Dairy Management Column

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WHEN IS THE BEST TIME TO BREED?

When to breed a dairy animal is a standard question on the final exams to animal science students at the University of Delaware. In preparing students for this question, I always explained the many factors involved I wanted them to understand there is no single answer.

A general understanding of artificial insemination (AI) is required Really, there is nothing artificial about AI, but the practice does remove the actual bull, goat buck or ram, and replaces him with a person making the semen deposit

This is where the trouble starts, because natural insemination service is more than just semen deposit It involves courting, stimulating, chasing, biting, pawing, smelling, snorting, bumping, trial mounting, and more stimulating until the cow, doe, or ewe stands still and accepts her suitor, none of which occurs when a person is doing AI

First, there is not enough time for all this, second, ignorance, and third, people's physiological inability to smell as keenly as bulls and bucks and rams do Nor do we understand or practice the body language that cows and does and ewes speak when they begin estrus, when they are in high estrus, or when they are out of estrus.

I always asked our students at least three advantages of AI and its disadvantages Typically, they know that AI provides more powerful genetic progress than natural service. After some prodding they also think that AI is more economical and more profitable. Rarely do they know that AI has removed most of the problems of reproduction diseases in cattle, goats and sheep, and they usually do not recognize a beneficial parallel to human reproductive behavior.

However, when asked disadvantages of AI, often they have no idea. So I ask: What does a bull do when he sees a cow mounting another cow? He begins the stimulating game, starting with smelling, something people do not know how to do.

So if AI fails to make some cows, does, and ewes pregnant, despite skillful training of the person doing AI, what can farmers do short of selling the animal? They get a real bull, buck or ram, the so-called "catch-up" sire, in place of the AI because they concede that an important element is missing, namely real estrus detection and stimulation.

Acknowledging this drawback of AI research has shown the best way (and it is a widely accepted practice in the dairy industry) is the so-called "a.m.-p.m." rule: Cows observed in estrus during the a.m. should best be bred during the p.m.; cows observed in estrus during p.m should be bred the next a.m Thus, for our students the answer about when to breed was If you see a cow in the pasture riding another cow, do not get excited and run to the dean to request that he notify me to do something for the cow. Do AI within 12 to 24 hours They learned firsthand about "observing" the onset of estrus.

Observation of estrus by people is hit and miss – at least it is never 100 percent. Therefore it follows that insemination can never be completely successful

Obviously, insemination should be synchronized to the time of ovulation. Also taken into account should be how long sperm will survive after being deposited into the reproductive tract, as well as how long ova will survive after ovulation. Research has shown that there are no precise data, only averages:

- Ovulation occurs 28 to 32 hours after onset of estrus
- Ova are viable between 6 and 12 hours after ovulation.
- Optimal fertility of ova is between 6 to 12 hours after ovulation.
- Semen is viable between 24 and 30 hours
- Estrus lasts from less than an hour to 36 hours, according to recent research with radiotelemetry.
- Estrus detection varies between 75 and 90 percent, depending on farmer diligence and the detection aids used such as tail patches, pedometer, tail paint, chin-ball markers and telemetry.

These data mean that no cow reacts exactly like the next one — only averages are known

This also holds true for does and ewes. The data also mean that "onset of ovulation" is the big unknown, thus the a.m.-p.m. rule to be safe.

New research at Cornell and Virginia shows, however, that the a.m.-p.m. safety rule is not good enough. A single mid-morning insemination for all cows observed in estrus the night before or the same morning should give near-maximum conception. This means that a farmer breeder would have a time advantage over calling an A.I. technician.

Among 2,500 dairy cow inseminations, the conception rates were 43 percent for A.I. between 0 and 4 hours after onset of estrus, 51 percent between 4 and 8 hours, 51 percent between 8 and 12 hours, and from thereon, declining to 14 percent for between 24 and 26 hours after onset of estrus.

The new recommendation was that highest conception rates should be achieved for AI between 4 and 12 hours after onset of estrus and that the use of the traditional a.m.-p.m. rule would reduce conception rates. It also has been estimated that the U.S. dairy industry loses more than $300 million annually because of failure and/or misdiagnosis of estrus detection.

