

MyAgSource, an online decision aid and herd management analysis tool developed to address the changing information management needs of US dairy producers and consultants.

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Abstract:

The dairy industry is an agricultural leader when it comes to the adoption of new technologies. The use of modern technologies in the dairy industry makes perfect sense. It has led to improved production levels, animal well being, animal health and has allowed producers to achieve significant gains in efficiencies. Through the use of technology, producers can manage larger numbers of animals and still provide the level of individual animal care and monitoring you would normally achieve in a smaller sized dairy.

One of the side effects of implementing new technologies has been the explosion in daily data generated on a single dairy cow. Modern, monthly Dairy Herd Improvement data collection includes approximately 70 data points per cow per lactation. With the newest parlor systems, one will be able to collect almost 5,500 pieces of production data during a single lactation. If you add milking times and daily values for cow activity and rumination to this mix, that adds another 1,500 pieces of data during a single lactation. Due to the growing number of diagnostics, it is unlikely we will see a slow-down in data generation.

With the rapid growth in on-farm data, the role of dairy record processing centers in providing dairy record management information back to producer will also change. Day to day cow management reports can easily be created using on-farm information systems. Most of the on-farm systems collecting daily data have easy to use reporting functions that condense the data down to useable cow based information that can be accessed by the various individuals working on the farm. However, the challenge comes when one wants to look at the overall herd management picture on a farm and how this compares to other farms. To achieve this, one needs access to data from multiple sources, multiple animals and collect data over a longer duration of time stored in a centralized database.

AgSource has taken the first step by developing MyAgSource. MyAgSource is a cloud based dairy records information system giving dairy producers 24/7 access to their DHI information. Aside from the traditional cow based reports more complex decision aid and herd management analysis tools data can be accessed online and easily interacted with by producers and consultants using PC based or mobile technology without the need to install a local application.

Keywords: R.H. Fourdraine, decision aid, data management, cloud based information, mobile technology

Introduction

The milk recording data collected by the US Dairy Herd Improvement (DHI) Associations and processed through the US dairy record processing centers have led to many advances in dairy herd information management and technology. The information derived from DHI data has allowed the dairy industry to improve dairy management practices related to genetics, animal health, reproduction and nutrition. As dairy management practices evolved over the past 40

years, so have dairy information management systems. In the 1970's, dairy records were calculated on paper then in the 80's paper was replaced with data entry into mainframe computers. Today, with advancements in PC technology more of the data and record management now takes place on the farm and the internet is used to transmit data to a centralized server based system.

While the number of US dairy farms has continued to decline, in recent years the total number of US dairy cows has remained fairly stable. As dairy farm operations grow in herd size and try to meet consumer and regulatory needs, they have to remain profitable. To meet these challenges, dairy producers will have to continue to innovate and employ the latest in management practices and technology.

Changes in on farm data capture systems

The DHI technician collects more than events based data such as breeding information, calving dates, health events, and so on. Under the standard US DHI milk recording program once a month a DHI technician also collects milk weights, milking times (with electronic milk meters) and a milk sample. The milk sample is analyzed for milk components (milk fat, protein, lactose, and possibly milk urea nitrogen), and somatic cell count. On a typical lactation (305 day) production record, this results in 70 data points per cow per lactation.

With the rapid evolution in on-farm data capture systems, such as parlor based data collection, milk diagnostics, feeding systems, and real time animal monitoring technology on-farm parlor systems now collect daily milk weights, milking times, milk component data (fat and protein), milk progesterone and conductivity at each milking. On a typical farm milking 3 times per day, over a single lactation this means $6 \times 3 \times 305$ or 5,490 data points per cow are collected. Real time measures such as cow activity (read three times a day in the parlor), rumination and feeding information, can easily add another 1,525 data points for each cow in a single lactation. As a result dairies will see an explosion of data generated on the farm. For a 1,000 cow dairy, the result is millions of data points loaded into the producer's on-farm computer.

As the amount of data generated on a single farm continues to grow exponentially, providers of dairy information management systems have to re-evaluate how they can continue to meet the short and long term information management needs of the future generation of dairy farms.

