


**WHAT ARE YOU THINKING?
MANAGING EMPLOYER AND EMPLOYEE
EXPECTATIONS ON THE DAIRY FARM**



 Cornell University
College of Agriculture and Life Sciences
PRO-DAIRY Program

Conference & Annual Meeting
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Top challenges on the dairy?

- **Difficulty of hiring and retaining qualified employees.**



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Dairy Farm Challenge:

- **Increasing cost of labor.**
- **Second greatest expense – just behind feed expense.**



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Dairy Farm Challenge:

- **Interface between labor productivity and cow productivity.**
- **Increased labor productivity = Increased cow productivity.**



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Challenge to Dairy Labor Productivity?

- **Turnover!**
- Turnover is the single factor with the biggest impact on dairy labor productivity.



Costs of Turnover?

Losses can be seen and measured in multiple categories:

- Productivity
- Recruitment
- Selection, hiring
- Safety issues
- Investment in employee orientation and training



Turnover rates?

- Employee turnover = # of employees leaving **divided by** the average total number of employees, **multiplied by** 100 (to give a percentage value).



Turnover Cost Calculations?

- Estimates are 150 to 250 percent of an employee's annual wage.
- Employee making \$10-12/hour
- Turnover cost = \$37,500 to \$45,000 at 150%



**Add
it up:**



- Dairy farm with 20 employees and 10% turnover . . .
- Cost is \$75,000 to \$90,000 per year.

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Reasons for Turnover?

- Research = Exit interviews and follow-up surveys
- **Top reasons given?**
- Compensation and benefits top the list
- Working conditions
- Lack of time off



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How accurate are these reasons?

All dairy producers **should** give due attention to working conditions, communication, employee motivation – to retain workers.

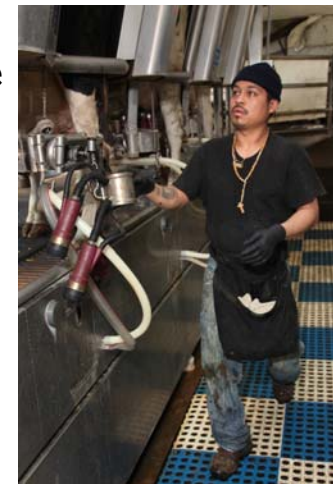


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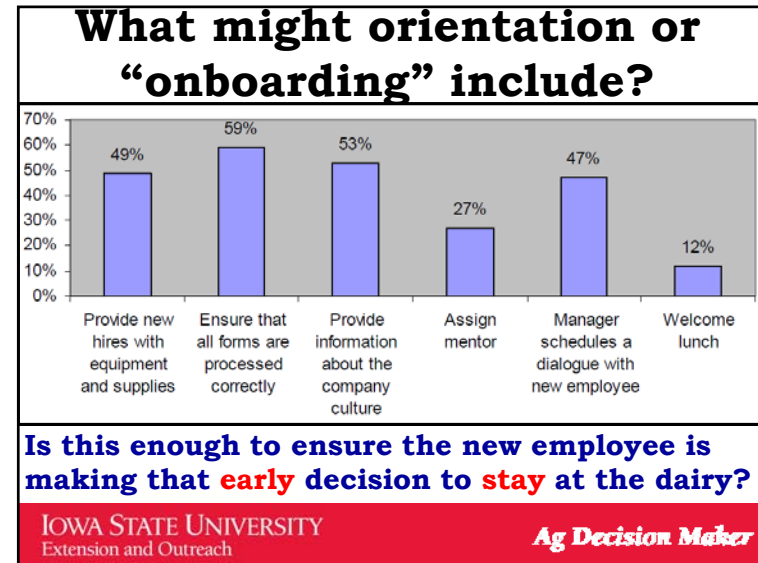
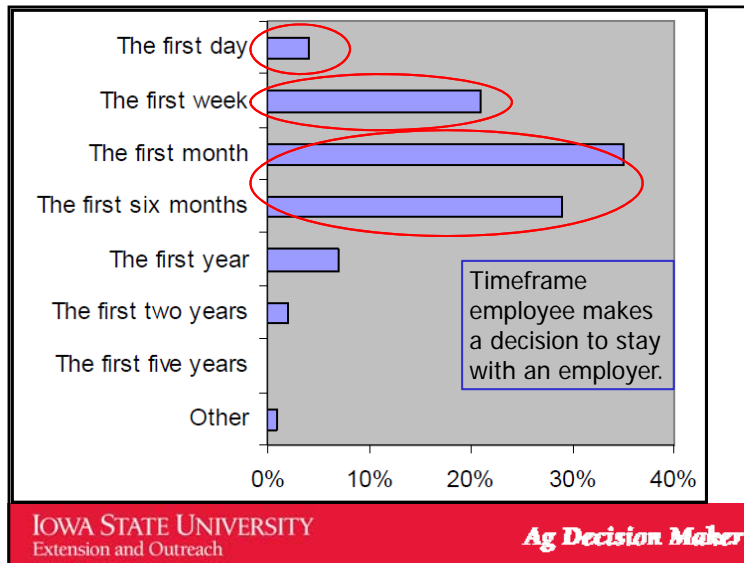
But **when** do employees make a decision to leave?

- Research:
- 90% of employees make their *stay-or-go* decision within the **first six months**.



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Recruitment and Hiring?

- **Significant investment in the processes of recruitment, interviewing, reference checks, evaluation, selection**

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Without a good start on Day One . . .

. . . all those hiring efforts can quickly go **"down the drain."**

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What difference does **Orientation** really make?

- They were hired to do a job.
- Shouldn't we just get them working and productive as quickly as possible?
- Research says otherwise:



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Orientation Group A:

- Senior leader spent 15 minutes discussing ways in which "working here will enable you to express your individuality."
- New employers ranked their individual strengths they would exhibit if stranded on a life raft at sea; spent time discussing /considering how their responses might differ from colleagues'.
- New employees answered questions about individual strengths such as, "What is unique about you that leads to your happiest times & best performance at work?" – then spent time discussing and sharing this.
- New employees were given fleece sweatshirts embroidered with their individual names, along with a name badge. They were asked to wear them throughout training.



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Orientation Group B:

- Senior Leader and a lead worker spent 15 minutes talking about why this is a great place to work.
- New employees spent 15 minutes writing answers to questions such as, "What did you hear about our Company today that you would be proud to tell your family about?"
- They discussed their answers.
- New employees received fleece sweatshirts embroidered with the company name, along with a badge. They were asked to wear them throughout training.



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Seven Months Later . . .

- Turnover rate in Group B was **47.2%** higher than that of Group A.
- Group A earned higher customer satisfaction scores during the seven months than those in Group B.



What difference could it make to your cows? – to the KPIs on your dairy? Productivity?

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What **Four Questions** do Millennials* ask after the **First Day** on the Job?



*18 to 33 years old,
born 1981-1996

- Why did they hire me for this job?
- Will I enjoy working here?
- Are any of my coworkers *friend* material?
- Who can I talk to about . . . ?

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Orientation Starts Early: **Establish the Start Date**

When the employment offer has been accepted, a start date should be agreed upon as soon as possible.



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Before that start date . . .

Inform the new employee of **what** will happen on the **first day** of work.



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Clearly Communicate . . .



What time they are expected to arrive – **plus** other basics!

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It may seem fundamental to the producer --

-- but, focus on the new worker.

- ▶ Reduce nervousness, apprehension.
- ▶ New employees have common questions.
- ▶ Send a “Frequently Asked Questions” (FAQs) letter – by US Mail and/or email.



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What should I wear?

- Many new farm employees do not have farm backgrounds, need guidance.
- Footwear, gloves, other appropriate attire.
- Biosecurity guidelines – some items may be provided.
- Inform new employee that they will be trained on biosecurity procedures.



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Lunch, snacks, beverages?



- Noon or evening meal provided?
- Snacks, beverages?
- Go to town for lunch?
- Inform the new employee of your farm practices and what they should/may bring to work.
- “Welcome” lunch ?

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Vehicles and Parking

- Vehicle required for job?—should have been communicated during the pre-employment process.
- Where do I park?
- Areas reserved for visitors, vendors, family?
- Employee of the month?



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What documents should I bring?



- Form I-9 as well as other basic forms.
- What documents will be needed to complete these forms for compliance with state and federal law.
- Consult USCIS website for the most current I-9 forms and instructions
- www.uscis.gov

What else should I bring (or not bring) to work?

- Cellphone?
- Other electronic devices?
- Tobacco-free workplace?
- Weapons?



What will I do on my first day?



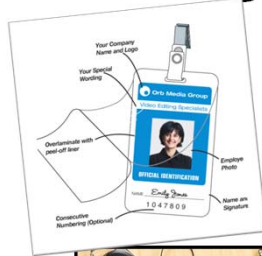
- First day(s) or week(s)
- Clearly communicate work hours, break policies
- General outline of initial orientation and training activities.
- Decreases apprehension or confusion
- Helps to prepare them for a planned orientation program as well as initial and ongoing training opportunities

The First Day

- Greet & **Welcome** Promptly
- Introductions – with connections
- Nametags, list, organizational chart
- Restrooms, break areas
- Key supervisor, mentor, partner
- Safety, biosecurity? New employee accompanied by a trained person.



Name Tags—Employee Badges



- Consider laminated clip-on photo ID badges for owners & employees.
- ID fosters worker socialization
- Farm security and biosecurity protocols are enhanced

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Shirts—Uniforms

or other printed wear?



- Identifies employees
- Pride
- Farm publicity!

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At the
end of
the first
day . . .



- Any questions?
- Offer assurances.
- Offer information, reminders about the days to come.
- Ask yourself: How did you do on those 4 Questions?

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Are there good answers to those
Four Questions?



- Why did they hire me for this job?
- Will I enjoy working here?
- Are any of my coworkers *friend* material?
- Who can I talk to about . . . ?

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After Day One: Do you have an Orientation program in place?

- Enhances socialization, reduces natural anxiety.
- **Research:** Orientation results in an employee who develops and maintains a positive attitude toward the employer.
- Positive attitude = earlier & higher productivity, longer retention, less turnover.
- Less stress = better concentration, learning, absorbing substantive information about job tasks



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Planning & Content of Orientation Program

- Planning may seem overwhelming, but resources are available.
- Ask **current employees** for input.
- “What do **you** wish you had been told when you first started working here?”
- “What do **you** view as important information for newcomers?”
- Every farm business is different . . . but possible content areas include → →



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Background, History, Overview of Your Farm

- Your dairy farm's story
- **Key people in history to present-day**
- Your farm's mission statement, goals and objectives.
- **Farm Tours – repeated – perhaps over a series of days**
- Throughout process -- emphasize role & importance of employees (this employee in particular) in the farm



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Farm Employee Handbook or Policy Documents



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**Don't
make a
mistake
with an
employee
handbook!**



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The money a producer spends having a competent employment lawyer review employment documents and procedures may be the best money spent.

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An employee handbook is – in essence – a contract with the employees.



- Producers should expect to be legally held to the language, promises made in that handbook.
- Be sure that statements made in an employee handbook is what was **intended** to be said.

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Job Descriptions



- **Orientation:** Use the job description as a guideline for discussion.
- **Discuss tasks including future training.**
- **Emphasize basic safety & importance of ongoing safety training, awareness.**
- **Discuss relationship and importance of position to other jobs & functions on the farm.**

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Who is on the Orientation Team?

- For consistent messages -- have the same person conduct orientation.
- Identify supervisors or more experienced co-workers to participate in the process.
- Assign a key **Mentor**
- All orientation team members should share a positive attitude.
- Constructive, upbeat messages geared toward positive, early impressions.



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Orientation: From Day One



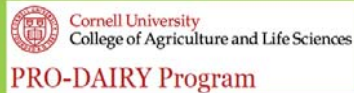
- Well-planned orientation requires time & effort.
- Sets the tone for a positive employment relationship on your farm.
- Employees treated with respect have greater job satisfaction.
- Translates into productive, long-term employees – good for the farm, good for the cows!

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Thank-you!

Please see ISU Extension and Outreach websites for Farm and Dairy Management resources!



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Vital know-how in every drop

afimilk



How to use PRECISION in Day-to-Day Management

Aurora Villarroel, DVM, MPVM, PhD, DACVPM, CVA, CTP

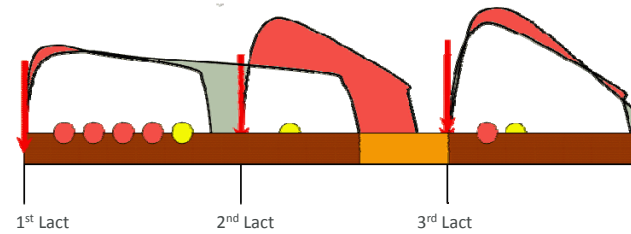
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Day-to-Day Management



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What Breeding Protocol ?



REPRODUCTION

What breeding protocol ?

REPRODUCTION

What breeding protocol to calve again in 12-14 months?

Reproduction



How to evaluate reproduction ?

$$\text{Proportion of Anestrus Cows} = \frac{\text{number of cows NOT cycling}}{\text{number of open cows}}$$

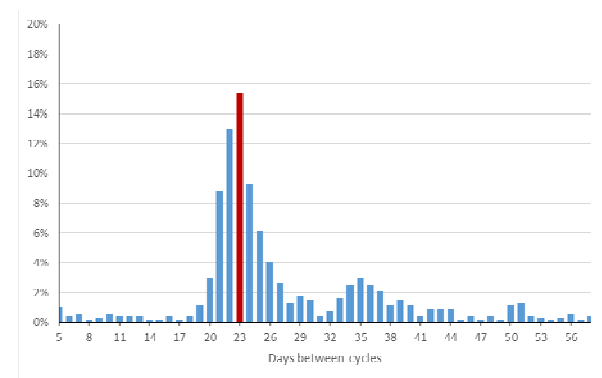
$$\text{Heat Detection risk (HDR)} = \frac{\text{number of cows detected in heat}}{\text{number of cows actually in heat}}$$

$$\text{Conception risk (CR)} = \frac{\text{number of cows that conceived}}{\text{number of cows inseminated}}$$

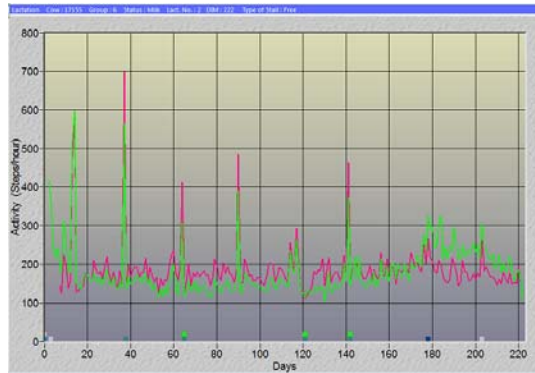
$$\text{Abortion risk} = \frac{\text{number of cows that aborted}}{\text{number of pregnant cows} + \text{number of cows that aborted}}$$

Risk vs. Rate

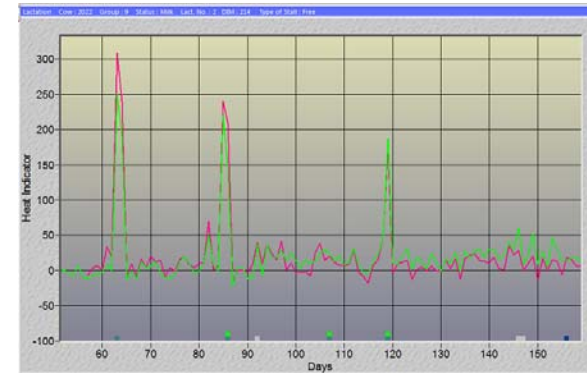
Rate is constricted to a specific time period, commonly 21 days



Heat Detection Accuracy



Heat Detection Accuracy



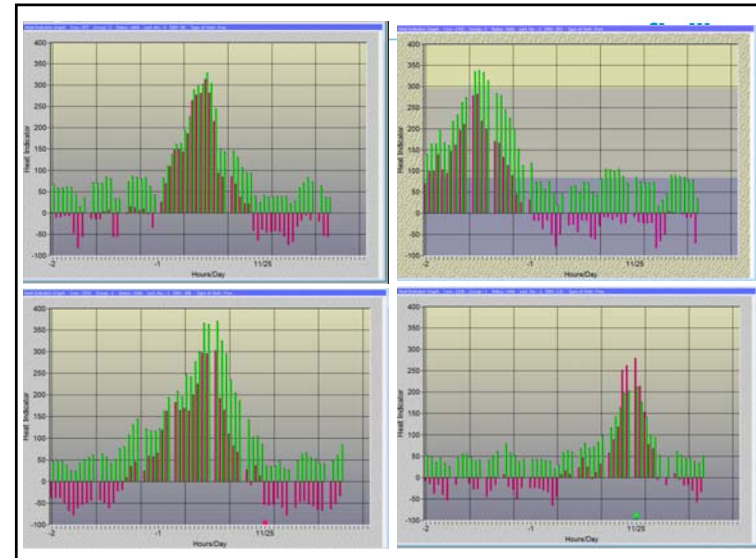
Early Embryonic Death

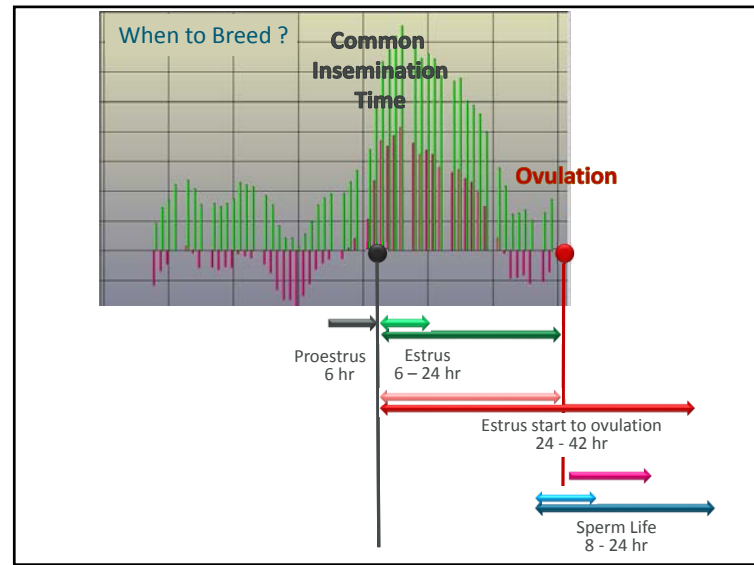
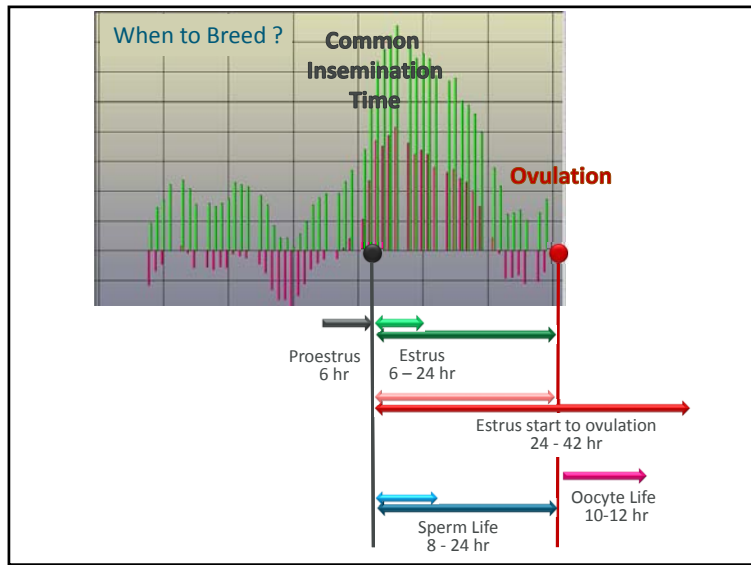
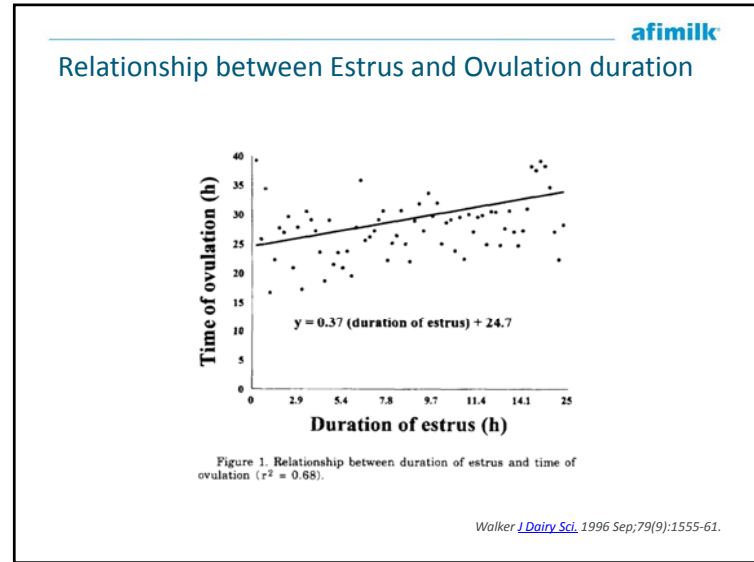
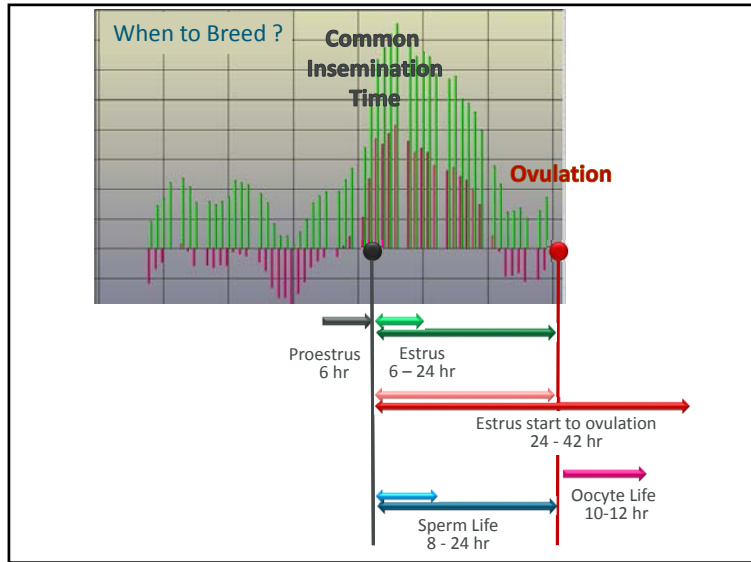
Farm A

| | Heifers (pre) | Heifers (pre) % | 1st lact. | 1st lact. % | 2nd lact. | 2nd lact. % | 3+ lact. | 3+ lact. % | All cows | All cows % | Total | Total % |
|-----------------------------------|---------------|-----------------|-----------|-------------|-----------|-------------|----------|------------|----------|------------|-------|---------|
| Distribution of cycles: 5-17 days | 6 | 5.56 | 16 | 12.90 | 4 | 7.69 | 3 | 3.41 | 23 | 8.71 | 29 | 7.80 |
| 18-25 days | 93 | 86.11 | 76 | 61.29 | 35 | 67.31 | 51 | 57.95 | 162 | 61.36 | 255 | 68.95 |
| 26-35 days | 3 | 2.78 | 14 | 11.29 | 5 | 9.62 | 14 | 15.91 | 33 | 12.50 | 36 | 9.68 |
| 36-60 days | 6 | 5.56 | 18 | 14.52 | 8 | 15.38 | 20 | 22.73 | 46 | 17.42 | 52 | 13.98 |
| Average days between Breedings | 22 | | 24 | | 25 | | 28 | | 25 | | 24 | |

Farm B

| | Heifers (pre) | Heifers (pre) % | 1st lact. | 1st lact. % | 2+ lact. | 2+ lact. % | All cows | All cows % | Total | Total % |
|-----------------------------------|---------------|-----------------|-----------|-------------|----------|------------|----------|------------|-------|---------|
| Distribution of cycles: 5-17 days | -- | -- | 10 | 5.56 | 46 | 6.07 | 56 | 5.97 | 56 | 5.97 |
| 18-25 days | -- | -- | 91 | 50.56 | 357 | 47.10 | 448 | 47.76 | 448 | 47.76 |
| 26-35 days | -- | -- | 43 | 23.89 | 188 | 24.80 | 231 | 24.63 | 231 | 24.63 |
| 36-60 days | -- | -- | 36 | 20.00 | 167 | 22.03 | 203 | 21.64 | 203 | 21.64 |
| Average days between Breedings | -- | -- | 28 | | 28 | | 28 | | 28 | |





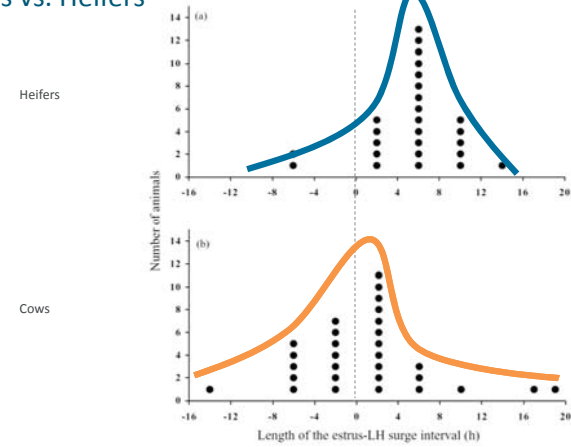
Bull Fertility

| Stage of oestrus | Sire fertility group | | | Group average† |
|-----------------------|----------------------|-------------|---------------|----------------|
| | Above average | Average | Below average | |
| Early | 74.3 | 62.7 | 58.4 | 65.7 |
| Mid- | 71.1 | 70.7 | 65.8 | 69.3 |
| Late | 78.6 | 75.1 | 71.8 | 75.1 |
| Post- | 73.3 | 71.3 | 73.8 | 72.8 |
| Group average† | 72.9 | 70.5 | 68.3 | 70.7 |

† Average for all inseminations.