Knowing the best time to breed is an important issue for dairy farmers with cows, goats, or sheep to maintain a profitable operation.

Haines, Halloway Double Champions

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NEW LONDON (Chester Co.) — There were two double grand champions when the Triangle Horse Show Series' year-end awards were presented at a pig roast/hay ride/square dance at Grazing Acres in New London in November.

Jennifer Haines of Boothwyn, won grand champion in both advanced equitation and the pleasure horse divisions. She rides Sidekick, a chestnut Throughbred/Quarter Horse mare.

Brooke Holloway of Kennett Square, riding Wrinkle In Time, was grand champion of the mini stirrup division for riders aged 10 and under. She moved up in competition and was also the grand champion of the beginning short stirrup division.

A total of eight shows were conducted in the 1999 series, and competitors accumulated points throughout the season. At the awards presentation, six places were recognized with large ribbons and prizes.

Three farms make up the "Triangle" for this show series. They are KA Equestrian Center, Cochranville, Grazing Acres, and Fox Meadow in Unionville. Call any of the participating farms for information and/or to be placed on the mailing list for the year 2000 series: Grazing Acres: (610) 255-5009; KA Equestrian: (610) 869-0746; or Fox Meadow (610) 444-8805.

Grand champion pleasure pony went to Desert Fire Belle, an Arabian mare ridden by Jenna DiNenno of West Grove. (Pleasure pony and beginner short stirrup were usually the largest divisions at the Triangle shows.)

Cyrano, ridden by Michelle Hicks of Kennett Square was the grand champion of the baby green division.

Low Down Louie, shown by Sarah Shaffer of West Grove, was grand champion of the low hunter division. Reserve grand champion in the low hunter and open equitation divisions was Sara Wilson of Coatesville, riding her bay Arabian, Caserio Tsalturi.

Martial Law, owned and shown by Alicia DelDuco of Oxford, was grand champion of the halter division for horses and ponies aged 3 or under. Reserve grandchampion was Quarter Moon Princess, owned and shown by Audrey Saunders of Rising Sun, Md.

Leadline grand champion was Rebecca Marks of West Grove. Reserve grand champion was Megan Thompson of West Grove.

In the mini mini division, for riders 8 and under, the grand champion was Kelsey Sherman of Kennett Square. Reserve grand champion was Heather Frank of Cochranville. Frank moved up in the competition and was also reserve grand champion of the mini stirrup division.

In the western division, the grand champion was SH Fallon, owned and shown by Lindsey Heinzman of Cochranville. Fallon was also the reserve grand champion of the pleasure pony division.

Reserve grand champion in western was Country Velvet, owned and shown by Janet Johnson of Coatesville.

In advanced short stirrup, the grand champion was Melissa Donohue of West Chester. Reserve grand champion was Bethany Moore of Landenberg. Moore's mount, Indian Jane, was the reserve grand champion of the pleasure horse division.

Reserve grand champion of beginner short stirrup was Kristen Schmidt of Kennett Square.

Flame, ridden by Jessica Knox of Unionville, was reserve grand champion of baby green division.

Other top series winners follow.

Low Hunter: 3. Melissa Donohue.

Halter: 3. Jennifer Knox.

Leadline: 3. Anthony DiNenno.

Mini Mini: 3. Jenna DiNenno.

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Beginner Short Stirrup: 3. Heather Frank.

Advanced Short Stirrup: 3. Andrea Heinzman.

Pleasure Horse: 3. Sara Wilson.

Open Equitation: 3. Sara Shaffer.

Western: 3. Ashley Eckard.

Pleasure Pony: 3. Michele Hicks.

Baby Green: 3. Brooke Holloway.

Growers Closer To Managing Cranberry Pests

GENEVA, N.Y. — When Cornellians hear the word "cranberries," they think of the moist bogs where cranberries grow, Ocean Spray's "Crave the Wave" advertising campaign, and the traditional Thanksgiving holiday meal of turkey, dressing, and cranberry sauce.

