Improving Estrus Detection in Dairy Cows
Dr. Rick Rorie, Professor, Animal Science

Estrous synchronization protocols such as OvSynch or CoSynch allow for the use of timed inseminations without estrous detection but are unlikely to be as successful as insemination based on detected estrus. Visual observation is a very accurate estrous detection method, when based on seeing a cow stand immobile for a few seconds when mounted. However, visual observation may not be very efficient in detecting estrus; 50 percent or more of the cows in estrus may not be detected. The combination of poor estrous detection and low conception rate can result in very low pregnancy rate. For example, if the estrous detection rate is 50 percent and the single service conception rate is 40 percent, then only 20 percent (50% × 40% = 20%) of the herd will become pregnant in a given estrous cycle.

Standing estrus averages about 12 hours in length in dairy cattle, but can range from 6 to 24 hours. The majority of cows exhibit estrus between 6 pm and 6 am the next morning, especially during hot weather. Cows that have a short period of standing estrus and exhibit estrus at night are those likely to go undetected. Mounting activity during estrus also can vary greatly. Data collected from electronic mount detectors that continuously record mounting activity during estrus indicate that some cows may have as few as 4 mounts during estrus, while others may have well over 100.

Considering the combination of many cows exhibiting estrus over night, a short duration of estrus in about 25 percent of cows and the possibility of few mounts during estrus, it is no wonder that the efficiency of estrus detection can be low. Listed below are a few recommendations to improve the efficiency of estrous detection.

Know the signs of estrus. Standing immobile for a few seconds when mounted is the "gold standard" for detecting estrus, but other signs can alert you to pay more attention to individual cows. During and after estrus, cows will have a mucous discharge (the mucous should be clear; cloudy mucous can indicate an infection). A bloody tinged mucous discharge indicates the cow was in estrus 2 or 3 days earlier, so you could expect estrus again in 17 to 19 days. A roughed tail head indicates the cow has been ridden and may be in estrus. A cow coming into or already in estrus is more active, nervous and restless. Often cows in and/or coming into estrus congregate together. Other signs include a swollen vulva, smelling of the vulva and riding other cows.

Make everyone responsible for estrous detection. Everyone who is around the herd should pay attention and make note of cows observed in estrus. Cows should be observed at least twice daily, preferably early morning and again before dark. Cows will be the least active during the heat of the day, from about noon until 6 p.m. The more often cows are observed, and the more people doing the observing, the more likely those cows with short estrous periods or few mounts will be detected in estrus.
Use estrous detection aids. “Scratch type” detection patches such as Estrotect and Estrus Alert work well and are less likely to give false indications of estrus. The patches have self-adhesive backs and are retained well if the cow’s rump is dry and clean at application. A general-purpose spray adhesive can be applied and then allowed a few seconds to get “tacky” before the self-adhesive patch is applied over the adhesive if the patch needs to be retained for longer periods than a few days. Paint or paint sticks can also be applied to the tail head; when the paint is disturbed or wiped off, it indicates mounting activity.

Keep good estrous detection and breeding records. Anyone using artificial insemination probably keeps estrous detection records when the cow was bred and what semen/bull was used but may pay less attention to good estrus detection records. On average, normal, cyclic cows exhibit estrus every 21 days, but the occurrence of estrus in individual cows may range from 18 to 24 days. After insemination, make note to pay close attention to the cow for a return to estrus, starting 18 days and continuing until 21 or more days after insemination. Good estrous detection records will also help identify reproductive problems so the appropriate treatment can be given. For example, a cow that develops a cystic follicle (resulting in ovulation failure) will exhibit estrus every 7 to 10 days. Cows identified as having a cystic follicle can be given gonadotropin-releasing hormone (GnRH) to induce ovulation and correct the problem.