McMillan *Anim Prod.* 1975 ;21(3):243-249

Cows vs. Heifers



Saumande *An Reprod Sci.* 2005;85:171-182

SICK COWS

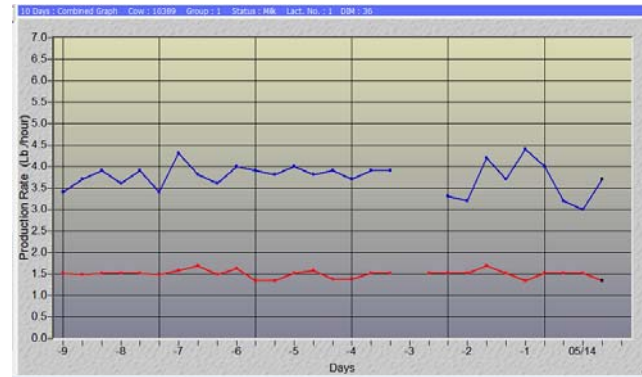
Sick Cow with Mastitis



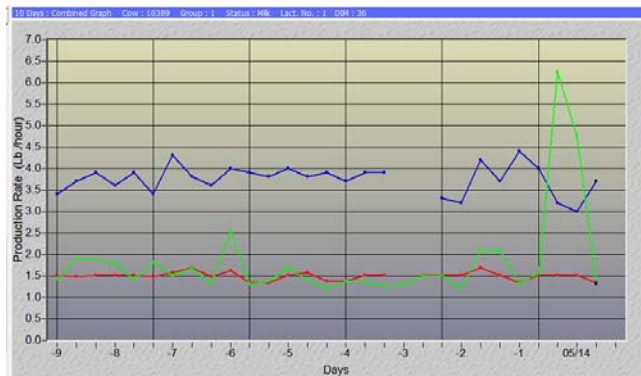
Sick Cow Detection



Sick Cow Detection



Sick Cow Detection....or not!



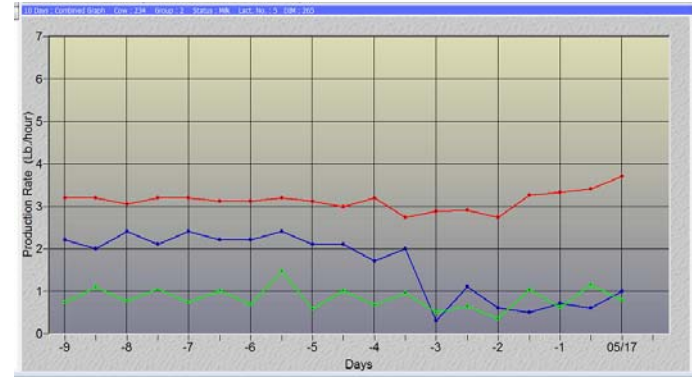
Sick Cow Detection



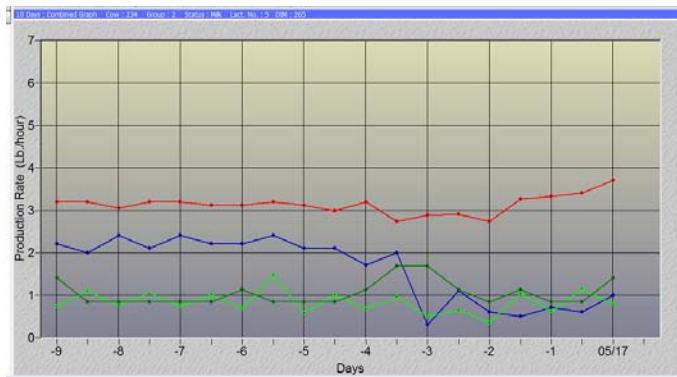
Sick Cow Detection



Sick Cow Detection



Sick Cow Detection



Sick Cow Detection



Sick Cow Detection



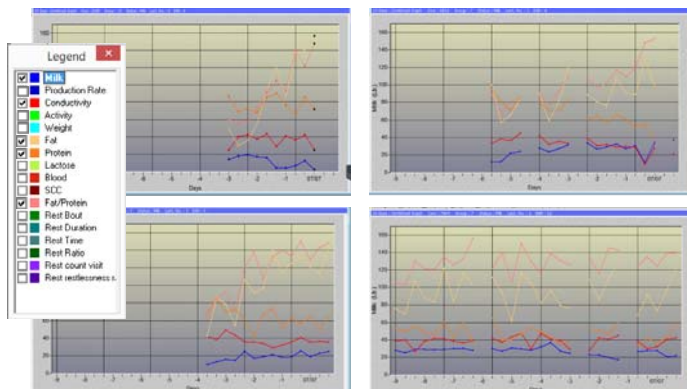
Sick Cow Detection

Ketosis using Fat:Prot Ratio and Milk

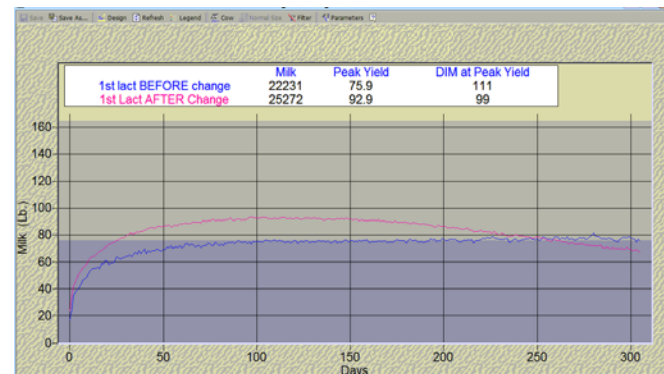


Sick Cow Detection

Ketosis using Afimilk In-Line Milk Lab

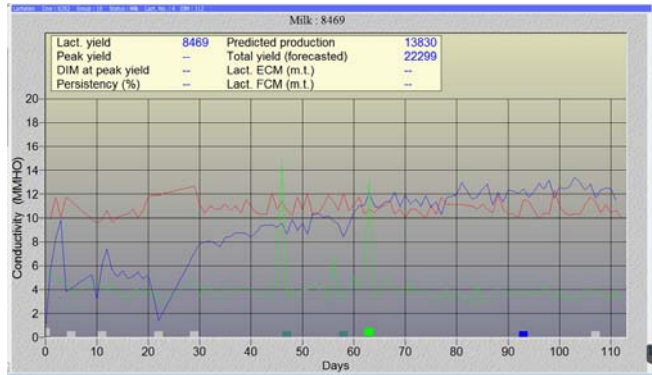


Is it Cost Effective?



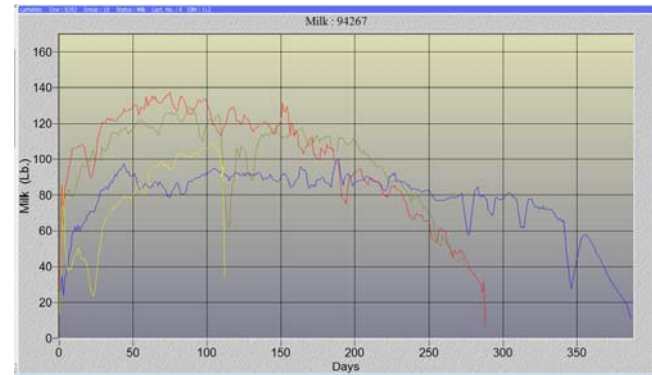
Treatment Efficacy Evaluation

LDA Surgery

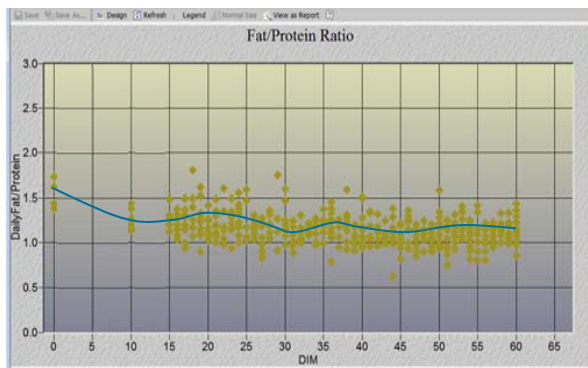


Disease Effect on Production

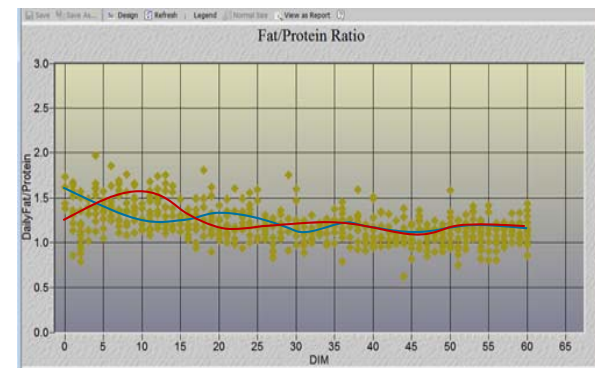
LDA



Fat:Prot Ratio for Ketosis Detection

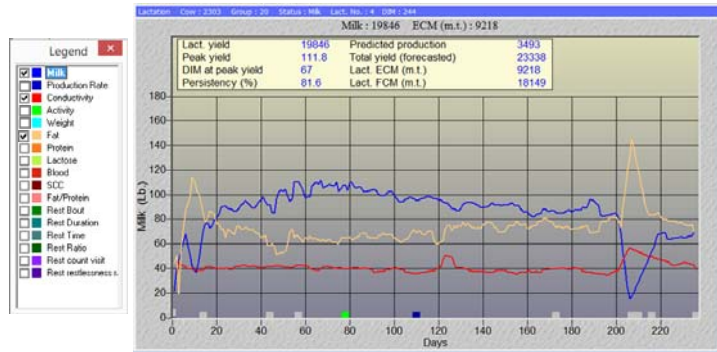


What if we check them every day?



Sick Cow Detection

Negative Energy Balance due to Coliform Mastitis



Sick Cow Detection

How to check everything on every cow every day?



Automatic Detection

Let the system work for you !!

| Index | Cont | Lact | DIM | Breed | Age | Sex | Date | Daily prod | Active | Active | Active | Yield dev | Yield dev | Yield dev | Cond | Cond | Cond | Code |
|-------|------|------|-----|-------|-----|-----|------------|------------|--------|--------|--------|-----------|-----------|-----------|------|------|------|-----------|
| 1 | 7994 | 2 | 4 | 6 | - | - | Calfing | 36.7 | 54.9 | 2 | 46 | 25 | 25 | 25 | 41 | 28 | 11 | 1 E S |
| 2 | 9792 | 2 | 2 | 6 | - | - | Calfing | 63.9 | 47.9 | 44 | 61 | 25 | 35 | 22 | 36 | 28 | 23 | 0 105 E |
| 3 | 652 | 4 | 1 | 89 | 1 | 22 | Bred | 47.6 | 61.9 | 18 | 4 | - | 25 | 25 | - | 0 | 2 | 35 |
| 4 | 6521 | 5 | 4 | 152 | 1 | 77 | Pregnant | 46.5 | 98.7 | 47 | 6 | - | 25 | 52 | - | 0 | 7 | 35 C |
| 5 | 141 | 0 | 1 | 296 | 1 | 119 | Do not Bre | 39.6 | 64.2 | 0 | 26 | - | 26 | 13 | - | 0 | 0 | 35 100 C |
| 6 | 4310 | 0 | 6 | 328 | 2 | 186 | Pregnant | 41.1 | 27.0 | 1 | 26 | - | 49 | 40 | - | 14 | 2 | 50 E 05 |
| 7 | 6626 | 0 | 2 | 318 | 2 | 223 | Pregnant | 6.2 | 15.8 | 25 | 12 | - | 41 | 0 | - | 1 | 6 | 35 C |
| 8 | 8994 | 0 | 2 | 323 | 2 | 206 | Pregnant | 13.4 | 20.9 | 9 | 5 | - | 4 | 16 | - | 12 | 4 | 35 C 58 |
| 9 | 6630 | 0 | 2 | 300 | 2 | 208 | Pregnant | 26.1 | 43.7 | 7 | 13 | - | 33 | 37 | - | 10 | 0 | 35 C |
| 10 | 6624 | 10 | 4 | 155 | 1 | 83 | Pregnant | 72.2 | 87.8 | 14 | 1 | 6 | 20 | 24 | 17 | 4 | 3 | 1 35 C 04 |
| 11 | 6324 | 11 | 4 | 224 | 1 | 154 | Pregnant | 94.5 | 103.0 | 6 | 7 | 5 | 34 | 37 | 51 | 1 | 1 | 0 E 25 |
| 12 | 8530 | 11 | 4 | 186 | 1 | 97 | Pregnant | 77.8 | 98.9 | 7 | 17 | 2 | 32 | 4 | 22 | 4 | 0 | 0 35 E |
| Total | - | - | - | - | - | - | - | 164.9 | - | - | - | - | - | - | - | - | - | - |
| Avg | - | - | - | 196 | 1 | 144 | - | 42.1 | 62.0 | 3 | 6 | 6 | 23 | 18 | 19 | 0 | 0 | 0 |

Thank you!



HOW TO USE PRECISION IN DAY-TO-DAY MANAGEMENT

Aurora Villarroel, DVM, MPVM, PhD, DACVPM, CVA, CTP
Afimilk, Ltd.

This conference focuses on precision dairy management, defined as the use of automation for information collection and process management to improve productivity and profitability. However, information is not collected per se, but in the form of data that then needs to be transformed into information. There are many data options to be collected on a farm: calving dates, insemination dates, whether the breeding was successful or not, dry-off dates, etc. Then, certain calculations and data combinations give us the information we need to evaluate certain areas of the farm, as in this case, reproduction. The main issue becomes in establishing what data we need to collect on each farm that will give us the required information to best manage it within the confines economic viability.

There are many areas on the dairy farm that need to be evaluated for optimal performance, but today we will concentrate specifically on reproductive management and sick cow detection and monitoring.

REPRODUCTION

The eternal question for reproduction in dairy cattle is 'what breeding protocol do I need to follow to get cows pregnant?' However, this is not the real question, because, what do we get by getting every single cow pregnant if later every single one of them aborts? Will be happy if we get them all pregnant after 200 DIM? So, in keeping with the focus of this conference, let's make this question more precise: **'what breeding protocol do I need to follow to get all cows pregnant in time so they calve again within 12-14 months?'** To figure out this protocol, there are two different things that need to happen in series:

1. Cows needs to conceive
2. Cows need to stay pregnant

This means that we need to monitor two separate metrics to evaluate these two separate events. First we need to know how many cows of those we inseminate do conceive. This metric is called conception risk (CR) and is calculated dividing the total number of cows diagnosed pregnant at fist preg check by the total number of cows inseminated. Most people are used to hear the term conception rate, which only applies when it is calculated for a specific timeframe, such as for example a 21-day period.

$$\text{Conception risk (CR)} = \frac{\text{number of cows that conceived}}{\text{number of cows inseminated}}$$

The second thing we need to know is how many cows abort. This metric is called the **abortion risk**, and it is calculated by dividing the total number of abortions by the sum of the total number of pregnant cows and the cows that aborted.

$$\textit{Abortion risk} = \frac{\textit{number of cows that aborted}}{\textit{number of pregnant cows} + \textit{number of cows that aborted}}$$

The rationale behind this is that, epidemiologically speaking, a risk is calculated as animals with a specific event in the numerator, divided by animals eligible to see that event in the denominator. The cows that have aborted were eligible to abort only because they were pregnant, so they need to be included in the denominator. For comparison, think for example of the following metric: if we say 15% of the people attending this conference drove to the meeting (as opposed to 85% flew in), the calculation takes into account in the numerator only those that drove, but in the denominator are all of the attendees to the conference, those that drove and those that flew in.

To complicate matters further, we know that some cows do indeed conceive, but they lose the embryo before preg check. These cows fall into a grey category called early embryonic death (EED), also called embryonic absorption. These are commonly evaluated by assuming that normal heat cycles have 18-25 days intervals, and that anything beyond 25 days is early embryonic death. This then begs the use of another metric to evaluate these cows, and that is the **proportion of insemination intervals that are greater than 25 days**. It is very important to stress that this is an assumption, and that not all cows that have insemination intervals greater than 25 days have indeed absorbed the pregnancy, but they could have had bad heat detection as seen in Figure 1. The counter part of this situation is in situations where cows are bred without being in heat but within a normal interval. This will make the metric look OK, effectively hiding the real problem on the farm (Figure 2).

Although EED and abortions can be due to infectious diseases such as BVD, IBR and leptospirosis, a weak embryo can die early without any other external factors influencing it. Part of the viability of the embryo is derived from an on-time conception with a mature oocyte and vigorous well-capacitated sperm. Other factors include genetic abnormalities and environmental conditions affecting the utero (e.g. fever and prostaglandin release due to inflammation in the cow). Therefore, correct insemination timing is important in making sure that conception happens, but also to make sure that the embryo has the best conditions to survive long-term. But **how do we determine when is the best time to breed a cow?** To answer this question we need information about reproductive physiology, specifically, the duration of certain intervals that have been evaluated with research and are presented in Table 1. Using these ranges, it becomes obvious that the largest variability is in the duration of the actual heat, which is likely the determinant for fertility, and yet it is not something that most heat detection systems are measuring.

- If we only know that the cow 'is in heat' (i.e. rubbed off or standing), we need to guess at which point of the heat she is. Timing to ovulation could be anywhere between 10-30 hours; obviously a very large range to determine when to breed.
- If we know when the cow started to become in heat (i.e. increased activity), we need to guess how long she is going to be in heat. Timing to ovulation could be anywhere between 24-42 hours. A narrower range to determine when to breed, but with too much lag time (although this may help farmers that can only breed once a day).
- If we know when she stopped being in heat, we need to guess how long it will be until ovulation. Narrow range of breeding time and short lag time, which doesn't leave much time for decision making, but provides the best breeding time.

Therefore, if we have a method to determine how long a cow is in heat, we can optimize insemination time. With the advancement of activity monitors over the past recent years, it has become possible to collect data on cow activity every hour of the day, so that decisions can be made almost immediately. For example, with the new AfiAct II system from Afimilk Ltd. it is possible to, not only determine when a cow starts coming in heat (increase in activity to over twice the baseline), but it is also possible to determine when the peak of that activity happens, as well as when it ends (Figure 4). This leads to much more precise decisions on when the best time to breed a cow is. To fine-tune the best insemination time for each cow the farm can use automatic sorting gates that will place the cows in an accessible area without having to disturb the entire pen. Another viable option is to determine what the pattern of the majority of the cows is, and then adequate insemination times to the average cow in that farm. Collecting data on each cow on the farm will produce enough information to be able to customize the day-to-day management based on results on that specific farm, as opposed to basing decisions on research performed in different farms and under different conditions.

Table 1. Critical timings for fertilization in cattle

| Event | Avg time (hrs) | Range (hrs) |
|---|-----------------------|--------------------|
| Pro-estrus duration (start of activity) | 6 | |
| Estrus duration (standing heat) | 12 | 6 - 24 |
| Estrus to ovulation | 28 | 24 - 42 |
| Oocyte life span | | 10 - 12 |
| Oocyte migration to fertilization site | 6 | |
| Sperm life span | | 8 – 24 |

Sources:

Senger PL. Pathways to pregnancy and parturition. 1999. Current Conceptions, Inc. Pullman, WA. 1st Rev Ed. 281 pages.

Saumande J and Humblot P. The variability in the interval between estrus and ovulation in cattle and its determinants. Anim Reprod Sci. 2005 Feb;85(3-4):171-82.

Hawk HW. Sperm survival and transport in the female reproductive tract. J Dairy Sci. 1983 Dec;66(12):2645-60.

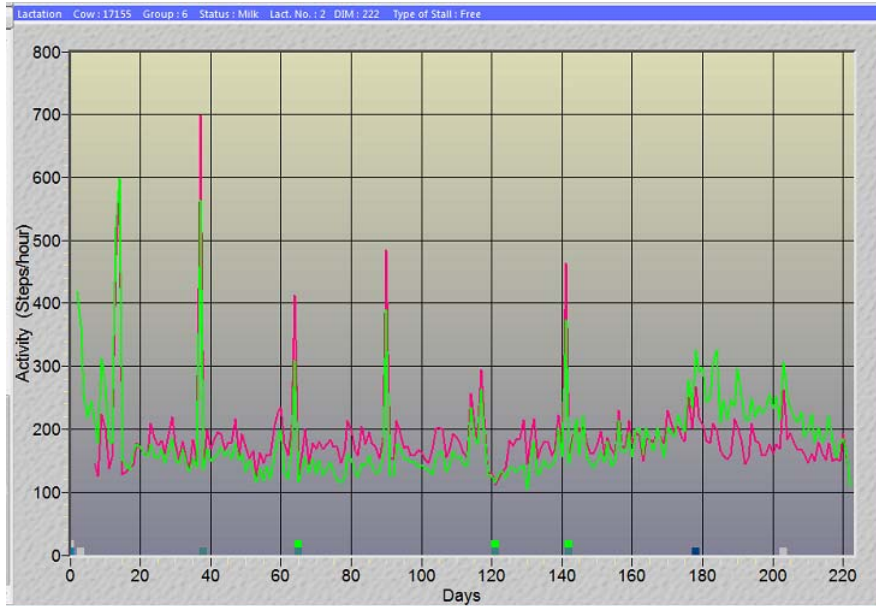


Figure 1. Cow inseminated 56 days after previous insemination that had a normal heat 25 days after previous insemination. Notice the heats indicated by high activity in the graph at 14, 37, 65, 90, 119 and 141 DIM. Inseminations are indicated by lime green boxes next to the X axis, at 65, 130, 121 and 141 DIM. The rugged activity past 180 DIM likely indicates lameness. Notice that she was in heat at 90 DIM but was not bred. Therefore, she will count in the metric as a long interval between breedings, which will be assumed an EED, when in fact she was in heat but was not bred (breeders in this farm were not following instructions correctly). This cow conceived to the breeding at 141 DIM, as indicated by the blue box next to the X axis at 178 DIM 9day of preg check). Source: AfiFarm software, Afimilk Ltd.

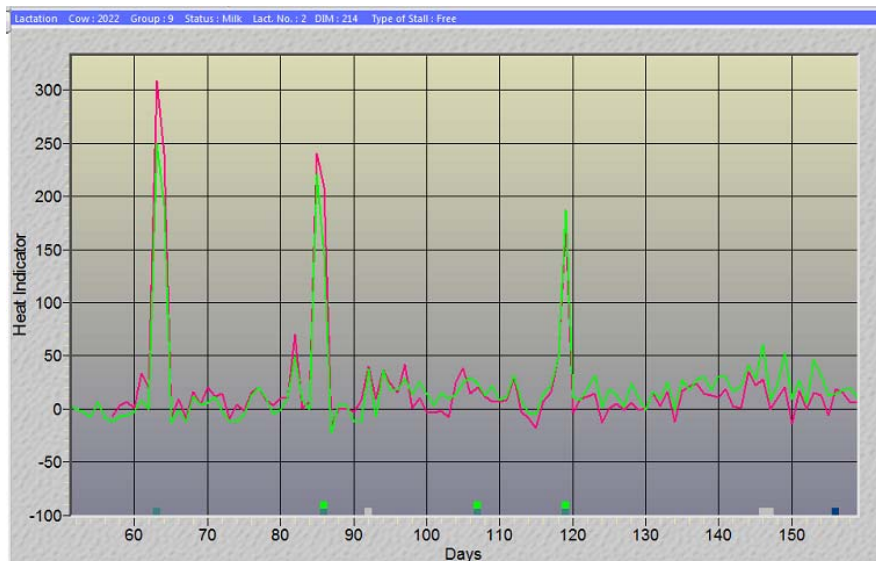


Figure 2. Cow that has been in heat 3 times and has been bred 3 times, but not at the appropriate times. Heats are indicated by high activity days at 63, 86 and 119 DIM. However, she was not bred at 63 DIM (before VWP). Instead she was

bred at 86, 107 and 119 DIM, indicated by the lime green boxes (the breeders on this farm were still detecting heats visually and estimated that this cow was rubbed off). This cow will count as a normal breeding interval of 21 days (107-86) and a short breeding interval of 12 days (119-107), when in fact her real interval as determined by the high activity measured by the pedometers is 33 days (119-86), indicating a problems of early embryonic death (EED) that will be hidden from the evaluation if only numbers are being evaluated. This cow conceived to that last insemination, as indicated by the blue box at 156 DIM. Source: AfiFarm software, Afimilk Ltd.

