ABS TECHNICAL Service

NEWSLETTER **Summer 2015**

Welcome to the Summer Technical Service Newsletter!

As the world-leading provider of bovine genetics, ensuring that our products and solutions exceed customer expectations is critical. That is why in Technical Service (TS) we continually strive to be at the forefront of technical knowledge while remaining true to our core company values. The exciting activities accomplished by our team and showcased in this newsletter are unequivocal proof of our commitment to the success of our customers.

This quarter, we dive into a timely issue in North America and Europe, heat stress. Dr. Flavio Bitencourt of the US TS team and Dr. Huw Lloyd, Director of Technical Service in the EMEA region, provide their insight regarding the best ways to mitigate the problems that heat stress presents to herds across the globe.

In May of this year, members of our global team took part in the Minnesota Dairy Health Conference in Bloomington, Minnesota. In this issue, you'll see a brief synopsis of the conference and an article from Dr. Cristian Vergara on digital dermatitis.

The strength of the information we provide is derived from the partnerships forged between the industry and academic partners. In this issue, one such partnership is featured. Noelia Silva-del-Río and Jennifer Heguy, both of the University of California Davis, share information with us on Silage Face Management.

Lastly, our team is comprised of a dynamic and dedicated group of people. It is our distinct pleasure to serve the best customers and sales force in the industry. The next section of the newsletter highlights the global trainings and events the Technical Service team has hosted and participated in around the globe. We are proud to present a compilation of photos and stories from our global team including highlights from Dr. Huw Lloyd's trip to Egypt, Dr. Diego Vallejo's Russian customer training, the use of our newest Walkthrough tool in Brazil and the German customer tour in the United States.

We hope that you enjoy our most recent installment of the Technical Service Newsletter. As always, many thanks for your support and please let us know if we can be of assistance.

Regards,

Dr. Hernando Lopez
Genus ABS
Global Technical Service Director
hernando.lopez@genusplc.com

inside:

IN THE NEWS: Heat Stress

Dr. Huw Lloyd
ABS EMEA Technical Service Director

Dr. Flavio Bitencourt
US Technical Service Consultant

Heat stress can affect fertility as well as milk yields so it is something dairy farmers need to be aware of. ABS EMEA Technical Services Director, Dr. Huw Lloyd and Dr. Flavio Bitencourt, US Technical Service Consultant, consider the problem and what can be done to reduce the risk.

Everyone likes to see cows out grazing on a bright summer's day, but it is important to appreciate that weather conditions can cause problems for dairy cows. Dr. Lloyd notes that heat stress is a more common problem than is often appreciated and can have a marked impact on current and future performance.

It is not just a matter of temperature. Heat stress occurs when temperature and, critically, humidity act to increase the cow's body temperature above normal limits. Dairy cows are more sensitive to heat stress than many other mammals because of the high metabolic heat production due to fermentation in the rumen. As milk production increases, heat production from the rumen increases and makes cows even more susceptible to the effects of heat stress. They have higher rectal temperatures, increased respiration rates, decreased feed intake (DMI), decreased milk production (volume and components), decreased reproductive performance and other health problems (e.g., retained placenta, mastitis). Heat stress can be a problem sooner than many think. Cows start to be affected by heat stress when the temperature reaches just 22°C/72°F.

The symptoms and effects of heat stress are many, varied and include reduced dry matter intake, increased water requirement, increased respiratory rate, greater water loss as evaporation, higher body temperature and changes in metabolic and hormonal rates. Given this list, it is easy to see why both yield and fertility can be affected.

Cows are under heat stress if they show one or more of the following symptoms:

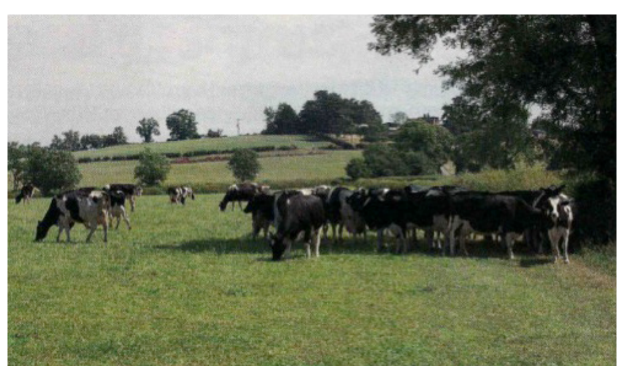
- Body temperature above 39.2°C/102.6°F
- Respiratory rate over 60 breaths per minute
- 10% reduction in dry matter intake
- Milk yield down more than 10%

Measuring Heat Stress

"Measuring rectal temperature can indicate the level of heat stress," Lloyd says, "As a rough rule of thumb, if more than seven out of 10 cows have rectal temperatures above 39.2°C/102.6°F in the afternoon, they are at risk of reduced yield and fertility. Respiration rate should be assessed at the same time, counting the number of breaths/flank movements for 30 seconds and multiplying by two."

The extent of heat stress depends on the combination of temperature and humidity and advises the likely impact can be measured using the Temperature-Humidity Index (THI). Based on environmental temperature and humidity readings, it can be used to estimate the level of heat stress cows are suffering (see below). When THI exceeds 72, reproductive efficiency can be affected. While there may only be a few days in a year when environmental temperatures and humidity increase the THI, the living environment of dairy cows can provide a greater risk, especially as it can increase humidity.

Temperature-Humidity Index (THI) and Clinical Symptoms		
	Respiration Rate (breaths/minute)	Rectal Temperature (°C/°F)
Stress Threshold	>60	>38.5°/101.3°
Mild – Moderate	>75	>39.2°/102.6°
Moderate – Severe	>85	>40.0°/104°
Severe	120 – 140	>41.0°/105.8°