FDA Guidance Will Affect Medications Used for Dairy Cattle
Dr. Jeremy Powell, Professor and Veterinarian, Animal Science

Due to growing concerns regarding antibiotic resistance, the U.S. Food and Drug Administration (FDA) recently released its guidance for industry #213 (GFI #213). Through these recommendations, the FDA has asked animal pharmaceutical companies to phase out antimicrobial drugs administered to food-producing animals in medicated feed or drinking water for “production indications” within the next three years. These production indications would include the use of a medicated feed product for increased rate of rate of weight gain or improved feed efficiency. These guidelines direct drug companies to specifically seek changes in antibiotic medicated feed labeling that has been determined to be important in human medicine with the intent to address growing concerns regarding antibiotic drug resistance found in some infectious pathogens.

Products used in the dairy industry affected by the FDA action include chlortetracycline (CTC) and neomycin. There are other products such as ionophores (Rumensin and Bovatec) that are used in dairy feeds that are not affected by this proposal. A full list of antibiotic drugs the FDA is focusing on can be found in Appendix A at this link: http://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM052519.pdf.

The guidance declares that using certain antibiotic medications in food-producing animals to promote growth or improve feed efficiency is not considered judicious or responsible.

The FDA begins to implement their proposed framework set forth in the GFI #213, the agency intends for the VFD to provide effective supervision and management of medicated feed products used in food-producing animals.

For more information regarding the FDA's proposed guidelines, click on the following website: http://www.fda.gov/downloads/AnimalVeterinary/guidancecomplianceenforcement/guidanceforindustry/ucm299624.pdf.
Warm Weather Is Coming: It’s Time to Start Thinking About Heat Stress

Dr. Karl VanDevender, Professor - Extension Engineer

The heat and humidity of a typical Arkansas summer combine to make a very uncomfortable environment for lactating dairy cows. During hot summer weather, milk production may decrease by as much as 50 percent and reproductive proficiency of lactating dairy cows is greatly diminished. Some data indicate that only 10 to 20 percent of inseminations in “heat stressed” cows result in pregnancies.

Some signs of heat stress in lactating cows are obvious, especially the reduced milk production and the lethargic behavior of the cows. Moderate signs of heat stress may occur when the temperature is between 80° and 90°F with the humidity ranging from 50 to 90 percent. These signs include rapid shallow breathing, profuse sweating and an approximately 10 percent decrease in milk production and feed intake by cows. As heat stress increases, the cow will show severe depression in milk yield and in feed intake as her body temperature elevates. She will begin exhibiting more significant signs of heat stress, such as open mouth breathing with panting and her tongue hanging out.

The first step to reduce heat stress is to provide cool water and shade for all milking and dry cows plus heifers. Water is the primary nutrient needed to make milk, accounting for over 85 percent of the content of milk. Also, water requirements increase as the environmental temperature rises. It also is very important that cows have water in a location that is close to shade, since they will not travel great distances for water in a hot environment. Water should be placed away from the milking parlor but in an exit lane from the barn as well as near the feeding location of the cows. Water should be available for cows near their loafing area, either in the shade of native trees or artificial shade. Water also should be clean, fresh, at approximately ground temperature.

Shading from direct sunlight is also very important, as this allows cows to rest in a more comfortable environment. The possible sources of shade range from trees to portable shade cloth structures to permanent roofed structures. Each approach has its own set of advantages and disadvantages.

The second step to alleviate heat stress in lactating cows is to provide a more comfortable environment in the holding and feeding areas. Ideally the holding pen area is cooled with combination of shade, air movement and water. When combined with air movement, water can increase cooling ability of the cow. However, adding water in humid or poorly ventilated holding pens can increase heat stress. If it does not evaporate from the cow the water can actually limit cooling.

One system that works very effectively is to sprinkle water onto the cows just long enough to wet their backs. Fans are then used to help remove evaporated water vapor away from the cow. When the cows’ backs are dry in a few minutes, the process is repeated. Avoid allowing water to run onto the udder. If water does reach the udder, it is possible that bacteria can be transferred into the mammary gland and result in more mastitis. If possible, blow air onto the cows continuously. However, in some cases, the fans may need to be off for the period when the sprinklers are running so the water droplets land on the cows’ backs. The floor of the holding area should be grooved or rough-surfaced concrete or some other suitable footing so cows do not slip in the wet environment. As a general rule, water should not stand in the holding pen and the feet of cattle should be exposed to limited water. Also care and design should be used to avoid unintended consequences with manure and heavy use area management.

