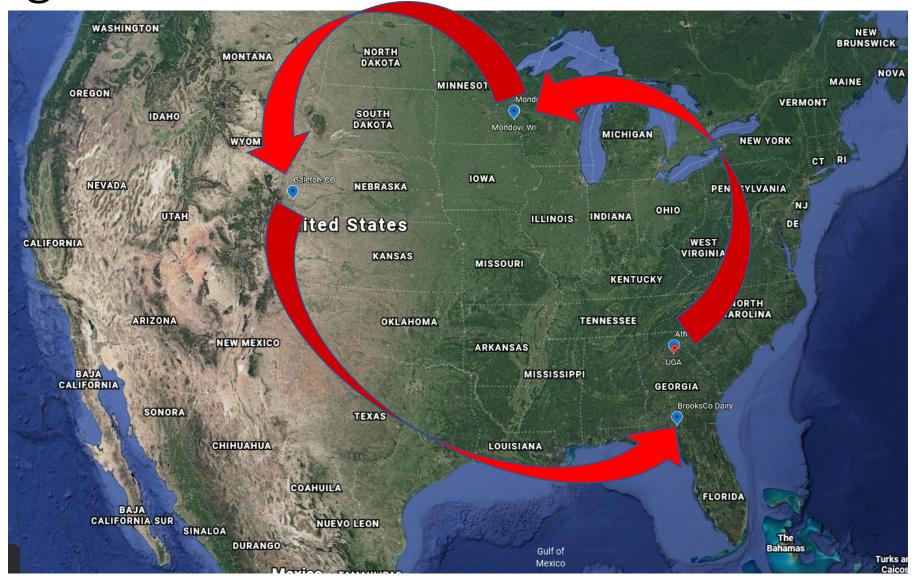
# On-Farm Milk Testing and Managing Results

Justin Graham, DVM

Background and Introduction



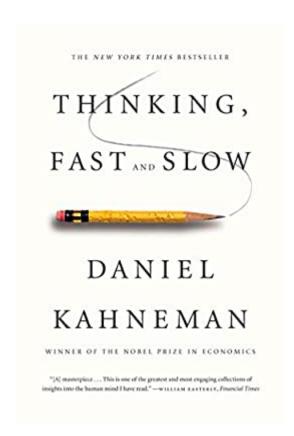
# Before We Get Started... A Quick Talk About Thinking



Thinking about results and cognitive bias



- Two systems for categorizing thinking
  - System 1 Fast Thinking
  - System 2 Slow Thinking

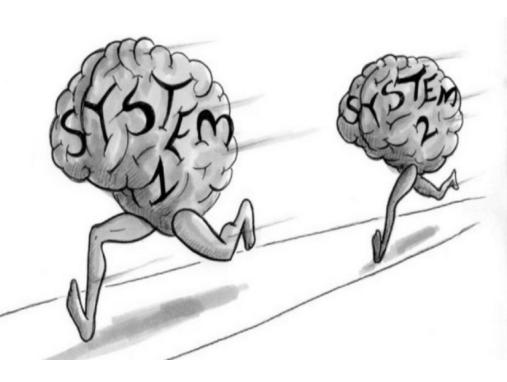


#### System 1 – Fast thinking

- Requires little energy, is our default system of thinking
- Relies on intuition
- Jumps to conclusions
- Examples: 2+2=?, Thought process when a car pulls out in front of you

#### System 2 – Slow thinking

- Takes effort and attention, devoted to more complex tasks
- Examples: How many times does a letter appear on a page?



Bat and Ball Riddle

Together, a baseball and bat cost \$1.10

• The bat cost **\$1.00** more than the ball.

How much does the ball cost?



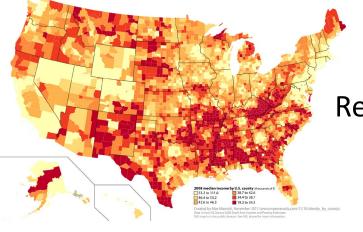




\$0.10

\$1.10 + \$0.10 = \$1.20





#### The Law of Small Numbers

Research looking at the incidence of kidney cancer

**Lowest** incidence of kidney cancer Rural and sparsely populated counties

Benefits of a rural lifestyle? Clean air? Clean water? Access to farm fresh foods?

**Highest** incidence of kidney cancer Also rural and sparsely populated counties

Poor access to healthcare, increased alcohol and tobacco consumption, poor diet?

Rural counties have small populations so we would expect extreme results!

