Lionel's News

August 2015 — 15th Edition

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We continuously strive to be at the forefront of new innovations. This newsletter serves as a means to keep you updated with what is available, and how these products can be used.

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Regards

Duncan Stephenson

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Is unsaleable milk good enough for your calves?

Whole milk is a nutritious feed source for calves, but it also has limitations that must be handled properly.

by Robert E. James

The author is in the department of dairy science at Virginia Tech University in Blacksburg, Va.

Many dairies have adopted more progressive calf feeding programs where milk or milk replacer feeding rates have risen from 4 quarts per day to 8 quarts or more per day. The cash outlay for milk replacer (particularly those high-quality ones formulated for biologically normal feeding rates) has caused some producers to consider incorporating the use of unsaleable milk (USM) into their calf feeding programs.

Usually, USM is obtained from the second and greater milking that is not suitable for sale and also from cows treated with antibiotics. Before making the decision to replace a high-quality milk replacer with USM, several important factors should be considered and questions answered.

Think of the calf

Remember that the calf is a young animal with a developing immune system that is very susceptible to respiratory and digestive disease. Risks involved in feeding USM must be considered when developing successful feeding programs for this young animal.

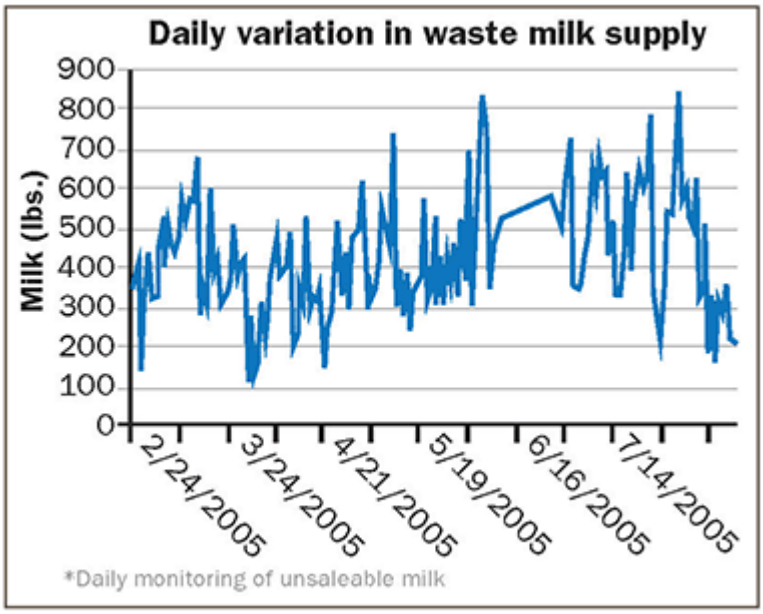
For starters, USM can be a source of pathogenic bacteria. This can be particularly problematic in farms purchasing animals of unknown health status. Several important diseases can be transmitted to calves during this early milk feeding period.

In addition to specific disease agents, consumption of milk with high bacteria counts is probably not

conducive to calf health during the first few weeks of life when the bacterial flora of the young calf is very unstable. Failure to adequately clean storage vessels or insufficient cooling of USM results in rapid bacterial growth and deterioration of milk quality. Aerobic bacteria counts from raw USM samples in several field trials were found to vary between a low of 5,000 cfu/mL to over 100,000,000 cfu/mL.

In addition, antibiotics from treated cows have an unknown impact on the normal bacterial flora of the calf, particularly in one less than 2 weeks of age.

The nutrient content of USM also varies tremendously. Field studies conducted in North Carolina, California and Wisconsin found wide variations in fat and protein content, as shown in the table. This happened for a variety of reasons, including inadvertent addition of water to USM and poor agitation during storage.



A steady supply needed

Most farms experience a large daily or weekly variation in supply of waste milk. One 1,200-plus cow dairy in the eastern U.S. (see figure) found that daily production of USM varied from a low of 100 pounds to a high of over 800 pounds per day. Production of USM did not correlate well with the demand of USM for their calf feeding program.

How much USM should a farm produce on a daily basis? A plentiful supply of USM should not be viewed as an abundant source of calf feed but a loss of potential milk income. Marketing milk with low SCC should be a goal of every progressive dairy producer. This is achieved in two ways: 1) instituting managed milking programs which foster production of low SCC milk; 2) withholding milk from high SCC cows. The latter example results in lost income and incurs higher expenses as the production costs per cwt. (hundredweight) of milk withheld from sales must be absorbed by the remaining milk sold.

Pasteurization a must

Unsaleable milk should never be fed raw due to the risk of transmitting infectious diseases to the calves. Milk from cows possibly infected with Johne's and BVD (bovine viral diarrhea) is especially of concern. Fortunately, there are many pasteurizers suitable for on-farm use that have proven to reliably treat USM. These are either batch or high temperature short time (HTST) pasteurizers. Batch pasteurizers are required to heat milk to 145°F and hold it for at least 30 minutes, while the HTST units achieve this by heating milk to 161°F for 15 seconds.

Nutritional value of unsaleable milk

Location of study	Fat % range		Protein % range	
East U.S.[1]	1.5	4.5	2.7	3.8
West U.S.[1]	1.2	12.1	2.7	4.7
Wisconsin[2]	2.8	4.7	2.9	5.1
West U.S. dairy[3]	2.2	3.6	2.9	5.1

[1] M.C. Scott, 2005
[2] Jorgensen et al., 2006
[3] K.L. Machado, 2011

It is important to note that only when pasteurizers are correctly installed and maintained will they "kill" 98 to 99 percent of the bacteria. Pasteurization is generally considered to be successful when postpasteurization counts are 20,000 cfu/mL or less. Therefore, bacteria counts prior to pasteurization should not exceed 2,000,000 cfu/mL.

Basic protocols must be followed to achieve consistent, successful pasteurization. Thoroughly clean all surfaces that come in contact with USM, including milking equipment, lines, hoses and storage containers.

Ideally, USM should be harvested, pasteurized and fed to calves in as short a time as possible to prevent growth of bacteria. One must follow identical protocols that are used for saleable milk to limit bacterial growth.