Farm A

| | Heifers (pre) | Heifers (pre) % | 1st lact | 1st lact. % | 2nd lact | 2nd lact. % | 3+ lact. | 3+ lact. % | All cows | All cows % | Total | Total % |
|-----------------------------------|---------------|-----------------|----------|-------------|----------|-------------|----------|------------|----------|------------|-------|---------|
| Distribution of cycles: 5-17 days | 6 | 5.56 | 16 | 12.90 | 4 | 7.69 | 3 | 3.41 | 23 | 8.71 | 29 | 7.80 |
| 18-25 days | 93 | 86.11 | 76 | 61.29 | 35 | 67.31 | 51 | 57.95 | 162 | 61.36 | 255 | 68.55 |
| 26-35 days | 3 | 2.78 | 14 | 11.29 | 5 | 9.62 | 14 | 15.91 | 33 | 12.50 | 36 | 9.68 |
| 36-60 days | 6 | 5.56 | 18 | 14.52 | 8 | 15.38 | 20 | 22.73 | 46 | 17.42 | 52 | 13.98 |
| Average days between Breedings | 22 | | 24 | | 25 | | 28 | | 25 | | 24 | |

Farm B

| | Heifers (pre) | Heifers (pre) % | 1st lact | 1st lact. % | 2+ lact. | 2+ lact. % | All cows | All cows % | Total | Total % |
|-----------------------------------|---------------|-----------------|----------|-------------|----------|------------|----------|------------|-------|---------|
| Distribution of cycles: 5-17 days | -- | -- | 10 | 5.56 | 46 | 6.07 | 56 | 5.97 | 56 | 5.97 |
| 18-25 days | -- | -- | 91 | 50.56 | 357 | 47.10 | 448 | 47.76 | 448 | 47.76 |
| 26-35 days | -- | -- | 43 | 23.89 | 188 | 24.80 | 231 | 24.63 | 231 | 24.63 |
| 36-60 days | -- | -- | 36 | 20.00 | 167 | 22.03 | 203 | 21.64 | 203 | 21.64 |
| Average days between Breedings | -- | -- | 28 | | 28 | | 28 | | 28 | |

Figure 3. Comparison of interval between breedings in two farms. Farm A has a normal profile (5-17 days <10%, 18-25 days >60%, 26-35 days <15% and 36-60 days <15%), Farm B has a problem with early embryonic death (EED) evidenced by the large proportion of cows with long intervals between breedings (target in our farms is <15%). Source: AfiFarm software, Afimilk Ltd.

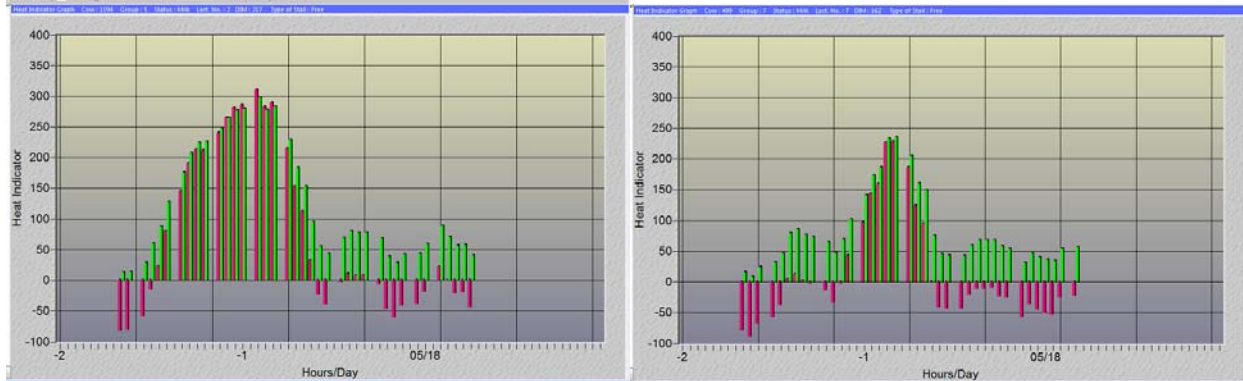


Figure 4. Hourly graphs of activity. The cow on the left was in heat for 16 hours, while the cow on the right was in heat only for 6 hours. Both belong to the same farm. Source: AfiAct II software, Afimilk. Ltd.

SICK COW DETECTION

As any living being, cows will encounter health issues along the way, and therefore, we must maintain vigilant every day to detect which cows may be having issues, so they can be treated promptly and effectively to ensure prompt recovery. Then we need to monitor them until they recover, so we can make sure that our treatment protocols are appropriate and, if not, we have the ability to make an informed decision to change those protocols.

When evaluating sick cows, typically most farmers look at milk production. Although it is a good indicator, it is not very specific, so we can see milk drops in cows that have changed pens or cows that are in heat. This means that, in addition to milk information, we now need event information and activity (for heat detection). Compare for example the cow in Figure 5 and Figure 6; both have dropped milk by more than 30% in the last 1-2 milkings. The difference is that the cow in Figure 5 is in heat, so that the drop in milk can be explained by the increased activity and lack of resting /eating times, while the cow in Figure 6 has mastitis, as evidenced by the increased conductivity. Figure 7 shows a cow that has dropped in milk, but is not in heat and does not have mastitis; she is off-feed, which can be due to a digestive issue or pneumonia (can't eat well because she can't breathe well). Finally, Figure 8 shows a cow that is lame, as evidenced by the ragged activity graph. Therefore, with a milk meter that provided information on milk production and conductivity, and a pedometer that measures activity, we can now detect not only that a cow is sick in general, but actually hone into what the likely diagnosis is. The addition of other sensors that can measure milk components such as butterfat, protein and lactose, can help fine-tune the diagnosis even further.

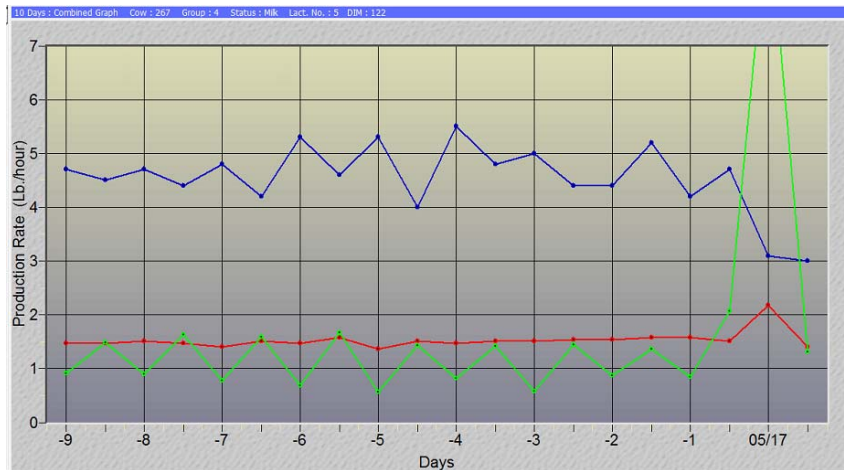


Figure 5. Graph showing milk production (blue) at each milking (2x) and activity (green) for a cow that has dropped in milk production because she is in heat. Conductivity (red) shows a small rise typical of cows that retain their milk (heat). Source: AfiFarm software, Afimilk, Ltd.

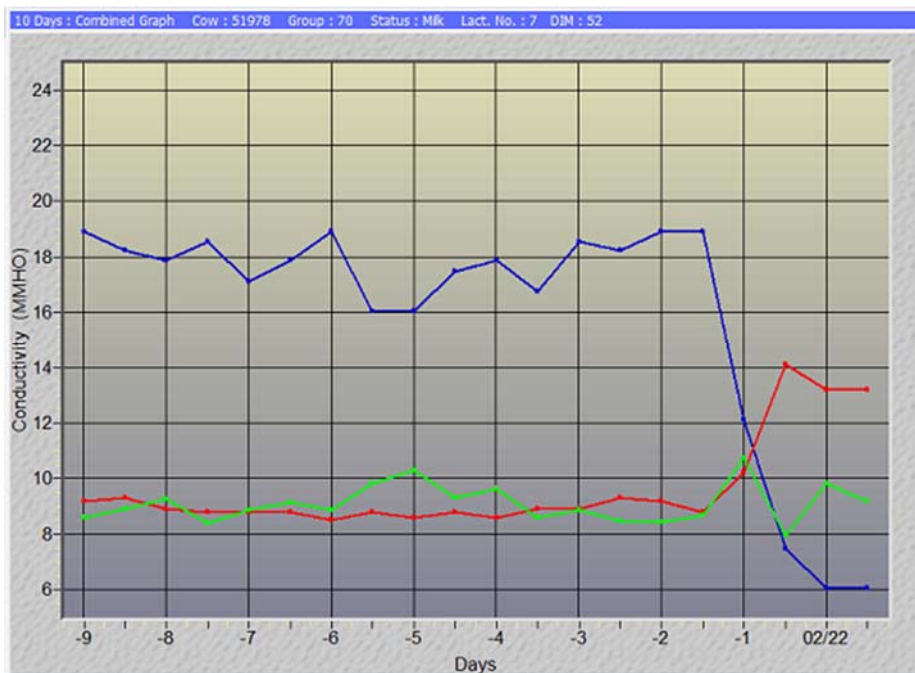


Figure 6. Graph showing milk production (blue), activity (green) and conductivity (red) at each milking (2x) for a cow that has dropped in milk production because she has mastitis. Conductivity shows a sharp rise and activity is flat or slightly decreased. Source: AfiFarm software, Afimilk, Ltd.

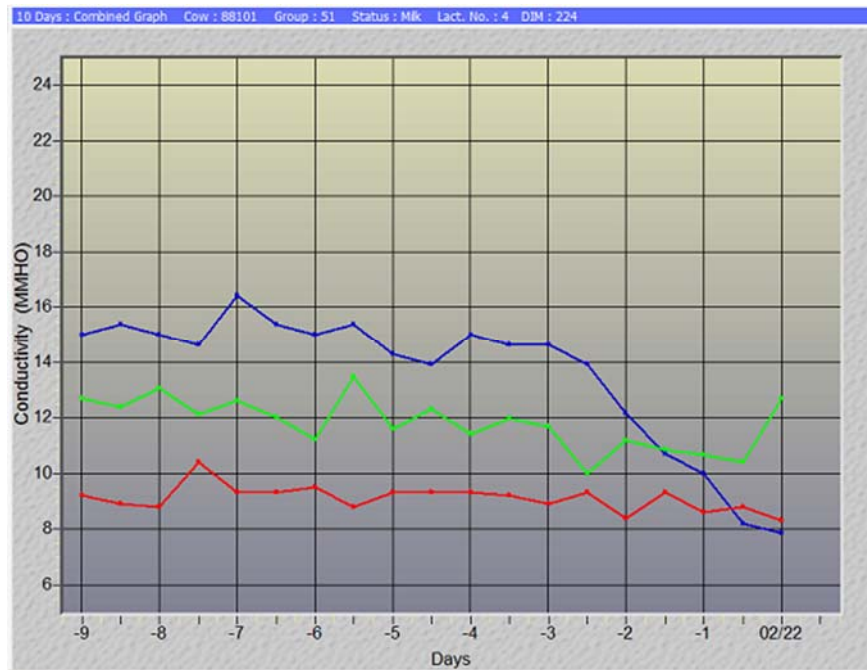


Figure 7. Graph showing milk production (blue), activity (green) and conductivity (red) at each milking (2x) for a cow that has been gradually dropping in milk production due to being off-feed (digestive issue or pneumonia). Conductivity and activity are relatively flat, while milk production dropped over a span of at least 3 days. Source: AfiFarm software, Afimilk, Ltd.

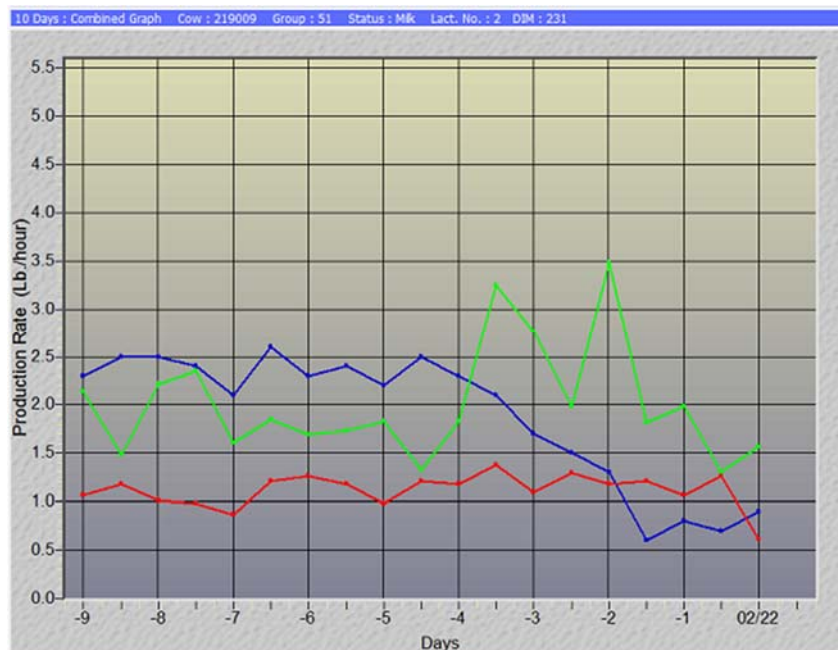


Figure 8. Graph showing milk production (blue), activity (green) and conductivity (red) at each milking (2x) for a cow that has dropped milk production because she is lame. Activity shows a ragged increase as opposed to a flat line or quick up and down (heat) as in the other graphs. Source: AfiFarm software, Afimilk, Ltd.

In conclusion, the use of automatic data collection tools and the evaluation of specific combinations of the data provided by these tools can give us the necessary information to manage a farm on a day-to-day basis. Having more sensors and more data, however, is not useful if the data provided by these technologies is not integrated to provide information on which one can base decisions such as when to breed a cow to optimize pregnancy to term, or how to optimize the ability to provide an accurate diagnosis for a sick cow within 1 or 2 milkings so the cow can be adequately treated and promptly recover.

There are many options of technology available to dairy farmers nowadays, anywhere from automatic calf feeders to automatic in-line milk components sensors. To determine what fits within a farm, all technology needs to be evaluated trying to answer the question of **'what information will we get from the data provided by this tool and how will we change the management in response to that information?'** That is what provides precision in day-to-day management.



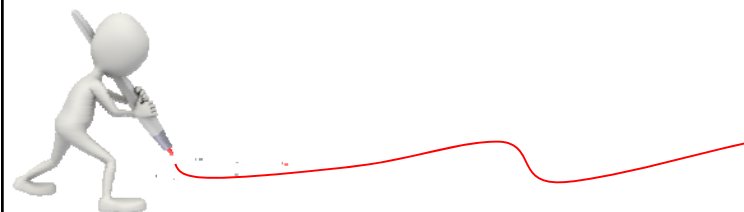
Worker Benefits and Housing March 9, 2016

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Disclaimer: This presentation is intended for general information purposes only and does not constitute legal advice. Specific questions and requests for legal advice should be addressed to legal counsel.

New York Law Requires Farms To Put It In Writing

- NY Labor Law Section 195 – Pay Notice
- NY Farm Minimum Wage Order Part 190
- Pay Notice and Work Agreement for Farm Workers (LS309)



Minimum Wage Standards for Farm Workers – 12 NYCRR Part 190

- The Minimum Wage Order for Farm Workers applies only to farm workers employed on farms where the total cash remuneration paid all persons employed on the farm exceeded \$3,000 in the previous calendar year.
- The Minimum Wage Order for Farm Workers provides that all workers, with certain exceptions, must be paid at least \$9.00 per hour. This does not include:
 - Members of the employer's immediate family

Minimum Wage Standards for Farm Workers (Continued...)

- The wage order permits employers to deduct specified allowances from the minimum wage for:
 - Meals
 - Lodging (except for seasonal migrant workers)
 - Payments in kind must cost no more than the farm market value.
- Employers must post these items in a conspicuous place in their establishment:
 - A summary of the wage order
 - A copy of the general work agreement

New York State Department of Labor
Division of Labor Standards

Pay Notice and Work Agreement for Farm Workers

This notice, when properly completed, satisfies the:

- Pay notice provisions of Section 195 of the NYS Labor Law
- Written work agreement provisions of Part 190, the Farm Minimum Wage Order

1. Employer Information:
Name _____ Phone _____
Doing Business As (DBA) Name(s) _____
Physical Address _____
Mailing Address _____
FEIN (optional) _____

2. Notice given: At hiring Before a change in pay rates, allowances claimed, or payday

3. Specific Location Where Workers Will Work _____

4. Types of Work to Be Performed _____

5. Hours for Standard Work Day _____ Hours for Standard Work Week _____

6. Describe Housing Arrangements, if Any, Including Number of Rooms and Cooking Facilities: _____

7. Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Salary, or Per Unit). Give capacity of unit. Payday _____
For Week Ending _____

8. Allowances, if Any, To Be Credited Towards Minimum Wage: Meals # _____ \$ _____
Lodging \$ _____ Payments in Kind (specify) _____

9. All Other Planned Payroll Deductions (e.g., Social Security, taxes, other) _____

LS-309 (5/16) Page 1

Benefits to Be Provided by Employer (Sick Leave, Vacation, Personal Leave, Holidays, Other) _____

Approximate Period of Employment: From _____ To _____

Non-Economic Terms and Conditions of Employment (e.g., Transportation Availability, Medical Service, (Care, Schooling, etc.)) _____

Will Overtime Be Paid at a Higher Rate? No Yes. If "Yes," specify agreement with worker (e.g., overtime: _____)

Employee Acknowledgment. On this day, I have been notified of my pay rate, overtime rate (if any), rates, and designated payday. I told my employer what my primary language is _____

Check one: I have been given this pay notice in English because it is my primary language, or I have been given this pay notice in English only, because the Department of Labor does not yet offer a pay notice form in my primary language, which is _____

Yes Employee Name _____
Signature _____ Date _____
Preparer's Name & Title _____ Signature _____

Each employee must receive a signed copy of this form. The employer must keep a copy for 6 years.

Sections and additional information:
§ 195 requires that the information on this notice be provided in writing to all employees at the time of hiring.
§ 195 also requires employers to notify employees in writing of any changes to the information at least seven (7) days prior to the time of such changes, unless such changes are reflected on the employer's wage statement (see, even if the change will be reflected on the employer's wage statement, employers may not treat an employee's rate of pay without notifying the employee before the work is performed).
§ 195 also requires that the information on this notice be provided in English and in the employer's primary language, if other than English. If the NYS Department of Labor provides a template in that language, if the NYS Department of Labor does not provide a template in that other language on its website, then the notice may be provided in that language.
§ 195 also requires that employers notify their employees in writing or by publicly posting their policy on sick leave, paid personal leave, holiday and breaks.
§ 195 also requires that employers preserve their payroll records for 6 years.
Minimum Wage Order for Farm Workers requires that employers post, in a conspicuous place on the farm, a copy of generally applicable work agreement and a posting issued by the NYS Department of Labor summarizing the Farm Minimum Wage provisions.

LS-309 (5/16) Page 2

New York State Department of Labor
Division of Labor Standards

Pay Notice and Work Agreement for Farm Workers

This notice, when properly completed, satisfies the:

- Pay notice provisions of Section 195 of the NYS Labor Law
- Written work agreement provisions of Part 190, the Farm Minimum Wage Order

1. Employer Information:
Name The North American Creamery LLC Phone (555) 555-5555
Doing Business As (DBA) Name(s) The Happy Cow
Physical Address 52 Ice Cream Avenue, Ballston Spa, NY 12020
Mailing Address PO Box 5050, Ballston Spa, NY 12020
FEIN (optional) 12-3456789

2. Notice given: At hiring Before a change in pay rates, allowances claimed, or payday

3. Specific Location Where Workers Will Work: _____

4. Types of Work to Be Performed:
The Miker will feed cows and milk them three times per day. Miker must check the cows for mastitis and perform general farm labor including operating the skid steer and clearing stalls.

5. Hours for Standard Work Day: 7 1/2 Hours for Standard Work Week: 32 1/2

6. Describe Housing Arrangements, if Any, Including Number of Rooms and Cooking Facilities:
Each worker will share a bedroom in a single-family, wood-framed home with five bedrooms, two people per room. The house includes two full bathrooms, washer and dryer. The owner will prepare and serve 3 meals per day to the workers. Transportation to and from the work site will also be provided by the employer, at no cost to the workers.

7. Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Salary, or Per Unit). Give capacity of unit. Payday _____
For Week Ending _____
\$9.00 per hour

8. Allowances, if Any, To Be Credited Towards Minimum Wage: Meals # 1 \$ 1.70 (\$35.70/week)
Lodging \$ 5.00/meal (\$42.00/week) Payments in Kind (specify) _____ \$ _____

9. All Other Planned Payroll Deductions (e.g., Social Security, taxes, other)
Worker must pay taxes, social security and other taxes as required by federal, state and local regulations.

LS-309 (12/15) Page 1

MICHAEL BEST
& FRIEDRICH LLP

Pay Notice & Work Agreement – Form LS118

- NYS Labor Law requires you to give employees a written pay notice:
 - At hiring
 - On or before February 1st of each subsequent year (The law does not say this! The Form has been changed)
 - In advance of any reduction in the rate of pay; and
 - Whenever there is a change in any of the information, unless it will be shown on the next paystub

New York State Department of Labor
Division of Labor Standards

Pay Notice and Work Agreement for Farm Workers

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4. Types of Work to Be Performed:
The Miker will feed cows and milk them three times per day. Miker must check the cows for

6. Describe Housing Arrangements, if Any, Including Number of Rooms and Cooking Facilities:
Each worker will share a bedroom in a single-family, wood-framed home with five bedrooms, two people per room. The house includes two full bathrooms, washer and dryer. The owner will prepare and serve 3 meals per day to the workers. Transportation to and from the work site will also be provided by the employer, at no cost to the workers.

7. Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Salary, or Per Unit). Give capacity of unit. Payday _____
For Week Ending _____
\$9.00 per hour

8. Allowances, if Any, To Be Credited Towards Minimum Wage: Meals # 1 \$ 1.70 (\$35.70/week)
Lodging \$ 5.00/meal (\$42.00/week) Payments in Kind (specify) _____ \$ _____

9. All Other Planned Payroll Deductions (e.g., Social Security, taxes, other)
Worker must pay taxes, social security and other taxes as required by federal, state and local regulations.

LS-309 (12/15) Page 1

Housing Arrangements

- Single Occupancy (private room in a shared residence)
- Multiple Occupancy (shared room/dorm arrangement)
- Individual Apartment
- Individual Apartment (with family)



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- Specific Location Where Workers Will Work: 52 Ice Cream Avenue, Ballston Spa, NY 12020
- Types of Work to Be Performed:
 The Miker will feed cows and milk them three times per day. Miker must check the cows for mastitis and perform general farm labor including operating the skid steer and cleaning stalls.
- Hours for Standard Work Day: 7 1/2 Hours for Standard Work Week: 52 1/2
- Describe Housing Arrangements, if Any, Including Number of Rooms and Cooking Facilities:

7. Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Salary, or Per Unit). Give capacity of unit.

\$9.00 per hour

- Allowances, if Any, To Be Credited Towards Minimum Wage: Meals # 1 \$ 1.70 (\$35.70/week)
 Lodging \$ 5.00/week (\$42.00/week) Payments in Kind (specify) \$ 1
- All Other Planned Payroll Deductions (e.g., Social Security, taxes, other)
 Worker must pay taxes, social security and other taxes as required by federal, state and local regulations.



Pay Notice and Work Agreement for Farm Workers

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- Notice given: At hiring Before a change in pay rates, allowances claimed, or payday
- Specific Location Where Workers Will Work: 52 Ice Cream Avenue, Ballston Spa, NY 12020
- Types of Work to Be Performed:
 The Miker will feed cows and milk them three times per day. Miker must check the cows for mastitis and perform general farm labor including operating the skid steer and cleaning stalls.
- Hours for Standard Work Day: 7 1/2
- Describe Housing Arrangements, if Any, Inc.
 Each worker will share a bedroom in a single-family includes two full bathrooms, washer and dryer. The Transportation to and from the work site will also be provided.
- Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Salary, or Per Unit). Give capacity of unit.**
\$9.00 per hour

**Payday Every Friday
 For
 Week Ending Previous Saturday**

- Allowances, if Any, To Be Credited Towards Minimum Wage: Meals # 1 \$ 1.70 (\$35.70/week)
 Lodging \$ 5.00/week (\$42.00/week) Payments in Kind (specify) \$ 1
- All Other Planned Payroll Deductions (e.g., Social Security, taxes, other)
 Worker must pay taxes, social security and other taxes as required by federal, state and local regulations.