#### **Recency Bias**

We *overvalue the importance of the most* recent events compared to past events



#### **Examples:**

- The last 2 heifers that freshened in had mastitis, I must have a fresh heifer mastitis problem
- On Monday, there were only 2 pregnancies out of the 20 cows preg checked.
   Now the only thing I can think about all week is repro performance.

# What is *Good Milk Quality*?

# Milk Quality

#### Good Milk Quality noun

\ gud milk 'kwä-lə-tē\

#### **Definition:**

The culmination of a lot of small things done right



# Milk Quality: Philosophy

• "An ounce of prevention is worth is a pound of cure"

Attention to detail is crucial to success

 Mastitis is not actually a disease of the cow, it is a disease of man put on the cow

 Develop good quality people and give them the tools and feedback they need to succeed

# Monitoring Milk Quality

"Don't *Expect* what you don't *Inspect*"

- What can I expect?
  - Low somatic cell count, 0 cows in hospital for mastitis, low bacteria counts

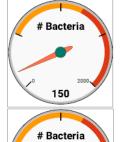
What can I inspect?

# Environmental Streps

On-Farm Procedures and Reporting

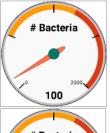
#### JeffCo Streps Ambientales





ora del Inicio del Tanque:	12/25/2020	7:05 AM
<u> Tiempo Final del Tanque:</u>	12/25/2020	12:09 PM
Turno:	7-3	mycon

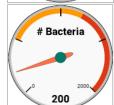
nycon 1000 /-3 mycon 1000 mero de Bacterias: 150 alan 1000 Resultado: BAJO franciso



 Hora del Inicio del Tanque:
 12/23/2020
 4:13 PM

 Tiempo Final del Tanque:
 12/23/2020
 8:57 PM

 Turno:
 3-11
 amadeo



Hora del Inicio del Tanque: 12/25/2020 1:49 AM
Tiempo Final del Tanque: 12/25/2020 7:00 AM

Turno: 11-7 carlos
imero de Bacterias: 200 oscar

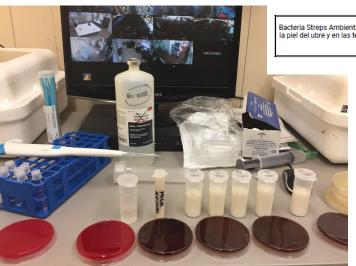
juan aurelio

#### Número de Bacterias Resultado

Bajo < 500

Moderado = 500-1200 Alto > 1200

Bacteria Streps Ambientales son un tipo de bacterias que normalmente se puede encontrar en la piel del ubre y en las tetas. Buena técnica de preparación (brocheo) bajará el número de las bacterias en la leche.



#### What are Environmental Strep Species?

WVS Mastitis Lab: Bacterial Bedding Counts
955 Harris Ave
Waupun WI 53963

Brooksco Dairy						
Date:	Sample type	% dry matter	%Organic Matter			
9/19/2017	Sand-1	98%	1%			
Bacteria		bacteria/g of dry matter				
Gram Negative bacteria		81,656	Fresh Pens			
Coliform bacteria		66,346				
Klebsiella er p.		255				
Streptococcus spp.		267,935				



**Laboratory for Udder Health** 

St. Paul MN 55108 Ph: (612) 625-8787 / (800) 605-8787

Fax: (612) 624-8707 http://www.vdl.umn.edu

1333 Gortner Avenue

**Mastitis Bulk Tank Culture Report** 

Accession Number: D17-029709 Received Date: 08/10/2017
Submitting Clinic: Brooksco Dairy Owner: BROOK CO DAIRY

P.O. Box 508

Quitman GA 31643 (229) 263-7900-(BD.QG)

Veterinarian: External Ref:

Site: BROOKS CO DAIRY

Premises: County:

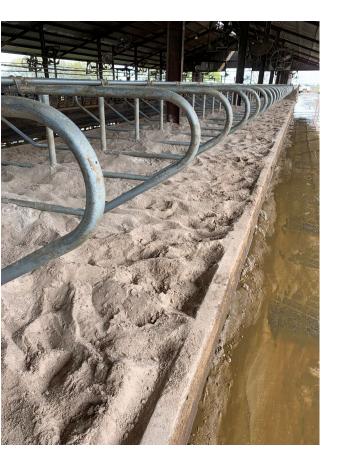
Species: Bovine

Pathologist: Udder Health Accessions

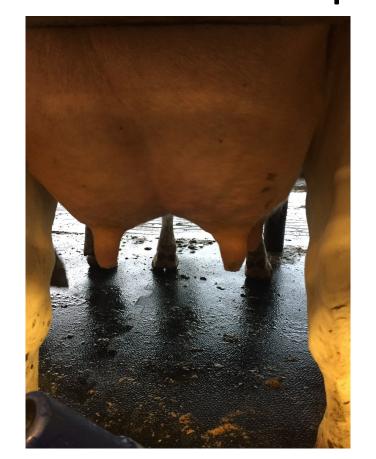
Condition of Sar	Samples: Milk Bulk Tank Culture, Milk Bulk Tank							
Sample		Strep agalactiae	Staph aureus		Non-ag Strep		oliforms	Staph sp.
Description	Collected	Colonies/ml	Colonies/ml	1	Colonies/m/i	C	lonies/ml	Colonies/ml
BT 8/9, 8/7		0	30 Low		1,250 High		Low	105 Low
High levels of C	Coliforms and/or	Non-ag Strep usually i	ndicate the degree of tea	at conta	anipation at milking t	ne, no	infection of the	
gland. However	, these organism	s are good indicators for	r potential of infection	and/or	elevated SCC.			
BT 8/8		0	10 Low		2,200 Very High	(	)	150 Low
High levels of C	Coliforms and/or	Non-ag Strep usually i	ndicate the degree of tea	at conta	amination at milking t	ime, no	infection of the	
gland. However	, these organism	s are good indicators fo	r potential of infection	and/or	elevated SCC.			

ALG-08/13/2017

#### What are Environmental Strep Species?











- On-farm testing vs using outside laboratory
  - Garbage in, Garbage out. If unsure that accurate on-farm results can be obtained, use an outside lab.
  - Benefits of on-farm testing
    - Quick turn around
    - No shipping
    - More frequent testing can be done
    - Employee training/development opportunity
- Involve your herd veterinarian before starting

#### • Equipment Needed:

- 60 ml syringe and needle
- 2 oz plastic tubes for milk collection
- 13 ml plastic tubes for dilutions
- 100 1,000µl Micropipette and tips
- 1,000µl 5,000µl Micropipette
- L shaped spreader







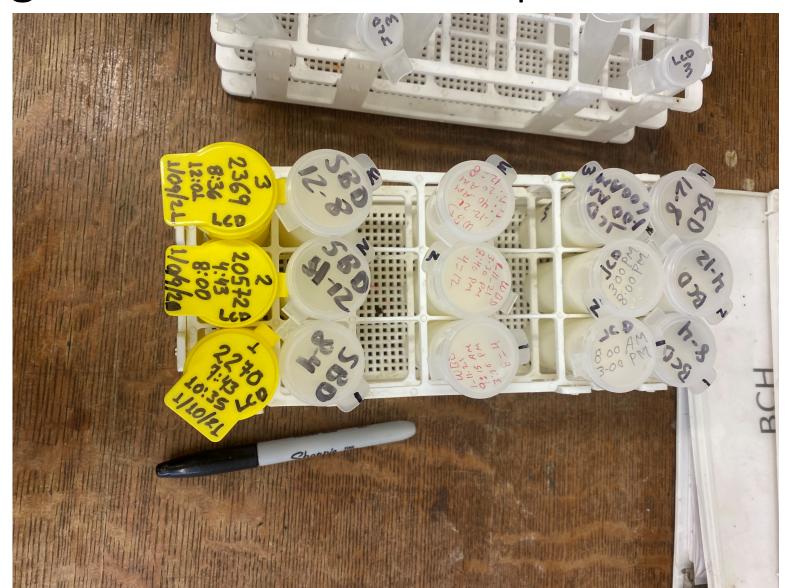
#### • Equipment Needed:

- Sterile water
- Hypertonic saline
- Media plates specific for Streptococcuspos
   spp.
  - University of Minnesota MTKT media plates
  - Udder Health Systems Modified Edward media plates
- Incubator