Penciling it out

The first decision to make regarding use of USM as a feed for the calf feeding program is to determine the true cost of owning and operating a pasteurizer. In addition to purchase cost, one must also consider installation cost, including electrical and plumbing expense and provision of a source of adequate hot water for HTST systems. Estimate additional expense for labor and electricity or gas to operate the pasteurizer and/or hot water heater.

Pasteurizer function must be routinely monitored by measuring bacterial counts after pasteurization and by sampling milk fed to the last calf on at least a monthly basis. State or cooperative labs can provide these services. Several spreadsheets are also available to aid in estimating the cost of the milk feeding system:http://extension.psu.edu/animals/dairy/nutrition/calves orhttp://www.vtdairy.dasc.vt.edu/tools/tool-data.html.

Many dairies have successfully incorporated use of pasteurized USM into their calf feeding programs. However, the first decision is to carefully consider the true cost of these systems relative to feeding milk replacer. If a pasteurizer is implemented, meticulous care must be taken to manage it successfully.

This article appears on page 335 of the May 10, 2015 issue of *Hoard's Dairyman.*

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Prikkel Voeding vir hoër Fekunditeit en Vrugbaarheid

Geskryf deur: Raché Stofberg

Voeding gedurende die teel seisoen het die grootste impak op die sukses en winsgewendheid van ‘n skaap onderneming se persentasie bemarkbare lammers. Die doelwitte van die teel sei- soen is om die aantal oop ooie so laag as moontlik te hou, die ovulasie tempo so hoog as moontlik te hou en ‘n lae voorkoms van embrioniese mortaliteite te hê. Hierdie doelwitte kan bereik word deur ooie in ‘n optimale liggaams kondisie te kry voor dekking.

Prikkel voeding is die term wat gebruik word wanneer diere van ‘n lae na ‘n hoë voedingspeil oorgeskakel word voor dekking. Dit kan in die vorm van aanvullende voeding, of beter kwaliteit weidings wees. Die energie en proteïen inhoud van die rantsoen word dus verhoog, wat ‘n direkte invloed op die ovulasie tempo het, en dus ook ‘n hoër lam persentasie tot gevolg kan hê. Die ovulasie tempo is die primêre faktor wat die fekunditeit en vrugbaarheid van die kudde beïnvloed. Die prikkel periode duur gewoonlik 3 weke (±17 dae) voor dekking, maar kan varieër in lengte afhangend van die kudde se huidige liggaams kondisie.

Die respons op prikkel voeding word beïnvloed deur:

- Ouderdom van die ooi (volwasse ooie reageer beter op prikkel voeding as jong ooie)
- Ras (produktiewe rasse het ‘n kleiner respons)
- Liggaams kondisie (maerder ooie het ‘n groter respons as bo-gemiddelde kondisie ooie)
- Fase van die teel seisoen (die beste respons word vroeg en laat in die teel seisoen gesien)

Prikkelvoeding is veral voordelig vir maer ooie wat nog nie herstel het van vorige laktasie-stres nie. Ooie wat te vet is (bo-gemiddelde kondisie telling) sal geen respons toon op prikkel voeding nie.

Dit is die beste om prikkelvoeding aan ooie te voorsien wat ‘n liggaams kondisie telling van 2-2.5 het, om sodoende hul kondisie telling te verhoog na 3-3.5. Ooie wat op ‘n stygende voedingspeil is sal meer eierselle vrystel as ooie wat op ‘n bestendige voedingspeil is. Hierdie ooie wat gewig optel in die laaste paar weke voor dekking, is meer geneig om dragtig te raak en tweelinge of drielinge te hê as ooie wat in ‘n swakker kondisie is. Dit neem ongeveer 6 weke vir ooie wat op ‘n goeie weiding is, om met ‘n kondisie telling van 1 te verbeter, en 3 weke op goeie weiding om met ‘n halwe kondisie telling te verbeter. Die volgende tabel dui die vereiste periode aan wat nodig is om ooie wat in ‘n onder-gemiddelde kondisie is te laat optel na die ideale dek kondisie.

TABEL 1 Prikkel periode nodig om ideale dek kondisie telling te bereik

Ooi liggaams kondisie telling voor prikkel	Prikkel periode
1.5	9 weke
2.0	6 weke
2.5	3 weke
3.0	2 weke

Ooie wat al klaar in ideale liggaams kondisie is, moet eers rondom 2 weke voor dek spesiale voeding ontvang, en ten minste 2-4 weke in teel seisoen voortduur daarmee. Die rede hiervoor is om vroeë embrio mortaliteite te verminder. Die ekstra voeding verseker dat die bevrugte eierselle 'n baie beter kans het om aan die uterus wand vas te heg, en nie geherabsobeer word deur die liggaam as gevolg van te min energie vanaf die ooi nie.

Dit is belangrik om nie te lank na die teel seisoen voort te gaan met prikkel voeding nie, want dit is nie net onnodig duur nie, maar dit help ook nie verder met ooi prestasie en produktiwiteit onder 'n onderhouds voedings program nie. Dit kan ook 'n negatiewe invloed op die oorlewing van die embrio's hê, omdat die progesteroon vlakke sal daal. Progesteroon is die hormoon wat verantwoordelik is vir die onderhoud van die embrio deur die dragtige siklus.

Prikkel voeding verskaf 25% meer nutriënte bo die onderhouds vlak om sodoende hoër vrugbaarheid en fekunditeit syfers in die kudde waar te neem. Volgens tabel 2 is dit duidelik dat die daaglikse TVN (Totale Verteerbare Nutriënte) varieër tussen 0.94 en 1.18 kg soos die dier volwassenheid bereik. Die droë materiaal (DM) inname per dier as 'n persentasie van liggaams massa wissel rondom 3.2 tot 2.2%, energie tussen 14.23 en 17.57 MJ/kg en ru-proteïen tussen 150 en 177 g per dag.

