CLARIFIDE™

# Frequently Asked Questions

August 2010

## Pfizer Animal Genetics Enters the Dairy Genomics Market

**Q: Who is Pfizer Animal Genetics?**

A: Pfizer Animal Genetics, a business unit of Pfizer Animal Health, is the world's leading provider of comprehensive state-of-the-art genomic information and support services.

## CLARIFIDE™ Basics

**Q: What is CLARIFIDE?**

A: CLARIFIDE is a DNA-marker-based technology that provides a comprehensive genetic evaluation for each animal. CLARIFIDE is a 3,000-marker panel (3K) that delivers genomic predictions for as many as 30 production, health and type traits, and nine composite indexes, which provide insight into an animal's future genetic potential.

For more information and full trait definitions, please refer to "Understanding Your Results" at www.pfizeranimalgenetics.com.

| Production Traits | Abbreviation |
|---|---|
| Milk Yield | Milk # |
| Fat Yield | Fat # |
| Protein Yield | Pro # |
| Fat % | Fat % |
| Protein % | Pro % |
| Somatic Cell Score | SCS |
| Daughter Pregnancy Rate | DPR |
| Productive Life | PL |
| Sire Calving Ease | SCE |
| Daughter Calving Ease | DCE |
| Sire Still Birth | SSB |
| Daughter Still Birth | DSB |
| Individual Inbreeding | Ind Inbrd |
| Future Inbreeding | Fut Inbrd |

| Indexes | Abbreviation |
|---|---|
| Net Merit | NM$ |
| Cheese Merit | CM$ |
| Fluid Merit | FM$ |
| Breed Performance Index | BPI |
| Type – Final Score | Type FS |
| Udder Composite | UDC |
| Feet/Legs Composite | FLC |
| Body Size Composite | BSC |
| Calving Ability | CA$ |

| Type Traits | Abbreviation |
|---|---|
| Stature | ST |
| Strength | SG |
| Body Depth | BD |
| Dairy Form | DF |
| Rump Angle | RA |
| Rump – Thurl Width | RW |
| Rear Legs Side View | LS |
| Rear Legs Rear View | LR |
| Foot Angle | FA |
| Feet/Legs Score | FLS |
| Fore Udder Attachment | FU |
| Rear Udder Attachment | RH |
| Rear Udder Width | UW |
| Udder Cleft | UC |
| Udder Depth | UD |
| Front Teat Placement | FT |
| Rear Teat Placement | RT |
| Teat Length | TL |

**Q: How will CLARIFIDE help me with my dairy?**

A: CLARIFIDE is a selection tool to help identify young females with the greatest genetic potential for productivity across a broad range of traits. It provides the opportunity to accentuate the strengths of those with the greatest genetic merit, identify those animals best suited for alternative reproductive technologies such as sexed semen or embryo transfer, and address deficiencies to improve future generations. As a result, CLARIFIDE provides the immediate opportunity to accelerate the production capabilities of your herd through better genetic selection. Longer term, CLARIFIDE empowers better mating decisions across the inventory of tested females – which enables more effective production of superior females available for selection to produce the next generation of females in the herd.

Historically, most genetic progress has been made from the sire side of the pedigree from highly reliable genetic information known about bulls and how daughters perform based on their recorded production. On the female side, appreciably less reliable information for individual animals has come from limited production records and progeny. For the majority of traits, the number of progeny and production records required to achieve the levels of reliability available from CLARIFIDE genetic predictions exceeds what can be achieved in a dairy cow's lifetime.

CLARIFIDE results allow producers to make more informed selection, breeding and management decisions, and set achievable goals for improved genetic merit and production.

Q: What animals should I test?

A: CLARIFIDE is a genomic assessment tool designed for use in Holstein, Jersey and Brown Swiss females. Use CLARIFIDE to better predict the genetic potential of heifers as calves and maximize return on your investment in these animals. The average cost to rear a heifer is $2,150.[1] This is a significant investment with very little knowledge about how the animal will perform and what the animal will pass on to its daughters.

Test results can be used to more precisely select animals according to genetic potential and mate animals to complement genetic strengths and weaknesses. More timely identification of genetically inferior animals enables producers to more effectively manage feed, facilities, labor and capital resources.

**Q: When should I test animals?**

A: To take full advantage of CLARIFIDE results, test young heifers so results can be used to make your initial selection and breeding decisions, ensuring the greatest long-term impact throughout the animal's productive life. DNA collection can fit into an array of different age groups to meet the needs of the operation, such as:

- Birth to 40 days of age
- Young heifers (60 – 90 days of age)
- Breeding age heifers (10 – 12 months of age)
- Springer heifers (20 – 22 months of age)
- At freshening
- High-value cows