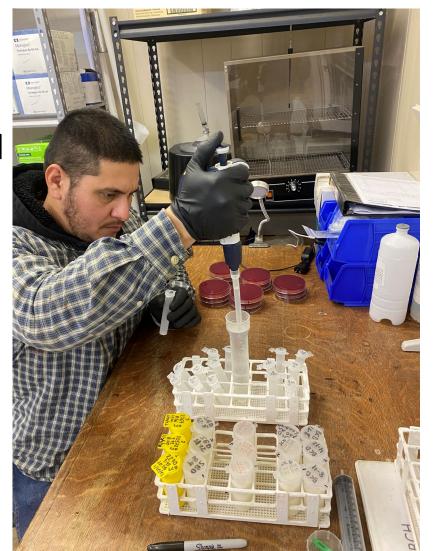
Samples collected in 2 oz milk vials

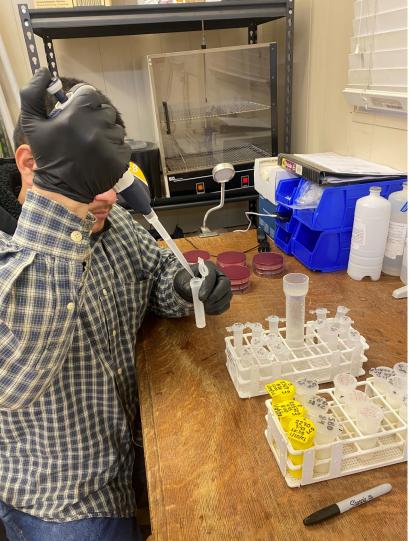


Isotonic saline solution made using hypertonic saline and sterile water



4.5 ml saline solution portioned out into 13 ml plastic vials

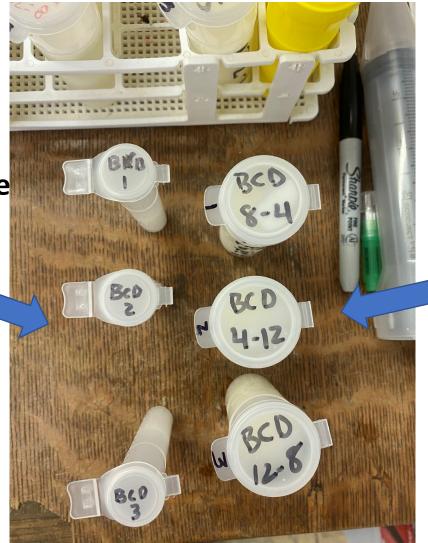








Diluted milk samples: 0.5 ml milk + 4.5 ml saline solution



Milk samples collected from each shift















**0.5 ml** milk + **4.5 ml** saline solution 1/10 dilution

1/10 sample dilution X 1/5 plating dilution = 1/50 dilution



**0.2 ml** milk onto plate 1/5 plating dilution

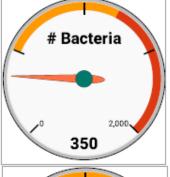
OR... Just multiply every colony counted by **50**!!!

#### **Reporting Results**

- Sampling routine at BrooksCo:
  - 1 sample from each milking shift each week
    - Day time shift
    - Late day/early evening
    - Night shift
- Samples collected throughout the week, results reported the following week.

#### **BROOKSCO STREPS AMBIENTALES**





 Hora del Inicio del Tanque:
 1/4/2021
 9:26 AM

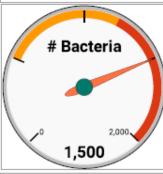
 Tiempo Final del Tanque:
 1/4/2021
 2:26 PM

 Turno:
 8-4
 ESTELA

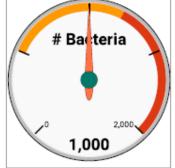
 Número de Bacterias:
 350
 ERICK

 Resultado:
 BAJO
 PATRICIA

CAMILO JULIO



Hora del Inicio del Tanque: 1/4/2021 6:46 PM
Tiempo Final del Tanque: 1/4/2021 10:50 PM
Turno: 4-12 FLORENCIO
Número de Bacterias: 1,500 WILFREDO
Resultado: ALTO MARTINA
ISAIAS
CELSO