TABEL 2 Daaglikse Nutriënt Behoeftes vir Prikkel Voeding (2 weke voor dek en eerste 3 weke van dek periode)

LIGGAAMS MASSA	**MASSA VERANDER / DAG**	**DM / DIER**		**NUTRIËNTE PER DIER**							
				ENERGIE			**RU-PROTEÏEN**	**Ca**	**P**	**VIT A (aktief)**	**VIT E (aktief)**
(kg)	(g)	(kg)	(% liggaams massa)	TVN (kg)	VE (MJ/ kg)	ME (MJ/ kg)	(g)	(g)	(g)	(IU)	(IU)
50	100	1.6	3.2	0.94	17.15	14.23	150	5.3	2.6	2, 350	24
60	100	1.7	2.8	1.00	18.41	15.06	157	5.5	2.9	2, 820	26
70	100	1.8	2.6	1.06	19.66	15.90	164	5.7	3.2	3, 290	27
80	100	1.9	2.4	1.12	20.50	16.74	171	5.9	3.6	3, 760	28
		2.0	2.2	1.18	21.34	17.57	177	6.1	3.9	4, 230	30

MAKSILAM 55

Prikkel voeding voor die paar seisoen is nie net nodig vir ooie nie, maar ook vir teelramme sodat hul volle genetiese reproduksie potensiaal benut kan word. Teelramme moet in 'n uitstekende kondisie wees (kondisie telling van 3.5 tot 4.0) om hoë besettings syfers en fekunditeit in die kudde te sien. Daar moet egter gelet word dat hierdie ramme nie oorvet en onfiks is nie, want dit sal hul geslagsdrang en besetting syfers negatief beïnvloed.

Om hoë ovulasie tempo's te verseker, moet onder-kondisie ooie minstens twee maande voor die teel seisoen 'n prikkel rantsoen ontvang om 'n stygende liggaams massa te kry. Teelramme se spermsel ontwikkeling neem ongeveer twee

maande, daarom moet hul ongeveer twee maande voor die teel seisoen ‘n deurvloeiproteïen prikkel rantsoen ontvang.

Wesfed se Maksilam 55 is ‘n uitstekend proteïen konsentraat om te gebruik tydens die prikkel periode. Die insluiting van geëkstrueerde proteïen bronne verhoog die verbyvloeiproteïen inhoud in die rantsoen wat help met groei en uier ontwikkeling. Maksilam 55 kan gebruik word tesame met klein grane en goeie verteerbare vesel bronne soos lusern om ‘n volvoer te verskaf aan ooie tydens prikkel. Dit kan ook as ‘n aanvullende voeding gegee word vir ooie wat op goeie weidings loop. Die insluitng van ‘n mineraal en vitamien pak verseker dat die ooi gesond en gebalanseerd die dek tyd ingaan. Raadpleeg ‘n Wesfed voedingskudige vir rantsoen voorstelle.

VOORGESTELDE PRIKKEL RANTSOEN:

Rou materiaal	Volvoer	Lek
Maksilam 55	100 kg	250 kg
Mielies	550 kg	560 kg
Lusern	250 kg	-
Melassemeel	80 kg	80 kg
Sout	10 kg	100 kg
Voerkalk	10 kg	10 kg
TOTAAL	**1000 kg**	**1000 kg**
Inname/ooi/dag	*Sien tabel 2*	*600gram*
Inname/ram/dag	*Sien tabel 2*	*300gram*

‘n Goeie prikkel voedings program verhoog nie net die vrugbaarheid van die kudde nie, maar het ook hoër fekunditeit syfers tot gevolg wat sorg vir hoër lam persentasies. ‘n Kudde kan slegs hul volle genetiese reproduksie potensiaal bereik indien voeding en bestuur optimaal is. Goeie bestuur en korrekte voeding is dus van kardinale belang om ‘n winsgewende skaap onderneming te verseker.

Raché Stofberg

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The Importance of Ventilation in Broiler

Ventilation is one of the most common challenges facing broiler growers in both conventional and closed-environment housing. Broilers should easily achieve their economic and genetic potential when they live in a specifically controlled environment that meets their needs. Ventilation systems are designed to automatically manage this environment for broilers, especially during the brooding period. Whether you use a tunnel- or cross-ventilation system or a combination of both, ventilation is necessary to create the optimum environment that broilers need to grow and develop during each stage of life.

The right system not only ensures adequate air exchange throughout the broiler house, but also removes excess moisture from the litter, maintains oxygen and carbon dioxide levels, and regulates temperature within the house.

1. Maintain Air Quality

A key requirement of any minimum ventilation system is to meet the oxygen demand of the modern broiler chick and to ensure good distribution of fresh air throughout the broiler house. Oxygen is required for both the production of body heat and metabolism of nutrients essential for growth. During the first week, the carbon dioxide is primarily produced by the combustion of LPG and from the chicks themselves. A chick's respiratory system is at near full capacity at comfort temperature. As the environment temperature drops, the chick must consume considerably higher levels of oxygen to stay comfortable. Ventilation systems remove carbon dioxide and supply chicks with the oxygen they need to develop healthy cardiovascular systems and to prevent problems such as ascites, which can occur if demand for oxygen increases by just five percent.

2. Remove Excess Moisture

The minimum ventilation systems are also responsible for removing excess moisture from the litter. Today's modern broiler chicks consume nearly twice as much water at 28 days than they did 25 years ago. Approximately 75 percent of the water consumed daily is released as water vapor from the respiratory system or deposited along with the droppings as moisture in the litter.

The litter in a broiler house acts like a sponge. If the ventilation system cannot keep up with moisture deposited in the litter, the surface of the litter eventually becomes damp and slippery. Once moisture reaches the surface, no water can escape and the situation cannot be reversed. This is a dangerous and unsanitary environment, producing very high bacterial loads, ammonia odors, insect infestations and even footpad lesions. However, proper management of moisture levels should ensure oxygen and carbon dioxide levels are kept in check.

3. Regulate Temperature

The third function of the minimum ventilation system is to maintain the proper temperature distribution in the broiler house. Chicks are not thermo-competent until 14 days of age, and therefore rely on supplementary heat to keep them warm.

During the first seven days, chicks will more than quadruple their body weight. This is the only opportunity to achieve such growth in a single week. However, if chicks are cold, they are less active and they don't eat. If they don't eat, they don't grow. Keeping chicks warm and ensuring adequate supplementary feed, access to fresh water and good minimum ventilation are crucial factors for determining a flock's overall performance.

Members of Cobb's technical service team help customers establish their own successful ventilation systems by sharing knowledge from around the world. Customers living in similar climates often experience many of the same challenges and can benefit from each others' expertise and best practices. Armed with an understanding of both automated and manual ventilation systems, customers can improve their operations and final performance.