Wage Statement (pay stub) for Agricultural Employers Only: Required Information under Section 195.3

1. Employer name, address, and phone number
 2. Employee name
 3. Dates covered by payment

| Rate | Hourly | Hours | Units | Allowances | Credits | Gross | Gross | Deductions | Deductions | Net Pay |
|-------|--------|---------|-------|------------|---------|---------|---------|------------|------------|---------|
| | | | | | | | | | | |
| 10.00 | 200 | 2000.00 | | | | 2000.00 | 2000.00 | 150.00 | 150.00 | 1850.00 |
| | | | | | | | | 44.00 | 44.00 | 1806.00 |
| | | | | | | | | 12.00 | 12.00 | 1794.00 |
| | | | | | | | | 44.00 | 44.00 | 1750.00 |
| | | | | | | | | 12.00 | 12.00 | 1738.00 |
| | | | | | | | | 44.00 | 44.00 | 1694.00 |
| | | | | | | | | 12.00 | 12.00 | 1682.00 |
| | | | | | | | | 44.00 | 44.00 | 1638.00 |
| | | | | | | | | 12.00 | 12.00 | 1626.00 |
| | | | | | | | | 44.00 | 44.00 | 1582.00 |
| | | | | | | | | 12.00 | 12.00 | 1570.00 |
| | | | | | | | | 44.00 | 44.00 | 1526.00 |
| | | | | | | | | 12.00 | 12.00 | 1514.00 |
| | | | | | | | | 44.00 | 44.00 | 1470.00 |
| | | | | | | | | 12.00 | 12.00 | 1458.00 |
| | | | | | | | | 44.00 | 44.00 | 1414.00 |
| | | | | | | | | 12.00 | 12.00 | 1402.00 |
| | | | | | | | | 44.00 | 44.00 | 1358.00 |
| | | | | | | | | 12.00 | 12.00 | 1346.00 |
| | | | | | | | | 44.00 | 44.00 | 1302.00 |
| | | | | | | | | 12.00 | 12.00 | 1290.00 |
| | | | | | | | | 44.00 | 44.00 | 1246.00 |
| | | | | | | | | 12.00 | 12.00 | 1234.00 |
| | | | | | | | | 44.00 | 44.00 | 1190.00 |
| | | | | | | | | 12.00 | 12.00 | 1178.00 |
| | | | | | | | | 44.00 | 44.00 | 1134.00 |
| | | | | | | | | 12.00 | 12.00 | 1122.00 |
| | | | | | | | | 44.00 | 44.00 | 1078.00 |
| | | | | | | | | 12.00 | 12.00 | 1066.00 |
| | | | | | | | | 44.00 | 44.00 | 1022.00 |
| | | | | | | | | 12.00 | 12.00 | 1010.00 |
| | | | | | | | | 44.00 | 44.00 | 966.00 |
| | | | | | | | | 12.00 | 12.00 | 954.00 |
| | | | | | | | | 44.00 | 44.00 | 910.00 |
| | | | | | | | | 12.00 | 12.00 | 898.00 |
| | | | | | | | | 44.00 | 44.00 | 854.00 |
| | | | | | | | | 12.00 | 12.00 | 842.00 |
| | | | | | | | | 44.00 | 44.00 | 798.00 |
| | | | | | | | | 12.00 | 12.00 | 786.00 |
| | | | | | | | | 44.00 | 44.00 | 742.00 |
| | | | | | | | | 12.00 | 12.00 | 730.00 |
| | | | | | | | | 44.00 | 44.00 | 686.00 |
| | | | | | | | | 12.00 | 12.00 | 674.00 |
| | | | | | | | | 44.00 | 44.00 | 630.00 |
| | | | | | | | | 12.00 | 12.00 | 618.00 |
| | | | | | | | | 44.00 | 44.00 | 574.00 |
| | | | | | | | | 12.00 | 12.00 | 562.00 |
| | | | | | | | | 44.00 | 44.00 | 518.00 |
| | | | | | | | | 12.00 | 12.00 | 506.00 |
| | | | | | | | | 44.00 | 44.00 | 462.00 |
| | | | | | | | | 12.00 | 12.00 | 450.00 |
| | | | | | | | | 44.00 | 44.00 | 406.00 |
| | | | | | | | | 12.00 | 12.00 | 394.00 |
| | | | | | | | | 44.00 | 44.00 | 350.00 |
| | | | | | | | | 12.00 | 12.00 | 338.00 |
| | | | | | | | | 44.00 | 44.00 | 294.00 |
| | | | | | | | | 12.00 | 12.00 | 282.00 |
| | | | | | | | | 44.00 | 44.00 | 238.00 |
| | | | | | | | | 12.00 | 12.00 | 226.00 |
| | | | | | | | | 44.00 | 44.00 | 182.00 |
| | | | | | | | | 12.00 | 12.00 | 170.00 |
| | | | | | | | | 44.00 | 44.00 | 126.00 |
| | | | | | | | | 12.00 | 12.00 | 114.00 |
| | | | | | | | | 44.00 | 44.00 | 70.00 |
| | | | | | | | | 12.00 | 12.00 | 58.00 |
| | | | | | | | | 44.00 | 44.00 | 14.00 |
| | | | | | | | | 12.00 | 12.00 | 2.00 |

This sample wage statement shows the basic requirements of 195.3 for an agricultural employee, paid by the hour and by piece rate, as well as covered by Part 190 Minimum Wage Order for Farm Workers. Please note that there may be additional requirements based upon the specific pay agreement and/or wage order coverage.



Are You Supplying Complete Pay Stubs to Employees?

- Did you know that all employers must send pay stubs to employees each pay period? The pay stub should NOT include the employer's social security number. The following information is required:
- Name of Company
 - Address
 - Phone Number
 - Employee Hire/Start Date or Salary Worksheet
 - Employee ID/Working Station Code

New York State Department of Labor
Division of Labor Standards

Pay Notice and Work Agreement for Farm Workers

This notice, when properly completed, satisfies the:

- Pay notice provisions of Section 195 of the NYS Labor Law
- Written work agreement provisions of Part 190, the Farm Minimum Wage Order

1. Employer Information:
 Name The North American Creamery LLC Phone (555) 555-5555
 Doing Business As (DBA) Name(s) The Happy Cow
 Physical Address 52 Ice Cream Avenue, Ballston Spa, NY 12020
 Mailing Address PO Box 5050, Ballston Spa, NY 12020
 FEIN (optional) 12-3456789

2. Notice given: At hiring Before a change in pay rates, allowances claimed, or payday

3. Specific Location Where Workers Will Work: 52 Ice Cream Avenue, Ballston Spa, NY 12020

4. Types of Work to Be Performed:
 The Milker will feed cows and milk them three times per day. Milker must check the cows for mastitis and perform general farm labor including operating the skid steer and cleaning stalls.

5. Hours for Standard Work Day 1 1/2 Hours for Standard Work Week 52 1/2

6. Describe Housing Arrangements, if Any, including Number of Rooms and Cooking Facilities:
 Each worker will share a bedroom in a single-family, wood-framed home with five bedrooms, two people per room. The house includes two full bathrooms, washer and dryer. The owner will prepare and serve 3 meals per day to the workers. Transportation to and from the work site will also be provided by the employer, at no cost to the workers.

7. Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Payday 12/25/2025
 Salary, or Per Unit). Give capacity of unit. For Week Ending 12/22/2025 12/22/2025
 \$9.00 per hour

8. Allowances, If Any, To Be Credited Towards Minimum Wage: \$ 1.70 (\$35.70/week)
\$ 2

9. All Other Planned Payroll Deductions (e.g., Social Security, taxes, other)
 Worker must pay taxes, social security and other taxes as required by federal, state and local regulations.

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MICHAEL BEST
 & FRIEDRICH LLP

12 NYCRR § 190-3.1 Allowances

- Meals
- Lodging and utilities
- Payments in kind acceptable to the employee may be considered as part of the minimum wage, but shall be valued at not more than the farm market value at the time such payments were provided

New York State Department of Labor
Division of Labor Standards

Pay Notice and Work Agreement for Farm Workers

This notice, when properly completed, satisfies the:

- Pay notice provisions of Section 195 of the NYS Labor Law
- Written work agreement provisions of Part 190, the Farm Minimum Wage Order

1. Employer Information:
 Name The North American Creamery LLC Phone (555) 555-5555
 Doing Business As (DBA) Name(s) The Happy Cow
 Physical Address 52 Ice Cream Avenue, Ballston Spa, NY 12020
 Mailing Address PO Box 5050, Ballston Spa, NY 12020
 FEIN (optional) 12-3456789

2. Notice given: At hiring Before a change in pay rates, allowances claimed, or payday

3. Specific Location Where Workers Will Work: 52 Ice Cream Avenue, Ballston Spa, NY 12020

4. Types of Work to Be Performed:
 The Milker will feed cows and milk them three times per day. Milker must check the cows for mastitis and perform general farm labor including operating the skid steer and cleaning stalls.

5. Hours for Standard Work Day 1 1/2 Hours for Standard Work Week 52 1/2

6. Describe Housing Arrangements, if Any, including Number of Rooms and Cooking Facilities:
 Each worker will share a bedroom in a single-family, wood-framed home with five bedrooms, two people per room. The house includes two full bathrooms, washer and dryer. The owner will prepare and serve 3 meals per day to the workers. Transportation to and from the work site will also be provided by the employer, at no cost to the workers.

7. Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Payday 12/25/2025
 Salary, or Per Unit). Give capacity of unit. For Week Ending 12/22/2025 12/22/2025
 \$9.00 per hour

Lodging \$ 6.00/day (\$42.00/week) Meals # 1 \$ 1.70 (\$35.70/week)
city/ state \$ 2

9. All Other Planned Payroll Deductions (e.g., Social Security, taxes, other)
 Worker must pay taxes, social security and other taxes as required by federal, state and local regulations.

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MICHAEL BEST
 & FRIEDRICH LLP

Allowances for Housing Arrangements

- \$18.95/Week** • Single Occupancy (private room in a shared residence)
- \$12.65/Week** • Multiple Occupancy (shared room/dorm arrangement)
- \$5.00/Day** • Individual Apartment
- \$8.00/Day** • Individual Apartment (with family)

New York State Department of Labor
Division of Labor Standards

Pay Notice and Work Agreement for Farm Workers

This notice, when properly completed, satisfies the:

- Pay notice provisions of Section 193 of the NYS Labor Law
- Written work agreement provisions of Part 190, the Farm Minimum Wage Order

1. Employer Information:
 Name The North American Creamery LLC Phone (555) 555-5555
 Doing Business As (DBA) Name(s) The Happy Cow
 Physical Address 52 Ice Cream Avenue, Ballston Spa, NY 12020
 Mailing Address PO Box 5050, Ballston Spa, NY 12020
 FEIN (optional) 12-3456789

2. Notice given: At hiring Before a change in pay rates, allowances claimed, or payday

3. Specific Location Where Workers Will Work: 52 Ice Cream Avenue, Ballston Spa, NY 12020

4. Types of Work to Be Performed:
 The Milker will feed cows and milk them three times per day. Milker must check the cows for mastitis and perform general farm labor including operating the skid steer and cleaning stalls.

5. Hours for Standard Work Day: 1.12 Hours for Standard Work Week: 32.12

6. Describe Housing Arrangements, if Any, including Number of Rooms and Cooking Facilities:
 Each worker will share a bedroom in a single-family, wood-framed home with five bedrooms, two people per room. The house includes two full bathrooms, washer and dryer. The owner will prepare and serve 3 meals per day to the workers. Transportation to and from the work site will also be provided by the employer, at no cost to the workers.

7. Employee's Rate(s) of Pay. Indicate Basis (Per Hour, Shift, Day, Week, Payday, etc.):
 Salary, or Per Unit: Give capacity of unit. For Week Ending Process Salary
 \$9.00 per hour

8. Allowances, if Any, To Be Credited Towards Minimum Wage: Meals # 1 \$ 1.70 (\$35.70/week)
 Lodging \$ 0.00 (\$0.00/week) Payments in Kind (specify) none \$ 0

9. All Other Planned Payroll Deductions (e.g., Social Security, taxes, other)
 Worker must pay taxes, social security and other taxes as required by federal, state and local regulations.

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NY Labor Law §193 Deductions from wages*

- No employer shall make any deduction from the wages of an employee, except deductions which:
 - are made in accordance with the provisions of any law or any rule or regulation issued by any governmental agency; or
 - are expressly authorized in writing by the employee and are for the benefit of the employee; provided that such authorization is kept on file on the employer's premises. Such authorized deductions shall be limited to payments for insurance premiums, pension or health and welfare benefits, contributions to charitable organizations, payments for United States bonds, payments for dues or assessments to a labor organization, and similar payments for the benefit of the employee.

MICHAEL BEST
& FRIEDRICH LLP

NY Labor Law §193 Deductions from wages* (Cont'd...)

- No employer shall make any charge against wages, or require an employee to make any payment by separate transaction unless such charge or payment is permitted as a deduction from wages under the provisions of subdivision one of this section.

* NB Effective November 6, 2015

MICHAEL BEST
& FRIEDRICH LLP

Deductions

- Deductions that the worker has authorized ***in writing and for his or her benefit***
- In order to make deductions for housing the employer must have the agreement in writing
- In order for the housing to be for the employee's benefit, it must be voluntary, and must not be for the employer's benefit

What Are Similar Payments for the Benefit of the Employee Under Section 193?

A payment benefits the employee if it provides financial or other support for the employee, or his or her family.

To be considered "similar," a payment **must** fall into one of the following categories:

- health and welfare benefits;
- pension and retirement benefits;
- child care and educational benefits;
- charitable benefits;
- dues and assessments;
- transportation; and
- food and lodging

Some of these categories of benefits are not typically offered to workers in agriculture. If you believe you provide one of these benefits, please contact the Department of Labor at: Phone: (877) 466-9797 or Email: dola@labor.ny.gov

What about Housing and Utilities?

Deductions for housing are not allowed; however, you can take an allowance towards the minimum wage.

For workers who are not migrant or seasonal farm workers, you may consider a housing allowance (that includes utilities) towards meeting the minimum wage, as follows:

- \$18.95/week for single occupancy (private room in shared residence)
- \$12.65/week for multiple occupancy (shared room/dorm arrangement)
- or
- \$5.00/day for an individual apartment
- \$8.00/day for individual apartment with family

Note: Housing and utilities provided to *migrant and seasonal farm workers* **must** be free.



UTILITIES



12 NYCRR § 195-2.1 Prohibited Practices

(a) Wage deductions. No employer shall make any deductions from wages except those that fall within the following four categories:

- (1) Any deductions made in accordance with any law, rule or regulation issued by any governmental agency;
- (2) Deductions specified by, or similar to those specified by, section 193 of the Labor Law, authorized by, and for the benefit of, the employee;
- (3) Deductions for the recovery of overpayments made in accordance with this Part; and
- (4) Deductions for the repayment of wage advances made in accordance with this Part.

12 NYCRR § 195-2.1 Prohibited Practices (Cont'd...)

(b) Separate transactions. No employer shall make any charge against wages, or require an employee to make any payment by separate transaction unless such charge or payment is permitted as a deduction from wages under this Part or is permitted or required under any provision of a current collective bargaining agreement.

II. Chart of Laws Governing Wage Deductions

| Deduction / Benefit | NYDOL Position | Statute and Regulation |
|---------------------|--|------------------------------------|
| HSA | Allowed as a voluntary deduction expressly authorized in writing by the employee and for the benefit of the employee | 12 NYCRR 195-2.1; NY Labor Law 193 |
| IRA | See above | See above |
| Health Insurance | See above | See above |
| Child Support | Allowed as a deduction in accordance with any law, rule or regulation | 12 NYCRR 195-2.1; NY Labor Law 193 |





II. Chart of Laws Governing Wage Deductions

(Continued....)

| Deduction / Benefit | NYDOL Position | Statute and Regulation |
|---------------------|---|---|
| Housing | Housing and utilities may not be deducted from wages except as an allowance permitted under NYDOL Minimum Wage Order 190. See https://labor.ny.gov/formsdocs/djpa/p737.pdf ; https://www.labor.ny.gov/immigrants/PDF/deductions-webinar.pdf ("Deductions for housing are not allowed; however, you can take an allowance towards the minimum wage.") | Minimum Wage Order 190; NY Labor Law 193; NYCRR 195-2.1, 195-4.4, and 195-4.3 |



II. Chart of Laws Governing Wage Deductions

(Continued....)

| Deduction / Benefit | NYDOL Position | Statute and Regulation |
|----------------------------|---|---|
| Housing (Continued....) | For workers who are not migrant or seasonal farm workers, you may consider a housing allowance (that includes utilities) towards meeting the minimum wage, as follows: •\$18.95/week for single occupancy (private room in shared residence) •\$12.65/week for multiple occupancy (shared room/dorm arrangement) or •\$5.00/day for an individual apartment •\$8.00/day for individual apartment with family | Minimum Wage Order 190; NY Labor Law 193; NYCRR 195-2.1, 195-4.4, and 195-4.3 |



II. Chart of Laws Governing Wage Deductions

(Continued....)

| Deduction / Benefit | NYDOL Position | Statute and Regulation |
|---------------------|---|--|
| Utility Deduction | See above. Limits on housing deductions also restrict what can be deducted for utilities. For example, the \$5/day limit on deductions for individual apartments includes both rent and utilities | See above |
| Clothing / Uniform | NYDOL has taken the position that no such deductions are allowed. See https://labor.ny.gov/formsdocs/djpa/p737.pdf | NY Labor Law 193; NYCRR 195-2.1, 195-4.4, and 195-4.3 |
| Wage Advances | Allowed in accordance with NYDOL's Written Authorization for Wage Advances form | NY Labor Law 193; NYCRR 195-5.2 |

10. Benefits to Be Provided By Employer (Sick Leave, Vacation, Personal Leave, Holidays, Other)

Worker will have 5 personal days and 5 sick days. After 1 year of employment, (s)he will receive 5 vacation days. These benefits are forfeited if not used within one calendar year after they are earned.

Child Care, Schooling, etc.; Worker will be provided weekly transportation to the store in addition to round trip transportation from the housing location to the worksite each day.

13. Will Overtime Be Paid at a Higher Rate? No Yes If "Yes," specify agreement with worker regarding overtime.

14. Employee Acknowledgment: On this day, I have been notified of my pay rate, overtime rate (if any), allowances, and designated payday. I told my employer what my primary language is.

Check one: I have been given this pay notice in English because it is my primary language, or
 I have been given this pay notice in English only, because the Department of Labor does not yet offer a pay notice form in my primary language, which is _____

Print Employee Name: Juan Carlos Valdez

Signature _____ Date _____

15. Preparer's Name & Title: Matthew Bates, Owner Signature _____

The employee must receive a signed copy of this form. The employer must keep a copy for 6 years.

Instructions and additional information:

Section 195 requires that the information on this notice be provided in writing to all employees the time of hiring, and on or before February first of each subsequent year of employment.

Section 195 also requires employers to notify employees in writing of any changes to the information at least seven calendar days prior to the time of such changes, unless such changes are reflected on the employee's wage statement. However, even if the change will be reflected on the employee's wage statement, employers may not lower an employee's rate(s) of pay without notifying the employee before the work is performed.

Section 195 also requires that the information on this notice be provided in English and in the employee's primary language, if other than English, if the NYS Department of Labor provides a template in that language. If the NYS Department of Labor does not provide a template in that other language on its website, then the notice may be provided in English only.

Section 195 also requires that employers notify their employees in writing or by publicly posting their policy on sick leave, vacation, personal leave, holidays and hours.

Section 195 also requires that employers preserve their payroll records for 6 years.

The Minimum Wage Order for Farm Workers requires that employers post, in a conspicuous place on the farm, a copy of any generally applicable work agreement and a posting issued by the NYS Department of Labor summarizing the Farm Minimum Wage provisions.

10. Benefits to Be Provided By Employer (Sick Leave, Vacation, Personal Leave, Holidays, Other)
Worker will have 5 personal days and 5 sick days. After 1 year of employment, (s)he will receive 5 vacation days. These benefits are forfeited if not used within one calendar year after they are earned.

11. Approximate Period of Employment: From 1/3/2018 To 12/31/2018

12. Non-Economic Terms and Conditions of Employment (e.g., Transportation Availability, Medical Service, Child Care, Schooling, etc.)
Worker will be provided weekly transportation to the store in addition to round trip transportation from the housing location to the worksite each day.

13. Will Overtime Be Paid at a Higher Rate? No Yes If "Yes," specify agreement with worker regarding overtime.

14. Employee Acknowledgment: On this day, I have been notified of my pay rate, overtime rate (if any), allowances, and designated payday. I told my employer what my primary language is.
Check one: I have been given this pay notice in English because it is my primary language, or I have been given this pay notice in English only, because the Department of Labor does not yet offer a pay notice form in my primary language, which is _____
Print Employee Name Juan Carlos Valdez
Signature _____ Date _____

15. Preparer's Name & Title Matthew Bates, Owner Signature _____

The employee must receive a signed copy of this form. The employer must keep a copy for 6 years.

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Section 195 requires that the information on this notice be provided in writing to all employees the time of hiring, and on or before February first of each subsequent year of employment.
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Section 195 also requires that employers preserve their payroll records for 6 years.
The Minimum Wage Order for Farm Workers requires that employers post, in a conspicuous place on the farm, a copy of any generally applicable work agreement and a posting issued by the NYS Department of Labor summarizing the Farm Minimum Wage provisions.

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provided in English and in the employee's primary language, if other than English,

10. Benefits to Be Provided By Employer (Sick Leave, Vacation, Personal Leave, Holidays, Other)
Worker will have 5 personal days and 5 sick days. After 1 year of employment, (s)he will receive 5 vacation days. These benefits are forfeited if not used within one calendar year after they are earned.

11. Approximate Period of Employment: From 1/3/2018 To 12/31/2018

12. Non-Economic Terms and Conditions of Employment (e.g., Transportation Availability, Medical Service, Child Care, Schooling, etc.)
Worker will be provided weekly transportation to the store in addition to round trip transportation from the housing location to the worksite each day.

13. Will Overtime Be Paid at a Higher Rate? No Yes If "Yes," specify agreement with worker regarding overtime.

14. Employee Acknowledgment: On this day, I have been notified of my pay rate, overtime rate (if any), allowances, and designated payday. I told my employer what my primary language is.
Check one: I have been given this pay notice in English because it is my primary language, or I have been given this pay notice in English only, because the Department of Labor does not yet offer a pay notice form in my primary language, which is _____
Print Employee Name Juan Carlos Valdez
Signature _____ Date _____

15. Preparer's Name & Title Matthew Bates, Owner Signature _____

The employee must receive a signed copy of this form. The employer must keep a copy for 6 years.

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Section 195 requires that the information on this notice be provided in writing to all employees the time of hiring, and on or before February first of each subsequent year of employment.
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The Minimum Wage Order for Farm Workers requires that employers post, in a conspicuous place on the farm, a copy of any generally applicable work agreement and a posting issued by the NYS Department of Labor summarizing the Farm Minimum Wage provisions.

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in writing or by publicly posting their policy on sick leave, vacation, personal leave, holidays and hours.

10. Benefits to Be Provided By Employer (Sick Leave, Vacation, Personal Leave, Holidays, Other)
Worker will have 5 personal days and 5 sick days. After 1 year of employment, (s)he will receive 5 vacation days. These benefits are forfeited if not used within one calendar year after they are earned.

11. Approximate Period of Employment: From 1/3/2018 To 12/31/2018

12. Non-Economic Terms and Conditions of Employment (e.g., Transportation Availability, Medical Service, Child Care, Schooling, etc.)
Worker will be provided weekly transportation to the store in addition to round trip transportation from the housing location to the worksite each day.

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Check one: I have been given this pay notice in English because it is my primary language, or I have been given this pay notice in English only, because the Department of Labor does not yet offer a pay notice form in my primary language, which is _____
Print Employee Name Juan Carlos Valdez
Signature _____ Date _____

15. Preparer's Name & Title Matthew Bates, Owner Signature _____

The employee must receive a signed copy of this form. The employer must keep a copy for 6 years.

Instructions and additional information:
Section 195 requires that the information on this notice be provided in writing to all employees the time of hiring, and on or before February first of each subsequent year of employment.
Section 195 also requires employers to notify employees in writing of any changes to the information at least seven calendar days prior to the time of such changes, unless such changes are reflected on the employer's wage statement. However, even if the change will be reflected on the employer's wage statement, employers may not lower an employee's rate(s) of pay without notifying the employee before the work is performed.
Section 195 also requires that the information on this notice be provided in English and in the employee's primary language, if other than English, if the NYS Department of Labor provides a template in that language. If the NYS Department of Labor does not provide a template in that other language on its website, then the notice may be provided in English only.
Section 195 also requires that employers preserve their payroll records for 6 years.
The Minimum Wage Order for Farm Workers requires that employers post, in a conspicuous place on the farm, a copy of any generally applicable work agreement and a posting issued by the NYS Department of Labor summarizing the Farm Minimum Wage provisions.

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employers preserve their payroll records for 6 years

10. Benefits to Be Provided By Employer (Sick Leave, Vacation, Personal Leave, Holidays, Other)
Worker will have 5 personal days and 5 sick days. After 1 year of employment, (s)he will receive 5 vacation days. These benefits are forfeited if not used within one calendar year after they are earned.

11. Approximate Period of Employment: From 1/3/2018 To 12/31/2018

12. Non-Economic Terms and Conditions of Employment (e.g., Transportation Availability, Medical Service, Child Care, Schooling, etc.)
Worker will be provided weekly transportation to the store in addition to round trip transportation from the housing location to the worksite each day.

13. Will Overtime Be Paid at a Higher Rate? No Yes If "Yes," specify agreement with worker regarding overtime.

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Print Employee Name Juan Carlos Valdez
Signature _____ Date _____


15. Preparer's Name & Title Matthew Bates, Owner Signature _____

The employee must receive a signed copy of this form. The employer must keep a copy for 6 years.

