Industry Presentation
The New Era of Herd Management
with Today's Lower Cost Identification Systems

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Identification, Software and Technology Help Large Herd Managers Retain Individual Cow Management Attention, Regardless of Herd Size

Back when average herd size was 50 cows or fewer; it was easy to manage cows individually. As herd sizes increase, however, it becomes harder to make sure each cow gets the attention she needs. With animal health and reproduction programs that require regular cow handling, individual cow management is even more critical.

New advances in identification, software, and equipment technology allow dairy producers the opportunity to manage larger herds while still providing individual animal attention. A message often missed when looking at *low cost ID*. The tag is only a small part of the investment. When incorporating an electronic identification tag for herd management purposes, there needs to be a system to harvest information. The electronic tag does not accomplish anything on its own. It is only an integral part of a larger dairy management system. An example of a complete herd management system that is integrated together to provide solutions to dairy producers is shown in Figure 1. We call it Dairy Management System 21 (WestfaliaSurge, Inc., Naperville, Illinois).

HOW IT WORKS

New management systems need 3 critical components to work seamlessly:

- Individual animal identification,
- A user-friendly computer software program, and
- Equipment to read individual animal identification quickly, consistently, and accurately.

Basic cow identification can be done using radio frequency identification (**RFID**) devices embedded inside ear tags, neck chains, or leg bands. For more extensive information, such as animal activity and to monitor certain health events, neck or leg worn devices containing more robust technology are needed. All devices are read by readers stationed in places animals frequent, such as the milking parlor, sorting gate area, or weigh scales. Tags may also be read in remote locations with the use of a hand held computer, wand type tag reader, and software such as DPMobile II. The data collected can be used to determine an animal's condition at a specific point in time or identify an animal within a group of cows.

The information that is collected is downloaded to a computer where management software programs, such as DairyPlan C21, take this data and turn it into useable formats; so that information from
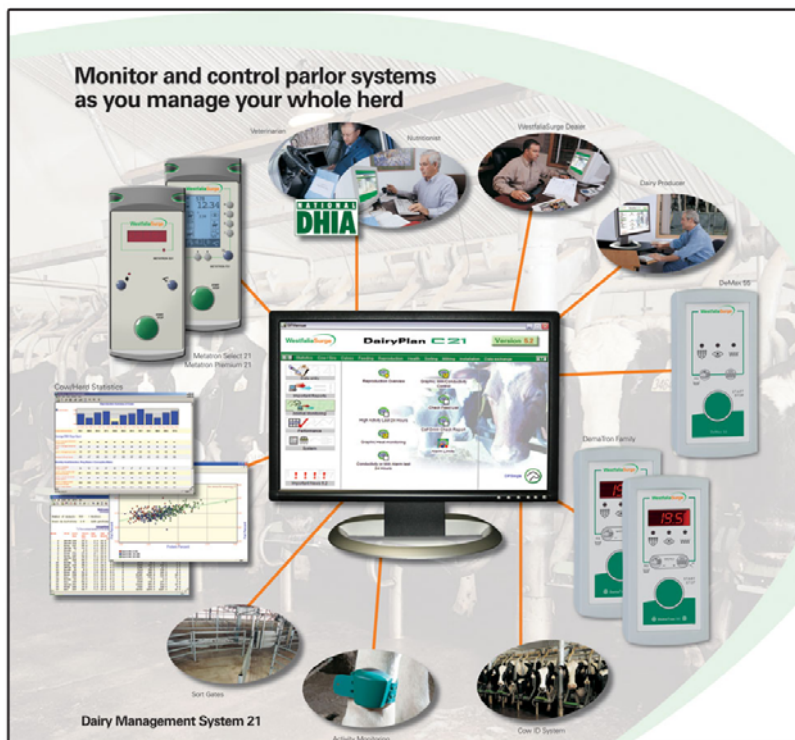
Figure 1. Dairy Management System 21.

individual cows can easily be tracked and analyzed by the dairy producer.

Using software-generated reports, the herdsperson is able to identify a list of cows in need of attention. The management lists pull together exactly what is important to maintain compliance on the dairy. If you only want to pay attention to activity reports to identify cows in heat, or you want to look at cows with decreased milk production and rising somatic cell counts, you are able to do so. With the data available, producers can easily use the software program to focus on specific management areas.

When this information is fed back into the barn to an automated sort gate system, animals can be sorted to a pen or palpation rail for further handling as they leave the parlor. Once cows are separated, the herdsperson can consult the computer to find out why the cow was sorted from the group and, based on the cow's information, an informed health decision can be made for that individual cow.

So, from the comfort of your office, problem cows can be identified and pulled from the string every day.

FINDING PROBLEMS EARLY

When used to its full benefit, this new technology pays back in key ways.

- **Early identification of health problems**. Measuring conductivity levels in the parlor can identify possible mastitis cases early, sometimes earlier than they could be identified by visual detection. Because the information is collected multiple times per day, slight increases in somatic cell counts or decreases in milk production can be flagged and cows can be checked.