Visit our Cobb Academy or Elements of Success video series for even more information on the importance of ventilation during brooding or in the hatchery.

http://cobb-vantress.com/academy/articles/article/academy/2015/04/04/the-importance-of-ventilation-in-broiler-management

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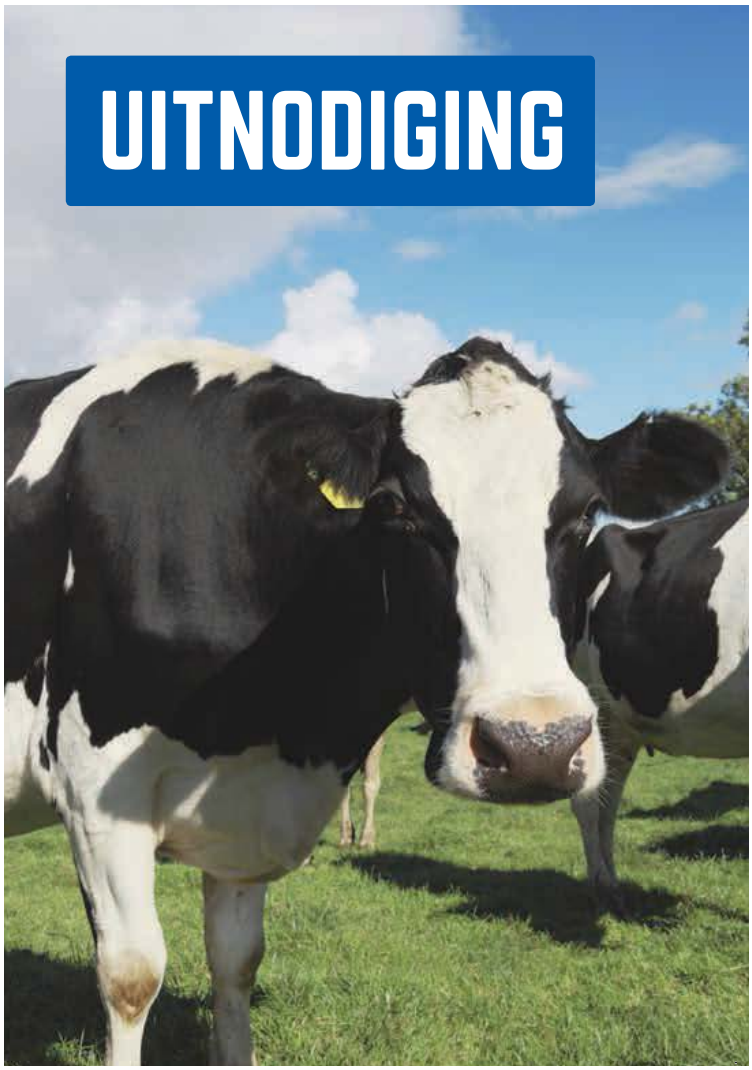

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MARK HART

Mark het meer as 30 jaar ondervinding in die melkbedryf. Hy het 'n suiwel-wetenskapgraad verwerf aan die Cornell Universiteit asook sy MBA voltooi deur Rockhurst Universiteit. Nadat hy in melkproduksie gewerk het, het hy by DeLaval melktoerusting aangesluit waar hy verskeie bemarkingsposisies in bemarking bekleë het en gefokus het om innoverende oplossings te vind om kliënte behoeftes wêreldwyd te bevredig.

Hy is werksaam by Elanco vanaf 2002. Hy was aan die leierskap wat die Amerikaanse melkbesigheidseenheid tot stand gebring het met die registrasie van Rumensin® vir koeie in laktasie asook die oorneming integrasie van die Monsanto melkbesigheidseenheid. Die laaste 5 jaar het hy Elanco se wêreldwye melkbesigheidseenheid gelei met portefeulje-groei asook geografiese uitbreiding.

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Deur Mark Hart

DATUMS:

- Dinsdag 25 Augustus – Weskaap
  Fynbos Golf and Country Estate, Oubosrand
- Woensdag 26 Augustus – Weskaap
  Tramonto, Geelhoutboom Straat , George
- Vrydag 28 Augustus – KwaZulu Natal
  Button and Birding Gastehuis, Creighton

TYD:

18:30 vir 19:00
(Ligte verversings met aankoms; Praatjie sal stiptelik om 19:00 begin met aandete na die tyd)

RSVP:

Mirilene Swanepoel
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Dairy Outlook

August 2015

By Jim Dunn
Professor of Agricultural Economics, Penn State University

Market Psychology

The value of the dollar rose against the currencies of other dairy exporters, although less than in recent months. Greece has worked out a deal with the European Union, although its troubles are far from over. China continues to not buy dairy products and the Russian embargo will continue for another year. Despite lower prices, producers in Europe, New Zealand, and Australia are not cutting back on production so far. The corn and soybean crops have struggled with a satellite report that the 2015 crop is worse than expected. The prices of the exportable powdered dairy products have fallen sharply in the past month, with skim milk powder down by 15.8%, and dry whey by 16.7%. These products have been closely tied to export markets and fallen with world markets, while cheese and butter have risen slightly, by 3.7% and 2.3% respectively.

The Australian dollar is down 1.1% and the New Zealand dollar down by 1.0%., while the Euro has fallen by 0.2%. These lower currency values reflect weak export markets in China for Australia and New Zealand, and the loss of the Russian market for the European Union. While the general problems in the importing major importing countries adversely affect the United States, we have more of a stand-alone economy and greater dependence on the markets in Central and South America, which ae not as weak as Asia.

Table 1 lists some past and estimated future milk prices. I estimate the July Pennsylvania all-milk price to be $18.31/cwt, up $0.21 from June. The dairy futures market prices for Class III and IV show weak prices in the rest of 2015, especially Class IV. The average Class III price for the first seven months was $16.04/cwt. and the future prices for the last five months of 2015 average $16.41. The July Class IV price was down $0.75/cwt. from June at $13.15/cwt. The Class

IV futures prices are lower than the $13.62 for January through July, averaging $13.09 for the next five months. Class IV in particular has been torpedoed by the maintenance of skim milk powder exports by matching the lower world powder prices. The result is that Class III and Class IV prices have gone their separate ways, while both were about the same price in 2014, and Class IV was $1.06 higher than Class III in 2013 My forecast for the average Pennsylvania all-milk price for 2015 is $18.23/cwt., which is $7.42/cwt. below the 2014 average.