Cows seeking shade can indicate a problem with heat stress

Humidity		T FARENHEIT
37%		60.0
THI	59.7	No Stress

T FARENHEIT																					T Celsius
115.7°F	84.5	86.1	87.6	89.2	90.8	92.3	93.9	95.4	97.0	98.5	100.1	101.7	103.2	104.8	106.3	107.9	109.5	111.0	112.6	114.1	46.5°C
114.8°F	84.1	85.6	87.2	88.7	90.2	91.8	93.3	94.9	96.4	97.9	99.5	101.0	102.5	104.1	105.6	107.1	108.7	110.2	111.7	113.3	46.0°C
113.9°F	83.7	85.2	86.7	88.2	89.7	91.3	92.8	94.3	95.8	97.3	98.8	100.3	101.8	103.3	104.8	106.4	107.9	109.4	110.9	112.4	45.5°C
113°F	83.3	84.8	86.3	87.8	89.2	90.7	92.2	93.7	95.2	96.7	98.2	99.6	101.1	102.6	104.1	105.6	107.1	108.5	110.0	111.5	45.0°C
112.1°F	82.9	84.4	85.8	87.3	88.7	90.2	91.7	93.1	94.6	96.0	97.5	99.0	100.4	101.9	103.3	104.8	106.3	107.7	109.2	110.6	44.5°C
111.2°F	82.5	83.9	85.4	86.8	88.2	89.7	91.1	92.5	94.0	95.4	96.8	98.3	99.7	101.2	102.6	104.0	105.5	106.9	108.3	109.8	44.0°C
110.3°F	82.1	83.5	84.9	86.3	87.7	89.1	90.5	92.0	93.4	94.8	96.2	97.6	99.0	100.4	101.8	103.2	104.7	106.1	107.5	108.9	43.5°C
109.4°F	81.7	83.1	84.5	85.8	87.2	88.6	90.0	91.4	92.8	94.2	95.5	96.9	98.3	99.7	101.1	102.5	103.9	105.2	106.6	108.0	43.0°C
108.5°F	81.3	82.6	84.0	85.4	86.7	88.1	89.4	90.8	92.2	93.5	94.9	96.2	97.6	99.0	100.3	101.7	103.1	104.4	105.8	107.1	42.5°C
107.6°F	80.9	82.2	83.5	84.9	86.2	87.6	88.9	90.2	91.6	92.9	94.2	95.6	96.9	98.2	99.6	100.9	102.3	103.6	104.9	106.3	42.0°C
106.7°F	80.5	81.8	83.1	84.4	85.7	87.0	88.3	89.6	91.0	92.3	93.6	94.9	96.2	97.5	98.8	100.1	101.5	102.8	104.1	105.4	41.5°C
105.8°F	80.1	81.3	82.6	83.9	85.2	86.5	87.8	89.1	90.4	91.6	92.9	94.2	95.5	96.8	98.1	99.4	100.7	101.9	103.2	104.5	41.0°C
104.9°F	79.7	80.9	82.2	83.4	84.7	86.0	87.2	88.5	89.8	91.0	92.3	93.5	94.8	96.1	97.3	98.6	99.9	101.1	102.4	103.6	40.5°C
104°F	79.3	80.5	81.7	83.0	84.2	85.4	86.7	87.9	89.2	90.4	91.6	92.9	94.1	95.3	96.6	97.8	99.1	100.3	101.5	102.8	40.0°C
103.1°F	78.8	80.1	81.3	82.5	83.7	84.9	86.1	87.3	88.5	89.8	91.0	92.2	93.4	94.6	95.8	97.0	98.2	99.5	100.7	101.9	39.5°C
102.2°F	78.4	79.6	80.8	82.0	83.2	84.4	85.6	86.8	87.9	89.1	90.3	91.5	92.7	93.9	95.1	96.3	97.4	98.6	99.8	101.0	39.0°C
101.3°F	78.0	79.2	80.4	81.5	82.7	83.9	85.0	86.2	87.3	88.5	89.7	90.8	92.0	93.2	94.3	95.5	96.6	97.8	99.0	100.1	38.5°C
100.4°F	77.6	78.8	79.9	81.0	82.2	83.3	84.5	85.6	86.7	87.9	89.0	90.2	91.3	92.4	93.6	94.7	95.8	97.0	98.1	99.3	38.0°C
99.5°F	77.2	78.3	79.5	80.6	81.7	82.8	83.9	85.0	86.1	87.2	88.4	89.5	90.6	91.7	92.8	93.9	95.0	96.2	97.3	98.4	37.5°C
98.6°F	76.8	77.9	79.0	80.1	81.2	82.3	83.4	84.4	85.5	86.6	87.7	88.8	89.9	91.0	92.1	93.2	94.2	95.3	96.4	97.5	37.0°C
97.7°F	76.4	77.5	78.5	79.6	80.7	81.7	82.8	83.9	84.9	86.0	87.1	88.1	89.2	90.3	91.3	92.4	93.4	94.5	95.6	96.6	36.5°C
96.8°F	76.0	77.0	78.1	79.1	80.2	81.2	82.2	83.3	84.3	85.4	86.4	87.4	88.5	89.5	90.6	91.6	92.6	93.7	94.7	95.8	36.0°C
95.9°F	75.6	76.6	77.6	78.6	79.7	80.7	81.7	82.7	83.7	84.7	85.8	86.8	87.8	88.8	89.8	90.8	91.8	92.9	93.9	94.9	35.5°C
95°F	75.2	76.2	77.2	78.2	79.2	80.2	81.1	82.1	83.1	84.1	85.1	86.1	87.1	88.1	89.1	90.1	91.0	92.0	93.0	94.0	35.0°C
94.1°F	74.8	75.8	76.7	77.7	78.7	79.6	80.6	81.6	82.5	83.5	84.4	85.4	86.4	87.3	88.3	89.3	90.2	91.2	92.2	93.1	34.5°C
93.2°F	74.4	75.3	76.3	77.2	78.2	79.1	80.0	81.0	81.9	82.9	83.8	84.7	85.7	86.6	87.6	88.5	89.4	90.4	91.3	92.3	34.0°C
92.3°F	74.0	74.9	75.8	76.7	77.6	78.6	79.5	80.4	81.3	82.2	83.1	84.1	85.0	85.9	86.8	87.7	88.6	89.6	90.5	91.4	33.5°C
91.4°F	73.6	74.5	75.4	76.3	77.1	78.0	78.9	79.8	80.7	81.6	82.5	83.4	84.3	85.2	86.1	86.9	87.8	88.7	89.6	90.5	33.0°C
90.5°F	73.2	74.0	74.9	75.8	76.6	77.5	78.4	79.2	80.1	81.0	81.8	82.7	83.6	84.4	85.3	86.2	87.0	87.9	88.8	89.6	32.5°C
89.6°F	72.8	73.6	74.5	75.3	76.1	77.0	77.8	78.7	79.5	80.3	81.2	82.0	82.9	83.7	84.6	85.4	86.2	87.1	87.9	88.8	32.0°C
88.7°F	72.4	73.2	74.0	74.8	75.6	76.4	77.3	78.1	78.9	79.7	80.5	81.3	82.2	83.0	83.8	84.6	85.4	86.2	87.1	87.9	31.5°C
87.8°F	72.0	72.8	73.5	74.3	75.1	75.9	76.7	77.5	78.3	79.1	79.9	80.7	81.5	82.3	83.0	83.8	84.6	85.4	86.2	87.0	31.0°C
86.9°F	71.6	72.3	73.1	73.9	74.6	75.4	76.2	76.9	77.7	78.5	79.2	80.0	80.8	81.5	82.3	83.1	83.8	84.6	85.4	86.1	30.5°C
86°F	71.2	71.9	72.6	73.4	74.1	74.9	75.6	76.3	77.1	77.8	78.6	79.3	80.1	80.8	81.5	82.3	83.0	83.8	84.5	85.3	30.0°C
85.1°F	70.7	71.5	72.2	72.9	73.6	74.3	75.1	75.8	76.5	77.2	77.9	78.6	79.4	80.1	80.8	81.5	82.2	82.9	83.7	84.4	29.5°C
84.2°F	70.3	71.0	71.7	72.4	73.1	73.8	74.5	75.2	75.9	76.6	77.3	78.0	78.7	79.3	80.0	80.7	81.4	82.1	82.8	83.5	29.0°C
83.3°F	69.9	70.6	71.3	71.9	72.6	73.3	73.9	74.6	75.3	75.9	76.6	77.3	78.0	78.6	79.3	80.0	80.6	81.3	82.0	82.6	28.5°C
82.4°F	69.5	70.2	70.8	71.5	72.1	72.7	73.4	74.0	74.7	75.3	76.0	76.6	77.3	77.9	78.5	79.2	79.8	80.5	81.1	81.8	28.0°C
81.5°F	69.1	69.7	70.4	71.0	71.6	72.2	72.8	73.5	74.1	74.7	75.3	75.9	76.6	77.2	77.8	78.4	79.0	79.6	80.3	80.9	27.5°C
80.6°F	68.7	69.3	69.9	70.5	71.1	71.7	72.3	72.9	73.5	74.1	74.7	75.3	75.8	76.4	77.0	77.6	78.2	78.8	79.4	80.0	27.0°C
79.7°F	68.3	68.9	69.5	70.0	70.6	71.2	71.7	72.3	72.9	73.4	74.0	74.6	75.1	75.7	76.3	76.9	77.4	78.0	78.6	79.1	26.5°C
78.8°F	67.9	68.5	69.0	69.5	70.1	70.6	71.2	71.7	72.3	72.8	73.4	73.9	74.4	75.0	75.5	76.1	76.6	77.2	77.7	78.3	26.0°C
77.9°F	67.5	68.0	68.5	69.1	69.6	70.1	70.6	71.1	71.7	72.2	72.7	73.2	73.7	74.3	74.8	75.3	75.8	76.3	76.9	77.4	25.5°C
77°F	67.1	67.6	68.1	68.6	69.1	69.6	70.1	70.6	71.1	71.6	72.1	72.5	73.0	73.5	74.0	74.5	75.0	75.5	76.0	76.5	25.0°C
76.1°F	66.7	67.2	67.6	68.1	68.6	69.0	69.5	70.0	70.5	70.9	71.4	71.9	72.3	72.8	73.3	73.7	74.2	74.7	75.2	75.6	24.5°C
75.2°F	66.3	66.7	67.2	67.6	68.1	68.5	69.0	69.4	69.9	70.3	70.7	71.2	71.6	72.1	72.5	73.0	73.4	73.9	74.3	74.8	24.0°C
74.3°F	65.9	66.3	66.7	67.1	67.6	68.0	68.4	68.8	69.3	69.7	70.1	70.5	70.9	71.4	71.8	72.2	72.6	73.0	73.5	73.9	23.5°C
73.4°F	65.5	65.9	66.3	66.7	67.1	67.5	67.9	68.3	68.6	69.0	69.4	69.8	70.2	70.6	71.0	71.4	71.8	72.2	72.6	73.0	23.0°C
72.5°F	65.1	65.4	65.8	66.2	66.6	66.9	67.3	67.7	68.0	68.4	68.8	69.2	69.5	69.9	70.3	70.6	71.0	71.4	71.8	72.1	22.5°C
71.6°F	64.7	65.0	65.4	65.7	66.1	66.4	66.7	67.1	67.4	67.8	68.1	68.5	68.8	69.2	69.5	69.9	70.2	70.6	70.9	71.3	22.0°C
		0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%

