Pedigree Questions & Answers

HARVUE ROY PROSTY
USA 52378753 100% RHA-NA
5-07 95 EEEE

PTA +257M +64F +88P 57
PTA +257NM +14F +188P 57
PTA +1.20L +0.60S +1.49FC 56
PTA +3.08T +2.91U +1.49F 56

AGE X DAYS MILK DCM % FAT % PRO 448
* 2-03 2 305 24780 98 4.1 886 1.0 648
** 3-10 2 305 31690 95 4.5 1436 3.1 934

ALL-AMERICAN SR 3Y COW 2007
1st INTERNATIONAL SR 3Y, INT & RES GR 200
1st & FALL NATI 2Y COW 2006

ROYLANE JORDAN-ET
USA 17064727 100% RHA
10-09 95 EEEE

PTA +50M +540M +102P 58
PTA +640M +02F +86P 58
PTA +3.50L +3.05S +1.85F 58

CTPI +1470 PTA 58

HOLSTEIN FOUNDATION
"Developing Dairy Leaders for Tomorrow"
This workbook, “Pedigree Questions & Answers,” was developed to present a basic explanation of official pedigree formats and to acquire basic skills in comparing and evaluating pedigrees. More comprehensive information on genetics, genetic measures and their calculations is available from each breed association.

The Holstein Foundation’s mission is to promote and support programs that develop leadership for the dairy industry. The Holstein Foundation offers a variety of programs to youth, young adult and farm families. Current programs targeting youth include the popular Dairy Bowl and Dairy Jeopardy competitions. The Foundation also focuses on youth education and outreach activities, offering free workbooks, and ribbons for local fairs.
What is a pedigree?

A pedigree is a record of an animal’s ancestry, and is always set up in the same format. Information about the sire, or father, is shown on the top half of a pedigree, and is called paternal information. Maternal information, which refers to the dam or mother, is printed on the bottom half of a pedigree.

A three-generation pedigree includes the individual animal, the sire and dam, and the paternal and maternal grandparents. If information about the great-grandparents also was included, it would be a four-generation pedigree. A five-generation pedigree would show information for the great-great-grandparents.

Three-Generation Pedigree Format

Pedigrees are useful because of the information they provide. Sire and dam information can help you predict how well a heifer will milk and classify as a mature cow. While all pedigrees basically show the same information and are arranged in a similar way, there are differences among them.

What information does a pedigree provide?

A pedigree provides genetic and performance information on the individual animal and its ancestors. Genetic information is provided for each male relative on the pedigree. Estimates of his ability to transmit superior production and type traits to his daughters are printed. These genetic estimates are based upon the performance of the bull’s daughters as compared to other cows in the same herd. The classification score and production records for each female ancestor are also shown on a pedigree, along with genetic estimates for production and type traits. The genetic value for an individual animal with no performance or progeny information is predicted from its ancestors’ information and shown on the pedigree. For a mature animal, the pedigree contains genetic values for production and type traits based on the animal’s own performance, performance of the animal’s offspring and ancestor information.
### Parts of a Pedigree

#### Official Holstein Pedigree

**BUDJON-JK MAC EAXULT-ET**

- **PTPI:** +1836
- **USA:** 140273869 100%RHA-NA

<table>
<thead>
<tr>
<th>Age (Days)</th>
<th>Milk</th>
<th>DCRM</th>
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<th>DCRC</th>
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<tr>
<td>6-01</td>
<td>92</td>
<td>EEEVE GM</td>
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<td>PTA</td>
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<td>2.88SCS#</td>
<td>+1.2DPR</td>
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</tr>
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<td>+3.23UDEC#</td>
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**BUDJON-JK LINJET EILEEN-ET**

- **CTPI:** +1769
- **USA:** 125791216 100%RHA-NA

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<tr>
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</tr>
<tr>
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**REGANCREST-HHF MAC ET**

- **GTPI:** +1900 G
- **USA:** 60040164 100%RHA-NA

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**REGANCREST-RUDOLPH DENA ET**

- **CTPI:** +1489
- **USA:** 17391080 100%RHA-NA

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<td>PTA</td>
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### Additional Pedigrees

**MARA-THON BW MARSHALL-ET**

- **GTPI:** +1569 G
- **USA:** 2290977 100%RHA-NA

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<tr>
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**REGANCREST BW REGANCREST-HHF MAC-ET G**

- **GTPI:** +1900 G
- **USA:** 60540164 100%RHA-NA

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<td>04/20/2001</td>
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<td>+6P</td>
<td>91%</td>
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<tr>
<td>PTA</td>
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**SUNNYLODGE LINJET M**

- **TPI:** +1266 M
- **CAN:** 5578866 100%RHA-NA

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<td>9-00</td>
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### MACE TYPE EVALUATION

- **GTPI:** +1900 G
- **USA:** 15395294 100%RHA-NA

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<td>35240</td>
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Other Pedigrees

- **ALL-AMERICAN 5Y COW 2004**
- **RESERVE ALL-AMERICAN 5Y, COW 2005**
- **1st MID-W SPR NAT CHAMP BRED & OWNED 2005**
- **1st MID-W SPR NAT 4Y COW 2003**
- **1st INTERNATIONAL 125,000 LB COW 2000**
- **2nd MID-W SPR NAT 4Y COW 1997**

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GTPI indicates genomic data was supplied to USDA. Protein reported is true protein.