The relatively strong U.S. dollar continues to hurt U.S. exports of dairy products. Prices in the Global Dairy Trade auctions in New Zealand continue to fall. Although El Niño generally means drought in New Zealand and Australia, this year it has not disrupted dairy production to a meaningful degree.

Corn and Soybean Markets

Corn and soybean markets have stabilized, as the weather in the western Corn Belt has offset some of the potential ill effects of the wet conditions in the eastern Corn Belt. The cool summer is helping dairy farmers in the Great Lakes states, although hay harvest has been a problem.

Income over Feed Costs (IOFC)

Penn State's measure of income over feed costs fell by 3.5% in July, as milk prices rose but feed prices rose by more. Figure 1 shows how these values compare to recent years. July's feed cost is 37¢/cow/day more than in June. July's value for IOFC of $6.43/cow/day is far below the 2014 value, when the milk price was very high and feed prices were somewhat lower. The higher feed prices caused the lower IOFC in July. Income over feed cost reflects daily gross milk income less feed costs for an average cow producing 65 pounds of milk per day. Table 2 and Figure 1 showing the monthly data follow.

The allocation of the revenue per hundred pounds of milk (milk margin) is shown in Table 3. The milk margin is the estimated amount of the Pennsylvania all milk price that remains after feed costs per hundredweight of milk production are paid. Like income over feed cost, this measure shows that the June PA milk margin was

3.6% lower than in June. Given the margin situation and prospects for the near future, this may be the year to enroll in the Dairy Margin Protection Program offered by USDA. The enrollment period for Year 2 of the Program ends September 30, 2015.

Milk Production

The latest milk production report showed June milk production up 0.8% from a year earlier, but down from last month (Figure 2). This increase in milk production is below the percentage increase of last June, and more importantly it is a decrease from May's milk production. It is especially important, in that on a 30 day month basis, milk production in June was below May, which is a logical response to the impact of the California drought and the low milk prices and margins. The monthly cow numbers are shown in Figure 3. The June cow numbers rose by only 0.54%. This growth is minimal, although some states have been increasing herd size, especially Michigan, Minnesota, and Iowa. Year over year cow number increases continue to be a source of milk production growth, despite the falling milk production in California (-4.3%). The growth in cow numbers last year was much greater than this year. Of course, the incentives were much greater as well.

Table 1. Milk Prices and Milk Futures Prices for 2014 and 2015
(Based on futures prices of August 10, 2015)

2014	Class III $/cwt	Class IV $/cwt	PA All Milk $/cwt
Jan	$21.15	$22.29	$24.90
Feb	$23.35	$23.46	$25.90
Mar	$23.33	$23.66	$26.70
Apr	$24.31	$23.34	$26.80
May	$22.57	$22.65	$26.20
Jun	$21.36	$23.13	$25.10
Jul	$21.60	$23.78	$25.40
Aug	$22.25	$23.89	$26.30
Sep	$24.60	$22.58	$27.40
Oct	$23.82	$21.35	$26.10
Nov	$21.94	$18.21	$24.30
Dec	$17.82	$16.70	$22.60
Annual	$22.34	$22.09	$25.64
Annual change	$ 4.35	$ 3.03	$ 4.16
% change	24.2%	15.9%	19.4%

2015	Class III $/cwt	Class IV $/cwt	PA All Milk $/cwt
Jan	$16.18	$13.23	$19.20
Feb	$15.46	$13.82	$18.30
Mar	$15.56	$13.80	$17.70
Apr	$15.81	$13.51	$17.60
May	$16.19	$13.91	$17.80
Jun	$16.72	$13.90	$18.10
Jul	$16.33	$13.15	$18.31
Aug	$16.44	$12.72	$18.21
Sep	$16.70	$12.94	$18.44
Oct	$16.61	$13.19	$18.49
Nov	$16.32	$13.37	$18.39
Dec	$15.99	$13.24	$18.15
Annual	$16.19	$13.40	$18.23
Annual change	-$ 6.15	-$ 8.69	-$ 7.42
% change	-27.5%	-39.3%	-28.9%

Table 2: PA Income over Feed Costs

Month	All Milk Price	Feed Cost per 65 lbs. Milk	Income over feed cost
Jan-14	$24.90	$4.90	$11.29
Feb-14	$25.90	$5.00	$11.84
Mar-14	$26.70	$5.15	$12.20
Apr-14	$26.80	$5.62	$11.80
May-14	$26.20	$5.60	$11.43
Jun-14	$25.10	$5.34	$10.97
Jul-14	$25.40	$4.75	$11.76
Aug-14	$26.30	$4.54	$12.56
Sep-14	$27.40	$4.80	$13.01
Oct-14	$26.10	$4.84	$12.13
Nov-14	$24.30	$4.91	$10.89

Dec-14	$22.60	$5.14	$9.55
Jan-15	$19.20	$5.24	$7.24
Feb-15	$18.30	$5.12	$6.78
Mar-15	$17.70	$5.17	$6.34
Apr-15	$17.60	$5.15	$6.29
May-15	$17.80	$4.90	$6.67
Jun-15	$18.10	$5.10	$6.67
Jul-15	$18.31	$5.47	$6.43

Table 3: PA Milk Margin

	All milk price per cwt.	Feed cost per cwt.	Milk margin per cwt.
Jan-14	$24.90	$7.53	$17.37
Feb-14	$25.90	$7.68	$18.22
Mar-14	$26.70	$7.93	$18.77
Apr-14	$26.80	$8.65	$18.15
May-14	$26.20	$8.62	$17.58
Jun-14	$25.10	$8.22	$16.88
Jul-14	$25.40	$7.31	$18.09
Aug-14	$26.30	$6.98	$19.32
Sep-14	$27.40	$7.38	$20.02
Oct-14	$26.10	$7.44	$18.66
Nov-14	$24.30	$7.55	$16.75
Dec-14	$22.60	$8.06	$13.54
Jan-15	$19.20	$8.20	$11.00
Feb-15	$18.30	$7.88	$10.42
Mar-15	$17.70	$8.23	$9.47
Apr-15	$17.60	$7.93	$9.67
May-15	$17.80	$7.53	$10.27
Jun-15	$18.10	$7.84	$10.26
Jul-15	$18.31	$8.42	$9.89