	NO STRESS
	STRESS THRESHOLD
	MILD STRESS
	SEVERE STRESS
	ACUTE STRESS

To calculate the THI of your herd, please visit the ABS Technical Service calculator tool.

Nutrition

Dr. Bitencourt recommends changing feeding schedules to offer fresh feed during the coolest time of the day, early in the morning and/or late in the evening to avoid feed overheating and increase frequency of bunk push out/clean out, particularly if feed line soakers are adding moisture to the feed.

Work with your nutritionist to ensure the ration delivers the nutrients needed for peak performance in hot weather, such increasing nutrient density by adding rumen inert fat; increasing bypass protein levels; increase potassium levels to make up for its loss through sweating, panting and urination. Additionally, increase water availability with waterers in the exit lane from the parlor.

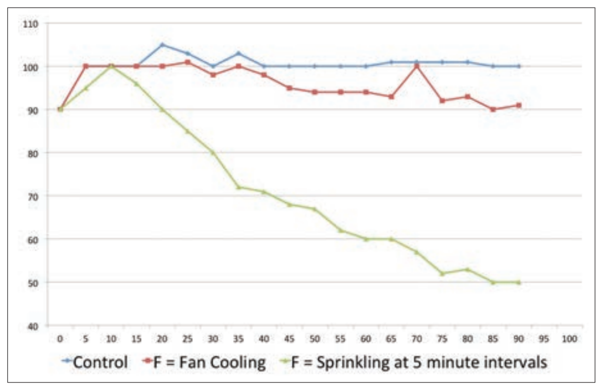
Environment

Bitencourt says, "Work on stock density to find the ideal one for the particular operation, keeping it at a level to optimize DMI while keeping cows cool and comfortable. Shade should be available for all groups of cows to minimize the direct contact with the sun with proper ventilation on facilities to keep the air moving as much as possible. The cooling system should begin to work at 65°F, with soakers and fans on the feed bunks, and fans on top of the stalls."