Instructions and additional information:
Section 195 requires that the information on this notice be provided in writing to all employees the time of hiring, and on or before February first of each subsequent year of employment.
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Section 195 also requires that employers preserve their payroll records for 6 years.

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a copy of any generally applicable work agreement


Department of Labor Post Conspicuously
ATTENTION EMPLOYEES
 (ATENCIÓN EMPLEADOS)
AGRICULTURAL MINIMUM WAGE INFORMATION
 (INFORMACIÓN SOBRE EL SALARIO MÍNIMO PARA LA AGRICULTURA)

Effective 12/31/15 **\$9.00** per hour
 Basic Hourly Rate

A partir del 12/31/15 **\$9.00** por hora
 Salario Básico

Meals and Lodging
 A specific credit may be granted toward the minimum wage for meals and/or lodging provided by the employer.

Federal Law
 Employees covered under the federal Fair Labor Standards Act must be paid in accordance with State law and also in accordance with higher federal requirements, where applicable.

Other Wage Requirements
 A specific amount must be paid, in addition to the minimum wage, for the maintenance of required uniforms. There are provisions for other supplemental wages in New York State industry wage orders. These may include a per-time rate, daily call-in rate, and a rate for split shift or spread of hours. Whether a particular supplemental wage applies depends on the provisions of the industry wage order covering the employment.

For additional information or to file a complaint
 Write or call the Department of Labor, Division of Labor Standards at one of the offices listed below.

| | | |
|--|---|---|
| State Office Building Campus Albany, NY 12242 (518) 457-2730 | 400 Oak Street Garden City, NY 11530 (516) 794-8195 | 333 E. Washington Street Syracuse, NY 13202 (315) 438-4067 |
| 44 Howley Street Binghamton, NY 13901 (607) 721-6024 | 75 Vanck Street, 7 th Fl. New York, NY 10013 (212) 775-3800 | 120 Bloomington Road White Plains, NY 10605 (914) 997-6521 |
| 65 Court Street Buffalo, NY 14202 (716) 840-7141 | 276 Waring Road, Rm. 104 Rochester, NY 14609 (585) 528-8800 (sub-office) | For additional information: www.labor.ny.gov |


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 LS 109 (12-15)



Is a Lease Required?

- Lease is a contract – must be signed
- Employment is at-will
- A lease changes your relationship relative to housing rights





What if No Lease?

- Without a lease, renters who pay monthly rent are “month to month” tenants
- Tenants who stay past the end of a lease are “month to month” tenants if the landlord accepts the rent.



Lease Requirements

- Use words with common and everyday meanings
- Clear and coherent
- Sections appropriately captioned
- Print must be large enough to be read easily



Lease Prohibitions

- Exempting landlords from liability for injuries to persons or property caused by the landlord's negligence, or that of the landlord's employees or agents
- Waiving the tenant's rights to a jury trial in any lawsuit brought by either of the parties against the other for personal injury or property damage
- Requiring tenants to pledge their household furniture as security for rent
- If lease states that landlord may recover attorney's fees and costs incurred if a lawsuit arises, a tenant automatically has a reciprocal right to recover those fees as well

Eviction

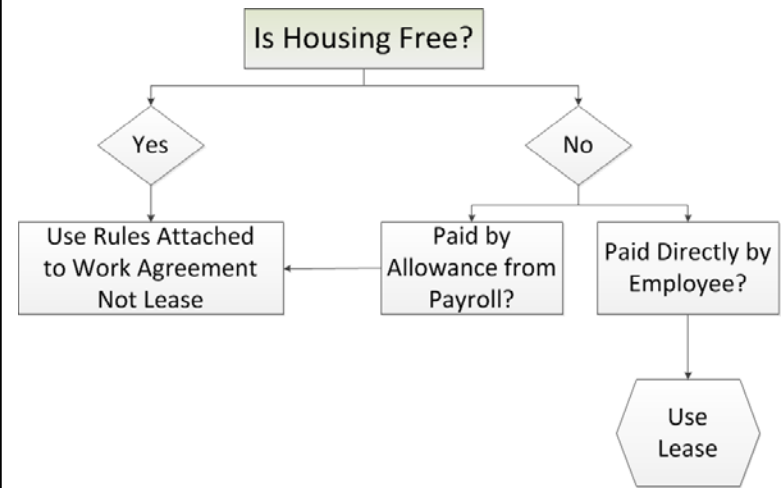
- Tenant protected from eviction during lease term (*Except for significant violations of lease or local housing laws or codes*)
- Tenant can be legally evicted only after landlord has brought a court proceeding and obtained judgment of possession
- Only a sheriff, marshal, or constable can carry out court warrant to evict
- Don't take the law into your own hands, use force or other unlawful means (*Triple damages*)

Eviction (Continued....)

- Must give tenant reasonable amount of time to remove belongings
- You may not retain personal belongings or furniture
- Month to Month – one month's notice required



Conclusions about Leases



Right's of Tenants

Privacy and Guests

Warranty of Habitability

Specific Safety and Health

List of Standards that Affect Farmworker Housing

- Bathing Facilities
- Fire and Smoke Detection
- Flooring Requirements
- Garbage
- Heating
- Laundry
- Light and Ventilation

List of Standards that Affect Farmworker Housing

- Public Health Hazards
- Screening
- Sewerage
- Sleeping Quarters
- Toilet Facilities
- Water Supply

Questions?



How do We Make Better Decisions in Dairy Cattle Diets and Management with Forages and Nitrogen

Mike Van Amburgh, Rick Grant, Kurt Cotanch, Ryan Higgs
Debbie Ross, Marcelo Gutierrez, Alessandro Zontini, Larry
Chase, and Andreas Foskolos



Outline

- New approaches to describing NDF
 - aNDFom – why and what it means
 - aNDFom digestibility
 - uNDF – definition
 - uNDF and NDF pools
 - Implications of using this information
- Updates to the CNCPS related to N efficiency
- Summary

High Forage Diets: Cows Can Do It

- **Two case studies in New York**
 - **Herd 1 – entire herd**
 - 73-75% forage (includes corn silage)
 - 80-85 lb/d milk (2x), 3.7% fat, 2.9% protein
 - $NE_L=0.76$ Mcal/lb
 - **Herd 2: high pen**
 - 82% forage (includes corn silage)
 - 100 lb/d milk (3x), 3.6% fat, 3.0% protein
 - $NE_L=0.77$ Mcal/lb

(Chase, 2012)

NDF analyses

- Nutrition models/software have an input for NDF that is used primarily to calculate energy from available carbohydrates and effective fiber
- Mertens (2002) published the NDF method and gained AOAC approval – there are many approaches to measure NDF
- We want everyone to use of aNDFom – NDF with amylase, sodium sulfite and ash correction – we are working to move labs in that direction
- Sniffen et al. 1992...

Why aNDFom?

- Hay in a hurry – wide swathing picks up dirt
- 600-800 hp choppers and big equipment that move fast make dust and dirt fly
- Flood irrigation moves soil
- Dirt/soil does not solubilize in NDF solution, thus if not corrected will inflate the NDF content
- Inflation of the NDF content means the diet as formulated is lower in actual NDF – intake and rumen health can be compromised (e.g. SARA)

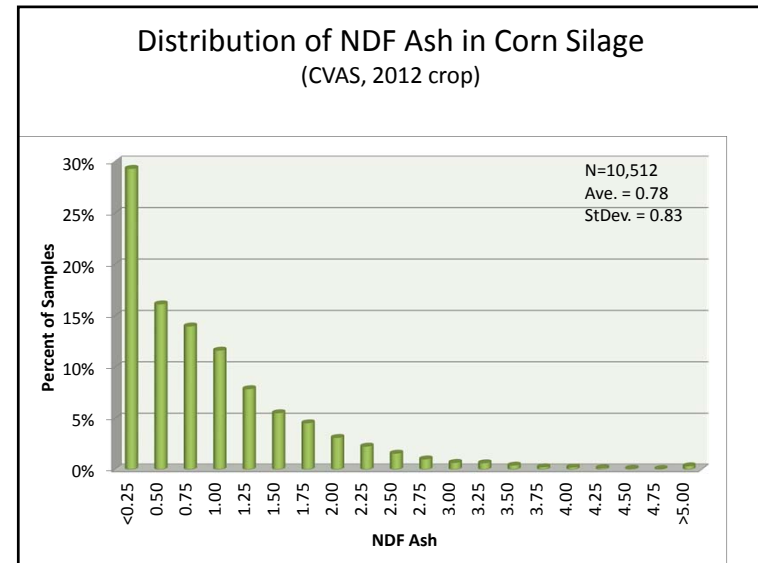
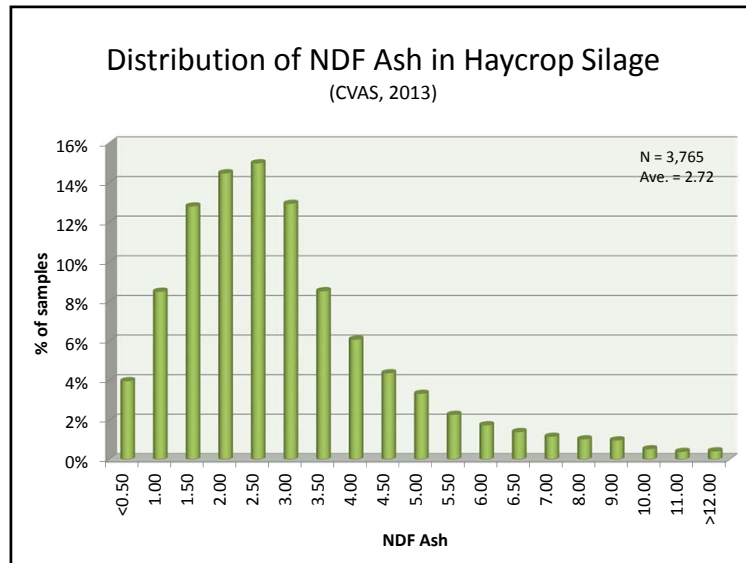


27 FIELD 316 SORGHUM X SUDAN

| FIBER | % NDF | % DM |
|----------------------------|-------|-----------|
| ADF | 56.5 | 34.0 |
| aNDF | → | 60.2 |
| aNDFom | → | 55.4 |
| NDR (NDF w/o sulfite) | | ~ 5 units |
| peNDF | | |
| Crude Fiber | | |
| Lignin | 4.95 | 2.98 |
| NDF Digestibility (12 hr) | | |
| NDF Digestibility (24 hr) | | |
| NDF Digestibility (30 hr) | 60.2 | 36.3 |
| NDF Digestibility (48 hr) | | |
| NDF Digestibility (240 hr) | 74.9 | 45.1 |
| uNDF (30 hr) | 39.8 | 24.0 |
| uNDF (240 hr) | 25.1 | 15.1 |

26 FIELD 308 TEST 2 SORGHUM X SUDAN

| FIBER | % NDF | % DM |
|----------------------------|-------|----------|
| ADF | 57.6 | 36.8 |
| aNDF | → | 63.9 |
| aNDFom | → | 53.7 |
| NDR (NDF w/o sulfite) | | 10 units |
| peNDF | | |
| Crude Fiber | | |
| Lignin | 4.86 | 3.11 |
| NDF Digestibility (12 hr) | | |
| NDF Digestibility (24 hr) | | |
| NDF Digestibility (30 hr) | 49.3 | 31.5 |
| NDF Digestibility (48 hr) | | |
| NDF Digestibility (240 hr) | 77.0 | 49.2 |
| uNDF (30 hr) | 50.7 | 32.4 |
| uNDF (240 hr) | 23.0 | 14.7 |



Example of the Impact of Ash Contamination on NDF and NDF Digestibility Recovery

| Sample | NDF | NDFom | NDFD30 | NDFD30om |
|----------|-------|--------------|--------|--------------|
| 15081-68 | 54.6% | 48.3% | 56.3% | 65.9% |
| 15085-56 | 60.1% | 50.9% | 49.7% | 61.9% |

Ralph Ward

- ### The Take Home
- aNDFom is becoming the new standard assay
 - Will take time to develop all of the NIR equations, but commercial labs are making great progress (time and \$\$\$)
 - Continue to use the “benchmarks” that we have always used just replace NDF with aNDFom (1.1-1.2% BW aNDFom intake, etc.)
 - Side benefits are better rumen health through greater rumen fill (using real value) and better predictions of energy and protein supply due to more accurate numbers

aNDFom Digestibility and Implications

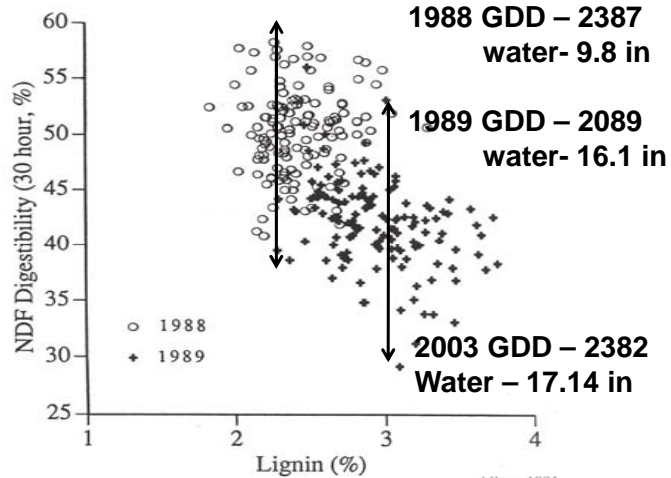
Cows, acres, digestible aNDFom per acre,
light, heat and water...



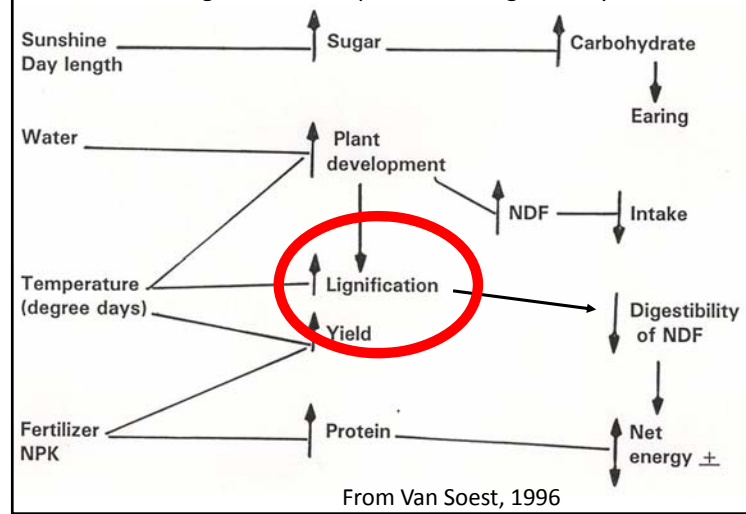
“Lignification” = cross linking between
lignin and hemicellulose

- Light, heat and water interact at various stages of development to affect digestibility
- For example, water stress causes ~ 7x greater cross-linking between lignin and hemicellulose
- Similar to the effect of building a very tall building – to keep it standing, the building needs crossbeams to provide rigidity

NDF Digestibility as Affected by Lignin (GDD and Water)



Factors Affecting Plant Development and Digestibility



Estimating iNDF ... Measuring uNDF

- $ADL \times 2.4/NDF$ (Chandler et al., 1980)
- $ADL/NDF^{0.67}$ (Weiss et al., 1992)
- 288-h in situ (Huhtanen et al., 2007)
- 240-h in vitro fermentation (Raffrenato and Van Amburgh, 2010)

Van Soest and Lane Moore, 1963
USDA, Beltsville, MD right after
Pete characterized NDF



NDF Digestibility/Indigestibility

- Nousiainen et al. (2003; 2004)
demonstrated in grasses that the relationship between lignin and digestibility was highly variable
- This was confirmed by Rinne et al. 2006 on legumes
– methods used to determine this included 288 hr in situ (in a bag in the rumen) fermentations
- We were/are doing similar work at Cornell
- Working to develop a procedure that could be used in a commercial lab
Ph.D. work of Raffrenato (2011)



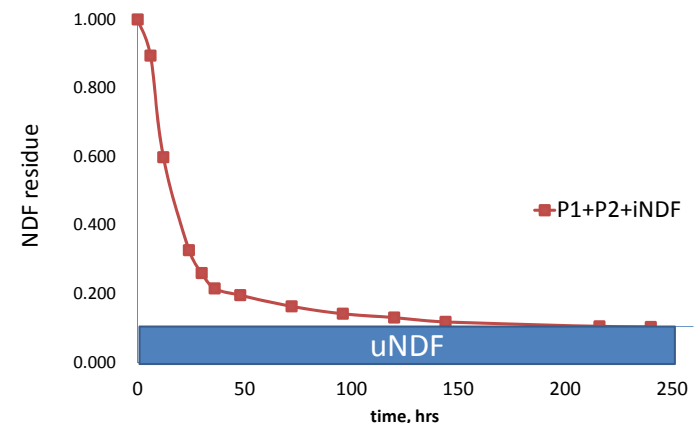
uNDF – Another New Term

- Unavailable NDF
- Determined after a 10 day (240 hr) in vitro incubation under specific conditions and proper filtration
- Commercial labs are providing this value now via NIR analysis, so you don't need to wait 10 days



It doesn't stay in the cow that long, does it?

Corn silage example: NDF_{digestibility}



Corn silage example for uNDF 240 vs lignin*2.4 – 2013 corn silages

| | CS 1 | CS 2 | CS 3 | CS 4 |
|----------------|------|------|------|------|
| NDF, %DM | 45.4 | 44.5 | 40.3 | 50.2 |
| aNDFom, %DM | 44.4 | 43.8 | 38.8 | 49.3 |
| Lignin, %DM | 3.40 | 3.43 | 2.87 | 4.26 |
| Lignin*2.4/NDF | 18.4 | 18.7 | 17.9 | 20.7 |
| uNDF, %NDF | 11.8 | 10.7 | 10.9 | 14.2 |

Corn silage chemistry and uNDF by three methods, 240 hr uNDF, Chandler et al. (1980) and Conrad et al., 1984 equations

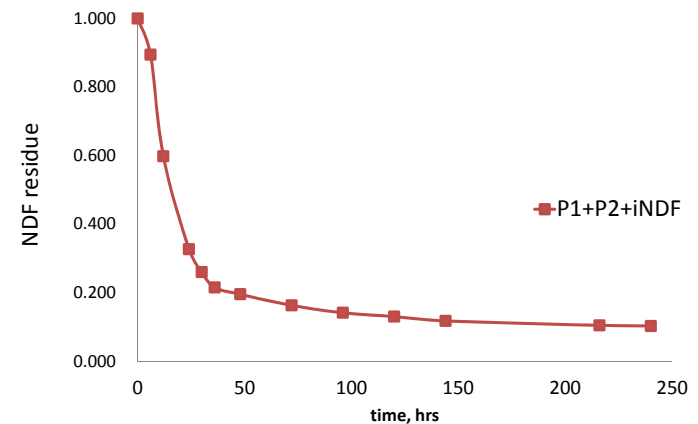
| Corn silage | aNDF, %DM | aNDFom, %DM | uNDF, %NDF | Chandler et al. 1980 | Conrad et al., 1984 |
|-------------|-----------|-------------|------------|----------------------|---------------------|
| 1 | 38.1 | 37.5 | 23.6 | 42.3 | 16.4 |
| 2 | 39.5 | 38.9 | 25.6 | 39.2 | 16.9 |
| 3 | 41.5 | 40.9 | 27.3 | 43.4 | 17.7 |
| 4 | 43.7 | 41.9 | 22.8 | 42.8 | 31.8 |

Ratio of lignin to uNDF

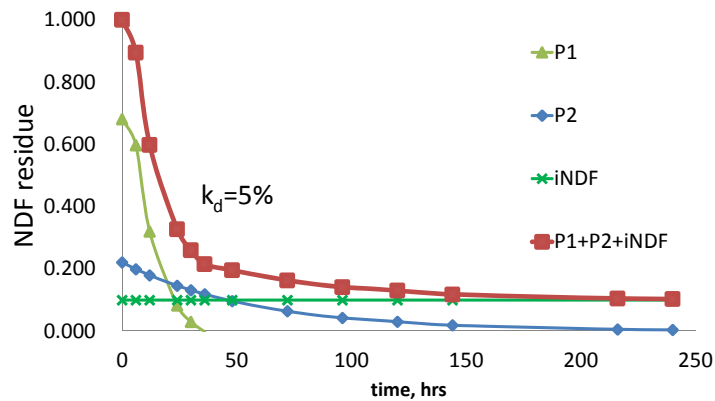
| Group | n | NDF %DM | ADL g/kg NDF | uNDF | Ratio (range) uNDF/ADL (%NDF) |
|-------------------|----|---------|--------------|-------|-------------------------------|
| Conventional C.S. | 30 | 42.7 | 72.4 | 316.8 | 4.72 (1.73-7.59) |
| BMR C.S. | 15 | 39.1 | 43.6 | 171.7 | 4.01 (3.14-5.45) |
| Grasses | 15 | 47.2 | 62.1 | 222.8 | 3.63 (2.51-4.73) |
| Mature grasses | 11 | 64.5 | 84.4 | 313.8 | 3.89 (2.60-5.64) |
| Immature grasses | 13 | 44.1 | 59.3 | 232.2 | 4.16 (2.59-7.40) |
| Alfalfas | 18 | 36.6 | 172.6 | 461.4 | 2.70 (2.43-2.95) |

Raffrenato 2011

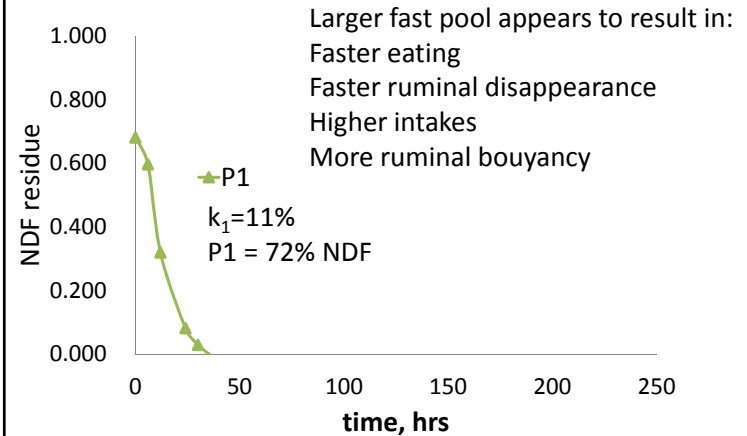
Corn silage example: NDF_{digestibility}



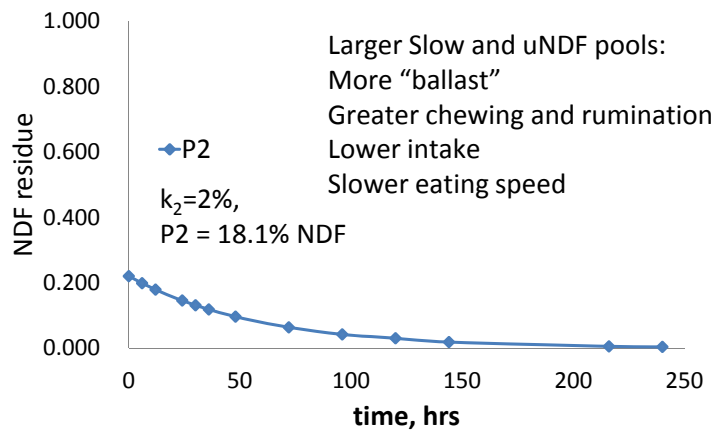
Corn silage example: P1+P2+iNDF



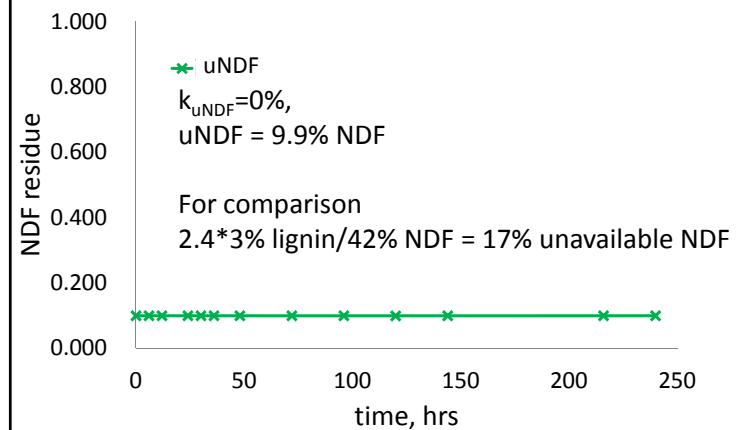
Corn silage example: fast pool



Corn silage example: slow pool



Corn silage example: uNDF



uNDF Study @ Miner Institute

- What does it mean and how do we take advantage of the information?