 Hora del Inicio del Tanque:
 1/4/2021
 1:36 AM

 Tiempo Final del Tanque:
 1/4/2021
 5:10 AM

 Turno:
 12-8
 GLADYS

 Número de Bacterias:
 1,000
 MARVYN

 Resultado:
 MODERADO
 MARINA

 OTILIO
 CELSO

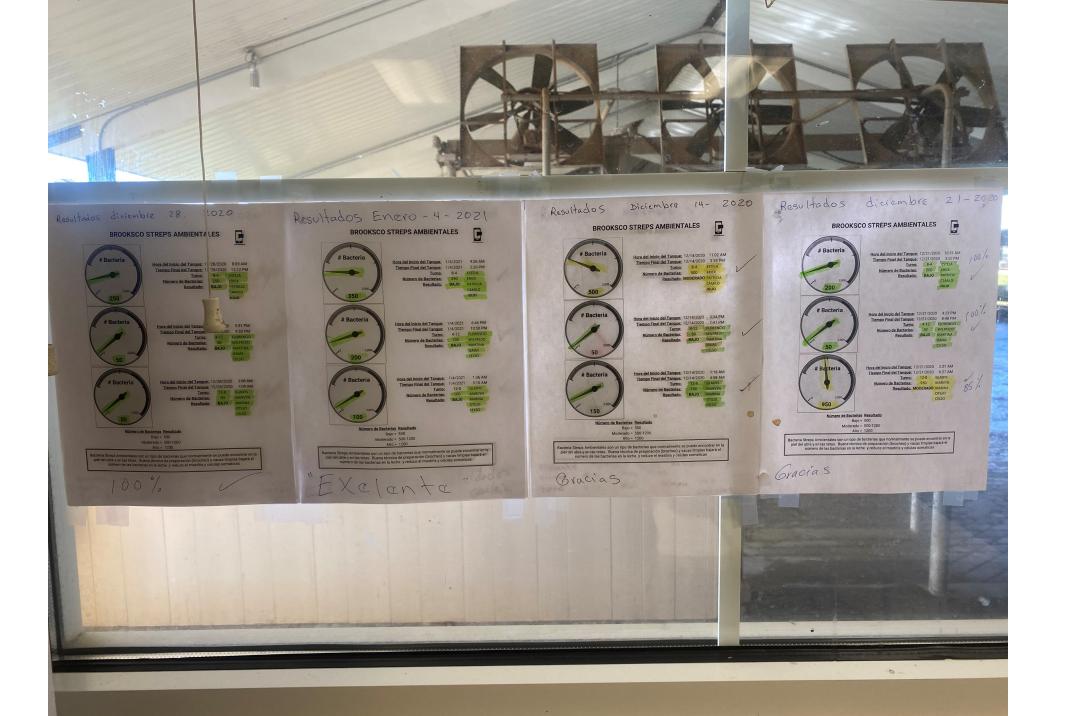
#### Número de Bacterias Resultado

Bajo < 500

Moderado = 500-1200

Alto > 1200

Bacteria Streps Ambientales son un tipo de bacterias que normalmente se puede encontrar en la piel del ubre y en las tetas. Buena técnica de preparación (brocheo) y vacas limpias bajará el número de las bacterias en la leche, y reduce el mastitis y celulas somaticas



amination at milking ti

600 Low

High levels of Coliforms and/or Non-ag Strep usually indicate the degree of teat co

ALG-08/13/2017

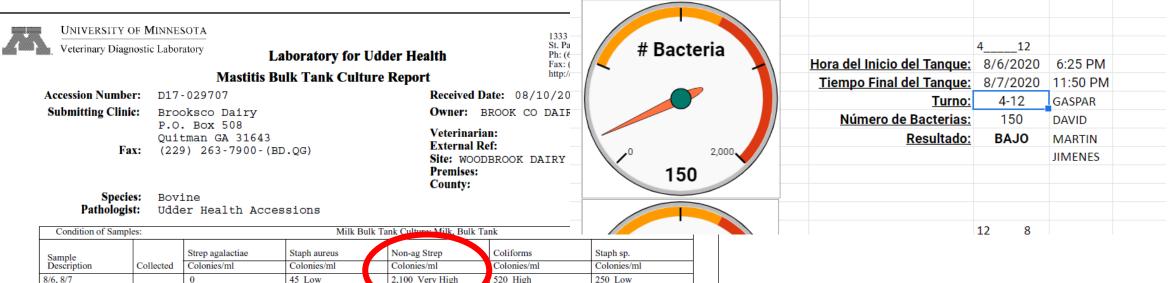
gland. However, these organisms are good indicators for potential of infection and/or

30 Low

 Checks and Balances - Periodically pull duplicate samples, do one sample on-farm and send the other to an outside lab. Compare results.

not infection of the

65 Low



130 Low

# Calf Milk & Colostrum Culturing

On-Farm Procedures and Reporting

# On-Farm Testing: Calf Milk & Colostrum

#### Equipment Needed for Calf Milk & Colostrum:

- Same equipment as Environmental Strep with exception of media plates.
- Substitute Blood agar plates in place of Strep selective plates

#### Procedure for Calf Milk & Colostrum:

- Essentially same procedure except 1 to 2 more dilutions needed.
- Remember from environmental strep testing After diluting, **1 colony counted = 50 colonies undiluted**. If adding an extra 1/10 dilution just add an extra 0. So with 2 dilutions multiply by 500. 3 dilutions multiply by 5,000.