What Cornellians rarely consider is the university's connection to cranberry research in Massachusetts.

But, thanks to the work of a team that includes soil insect ecologist Paul Robbins, cranberry growers in Massachusetts are one step closer to managing pests that adversely affect the state's $200 million cranberry industry.

"There are about 30,000 species of beetles in North America of which 1500 species are scarab beetles," said Robbins, who works at the New York State Agricultural Experiment Station in Geneva, N.Y. "The larvae of at least five species of these scarabs feed in the root systems of cranberry bogs. These species include the Japanese beetle (Popillia japonica), the Oriental beetle (Exomala orientalis), the cranberry white grub (Phyllophaga anxia), the cranberry root grub (Lichnanthe vulpina), and Hoplia modesta, a small beetle species for which there is no common name. The larval feeding weakens the root system of the plant, thereby reducing yield. Equally important, weak roots reduce vine density which predisposes the bog to weed invasion."

This spring the Cornell team completed the identification of the sex attractant of the last of the five scarab species in cranberries, Hoplia modesta. The group had previously identified the sex attractants of all but the Japanese beetle, whose pheromone was already known.

The Cornell Connection

The Cornell connection to the cranberry industry began when Anne Averill, a former post-doctoral associate in the Geneva lab of entomologist Wendell Roelofs, left Cornell to accept a position as the cranberry entomologist at the Massachusetts Cranberry Experiment Station in East Wareham near Cape Cod.

An agreement between Averill and Michael Villani, a soil ecologist at the Experiment Station in Geneva, led to a cooperative project that involved Robbins traveling to the Cape Cod area to collect beetle larvae for research and to observe behavior of adults.

"Digging the beetle larvae, or grubs as they are called, out of the cranberry bog is strenuous," Robbins said. "It's not like digging grubs out of turf as our lab often does in the fall in the Geneva area. You have to slice through the thick mat of cranberry vines with a tool called a turf ax and push hard to roll it back. The density of grubs is usually not nearly as great as in turf, so you have to search a greater area to get the same number of larvae."

Observations of the night flying June beetles (Phyllophaga anxia) have taken Robbinsto the cranberry bogs for nocturnal forays. Using a light overlaid with a red gel (insects will not fly to the red light) attached to a car battery, he has videotaped the males flying to traps baited with the synthetic sex attractant. "As I look at the video today, it resembles what I've seen of the Blair Witch Project because the beetles were flying into my hair as I was trying to hold the camera steady," said Robbins.

Another link in the Cornell cranberry connection is Aijun Zhang, another former post-doctoral associate from Roelofs' lab. Zhang was involved in the identification and synthesis of all four of the scarab sex pheromones elucidated by the Cornell connected group. Zhang currently works as a chemist for the USDA in Beltsville, Md.

Identification of the pheromone of the cranberry white grub, Phyllophaga anxia, led Robbins to the subject of his doctorate thesis, that of geographical variation in the male response to the sex attractant of this species. "Phyllophaga anxia is perhaps the most common species of the genus Phyllophaga throughout its range, although it is a pest only on cranberries in Wisconsin and Massachusetts," Robbins noted.

The pheromone the team identified consists of a particular blend of two chemicals, the methyl esters of valine and isoleucine, both essential amino acids.

"When we deployed these two chemicals in test blends ranging from 100/0 to 0/100 in over 35 locations throughout the U.S., we found extreme variation in the male response," said Robbins. "Sometimes the males fly to 100 percent valine, in another location to 100 percent isoleucine, in another to a blend of the two, and, in another, the response is split down the middle, with half the males at a given location flying to each chemical."

Robbins is ready to test his hypothesis that it is phermonal conflict between different species of Phyllophaga using the same blends of these chemicals that pushes this disruptive selection.

According to Robbins, there are more than 200 species of Phyllophaga in the U.S. and they can only be taxonomically separated by the internal male genitalia. Robbins has examined nearly 20,000 beetle genitalic structures in the course of the study to identify the nearly 40 different Phyllophaga species trapped using these two compounds. He likes the idea that an economic problem was the starting point for driving a study in basic biology.