Figure 1: PA Dairy Income over feed cost

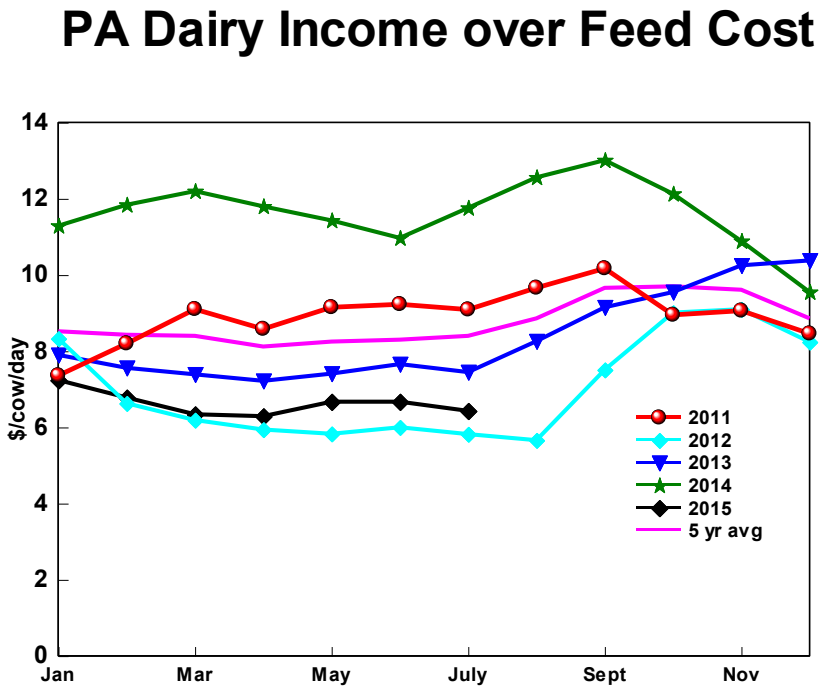


Figure 2: Milk Production

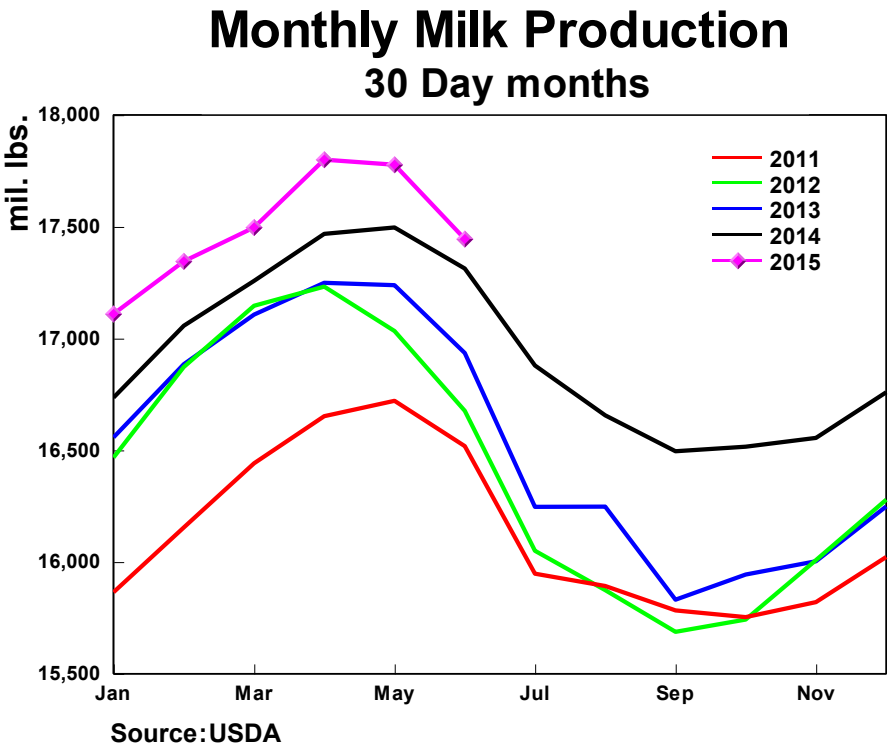
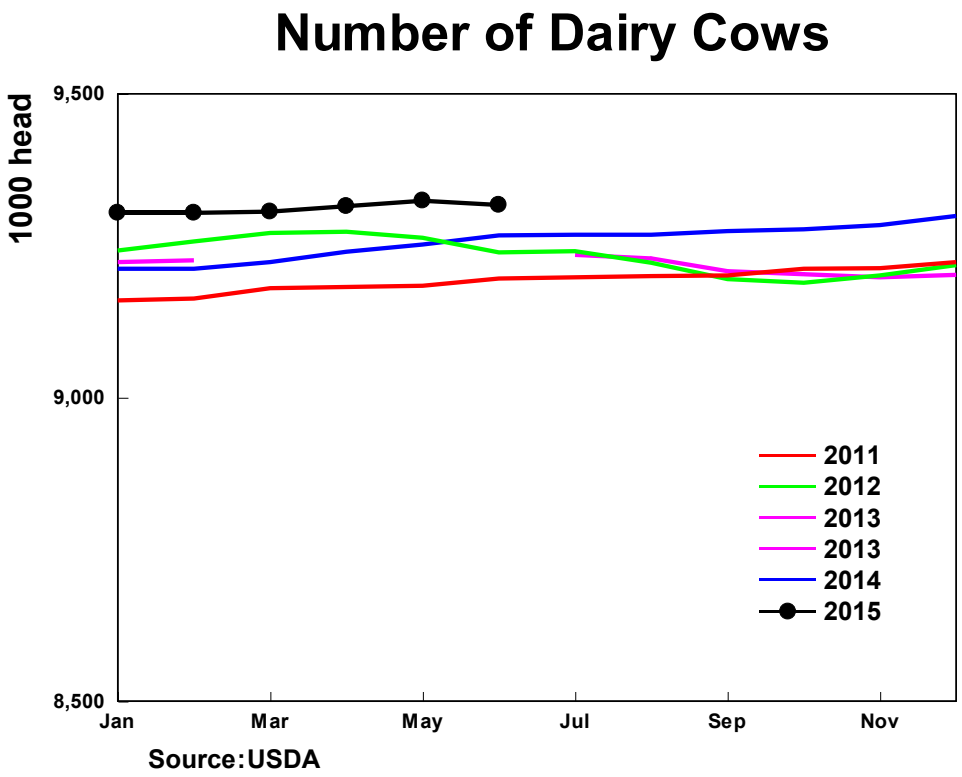


Figure 3: Dairy Cows



Antibiotics and the Gut Microbiome

Antibiotics given to infant mice may have long-term effects on the animals' metabolism and gut microbiota.