The purpose of soakers is to soak the cow to her skin and allow for evaporative cooling using fans. Soaking a cow that is already wet will provide little additional cooling. The more wet/dry cycles per hour, the more cooling will be achieved. The wetting frequency should increase as the temperature climbs, with these general guidelines: 65°F every 15 minutes; 80°F every 10 minutes; 90°F every 5 minutes.

Fans and soakers work better for parts of the country with high temperature and humidity during the day and night. The evaporative cooling of tunnel and cross ventilation barns work well for regions with high temperature and low humidity (Dahl et al, 2012).

Dr. Bitencourt emphasizes, "It is important to remember the holding pen and parlor. Due to the crowding of cows in this area, it becomes the hottest place of the dairy and it should have fans and sprinklers to keep cows comfortable." Below is a picture comparing the drop in respiration rates on cows without cooling, with fans only, and sprinklers and fans in 5 minute intervals:



Graph 1: Ventilating Freestall Barns: Tunnel vs. Natural. Brian J Holmes, Babcock Institute, University of Wisconsin

Heat Stress and Reproduction

It is very clear that the negative effects of heat stress on reproduction is the result of the direct influence on reproductive functions and embryonic development and indirect influences mediated through changes in energy balance. The reduction in DMI can prolong the period of negative energy balance and negatively influences the plasma concentrations of insulin, IGF-I and glucose (Ronchi et al., 2001), resulting in poor follicular development with low quality of oocytes, and low duration and intensity of estrus expression. Nebel et al (1997) found that Holstein cows during the summer have 4.5 mounts per estrus versus 8.6 per estrus in winter.

Using Florida data, De Vries (2004) assumed a loss in milk production of at most 15% and a reduction in conception rate of at most 53% in the summer compared to the data for February. Data from Israel showed a decrease in the summer of 7% for milk production and 51% in conception rate in herds producing at an average rate (Flamenbaum and Galon, 2010).

IN THE NEWS: Heat Stress (continued)

The mechanisms through which heat stress influences the function of hypothalamic-hypophyseal-ovarian axis are not completely understood. There is a clear reduction in the pulse and amplitude of luteinizing hormone (LH) leading to prolonged follicular dominance, delayed ovulation and a markedly reduced quality of oocytes with reduction in conception rate (Diskin et al., 2002; Bridges et al., 2005).

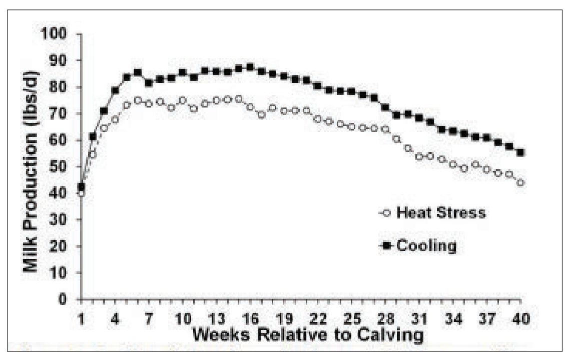
Whether insufficient progesterone secretion by the corpus luteum contributes to low fertility in cattle exposed to heat stress is debatable. Wolfenson et al. (2002) analyzed progesterone production in vitro by theca and granulosa cells obtained from cows in cool and hot seasons as well as progesterone concentrations in general circulation. This study demonstrated that under chronic summer stress conditions, progesterone production was markedly reduced, especially by luteinized theca cells. Results presented indicated a 25% decrease in plasma concentrations of progesterone in cows in summer compared to those in winter and, it was postulated that heat stress induced damage to follicular function that was carried over to the subsequently formed corpus luteum.

This large decrease in reproduction due to heat stress has motivated much research into ways to increase pregnancy rates in the summer (Hansen and Aréchiga, 1999; Jordan, 2003). Embryo transfer can significantly improve pregnancy rates during the summer months by bypassing the period in which the embryo is more susceptible to heat stress. In a recent study, lactating dairy cows were bred using in vitro-produced embryos with sexed semen that were either frozen and thawed or remained fresh and were transferred after a timed embryo transfer program into lactating dairy cows during summer or were bred with conventional AI semen (Stewart et al., 2011). Conception rates were doubled with fresh embryos compared to AI.

Heat Stress and the Dry Cow

There is evidence that heat stress during late gestation has profound effects on cows during the pre- and postpartum periods. In addition to impaired immune function during the transition period, it affects mammary gland development before parturition and exerts residual effects on metabolism in early lactation and subsequent lactation performance. It also compromises placental development and fetal growth and negatively affects the immune competence of the offspring.

In a large scale study that included more than 2,600 calving records over 3 consecutive years on a commercial dairy located in Florida, Dahl and Thompson (2012) studied effects of season of the dry period on the occurrence of health disorders in the first 60 DIM, and found that cows dried off in hot months (June, July, and August) had higher incidence of mastitis, respiratory problems, and retained fetal membranes in early lactation compared with those dried in cool months (December, January, and February). In summary they concluded that dry cows that were cooled had improved DMI, body weight and body condition score during the dry period; improved immune status during transition, with better innate immune function (first line of defense to pathogens) and higher acquired immune function (greater IgG protection). In relation to the heifer calves from the dams that were cooled, they had higher passive IgG transfer; greater birth, weaning and year old weights; greater reproductive performance and about 10 Lbs more milk production during their first lactation.



Graph 2: *Milk production of cooled and heat stressed cows. (Dahl, G.E., S. Tao, and I.M. Thompson. 2012. Impact of Dry Cow Cooling on Subsequent Performance and Health).*

Heat Stress and Genetic Selection

A largely unexplored strategy to reduce the severity of heat stress effects on dairy cattle is to genetically select cattle for increased thermotolerance. There is genetic variation for heat tolerance in Holsteins (Dikmen et al., 2012) and specific SNP have been identified that are associated with that genetic variation (Hayes et al, 2009; Dikmen et al., 2013). One such gene has been identified. It is the SLICK haplotype (http://omia.angis.org.au/OMIA001372) and it confers animals with a short and sleek hair coat. The locus has been mapped to bovine chromosome (Chr) 20 (Mariasegaram et al., 2007; Flori et al., 2012). Originally identified in Senepol cattle, the gene has been introduced into Holsteins through absorbent crossing (Olson et al, 2003).