# On-Farm Testing: Calf Milk & Colostrum

**Results Reporting** 







On-Farm Procedures and Reporting



# On-Farm Testing: Mastitis Culturing

#### Equipment Needed:

- Sample Collection Tubes
- Cotton Swabs
- Media Plates
  - Minnesota Tri-plate differentiate Gram-positive, Gram-negative, & Strep
  - Bi-plate differentiate Gram-positive or Gram-negative
- Incubator

• Procedure: Day 1



**Sample Collection** 

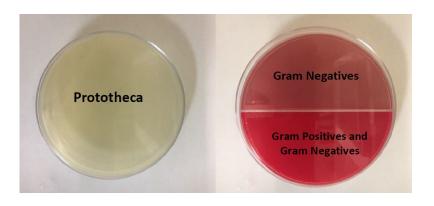


**Plating** 

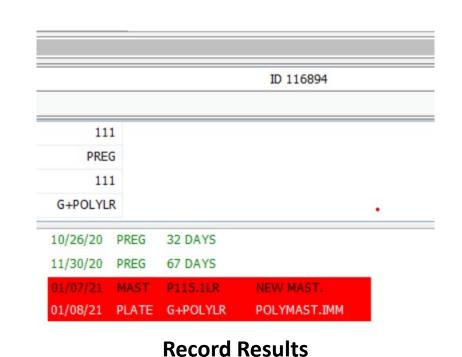


Incubate for 24 hours

Procedure: Day 2



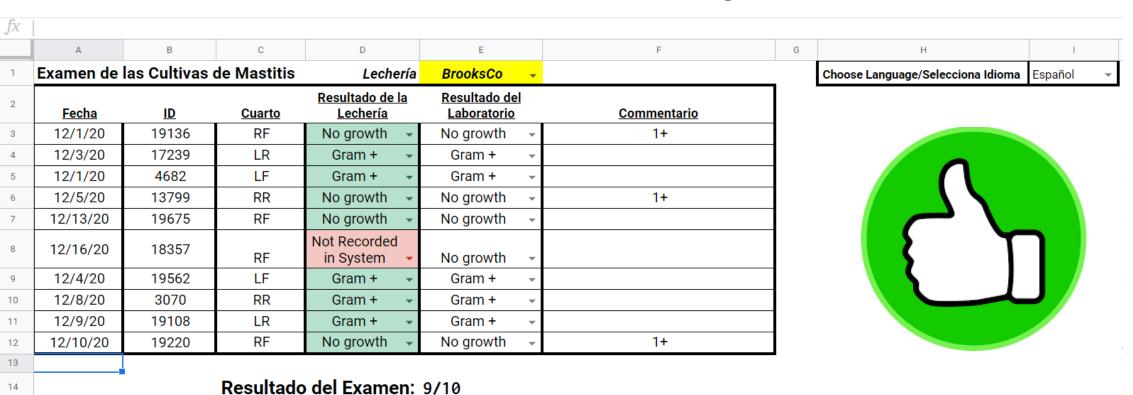
Read Culture Results 24 hours later, (Prototheca culture results read 72 hours later)