03442565 1513540 12/23/2009

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PARTS OF AN OFFICIAL U.S. REGISTERED HOLSTEIN PEDIGREE

An Official Holstein Pedigree contains a great deal of information about an animal. Sections that will be covered in the following pages are:

A. Registered Ancestry
B. Animal Identification Information
C. Genetic Values
D. Sire Information
E. Sire’s Genetic Values
F. Dam Information
G. Dam’s Genetic Values
H. Production Records
I. Lifetime Production Records
J. Show Records
K. Footer Information

A. REGISTERED ANCESTRY

Line 1: The first line, centered on a pedigree, shows the percentage Registered Holstein Ancestry (RHA) and whether the animal is of North American (RHA-NA) or International (RHA-I) blood line.

Line 2: Percentile Ranking (P level), Total Performance Index (TPI), and barn identification.

The P level indicates the percentile ranking of the animal based on PTPI. The percentile ranking compares registered animals of the same sex born in the same year. This animal’s P9 level indicates she is in the 90% percentile. In other words, her PTPI is among the highest 10% of the heifers born in 2009. You may find the following abbreviations on this line:

TPI: Total Performance Index – Bulls that have not been genomically tested, but have progeny information used in calculating their index will have TPI.
PTPI: Pedigree Total Performance Index – The animal’s index is calculated based on parent averages. Most young animals will have a PTPI.
GTPI: Genomic Total Performance Index – A GTPI indicates that genomic information was used in the calculation of the individual PTAs and overall index. Genomics involves the sequencing of genetic material in cattle DNA, which helps to provide great accuracy and transmitting reliability. The genomic information does not appear on the animal’s pedigree until after the USDA publishes the National Genetic Update in January, April and August of each year. Once a cow has been genomically tested, the information will be incorporated into the PTAs of her descendants. Animals of any age may have a GTPI.
CTPI: Cow Total Performance Index – The cow has received an official required classification score and has production information which figures into her index calculation.
**ANIMAL IDENTIFICATION INFORMATION**

**B. ANIMAL IDENTIFICATION INFORMATION**

![Official Holstein Pedigree](image)

**C. GENETIC VALUES**

**Line 1:** Predicted Transmitting Abilities (PTA) for Milk (M), Fat (F), Protein (P), Production Reliability (R) and date of the evaluation.

**Line 2:** PTA for Productive Life (PL), PTA Somatic Cell Score (SCS), PTA Daughter Pregnancy Rate (DPR), and Predicted Daughter Calving Ease (DCE).

**Line 3:** PTA for Type (T), Udder Composite (UDC), Feet and Legs Composite (FLC), Type Reliability (R) and date of the evaluation.

For young animals, these PTA values are estimated by averaging the parents' PTA values. We know these values are parental averages when the # symbol is used. PTA expresses the level of genetic superiority that an animal transmits to its offspring for a given production or type trait. This value is used to rank animals based on their genetic merit.

Reliability measures the confidence you can place in the Predicted Transmitting Abilities. An animal's reliability is based on the information available in the evaluation, information from the animal, and its parents and progeny.

**Line 1:** Registered Name, TPI Value, birth date, and sex.

The Registered Name includes the prefix of the breeder (owner of the dam at the time she was bred) and the individual animal's barn name. The Registered Name cannot exceed 27 characters. Suffixes such as -RED (red hair color), -ET (embryo transfer), and -TW (twin) must be included in the 27 character limit.

PTPI estimates the ability of the young animal to transmit superior traits. This value combines one half of the dam's CTPI and one-half of the sire's TPI.

Some animals may have an 'M' after their TPI value. The M refers to MACE (Multiple-trait Across Country Evaluation), and indicates that the sire has daughters in countries other than the United States that contributed genetic information to the bull's proof. INTERBULL (International Bull Evaluation Service) is a nonprofit organization based in Uppsala, Sweden, which calculates International Genetic Evaluations and is responsible for promoting the development and standardization of the international genetic evaluations for cattle.

**Line 2:** Nation Code, Registration Number, RHA, and any genetic codes*.

*To view a list of genetic codes and what they mean, see page 21.

**Line 3:** Age at Classification in years and months, Final Score, Major Classification Breakdowns, Recognitions (Gold Medal Dam or Dam of Merit) and the cow's birth date. *(If applicable)*

**Line 1:** For young animals, these PTA values are estimated by averaging the parents’ PTA values. We know these values are parental averages when the # symbol is used. PTA expresses the level of genetic superiority that an animal transmits to its offspring for a given production or type trait. This value is used to rank animals based on their genetic merit.

