy milks 3X in a double-25 parallel parlor.

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Dam of Merit℠, Elite Performer™, Gold Medal Dam℠, Holstein COMPLETE®, Official Holstein Pedigree™, Progressive Breeders Registry℠, Progressive Genetics Herd℠, Red Book Plus/MultiMate™, Registered Holsteins®, TPI® and all variations, and TriStar℠ are all servicemarks of Holstein Association USA, Inc. Enlight® is a trademark of Holstein Association USA, Inc. and Zoetis LLC.
Do the Right Thing—
Transfer Your Holsteins

It’s important to our breed integrity that owners transfer animals properly

Transfer of ownership of Registered Holsteins® is crucial to the continuation of lineage recorded in the Holstein Association USA, Inc. herdbook. The responsibility of the transfer of ownership is clearly spelled out in two official documents of the Association.

First, in the constitution and bylaws of Holstein Association USA, Inc. as revised and amended June 28, 2014.

Transfers and Fees ART. IV, SEC 26
The transfer policy and fees are established by the Board of Directors. Any change in the fee requires the approval by a vote of two-thirds of the voting members of the Board of Directors. It is the duty of members to adhere to Board Transfer policy.

Second, in the transfer policy, as approved November 20, 2009.

Transfer Policy
It is the principal responsibility of the owner of record (or authorized agent or sale manager), within 30 days of the date of sale of Registered Holstein®, to submit a completed application for transfer and to pay the fee for said transfer. Every transfer of an animal or embryo will be taken as a guarantee of the owner of record that all matters stated in the application are true. The date of transfer must be the date of sale.

Applications for transfer can be recorded without signatures unless the recorded owner requires signatures on applications for transfer of animals or embryos. Both buyer and seller will be notified that a transfer has been recorded. If it is later determined that a transfer of ownership did not take place, reasonable effort will be made to give notice to the parties and Holstein Association USA records will be corrected.

Discretion will be used in determining the amount of effort to be made in identifying intervening ownerships and collection intervening transfer fees.

As you can see, the constitution states it is the duty of members to adhere to the board transfer policy, which says transfers are the principal responsibility of the owner of record, agent, or sales manager.

This should not be taken lightly. If you are a member in good standing of the Holstein Association, you are obligated to adhere to its rules. Furthermore, if you are a true believer in the superiority of Registered Holsteins and have benefited from their value and the registration certificate that represents your breed, you should gladly complete the transfer process when selling Registered Holstein genetics.

The Holstein Association has reduced the cost to very affordable levels, as you can see by the following fee schedule:

<table>
<thead>
<tr>
<th>Type of Transfer</th>
<th>Fee</th>
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<tbody>
<tr>
<td><strong>Regular</strong></td>
<td></td>
</tr>
<tr>
<td>Within 30 days of sale</td>
<td>$10.00</td>
</tr>
<tr>
<td>Within 31 to 60 days of sale</td>
<td>$12.50</td>
</tr>
<tr>
<td>More than 60 days</td>
<td>$15.00</td>
</tr>
<tr>
<td>No sale/Within family</td>
<td>$5.00</td>
</tr>
<tr>
<td>Three-generation pedigree</td>
<td>Free</td>
</tr>
<tr>
<td>Rush transfer service fee</td>
<td>$10.00</td>
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<tr>
<td>Transfer of embryos</td>
<td>$10.00</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Transfer</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole herd</strong></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>$100.00</td>
</tr>
<tr>
<td>Non-family:</td>
<td></td>
</tr>
<tr>
<td>First 200 animal</td>
<td>$100 plus $2 per animal</td>
</tr>
<tr>
<td>201-1,000</td>
<td>$1.50 per animal</td>
</tr>
<tr>
<td>1,001-3,000</td>
<td>$1 per animal</td>
</tr>
<tr>
<td>3,001+</td>
<td>No charge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Transfer</th>
<th>Fee</th>
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</thead>
<tbody>
<tr>
<td><strong>Partial herd</strong></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>$100 plus $1.50 per animal</td>
</tr>
<tr>
<td>Non-family</td>
<td>$100 plus $4 per animal</td>
</tr>
</tbody>
</table>

If you need help with the transfer process, call your regional sales representative, or the Holstein office at 800.952.5200. We are eager to help you!