## CLARIFIDE Results and Data Reporting

**Q: How are CLARIFIDE results expressed?**

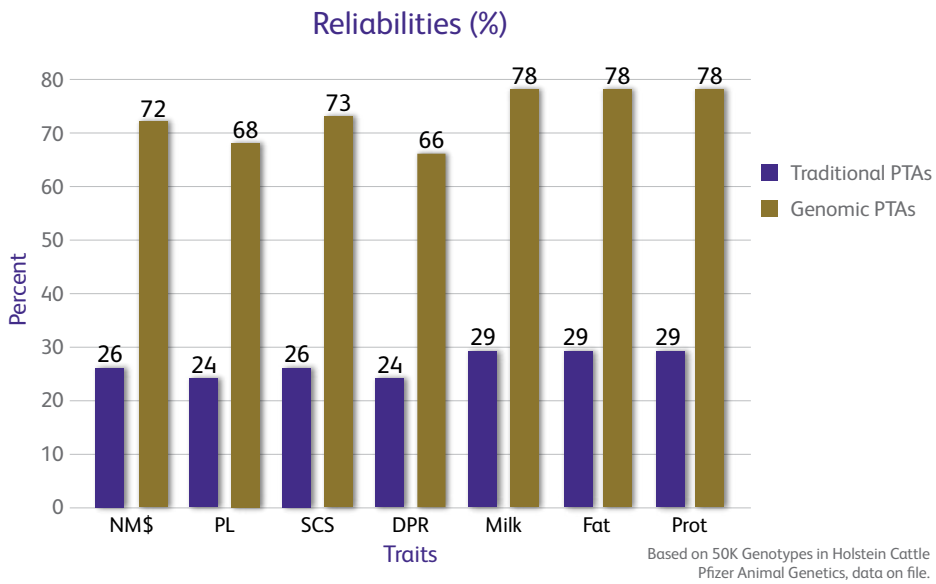
A: CLARIFIDE results are expressed as Genomic Predicted Transmitting Abilities (GPTAs). Each GPTA is expressed in units of the trait. A GPTA is one-half of the female's genetic-producing ability. For example, the GPTA for milk production is expressed in pounds of milk and the GPTA for productive life is measured in months.

Associated reliability values will be available for the core traits in the CLARIFIDE Customer Report.

**Q: What is the reliability of a GPTA and how does improving it help me make better decisions?**

A: Reliability values quantify the relationship between predicted and actual genetic merit. The higher the reliability, the lower the chance the animal's expressed performance will differ from the predicted performance.

For the majority of traits, the number of progeny and production records required to achieve the levels of reliability available from CLARIFIDE genetic predictions exceeds what can be achieved in a dairy cow's lifetime.




Based on 50K Genotypes in Holstein Cattle
Pfizer Animal Genetics, data on file.

# Implementing CLARIFIDE Results

**Q: How do I use the CLARIFIDE results?**

A: CLARIFIDE results enable more dependable selection, mating and management decisions for enhanced productivity and net return. Results can be used to identify replacements with superior genetic merit for productivity, make more informed mating decisions for genetic improvement, manage inbreeding and authenticate available pedigree information.

**Q: As a dairy producer, how would I benefit by using CLARIFIDE?**

A: Genomic predictions, such as GPTAs, are a way to enhance a producer's replacement heifer development program. This can be achieved by focusing resources on those females with the greatest genetic potential and making informed breeding decisions. The genomic predictions available through CLARIFIDE allow head-to-head comparison of candidate females, which helps make breeding and management decisions easier.

The example below compares three heifers that have very similar pedigree information available, but vast differences in Net Merit. CLARIFIDE can help select which females will generate the greatest profits and allow the producer to utilize this information with more confidence. Based on the example below, the producer would expect Heifer 2 to generate an additional $498 return ($124 + $125 = 249 x 2) over her lifetime compared with Heifer 1.

| Heifer | Net Merit $ | Reliability % |
|---|---|---|
| 1 | -124 | 62 |
| 2 | 125 | 63 |
| 3 | 48 | 62 |

**Q: Net Merit is the first index listed on the customer report. What is Net Merit and why is it important to pay attention to it as I review the CLARIFIDE results?**

A: Net Merit is an index that expresses the expected lifetime profit of a female compared with the breed base, utilizing economically relevant traits related to yield, health, longevity and calving ease.

Net Merit measures the potential profit an individual animal generates for your dairy operation. In a commercial dairy population, animals tested with CLARIFIDE showed an extreme range in Net Merit dollars generated over the animal's lifetime. The chart below outlines the difference between the lowest and highest animals of $419. This GPTA NM$ difference would equate to $838 ($224 + $195 = 419 x 2) over their lifetime.

| | Minimum | Maximum | Dollar Difference |
|---|---|---|---|
| Net Merit $ | -224 | +195 | 419 |

**Q: Individual inbreeding and future inbreeding values are listed on the customer report. How will I be able to use that in making breeding decisions?**

A: The inbreeding values, based on the degree of homozygosity of the CLARIFIDE marker panel, can be used to effectively manage inbreeding accumulation in the herd.

- Research has documented a negative impact of $22 per cow per year for each 1 percent increase in inbreeding.[2]
- These genomic inbreeding measures help producers pinpoint females with high inbreeding coefficients and make mating decisions to service sires with less related or unrelated pedigrees.