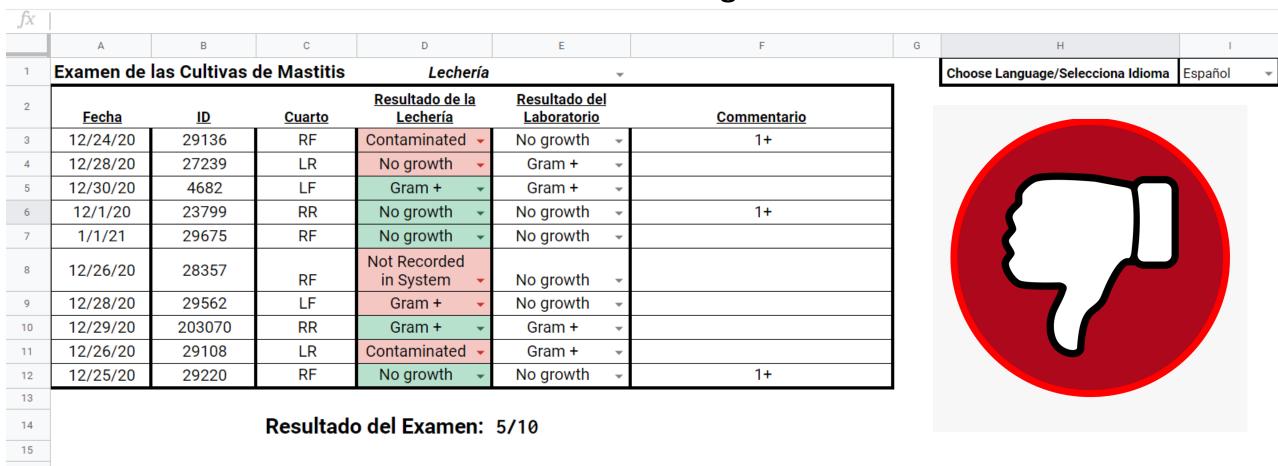


Checks and Balances – Mastitis Culturing Quiz

15



Checks and Balances – Mastitis Culturing Quiz

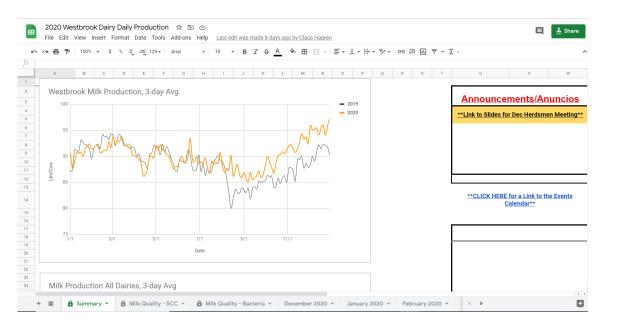


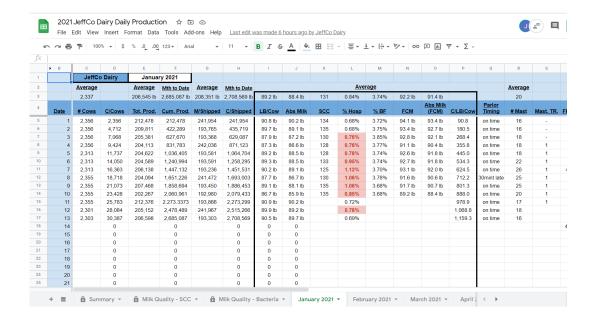
- Again, excellent opportunity to involve your herd veterinarian
- Percent no growths can be high (30-50%). Can be normal, but also can be other things: Improper sample collection, improper plating, high or low incubator temperature.
- If employees are performing, work with your veterinarian to set clear guidelines for what is a no growth, what is a contaminated sample, etc.
- In the Southeast, highly recommend culturing for *Prototheca* on every mastitis case.

Somatic Cell Count, Bacteria Counts, % Hospital



# Google Sheets





#### **Somatic Cell Count**

- Can report daily averages or tank averages
- Key is looking at trend over time
- Color coded to show good and bad
- Excellent feedback for employees

Date	SCC	
1/2/2021	113	
1/1/2021	105	
12/31/2020	116	
12/30/2020	130	
12/29/2020	118	
12/28/2020	120	
12/27/2020	123	
12/26/2020	130	
12/25/2020	123	
12/24/2020	119	
12/23/2020	108	
12/22/2020	120	
12/21/2020	125	
12/20/2020	130	
12/19/2020	127	
12/18/2020	115	
12/17/2020	115	
12/16/2020	118	
12/15/2020	123	
12/14/2020	125	
12/13/2020	123	
12/12/2020	127	
12/11/2020	133	
12/10/2020	138	