According to Dikmen et al., 2008 lactating Holsteins that inherited the slick hair gene from Senepol cattle have superior ability to regulate body temperature. The physiological basis for thermotolerance in slick cows involves multiple modes of heat loss to the environment. The short hair length caused by the SLICK haplotype reduces the insulation to conductive and convective heat loss in the hair coat (Berman, 2004) and thereby increases sensible heat loss. Evaporative heat loss is also heightened in slick cows because of the increased sweating rate during heat stress. Even in situations where housing has been modified to reduce the effect of heat stress, they experience less-pronounced reductions in milk yield during the summer, with the reduction in daily milk yield in summer compared with winter being 2.8Lbs for slick cows and 8Lbs for non slick cows (Dikmen et al., 2014).

This could be a promising area for research to potentially increase productivity in the warm parts of the globe by introducing the slick hair gene to Holstein and Jersey embryos producing animals more adapted to their environment.

Holding Area Cooling

In many dairies the holding area is a place where heat is highly concentrated. Speaking to a group of global technical personnel, Dr. Ken Nordlund of the University of Wisconsin spoke to strategy on holding area cooling. Typically, ventilation in holding pens is natural from sidewalls and/or "used" re-circulated air from the parlor that is forced into the holding pen. Dr. Nordlund stressed that usually this forced, re-circulated air that has gained humidity and temperature throughout the day is not ventilation. The key to ventilation is fresh air. Usually these holding pens allow for partial fan coverage, but natural ventilation is very limited due to general farm layout.

Dr. Nordlund and his staff started trialing positive pressure tube systems, used in calf barns, to deliver fresh air to holding areas. These tubes run by one fan will provide more than 30 smaller air jets to cool cows, onto and between not just skimming the top, versus one big air jet from a fan. These smaller air jets will provide consistent, fresh air for all cows regardless of their location in a holding area. The typical fan setup left 2/3 of the cows feeling very little air movement to cool them. It is recommended that tubes are spaced 6 – 12 feet/ 1.8 – 3.6 meters apart and 4 feet/1.2 meters above crowd gates. Utilizing this type of tube system will reduce power usage by approximately 50% as compared to the typical system. Please contact your local representative to learn more. The Dairyland Initiative program has guides to installing pressure tube systems on dairies. To find more information on the Dairyland Initiative, visit https://thedairylandinitiative.vetmed.wisc.edu/index.htm.

In Conclusion

With proactive management, it is possible to reduce the impact of heat stress and achieve increased summer fertility, greater milk production and maximize cow comfort. Ask your Technical Service representative for support in heat stress mitigation for your herd.

References

Berman, A. 2004. Tissue and external insulation estimates and their effects on prediction of energy requirements and of heat stress. J. Dairy Sci. 87:1400–1412.

Bridges, G. A., M. L. Mussard, J. L. Winkler, C. L. Gasser, D. E. Grumm, J. L. Pate, and M. L. Day. 2005. Influence of duration of proestrus on preovulatory estradiol concentrations and uterine gene expression following induced ovulation in cattle. Biol. Reprod. Sp. Iss. p. 180. (Abstr.)

Dahl, G.E., S. Tao, and I.M. Thompson. 2012. Impact of Dry Cow Cooling on Subsequent Performance and Health.

De Vries, A. 2004. Economic value of delayed replacement when cow performance is seasonal. J. Dairy Sci. 87: 2947-2958.

Diskin, M.G., Austin, E.J., Roche, J.F., 2002. Exogenous hormonal manipulation of ovarian activity in cattle. Domestic Animal Endocrinology 23, 211–228.

Dikmen, S., E. Alava, E. Pontes, J. M. Fear, B. Y. Dikmen, T. A. Olson, and P. J. Hansen. 2008. Differences in thermoregulatory ability between slick-haired and wild-type lactating Holstein cows in response to acute heat stress. J. Dairy Sci. 91:3395–3402.

Dikmen, S., J. B. Cole, D. J. Null, and P. J. Hansen. 2012. Heritability of rectal temperature and genetic correlations with production and reproduction traits in dairy cattle. J. Dairy Sci. 95:3401–3405.

Dikmen, S., J. B. Cole, D. J. Null, and P. J. Hansen. 2013. Genome wide association mapping for identification of quantitative trait loci for rectal temperature during heat stress in Holstein cattle. PLoS ONE 8:e69202.

Dikmen, S., Khan, F.A., Huson, H.J., Sonstegard, T.S., Moss, J.I., Dahl, G.E., Hansen, P.J. 2014. The SLICK hair locus derived from Senepol cattle confers thermotolderance to intensively managed lactating Holstein cows. J. Dairy Sci. 97:5508-5520

Flamenbaum, I, and N. Galon. 2010. Management of heat stress to improve fertility in dairy cows in Israel. J. Reprod. Dev. 56 (Suppl.):S36-S41.

Flori, L., M.I. Gonzatti, S. Thevenon, I. Chantal, J. Pinto, D. Berthier, P. M. Aso, and M. A. Gautier. 2012. A quasiexclusive European ancestry in the Senepol tropical cattle breed highlights the importance of the slick locus in tropical adaptation. PLoS ONE 7:e36133.

Hansen, P.J., and C.F. Aréchiga. 1999. Strategies for managing reproduction in the heat-stressed dairy cow. J. Animal Sci. 77:36-50.

Hayes, B. J., P. J. Bowman, A. J. Chamberlain, K. Savin, C. P. van Tassell, T. S. Sonstegard, and M. E. Goddard. 2009. A validated genome wide association study to breed cattle adapted to an environment altered by climate change. PLoS ONE 4:e6676. Jordan, E.R. 2003. Effects of heat stress on reproduction. J. Dairy Sci. 86:(E. Suppl.):E104-114.

Mariasegaram, M., C. C. Chase Jr., J. X. Chaparro, T. A. Olson, R. A. Brenneman, and R. P. Niedz. 2007. The slick hair coat locus maps to chromosome 20 in Senepol-derived cattle. Anim. Genet. 38:54–59.

Nebel, R.L., S. M. Jobst, M.B.G. Dransfield, S. M. Pandolfi, and T. L. Baily, 1997. Use of radio frequency data communication system, HeatWatch, to describe behavioral estrus in dairy cattle. J. Dairy Sci. 80 (Suppl. 1):179 (Abstr.).

Olson, T. A., C. Lucena, C. C. Chase Jr., and A. C. Hammond. 2003. Evidence of a major gene influencing hair length and heat tolerance in Bos taurus cattle. J. Anim. Sci. 81:80–90.