By Anna Azvolinsky | June 30, 2015

WIKIMEDIA, SAGE ROSS Even short pulses of widely used antibiotics can lead to long-term development changes in mouse pups, including increased body mass and bone growth and changes to the gut microbiota, according to a study published today (June 30) in *Nature Communications.*

"While this is a correlative study, [the researchers] present a plausible case that antibiotics, by changing the gut microbiota, may affect host function," said Lee Kaplan, a gastroenterologist and molecular biologist at the Massachusetts General Hospital in Boston who was not involved in the work. "This suggests there may be correlates between the microbiota and changes in the host that can be identified in future experiments and exploited for therapeutic benefit."

In prior studies, microbiologist Martin Blaser of the New York University Langone Medical Center and his colleagues showed that mice given low-doses of penicillin shortly after birth became overweight in adulthood if fed a high-fat diet, and that this effect was due to changes in the gut microbiota and metabolism. Seeing profound changes with even low-dose antibiotic exposure—similar to the chronic antibiotic treatment of farm animals to promote growth—Blaser wanted to understand the effects of therapeutic antibiotic doses in kids. "Children don't get low-dose antibiotics every day, they get pulses of high doses of antibiotics for short time periods to treat infections," he said.

To replicate this in the lab, the researchers gave three short doses of amoxicillin or another antibiotic called tylosin, or alternating courses of each. Amoxicillin is the number one prescribed pediatric antibiotic, according to Blaser, while macrolides like tylosin are the second most frequently used antibiotics class. The mice also received a high-fat diet several days after the antibiotic treatment, which Blaser suspects exacerbates the metabolic phenotype associated with antibiotics.

As Blaser's group anticipated, the antibiotic treatments resulted in notable changes to the gut microbiota of the mice, although the two antibiotics resulted in different patterns. Tylosin treatment resulted in changes to the gut microbes that lasted for several months, for example, while amoxicillin treatment led to shorter-term changes that only lasted a week. Tylosin and the combined-antibiotic treatment also seemed to have a greater impact on Bacteroidetes species than amoxicillin treatment alone.

"This is a very nice work and it is bold—using high-fidelity shotgun metagenomics in an animal intervention model," added Kristoffer Forslund a research scientist at the European Molecular Biology Laboratory, Heidelberg, Germany who was also not involved in the study. "Few have done that on this scale, which makes this a milestone."

The antibiotic treatments also affected the animals' fat and bone-density levels. Amoxicillin treat-

ment resulted in increases in lean mass and significantly larger bones and higher bone mineral content while tylosin increased lean and total body mass compared to no antibiotic control animals. “This means that the antibiotics are affecting early life development,” said Blaser. Pulsed antibiotic treatment also resulted in gene expression changes in the liver as many as 120 days after completion of the treatment.

“These are important observations that need to be replicated in human studies,” Willem de Vos, a microbiologist at Wageningen University in the Netherlands told *The Scientist* in an e-mail. While previous work has shown that microbial communities influence obesity and insulin resistance, this study supports the idea that antibiotics affect the gut microbiome and that the disturbed gut microbiota may contribute to metabolic signaling.

“[This study] underscores the complexity of the system and the need to continue to drill more deeply,” said Kaplan. (To read more about the importance of the microbiome in health and disease, read this month’s feature story, “The Sum of Our Parts.”)

Y.R. Nobel et al. “Metabolic and metagenomic outcomes from early-life pulsed antibiotic treatment,” *Nature Communications,* DOI: 10.1038/ncomms8486, 2015.

TheScientist

http://mobile.the-scientist.com/article/43422/antibiotics-and-the-gut-microbiome

THE MICRO WARS

(AND WHY WE'RE LOSING THEM...)

Most of us conveniently ignore the fact that micro-organisms, not humans, are the dominant life form on our planet. Incredibly resilient and diverse in number, they are not only the foundation of all life on Earth but interact with human life in countless ways (up to 3% of total human body mass consists of bacteria). While most of this inter-species interaction is benign or even beneficial, many micro-organisms do pose a threat to human society and commercial food production is at the leading edge of this challenge - a challenge not made easier by the sheer scale of the integrated global food production supply chain. Add to this the ever-increasing sophistication of analytical methods used to track unwanted micro-organisms combined with a more informed and activist consumer base, and the stage is set for warfare at the microscope level.

But there's a problem: mankind is slowly but steadily losing this war; despite our vast knowledge of micro-organisms and technological advances the fact is that microbial infestation, whether related to food spoilage or acute human infection, is on the rise and the WHO has recently warned that increasing levels of bacterial resistance to antibiotics, antiseptics and disinfectants could pose a threat to human prosperity.