Reliability measures the confidence you can place in the Predicted Transmitting Abilities. An animal's reliability is based on the information available in the evaluation, information from the animal, and its parents and progeny.
D. SIRE INFORMATION (SIRE, GRANDSIRE AND GREAT-GRANDSIRE)

**REGANCREST-HHF MAC-ET**

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<thead>
<tr>
<th>GTPI</th>
<th>USA 60540164 100% RHA-NA TV TL</th>
</tr>
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<tbody>
<tr>
<td>6-01</td>
<td>92 EEEV GM 8/09 04/20/2001</td>
</tr>
</tbody>
</table>

- **PTA**: +715M +35F +22P 98%R 8/2009
- **PTA**: +501NM +.03%F +.00%P 100%US
- **PTA**: +.08%P +.08%P +.08%P 100%US
- **PTA**: +2.94T +.70% UDC +2.23% FLC 94%R 8/2009

**Line 1**: Registration Name, and Total Performance Index (TPI).

The TPI combines PTA Protein, PTA Fat, PTA Type, STA Dairy Form, Udder Composite, Feet & Legs Composite, PTA Productive Life, PTA Somatic Cell Score, PTA Daughter Pregnancy Rate, PTA Daughter Calving Ease, and PTA Daughter Stillbirth to rank sires on their ability to transmit a balance of these eleven traits.

Some bulls may have a “G” or an “M” following their TPI value. An “M” following a bull's TPI stands for MACE, and means that foreign daughter information is included in his index, and it may or may not contain U.S. daughters. No genomic data is included in this case. If a “G” is following the bull’s TPI, the index contains genomic data and the bull may have U.S. daughters, foreign daughters, or no daughters. If there is no label following the TPI, only U.S. daughter information is included and no genomic data.

**Line 2**: Nation Code, Registration Number, RHA, and any genetic codes*.
*To view a list of genetic codes and what they mean, see page 21.

**Line 3**: Age at Classification, Final Score, Major Classification Breakdowns, Recognitions (such as Gold Medal Sire) followed by the date recognized and the animal's birth date.

Age at classification is written as the year-months. For example, if an animal was classified at “4-11”, that means that it was four years and eleven months old when they were given that classification score.

For a bull, the order of the Major Classification Breakdowns is Front End & Capacity (worth 40% of final score), Dairy Strength (25%), Rump (10%), and Feet and Legs (25%).

- **E** = Excellent (90-97 points)
- **G** = Good (75-89 points)
- **V** = Very Good (85-89 points)
- **F** = Fair (65-74 points)
- **+** = Good Plus (80-84 points)
- **P** = Poor (50-64 points)

Some bulls may have a “G.” or “M.” following the TPI value.
This section includes genetic information about production and type data for the animal's sire.

Line 1: MACE Yield Evaluation (if applicable – not all animals will have this line)

Line 2: Predicted Transmitting Abilities (PTA) for Milk (M), Fat (F), Protein (P), Production Reliability (R) and date of the evaluation.

Line 3: Net Merit $ Index (NM), PTA Percent (PTA%) for Fat (F) and Protein (P) percent and percentage US daughters. These values only appear for animals with their own PTAs for production.

Line 4: PTA for Productive Life (PL), Somatic Cell Score (SCS), Daughter Pregnancy Rate (DPR), and Daughter Calving Ease (DCE).

Line 5: Predicted Transmitting Ability of Type (T), Udder Composite (UDC), Feet and Legs Composite (FLC), Type Reliability (R) and the date of the evaluation.

### DAM INFORMATION (DAM, GRANDDAM AND GREAT-GRANDDAM)

Line 1: Registration Name, Cow Total Performance Index (CTPI).

CTPI combines PTA Protein, PTA Fat, PTA Type, STA Dairy Form, Udder Composite, Feet & Leg Composite, PTA Productive Life, PTA Somatic Cell Score, PTA Daughter Pregnancy Rate, PTA Daughter Calving Ease, and PTA Daughter Stillbirth. This value ranks the cow on her ability to transmit a balance of these traits. CTPI is similar to a sire’s TPI.

Line 2: Nation Code, Registration Number, RHA, and any genetic codes.

*To view a list of genetic codes and what they mean, see page 21.

Line 3: Age at Classification in years and months, Final Score, Major Classification Breakdowns, Recognitions (Gold Medal Dam or Dam of Merit) and the cow’s birth date.

The current classification breakdowns were introduced in December 2004. Classification scores from before this date are underlined on pedigrees. For cows, the major classification category breakdowns are: Front End/Capacity (worth 20% of the final score); Dairy Strength (20%); Rump (5%); Feet & Legs (15%) and Udder (40%).
E = Excellent (90-97 points)  
G = Good (75-89 points)  
V = Very Good (85-89 points)  
F = Fair (65-74 points)  
+ = Good Plus (80-84 points)  
P = Poor (50-64 points)

Cows may receive Multiple “E” designation if classified Excellent in the following age brackets:
1E: Up to 6 years old  
2E: 6 to 9 years old  
3E: 9 to 12 years old  
4E: 12 to 15 years  
5E: 15 to 18 years  
6E: Any subsequent three year period

To be eligible for an additional “E”, the cow must have calved within the last 36 months.

An “E” will appear on this line after the major breakdown designations. A 2, 3, 4, 5, or 6E shows the number of times the animal was classified Excellent in different age brackets.