**Q: Which breeds can be tested with CLARIFIDE?**

A: CLARIFIDE is breed-specific for females within the Holstein, Jersey and Brown Swiss populations. At this time CLARIFIDE is not validated in crossbreds; therefore, AIPL will not report results.

**Q: What is Pfizer Animal Genetics' plan for future offerings?**

A Pfizer Animal Genetics is making significant investments in research, people and systems that will further enhance the application of genomics for improved breeding and management decisions such as production, health and reproduction, and other economically important traits.

## Customer Service Details

**Q: How can I order a CLARIFIDE test?**

A: To order a test kit, choose from one of the following:

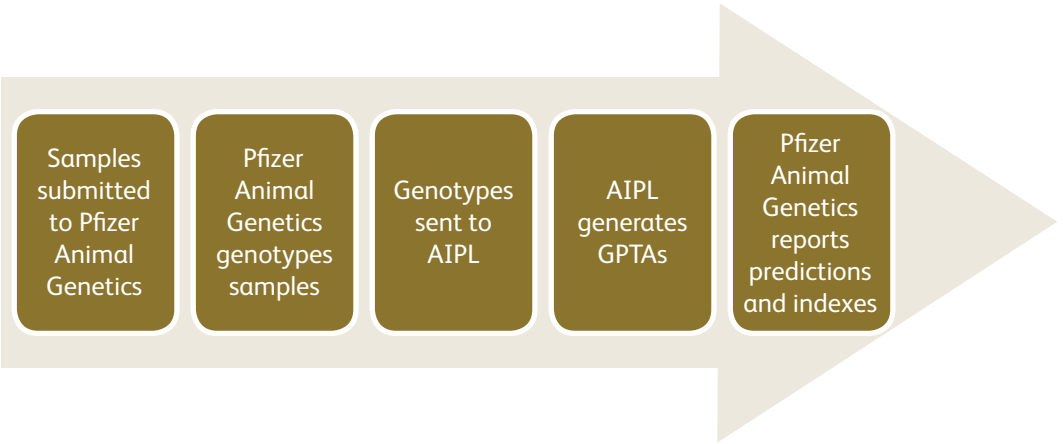
1. Download an order form at www.pfizeranimalgenetics.com
2. Call Pfizer Animal Genetics Customer Service at 877-233-3362

**Q: When should I submit samples for CLARIFIDE testing?**

- For your convenience, we accept and welcome sample and order submissions at any time and will process them in the order in which they are received.
- To meet the USDA Animal Improvement Programs Laboratory (AIPL) deadlines, samples must arrive at the Pfizer Animal Genetics laboratory in Kalamazoo, Mich., no later than the dates listed below. Customers should expect results by the corresponding dates in the right-hand column.

| Deadline for Samples Received at Pfizer Animal Genetics | Reported to Customer |
|---|---|
| Aug 9 Mon | Sep 9 Thu |
| Sep 13 Mon | Oct 14 Thu |
| Oct 4 Mon | Nov 4 Thu |
| Nov 1 Mon | Dec 9 Thu |
| Dec 6 Mon | Jan 13 Thu |

- Submitted samples will be processed following the steps below:



**Q: How will the results get reported to me, and am I able to contact Pfizer Animal Genetics for additional technical advice on how to use the individual animal results?**

A: Your CLARIFIDE results are reported electronically in an Excel® spreadsheet that contains several views of the information for simplified review and ease of data analysis. Additionally, we will provide an Understanding Your Results reference tool. Please feel free to contact Customer Service at 877-233-3362 if you have additional questions. A sample report may be viewed on our website at www.pfizeranimalgenetics.com.

**Q: What types of DNA samples are recommended for CLARIFIDE testing?**

A: Blood cards, whole blood or hair samples will be accepted for CLARIFIDE testing. The following table lists the amounts needed for each sample type for testing and which sample types should be utilized based on the age of the animal:

| Sample Type | Amount Required | Age of Animal |
|---|---|---|
| Blood cards* | 1 FTA blood card, not oversaturated | All ages |
| Blood* | 3 ML in purple-top tubes, refrigerated | All ages |
| Hair | 1 hair collector with at least 20 to 30 intact hair bulbs (hair roots, follicles) | Animals older than 4 months of age |

*For twins, hair is the only accepted tissue source.

CLARIFIDE helps dairy producers identify the females that—along with their offspring—will be the genetic foundation of the herd for years to come.

For more information about CLARIFIDE, visit www.pfizeranimalgenetics.com or call 877-233-3362.

Pfizer Animal Health
Animal Genetics

CLARIFIDE™

Predict the future now.

References

1 Zwald A, Kohlman TL, Gunderson SL, Hoffman PC and Kriegl T. University of Wisconsin. Economic costs and labor efficiencies associated with raising dairy herd replacements on Wisconsin dairy farms and custom heifer raising operations. 2007. Available at: http://www.sheboygan.uwex.edu/ag/dairy/documents/CostofRaisingHeifers-2007ICPAReport.pdf. Accessed July 23, 2010.

2 Smith LA, Cassell BG, Pearson RE. The effects of inbreeding on the lifetime performance of dairy cattle. *J Dairy Sci* 1998;81:2729-2737.