Ronchi, B., Stadaioli, G., Verini Suppolizi, A., Bernabuci, U., Lacetera, N. and Accorsi, P.A. (2001). Infunece of heat stress or feed restriction on plasma progesterone, oestradiol-l7beta, LH, FSH, polactin and cortisol in Holstein heifers. Livestock production Sci. 68: 231-241.

Stewart, B.M., J. Block, P. Morelli, A.E. Navarette, M. Amstalden, L. Bonilla, P.J. Hansen, and T.R. Bilby. 2011. Efficacy of embryo transfer in lactating dairy cows during summer using fresh or vitrified embryos produced in vitro with sex-sorted semen. J. Dairy Sci. 94:3437-3445.

Wolfenson et al., 2002Wolfenson, D., Sonego, H., Bloch, A., Shaham-Albalancy, A., Kaim, M., Folman, Y., Meidan, R. Seasonal differences in progesterone production by luteinized bovine thecal and granulosa cells. Domest. Anim. Endocrinol. 2002;22:81–90.

MN Dairy Health Conference, May 2015
Digital Dermatitis and Risk of Milk Residues

Christian Vergara, DVM, MS
Technical Service Consultant

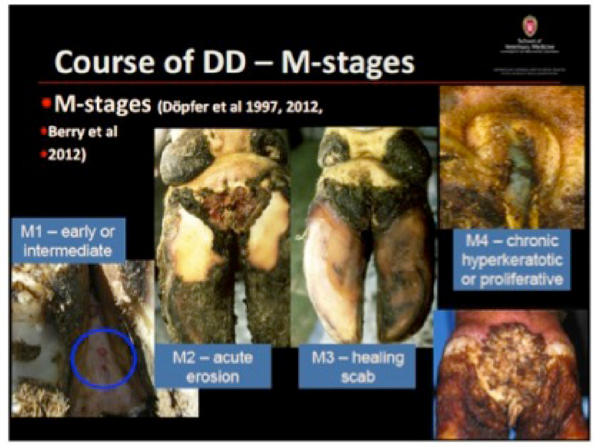
Lameness continues to be a big concern for dairy producers. Lameness continues to be a big concern for dairy producers. For us involved in dairy cows' reproduction, we know firsthand the effect of this disease on heat expression, but also in severe cases we have seen the whole cow compromised in terms of her body condition, metabolic status and consequently, immunity.

Highly related to cow comfort, in the Midwest, the lameness prevalence has been decreasing in the last 10 years from around 20% in sand bedded herds to 11%. Whereas in herds with mattress stalls, the prevalence went from 30% to 18%, according Dr. Nigel Cook's recent research (2013).

Despite the reduction in prevalence and all the improvements and new knowledge in regards to cow housing, in the same 10 year period the most common foot lesion been diagnosed in the U.S. has been digital dermatitis (DeFrain et al, 2011), perhaps acting as a bottleneck for further improvements in lameness reduction. Worldwide this disease is described as showing prevalence from 10% to 30%, with the U.S. being among the countries with highest prevalence.

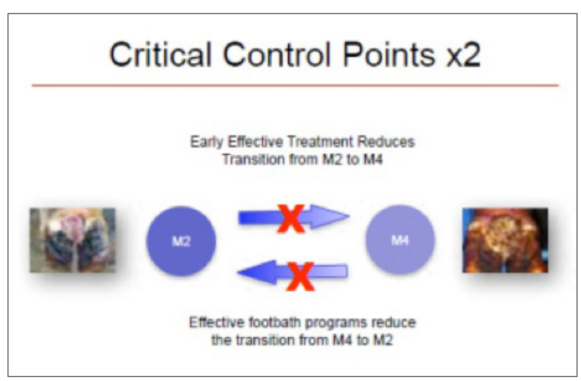
As a result, digital dermatitis (DD) will remain a challenge for dairy producers and one of the key areas of focus. As a matter of fact, this has been one of the most active topics in the newest research from scientists linked to dairy lameness and it was a key topic during the last MN Dairy Health Conference in May 2015. There still many things to learn in regards to DD, but recent understanding of the pathogenesis and epidemiologic dynamic have been crucial.

DD is an infectious disease caused by a gram negative strictly anaerobic spirochete, and experimental clinical cases have been induced with Treponema sp. The Treponema in his life cycle has a spiral stage that can penetrate, like a corkscrew, the epidermis and dermis of the foot, associated to wet anaerobic environments (manure, among others), creating at the beginning a subclinical (M1) but later clinical active lesion (M2). Once inside the dermis, the Treponema will alter the dermal growth pattern creating



the characteristic acute ulcerative and proliferative lesion (M2, strawberry like). The lesion will progress to healing (M3) and to a chronic stage (M4). However, at this point, the Treponema has reached deep in the dermis and encysted, which causes the disease to reactivate from the chronic stage.

Knowing the cycle is helpful, because in easy terms we are able to understand that once the infection is chronic, the only strategy of control is to avoid the reactivation of the lesion. This can be achieved with periodic 10-12 feet long hoof baths of cooper sulfate (5-10%), hygiene and corrective trimming twice in lactation, among others. On the other hand, the widely used topical Oxytetracycline (OTC) would be only efficient in early stages of the lesion cycle, before Treponema gets deeper in the dermis. The antibiotic has been proved effective before the Treponema gets to the encysted stage of new and reactivated lesions.



As a result of the well known OTC therapeutic effect, it not surprising that the drug is widely used by trimmers, but without a clear or standardized dose. OTC is not presently labeled for the treatment of DD, there is no specific dosage or milk or meat withholding time after a cow receives treatment. “If it were to require a prescription, that means the dairy’s veterinarian assumes the risk when determining how much tetracycline the hoof trimmer can apply, how it can be applied and the withdrawal period,” stated Dr. Gerard Cramer of the University of Minnesota.

OTC usage remains in a grey area for many farms right now and represents a drug of interest for the FDA and milk processors (currently testing). Therefore, a veterinary prescription and veterinary client patient relationship (VCPR) may soon be required for use.

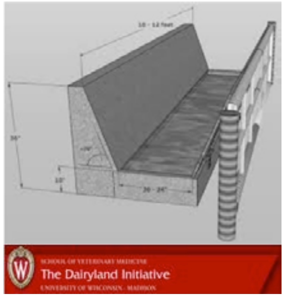
With those antecedents, the University of Guelph and University of Minnesota have jointly been working on the potential risk of residues coming from topical treatment with OTC. They were testing different dose concentrations of powder OTC with or without wrap (2, 5 and 25 g per foot, as shown in picture). The legal limit for the drug in milk is 300 ppb in the U.S. and 100 ppb in Canada, but some processors may run a test that can detect 10-30 ppb.