GMD means the cow has received Gold Medal Dam recognition and DOM stands for the Dam of Merit recognition. Gold Medal Dam status is earned by a female when the cow and at least three of her daughters have been classified and the cow must be milking in a herd participating in the TriStar program. All cows over 87% RHA or higher born in the past 25 years are automatically screened twice a year to identify those that meet GMD requirements. Equal emphasis is placed on production and type on progeny performance. If the cow does not qualify on a mature equivalent basis, she will qualify with lifetime credits of 200,000 pounds milk or 7,200 pounds fat or 6,400 pounds protein. This is a permanent recognition.

The Dam of Merit recognition is also a permanent recognition for cows with over 87% RHA and higher. Eligible cows were born in the past 25 years and milking in a herd participating in the TriStar program. They must have CTPI values exceeding birth year cutoff and at least three offspring with a PTA for production and type. Twice each year Holstein Association USA automatically screens their database for qualifying cows.

### DAM’S GENETIC VALUES

This section includes information about production and type traits for the animal’s dam.

**Line 1:** Predicted Transmitting Abilities (PTA) for Milk (M), Fat (F), Protein (P), Production Reliability (R) and the evaluation date.

Predicted Transmitting Ability estimates the genetic superiority the cow is expected to transmit to her offspring. This value for production traits is based on information about the cow, her sire, her dam and her progeny. Reliability for PTA Milk is based on the cow’s number of production records and the accuracy of the information about her sire, dam and progeny.

**Line 2:** Net Merit $ Index (NM), PTA Percent (PTA%) for Fat (F) and Protein (P) percent. These values only appear for animals with their own PTAs for production.

**Line 3:** PTA for Productive Life (PL), PTA Somatic Cell Score (SCS), PTA for Daughter Pregnancy Rate (DPR), and PTA Daughter Calving Ease (DCE).

**Line 4:** Predicted Transmitting Ability of Type (T), Udder Composite (UDC), Feet and Legs Composite (FLC), Type Reliability (R) and the evaluation date. The cow’s PTA for Type is based on the cow’s final score and her parents’ genetic merit.
PRODUCTION RECORDS

For females, production records follow the genetic information.

Each main line indicates the type of testing program (for production records starting prior to 1/1/1997) or TriStar Option (for production records starting after 1/1/1997); age at calving; number of times milked per day; length of record in days; pounds of milk; DCRM (Data Collection Rating for milk); fat percent; pounds of fat; protein percent; pounds of protein; and DCRC (Data Collection Rating for components) during that lactation up to 305 days. An “X” at the end of the line indicates that the record contains some extreme test-day data. A second line of data is only included if the cow’s lactation is longer than 305 days (up to 365 days) for that lactation.

State and national leader records for Milk, Fat and Protein production are labeled on the line below the outstanding record. The designation indicates the placing (1st, 2nd, or 3rd), where the record was made (the state abbreviation or NAT for National record), and category (MILK, FAT, PROTEIN). This recognition is based on DHIR and TriStar Premier records and are made in seven age categories.

LIFETIME PRODUCTION RECORDS

Once a cow produces more than 100,000 pounds of milk in her lifetime, her total production information appears on the pedigree and is labeled ‘LIFE’.

SHOW RECORDS

A female animal’s placing at National Holstein Shows (if they placed in the top 3 in their class) and All-American recognitions may be included on the pedigree.

FOOTER INFORMATION

Line 1: Protein Form, Holstein Processing Numbers, and date the pedigree was printed.

In May of 2000, Holstein Association USA started printing true protein as the default format. As of January 2010, Official U.S. Holstein Pedigrees will only have true protein printed on them, keeping with the U.S. standard.
How can you use pedigrees?

Pedigrees provide detailed performance and genetic information about an animal and their ancestors that has multiple uses. The pedigree values that measure the ability of the sire and dam to transmit their traits can help you predict the calf’s future performance.

When selecting an animal to purchase, different people will have different areas they look for in a pedigree, depending on what their goals are. Someone looking for a show calf will pay close attention to the birth date, the dam and sire's classification scores, any show winnings in the pedigree and PTA Type. Someone looking for an exceptional milk cow will likely look at TPIs in the pedigree, PTAs for Milk, Fat, and Protein, as well as all production records in the pedigree. There are several examples, but they all have one thing in common – looking at a calf’s pedigree will help give insight into future performance. When you begin your search for a project animal, first decide what information is important.

Pedigrees are also very important when making mating decisions on your animals. They allow you to view ancestry to prevent inbreeding, as well as get a total picture of the genetic strengths and weaknesses of your animal and her family. You can look for trends in milk production, classification score, TPI, or other areas to see where you might need to improve the animal.

What are your goals?

Pretend that you have won a $2,500 scholarship to purchase a heifer as your dairy project. What are some minimum criteria that you would like to set for animals you will consider purchasing?

- Age
- Heifer’s PTPI or GTPI
- % RHA
- Dam’s classification score
- Dam’s milk production
- Dam’s TPI
- Sire’s TPI

List any other criteria that you will consider in your selection:

- 
- 
- 


TEST YOUR PEDIGREE KNOWLEDGE

Use the pedigree for **Hol-Star Toystory Tiera** on the following page to complete the exercise.