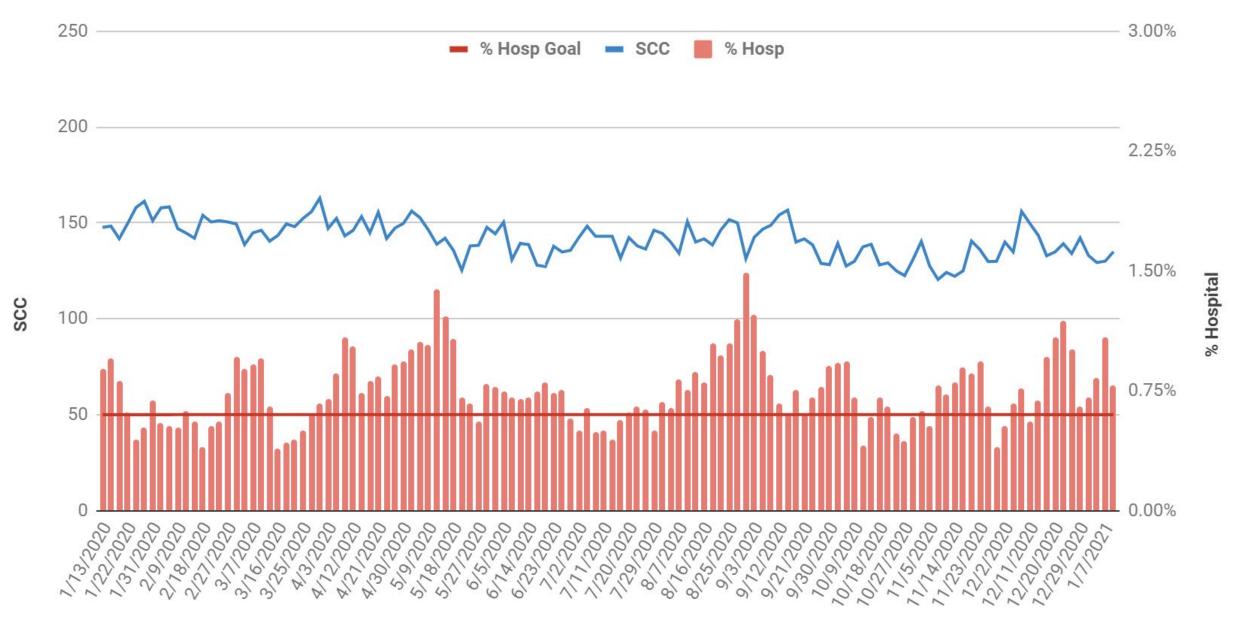
Trouble on the Horizon Dairy - Milk Quality					
Date	SCC				
1/2/2021	133				
1/1/2021	134				
12/31/2020	145				
12/30/2020	138				
12/29/2020	144				
12/28/2020	130				
12/27/2020	145				
12/26/2020	175		l		
12/25/2020	188		l I		
12/24/2020	240				
12/23/2020	220				
12/22/2020	213				
12/21/2020	225				
12/20/2020	190				
12/19/2020	183				
12/18/2020	150				
12/17/2020	152				
12/16/2020	150				
12/15/2020	140				
12/14/2020	148				
12/13/2020	145				
12/12/2020	150				
12/11/2020	158				
12/10/2020	156				

#### **Bacteria Counts**

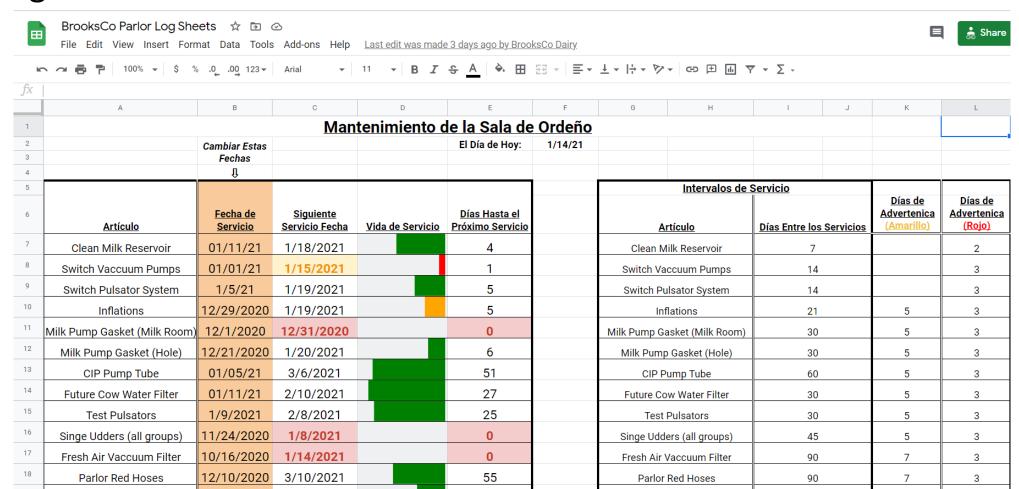
- Easy to quickly scan through and find high counts
- Again, color coded to identify good and bad
- Nice for parlor managers

Date	SPC	PI	LPC
1/11/2021			
1/10/2021			
1/9/2021	1,000	1,000	150
1/8/2021	1,750	1,250	158
1/7/2021			
1/6/2021	9,000	25,000	220
1/5/2021	1,600	2,200	120
1/4/2021			
1/3/2021	2,000	2,500	190
1/2/2021	1,600	2,400	270
1/1/2021			
12/31/2020			
12/30/2020			
12/29/2020			
12/28/2020	2,000	3,000	180
12/27/2020	1,600	1,800	124
12/26/2020			
12/25/2020	1,333	3,333	103
12/24/2020	1,800	2,600	124
12/23/2020			
12/22/2020	1,500	2,000	

#### Milk Quality, 3-day Avg.



Log sheet for Parlor Maintenance



# Thanks for your attention!

Sometimes pictures can tell the whole story