For additional information, the publications Heat Stress in Dairy Cattle (FSA30406) and Cooling Dairy Cattle in the Holding Pen (FSA4019) are available at http://www.uaex.edu/publications.
Horn Flies
Dr. Kelly Loftin, Extension Entomologist

Horn fly, *Haematobia irritans*, populations on cattle will be reaching treatment levels soon, if not already. This blood feeder is the most economically important insect pest of cattle in Arkansas, and the U.S. losses are greatest to lactating cows and growing calves. High populations cause blood loss and severely annoy cattle. In addition, high horn fly populations are associated with increased summer mastitis in dairy heifers.

A horn fly is about half the size of a house fly and spends most of its time on the back, head and shoulders of its host. They also feed on the belly and legs. In addition to being smaller than the house fly, horn flies can be differentiated by piercing mouthparts that resemble a beak. Horn flies briefly leave the animal to deposit eggs on fresh cattle manure (less than 10 minutes old). Both sexes feed on cattle and take 20 to 40 blood meals per day. Although rare, populations of up to 10,000 per animal have been documented.

Development from egg to adult requires as little as 9 to 12 days. Larva hatch and develop within the manure. Mature larvae migrate to the lower portion of the manure pat or in the soil to pupate. Adults immerge from pupa after about 5 or 6 days. Horn flies survive the winter as pupae in the soil.

After the adult emerges, it seeks a host to begin blood feeding. An adult female may begin laying eggs three days after emergence and may lay up to 400 eggs during her lifetime. With such a short life cycle, several generations per year are possible, allowing this pest to develop insecticide resistance. In Arkansas, two seasonal population peaks occur, one in the late spring and one in the late summer or early fall.

Complete elimination of horn flies is impractical and impossible. Most research suggests that economic damage occurs in dairy cattle when 75 to 100 horn flies per animal are present. For beef cattle, this threshold is about twice (150 to 200) that number. Monitoring horn fly populations is important in managing this pest. Populations are monitored by counting the number of horn flies on the heads, shoulders and backs of at least 10 cows. Average counts approaching 75 to 100 horn flies per animal (dairy cattle) indicate that economic loss may occur and that control measures are necessary.

Horn fly control methods vary widely. Insecticide-impregnated ear tags, self-treatment devices such as back rubbers and dust bags, pour-on insecticides and sprays are the most common method of applying contact insecticides. Other methods include feed additives containing insect growth regulators, walk-through sprayers and walk-through traps. The walk-through trap is a nonchemical method that traps flies that are brushed off the animal as it passes through the trap. The walk-through sprayer (3-D Quik Hand Cattle Sprayer) sprays the animal as it passes through the sprayer. Both walk-through methods are well suited for some dairy operations.
Insecticide-impregnated ear tags are economical, easy to use and can provide long-term control. As a result of these attributes, ear tags are often overused or misused, resulting in insecticide-resistant horn flies. This misuse and other factors, such as the short generation time (2 weeks) and multiple generations per season (~10), contribute to insecticide resistance potential. The active ingredients of insecticide-impregnated ear tags fall into three insecticide classes: synthetic pyrethroids, organophosphates and macrocyclic lactones. To mitigate potential insecticide resistance, rotate insecticide class and remove ear tags at the end of the fly season or when they fail. Also, if ear tags are applied too early, they may fail late in the season because of normal loss of insecticide activity or possible resistance.

Remember to study the label prior to insecticide purchase and use. Some insecticides registered to use on beef cattle or non-lactating dairy cattle cannot be used on lactating dairy cattle. The animal sections of MP144, *Insecticide Recommendations for Arkansas*, and FSA7031, *Controlling Horn Flies on Cattle*, provide more detailed information on insecticides and horn fly control. Both are available at your county Extension office or online at [http://www.uaex.edu/publications/mp-144.aspx](http://www.uaex.edu/publications/mp-144.aspx) (MP144) and [http://www.uaex.edu/publications/PDF/FSA-7031.pdf](http://www.uaex.edu/publications/PDF/FSA-7031.pdf) (FSA7031), respectively.