Agriculture in the Firing Line

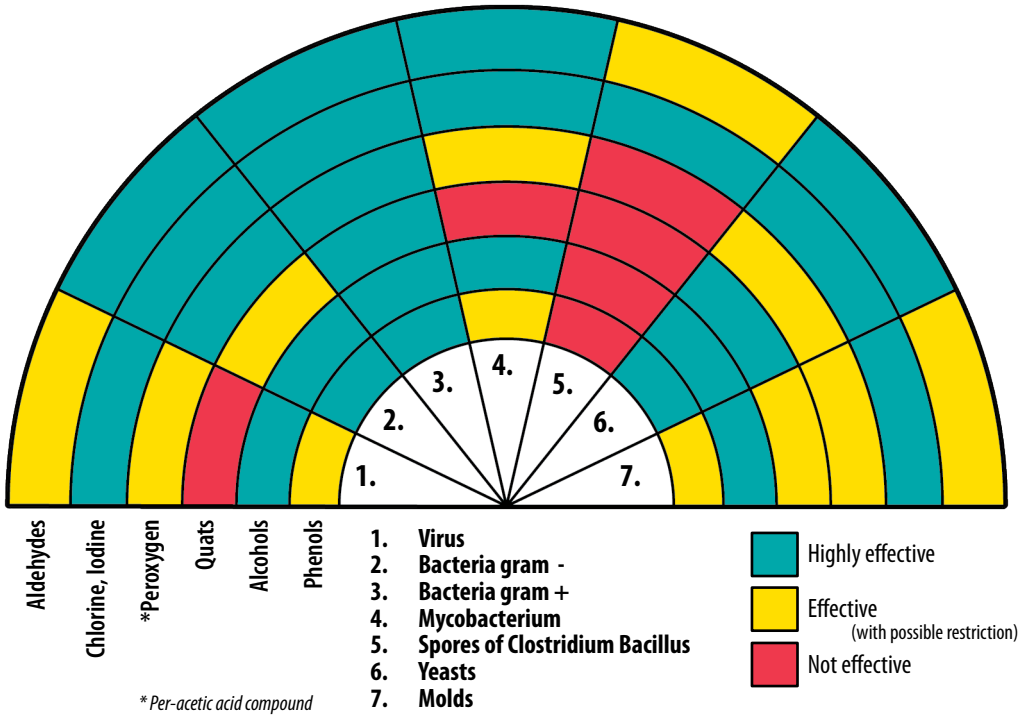
Microorganisms rapidly adapt to environmental, physical and chemical conditions, so it's not surprising that resistance to extensively used antiseptics and disinfectants has been reported. Of the mechanisms that have been identified the most significant are clearly intrinsic, in particular the ability to sporulate, and the protective effects of biofilms. In this context "resistance" can perhaps be more correctly described as "tolerance" - or the protective effects that permit microorganisms to survive in the presence of an active agent. While the WHO has identified the twin priorities of more judicious use of anti-biotics and the development of more powerful alternatives, the global food industry also has a critical role to play because many reports of microbial resistance cite parallel causes like **inadequate cleaning**, **incorrect product use** and **ineffective infection control** practices. It has been speculated that low-level resistance may aid in the survival of microorganisms at residual levels of antiseptics and disinfectants. Addressing these challenges seems simple enough in theory, but in practice food producers are overwhelmed by the sheer number of competing disinfectants, methods and (often contradictory) advice. It is also clear that antiseptic and disinfectant products can vary significantly despite containing similar levels of biocides. This underlines the need for closer scrutiny of efficacy claims and adequate test methodologies.

No Shortcuts - Practice Makes Perfect

Although international best practice teaches that cleaning and disinfection should always be treated as two separate processes, in SA the 'shortcut' route of using cleaning-disinfectant 'combo' formulations has proven resilient – with hygiene control suffering as a result. Many formulators and marketers also seem to forget (or ignore) the fact that, besides lifting dirt and grease and attacking organisms, effective cleaning methods should also address biofilm removal and control – preferably on a continuous basis. **Chlorination** is particularly efficient in this application due its innate ability to strip out the Nitrogen bonds holding protein biofilm together. Another concerning trend is the tendency of some vendors and even specialised cleaning & hygiene contractors to use disinfectant compounds more broadly than their demonstrated chemical efficacy. Ultimately the selection of disinfectant always represents some level of compromise. While there are no 'silver bullets', to help make things a little clearer for the end user the United Nations Food and Agriculture Organisation (FAO) has published an interesting chart demonstrating its own assessment of the relative efficacy and spectrum-utility of the most common environmental disinfecting compounds.

MEAT PROCESSING TECHNOLOGY FOR SMALL TO MEDIUM SIZED PRODUCERS (FAO 2008)

Effect of some chemical disinfectants on microorganisms



source :FAO

Looking Ahead

It's not hard to find consensus that microbial resistance is one of the most serious threats the world faces today. What has proven much more difficult has been to raise broad awareness of the role the non-scientific community can play in slowing this progression and minimizing its potential effects. Both food producers and retailers have a role to play here, and awareness of the following principles offer a good starting point:

1. In order to succeed at both, it's imperative to **separate cleaning and disinfection**.
2. Make **biofilm control** part of your product selection procedure
3. Be aware of the capabilities - and limitations – of the disinfectant/s you select, and always ensure formulations contain **sufficient active ingredient** to ensure microbial 'kill'.
4. Where hygiene is contracted out to a third party, ensure that you understand - and **support** – the chemical solutions they employ.
5. **Avoid the use of antibiotics wherever possible**

References: i) FAO; ii) Antiseptics and Disinfectants: Activity, Action and Resistance (ASM)

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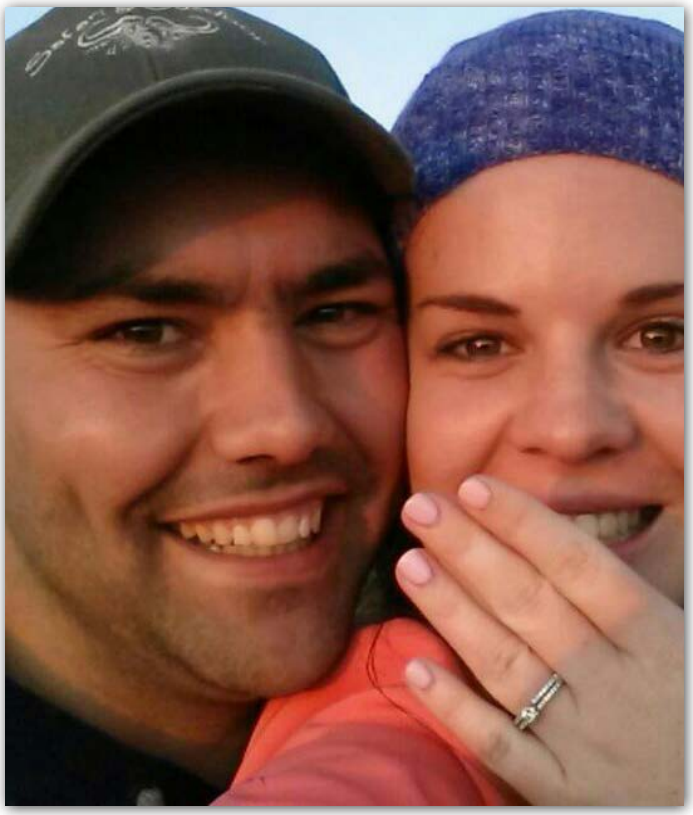

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