1. What is the name of the granddam that has been tested and shown not to be a carrier of BLAD?

2. What is Tiera’s P level?

3. What is the sire’s TPI?

4. What does “PTA” stand for on a pedigree?

5. What is the dam’s final score and age at classification?

6. What is Marshall’s relationship to Tiera?

7. Which maternal female relative has the highest CTPI?

8. What is the sire’s reliability for PTA Type?

9. What is the dam’s PTA Protein?

10. What is the name of the granddam that is a Gold Medal Dam?

11. Of the three bulls shown on this pedigree, which has the highest PTA for milk?

12. What is the dam’s Predicted Transmitting Ability for milk?

13. What is the country code, registration number and RHA of the maternal grandsire?

14. When was Tiera born?

15. How many pounds of milk did the dam produce in her first 305-day lactation?

16. What is Tiera’s parent average PTA for Productive Life?

17. What is the sire’s PTA for type?

18. Information about the (dam or sire) is always on the top half of a pedigree.

19. Which does maternal refer to, the sire or the dam?

20. What is the sire’s PTA for protein percent?

21. Which animal in the pedigree has the lowest PTA for SCS?

22. What does “SCS” stand for?

(Answers on page 23)
## Tiera

### Official Holstein Pedigree

#### 100% Registered Holstein Ancestry (RHA-NA)

<table>
<thead>
<tr>
<th>Pedigree Name</th>
<th>Genomic PI</th>
<th>USA ID</th>
<th>Birth Date</th>
<th>Gender</th>
<th>Age</th>
<th>Days</th>
<th>Milk</th>
<th>DCRM</th>
<th>Fat</th>
<th>Prot</th>
<th>DCRC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tiera</strong></td>
<td>1817</td>
<td>03/14/2007</td>
<td>FEMALE</td>
<td></td>
<td>03/08</td>
<td>86</td>
<td>VGVV</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>MARA-THON BW MARSHALL-ET</strong></td>
<td>+1569 G</td>
<td>03/23/1994</td>
<td></td>
<td></td>
<td>08/20</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>JENNY-LOU MRSHL TOYSTORY-ET</strong></td>
<td>+1919 G</td>
<td>03/29/1997</td>
<td></td>
<td></td>
<td></td>
<td>89</td>
<td>VEEE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HOL-STAR OUTSIDE TEERA-ET</strong></td>
<td>+1798 G</td>
<td>08/22/2000</td>
<td></td>
<td></td>
<td>09/08</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COMESTAR OUTSIDE-ET</strong></td>
<td>+1651 G</td>
<td>02/27/1994</td>
<td></td>
<td></td>
<td></td>
<td>89</td>
<td>VEEE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HOL-STAR TEARY DURHAM</strong></td>
<td>+1728 G</td>
<td>03/08/2000</td>
<td></td>
<td></td>
<td>10/08</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GTPI indicates genomic data was supplied to USDA.**

Protein reported is true protein. 003442565 1513627 12/23/2009
Practicing Pedigree Comparisons

Now that you understand the terms used on a pedigree and the information that they include, let's practice comparing different pedigrees. Answer these questions using the following two pedigrees and by indicating either pedigree A or B.

1. Which heifer's maternal granddam has lifetime production records?
2. Which heifer is sired by the bull with the higher TPI?
3. Which heifer's dam has the higher Udder Composite Index?
4. Which heifer has the higher Total Performance Index?
5. Which heifer's grandsire was tested positive for CVM?
6. Which dam is predicted to transmit a higher level of overall type?

7. Which dam has the higher first lactation 305 day milk production record?

8. Which sire has the higher % Reliability for PTA Type?

9. Which sire has the higher PTA for Type?

10. Which heifer’s maternal granddam has been Classified Excellent more than once?

11. Which heifer is the youngest?

12. Which heifer has an animal on the maternal side of her pedigree that was last classified before December 2004?

13. Which dam has the higher PTA% Protein?

14. Which sire has the higher PTA for Net Merit?

15. Which heifer has a granddam registered outside the U.S.?

(Answers on page 23)
Rank These Heifers

It is time to put your pedigree knowledge and evaluation skills to work. Assume that you have your choice of four heifers for your next project animal. Which one would you choose? Before looking at the pedigrees, first answer the following questions.

1. What are your goals for this heifer?

_____________________________________________________________________________________________

_____________________________________________________________________________________________

_____________________________________________________________________________________________

_____________________________________________________________________________________________

2. List the pedigree information and criteria that you plan to consider in making your decision.

_____________________________________________________________________________________________

_____________________________________________________________________________________________

_____________________________________________________________________________________________

_____________________________________________________________________________________________

Now look at the four pedigrees on the following pages, and rank them in the order that you would like to own the animals.

Rank the heifers in the order you would purchase them.

_____________________________________________________________________________________________

_____________________________________________________________________________________________

_____________________________________________________________________________________________

_____________________________________________________________________________________________

Which heifer would be your first choice and why?