Transfers are the only way to continue the legacy of breeding Registered Holsteins you have started. Transfers are also an excellent way to help develop interest from new members. Show new members the value of Registered Holsteins by transferring ownership at the time of sale. Help these new members cultivate their interest in Registered Holsteins.

This will not only make them more profitable, but their interest will help continue the future of Registered Holsteins. Do the right thing—transfer ownership of Registered Holsteins you sell.

Find more information on our website at www.holsteinusa.com/animal_id/transfer.html.

—Steve Peterson is national sales manager for Holstein Association USA, Inc.
Despite the challenges facing members in 2015, your Holstein Association saw growth in key programs. The expansion of the U.S. Registered Holstein® herd continued in 2015, as members registered 382,990 animals. This exceeds the 2014 total by 9,934 head or three percent, when 373,056 were registered. Many thanks to all of you for your role in accomplishing this feat!

By comparison, ten years ago in 2005, we registered 301,852 Holsteins. In 2004, 293,527 animals were registered and back in 2003, the number was 288,841.

The consistent growth of the Holstein breed over the last ten years is significant. Generally, it is difficult for the major player in any market to achieve this type of gain year in and year out. Increasing Holstein registrations by 81,138 head in ten years and 94,149 animals in 12 years is an outstanding accomplishment.

In addition to the 382,990 animals registered, you identified 198,876 Holsteins through the Basic ID program, a stepping stone to full registry status. All told, you identified 581,866 Holsteins in 2015.

Holstein COMPLETE® enrollment in 2015 totaled 311,677 cows. This represents a five percent increase over the previous year. As you know, the Holstein COMPLETE program is a valuable, convenient package which integrates membership, registration, classification, mating information, pedigrees, production records, and genetic reports. If you’d like to find out more about COMPLETE, please visit with your Holstein Association regional sales representative.

Our classification team evaluated 218,256 cows in the regular classification program in 2015. There were 74,814 head appraised in the SET™ program last year.

Enthusiasm for the Holstein Association continues. We welcomed 550 new adult members to the Association in 2015 and 852 new junior members joined our ranks last year.

The number of genomic tests run on Holsteins is soaring! Last year, 285,458 genomic tests were performed and recorded on Holstein females and 31,162 on Holstein males. Since we started tracking genomic testing back in 2008, there have been 1,054,743 genomic tests performed and recorded on Holstein cattle. By comparison, there have been just 138,043 genomic tests performed and recorded on the next largest dairy breed in the United States.

Moreover, the huge advantage in number of genomic tests run on Holsteins will further distance the gap between our beloved black-and-white cow and other breeds. It is clear to see why Holsteins are the United States’ and world’s most efficient and prominent dairy breed.

AgriTech Analytics–ATA–had strong growth in 2015. We processed cow records on over 982,000 cows, a healthy increase of 24,506 head, or three percent over 2014.

Increasing Holstein registrations by 81,138 head in ten years and 94,149 animals in 12 years is an outstanding accomplishment.

Your dedication to the Holstein cow, far and away the world’s most popular dairy breed and the most iconic symbol in agriculture, is the catalyst of our growth. Looking ahead, the future for the Registered Holstein cow and her owners is bright.

Prepare your nominations

As we look forward to the 2016 National Holstein Convention to be held in Saratoga Springs, New York, June 27 - July 1, our thoughts turn to the Elite Breeder, Distinguished Leadership, and Distinguished Young Holstein Breeder awards which will be presented at the convention banquet.

Let me take this opportunity to encourage you to nominate deserving individuals from each of your home states for these prestigious awards. All of us know of many worthy candidates, and we urge you to take a few minutes to nominate them.

Application and nomination forms are available online and are due February 26 for all three awards. The Elite Breeder and Distinguished Leadership awards are considered for three years after submittal. Award winners are featured on the Wall of Fame at Holstein Association USA headquarters in Brattleboro, Vermont. Please see more on page 8.

I look forward to seeing you in New York.

— John M. Meyer

is Chief Executive Officer of Holstein Association USA, Inc.
Mike Santos Jr. is proud of being a fourth-generation dairy farmer. That pride shines through when he shows a 1930 photo of his grandfather, Manuel Santos Jr., and his family, hanging on the office wall at Terra Linda Dairy.