Daily attention lists

The on farm data capture systems have local PC software components to manage the data collected from the various equipment. Data is collected and stored in a local computer and are predominantly used to generate "daily attention lists". These daily attention lists identify cows for a specific purpose. The purpose may be an attention list for cows that need to be bred, cows that have a health problem, low producing cows, etc. These lists are generated using the most current data on single animals and select animals based on certain inclusion or exclusion criteria. Generally these lists do not involve in depth analysis of multiple data sources, or work across multiple animals. These attention lists allow producers with real time monitoring systems and parlor information to focus on those animals needing attention and allow them to manage a large group of animals very efficiently on a day to day basis.

The creation of daily attention lists are best addressed at the farm level using PC based software and local databases. Current on farm data capture systems provide software that meets these needs.

Herd management information needs

The day to day individual cow management needs are well met through the use of daily attention lists run from local PC based software and databases. The ongoing challenge is related to the overall herd management information needs that require more in depth analysis. To generate overall herd management information, the producer or consultants generally turn to analysis or individual cow decision support tools that evaluate larger sets of data collected over a period of time and potentially from multiple data sources. The output of these analysis and decision support tools allow producers or consultants to determine if specific management strategies are having a positive effect on overall profitability and allow them to make more informed decisions.

AgSource's exclusive analysis tool, the Fresh Cow Summary analyzes the herd's transition cow management program. The AgSource Fresh Cow Summary (figure 1) features the patented Transition Cow Index® (TCI®) which is calculated on second or greater lactation cows soon after the cow freshens. TCI® takes into account multiple data points from the current and prior lactations, and provides analysis of multiple indicators that are important to the transition cow management program.

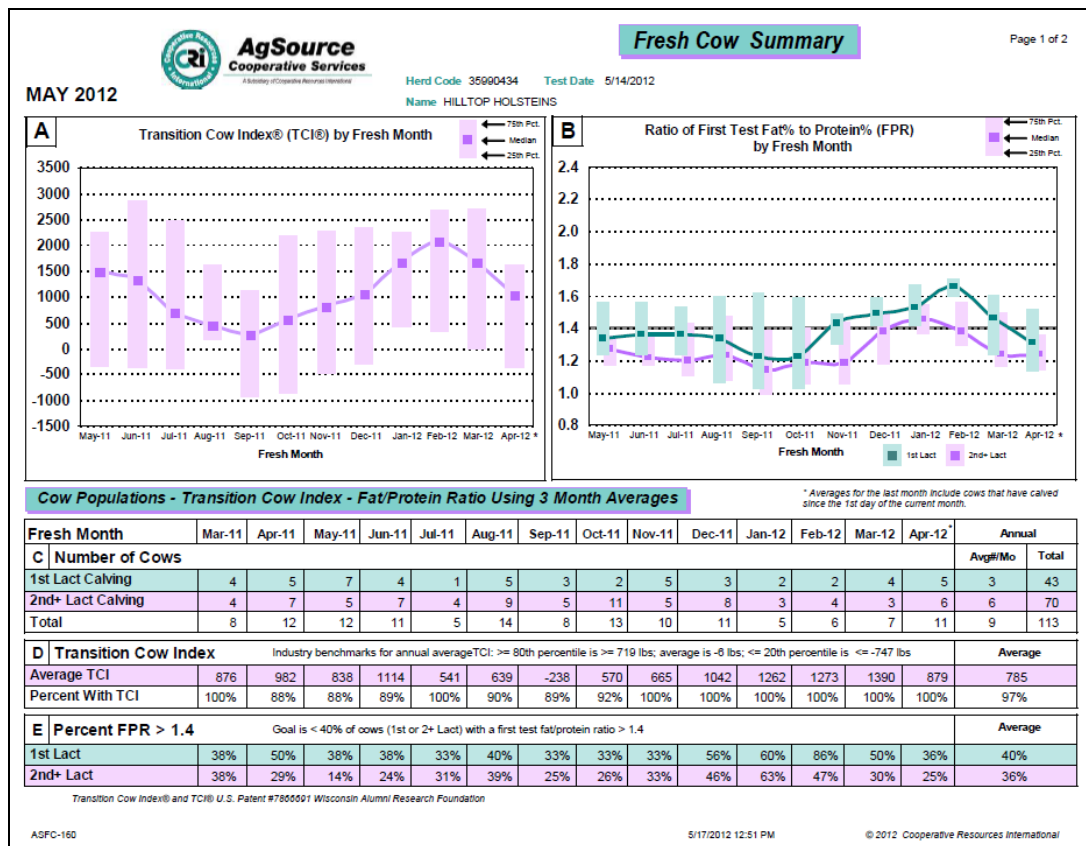


Figure 1. AgSource Fresh Cow Summary Sample.