_____________________________________________________________________________________________

_____________________________________________________________________________________________

_____________________________________________________________________________________________
1782FEMALE 03/01/2009

GTPI
CAROL PRELUDE MTOTO-ET +1645 G
PTA 600001001962 100% RHA-NA TV TL GM 1/08
07/13/1993
PCTA +1062M +40F +22P 99% R 8/2009
PCTA +465NM +.01F -.04P 38US
PCTA +3.4PL 2.49SCS +.9DPR 5%DCE
PCTA +1.02T +.81UDC +1.13FLC 99% R 8/2009

GTPI
CONDON AERO SHARON +1260
CAN 5373153 100% RHA-NA
01/20/1991
PCTA +315M +21F +13P 51% R 8/2009
PCTA +80NM +.04F +.01P
PCTA -.9PL 2.94SCS -2.2DPR 10%DCE
PCTA +1.52T +1.03UDC +1.49FLC 45% R 8/2009

GTPI
COMESTAR OUTSIDE-ET +1651 G
CAN 6026421 100% RHA-NA TV TL GM 1/08
02/27/1994
PCTA +540M +43F +4P 99% R 8/2009
PCTA +365NM +.09F -.05P 178US
PCTA +5.0PL 2.98SCS +1.5DPR 9%DCE
PCTA +2.04T +1.77UDC +2.21FLC 99% R 8/2009

GTPI
WHITTIER-FARMS CINDY-ET +1452
USA 173522979 100% RHA-NA
06/26/1997
PCTA +443M +22F +16P 80% R 8/2009
PCTA +295NM +.02F +.01P
PCTA +3.2PL 2.86SCS +.1DPR 9%DCE
PCTA +.99T +1.38UDC +1.05FLC 76% R 8/2009

AGE X DAYS MILK DCRM % FAT % PROT DCRC
2-05 2 305 26817 95 4.6 1228 3.1 819 95
365 30760 95 4.6 1423 3.1 953 95
365 40450 95 4.4 1783 3.1 1235 95

---
GTPI indicates genomic data was supplied to USDA. Protein reported is true protein.
### Shauna

**Official Holstein Pedigree**

100% Registered Holstein Ancestry (RHA-NA)

<table>
<thead>
<tr>
<th>AMMON-PACHEY SHAUNA-ET</th>
<th>665</th>
<th>04/16/2009</th>
<th>FEMALE</th>
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<tbody>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+2735M</strong></td>
<td><strong>+111F</strong></td>
<td><strong>+87P</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+916NM</strong></td>
<td><strong>+.04%F</strong></td>
<td><strong>+.02%P</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+6.2PL</strong></td>
<td><strong>2.76SCS</strong></td>
<td><strong>+.5DPR</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+3.7IT</strong></td>
<td><strong>+2.63UDC</strong></td>
<td><strong>+.214PLC</strong></td>
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**GTPI**

<table>
<thead>
<tr>
<th>ROSE-BAUM TABOO-ET</th>
<th>1494 G</th>
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<tbody>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+8044M</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+318NM</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+2.1PL</strong></td>
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<tr>
<td><strong>PTA</strong></td>
<td><strong>+.96T</strong></td>
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</table>

**GTPI**

<table>
<thead>
<tr>
<th>ENSENADA TABOO PLANET-ET</th>
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<tbody>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+2581M</strong></td>
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<tr>
<td><strong>PTA</strong></td>
<td><strong>+763NM</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+5.6PL</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+2.24T</strong></td>
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**GTPI**

<table>
<thead>
<tr>
<th>PINE-TREE MARTHA SHEEN-ET</th>
<th>2291 M</th>
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</thead>
<tbody>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+2233M</strong></td>
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<tr>
<td><strong>PTA</strong></td>
<td><strong>+803NM</strong></td>
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<tr>
<td><strong>PTA</strong></td>
<td><strong>+5.1PL</strong></td>
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<tr>
<td><strong>PTA</strong></td>
<td><strong>+3.31T</strong></td>
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</table>

<table>
<thead>
<tr>
<th><strong>AGE X DAYS MILK DCRM % FAT % PRT DCRC</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1-11 3 305 26750 95 4.0 1075 3.0 813 92</strong></td>
</tr>
<tr>
<td><strong>365 31210 95 4.2 1105 3.1 968 92</strong></td>
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**GTPI**

<table>
<thead>
<tr>
<th>PLUSZANSKI AMEL PATTY-ET</th>
<th>1853</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USA 130161039 100%RHA-NA TV</strong></td>
<td></td>
</tr>
<tr>
<td><strong>GM</strong></td>
<td><strong>8/05</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+2695M</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+583NM</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+1.59T</strong></td>
</tr>
</tbody>
</table>

**GTPI**

<table>
<thead>
<tr>
<th>PINE-TREE MISSY MARTHA-ET</th>
<th>2063</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USA 61733086 100%RHA-NA TV</strong></td>
<td></td>
</tr>
<tr>
<td><strong>GM</strong></td>
<td><strong>8/09</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+2112M</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+692NM</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+4.0PL</strong></td>
</tr>
<tr>
<td><strong>PTA</strong></td>
<td><strong>+1.18T</strong></td>
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</tbody>
</table>

GTPI indicates genomic data was supplied to USDA.

Protein reported is true protein.