It's the same farm in Tulare, California, where Mike, his father, Mike Sr., and brother Craig dairy today. But much has changed too. Good genetics and modern management have increased the dairy herd from about 25 head to 1,400 cows, milking and dry, and 1,600 replacements, all Registered Holsteins®. A rolling herd average of 30,525 pounds of milk [ECM], 1,086 pounds of fat, and 888 pounds of protein makes Terra Linda Dairy one of the highest-producing herds in the country's top dairy county.

As partners in the dairy, Mike Jr. works with the cows, Craig does the farming, and Mike Sr. oversees the operation. They milk 3X in a double-25 parallel parlor, built ten years ago along with their freestall barn. Their original milking barn, a double-13 herringbone which now milks the hospital group, was built in 1972 when Manuel Jr. and his brother John Santos decided to split the farm as the family grew.

Managing with Genomics

Genomic testing is standard on Terra Linda's heifers today. But it was only in 2014 that Mike Jr. started testing. “That year we did our first group, and one was a 2676 GTPI Mogul heifer out of an 86 VG Tempo out of an 85VG Bronco,” he said. Hoping to make more of a name for the dairy, they put the heifer, Linda-Terra Mogul 2074, into the 2015 Pride of Washington Sale. She brought the highest price of the day, $97,000, from ABS Global.

Since then, Mike has been testing almost all heifers when they come back from the calf ranch, at four to five months old. “A long time ago we decided to become a purebred herd in a commercial setting,” he said. “The goal is to take the top GTPI, and influence and speed up improvement of our herd.” He's using the results to make breeding and culling decisions to fine-tune the herd. He uses the Enlight® program online for management decisions. He is also doing IVF work, with an eye to building an on-farm IVF facility soon. He is currently using the bottom 25 percent GTPI of his cows and heifers as embryo recipients.

The dairy began classifying in the 1990s and, today, scores three times a year on the COMPLETE program. The herd has 576 cows classified at 80 or above, including nine Excellents, 203 Very Goods, and 23 Very Goods in their first lactation.

Terra Linda manages its cows for maximum milk production but also to breed back quickly. “Your repro has to be good to have good milk production,” Mike Jr. said. “Nutrition is a big factor.” He feeds a twice-daily milking ration at a ratio of 54/46 concentrate to roughage, which includes alfalfa hay, corn silage, rolled corn, canola, whole cottonseed, distillers grains, bypass fat, molasses, and minerals. The dairy grows all of its own corn silage, aiming for a minimum 30 percent starch and 8 percent protein. The hay is a blend of about 54-55 TDN (total digestible nutrients) with at least 20 percent protein.

Terra Linda had the highest-producing herd in Tulare County in 2013 and 2014.
They raise 1,200 acres of alfalfa—including 75 percent of their milk-cow hay—and corn and wheat silage, as well as several hundred acres of almonds. Like other dairy producers in the San Joaquin Valley, the Santoses have been hurt by chronic drought and have had to drill six wells, at cost of $150,000-$175,000 each.

Terra Linda’s cows are housed in freestalls except hospital and maternity cows, which are housed in free pens where the close-up and fresh cows are closely monitored. Fans and sprinklers provide essential cooling from June through September. Mike Jr. uses Allflex’s SCR as a management tool to monitor rumination for heat detection and identify sick cows.

“If I’m going to milk cows, I want them to be good ones. I don’t want to milk just run-of-the-mill cows.”

Terra Linda breeds for cows that thrive in a commercial setting.

Registered Holstein® Beginning

Mike Sr. bought his first Registered Holstein in 1975 from California dairyman Doug Maddox, and soon began registering a select few Holsteins, doing more as he stepped up his AI. Since 2012, Terra Linda has registered more than 2,800 head, and has another 900 animals on Basic ID. “As a purebred herd that’s used AI for years, that adds value marketwise,” Mike Jr. said.