Composition of diets used in uNDF study at Miner Institute.

| Ingredient | % of ration DM | Diet | | | |
|-----------------------------|----------------|----------------|-----------------|-----------------|------------------|
| | | LF-LD (Low CS) | HF-LD (High CS) | LF-HD (Low BMR) | HF-HD (High BMR) |
| Conventional corn silage | | 39.2 | 54.9 | --- | --- |
| Brown midrib corn silage | | --- | --- | 36.1 | 50.2 |
| Hay crop silage | | 13.4 | 13.4 | 13.3 | 13.3 |
| Corn meal | | 17.3 | 1.6 | 20.4 | 6.3 |
| Grain mix | | 30.1 | 30.1 | 30.2 | 30.2 |
| <u>Chemical composition</u> | | | | | |
| Crude protein, % of DM | | 17.0 | 17.0 | 16.7 | 16.7 |
| NDF,% of DM | | 32.1 | 35.6 | 31.5 | 35.1 |
| Starch, % of DM | | 28.0 | 21.2 | 27.8 | 23.8 |
| 24-h NDF digestibility, % | | 56.3 | 54.0 | 62.0 | 60.3 |
| peNDF, % of DM | | 17.3 | 23.1 | 18.5 | 21.5 |

uNDF study – Miner Inst.

| | High CCS | Low CCS | High BMR | Low BMR |
|------------|----------|---------|----------|---------|
| DMI lb/d | 58.43 | 63.95 | 64.39 | 64.61 |
| SCM lb/d | 92.17 | 99.67 | 100.77 | 102.31 |
| Efficiency | 1.58 | 1.56 | 1.57 | 1.58 |

uNDF Intake, Rumen content and Fecal excretion

| | High CCS | Low CCS | High BMR | Low BMR |
|------------------|----------|---------|----------|---------|
| uNDF Intake lb/d | 5.80 | 5.27 | 4.87 | 4.48 |
| uNDF Rumen lb | 9.17 | 8.42 | 7.63 | 7.06 |
| uNDF Fecal lb /d | 5.80 | 5.27 | 4.87 | 4.48 |

Can we use this to better predict DMI and adjust diets to allocate forages better?

| | High CCS | Low CCS | High BMR | Low BMR |
|-------------|----------|---------|----------|---------|
| uNDF, %DM | 9.92% | 8.24% | 7.57% | 6.93% |
| uNDFi:uNDFf | 1.00 | 1.00 | 1.00 | 1.00 |
| uNDFi: NDFr | 0.63 | 0.63 | 0.64 | 0.63 |
| uNDFr:uNDFi | 1.58 | 1.60 | 1.57 | 1.58 |

uNDFi, uNDF Intake
uNDFf, uNDF Fecal
uNDFr, uNDF Rumen content

Interpretation

- Need to understand what changes uNDF Rumen content
 - 4.48 – 5.80 lbs. or 7% - 10% DMI is significant
 - Rumen content appears to determine intake and fecal output of uNDF
 - What causes variation of uNDF Rumen content?
- “Working hypothesis”: the disappearance of the fast and slow pools of pdNDF determines volume of uNDF Rumen content and capacity along with the “ballast and rumen fill of the slow and uNDF fractions.

Perspective

| | High CCS | Low CCS | High BMR | Low BMR | Median |
|----------------|----------|---------|----------|---------|--------------|
| uNDF, %DM | 9.92% | 8.24% | 7.57% | 6.93% | 7.90% |
| uNDF Intake lb | 5.80 | 5.27 | 4.87 | 4.48 | 5.07 |
| uNDF Rumen, lb | 9.17 | 8.42 | 7.63 | 7.06 | 8.03 |
| uNDF Fecal/d | 5.80 | 5.27 | 4.87 | 4.48 | 5.07 |
| uNDFi:uNDFf | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| uNDFi:uNDFr | 0.63 | 0.63 | 0.64 | 0.63 | 0.63 |

Take into account current uNDF% and intake while rebalancing diet. If you know current capacity based on current feeds you should be able to optimize better diet.

Summary of 2008 and 2011 studies: uNDF240om rumen fill relative to intake

- 7 of 8 rations show similar ratio of rumen fill:intake of uNDF240om
 - 1.6x
- Suggests uNDF240om as viable predictor of DMI across various diets
- Considering 2008 and 2011 data; suggests
 - 0.40% BW as possible fill max, DMI max
 - 0.30% BW as possible fill minimum for rumen health and functioning.



Digestible aNDFom per Acre

- Cost effective, high quality land availability is tight
- Growth of the business is paramount to future success – so more cows
- Cows run on forage and high quality forage is the key to high milk yield, lower income over purchased feed costs and reduced environmental impact
- Question: How much digestible aNDFom do you yield per acre with your current forage program?
 - for corn silage have to recognize starch contribution for energy and purchased grain, but forage digestibility is still key

Forage Rotation and Selection to Optimize Digestible aNDFom per Acre

- Alfalfa is good example – traditional forage for lactating dairy cattle
- Drought resistant due to root structure and capability
- High nitrogen content for a forage
- Good digestibility?

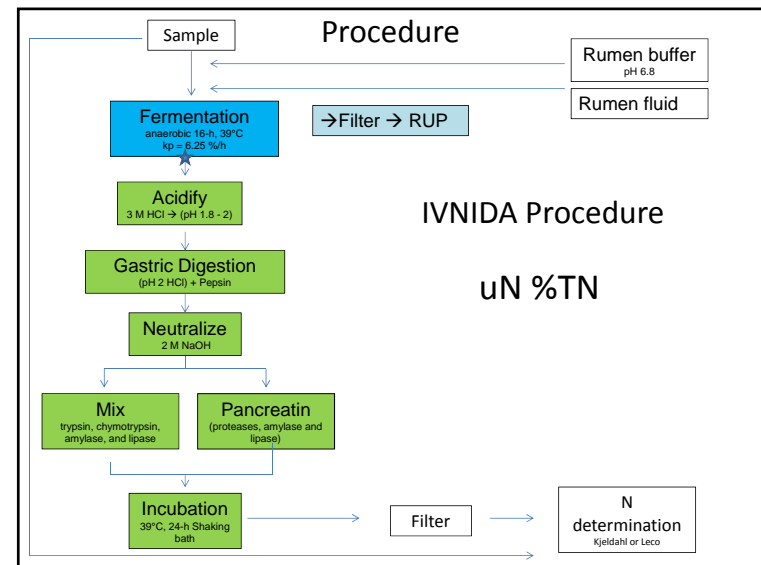
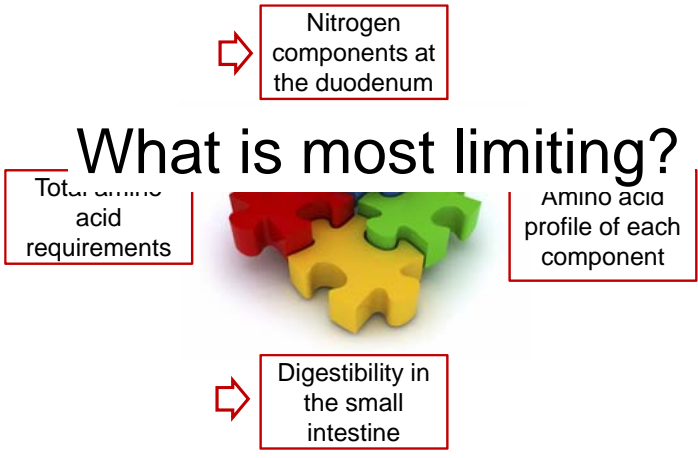
Forage Rotation and Selection to Optimize Digestible aNDFom per Acre

- uNDF content of alfalfa ranges from 43% to 53% depending on cutting and leaf to stem ratio
- 2012 Large Herd DFBS data – Haycrop yields 3 to 3.3 tons DM/acre
- Assume this is alfalfa at 40% NDF and 47% uNDF, that means tons digestible aNDFom per acre on average is 0.7 tons per acre

Forage Rotation and Selection to Optimize Digestible aNDFom per Acre

- Corn silage by comparison can range from 9 to 17% uNDF and will yield ~7.5 DM ton per acre.
- At 42% NDF, that is 3.2 tons aNDFom/acre and ~2.3 tons of digestible aNDFom per acre

Predicting AA Balance and Protein Supply
 – Four Pieces To The Nitrogen/AA Part of the Puzzle



Comparison of ADIN and Ross in-vitro indigestible N

| | Feed N (% DM) | ADIN (%N) | Ross In-vitro indigestible N (% N) |
|--------------------------------|---------------|-----------|------------------------------------|
| Regular blood meal | 16.2 | 4.7 | 16 |
| Heat damaged blood meal | 16.1 | 1.8 | 93 |
| Soybean meal solvent extracted | 7.6 | 6.7 | 8 |
| Soybean meal heat treated | 7.3 | 7.9 | 11 |

Source: Ross, 2013 43

Does The Cow Care?



Objectives

- To evaluate the performance of lactating dairy cattle fed two different levels of uN as determined by the IVNIDA
- To compare MP allowable milk predictions of the CNCPS using the detergent system or uN IVNIDA with the study data
- Economic evaluation of the outcome



Unavailable N in Excellent and Average Blood Meal Estimated by the Detergent System or by the uN assay

| Ingredient, % N | NDIN | ADIN | uN det. | uN IVNIDA |
|--------------------|------|-------|---------|-----------|
| LOW uN Blood Meal | 0.0 | 0.0 → | 0.0 | 9.0 |
| HIGH uN Blood Meal | 0.0 | 0.0 → | 0.0 | 33.8 |

Diet Formulation

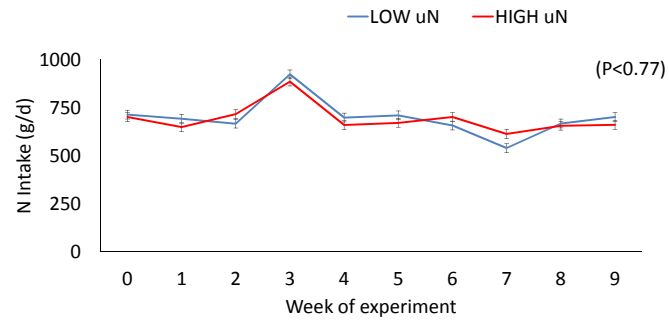
| Ingredient, % DM | Treatment | |
|---------------------|-----------|---------|
| | LOW uN | HIGH uN |
| Alfalfa haylage | 11.5 | 11.5 |
| BMR corn silage | 49.3 | 49.3 |
| Bakery byproduct | 1.8 | 1.8 |
| Blood meal (9% uN) | 3.7 | --- |
| Blood meal (34% uN) | --- | 4.0 |
| Canola meal | 3.0 | 3.0 |
| Corn grain | 16.1 | 16.1 |
| Energy Booster 100 | 1.8 | 1.8 |
| Molasses | 1.8 | 1.8 |
| Smartamine M | 0.1 | 0.1 |
| Sodium bicarbonate | 0.6 | 0.5 |
| Soybean hulls | 4.6 | 4.5 |
| Urea | 0.2 | 0.2 |
| Wheat midds | 4.6 | 4.5 |
| Min/vit mix | 1.0 | 1.0 |

Chemical Composition of Initial Diets Fed

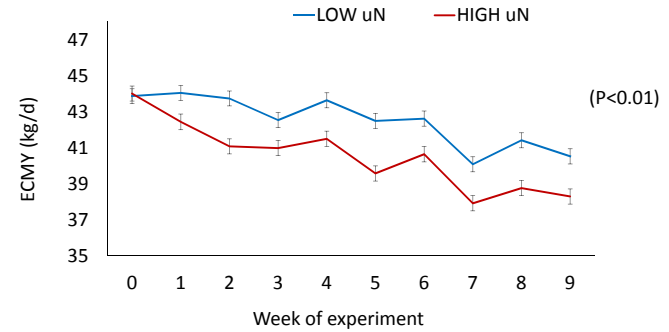
| Item | Treatment | |
|-----------------|-----------|---------|
| | LOW uN | HIGH uN |
| DM, % as fed | 50.0 | 50.5 |
| CP, % DM | 15.2 | 15.2 |
| NDF, % DM | 31.9 | 32.3 |
| ADF, % DM | 21.3 | 20.5 |
| Fat, % DM | 4.3 | 3.9 |
| Starch, % DM | 30.4 | 31.2 |
| Sugar, % DM | 3.6 | 3.3 |
| Ca, % DM | 0.65 | 0.60 |
| P, % DM | 0.43 | 0.43 |
| ME*, Mcal/kg DM | 1.8 | 1.7 |
| Lys:Met*, % MP | 3.21 | 2.89 |

* calculated CNCPS

Nitrogen Intake



Energy Corrected Milk



Results

| Item ¹ | Treatment | | SEM | P-value |
|--------------------------------|-----------|---------|------|---------|
| | LOW uN | HIGH uN | | |
| DMI, lb | 60 | 60 | 1.34 | 0.75 |
| N Intake, g | 671 | 664 | 14.8 | 0.77 |
| <i><u>Milk production</u></i> | | | | |
| Milk, lb | 93 | 89 | 0.68 | <0.01 |
| ECM, lb | 92 | 88 | 0.71 | <0.01 |
| Fat, lb | 3.33 | 3.13 | 0.04 | <0.01 |
| Protein, lb | 2.78 | 2.71 | 0.02 | 0.03 |
| <i><u>Milk composition</u></i> | | | | |
| Fat, % | 3.6 | 3.5 | 0.03 | <0.03 |
| Protein, % | 3.03 | 3.06 | 0.02 | 0.20 |
| Lactose, % | 4.9 | 4.86 | 0.02 | 0.18 |
| MUN, mg/dl | 9.4 | 8 | 0.18 | <0.01 |

¹ DMI: dry matter intake, ECM: energy corrected milk (Tyrrell and Reid, 1965), MUN: milk urea nitrogen

Results

| Item ¹ | Treatment | | SEM | P-value |
|------------------------------------|-----------|---------|-------|---------|
| | LOW uN | HIGH uN | | |
| <i><u>BW and BCS</u></i> | | | | |
| BW initial, lb | 1508 | 1525 | 22.26 | 0.58 |
| BW change, lb | 76 | 65 | 4.96 | 0.12 |
| BCS change | 0.44 | 0.35 | 0.07 | 0.29 |
| <i><u>Efficiency</u></i> | | | | |
| Gross feed efficiency ² | 1.56 | 1.50 | 0.03 | 0.34 |
| Milk N efficiency ³ | 30.0 | 29.7 | 0.70 | 0.76 |

¹ BW: body weight ; BCS: body condition score

² calculated as kg milk / kg DMI

³ calculated as milk N / N intake *100

CNCPS Prediction Evaluation

- Full chemical composition in all feeds
- Inputted all environmental, barn and animal characteristics from experiment
 - BCS change was inputted as measured
 - Target ADG was allowed to estimate nutrient requirements for growth based on mature size
- The uN values from the blood meals were the only values changed and were used in place of ADIN



CNCPS v6.5 predictions for ME and MP allowable milk

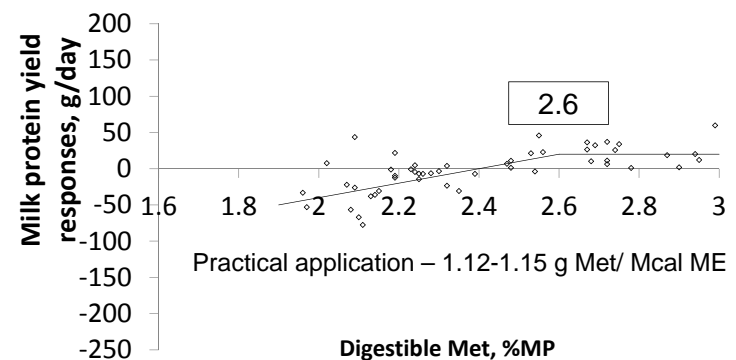
| Item | Treatment | |
|---------------------------------|-----------|---------|
| | LOW uN | HIGH uN |
| Energy corrected milk, lb | 92 | 88 |
| Predicted ME allowable milk, lb | 102 | 101 |
| <i>Using ADIN and NDIN</i> | | |
| Predicted MP allowable milk, lb | 99 | 99 |
| Predicted MP supply, g | 3,105 | 3,144 |
| <i>Using uN assay data</i> | | |
| Predicted MP allowable milk, lb | 94 | 87 |
| Predicted MP Supply, g | 3,036 | 2,835 |

N indigestibility study

- Final difference in predicted N supply was 32 g or 4.8% of N intake.
- Suggests that with adequate and correct N digestibility information, we can refine diet formulations to a small margin
- Challenge is getting variation in feed and management accounted for properly
- Understanding what is first or most limiting is important as we refine our formulation strategies

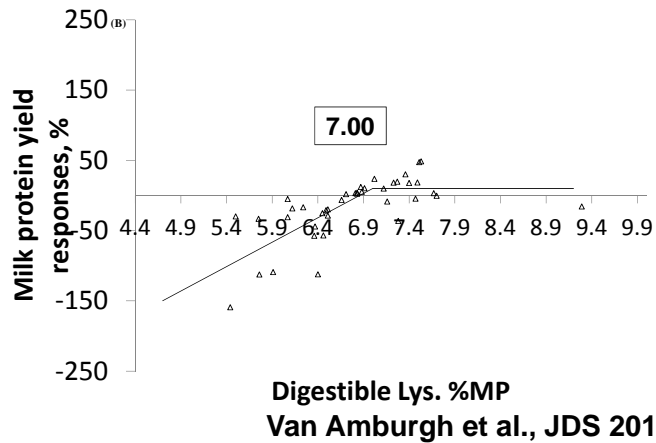
55

BALANCING FOR MET – UPDATED AA PROFILES – MILK PROTEIN YIELD v6.5



Source: Van Amburgh et al., JDS 2015

**BALANCING FOR LYS – UPDATED AA PROFILES –
MILK PROTEIN YIELD V6.5**



Methionine and Lysine and Relative to Energy

If 60 Mcals ME, then $(60 \text{ mcal} * 1.12 \text{ g/Mcal})$ 67.2 g Met

The lysine requirement should be $(7/2.6 = 2.69)$

Therefore $2.7 \text{ (Lys:Met)} * 67.2 \text{g} = 181.4 \text{ g Lys}$

Always calculated Met first – what the gram/energy relationship was derived from

Then calculate lysine otherwise the ratio will provide incorrect values

Thank you for your attention.



mev1@cornell.edu

Use of Rumination and Activity Monitoring for the Identification of Dairy Cows with Health Disorders

Julio Giordano, DVM, MS, PhD & Matias Stangaferro, DVM, MS
Dairy Cattle Biology and Management Laboratory

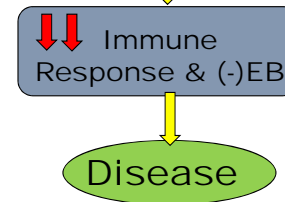
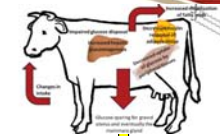


Cornell University
Department of Animal Science

Early Lactation Challenges

Health conditions to monitor post-partum period:

- ✓ Retained placenta
- ✓ Metritis
- ✓ Mastitis
- ✓ Displaced abomasum
- ✓ Ketosis
- ✓ Hypocalcemia
- ✓ Diarrhea
- ✓ Pneumonia



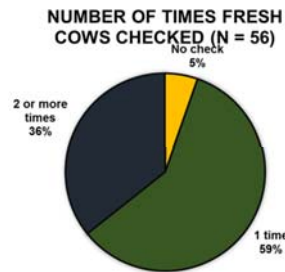
Health Monitoring SOPs

✓ Substantial variation across farms – frequency of checks, type of evaluation, labor demand and aids used

- ✓ Health monitoring programs –
 - ✓ costly
 - ✓ time consuming
 - ✓ require qualified labor

✓ Monitoring technologies

reduce or eliminate the burden associated with health monitoring programs



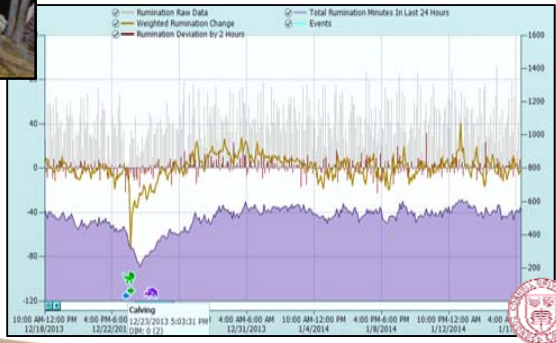
Sensor Data



Rumination-Activity Monitoring

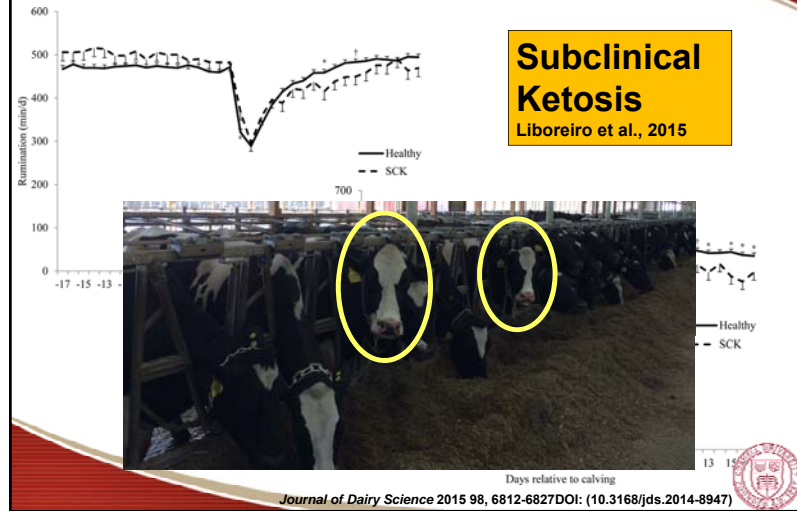


HR-Tag, SCR Dairy



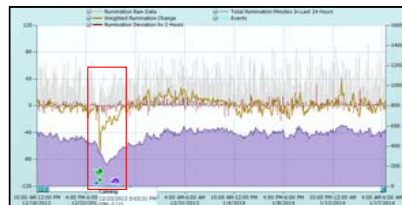
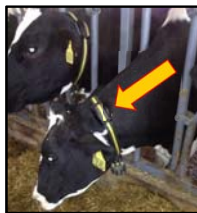
Rum-Act & Disease

Subclinical Ketosis
Liboreiro et al., 2015



Journal of Dairy Science 2015 98, 6812-6827 DOI: (10.3168/jds.2014-8947)

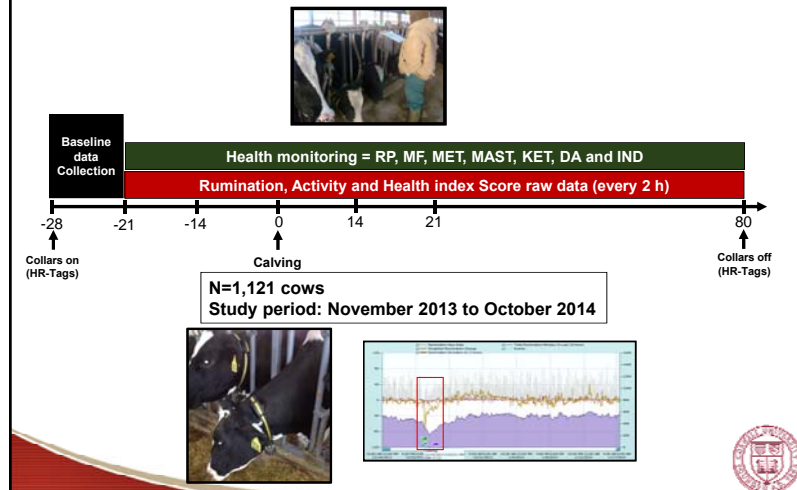
Rumination-Activity Monitoring & Cow Health



(1) Performance of the HR system to identify cows with health disorders (HD).

(2) When does the HR system identify cows with CD compared to farm personnel?

Cornell University Research Observational Prospective Cohort Study



Health Monitoring SOP

-Daily monitoring - all cows 1 to 10 DIM

- Direct observation
- Body Temperature
- Ketostix (urine ketones)
- Daily milk weights

-Rumen auscultation, check for DA

-Vaginal discharge - all cows at 8 DIM

-Milk culture - all cows at the beginning of lactation and mastitis cases

-Monitoring after 10 DIM: 3X milk weights and milk conductivity

Intensive Monitoring Program!!!

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)



Health Index Report

| | Cow Number | Group | Lactation Status | Days in Lactation | Days from Last Breeding | Activity Peak | Ruminati on Peak | Daily Ruminati on | Amount Of Evaluation | Health Index for Non |
|----|------------|-------|------------------|-------------------|-------------------------|---------------|------------------|-------------------|----------------------|----------------------|
| 1 | 20600 | 7 | Before | 6 | | -15 | -40 | 0 | -132 | 23.00 |
| 2 | 10856 | 7 | Before | 6 | | -40 | -44 | 13 | -464 | 32.00 |
| | | | | | | | | | -561 | 55.00 |
| | | | | | | | | | -462 | 56.00 |
| | | | | | | | | | -136 | 57.20 |
| | | | | | | | | | | 72.00 |
| | | | | | | | | | | 73.00 |
| | | | | | | | | | -290 | 79.00 |
| | | | | | | | | | -23 | 81.50 |
| | | | | | | | | | 2 | 82.00 |
| | | | | | | | | | -35 | 83.00 |
| 12 | 8062200 | 1 | Before | 57 | | -7 | -21 | 135 | 15 | 83.70 |
| 13 | 508600 | 1 | Ready | 68 | | -29 | -52 | 328 | -206 | 83.80 |
| 14 | 9251200 | 1 | Ready | 72 | | -17 | -34 | 318 | -133 | 84.70 |
| 15 | 12561 | 1 | Before | 46 | | -5 | -15 | 186 | 5 | 85.50 |
| | 15 | | | | | | | | | |

Evaluate the ability of Health Index (HI) score to identify cows with health disorders.