Activity reports also indicate when cow movement is outside a normal range, indicating a potential health problem. Identifying health problems early, allows producers to treat animals at a period in the disease cycle when they have a greater chance to recover in a more timely fashion. It also saves on veterinarian and pharmaceutical costs.

- **Greater labor efficiency.** In this system, the sort gate separates individual cows so managers can get to problem cows earlier, rather than spending time looking for and sorting them from the whole herd. Labor is more efficient because employees don't need to spend part of their day watching cows in each pen for health problems or heats. Instead

they can get the answers quickly by consulting the software program.

Using this new technology allows producers to monitor overall herd health while still focusing attention on the cows that need it most. Some producers have improved their reproductive efficiency as well, using the system to either improve heat detection through the use of activity reports or improve compliance with estrous synchronization programs by identifying and sorting those animals that require hormone therapy or insemination.

Whatever your needs, there is ample opportunity to take advantage of what new technology can offer. No matter the herd size, this technology can give your cows

Table 1. Type of recordkeeping system or animal identification used on U.S. dairies (adapted from USDA, 2007).

Record System	Percent Operations Based on Herd Size (Number of Cows)							
	Small (< 100)		Medium (100-499)		Large (≥ 500)		All Operations	
	%	SE	%	SE	%	SE	%	SE
Handwritten	77.9	1.5	67.2	2.1	38.1	2.8	73.5	1.2
DHIA	42.4	1.7	56.5	2.3	50.5	2.9	45.9	1.4
Non-DHIA off-farm computer record system	2.7	0.5	10.9	1.4	10.0	1.5	4.9	0.5
On-farm computer record system	9.3	1.0	37.8	2.2	82.7	2.1	19.4	0.9
Other system	4.0	0.7	5.9	1.2	3.2	1.0	4.4	0.6
Any record-keeping system	*94.2*	*0.9*	*97.0*	*0.9*	*99.8*	*0.1*	*95.1*	*0.7*

ID Type	Operations		Cows	
	%	SE	%	SE
Ear tags	86.5	1.0	94.0	0.5
Collars	12.7	0.9	10.3	0.9
Photograph or sketch	13.3	1.0	4.4	0.4
Branding	4.4	0.5	13.2	1.1
Tattoo	7.7	0.6	8.5	0.9
Leg bands	3.0	0.4	2.9	0.5
Electronic	4.1	0.5	9.0	0.9
Other	7.7	0.8	4.7	0.6
All Identification	*93.0*	*0.8*	*97.4*	*0.4*

the individual attention they need to remain productive and profitable.

ON-FARM COMPUTER USE AND ELECTRONIC ID SYSTEMS

Dairy producers cite individual ID as crucial for managing animal health and performance, based on the USDA's comprehensive "Dairy 2007" National Animal Health and Monitoring report (Table 1). Of the dairies surveyed, less than 50 % of them used a computerized recordkeeping system of any kind with less than 25 % of them using an on-farm computer. Of large herds (over 500 cows), 82.7 % used an on-farm computer record system. This statistic indicates that when cow numbers increase additional technology is required to manage properly.

Unfortunately, with this many on-farm computers, various methods of electronic ID were used on only 4.1 % of operations, accounting for 9.0 % of cows. Initial investment of these electronic ID systems and the individual cow tags has been the largest factor for the slow adaptation of these products. With the introduction of lower cost (per animal) ID systems, more dairies will have the opportunity to incorporate electronic identification for herd management purposes.

Questions to Consider When Selecting a Herd Management System Using Electronic Identification

How to choose which RFID tag fits the needs of your dairy?

- Tags should be ISO norm 11784 and 11875 compliant. Most tags available today meet these specifications and are available in

half-duplex or full-duplex. Both technologies work well and most hand held readers will work with either format. The differences can be explained simply. Half-duplex is similar to a walkie-talkie. You are either talking or listening. A full-duplex system is similar to a phone; you can talk and listen at the same time.

- Make sure that if you are planning to add automated peripherals, that the manufacturer will read the tag you purchase. Tag read ranges vary greatly. Many of the lowest cost tags on the market are meant to be read by a hand held reader. In this instance, a person would have a second or third opportunity to properly read the tag. If using a sort gate, for example, you have one opportunity to read the tag. If the tag is not read, the cow will be in the barn and not in the sort pen causing extra labor, etc.

- Ask yourself if you want to invest in National Animal Identification System (NAIS) compliant "840" tags? These tags require a premise registration, animal registering, and animal tracing. They are to be used only once and the tag number is retired with the animal.

- Lastly, determine if you want a tag that can be used for your herd management purposes only? Many tags are not "840" compliant and may be re-used if the animal leaves the premise. These tags are not tamper resistant and would not meet the NAIS guidelines.

Figure 2. Examples of radio frequency identification tags (all meet the ISO Norm).

What would you like to accomplish with your investment?