Managing his genetics with Enlight®, he looks for bulls with high-scoring dams; 95 percent of those he chooses are young genomic sires and the rest come from a lineup of very good proven bulls. Some of his top bull choices these days are S-S-I Montross Jett-ET, S-S-I Montross Premium-ET, OCD Jabar Heisenberg-ET, Woodcrest Mogul Yoder-ET, Webb-Vue Spark 2060-ET, De-Su Conley 12518-ET, Higherransom Azor-ET, Bacon-Hill Montross-ET, Siemers Mogul Pety, Morningview Mcc Kingboy-ET, and Cookiecutter Petron Halogen. Mike really likes his De-Su BKM McCutchen and Mountfield SSI DCY Mogul-ET milking daughters.

Mike Santos Jr., along with his brother, Craig, is the fourth generation on this California dairy which milks 1,400 head today.

His breeding strategy weighs heavily on good, deep-pedigree-based bulls along with strong udder composites with sound feet and legs. Mike also puts significant weight on production-based health traits, including Daughter Pregnancy Rate (DPR), Productive Life (PL), and somatic cell score, selecting bulls that are 2.0 or higher on udders and 2.0 or higher for type. Recently he began selecting for medium stature. “I like cows that can move around easily in a commercial setting and that can compete in a commercial setting.” And he looks for strong components, too. Terra Linda ships to Land O’ Lakes, which pays a premium for components. “I figure one-tenth point in butterfat is 23 cents on a paycheck, or $7 a month per cow,” Mike Jr. said. “It adds up.”

“We believe in good, deep pedigrees. It’s valuable—we can have the dam and grand-dam registered and scored, and then when someone comes in and asks, we can say there are no holes in the pedigree. You stay the course, and if you have a plan and execute it and stay true to it, you don’t have to go back and fill in the holes.”

Marketing good Registered Holsteins® will be a big plus for Terra Linda as the Santoses improve their herd and continue to register their cattle. But it’s not their top priority. “At the end of the day, we’re a dairy farm and we depend on the milk in the tank,” Mike Jr. said. “I want cows that will milk and breed back, to improve the genetics of the herd, and to improve the value of my animals with registration and pedigrees.

“If I’m going to milk cows, I want them to be good ones. I don’t want to milk just run-of-the-mill cows.”
A scholarship is also available to students interested in agriculture who plan to pursue their Master’s Degree in Business Administration. The **Robert H. Rumler MBA Scholarship** awards $3,000 to a qualified individual pursuing their MBA at an accredited university. Applications for this scholarship are due to the Holstein office by April 15, 2016.

For applications, go to www.holsteinusa.com, and click on Awards, then Individuals in the main menu, or contact Susan Harlow, sharlow@holstein.com or 800.952.5200, ext. 4165.

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### The 2016 Holstein Association USA Judges Conference will be held April 8 at the New York State Fairgrounds in Syracuse, NY.

Find out more at: [www.holsteinusa.com/shows/judges.html](http://www.holsteinusa.com/shows/judges.html)
Wisconsin Cow Breaks Record

Bur-Wall Buckeye Gigi, a Wisconsin Holstein, has become the new holder of the national milk production record. Gigi, bred and owned by the Behnke family’s Bur-Wall Holsteins in Brooklyn, Wisconsin, calved at nine years and three months, and set a 365-day record of 74,650 pounds of milk, with 2,126 pounds of fat and 2,142 pounds of protein.

That record breaks the one set by Ever-Green-View My 1326-ET, owned by Thomas J. Kestell of Waldo, Wisconsin, back in 2010. Her 365-day record was 72,170 pounds of milk.

By comparison, the actual production average for all U.S. Holstein herds enrolled in production-testing programs in 2014 was 24,953 pounds of milk, 918 pounds of butterfat and 773 pounds of protein.

Nine-year-old Gigi, who is scored EX-94 5E, was sired by R-E-W Buckeye-ET. She classified VG-88 as two-year-old. As an eight-year-old, she gave 61,186 pounds of milk and led the state of Wisconsin and the country in milk production, fat, and protein for mature cows. She was a 2013 winner of Holstein Association USA’s Star of the Breed award.

Looking for Director Candidates

HAUSA is looking for enthusiastic, qualified members in good standing to run for the HAUSA board of directors. The role of directors is to set policy for the association that is in the best interest of all members and to promote its mission.

The deadline for nominations is March 1. Director elections will be held at the annual meeting during the 2016 National Convention, June 28-July 1, in Saratoga Springs, New York.