Anecdotally, while running the experiments, they were using common fresh milk form a grocery store as standard, but they noticed this milk already had OTC residues, though below the maximum residue limit. They were forced to get organic milk for the lab assays after the impasse.

In their experiment conclusions at the cow level, they were able to trace back residues in the teat (either from contact contamination or absorption, not known) and milk within 8 to 27 hours after treatment, within the legal limits but detectable for processors. This suggests that despite being topical treatment, absorption may occur especially in extensive and highly ulcerative lesions.

As a take home message, Dr. Cramer encouraged the audience to “know” the OTC dose, he suggested that 2-3 g/ lesion is adequate to treat active stages of DD. He also encouraged keeping track of the number of cows treated simultaneously at any specific time, because a massive treatment may accumulate and trigger a bulk residue detection, especially in small herds.

For further assistance in hoof bath dimensions and bath dosages, request for a TS consultant to send the University of Wisconsin Dairyland Initiative recommendations.



Minnesota Dairy Health Conference

MN Dairy Health Conference, May 2015

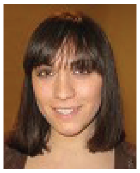
Members of our global team gathered in Bloomington, Minnesota between May 6 and 8th for the Minnesota Dairy Health Conference. This was an exciting educational opportunity for our group to learn about industry best practice on proactive and responsible animal care, quality assurance, animal well-being and milk quality.

From left to right: Cristian Vergara, Flavio Bitencourt, Huw Lloyd, Hernando Lopez, Helio Rezende and Anibal Ballarotti

Each member of the group pictured above has contributed their thoughts via TechLine articles on presentations of their choosing from the conference. We are proud to present Dr. Cristian Vergara’s article on Digital Dermatitis in this issue.

Silage Management at Feeding

Noelia Silva-del-Río
CE Dairy Specialist
VMTRC, Tulare, CA



Jennifer Heguy
UCCE Dairy Advisor
Stanislaus and San Joaquin Counties, CA

Good management practices during the feeding process will help us to minimize spoilage when forage is exposed to air. In the presence of oxygen, yeast can metabolize lactic acid, a strong acid that keeps the silage pH low. When pH increases, as consequence of lactic acid metabolization, undesirable fungi and bacteria are able to grow and further spoil the silage. This spoilage is translated into dry matter (DM) losses that can be as high as 10%, reduction in forage quality, and palatability.

There are several factors that favor aerobic deterioration during the feeding process:

1. Inadequate packing (insufficient tractor packing time, forage with high dry matter, chopping length too long, mature forage with hollow stalks that keep air inside).
2. Crops with high starch and sugars (i.e. corn silage) that could be used by yeast and other spoiling microorganisms.
3. High environmental temperatures that favor yeast growth as well as other spoiling microorganisms.
4. Ensiled forages with low concentration of organic acids such as acetic, butyric, or propionic that could inhibit yeast growth.

This article discusses the importance of good face management practices to minimize aerobic spoilage of ensiled forage during the feeding process.

Maintain a rapid progression through the silage face

The feed out rate of silage has important implications on the quality and quantity of the ensiled crop. The rule of thumb is to remove 5 to 10 cm (2 – 4 in.) in tower silos, 10 -15 cm (4 – 6 in.) in bunker silos, and 30 cm (12 in.) in bags. This recommendation is based on field observations, and reflects the removal depth to avoid heating during feed-out. However, this recommendation does not take into consideration the losses associated with microbial respiration without heating.

In well compacted silage structures, oxygen has been detected (> 10 mL/L) at 3 feet deep from the face without any heating (Muck and Huhnke, 1995). Therefore, following the rule of thumb the forage fed would have been exposed to oxygen for 7 days. So, even when we do not observed heating, it is advised that the removal rate is above the old rule of thumb. For example, for bunker silages 30 cm/d (12 inches) should be removed in cold weather months and 45 cm (18 in.) in warm months.

A desirable removal rate can only be achieved if the silage pile is sized according to the herd needs. However, it is common to see silage structures that are too large for the herd needs. In this case, the dairy producer may decide to remove less inches per day but remove the entire face, or work the face in sections and remove the recommended minimal depth.

Maintain a smooth surface:

The feed out face should be a smooth surface (with no cracks) and perpendicular to the floor. In this way we reduce the surface area exposed to oxygen, rain, and minimize the risk of avalanches. There are various ways to unload silage:

Figure 1: *In this dairy, silage face management is poor. The front loader lifts the silage from the bottom of the pile to the top, allowing oxygen to enter the face. When the forage is extracted with the front-end loader with vertical movements, it should always be done from top to bottom. In this way the forage is pressed down and air infiltration is limited air. If the structure is higher than 4.5 to 6 m (15 – 20 feet), it is difficult to extract the forage at the top with the front-end-loader.*

Figure 2: *This silage face is smooth and perpendicular to the floor. The operator is extracting the silage carefully across the width of the face.*

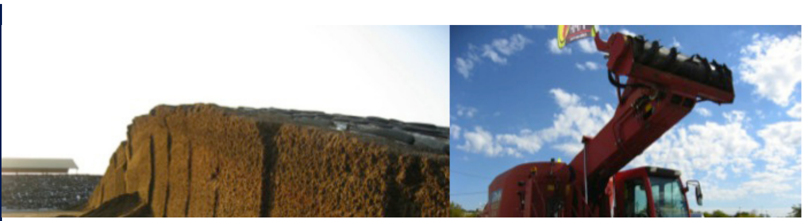


Figure 3: This dairy uses a face shaver. When mechanical unloaders are used, the exposed face could be reduced up to 9% for corn silage and 26% for alfalfa silage (Muck and Huhnke, 1995). This could be translated to a reduction in DM losses up to 3% compared with poorly operated front-end loaders.

Silage Cover

The silage cover should be pulled back to expose enough feed for 3 days. This will prevent a prolonged silage exposure to oxygen and weather elements (sun and rain). The plastic/face interface should be kept tight to prevent air infiltration. Silage covers should be sealed on the edges with sand, gravel bags or other materials.

Spoiled and moldy feed on the silage surface (sides and top) should be discarded as consumption of this material decreases intake, digestibility and destroys the rumen forage mat (Withlock et al., 2000). Discarding spoiled silage should be done carefully to avoid accidents at the work place. Employees should avoid walking on the top of the silage, close to the edge as the silage could collapse.