- Do you want to identify animals in remote locations only? This can be accomplished with a palm type hand held computer with software and wand style tag reader. This type of system is very economical and may have a quick payback.   Efficient use of labor is the major factor. Instead of scanning paper lists to find the action required for a specific cow, a quick scan will directly link the operator to the animal and the task required. Another benefit is improved accuracy because there is less chance of human error. Ease of use in adverse conditions such as low light or inclement weather allow for more efficient labor utilization.

- Would you like to identify animals in the milking parlor? Parlor identification can be configured as a portal (walk through) or individually at each stall. Portal ID can be very accurate with a few considerations. Antenna placement is crucial and

location should take into consideration cow traffic and style of entrance area. Individual stall ID systems seem to have the highest accuracy because of an antenna at each stall. They are also the most expensive. Remember, if you are choosing this system for herd management, accuracy of information and not cost should be the driving factor.

Ear tag ID systems are influenced by many outside factors, such as interference from metal in the antenna area and electrical noise. Electrical noise has been a major influence on accuracy. Due to the smaller coils in the ear tag, the signal is not as strong as found in larger tags, affecting read range. Steel in the antenna area may absorb some of the field, reducing the reading range. Electrical noise can be caused by many factors, including but not limited to, fluorescent lighting, metal rubbing against metal from parlor stalls, variable frequency drives on vacuum suppliers, and well pumps. Isolation using proper cabling, nylon bushings, and proper lighting controls will help eliminate excess electrical noise.

- What information would you like to gather (such as activity)? At this time, all low cost tags are ID only. To gather animal activity for breeding purposes, a pedometer style tag (Rescounter II) would be incorporated. The additional investment per cow is sizeable. The benefits of activity monitoring for breeding purposes and health monitoring are well proven and might be the best option for your

specific dairy. The willingness of the operator to make the investment and embrace the technology is key to the success of activity monitoring.

- Would you like to gather daily milk weight and conductivity information? It would be best to choose an ID system that would be compatible with a milk meter manufacturer and the software program to process these milk weights. Conductivity measurement detects changes in the salt levels in the milk and is an excellent indication of infection or injury to the udder. Remember, the information recorded is only useful when the software utilized will give you management reports in a timely, accurate, and useful manner.

- What peripherals would you like to incorporate in your system for added labor savings, such as sort gates, weigh scales, or concentrate feeding? With the incorporation of ear tag identification into automated sorting systems, this labor saving equipment is becoming very popular with large herds. Dairy facility design has incorporated sorting systems into special needs areas. This eliminates the need for headlocks for all animals throughout the facility providing savings in equipment and allowing better utilization of bunk space.

This can also help the herd manager and his assistants become more efficient. In many cases, the veterinarian and herd manager work exclusively in the special needs area for an entire shift. The cows come to them allowing better utilization of

time and equipment. On dairies with properly designed special needs areas there is no wasted time driving to the cows.

Dairies have also noticed the elimination of fluctuations in milk production due to disruption of cattle in their pen. Reduced milk production has been documented on many dairies the day of herd check, dry-offs, and culling. When cattle are gently sorted while exiting the parlor, there is less disruption of the entire group. Fewer employees amongst the cattle have lessened injuries to cattle and employees as well.

- Which herd management software should you choose? There are many options for herd management software, such as DairyPlan C21. Compatibility with the reader and other peripherals you would like to incorporate is very important. Technical support before, during, and after your purchase should be considered as well. Flexibility and ease of customizing reports will help you utilize the software efficiently. Many programs have limited report capability. Asking questions of current users or acquiring a demonstration program will make you comfortable with the software purchase.

Some programs do not support peripheral equipment that you might want to incorporate in the future. Today you may be looking to utilize only a hand held reader. As happens with many investments, the initial investment payback will lend to incorporating more management

tools, such as a sort gate or milk metering. Make sure your initial choice allows you to add these items without starting over completely.

CONCLUSION

When looking at all of the information being circulated today about low cost ID systems, remember that cheaper is not always better. When your dairy decides to incorporate electronic ID with a herd management system, the cheapest tag might work fine with a hand held reader, but might not accurately read as the cow walks through a portal identification loop at the parlor entrance or sorting gate.

Investigate what is available today and what will fit your budget and herd management goals. Don't neglect to think a few years down the road to the possibilities of incorporating more tools to make your dairy more efficient.

The concept of individual electronic ID is not new. WestfaliaSurge has over 30 yr of experience with electronic ID of individual cows. We are currently on our fifth generation of RFID tag. With the advent of lower cost ear tag type systems, it will open doors to many more dairies providing added herd management capabilities through the electronic tracking of animals along with more accurate record keeping. This in turn, leads to operations that are more efficient and profitable.

LITERATURE CITED

USDA. 2007. Dairy 2007, Part 1: Reference of Dairy Cattle Health and Management Practices in the United States, 2007. USDA-APHIS-VS, CEAH. Fort Collins, CO. pp 8-10.