Directors will be elected for three-year terms (two consecutive terms are allowed) in:

REGION 1: Pete Waterman is ineligible for reelection
REGION 4: Gayle Carson is ineligible for reelection.
REGION 6: Mark Kerndt is eligible for reelection.
AT-LARGE: Corey Geiger is ineligible for reelection.

If you’re interested, contact Jodi Hoynoski, staff liaison to the nominating committee (800.952.5200, ext. 4261, or e-mail: jhoynoski@holstein.com) or one of the members of the nominating committee.
FOCUS ON GENETICS

Recombination—the Making of New Allele Combinations

The best combinations in the future will depend on a broad selection of cow and sire lines from our breed.

Part of the excitement of the holiday season is the thrill of unwrapping a beautiful present from under the Christmas tree. Often a gift will be packaged with fancy paper and a beautiful bow—and inside it’ll contain something wonderful. Well, in dairy cattle breeding, we also need to think about how the genetics of our elite animals is presented to the next generation. The genetic merit of the animal, i.e., the sum of all of the alleles that the animal possesses, is the content of the package. The packaging of these alleles is done with chromosomes.

Each of our Holsteins has two sets of genes, which are arranged on 30 pairs of chromosomes. One chromosome from each pair will be transmitted to each of its offspring. The alleles that are linked together on the same chromosome tend to be transmitted together. However, even for these linked genes, Mother Nature has provided us with a way for new combinations to occur. This process is called crossing over, or recombination, of chromosomes.

In the creation of eggs and sperm, the pairs of chromosomes come together, duplicate, and then divide. The outside chromosomes are identical to the original parental pair. But, the two inside chromosomes often become intertwined, break, and exchange pieces. This exchange of chromosome segments creates new combinations of alleles, or “recombinants.”

One pair of chromosomes is involved in determining the sex of the animal (X and Y chromosomes). The other 29 pairs of chromosomes are referred to as autosomes. The naming of these 29 autosomes is done based upon their size. The largest, Chromosome 1, is three times longer than the shortest, Chromosome 29.

The number of crossover events per chromosome, i.e. the number of new combinations of alleles, differs according to the length of the chromosome. For example, Chromosome 3 will, on average, have 1.2 crossovers, while Chromosome 21 will average only 0.7. More than one crossover event can occur per pair of chromosomes. For example, with Chromosome 3, 41 percent of the time there will be one crossover between the inner pair of chromosomes; 27 percent of the time there will be 2 crossovers, and 9 percent of the time there will be 3 or more.

What’s particularly fascinating about this repackaging of our genetic material is that the rate of exchange of genetic material between pairs of chromosomes differs between species and amongst individuals within a species. In cattle, bulls have a 10 percent higher rate of producing new recombinants than cows. In humans, it’s the opposite: the eggs of our mothers will have a higher number of recombinants than the sperm of our fathers.

One possible explanation for why recombinants occur more often in women may be due to the repair mechanism involved with the breaking and recombining (repairing) of chromosomes. Occasionally, at the time of cell division, an extra chromosome or a missing chromosome can be transmitted. Eggs with more repaired chromosomes (recombinants) have fewer errors than eggs with more nonrecombinant chromosomes. This is especially important for older women, because their eggs are more...
susceptible to errors. An extra Chromosome 21 in people is responsible for Down syndrome, while having an extra one of the larger chromosomes will often lead to a nonviable embryo. The leading cause of pregnancy loss is abnormalities in chromosome number. In women, having more recombination is advantageous. If the natural selection of more viable embryos results in higher recombination in women, could we be driving up the recombination rate in bulls by selecting for better and better allele combinations? Is that a good thing?

Recombination leads to more genetic variation available for selection. In 2014, at the World Congress on Genetics Applied to Livestock Production, researchers from the United Kingdom presented the novel idea to include recombination rate as part of a selection index, or use genome editing to modify the recombination rate of all of the top bulls.

At first blush, this seems like a desirable plan. When one takes recombination rates into account, we see that a higher rate of recombination leads to a higher heritability. Obtaining a higher heritability value suggests that increasing recombination rates should lead to faster genetic progress. But does it really work in practice? Our industry is spending millions of dollars on ET and IVF, looking for just the right combination of alleles. So, if there is any type of advantage of higher recombination rates then we should see it in Holsteins.

