

New Technologies May Advance Dairy Cow Reproduction

GEORGE F.W. HAENLEIN
Extension Dairy Specialist
University of Delaware
NEWARK, Del. — The greatest success story in the animal industry in the last 50 years is artificial insemination (AI), particularly of dairy cattle.

It has led to a phenomenal increase in milk production, from less than 10,000 pounds milk per cow per year average per herd, to exceeding 20,000 pounds.

In addition to AI, some dairy farms still have bulls, so-called "ketch-up" bulls, for the purpose of catching those cows that have not become pregnant with A.I.

Why? It's the nose!
Bulls can smell when and which cow is in estrus. People can only observe whether a cow is in estrus through change in her behavior.

However, estrous behavior is frequently missed because of in-

complete observations or that some cows have "silent" estrus, especially on hot summer days. As a result, fewer than half of our dairy cows conceive when they should.

More cows are culled from a herd for reproductive failure than for any other reason. This situation leads back to estrus again and again, as reported from studies at the University of New Hampshire recently (Journal of Dairy Science

1998, 81:2299-2305), and points out why attention to estrus observation and detection can make great differences in dairy farm income and losses.

The technical industry has tried many devices and procedures to make estrous detection by people easier and more successful. Yet even the farms on which ketch-up bulls are found have a conception rate no better than 1 in 2 cows bred.

A method used for years is marker patches on the rump of cows. Pedometers attached to the legs of cows were developed to record the different levels of restless behavior on estrus days. Changes in milk and body temperature together with decreased feed intake and milk yield have been followed. Progesterone contents in milk have been tested.

One clever approach by Dr. Charles Kiddy of the Beltsville USDA Research Station was to train dogs to sniff and detect cows in estrus. That was 15 years ago.

These methods are neither simple nor reliable. Now, finally, there is new British research with an "electronic" nose!

Scientists, working with two groups of five and eight Holstein cows, used cotton swab to take samples from the cows' vulva. These samples were presented to a machine equipped with 12 electronic sensors to quantify the odors on different days during entire reproduction cycles of the cows.

It was discovered, for the first time (Journal of Dairy Science 1998, 81:2145-2150, that a strong correlation exists between concentrations of circulating reproductive hormones and quantities of different odors from the reproductive tract of cows.

This exciting news could mean fewer reproductive losses on United States dairy farms, because it would make estrus detection and accurate timing of AI possible, thereby significantly increasing fertility in cows.

Why is accurate timing of AI critical?

For successful conception, sperm from bull's semen straws, or ampules, must meet the cow's ovum at a certain optimum time. Otherwise there is one more cow bred but not pregnant.

From the time of actual AI until that crucial rendezvous time, the semen takes 8 hours to travel up the reproductive tract.

This illustrates why accurate timing of AI is so important, because the release of the ovum is independent of the act of AI; it happens at ovulation, which is related only to estrus and happens 24 to 32 hours after the onset of estrus.

Detecting estrus when it starts is critical, because the ovum does not wait. If the ovum becomes old (in terms of hours), it becomes a major contributor to a lower pregnancy rate.

New research using a large

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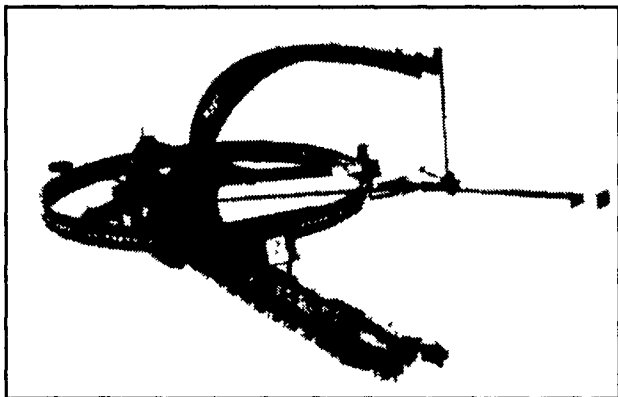
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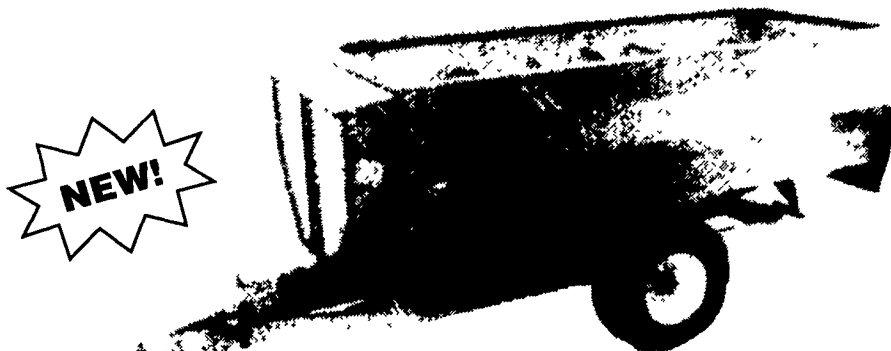
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