Cornell University Research Observational Prospective Cohort Study

(1) Performance of the HR system to identify cows with health disorders (HD).

(2) When does HR system identify cows with CD compared to farm personnel?

>Cows grouped based on occurrence of HD (health disorder) and HI (health index) score

- >HD+ and HI+ (HI < 86) → disorder and flagged
- >HD+ and HI- (HI ≥ 86) → disorder and NOT flagged
- >HD- (Healthy) → healthy

Farm Personnel Clinical Diagnosis



Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

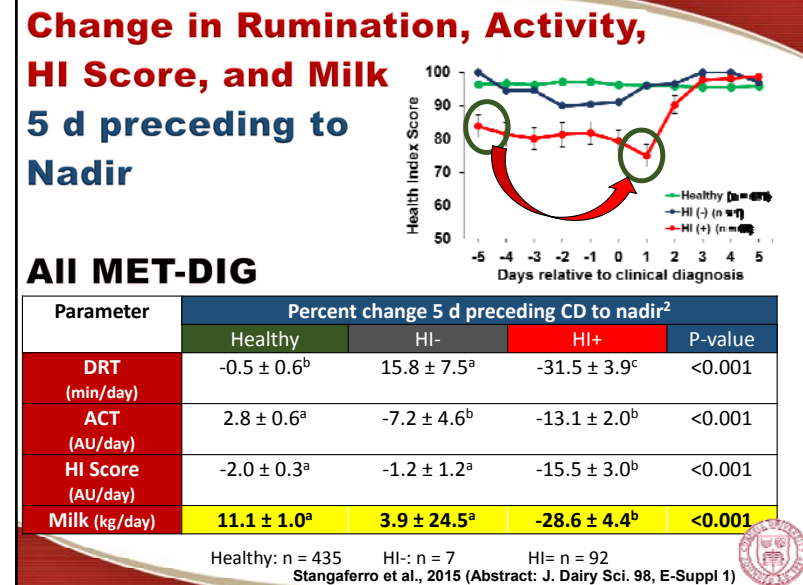
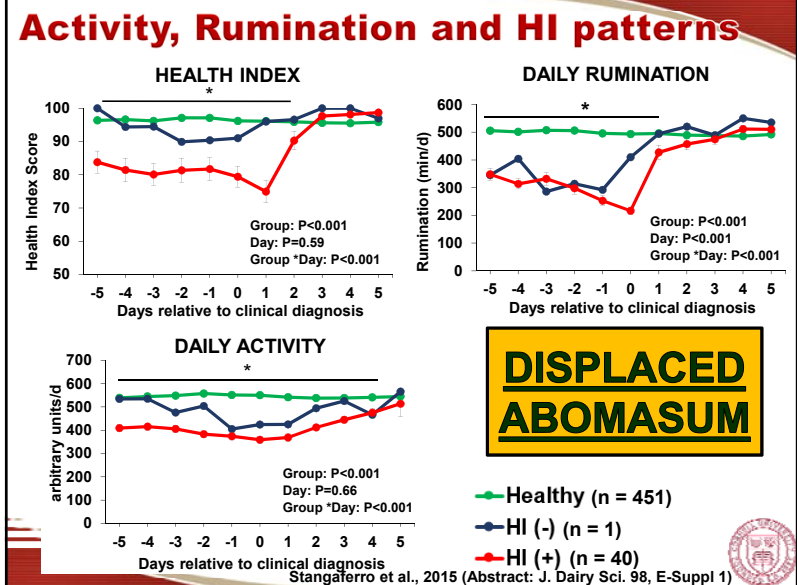


Ability of HI Score to Identify Cows with Health Disorders DA, KET, & IND

| Disorder | Cows detected Se, % (95% CI) | HI <86 to CD (d) |
|--------------------------------|------------------------------|-----------------------------|
| DA (n = 41) | 98 (93-100) | -3 (-3.7 to -2.3; P<0.01) |
| Ketosis (n = 54) | 91 (83-99) | -1.5 (-2.3 to -1.0; P<0.01) |
| Indig. (n = 9) | 89 (68-100) | -0.5 (-1.5 to 0.5; P=0.28) |
| All metabolic & dig. (n = 104) | 93 (89-98) | -2.1 (-2.5 to -1.6; P<0.01) |

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)





Conclusions

- ✓ The HR system was **effective** to identify cows suffering **metabolic and digestive disorders (DA, KET, IND)**.
- ✓ Cows with **DA and KET identified earlier** than farm personnel.
- ✓ **No difference in milk** for cows not flagged by HR (**HD+ and HI-**) and Healthy cows for 5 d prior to CD

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

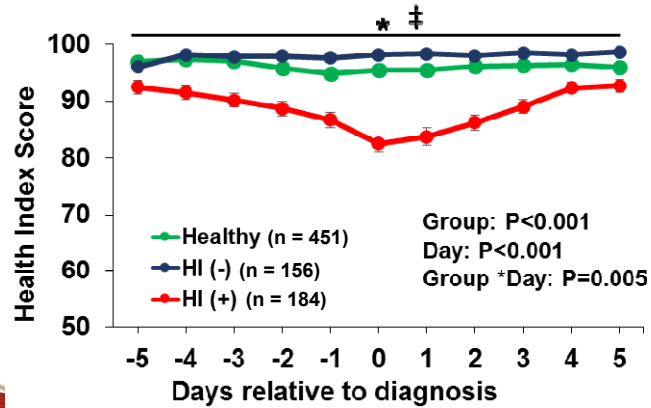
Ability of HI Score to Identify Cows with Health Disorders

| Disorder | Cows detected Se, % (95% CI) | HI <86 to DCD (d) |
|-------------------------------|------------------------------|------------------------------------|
| Metritis ALL (n = 349) | 55 (49-60) | -1.2 (-1.6 to -0.7; P<0.01) |
| ≤39.4°C (n = 165) | 56 (48-64) | -1.4 (-1.9 to -1.0; P<0.01) |
| 39.5-39.9°C (n = 79) | 49 (38-61) | -1.3 (-2.9 to 0.4; P = 0.17) |
| ≥40°C (n = 74) | 58 (46-70) | -0.2 (-0.9 to 0.4; P = 0.46) |
| Antibiotic treatment | | |
| Cephalosp. (n = 292) | 49 (43-55) | -1.1 (-1.6 to -0.6; P = 0.17) |
| Ampi./Oxytet. (n = 57) | 83 (70-91) | -1.4 (-2.1 to -0.7; P = 0.17) |

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

HI patterns

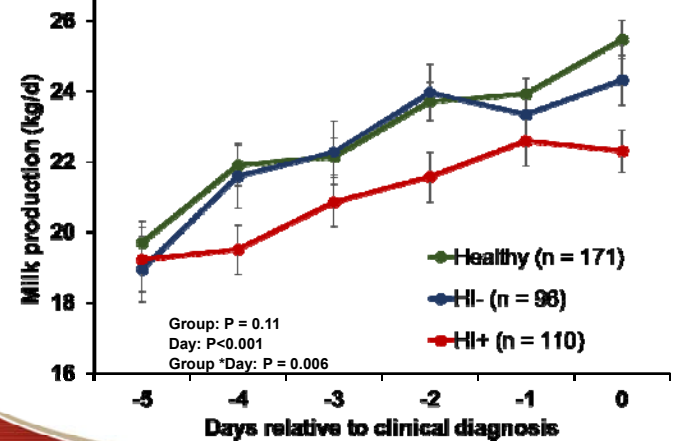
Metritis (Healthy, HI-, HI+)



Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

Milk Production – MET

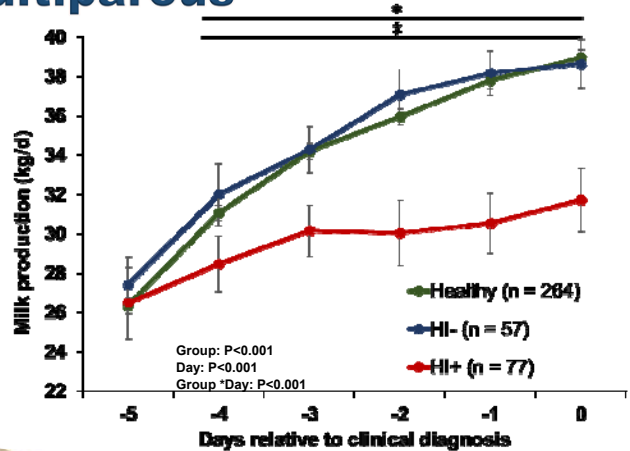
Primiparous



Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

Milk Production – MET

Multiparous



Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

Culling Dynamics and Repro

By HI Score (+ vs -)

| Parameter | Differences from 5 d preceding to nadir ¹ | | | P-value |
|-------------------------|--|-------------------------------|-------------------------------|---------|
| | Healthy | HI- | HI+ | |
| DNB/Sold <60 | 2.5 ^a (11/451) | 3.3 ^a (5/153) | 7.0 ^b (13/187) | 0.03 |
| DIM, % (n/n) | 18.6 ^a (84/451) | 14.4 ^a (22/153) | 31.0 ^b (58/187) | <0.001 |
| DIM at 1st AI, days (n) | 79 (400) | 79 (140) | 80 (157) | 0.73 |
| P/AI at 1st AI, % (n/n) | 46.0 (184/400) | 42.9 (60/140) | 45.9 (72/157) | 0.80 |

Cows in HI+ group twice as likely to leave the herd than cows in the HI- and Healthy group

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

Ability of HR System to Identify Cows with Disease

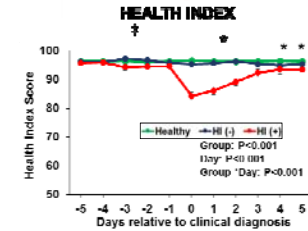
| Disease | Cows detected % Se (95% CI) | HR Flag to DCD (days) |
|---------------------------|--------------------------------|------------------------------------|
| Mastitis (n = 165) | 53 (45-61) | -0.6 (-1.1 to -0.2; P<0.01) |
| Clinical (n = 123) | 58 (49-67) | -1.2 (-2.7 to 0.3; P=0.12) |
| Subclinical (n = 42) | 41 (26-57) | -0.5 (-1.0 to -0.1; P=0.02) |
| By Pathogen | | |
| E. Coli. (n = 31) | 81(67-95) | -0.5 (-1.1 to 0.2; P=0.18) |
| Gram + (n = 39) | 49 (32-65) | -0.5 (-1.4 to 0.5; P=0.31) |
| Staph. Aureus (n = 11) | 46 (17-77) | -1.4 (-4.1 to 1.3; P=0.23) |
| No growth 48 h (n = 25) | 48 (28-69) | -0.2 (-1.4 to 1.1; P=0.78) |

Gram (+) = Streptococcus agalactiae, Streptococcus dysgalactiae, Streptococcus uberis, Streptococcus species, Staphylococcus species, Actinobacillus pyogenes.

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)



Change in Rumination, Activity, HI Score, and Milk 5 d preceding to Nadir



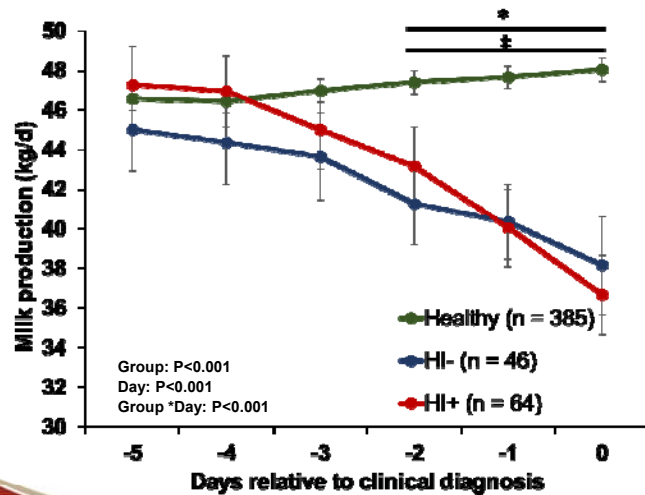
Clinical Mastitis

| Parameter | Percent change 5 d preceding CD to nadir ² | | | |
|-------------------|---|-------------------------|--------------------------|---------|
| | Healthy | HI- | HI+ | P-value |
| DRT (min/day) | 0.6 ± 0.9 ^a | -6.3 ± 3.7 ^b | -27.8 ± 5.1 ^c | <0.001 |
| ACT (AU/day) | 4.0 ± 1.2 ^a | 3.3 ± 2.9 ^a | -15.0 ± 2.6 ^b | <0.001 |
| HI Score (AU/day) | 0.4 ± 0.2 ^a | -1.4 ± 0.8 ^a | -13.4 ± 1.9 ^b | <0.001 |
| Milk (kg/day) | 4.1 ± 0.8 ^a | -9.2 ± 3.2 ^b | -21.9 ± 3.3 ^c | <0.001 |

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)



Milk Production - MAST



Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)



Health Index Score Performance

| | % (n/n) | 95% CI |
|-----------------|-------------------------|------------|
| False positives | 2.4 (1,955/72,423) | 2.6-2.8 |
| Specificity | 97.6 (70,695/72,423) | 97.2-97.4 |
| Accuracy | 95.6 (73,111/76,519) | 95.4, 95.7 |

• Each day was considered a new test

• Total number of days in the study was determined for individual cows until 80 DIM or DIM at which cows left the herd (sold or died)

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)



Tag Misplacement and Malfunction

3.7% tags malfunctioned or misplaced

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

Conclusions

- ✓ The HR system is most **effective** to identify cows suffering **metabolic and digestive disorders**.
- ✓ A relatively **lower Se** to identify cows with MET and MAST might be explained by **less severe systemic illness** and type of mastitis-causing pathogen.
- ✓ The HR system identified cows with **DA, KET, MET and MAST earlier** than farm personnel.

Stangaferro et al., 2015 (Abstract: J. Dairy Sci. 98, E-Suppl 1)

Challenges and Opportunities of Early Dz Detection

Opportunities

- Earlier treatment:
 - improved response
 - improved well-being
 - prevent associated disorders

Challenges

- Treatment decisions in the absence of clinical signs?
- Prophylactic treatment?

Health Index Score vs Days relative to clinical diagnosis

Group: P<0.001
Day: P=0.59
Group *Day: P<0.001

On-farm use...

NUMBER OF TIMES FRESH COWS CHECKED (N = 66)

- Farms with little-to-no intervention
 - identify more cows with health disorders
- Farms with intensive health monitoring
 - reduce labor & cow manipulation

FAMILY FARM TRANSITIONS: KEY DECISIONS



Cornell University
College of Agriculture and Life Sciences
PRO-DAIRY Program

Conference & Annual Meeting
March 8-9, 2017 Liverpool/Syracuse, New York

Melissa O'Rourke B.S., M.A., J.D.
Attorney –and– Farm & Agribusiness
Management Specialist

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We have about
30 minutes
together in this
breakout session

We'll talk about . . .

- Key decisions
- Family expectations
- Communication points
- Family conversation skills, approaches
- Resources
- Homework (see handout)



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Ag Decision Maker: An agricultural economics and business website

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- Homepage
- Crops
- Livestock
- Whole Farm**
- Business Development
- Cooperatives
- Renewable Energy

October 2015 Updates

AgDM New and Updated Files

Crops – Cost & Return

Farm Bill Decision Tools:

- 2014 Projected ARC-CO Payments – A1-32 (Decision Tool)
- 2015 Projected ARC-CO Payments – A1-32 (Decision Tool)
- Corn and Soybean Loan Rates – A1-34

Research briefs from the ISU Department of Economics

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- Other

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Whole Farm

Choose from navigation on left.

Overview

Whole Farm Decision encompass a farm and building leasing, land value as well as legal and tax issues, and iss

Popular Files

- Farm Costs and Returns – C1-10
- Farmiland Cash Rental Rate Survey
- Farmiland Value Survey (Iowa State
- Estate Planning Terms – C4-50
- Using Financial and Production Rec
- 41

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Evaluating Your Estate Plan
Transferring Assets & Management
Making It Work
Weight & Measurements
Other
Business Development

Whole Farm -- Transition and Estate Planning

Getting Started
Information Files
Getting Started in Farming: In
Getting Started in Farming: Or
Getting Started in Farming: Pa
Understanding Farm Business
Planning your Future Together
Critical Success Factors for Bu
Constructing a Succession Pla
Newsletter Articles
Retirement resources for ever
Getting started in farming: No
Business Arrangements

Transition & Estate Planning

Getting Started
Business Arrangements
Evaluating Your Estate Plan
Transferring Assets & Management
Making It Work

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Whole Farm > Transition and Estate Planning > Evaluating Your Estate Plan

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Cooperatives
Renewable Energy
Meet the author
Melissa O'Rourke
extension farm and agribusiness management specialist
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morourke@astate.edu

Estate Planning Attorneys: Finding One Who Can Work For You

File C4-61
Written April, 2012
pdf format

Law is a multifaceted and complicated field that is in a constant state of change. New regulations and statutes are continually enacted by state and federal authorities. Every decision released by a court or administrative body represents a new interpretation of legal concepts. It is not possible for any one attorney to be an expert in every field of law.

Attorneys in private practice may choose to limit their practice to certain areas of the law. In smaller communities many attorneys find it necessary to engage in "general practice" to serve a wide range of clients. However, an attorney may also have a particular interest in specific fields of law, such as estate planning, probate and trust administration. Finding an attorney to handle estate planning needs may take a little time and effort. This publication is intended to provide you with some guidelines.

You may already have a relationship with an attorney for other personal or business matters. Start by talking with that attorney about estate planning. Ask the attorney some of the questions found in this publication. If that attorney is not comfortable handling your estate planning needs, ask for recommendations.

1. Seek Recommendations: Think about how you would locate any other professional you might need, such as a plumber or electrician, a medical professional or a tax advisor. While it is possible to look on the internet or in the yellow pages, we often seek the recommendations of others. In particular, we ask people we respect, which might include family members, friends or other professionals with whom we are acquainted. Ask others, "Have you had a will or trust prepared? Who did that work for you? Would you recommend that person to others?" Start to assemble a list of the names that you receive and prepare to make some initial contacts.

2. Contact and Schedule Initial Meetings: Select two or three of the attorney names that you obtain and telephone those law offices. Explain that you are interested in having some estate planning done and that you would like to schedule an initial meeting with "Lawyer Jones" who has been recommended to you. Ask what the fee will be for such an initial meeting.

3. Come to the Meeting Prepared: Come to the meeting prepared to explain your circumstances and what kind of work you may need done. Bring along your most recent net worth statement and a completed Estate Planning Questionnaire (See AgDM File C4-57, Evaluating Your Estate Plan - Estate Planning Questionnaire). It is also possible that the law firm may have an estate planning questionnaire. You should also have a prepared list of questions to ask the attorney.

4. Questions for the Attorney: During this initial meeting, you should have some questions prepared to ask the attorney. These questions are intended to assist you in getting to know the attorney and that individual's background in estate planning. Possible questions to include are listed on the following page.

5. Evaluate and Select: Based on the recommendations you obtain, it may be worthwhile

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Evaluating Your Estate Plan: Estate Planning Attorneys: Finding One Who Can Work For You
Ag Decision Maker
File C4-61

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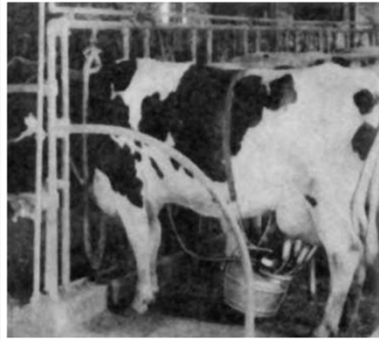
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Extension and Outreach
April 2012
Ag Decision Maker

PDF format of articles on Ag Decision Maker

(1) Decide to stop procrastinating.

Don't put off conversations about farm transition and estate planning!

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**Do you keep your dairy updated?—
Or do you get behind the times because
*that's the way we've always done it?***

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When was the last time you updated your estate plan?

- University studies –
- 60% do **not** have an updated estate plan
- 89% do **not** have a **farm transfer plan**
- **Many keep waiting for the “perfect” plan.**
- **Others avoid the difficult conversations**



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Is your family holding onto old – outdated methods and thinking?



- In years past, families made assumptions – that things would just go on as they had before.
- Without purposeful planning, the operation may cease to exist.

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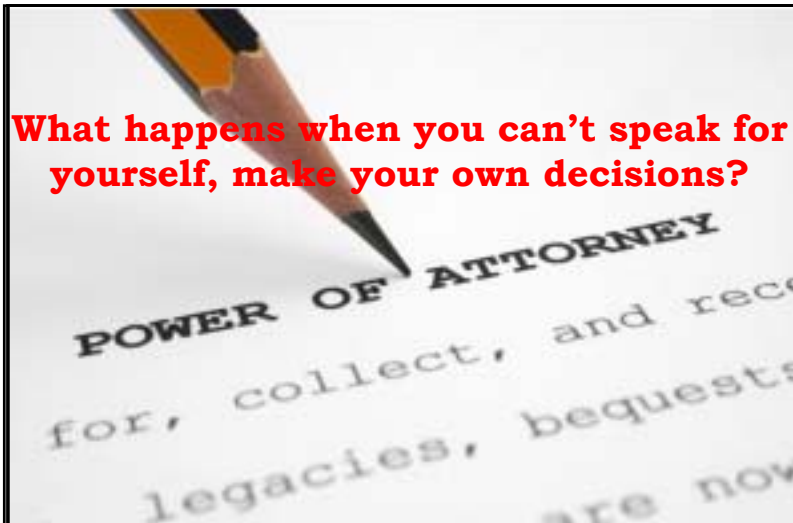
(2) Decide what your plans are for when you don't die -- (well, at least not right away)



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What happens when you can't speak for yourself, make your own decisions?



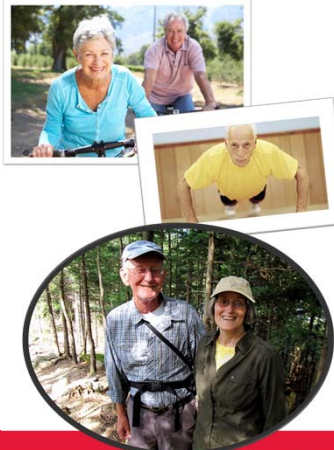
Substitute Decision-Making: Powers of Attorney (POA) –and– Health Care Planning & Directives

- **Incapacity** = lack of physical or mental abilities that results in a person's inability to manage personal care, property or finances.



“But I’m healthy and active, and besides – isn’t 80 the new 40?”

- After age 65, chances of becoming incapacitated rise to 50%+.
- At age 80, chance of becoming incapacitated rises to 75%.
- In any year, at any age, your chance of becoming incapacitated is greater than your chance of dying.



Power of Attorney for Business/Financial Purposes

- Allows your “agent” to act in your place if you’re unable to handle your own business/financial matters.
- Health care decisions? **NO!**
- Spells out agent’s **powers** such as:
 - Pay bills, file income taxes
 - Sell, lease assets
 - Collect money due



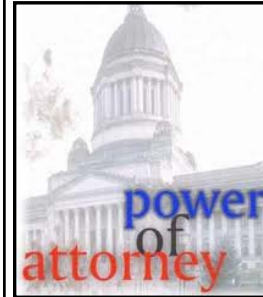
Power of Attorney for Medical/Healthcare Purposes

- Allows “agent” to make health care decisions if you’re not able to express those decisions.
- Spells out powers such as:
 - Hospitalization
 - Consent/reject treatment
 - Organ donation



Powers of Attorney guidelines:

- Name **at least** one *alternate* agent – and avoid “co-POAs”.
- Consider people **younger** than you!
- Healthcare/Medical and Business/Financial may be **different** agents.
- You must be “competent” (have legal capacity) when you sign.
- Power of Attorney only good during **lifetime**.



Living Will: also known as a “Declaration Relating to Use of Life-Sustaining Procedures”

- Purpose: Express what “life-sustaining” procedures are desired.
- Can **guide** a Healthcare POA.



- Many states have standardized forms for POAs and Living Wills and DNRs (Do-Not-Resuscitate Orders) which may *or may not* be right for you. **Please, consult with an attorney!**

Do Not Resuscitate (DNR) Orders – 2 Types

- ▶ **Physician-issued:** Allows emergency care providers and others outside a hospital to rely upon a physician-issued DNR order for an adult in a terminal condition.
- ▶ **Patient-issued:** Directs medical providers to not attempt resuscitation (CPR) if the patient’s heart stops.



**Evaluating Your Estate Plan:
Powers of Attorney and Other
Forms of Substitute Decision Making**

Ag Decision Maker

File C4-54

As we think about lifetime transitions and estate planning, one aspect is to consider the times in life where it may be necessary for someone to step into your shoes and make decisions for you. We never know – at any age – when we may be unable to speak for ourselves. With proper planning, there are a variety of tools that can be used for what is sometimes referred to as Substitute Decision Making.

In Iowa, the concept of substitute decision making is addressed in various sections of the Iowa code. For example, in 2008 the Iowa legislature passed chapter 231E, the "Substitute Decision Maker Act." Although the State Office of the Substitute Decision Maker has been defunded by the legislature at this writing, the law still provides some guidelines and definitions. The concept of substitute decision making generally means the provision of decision making services by guardian, conservator, representative payee or an attorney-in-fact or power of attorney, or personal representative.