---

**003443278 1514625 12/28/2009**
**100% Registered Holstein Ancestry (RHA-NA)**

**KINGSMILL DUNDEE TRALEE-ET**

**PTPI**

- USA 66605361 100% RHA-NA

**PTA**

- -35M +11F +8R 39%R 8/2009
- -4PLM 3.08SCSB -4DPR 99DCEB
- +2.66T+2.36UDC+1.52PLCH 39%R 8/2009

**MARCREST ENCORE**

**GTPI**

- USA 20437202 100% RHA-NA TV TL
- 9-04 96 EEEE GM 2/99 06/2019

**PTA**

- -471M -9F -13P 99%R 8/2009
- -166NM 0.31SCSB 0.00DPR 100%US
- -1.5PL 3.12SCSB -3DPR 12%DCE

**MAC TYPE EVALUATION**

- PTA +1.87T+1.77UDC+1.37FLC 99%R 8/2009

**SNOW-N D A N I E S D E L L I A**

**CTPI**

- USA 128825802 100% RHA-NA TV TL
- 7-08 95 EEEE 2E GMD DOM 12/2009

**AGE X DAYS MILK DCRM % FAT % PRT DCRC**

- **2-02 2 305 25140 92 4.4 1112 3.4 858 92**
- **3-03 2 305 31630 94 4.4 1396 3.1 984 94**

**COMESTAR LEE-ET**

**GTPI**

- CAN 5757117 100% RHA-NA TV TL
- CAN EX GM 8/03 10/26/1992

**PTA**

- -131M +12F +6P 99%R 8/2009
- +164NM 0.15SCSB 0.04DPR 7%US
- +2.2PL 2.96SCSB -2DPR 8%DCE
- +1.97T+1.32UDC+1.67FLC 99%R 8/2009

**ERNEST-ANTHONY TYRA-ET**

**CTPI**

- USA 126146756 100% RHA-NA
- 5-10 94 EEEE 2E GMD GMD 03/03/1998

**AGE X DAYS MILK DCRM % FAT % PRT DCRC**

- **2-06 2 305 25140 92 4.4 1112 3.4 858 92**
- **3-09 2 305 33470 94 4.3 1444 3.3 1333 93**

**1ST CT FAT & 1ST CT PROT**

- **365 42180 93 4.6 1931 3.4 1432 94**

**1ST CT PROT**

- **365 38650 94 4.7 1622 3.3 1293 94**

**1ST CT PROD & 2ND CT FAT**

- **3-08 2 305 37010 94 4.5 1678 3.3 1222 94**

**1ST CT PROD**

- **365 42180 93 4.6 1931 3.4 1432 94**

**LIFE**

- **1281 119220 3.4 5285 3.4 4085**

GTPI indicates genomic data was supplied to USDA.

Protein reported is true protein.
Glossary of Terms:

DAM OF MERIT (DOM)  
The Dam of Merit recognition is a permanent recognition for cows with over 87% RHA and higher. Eligible cows were born in the past 25 years and milking in a herd participating in the TriStar program. They must have CTPI values exceeding birth year cutoff and at least three offspring with a PTA for production and type. Twice each year Holstein Association USA automatically screens their database for qualifying cows.

GENETIC CODES

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Recessive or Dominant</th>
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<tbody>
<tr>
<td>BD</td>
<td>Bulldog</td>
<td>Recessive gene carrier</td>
</tr>
<tr>
<td>BL</td>
<td>Bovine Leukocyte Adhesion Deficiency (BLAD)</td>
<td>Recessive gene carrier</td>
</tr>
<tr>
<td>TL</td>
<td>Tested free of BLAD</td>
<td>Dominant gene carrier</td>
</tr>
<tr>
<td>TV</td>
<td>Tested free of CVM</td>
<td></td>
</tr>
<tr>
<td>DF</td>
<td>Dwarfism</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>Deficiency of Uridine Monophosphate Synthase (DUMPS)</td>
<td></td>
</tr>
<tr>
<td>TD</td>
<td>Tested free of DUMPS</td>
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</tr>
<tr>
<td>HL</td>
<td>Hairless</td>
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<td>IS</td>
<td>Imperfect Skin</td>
<td></td>
</tr>
<tr>
<td>MF</td>
<td>Mule-Foot</td>
<td></td>
</tr>
<tr>
<td>TM</td>
<td>Tested free of Mule-Foot</td>
<td></td>
</tr>
<tr>
<td>PO</td>
<td>Polled</td>
<td></td>
</tr>
<tr>
<td>PG</td>
<td>Prolonged Gestation</td>
<td></td>
</tr>
<tr>
<td>PT</td>
<td>Pink Tooth (Porphyria)</td>
<td></td>
</tr>
<tr>
<td>RC</td>
<td>Red hair color</td>
<td></td>
</tr>
<tr>
<td>B/R</td>
<td>Black/Red</td>
<td></td>
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<tr>
<td>TR</td>
<td>Tested free of red hair color</td>
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</tr>
<tr>
<td>CV</td>
<td>Complex Vertebral Malformation (CVM)</td>
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</table>

GOLD MEDAL DAM (GMD)  
A cow and at least three of her daughters must have been classified. The cow herself must also be milking in a herd participating in the TriStar program. TriStar published records are used in the evaluation. Automatic evaluation twice a year of all cows of 87% RHA or higher born in the past 25 years.