A recent article published in the November 2015 PLOS Genetics (10.1371/journal.pgen.1005387) by researchers at the University of Maryland and the USDA's Animal Genomics and Improvement Laboratory is shedding new light on this question. Their analysis of the genomic testing program in Holsteins represents the largest study of recombination rates in cattle ever reported. They identified over 8.5 million maternal and paternal recombination events.

The average number of crossovers or new recombination of alleles per gamete averaged 25.5 in the bulls (sperm cells) and 23.2 in the oocytes of the cows. The figure to the right shows the range amongst all of the bulls recorded. The variation that exists amongst them is quite large, going from only 18 to over 32. And the trend is increasing!

**Table 1.** lists the average number of crossovers for some of our popular bulls with over 2,000 sperm analyzed. In each of these categories, there are some very impressive bulls. The interpretation here may be that for some bulls the allele combination is already favorable and you are better off to keep the good combination of alleles together. Meanwhile for other bulls the highly favorable alleles are more widely dispersed. In this case uncoupling the linked alleles and looking for more favorable combinations to piece back together may be the way to go. Having a different breeding strategy for different animals is not a shocking conclusion to many of our old-time breeders. They’ve been honing this skill for years.

Our knowledge level on recombination rates still needs to increase before we can provide specific breeding recommendations. However, science is gaining ground. Another important finding by the researchers is that crossover events are much more likely to occur at some locations than at others. These high recombination areas are known as hotspots. Twenty five percent of all crossovers occurred at only 3 percent of the genome. To further complicate things, many hotspots were unique to each sex. For bulls, alleles located at the END of the chromosome are MORE likely to recombine than alleles at the beginning or middle of the chromosome.

This may be important for an undesirable genetic condition such as with the gene APOB which is responsible for Cholesterol Deficiency. Its location is about 70 percent down the length of chromosome 11, closer to the middle than it is to the end of the chromosome. If there are favorable alleles which are closely linked to the defective APOB allele, it’ll take a little longer than usual for them to escape their linkage with the Cholesterol Deficiency allele and allow us to select a new combination of all desirable alleles.

Breeding elite Holsteins is still a combination of a skilled eye and a firm grasp of the science behind it. As we go forward and continue to search for better and better combinations of alleles, we need to ensure that we have as many cow families and sire lines represented as possible. Only then can we seek to put together the best combination of alleles, and guarantee that we have obtained the rare alleles from within a wide sector of our breed rather than limit ourselves to only those allele combinations coming from a few predominant individuals.

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**Tom Lawlor, Ph.D. is Executive Director of Research and Development**
Jeff and Jan King of Kings-Ransom Farm LLC were cautious when they started their milk delivery business in 2010. “We wanted to make sure there was a customer base,” Jeff said. “We weren’t sure it would fly.”

No problem. Their retail endeavor has been so successful that they built a small farmstand and then bought a wholesale distribution route. Today, they’re constructing a milk-bottling plant on their farm in Schuylerville, New York, which is expected to go into production early in 2016. Under the King Brothers Dairy label, they’ll bottle milk from their 1,000 Registered Holsteins® to serve 500 home-delivery customers, along with an expanding list of food service and restaurant accounts in the Saratoga Springs region.

Jeff and Jan had always nursed the idea of bottling milk in the back of their minds. Their grandfather, Edgar King, and his brothers and sisters had delivered milk from the farm from the early 1900s until the 1960s. “Glass bottles from the dairy always sat on the mantel at home, and we always heard stories about delivering milk,” Jan said. “So we wanted to get the farm back into the milk delivery business.”

In addition to earning a retail price for about 5 percent of the milk they produce, the Kings are realizing another benefit from bottling. The new plant, under construction in a former freestall barn, a few yards from the road that runs by the farm, will be easy for people to visit and view through a wide window. “We can show people exactly where the product is produced and how we treat our animals,” Jeff said. “It’s been the most enjoyable part of this—whether a store account, a restaurant account, or a family—when you get a chance to interact and to see them make the connection, to see the fields and animals and the people who care for them. You see a lot of light bulbs go off for people and it’s a real pleasure.”