Power of Attorney (POA) and Related Documents grant authority to another person to manage your affairs on your behalf. You may be referred to as the principal while the person who is given the authority to act on your behalf is referred to as an attorney-in-fact or agent. Most POAs are intended to grant authority when you become unable to manage your own affairs. Although you must be competent at the time a POA is executed, many POAs are durable, which means that they remain in effect during a time of incompetency. Likewise, a POA may be revoked as long as you are competent to do so. A POA may be plenary, meaning it grants complete and unqualified authority to the attorney-in-fact. However, most POAs are express, which means that the POA grants specific, limited powers to the attorney-in-fact.

Pursuant to Iowa law, the Iowa State Bar Association has prepared several forms which can be used for substitute decision making purposes. These forms will be identified and discussed here. However, it is very important that you not rely on forms alone for your legal advice and decisions. Such forms may or may not fit your needs and wishes in the event that you become incompetent to manage your own affairs. You should consider and discuss your specific needs and wishes with your family and with your own legal professionals.

General Power of Attorney. This POA lists a broad range of specific powers that may be exercised by the attorney-in-fact that extend to your personal and financial affairs, including maintaining bank and other financial accounts, paying taxes, and voting on corporate matters. Paragraph 7 of the form contains provisions to allow you to designate whether the POA becomes effective immediately, upon a certain date or only upon your disability as designated by a physician. Should you wish to execute a general POA, this form may be appropriate; or, you may wish to have your attorney prepare a POA that covers your specific needs and desires.

**Read more about it!
– on
Ag Decision Maker:**

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www.extension.iastate.edu/agdm

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January 2012

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(3) Decide to establish ongoing family communication --



-- and take steps to start and continue this practice!

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Research: Communication Barriers to Family Farm Succession Conversations

- Penn State study
- Found several key barriers in farm families that kept them from talking about future plans for the family farm



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Passive Communication

When responding to questions about how families reached mutual understanding on issues related to family relations and plans for the family farm, respondents placed more emphasis on what was **implicitly understood** rather than **explicitly communicated**.



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Delays in Planning – due to unresolved issues in lives of adult children

- Waiting for children to make career decisions
- Concern about stability of adult child's marriage
 - Current marriage or possible future marriage



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Varying efforts to incorporate children's perspectives into future planning

- Most parents understand that farm succession planning can't be driven unilaterally by senior generation – but varied in how they went about accommodating children's perspectives and concerns.
- Some parents tried to be subtle in their efforts to exert influence with their children.
- Other parents were more direct in their efforts.



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Hold Regular Family Meetings: Guidelines

- Not over Thanksgiving or Christmas Dinner
- Schedule, commit the calendar
- Establish **agendas**.
- Keep **minutes**.
- Consider meeting **facilitation**



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No “family secrets” in estate or succession planning!

Everyone should know what's going on!



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“Reading of the Will?”

This is an outdated concept!



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Communicate, Communicate, Communicate

- **Head off conflict, hard feelings among family members.**
- **Technical details? Involve lawyer, other professionals.**
- **Include discussions regarding distribution of personal property.**



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Advantages of Communication

- All may not agree – but it’s better to share, explain your rationale.
- **Provides everyone an opportunity to understand and respect decisions.**
- Communication allows hurt feelings to heal, jealousy to diminish
- **Avoid estrangement or court battles among heirs.**



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- (4) **Discuss and decide strategies for how various heirs or family members may be treated – focusing on what’s **fair**, not necessarily **equal**.**



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Make decisions about what is **fair or equitable to all . . .**

. . . even though it may not be **equal.**



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► How to pass the farm business to the next generation—but not create animosity among heirs?

► If we divide assets equally among all, will it create such small pieces that successor child(ren) can't make a living operating the family farm?



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Non-Farm Children may have received:

- College tuition, down payment on a house, other compensation – receiving some inheritance early.
- **Who truly helped to create part of parents' final estate of by actively contributing to the parents' business over the years?**
- **Again – issues of "Contribution versus Compensation" – **fair** does not always mean **equal**.**



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Transferring the Farm Series #11 11/2011

Putting a Value on Sweat Equity Agricultural Business Management

David Goeller, Transition Specialist, Dept. of Agriculture Economics, U of Nebraska-Lincoln

For some farm/ranch families, deciding what to do with the family business can be very troublesome. How can we pass the farming business to the next generation while at the same time not create animosity or envy between the heirs? If we divide it equally between all the children, will it create such small pieces that the successor child cannot make a living operating the family farm? If one child is required to buy out his/her siblings will the business generate enough income to make this a feasible option? Most parents would say "We want to treat our children fairly," is dividing the farm equally between all the children always a fair solution?

Last week I found myself thinking about a family farming operation struggling with the dilemma of planning their estate. Let's call this family the Smiths. Like many families, Dad and Mom Smith would like to keep the "farm" in the family. Fortunately for them, son Jimmy, the youngest of three children, decided to return to the business in 1990. But unfortunately, if the farm business were divided into three equal pieces, the resulting slice would not be of adequate size to create a viable operation.

When Jimmy came back into the family business in 1990, the fair market value net worth of the business was \$500,000. Dad and Mom discussed the contribution that each child had made over their "growing up" years and decided that each child had contributed more or less about equally to the business during those years. So \$500,000 divided equally between the three children is \$200,000 each. Today's net worth of the business has grown to \$1,800,000. If divided equally between the three children \$600,000 would be left to each. The contributions from the three children toward the success of the farm business have very definitely not been equal since Jimmy's return, however.

There were no promises made to Jimmy when he returned to the farm, but many decisions were made differently because he was part of the business. When the neighbor's land came up for sale, Dad and Mom would not have been interested in purchasing that land if Jimmy had not been involved. It was Jimmy's idea to increase the rented land and add a seasonal enterprise to the business. It was also the labor and new energy provided by Jimmy that

allowed the business to profit, expand and grow. Jimmy has been paid a modest wage and allowed the use of machinery as he has developed his own farming business. But Dad, Mom and Jimmy all know that his contribution to the family farm has resulted in Jimmy developing a sizable investment of "sweat equity" into the farm business.

There are two dilemmas present in this example. The first arises because most of us want to treat our children fairly. Many of us think that the only way to treat each child fairly is to treat them equally. Maybe that's the way it was always done in our family. We certainly don't want to be the cause of any hard feelings. We don't want our non-farm kids to feel that they have been mistreated or slighted, but if you were to divide the farm business into equal pieces, would that result be of adequate size to create a viable business? What about the contribution of the farming child to the success and growth of the business? The second dilemma occurs because farm asset values have increased so dramatically. Earning adequate income to pay for the increased value of the assets may be difficult, if not impossible for a successor to accomplish. If the Smiths want their son Jimmy to be successful, they need to consider the income the operation will generate as well as the market value of the farm assets.

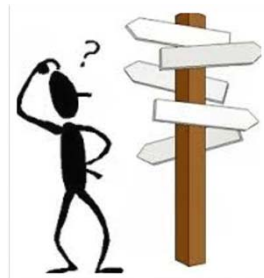
Let's look at how the Smith family valued the contribution of their son Jimmy by putting a value on his "sweat equity." Once completed, they used this in addition to the fair market value to help them reach their estate planning decisions.

Today the farm's net worth is \$1,500,000. If the Smiths were to divide the assets equally, they would leave \$500,000 to each child. But as they considered the contributions made by each child and the business growth because of Jimmy's return, they thought of it this way. There has been \$300,000 of increase since 1990. The business has grown and diversified. Profits have been reinvested into the farm, and farm assets have appreciated in value. Jimmy has contributed a substantial amount of "sweat equity." Both parents feel that they may have actually reduced several years ago and sold some of the original land prior to the recent jump in land values that Jimmy did not decide to return to the farm. After much evaluation and

Read more about it: University of Minnesota Extension – Transferring the Farm series

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(5) Decide how to own property and coordinate estate plans and property ownership strategies.



HOW Property is owned may be part of an estate plan or farm succession strategy



Real Property



Evaluating Your Estate Plan: Forms of Property Ownership
 One of the major goals of an estate plan is the distribution of property after death. To make decisions on this topic, it is important to understand the various forms of property ownership. This property can be owned by one person or several people. The method of ownership, in particular, which property is co-owned by two or more people, the method of co-ownership may determine who eventually owns the property.

Two Classifications of Property
 Real property includes land and whatever is built on the land or attached to the land. This includes buildings, fences and subsurface tiling. Mineral rights may also be considered with respect to real property.

Personal property may be either tangible or intangible. Tangible personal property includes anything that can be touched. Items like household goods, jewelry and clothing, in livestock, machinery, stored grain, vehicles and inventory items. Intangible personal property includes such things as bank or brokerage accounts, stocks, bonds and retirement plans. Some intangible property may be represented by a piece of paper, but it is not real property or tangible.

Methods of Property Ownership
 While property is commonly owned by individuals, it is important to make planning to consider with forms of property ownership. The method used depends on ownership and transfer to someone and joint tenancy.

Four Types of Ownership of Real Property
 If a person wants to own property with someone else, it is important to understand the various forms of ownership. This includes:

Ownership in Common
 Property is commonly owned by two or more people as tenants in common. Each owner has an undivided interest in the property. Each owner has the right to transfer their share of the property, but they cannot exclude the other owners. For example, if two siblings own a house, and one sibling is a tenant in common, they each have a one-quarter interest in the entire house. They cannot exclude anyone from the house. This is similar to the way that farmers own and use such a division of the land when several people own a farm or want to share and divide the property into separate owned parcels. Unlike tenants in common, property is shared equally by all owners.

Joint Tenancy with Right of Survivorship
 Property is commonly owned by two or more people as joint tenants with right of survivorship. Each owner has an undivided interest in the property. Each owner has the right to transfer their share of the property, but they cannot exclude the other owners. For example, if two siblings own a house, and one sibling is a joint tenant with right of survivorship, they each have a one-quarter interest in the entire house. They cannot exclude anyone from the house. This is similar to the way that farmers own and use such a division of the land when several people own a farm or want to share and divide the property into separate owned parcels. Unlike tenants in common, property is shared equally by all owners.

Partnership
 Property is commonly owned by two or more people as partners. Each owner has an undivided interest in the property. Each owner has the right to transfer their share of the property, but they cannot exclude the other owners. For example, if two siblings own a house, and one sibling is a partner, they each have a one-quarter interest in the entire house. They cannot exclude anyone from the house. This is similar to the way that farmers own and use such a division of the land when several people own a farm or want to share and divide the property into separate owned parcels. Unlike tenants in common, property is shared equally by all owners.

Trust
 Property is commonly owned by two or more people as trustees. Each owner has an undivided interest in the property. Each owner has the right to transfer their share of the property, but they cannot exclude the other owners. For example, if two siblings own a house, and one sibling is a trustee, they each have a one-quarter interest in the entire house. They cannot exclude anyone from the house. This is similar to the way that farmers own and use such a division of the land when several people own a farm or want to share and divide the property into separate owned parcels. Unlike tenants in common, property is shared equally by all owners.

- Land + anything attached to it
- Buildings, fencing, subsurface tiling

Personal Property:

Tangible and Intangible

- **Tangible** = anything you can touch
- **Intangible** = has value that you can't touch, but you can use it



| Account | Balance | Debit | Credit | Balance |
|----------------|----------------|-------|--------|----------------|
| Checking | 100.00 | | | 100.00 |
| Savings | 500.00 | | | 500.00 |
| Money Market | 250.00 | | | 250.00 |
| IRA | 1000.00 | | | 1000.00 |
| 401(k) | 750.00 | | | 750.00 |
| Health Savings | 150.00 | | | 150.00 |
| Retirement | 200.00 | | | 200.00 |
| Other | 50.00 | | | 50.00 |
| Total | 3000.00 | | | 3000.00 |



Raise your hand if . . .
You have **TOO MUCH STUFF?**

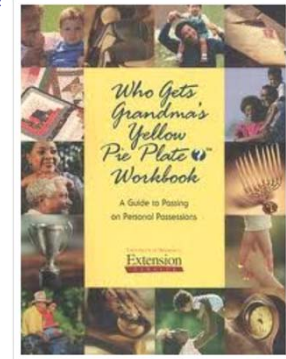


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Have a **plan** to dispose of or
pass on personal property:

- Pass on or dispose of some items **during lifetime.**
- “De-Clutter” your life!
- Example workbook →→
- Possessions you want to pass on after death?
 - List
 - Mark
 - Round-robin
 - Auction



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Real Property **or** Intangible
Personal Property may be owned
individually or jointly



➤ Most common for real estate = **fee simple ownership** → Unconditional power to use or transfer the property.

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Property Co-Ownership

- Joint tenants with right of survivorship (JTWROS)
- **Tenancy in Common (TIC)**



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Joint Tenancy with Right of Survivorship (JTWROS)



- Two or more people
- Equal shares
- Can't sell, transfer, mortgage without consent of others
- Right of survivorship = like a "built-in" will
- When an owner dies, ownership interest ceases.

Tenancy in Common

- Two or more owners
- **Separate but undivided interest**
- Shares may be equal, or unequal
- **No right of survivorship – shares pass to heirs.**



Fred & Wilma had 3 sons:

As part of their estate plan—they told their lawyer that when Fred died, they wanted each of those 3 sons to get one of the 80-acre parcels owned solely by Fred. **Fred died – and then they found out:**

Those three 80-acre parcels were owned by Wilma.

Farmland: Keeping it "in the family"?

What are the consequences?

Grandma & Grandpa: Own a section—640 acres
4 Kids – Allan Bill Cathy Donna
Equal Shares—25% each

Allan: To 4 kids equally, each own 6.25% of 640 acres

Bill: To 5 kids equally, each own 5% of 640 acres

Cathy: To 3 kids equally, each own 8.333% of 640 acres

Donna: 0 kids, leaves to the church (25% share) (and church wants to sell)

- ▶ **None of the grandkids live in the area.**
- ▶ Land is rented, farm manager takes 10%
- ▶ **Checks (income) to grandkids leaves the state**

(6) Decide whether you have a Federal Estate Tax or State Inheritance Tax issue.



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Quick review of the rules:



- **Federal Estate Tax:** Based on date-of-death estate value.
- **Unified Credit** = Amount of property that can be transferred at death without FET obligation.
- **Unlimited** transfers to surviving spouse & charities.
- What did ATRA – American Taxpayer Relief Act of 2012 – signed January 3, 2013 – do?
- Makes \$5 million (indexed for inflation) **permanent** – **\$5.43** million in 2015; **\$5.45** in 2016; estimated **\$7.5** million in 2020.

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ATRA – FET Impact on Farms and Small Businesses:

- USDA estimates that with the exemptions, only 0.6% of farms would have to pay an estate tax. (Another 2.1% would file returns but owe no taxes.)
- Tax Policy Center estimates: For 2013 deaths, only 120 farms & small business (at least 1/2 assets are in farm or business assets) would pay FET.



- Source: Washington Post, "Is the Estate Tax Killing Small Farms and Businesses?" – April 14, 2015.

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Share of farm operator estates with returns and taxes, 2013



Source: USDA, Economic Research Service estimate based on 2011 Agricultural Resource Management Survey data (ERS and National Agricultural Statistics Service).

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Check YOUR State laws re: State Inheritance Taxes

- Example: **New York** recently doubled its exemption amount from \$1 million for deaths before April 1, 2014 to \$2,062,500 for deaths from April 1, 2014 thru April 1, 2015.
- New York exemption will rise gradually thru 2019 to match the federal exemption.
- April 1, 2017: New York exemption will be \$5.25 million.



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Here's the point regarding FET:



- **Do the math:** 950 acres of land @ average value of \$11,000 per acre approaches **\$10.5 million** – hovering close to a level that could trigger federal estate tax.
- Farmland owners may have a false sense of federal estate tax security because they think their share of the farm is worth less than \$5.43 million.
- But adding up all the assets on the balance sheet and estimating increasing farmland values may paint a different picture at the time of death.
- Even considering Special Use Valuation – farmland owners should maintain an accurate balance sheet that reflects the **fair market value** of assets.

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(7) Decide to plan for the time of death – with **liquidity** and **final disposition** plans.



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Consider the costs that arise at death.

- Farmers accumulate assets: land, equipment, farm buildings, livestock.
- Costs of illness, medical care, funeral expenses add up.
- Settlement (probate **or** trust administration) has a cost.
- Cash may be needed to continue farm operations at the time of death prior to final estate settlement.
- Maintain assets with sufficient **liquidity** to convert to cash and cover these costs; or consider life insurance.
- Related: If an heir(s) will want to buy out other heirs' land interests at the time of death, provisions need to be made for sufficient cash or credit to achieve those purposes.

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Have you made final disposition plans?

Funeral Planning Checklist

A list of all of the issues to consider when planning a funeral.

Planning a funeral is a complicated process, which is made even more difficult by the emotional stress that accompanies the death of a loved one. Fortunately, many of the arrangements can be made ahead of time, which will decrease the burden on those left behind. Use the checklist below when discussing funeral plans with your loved one, to make sure that his or her final wishes are carried out.

Pre-Planning

All of these items can be arranged in advance of a person's death.

General Preparations

- Assemble personal information for obituary
- Choose a charity to direct donations to
- Decide if jewelry is to remain or be returned
- Choose a funeral home

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Iowa: There's a specific form to designate a person to have authority to make "final disposition" plans. → → → → → → →
Check your state and talk to your attorney about this—if it's important to you. NEW YORK appears to have a similar law & form.

Iowa Designation of Agent for Body Disposition

As authorized by Iowa Code Section 144C.3 Effective July 1, 2008

I hereby designate _____ as my agent for body disposition. My designee shall have the sole responsibility for making decisions concerning the final disposition of my remains and the ceremonies to be performed after my death. This declaration hereby revokes all prior declarations. This designation becomes effective upon my death. My designee shall act in a manner that is reasonable under the circumstances.

I may revoke or amend this declaration at any time. I agree that a third party (such as a funeral or cremation establishment, funeral director, or cemetery) who receives a copy of this declaration may act in reliance on it. Revocation of this declaration is not effective as to a third party until the third party receives notice of the revocation.

My estate shall indemnify my designee and any third party for costs incurred by them or claims arising against them as a result of their good faith reliance on this declaration. I execute this declaration as my free and voluntary act.

IMPORTANT — You **MUST** attach this form to a Durable Health Care Power of Attorney for it to be effective! Also, Iowa law does not allow you to use this document to give your designee specific instructions on what type of funeral, cremation, burial, or ceremony you may want. Therefore it is important that you write these wishes out separately and be sure to share them with your designee.

NOTE — You must have either two witnesses (not including your designee) sign this statement in each other's and your presence, **OR** you must have it notarized.

| | |
|------------------|-------|
| _____ | _____ |
| (your signature) | date |
| _____ | _____ |
| (witness one) | date |
| _____ | _____ |
| (witness two) | date |

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Plan ahead – buy your casket or urn before you need it.

TRAPPIST CASKETS Handmade caskets from the monks of New Melleray Abbey, est. 1849

Home Our Caskets & Urns > Ordering & Shipping > Future Need Planning > About Trappist Caskets >

Reverence for Nature

As Trappists, we are committed to responsible stewardship. Preserving the natural world it is important to us. Some of the wood we use comes from our own forest. To continue the cycle, we plant a tree as a living memorial to each person who is buried in a Trappist Casket.

Caskets Starting at \$1000

Child Casket Fund The Child Casket Fund eliminates the financial burden to families who are in need of a child's casket.

Urns Starting at \$225

See All Trappist Caskets | Help A Family In Need | See All Trappist Urns

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NORTHWOODS CASKET COMPANY Sustainability

STARTS WITH YOU

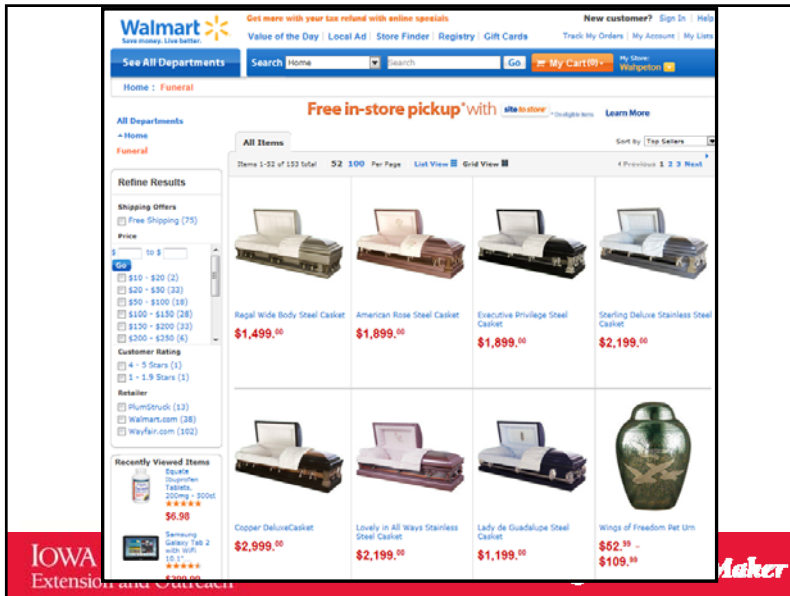
Simple Pine Box \$1,079.00

Plain Pine Box \$1,199.00

Build-Your-Own Casket Kit \$399.00

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(8) Decide to be organized and maintain good records



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Records that can be found, referred to and used by you and other for ongoing conversations, planning, or at incapacity or death.



- Safe place, yet still **accessible**.
- Safe deposit box, fireproof filing system?
- Have show-and-tell session with others.
- Hard (paper) copies are most accessible.
- Well-organized records, documents? → Procedures following death are less time-consuming, expensive and frustrating for others.

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Consider organizing documents in files or 3-ring binders



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(9) Decide to build your estate and transition planning team.



Build a team of professionals to support your planning process.



Who should be on your team?

| | |
|--|---|
| <p>Legal Professional</p> | <p>Tax and/or Accounting Professional</p> |
| <p>Financial Planning or Banking Professional</p> | <p>Other professionals? -Insurance -Real Estate -Spiritual</p> |

Read more about it: Ideas on how to find an attorney or other professional.

Evaluating Your Estate Plan: Estate Planning Attorneys: Finding One Who Can Work For You *Ag Decision Maker*
File C4-61

Law is a multifaceted and complicated field that is in a constant state of change. New regulations and statutes are continually enacted by state and federal authorities. Every decision released by a court or administrative body represents a new interpretation of legal concepts. It is not possible for any one attorney to be an expert in every field of law.

Attorneys in private practice may choose to limit their practice to certain areas of the law. In smaller communities many attorneys find it necessary to engage in "general practice" to serve a wide range of clients. However, an attorney may also have a particular interest in specific fields of law, such as estate planning, probate and trust administration. Finding an attorney to handle estate planning needs may take a little time and effort. This publication is intended to provide you with some guidelines.

You may already have a relationship with an attorney for other personal or business matters. Start by talking with that attorney about estate planning. Ask the attorney some of the questions found in this publication. If that attorney is not comfortable handling your estate planning needs, ask for recommendations.

- 1. Seek Recommendations:** Think about how you would locate any other professional you might need, such as a plumber or electrician whom we are acquainted. Ask others, "Have you had a will or trust prepared? Who did that work for you? Would you recommend that person to others?" Start to assemble a list of the names that you receive and prepare to make some initial contacts.
- 2. Contact and Schedule Initial Meetings:** Select two or three of the attorney names that you obtain and telephone those law offices. Explain that you are interested in having some estate planning done and that you would like to schedule an initial meeting with "Lawyer Jones" who has been recommended to you. Ask what the fee will be for such an initial meeting.
- 3. Come to the Meeting Prepared:** Come to the meeting prepared to explain your circumstances and what kind of work you may need done. Bring along your most recent net worth statement and a completed Estate Planning Questionnaire (See AgDM File C4-57, *Evaluating Your Estate Plan - Estate Planning Questionnaire*). It is also possible that the law firm may have an estate planning questionnaire. You should also have a prepared list of questions to ask the attorney.
- 4. Questions for the Attorney:** During this initial meeting, you should have some questions prepared to ask the attorney. These questions are intended to assist you in getting to know

(10) Decide to continuously discuss your plans and **maintain your estate or transition plan documents.**



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Farm Transition and Estate Planning is never “done.”



- Goals and Circumstances **Change**.
- Have **regular**, annual reviews with professionals – legal, tax, financial, insurance.
- Review **beneficiary designations** on intangible assets – retirement accounts, CDs, bank accounts, life insurance.
- **Life event triggers:** Births/adoptions, incapacitation or deaths, marriages, divorces/separations of anyone who may be impacted in you estate plan. Moving, changes in income or wealth.
- Don't expect professionals to call you to come in for a review.
- **Schedule annual check-ups** – just like you would with your physical health – to review plans and circumstances.

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What are your next steps?



- Set Goals
- **Seek Resources**
- Communicate
- **Get Organized**
- . . . Take advantage of Extension programs and resources!
- **Program options:**

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CONTINUE OR GET STARTED ON YOUR FAMILY FARM TRANSITION PLAN



Cornell University
College of Agriculture and Life Sciences

PRO-DAIRY Program

Conference & Annual Meeting

March 8-9, 2017

Liverpool/Syracuse, New York

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