Consider implementing good management practices at the time of covering to minimize/eliminate spoiled forage on the surface:

- Pack the last layers on the silage surface well
- After filling the silage structure, cover the silage as soon as possible
- Use good quality plastic of at least 5 mm
- Consider adding oxygen barrier plastic or double plastic
- When covering silage, make sure that plastic sheets overlap at least 0.9 to 1.2 m (3 – 4 feet)
- Add weight on top of the plastic cover to ensure plastic is touching the forage mass. If cut tires are used, place them so they touch. Place additional weight where plastic sheets overlap.
- Check the plastic cover for rips and holes, both at the time of covering, and throughout silage feed out.

Time sitting in the commodity area

Silage should be removed from the face just before the ration is prepared. Once removed, silage should be piled to minimize oxygen exposure and sun, and incorporated into the ration as soon as possible. In some dairies, the silage may need to be removed several times a day in order to avoid silage sitting for too long. The feeder should carefully estimate how much silage is needed, so little to no silage is left sitting at the end of the day. If there is loose silage left from the previous day, it should be fed to heifers, dry cows or low producing cow.

Other practices that should be avoided are:

- Removing silage at the end of the day to gain time the following day. This practice may save some time but silage quality will deteriorate considerably.
- Bringing ensiled feed from a remote location to feed cows for more than one day. This silage is normally left in the commodity area without cover or compaction and it is highly susceptible to aerobic deterioration, especially in the summer.

Incorporation of the silage into the total mixed ration.

Aerobic stability of the ration is a problem in many dairies, especially during the warm months. There are several strategies to minimize this problem:

- Extract only the forage needed for the day. If the herd size allows, do it several times a day.
- Feed the ration during the cold hours of the day.
- Prepare fresh feed with freshly extracted silage at least two times per day.
- Drop the ration in clean fedbunks with shade.
- Push the feed as frequently as necessary to stimulate appetite and ensure animals always have feed available.

Summary

To minimize aerobic spoilage during the feeding process it is important to:

1. Correctly size the silage structure so removal rate can be done as recommended.
2. Remove the forage carefully so the face is smooth and the surface exposed to oxygen is minimized.
3. Pull the plastic cover back two to three times per week.
4. Remove silage as needed throughout the day so it is incorporated into the ration shortly after removal.
5. Push feed up frequently, especially during the warm months, to avoid heating of the TMR in the feedbunk and to stimulate appetite.

References:

Muck, R.E., R.L. Huhnke. 1995. Oxygen infiltration from horizontal silo unloading practices. Transactions of the American Society of Agricultural Engineers, 38(1):23–31

Ruppel, K.A., R.E. Pitt, L.E. Chase, and D.M. Galton. 1995. Bunker silage management and its relationship to forage preservation on dairy farms. J. Dairy Sci. 78:141-153

Stone, W.C., L.E. Chase, and T.L. Batchelder. 2003. Corn silage and haylage variability within bunker silos. J. Dairy Sci. 86 (Suppl. 1):168. (Abstr.)

Withlock, L.A., T. Wistuba, M.K. Siefers, R. Pope, B.E. Brent, and K.K. Bolsen. 2000. Effect of level of surface-spoiled silage on the nutritive value of corn silage based rations. Kansas Agric. Exp. Sta. Rpt. of Prog. 850:22-24.

Around the World

Huw Lloyd, Technical Service Director for the EMEA region joined Gary Allsopp, Bovine Business Manager South Africa/Africa & Middle East Markets on a trip to Cairo, Egypt at the end of April 2015. The group visited several customer dairies and evaluated reproductive protocols and environmental challenges to optimize performance.

Adolfo Ferreira and Raul Andrade of ABS Pecplan in Brazil, pictured above, are using the ABS Walkthrough tool with a group of fresh cows at Agrindus Farm. ABS Walkthrough is showing very practical and useful support for ABS Tech Services staff and producers around the world on promoting animal health, comfort, welfare and ensuring all the needs that cows need to perform both productive and reproductive.

Cristian Vergara, Technical Service Consultant in North America, had the opportunity to teach the group visiting from Germany about the global technical team. He highlighted the support provided and the tools available. They reviewed www.abstechservices.com Cristian presented his research on managing high risk fresh cows in large herds, as well as his experience in reducing and managing that risk. The usage of sorted semen to reduce calving difficulty was one of the key takeaways for the group.

Diego Vallejo, Technical Service Consultant in North America, guided training for a Russian delegation. The group was comprised of academics, veterinarians and nutritionists, providing a unique opportunity for Dr. Vallejo to showcase his knowledge on those topics and share advanced technical training.

View more RMS Training Program Testimonials online

Reproductive (RMS) Training Program Testimonial

Tamal Kis of ABS Hungary notes, “It was a great pleasure for me to spend one week at the ABS RMS Training, in Twin Falls.

As the third biggest milk producer state in the US, in my opinion, Idaho was an ideal place for the training and to feel the intensive farming. The accommodation was fine, shops and restaurants are nearby. It was easy to find the training venues by the company car. The most important experience for me during the training was heat detection (chalking, marginal signs) and precision of AI technique. Jesus Berumen was a great teacher with lots of patience. I also had the opportunity to know the management perspective, to learn about the production protocols (nutrition, milking procedure, fresh cow management etc.). The presentations at the Idaho State Univ. were very interesting and practical. AI is not my routine work, but I got a lot of experience during this week, which I can use in my job. Of other importance is the fact that I gained access to the workings of a huge dairy system. Thank ABS and all the contributors for this great opportunity.

Ismail Ilker Kocaer, graduate of the RMS Training Program in March of 2015 hailing from Turkey, noted that the program was perfect for technicians like him. “Jesus is a wonderful trainer and leads the best program I’ve ever attended.”

Upon attending the training of Manuel Mendonca, Dwight Williams of ABS North America had the following reflections, “Jesus is very professional and dedicated to the professional implementation of RMS training. Jesus showed that he is not only a competent trainer, but as good trainers do, also open to suggestions from trainees. Manuel is a person that has had a great deal of experience and Jesus utilized this to also treat him as a peer and look for Manuel’s input where appropriate and do so while still maintaining the overall trainer positioning. The time and techniques demonstrated for heat detection were as good as I have ever seen. I was impressed.”

ABS

RMS TRAINING PROGRAM

www.abstechservices.com