AgSource's Herd Selection Guide is a decision support tool that takes multiple sources of data into account. The Herd Selection Guide takes the production, udder health, reproductive and genetic information on lactating cows and combines this with financial information about milk price, feed costs, replacement cost and salvage value and establishes a relative value for each cow comparing her to an average replacement animal using the Cow Value Calculator developed by Dr. Victor Cabrera from the University of Wisconsin Dairy Science Department.

As on farm data capture systems and real time monitoring systems become more popular there will be a greater need to develop new data collection and information delivery. Because the data sets will be much larger and will include data not previously recorded through the standard DHI Milk recording system there will be a need for more powerful tools to perform in depth timely analysis.

Evolution of dairy information management systems

As the dairy information management needs of dairy farmers continues to evolve, the rapid adoption of cloud based technology using high powered server based systems coupled with high speed internet access is a viable solution that provides dairy producers with a solution to the long term data collection and information delivery needs. Paper reports generated monthly cannot keep up with a producer's fast-paced business needs.

AgSource has taken the first step by developing MyAgSource which is a cloud based delivery system featuring most AgSource DHI reports available to dairy producers and consultants using either an internet capable PC or mobile technology. Data is stored on virtual machines using a Microsoft SQL Server database and a web-based application developed using PHP. MyAgSource can be accessed through a simple internet browser and does not require the installation of a local application. Over time this will minimize costs associated with support and maintenance of locally installed software.

To add additional value, MyAgSource allows users to interact with the data by incorporating sorting, graphing, and selection functionality. Another feature is the use of static benchmark data allowing producers to compare their data with other herds (figure 2). A feature currently under development allows for dynamic benchmarking which will allow the producer to generate the benchmarks real time.

DHI data calculated by the AgSource dairy records processing center supporting the MyAgSource application is transmitted after herd records are calculated. Producers are notified via e-mail that new information on MyAgSource is available.

Herd Overview
80th percentile is derived from HO herds with 500-1000 animals.

Metric	Curr Test	Trend	Prev Test	80th %tile
Daily Milk Production	89.7	-	91.5	92.4
MLM	96	+	93	97
% Fat	3.82	+	3.61	3.9
% Pro	3.29	+	3.21	3.2
Lact 1 Peak Milk	94		94	94
Lact 2 Peak Milk	121	-	122	122
Lact 3+ Peak Milk	132	-	134	130
Lact 1 Linear Score	2		2	1.7
Lact 2+ Linear Score	2.5	-	2.3	2.2
Weighted Avg SCC	143	-	115	142
% New Infections	7	-	5	7
% Chronic Infections	61	+	68	46
Lact 1 New Infections	11	+	12	11
Lact 2+ Dry Period Cures	80		80	82
Avg TCI®	568	+	492	920
Service Rate	56		56	58
Preg Rate	23		23	42
Preg Loss Rate	10		10	4
% Left	43		43	32.5
% Left < 60 DIM	6		6	6

Figure 2. MyAgSource Herd Overview.

Two of the big benefits of using a cloud based system hosted by a professional data center are the low startup costs and scalability. As data volume and processing needs continue to grow, the IT infrastructure supporting MyAgSource is easily scalable by adding more storage space, memory or processing power. Having this level of scalability available will allow support costs to be balanced with usage and the revenue generated via MyAgSource. A third benefit is that AgSource development staff can focus on developing new features and enhancements while data center staff is responsible for the operations, monitoring, security and maintenance of the IT infrastructure that supports MyAgSource.

Conclusion

AgSource has taken the first step developing a long term solution that will provide dairy producers and consultants and online tool that provides herd analysis and decision support tools 24/7. Future development will include collection of on-farm data, enhancements to the benchmarking capabilities, new analytical tools and provide greater opportunity for the users to interact with the information contained in MyAgSource.