GOLD MEDAL SIRE (GM)  
Automatic evaluation twice a year of all sires 87% RHA and higher. Minimum TPI level, updated semi-annually, to recognize approximately 25 new bulls per year. Minimum reliability of 90% for PTA Fat and PTA Type. Bulls must be free of undesirable recessives and enzyme deficiencies.

LINEAR COMPOSITE INDEXES  
Linear composite indexes combine trait information on several related traits into one numerical value. This composite index can be used as a selection tool in breeding programs to identify those bulls which are predicted to transmit a desirable combination of the traits in the composite index. The four indexes are: Udder Composite, Body Size, Feet and Legs, and Dairy Capacity.
UDDER COMPOSITE INDEX
Fore Udder Attachment, Rear Udder Height, Rear Udder Width, Udder Depth, Udder Cleft, Front Teat Placement, and Rear Teat Placement.

BODY SIZE COMPOSITE INDEX
Stature, Strength, Body Depth, and Thurl Width.

FEET AND LEGS COMPOSITE INDEX
Rear Legs - Side View, Rear Legs - Rear View, Foot Angle, Feet & Legs Score.

DAIRY CAPACITY COMPOSITE INDEX
Dairy Form and Strength.

MULTIPLE-TRAIT ACROSS COUNTRY EVALUATION (MACE)
This process combines genetic evaluations from around the world. The data contributing to these evaluations comes from either one single country or from several countries (which may include the U.S.).

PRODUCTIVE LIFE (PTA)
Productive Life (PL) helps to predict an animal’s ability to transmit longevity in the milking string. PL is defined as the number of months in milk (with a maximum of 10 months per lactation) until the cow is 84 months old. PL evaluations for cows and bulls are computed using multi-trait methods which also include evaluations for milk, fat, protein, somatic cell score and three type composites.

PREDICTED TRANSMITTING ABILITY
Estimate of genetic superiority (inferiority) that an animal will transmit to offspring; PTA used for both males and females; cows born in 2005 average 0 (milk, fat, protein and type).

RELIABILITY
Measure of amount of information in the evaluation; information from the animal, parents and progeny are considered.

SOMATIC CELL SCORE
Somatic cell score (SCS) evaluations are based on transformed somatic cell counts, so that each increase of 1 SCS represents a doubling of the somatic cell count. Lower SCS is related to less mastitis and, in some cases, premiums are paid for low SCS. As a result, unlike many other traits, lower SCS is better. SCS evaluations are centered around the Holstein breed average of 3.10.

TOTAL PERFORMANCE INDEX (TPI) - As of January 2010

\[
\begin{bmatrix}
26(PTAP) + 16(PTAF) + 10(PTAT) - 1(DF) +10(UDC) + 5(FLC) + 14(PL) - 5(SCS) + 10(DPR) - 2(DCE) - 1(DSB) \\
19.4 & 23.0 & .73 & 1.0 & .8 & .85 & 1.26 & .13 & 1.0 & 1.0 & 0.9
\end{bmatrix} 3.7 + 1815
\]
TRISTAR LABELS

For production records starting after 1/1/1997
Premier ★★★
Deluxe ★★
Custom ★
Non-Pedigree Qualified (NON)

TYPE OF TEST

For production records starting after 1/1/1997

<table>
<thead>
<tr>
<th>TYPE OF TEST</th>
<th>DHIR</th>
<th>DHIA</th>
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<tbody>
<tr>
<td>Alternating AM/PM with a time monitor</td>
<td>APT</td>
<td>APM</td>
</tr>
<tr>
<td>Alternating AM/PM component sampling</td>
<td>APS</td>
<td>APC</td>
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<tr>
<td>Alternating AM/PM without a time monitor</td>
<td>APR</td>
<td>APD</td>
</tr>
<tr>
<td>Weights and component samples at monthly test milkings</td>
<td>DHR</td>
<td>DHI</td>
</tr>
</tbody>
</table>

Answers

Test Your Pedigree Knowledge Correct Answers

1. Jenny-Lou Patron Toyane
2. 9
3. +1919
4. Predicted Transmitting Ability
5. EX-90, 4 years and 7 months of age
6. Paternal grandsire
7. Hol-Star Outside Teera-ET (dam)
8. 99%
9. +38
10. Jenny-Lou Patron Toyane
12. +1067
13. CAN6026421 100%RHA-NA
14. 3/14/2007
15. 26,090 pounds
16. +2.6
17. +3.06
18. Sire
19. Dam
20. +.00%
21. Hol-Star Teary Durham (maternal granddam)
22. Somatic Cell Score

Practicing Pedigree Comparisons Answers

1. B
2. B
3. A
4. A
5. B
6. A
7. A
8. B
9. B
10. B
11. A
12. B
13. B
14. A
15. B
16. B
17. A
18. B
19. A
20. B
21. A
22. B
A variety of educational workbooks are available at www.holsteinfoundation.org