Jeff and Jan decided early on that they would provide service that was second to none. “There are 10 different distributors in the Saratoga area that carry milk, plus some large companies, but they don’t hold a candle to our service,” Jeff said.

Quality was also important. “That was a big concern for our customers, but we always produced very high-quality milk and that translates into great taste and better shelf life,” Jan said. Their average SCC runs between 80,000 and 120,000. “When we first started talking to people, some didn’t believe that a farm our size could do that. But when you milk Holsteins, you get great milk quality and high component milk from the most efficient producing dairy animal, the Holstein.”
Prize-winning Dairy

The Kings were awarded the Distinguished Young Holstein Breeder Award in 2009 by Holstein Association USA. Today their Kings-Ransom Farm has a rolling herd average of 28,200 pounds of milk, 1075 pounds of fat, and 858 pounds of protein, milking 3X in a double-12 herringbone.

Besides milk, Kings-Ransom Farm each year merchandises between 150 and 250 high-value females, 40 to 50 bulls as service bulls and for AI, and some embryos.

Mountfield SSI DCY Mogul-ET has been a prominent bull for them over the last year or two; in the past they have relied on Regancrest Altaioita-ET, Coyne-Farms Dorcy-ET, and Ensenada Taboo Planet. For the last two years, they’ve used only young genomic bulls. On the female side, Kings-Ransom Dorcy Dextra-ET, EX-90 DOM, has far and away been their most influential cow. “We have more than 60 of her daughters on the farm and have sold a lot of her embryos, hundreds of thousands of dollars’ worth, so she is going to have a huge influence on our herd,” Jeff said.

Almost all heifers are genomic tested at two weeks of age. The Kings use the information to select high-value outliers and to designate heifers as either donor or recipients. They are also beginning to use health data from low-end heifers, such as heifer conception rate and stillbirths, to avoid using potential poor performers as recips.

The Kings are doing more IVF than embryo transfer these days because of the consistency and the opportunity to mate an animal more often. Jan’s wife, Pandora Davis, is a veterinarian who does about half of their conventional ET work; they also take advantage of a satellite IVF lab 20 minutes away.

Besides using Holstein USA services for genomic tests, registrations, classification, and EASY ID, the Kings are on Holstein COMPLETE. Their herd now includes 60 Excellent cows and more than 300 Very Good.

Their milking herd is housed in two freestall barns with a total of 900 stalls, bedded with sand. Calves are raised in hutches and group housing, then moved to another farm five miles away before they come back to the main farm for breeding. They are returned to the satellite farm until they calve.

The Kings grow 1,300 acres of corn for grain and silage, 200 acres of soybeans, and 1000 acres of alfalfa/grass for haylage. They store the feed in bunker silos, and use FeedWatch software to monitor and evaluate ingredients for their TMR.

Jeff and Jan’s parents, Edgar and Carolyn, are partners in the farm, as are their wives. In addition to ET work, Pandora Davis does all the routine vet work and runs her own veterinarian practice. Becky King, Jeff’s wife, is the bookkeeper and accountant for the dairy.

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Congratulations, Jaylene!

Holstein Association USA Inc. has presented the Overall Judi Collinsworth Outstanding Junior Exhibitor Award to Jaylene Lesher of Bernville, Pennsylvania. Lesher, 21, is a senior at Pennsylvania State University, majoring in animal science with a minor in agribusiness management. She also works part time at her parents’ dairy, Way-Har Farms, LLC.

The Collinsworth Award is presented in honor of the Association’s former executive director of member and industry services, Judi Collinsworth. The award recognizes youths’ work and involvement with Holstein cattle and dairy activities. One recipient is selected at each of the four National Junior Holstein Shows. Lesher won the award at Premier Junior Holstein Show. Other winners from 2015 National Junior Holstein Shows were Morgan Sageser, Kentucky, North American International Livestock Exposition; Jordan Siemers, Wisconsin, International Junior Holstein Show; and Steven Nelson, Missouri, Southern Spring National Junior Holstein Show.

For more information on Holstein youth programs, contact Kelli Dunklee at 800.952.5200, ext. 4124 or kdunklee@holstein.com.

Mark Your Calendars

Juniors, take note of these deadlines:

- **February 15**: National Holstein Women's Scholarship Organization applications must be postmarked.
- **March 1**: Distinguished Junior Member and Young Distinguished Junior Member entry books must be received in Brattleboro.
- **April 1**: Dairy Bowl and Dairy Jeopardy entries due in Brattleboro office.
- **May 1**: Junior National Convention contest entries due.
- **June 1**: Ownership deadline for cows and heifers (including leased heifers) to be exhibited at National Shows. Transfers must be received in the Brattleboro office by June 1.

More Kudos: Junior Holstein Contest Winners

Tiara Brothen, of Viroqua, Wisconsin, was the grand prize winner of Holstein Association USA Inc.'s 2015 Junior Photo Contest. She won for her photograph, “Spring Snacking.”

Awards were given to the top individuals in each division. Their photos will be posted on the Holstein USA website:

**Juniors**
1. Campbell Booth, Plymouth, Wisconsin
2. Evelyn Troutman, Myerstown, Pennsylvania
3. Ava Booth, Plymouth, Wisconsin

**Intermediate**
1. Connor Siemers, Newton, Wisconsin
2. Joseph Opsal, Blue Mound, Wisconsin
3. Cole Booth, Plymouth, Wisconsin

Viroqua produced another Junior Holstein winner, Katherine Larson, who took home the grand prize in the 2015 Junior Holstein Recipe Contest for her Creamy Dairy Caramel Chocolate Chip Cheesecake. Awards were given to the top individuals in each division.

**Juniors**
1. Mexican Lasagna – Cole Meyer, Hanover, Kansas
2. Coconut Cream Pie – Brandon Rokey, Sabetha, Kansas
3. Cherry Torte – Clarissa Ulness, Valders, Wisconsin

**Intermediate**
1. Charleston Cheese Dip – Sarah Lehner, Delaware, Ohio
2. Caramel Apple Skillet Cake – Ellie Ainslie, West Winfield, New York
3. Cheddar Bits – Katherine Gathje, Richmond, Minnesota

The winning recipes will be displayed by the National Holstein Women’s Scholarship Organization (NHWSO) at the National Holstein Convention next summer in Saratoga Springs, New York. NHWSO will publish all the recipes in a booklet to be sold for the benefit of NHWSO.

Ruby is YDLI Alumni Leader

Michelle L. Ruby, a communications consultant from Portland, Oregon, has been chosen the 2016 Young Dairy Leaders Institute Distinguished Alumni Leader by the Holstein Foundation Board of Trustees. Ruby is an alumna of Young Dairy Leaders Institute (YDLI) Class 2.

Ruby owns Ruby-Do Inc., a boutique communications company that helps clients deal with issues and prepare for crises. She is treasurer of Fir Ridge Holsteins, her family's 2,500-head Holstein dairy in Scio and Cloverdale, Oregon.

Allflex has been working with the country’s leading biotechnology companies, livestock genetic testing labs and leading livestock producers to develop a unique device for collecting tissue samples. The result is the nextGen Tissue Sampling Unit (TSU) by Allflex. nextGen by Allflex maintains Allflex’s commitment to innovation, quality and performance. The nextGen TSU provides:

- Fast, high performance sample collection
- Clean, uncontaminated sampling
- Visual, DNA-sample identification
- Minimize retesting
Illuminate Your Dairy’s Future with **Enlight**

"I use Enlight all the time. Whether it is for finding ET recipients, heifers to genomic test, or viewing the progress of the herd as a whole it captures a herd the size of ours either at a population point of view or individually extremely well and makes it easy to manage all of our Holsteins! The program saves me a lot of pedigree evaluation and headaches."

*Matt Ruby, Fir Ridge Holsteins, Oregon*

**Enlight** is an online management tool designed to help Holstein breeders handle herd genetics more efficiently.

This valuable resource is a collaboration between Holstein Association USA and Zoetis. Once enrolled in **Enlight**, all tests ordered by a herd will be processed by Zoetis, using one of their CLARIFIDE test options.

**Learn more about Enlight at www.holsteinusa.com**

To enroll, contact Holstein USA Customer Service at 800.952.5200, or visit www.enlightdairy.com!